

6.18 BOOM UNLOCK FAULTS

Table 6-8. Boom Unlock Faults

Boom Unlock Step		Fault Text	Extended Fault Text	Fault Trigger
UNLOCK BOOM	CHECK SYSTEM?	SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
PLATFORM UNLOADED?	PRESS ENTER	PLTFM NOT EMPTY	Platform Not Empty	If LSS is enabled the platform load must be less than 100lbs
		SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
TT CENTERED?	PRESS ENTER	BCS VIOLATION	BCS Violation	A fault was detected with the Boom Control System. The control system detected a fault that put the machine into the following retrieval modes: - Electrical Retrieval - Hydraulic Retrieval - Multiple Failures Retrieval: Hydraulic & Electrical both active The control system detected one of the following faults: - DTC 0019 - MAIN BOOM ENCROACHED - HYDRAULICS SUSPENDED - DTC 0020 - TOWER ENVELOPE ENCROACHED - HYDRAULICS SUSPENDED
		SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
		ALIGN TURNTABLE	Align Turntable	The DOS Switch is reporting the turntable is not inline
UNLOCK BOOM	TWR UP TO STOP	BCS VIOLATION	BCS Violation	A fault was detected with the Boom Control System. The control system detected a fault that put the machine into the following retrieval modes: - Electrical Retrieval - Hydraulic Retrieval - Multiple Failures Retrieval: Hydraulic & Electrical both active The control system detected one of the following faults: - DTC 0019 - MAIN BOOM ENCROACHED - HYDRAULICS SUSPENDED - DTC 0020 - TOWER ENVELOPE ENCROACHED - HYDRAULICS SUSPENDED
		SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
UNLOCK BOOM	BM OUT TO STOP	BCS VIOLATION	BCS Violation	A fault was detected with the Boom Control System. The control system detected a fault that put the machine into the following retrieval modes: - Electrical Retrieval - Hydraulic Retrieval - Multiple Failures Retrieval: Hydraulic & Electrical both active The control system detected one of the following faults: - DTC 0019 - MAIN BOOM ENCROACHED - HYDRAULICS SUSPENDED - DTC 0020 - TOWER ENVELOPE ENCROACHED - HYDRAULICS SUSPENDED
		SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)

SECTION 6 - JLG CONTROL SYSTEM

Table 6-8. Boom Unlock Faults

Boom Unlock Step		Fault Text	Extended Fault Text	Fault Trigger
UNLOCK BOOM	BMUPTO STOP	BCS VIOLATION	BCS Violation	A fault was detected with the Boom Control System. The control system detected a fault that put the machine into the following retrieval modes: - Electrical Retrieval - Hydraulic Retrieval - Multiple Failures Retrieval: Hydraulic & Electrical both active The control system detected one of the following faults: - DTC 0019 - MAIN BOOM ENCROACHED - HYDRAULICS SUSPENDED - DTC 0020 - TOWER ENVELOPE ENCROACHED - HYDRAULICS SUSPENDED
		SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
UNLOCK BOOM	RELEASE BOOM UP	N/A	N/A	Release the Boom Lift Up Switch
UNLOCK BOOM	CHECK BOOM 4MIN	SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
		TWR LIFT CB	Tower Lift Counterbalance valve failure	During the Tower Lift Counterbalance test more than 1° of movement was detected on Tower Angle Gravity Sensor 1 in 120 seconds
		BOOM LIFT CB	Boom Lift Counterbalance valve failure	During Boom Lift Counterbalance test more than 1° of movement was detected on Boom Angle Gravity Sensor Higher in 120 seconds
		BOOM TELE CB	Boom Telescope Counterbalance valve failure	During Boom Telescope Counterbalance test more than 0.3" of movement was detected on Boom Length Sensor 1 in 120 seconds
		TWR LIFT ENABLE	Tower Lift Enable valve failure	During Tower Lift Enable test more than 1° of movement was detected on Tower Angle Gravity Sensor 1 in 120 seconds
		BM LIFT ENABLE	Boom Lift Enable valve failure	During Boom Lift Enable test more than 1° of movement was detected on Boom Angle Gravity Sensor Higher in 120 seconds
		MOMENT FAULT	Moment System failure	During the Moment System test the moment value reported was outside of range
CHECK PASSED	PRESS ENTER	N/A	N/A	N/A
UNLOCK BOOM	BMINTO STOP	BCS VIOLATION	BCS Violation	A fault was detected with the Boom Control System. The control system detected a fault that put the machine into the following retrieval modes: - Electrical Retrieval - Hydraulic Retrieval - Multiple Failures Retrieval: Hydraulic & Electrical both active The control system detected one of the following faults: - DTC 0019 - MAIN BOOM ENCROACHED - HYDRAULICS SUSPENDED - DTC 0020 - TOWER ENVELOPE ENCROACHED - HYDRAULICS SUSPENDED
		SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
UNLOCK BOOM	BMDWNTO STOP	BCS VIOLATION	BCS Violation	A fault was detected with the Boom Control System. The control system detected a fault that put the machine into the following retrieval modes: - Electrical Retrieval - Hydraulic Retrieval - Multiple Failures Retrieval: Hydraulic & Electrical both active The control system detected one of the following faults: - DTC 0019 - MAIN BOOM ENCROACHED - HYDRAULICS SUSPENDED - DTC 0020 - TOWER ENVELOPE ENCROACHED - HYDRAULICS SUSPENDED

Table 6-8. Boom Unlock Faults

Boom Unlock Step		Fault Text	Extended Fault Text	Fault Trigger
		SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
UNLOCK BOOM	CENTER JIB SWG	BCS VIOLATION	BCS Violation	A fault was detected with the Boom Control System. The control system detected a fault that put the machine into the following retrieval modes: - Electrical Retrieval - Hydraulic Retrieval - Multiple Failures Retrieval: Hydraulic & Electrical both active The control system detected one of the following faults: - DTC 0019 - MAIN BOOM ENCROACHED - HYDRAULICS SUSPENDED - DTC 0020 - TOWER ENVELOPE ENCROACHED - HYDRAULICS SUSPENDED
		SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
UNLOCK BOOM	JIB UP TO MAX	BCS VIOLATION	BCS Violation	A fault was detected with the Boom Control System. The control system detected a fault that put the machine into the following retrieval modes: - Electrical Retrieval - Hydraulic Retrieval - Multiple Failures Retrieval: Hydraulic & Electrical both active The control system detected one of the following faults: - DTC 0019 - MAIN BOOM ENCROACHED - HYDRAULICS SUSPENDED - DTC 0020 - TOWER ENVELOPE ENCROACHED - HYDRAULICS SUSPENDED
		SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
UNLOCK BOOM	TWR UP TO STOP	SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
UNLOCK BOOM	TWR OUT TO STOP	SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
UNLOCK BOOM	LEVEL PLATFORM	SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
UNLOCK BOOM	CHECK BOOM 4MIN	SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
		TWRTELECB	Tower Telescope Counterbalance Valve Failure	During Tower Telescope Counterbalance test more than 0.3" of movement was detected on Tower Length Sensor 1 in 120 seconds
		TWRTELEENABLE	Tower Telescope Enable Valve Failure	During Tower Telescope Enable test more than 0.3" of movement was detected on Tower Length Sensor 1 in 120 seconds
CHECK PASSED	PRESS ENTER	N/A	N/A	N/A

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Table 6-8. Boom Unlock Faults

Boom Unlock Step		Fault Text	Extended Fault Text	Fault Trigger
UNLOCK BOOM	TWR IN TO STOP	SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
UNLOCK BOOM	CHECK BOOM 2MIN	SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
		TWR LIFT CB	Tower Lift Counterbalance valve failure	During the Tower Lift Counterbalance test more than 1° of movement was detected on Tower Angle Gravity Sensor 1 in 120 seconds
CHECK PASSED	PRESS ENTER	N/A	N/A	N/A
UNLOCK BOOM	TWR DWNTO MIN	SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
UNLOCK BOOM	BMDWNTO MIN	BCS VIOLATION	BCS Violation	A fault was detected with the Boom Control System. The control system detected a fault that put the machine into the following retrieval modes: - Electrical Retrieval - Hydraulic Retrieval - Multiple Failures Retrieval: Hydraulic & Electrical both active The control system detected one of the following faults: - DTC 0019 - MAIN BOOM ENCROACHED - HYDRAULICS SUSPENDED - DTC 0020 - TOWER ENVELOPE ENCROACHED - HYDRAULICS SUSPENDED
		SEE HELP MENU	See Help Menu on Analyzer	See Common machine health checks during boom unlock section. There is an active fault that is listed under one of the following sections - Sensor Health (no Faults) - Hydraulic Valve Health (no Faults)
UNLOCK BOOM	TEST COMPLETE	N/A	N/A	N/A

6.19 COMMON MACHINE CHECKS DURING BOOM UNLOCK

Table 6-9. Common Machine Checks During Boom Unlock

BCS Violation	DTC 0019 - MAIN BOOM ENCROACHED - HYDRAULICS SUSPENDED
	DTC 0020 - TOWER ENVELOPE ENCROACHED - HYDRAULICS SUSPENDED
	BCS System --> refer to fault responses, anything that triggers BCS fault, anything puts u in electrical or hyd retrieval
Sensor Health (no faults)	Tower Length Sensors OK
	Tower Lift Cylinder Angle Sensors OK
	Tower Angle Gravity Sensors OK
	Boom Angle Sensors OK
	Boom Length Sensors OK
	Platform Level Sensors OK
	Chassis Tilt Sensors OK
	Tower Lift Barrel Pressure Sensors OK
	Tower Lift Rod Pressure Sensors OK
	No Over pressure faults
Hydraulic Valve Health (no faults)	Park Brake Valve
	Chassis Brake Valve
	Main Dump
	Lift Pilot Valve
	Tower Lift Pilot Valve
	Tower Telescope Pilot Valve
	Lift Enable Valve
	Tower Lift Enable Valve
	Tower Telescope Enable Valve
Tower Lift Down Valve	

6.20 SETTING CRACKPOINTS

Crackpoints, the point at which a valve is opened enough to produce 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.

NOTE: Individual crackpoints can be adjusted, however if a ground control module is replaced, the adjustments must be performed in sequence as followed in this section.

The crackpoints covered in this section are:

- Platform Level Up and Down
- Boom Lift Up Flow Control (BM LFT UP FCNTL)
- Boom Telescope Out Flow Control (BM TEL OUT FCNTL)
- Tower Lift Up Flow Control (TWR LFT UP FCNTL)
- Tower Tele Out Flow Control (TWR TEL OUT FCNTL)
- Boom Lift Down Flow Control (BM LFT DN FCNL)
- Boom Telescope In Flow Control (BM TELE IN FCNTL)
- Tower Lift Down Flow Control (TWR LIFT DN FCNTL)
- Tower Tele In Flow Control (TWR TEL IN FCNTL)
- Boom Lift Down Enable (BM LFT DN EN)
- Boom Lift Down Aux Enable (BM LFT DN AUX EN)
- Tower Lift Down Enable (TWR LFT DN EN)
- Tower Tele In Enable (TWR TEL IN EN)


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...

Crackpoint Preconditions

The following Calibrations must be completed:

- Drive
- Axles
- Steer
- Chassis Tilt Sensor

The following Machine States must be met:

- Engine Running
- Hydraulic Warm-up completed
- Axles Extended
- Turntable inline
- Chassis Tilt $\lt; \pm 1.5^\circ$
- All Booms On Rest and Retracted

There must be no faults on the following valves:

- Tower Lift Flow Control Valve
- Tower Lift Down Enable Valve
- Tower Lift Directional Valves
- Tower Lift Pilot Valve
- Tower Telescope Flow Control Valve
- Tower Telescope In Enable Valve
- Tower Telescope Directional Valves
- Tower Telescope Pilot Valve
- Boom Lift Flow Control Valve

- Boom Lift Down Enable Valve
- Boom Lift Aux Enable Valve
- Boom Lift Directional Valves
- Boom Lift Up Override
- Boom Lift Pilot Valve
- Boom Telescope Flow Control Valve
- Boom Telescope Override
- Boom Telescope Directional Valves
- Platform Level Up & Down Valve
- Platform Level Up & Down Override

There must be no faults on the following sensors:

- Tower Length Transport Proximity Sensor
- Boom Angle Transport Proximity Sensor
- Boom Length Transport Proximity Sensor
- Tower Rod Side Pressure Transducers
- Tower Barrel Side Pressure Transducers
- Boom Lift Pressure Transducer
- Tower Telescope Pressure Transducer
- Boom Angle Sensor #2

There must be no CANbus failures on the following modules:

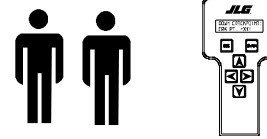
- BLAP

The following Machine States are checked before crackpoint setting is allowed:

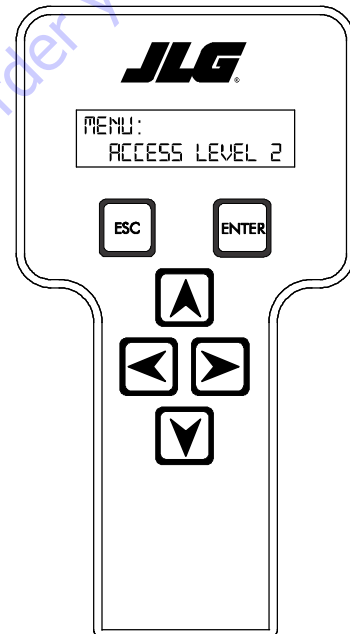
- Tower On Rest
- Tower Retracted
- Boom On Rest
- Boom Retracted


Platform Level Up and Down Crackpoints

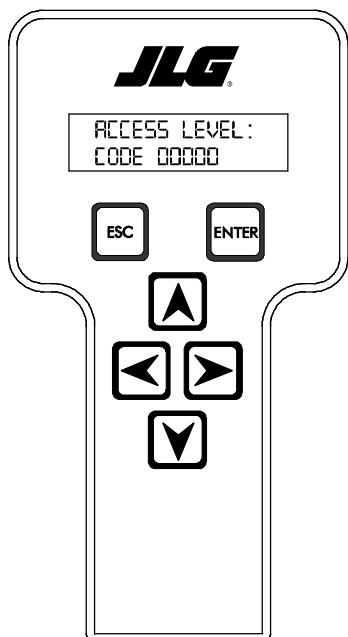
NOTE: To set crackpoints for Platform Level Up and Down, a JLG analyzer is needed. Have an assistant on hand to help verify that movement occurs.




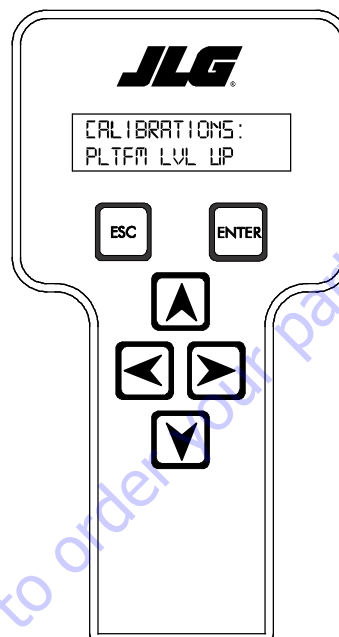
1. Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.
2. Scroll to MENU: OPERATOR ACCESS and press ENTER




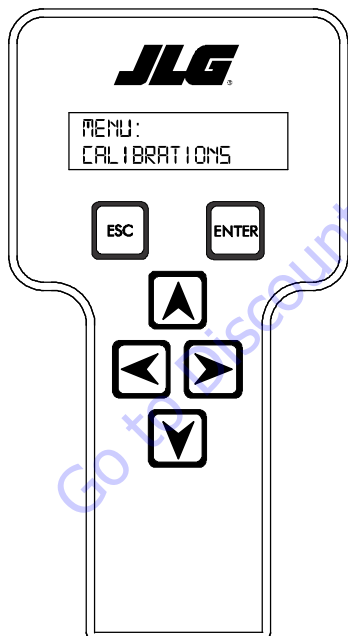
3. Enter code 33271 and press ENTER 




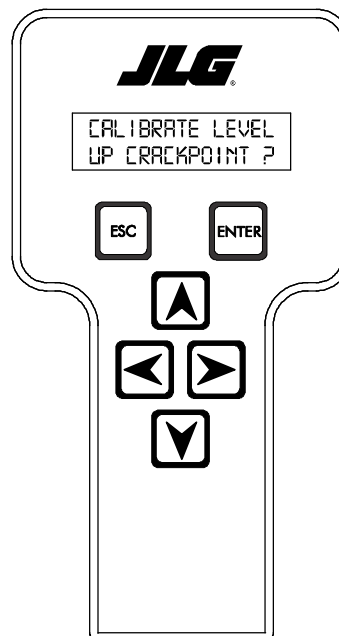
5. Scroll to PLTFM LVL UP and press ENTER 



4. Scroll to MENU: CALIBRATIONS and press ENTER 



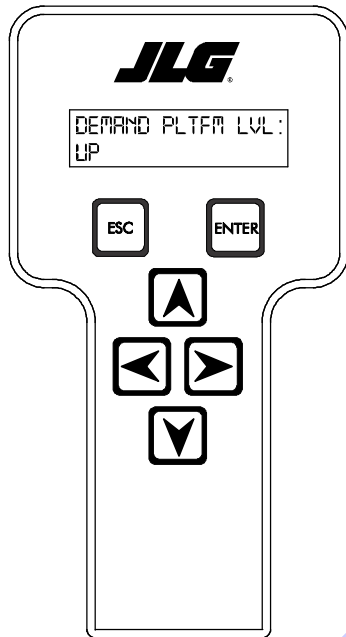
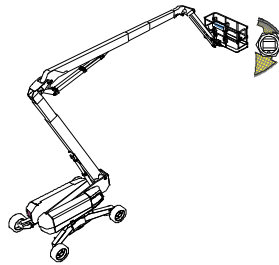
6. Press ENTER  to calibrate Platform Level Up crack-point.



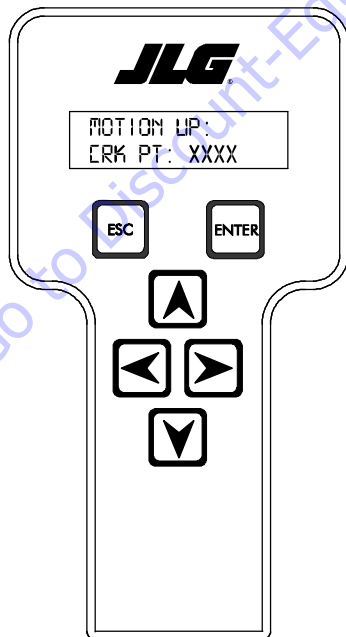
NOTE: Have an assistant help verify that movement occurs.

7. Using the Ground Controls, press and hold the Platform Level Up switch until the function starts moving, then press

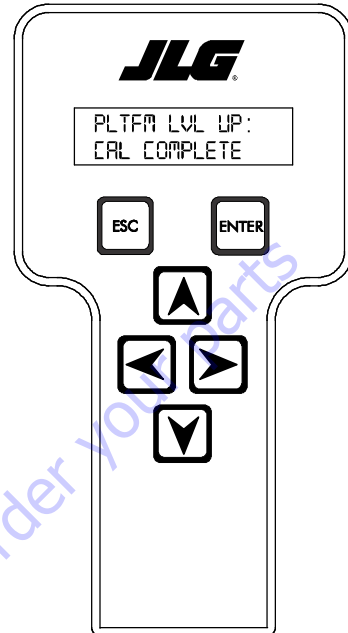
ENTER 




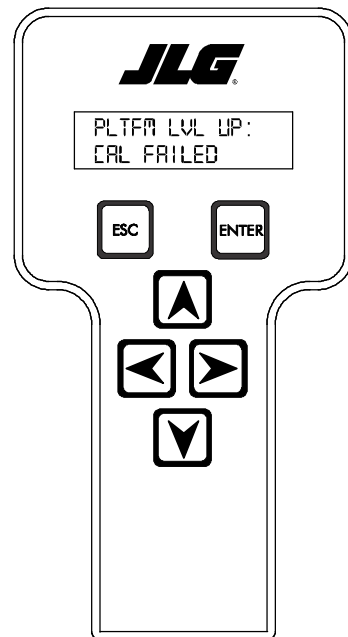
Release the Platform Level Up switch .



8. This completes the Platform Level Up crackpoint procedure.

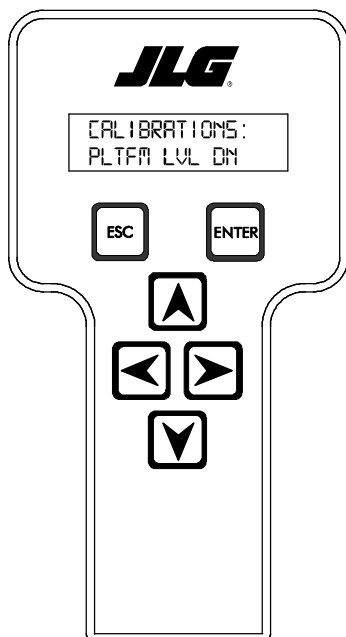


Press ESC  to return to the calibrations menu. If calibration fails, the screen will read as follows and the problem causing the failure must be resolved and the crackpoint set again.

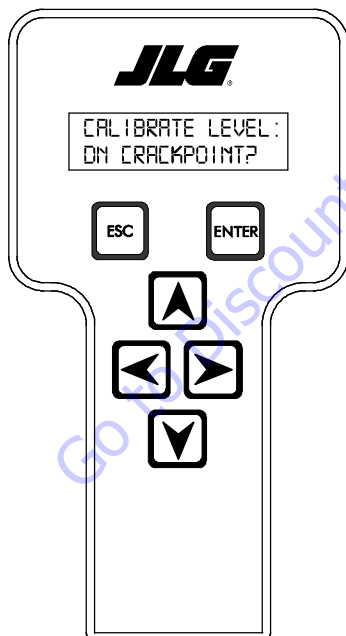


NOTE: If maximum limit is reached the number will stop increasing. Press ESC to exit the calibration.

9. Scroll to PLTFM LVL DN and press ENTER

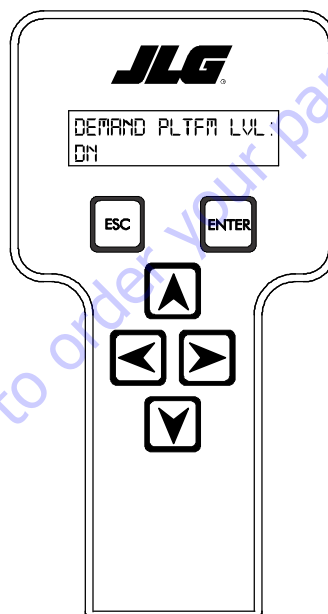
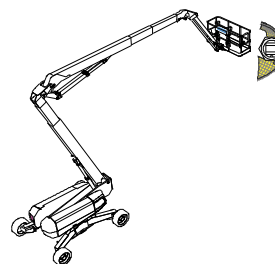


10. Press ENTER to calibrate Platform Level Down crackpoint.

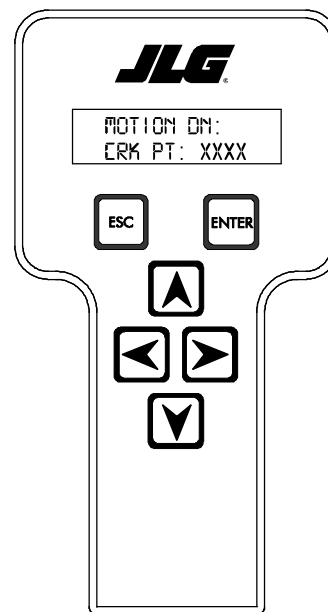


NOTE: Have an assistant help verify that movement occurs.

11. Using the Ground controls, press and hold the Platform Level Down switch until the function starts moving, then press

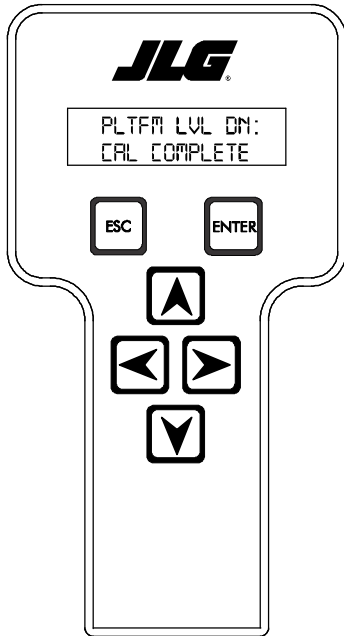



Release the Platform Level Down Switch.

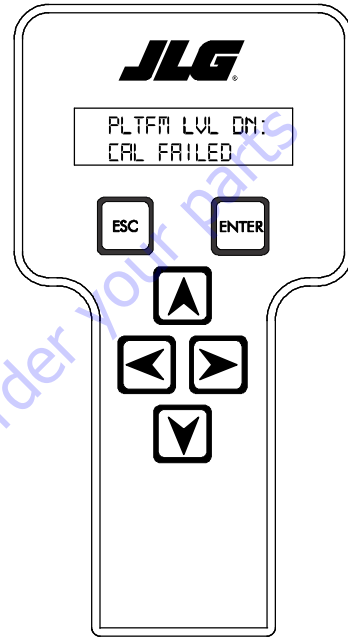


NOTE: If maximum limit is reached the number will stop increasing. Press ESC to exit the calibration.

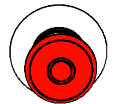
12. This completes the Platform Level Down crackpoint procedure. Press ESC  to return to the calibrations menu.



The crackpoint setting procedure for Platform Level Up and Down is complete. Press ESC  to exit calibrations. If calibration fails, the screen will read as follows and the problem causing the failure must be resolved and the crackpoint set again

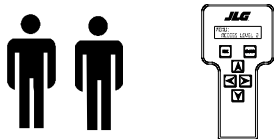


13. Push in Power/Emergency stop switch to save the calibration changes.

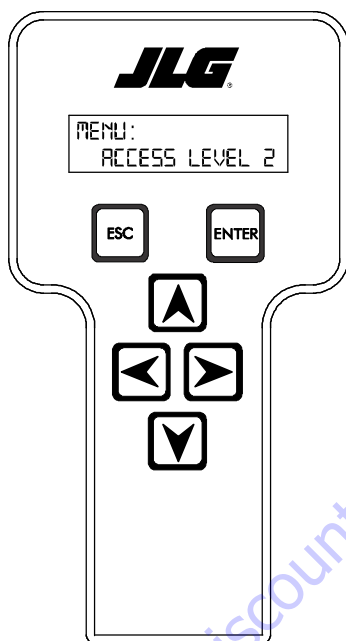


Boom Lift Up Crackpoints (BM LFT UP FCNTL)

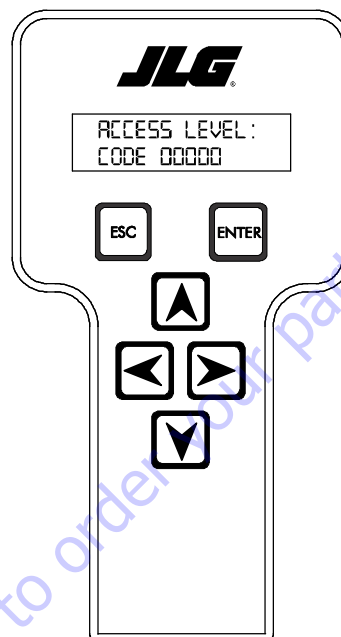
NOTE: To set crackpoints for the Main Lift Up, a JLG analyzer is needed. Have an assistant on hand to help verify that movement occurs.



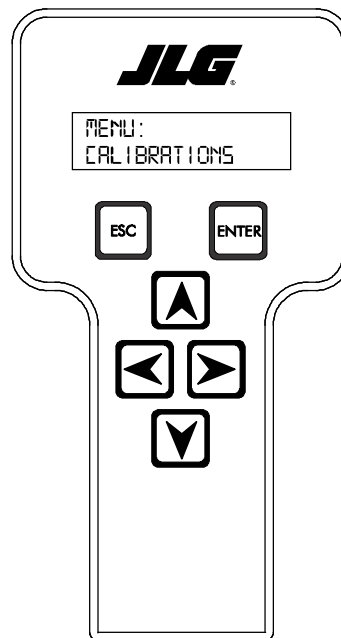
1. Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.
2. Scroll to MENU: OPERATOR ACCESS and press ENTER



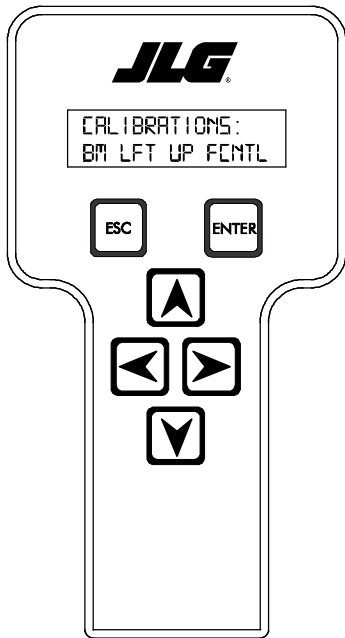
3. Enter code 33271 and press ENTER




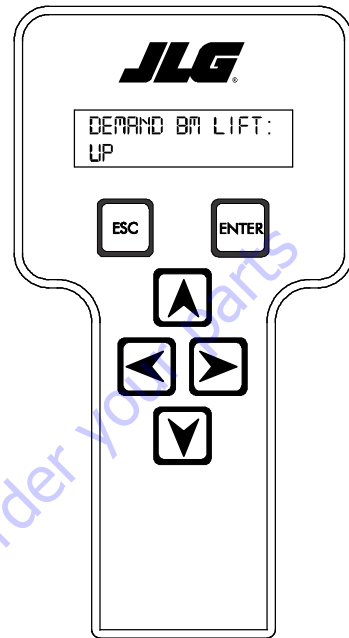
4. Scroll to MENU: CALIBRATIONS and press ENTER



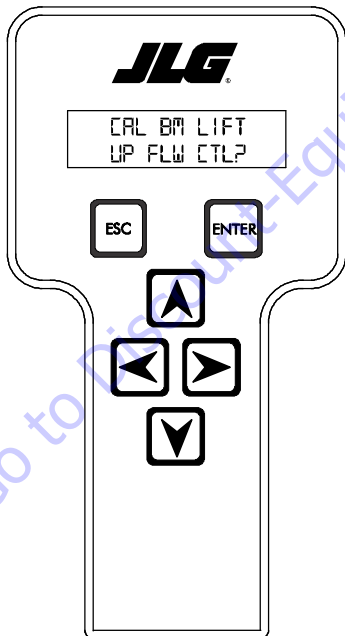
5. Scroll to BM LFT UP FCNTL and press ENTER .



7. Press ENTER  to calibrate Main Lift Up crackpoint.




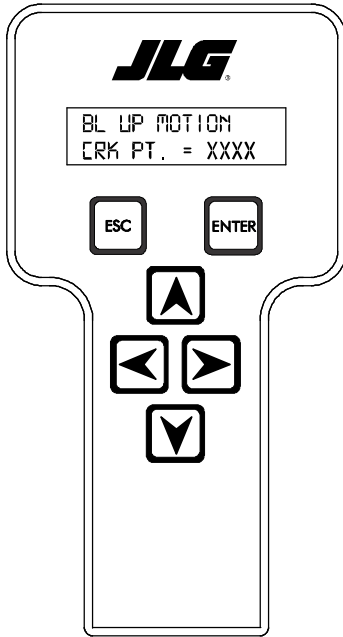
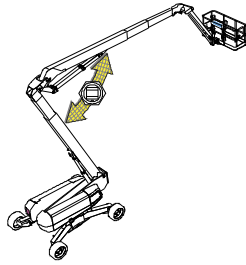
6. Press ENTER .



NOTE: Have an assistant help verify that movement occurs.

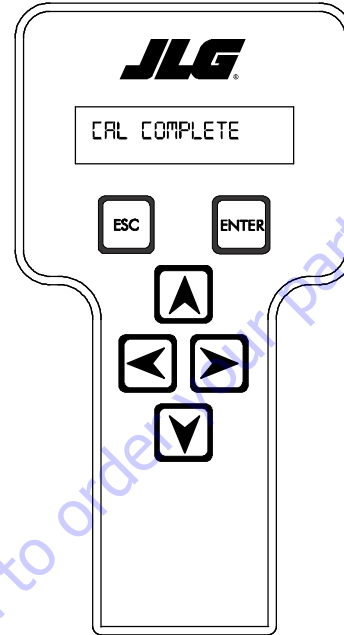
SECTION 6 - JLG CONTROL SYSTEM

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

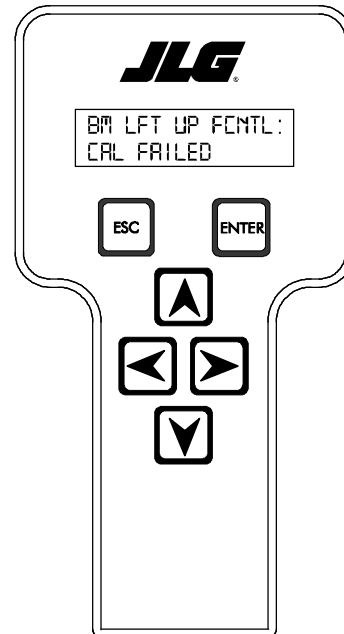


9. This completes the Main Lift Up crackpoint procedure.

Press ENTER .

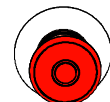


If calibration fails, the screen will read as follows and the problem causing the failure must be resolved and the crackpoint set again



NOTE: If maximum limit is reached the number will stop increasing. Press ESC to exit the calibration.

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

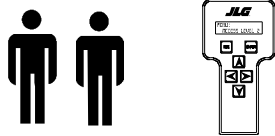


Main Telescope Out Crackpoint (BM TEL OUT FCNTL)

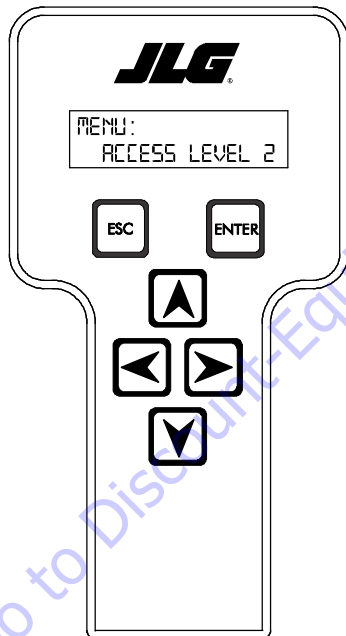
NOTICE

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

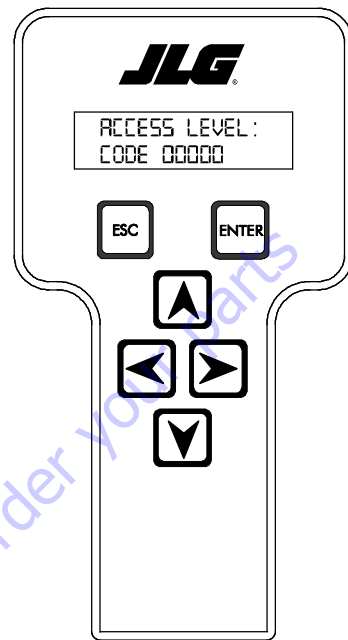
NOTE: To set crackpoints for Main Telescope Out, a JLG analyzer is needed. Have an assistant on hand to help verify that movement occurs.



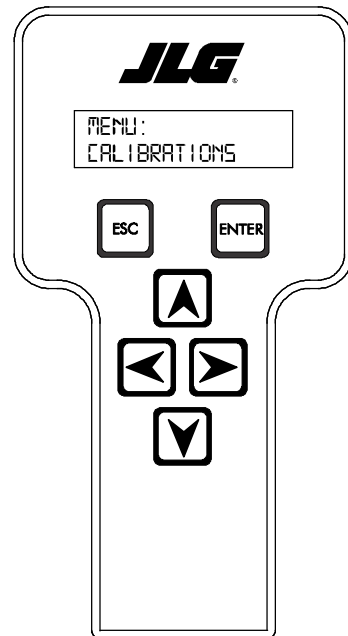
1. Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.
2. Scroll to MENU: OPERATOR ACCESS and press ENTER



3. Enter code 33271 and press ENTER

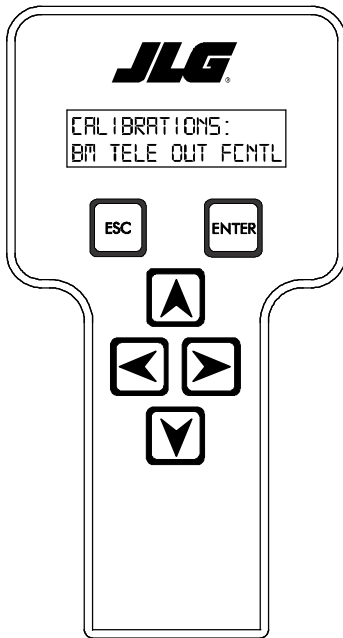



4. Scroll to MENU: CALIBRATIONS and press ENTER

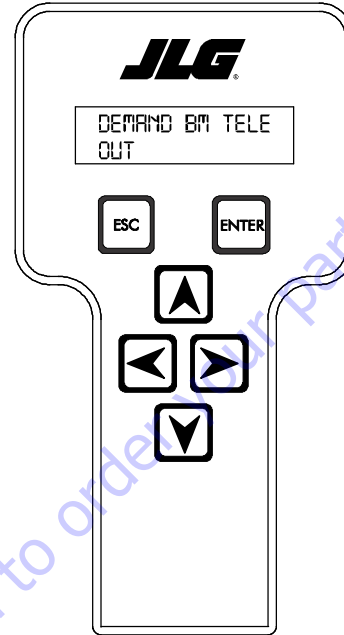


SECTION 6 - JLG CONTROL SYSTEM

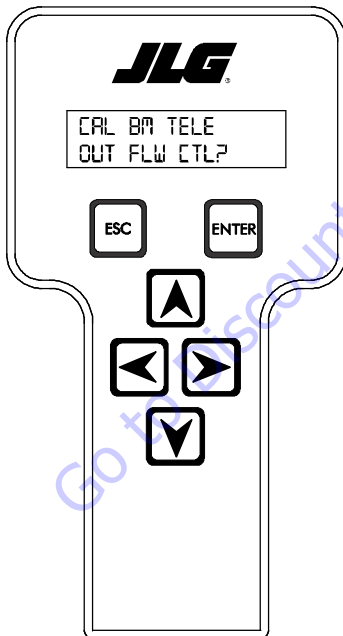
5. Scroll to BM TELE OUT FCNTL and press ENTER .



7. Press ENTER  to calibrate Main Telescope Out crackpoint.



6. Press ENTER .

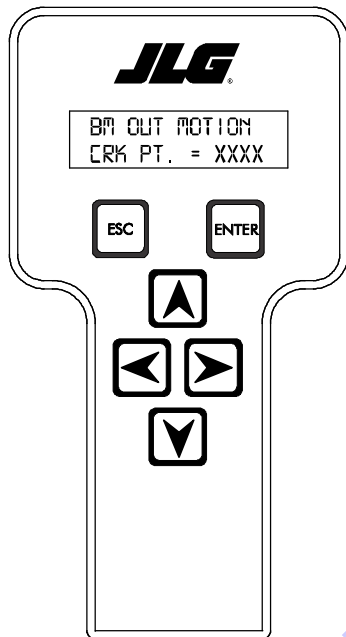
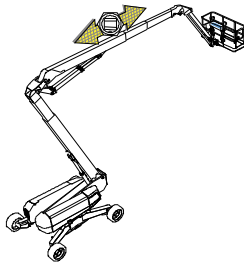


NOTE: Have an assistant help verify that movement occurs.

- 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.

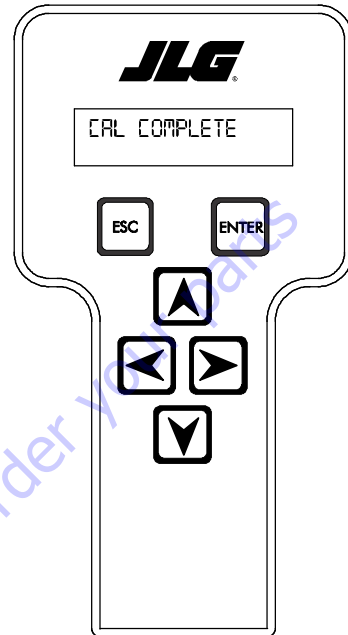


NOTE: If maximum limit is reached the number will stop increasing. Press ESC to exit the calibration.

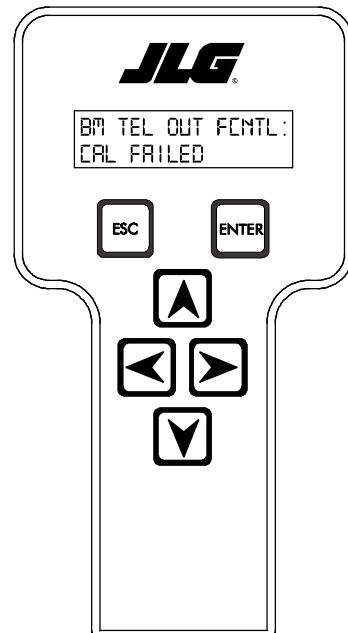
- This completes the Main Telescope Out crackpoint procedure. Press ENTER



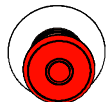
. Press ENTER



Press ESC to return to the calibrations menu. If calibration fails, the screen will read as follows and the problem causing the failure must be resolved and the crackpoint set again.

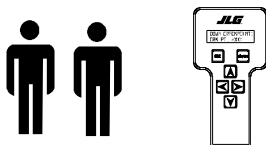


10. Push in Power/Emergency stop switch to save the calibration changes.

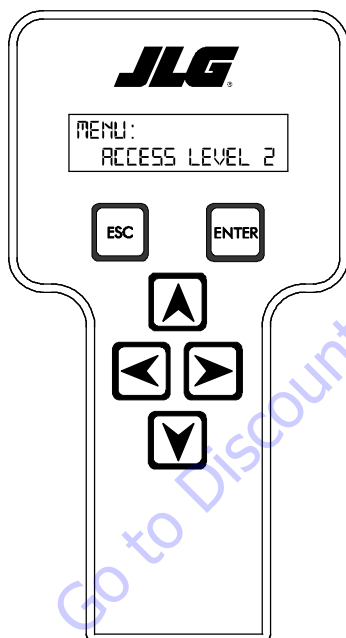


Tower Lift Up Crackpoint (TWR LFT UP FCNTL)

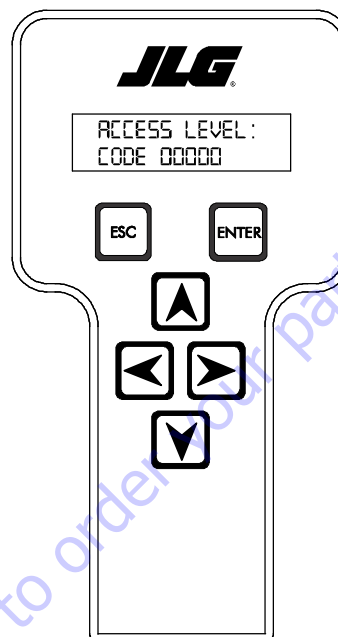
NOTE: To set crackpoints for Tower Lift Up, a JLG analyzer is needed. Have an assistant on hand to help verify that movement occurs.



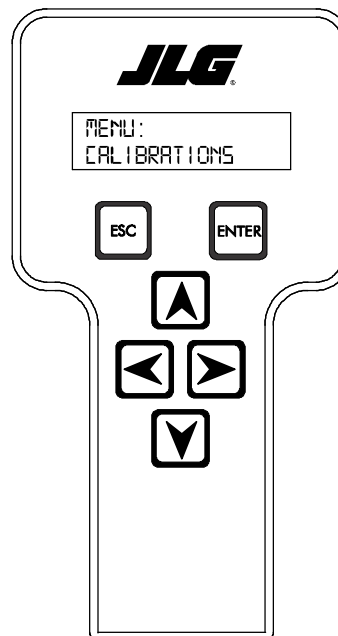
1. Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.
2. Scroll to MENU: OPERATOR ACCESS and press ENTER



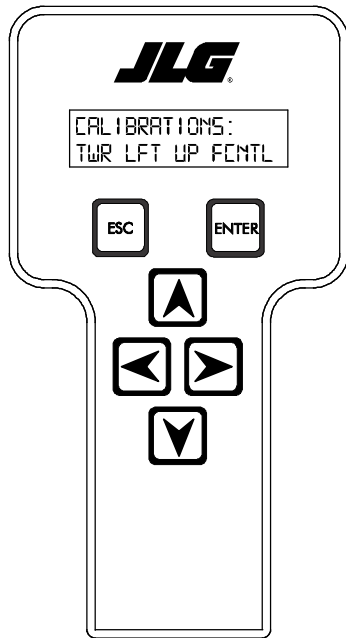
3. Enter code 33271 and press ENTER



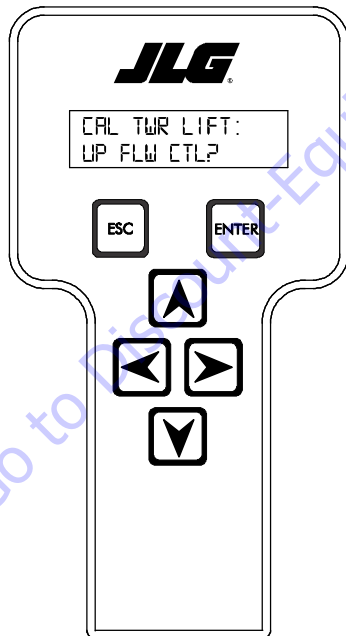
4. Scroll to MENU: CALIBRATIONS and press ENTER




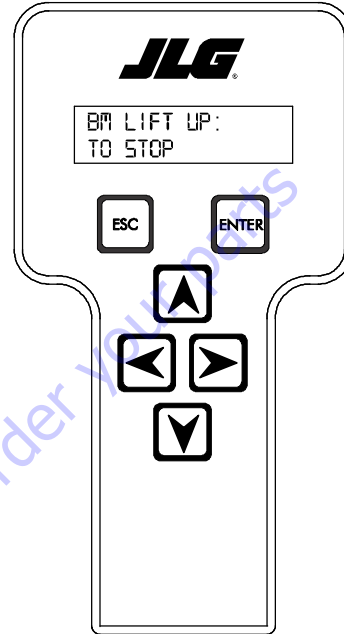
5. Scroll to TWR LFT UP FCNTL and press ENTER .




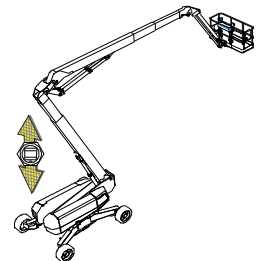
6. Press ENTER .

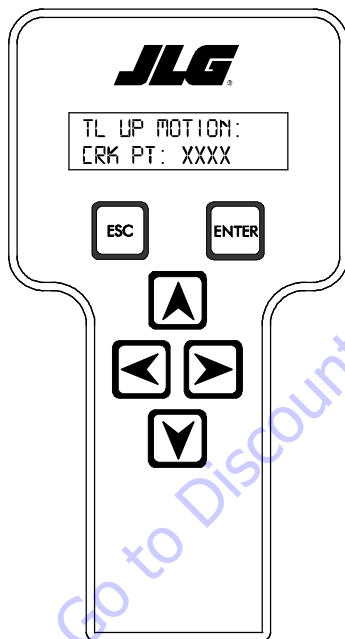
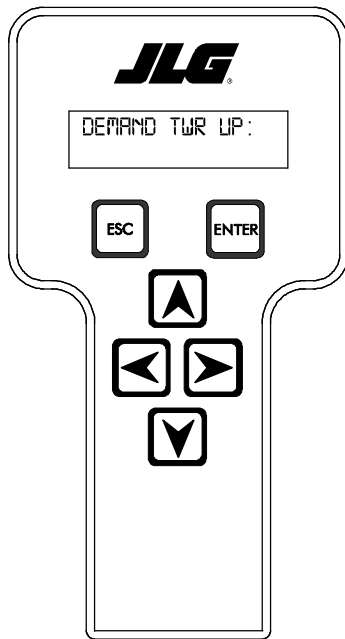



7. At the ground controls, press and hold the Boom Lift Up switch until the function stops moving. Press ENTER ,

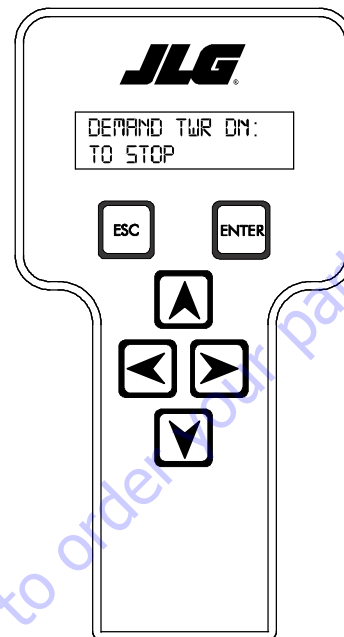



8. At the Ground Controls, press and hold the Tower Lift Up toggle switch until the function starts moving, then press ENTER . Release the Tower Lift Up toggle switch.

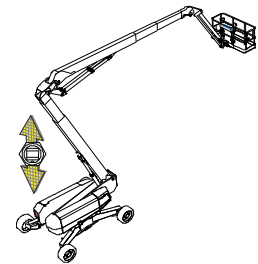




9. Press ENTER .



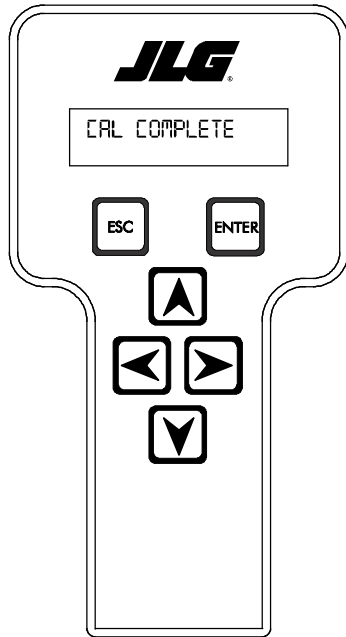
10. At the Ground Controls, press and hold the Tower Lift Down toggle switch until the function hits the stop, then press ENTER . Release the Tower Lift Up toggle switch.



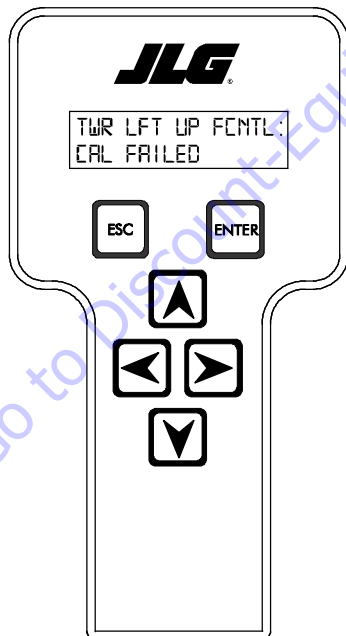
NOTE: If maximum limit is reached the number will stop increasing. Press ESC to exit the calibration.

- This completes the Tower Lift Up crackpoint procedure.

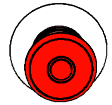
Press ENTER 



If calibration fails, the screen will read as follows and the problem causing the failure must be resolved and the crackpoint set again

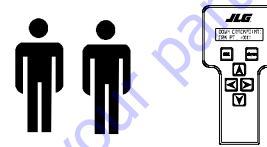


- Push in Power/Emergency stop switch to save the calibration changes.



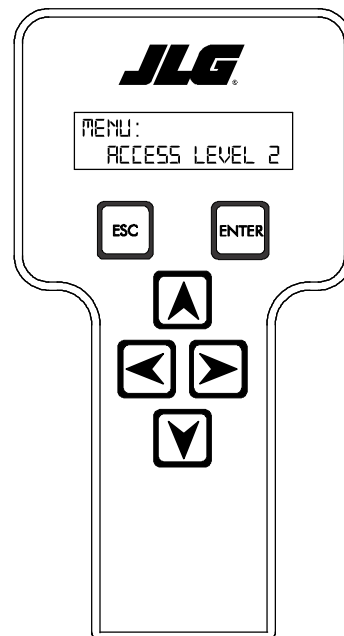
Tower Tele Out Crackpoint (TWR TEL OUT FCNTL)

NOTE: To set crackpoints for Tower Tele Out, a JLG analyzer is needed. Have an assistant on hand to help verify that movement occurs.




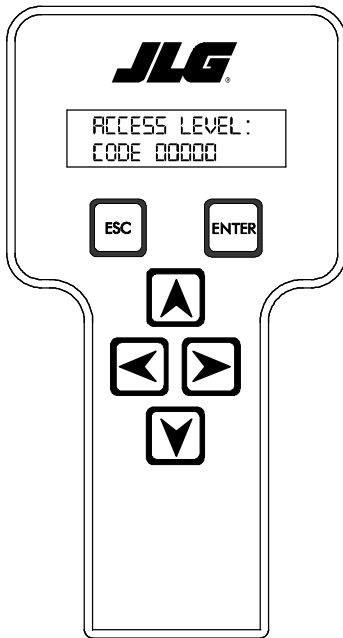
- Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.
- Scroll to MENU: OPERATOR ACCESS and press ENTER



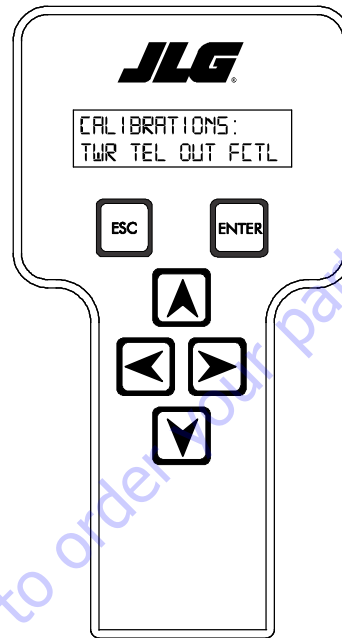



SECTION 6 - JLG CONTROL SYSTEM

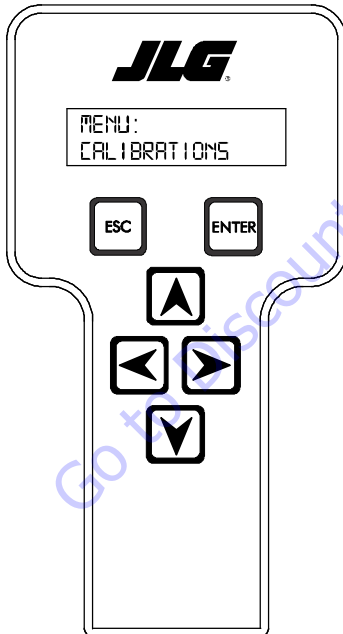
3. Enter code 33271 and press ENTER 




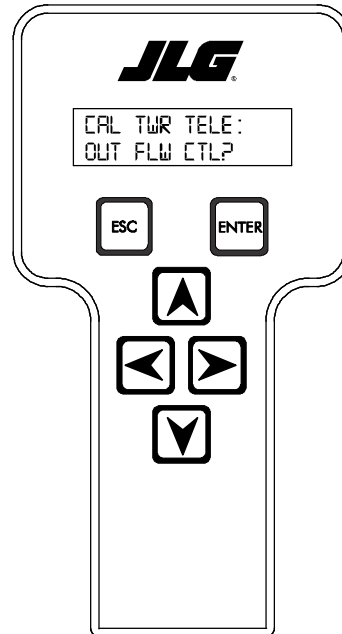
5. Scroll to TWR TEL OUT FCNTL and press ENTER 


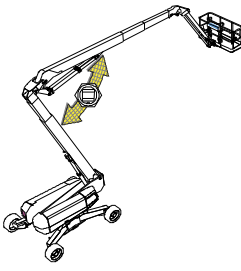


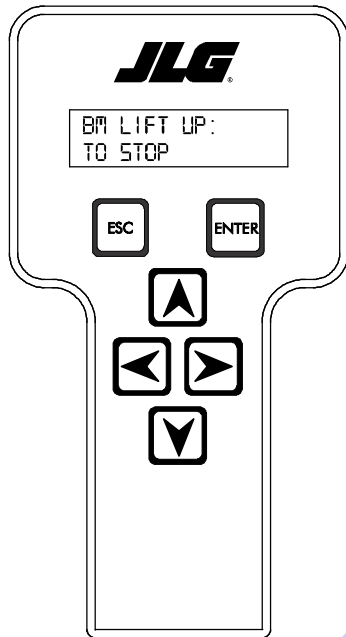
4. Scroll to MENU: CALIBRATIONS and press ENTER 


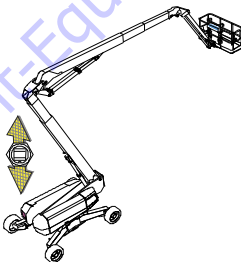


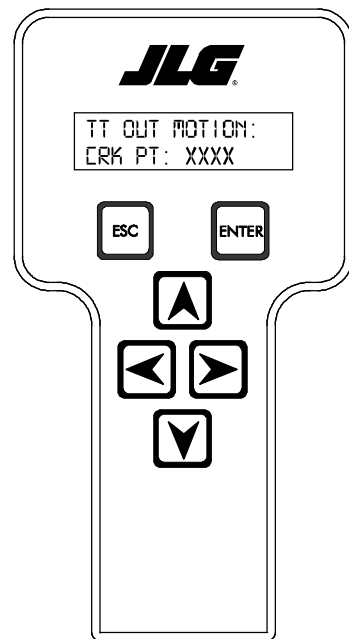
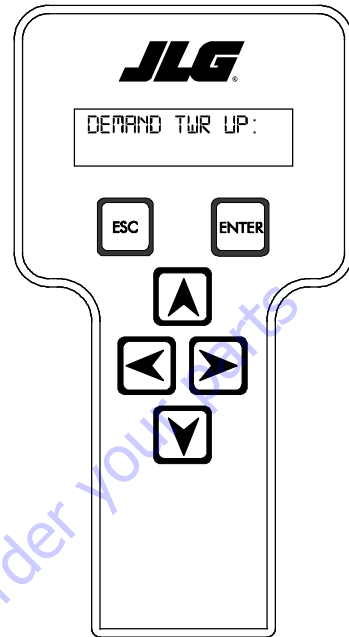
6. Press ENTER 



7. Press ENTER  to calibrate Tower Lift Up crackpoint. At the Ground Controls, press and hold the Boom Lift Up control switch until the function stops. Release the Boom Lift Up control switch
- 

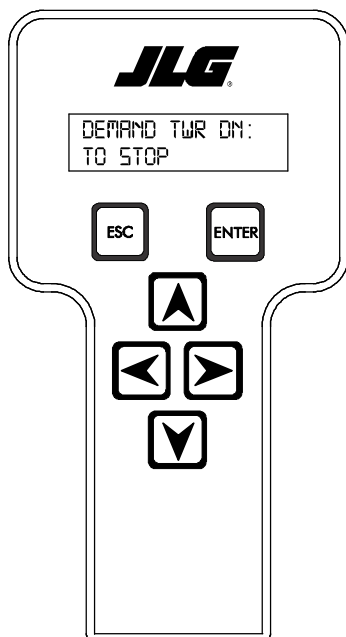


8. At the Ground Controls, press and hold the Tower Lift Up toggle switch until Tower Telescope starts to move, then press ENTER . Release the Tower Lift Up toggle switch.
- 



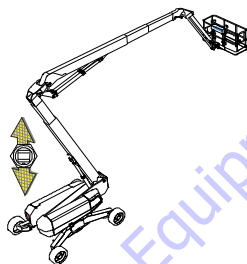
NOTE: If maximum limit is reached the number will stop increasing. Press ESC to exit the calibration.

9. Press ENTER .

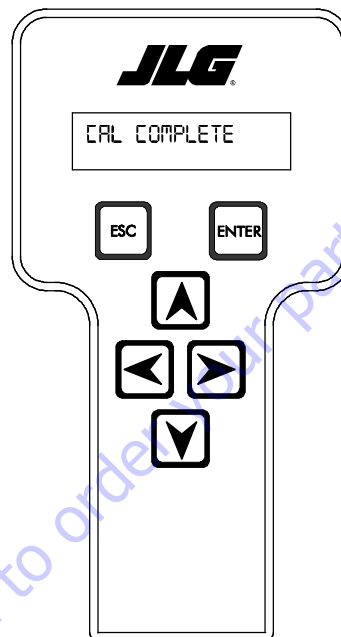


10. At the Ground Controls, press and hold the Tower Tele Down toggle switch until the function hits the stop. Release the Tower Tele Down toggle switch. Press

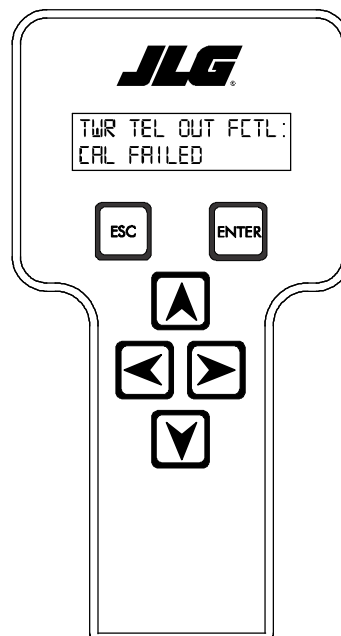
ENTER .



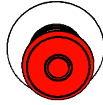
11. This completes the Tower Tele Out crackpoint procedure. Press ENTER .



If calibration fails, the screen will read as follows and the problem causing the failure must be resolved and the crackpoint set again

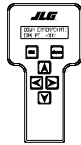


12. Push in Power/Emergency stop switch to save the calibration changes.

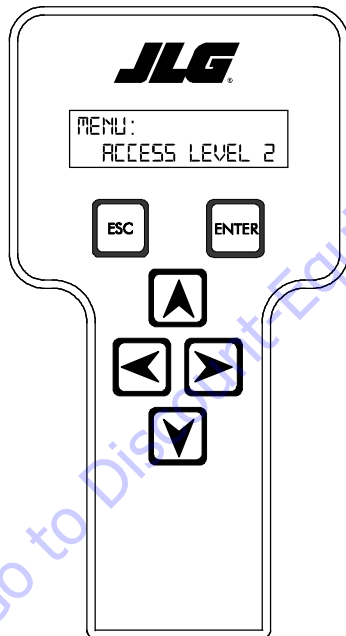


Main Lift Down Crackpoint (BM LFT DN FCNL)

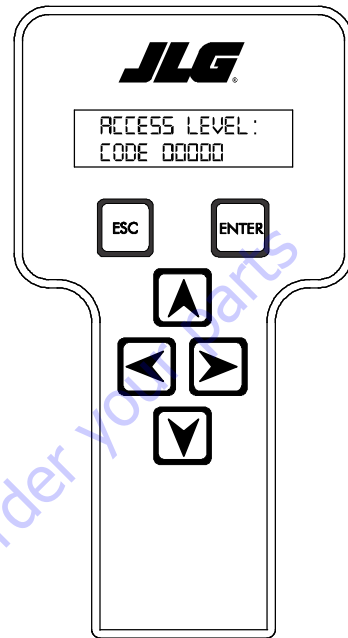
NOTE: To set crackpoints for Main Lift Down, a JLG analyzer is needed. Have an assistant on hand to help verify that movement occurs.



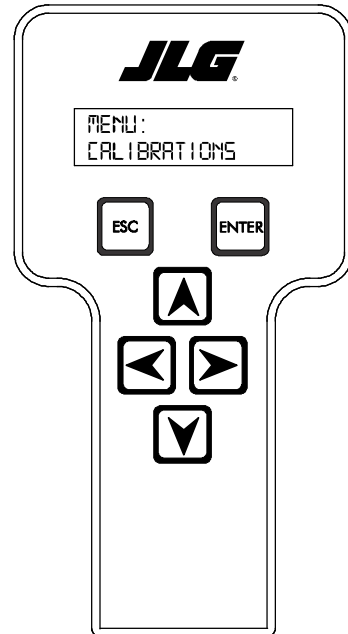
1. Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.
2. Scroll to MENU: OPERATOR ACCESS and press ENTER




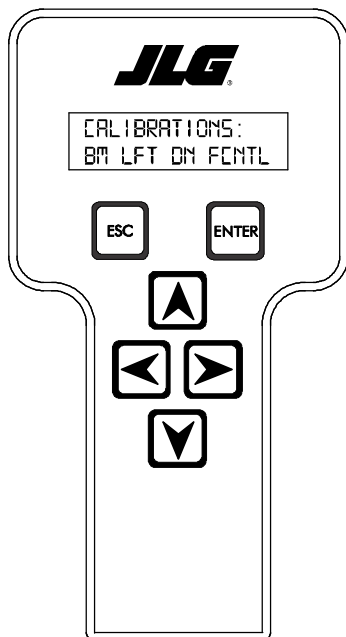
3. Enter code 33271 and press ENTER



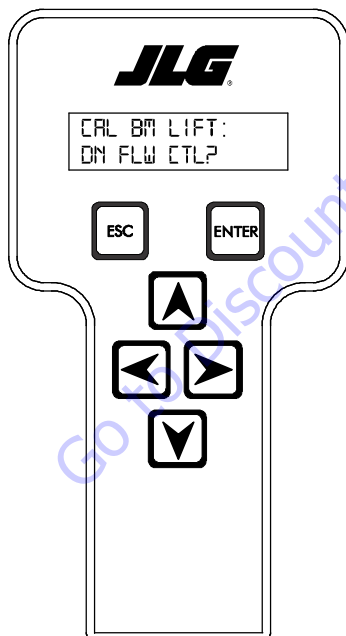
4. Scroll to MENU: CALIBRATIONS and press ENTER



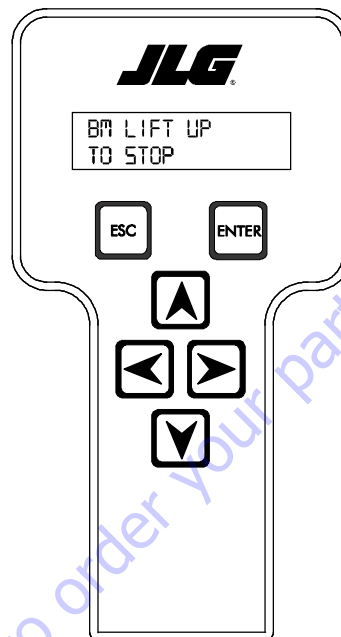
5. Press ENTER  to calibrate Main Lift Down crack-point.



6. Press ENTER .



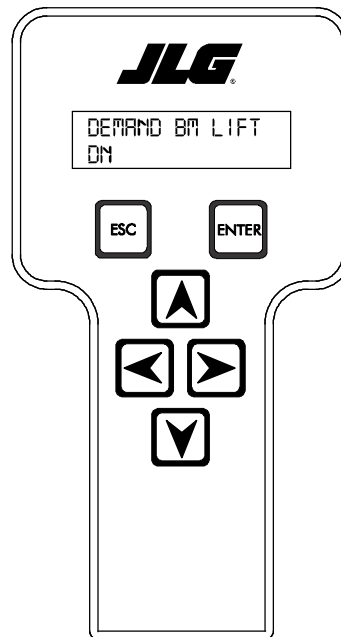
7. The screen should read:



At the ground controls, press and hold the Boom Lift Up switch until the function stops moving.

NOTE: This may not run if the pressure condition is already met.

8. Press ENTER . The screen should read:

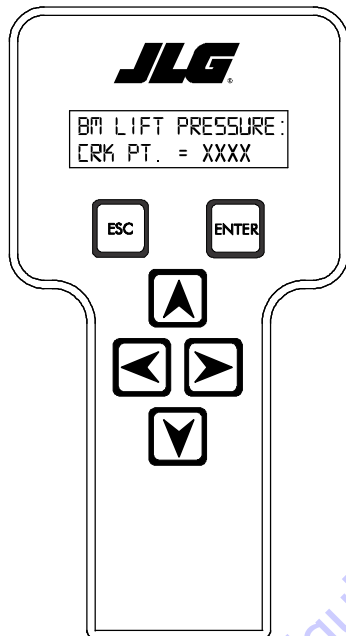
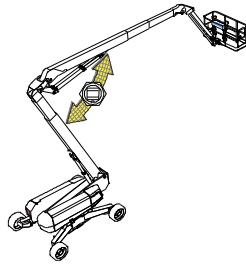


NOTE: There may be a slight movement of the boom in the down direction due to logic to release trapped pressure.

NOTE: Have an assistant help verify that movement occurs.

9. At the Ground Controls, press and hold the Lift Down toggle switch. Release the Lift Down toggle switch. Press

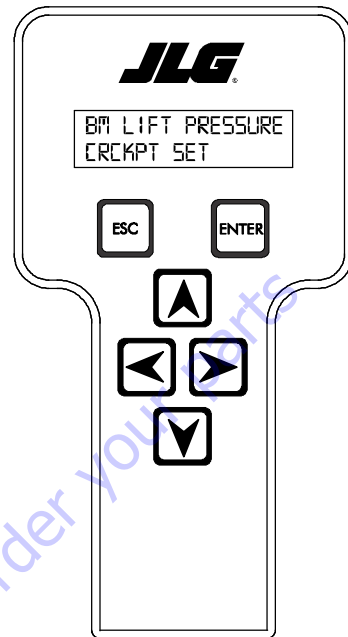
ENTER .



NOTE: No function movement will occur at this point.

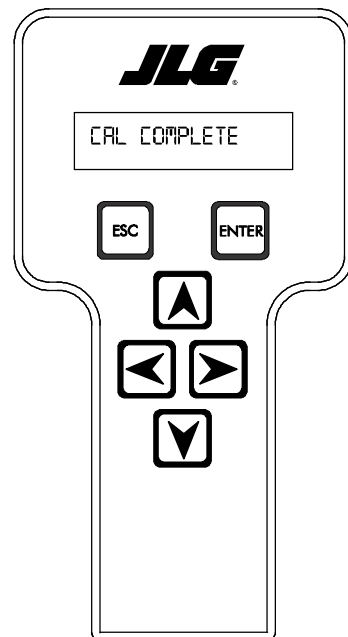
NOTE: If maximum limit is reached the number will stop increasing. Press ESC to exit the calibration.

The screen will read:

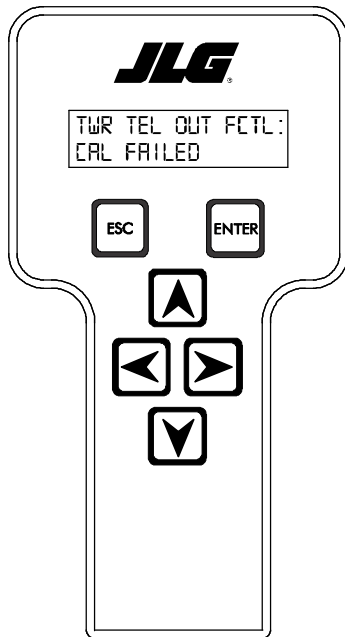


10. This completes the Main Lift Down crackpoint procedure. Press ENTER

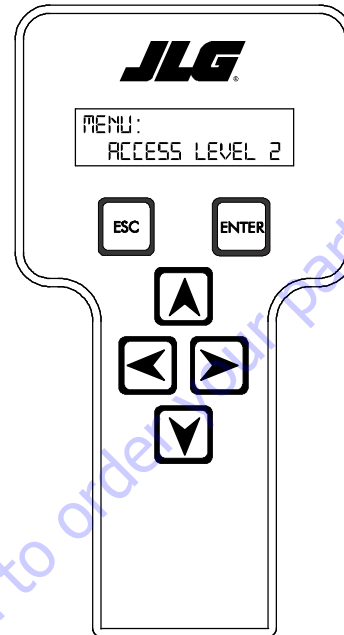
ENTER .



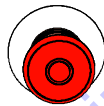
If calibration fails, the screen will read as follows and the problem causing the failure must be resolved and the crackpoint set again



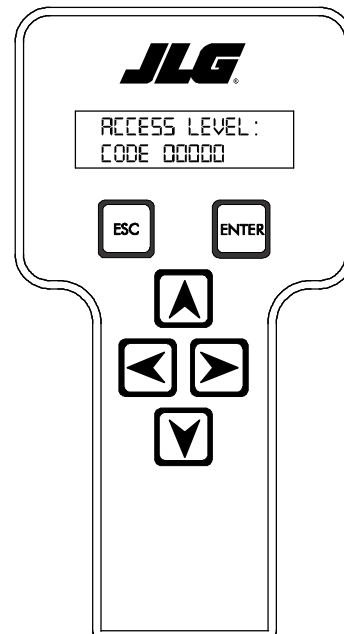
2. Scroll to MENU: OPERATOR ACCESS and press ENTER



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

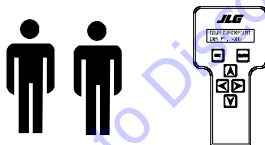


3. Enter code 33271 and press ENTER




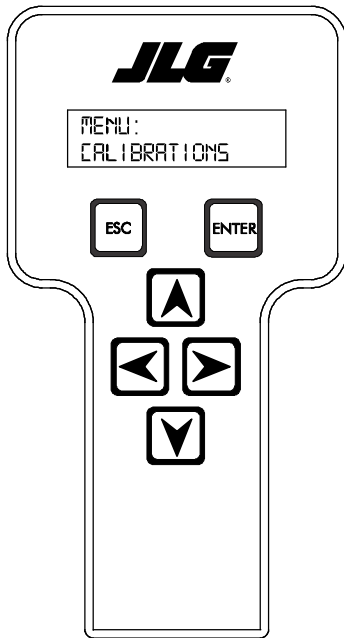
Main Telescope In Crackpoint (BM TELE IN FCNTL)

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

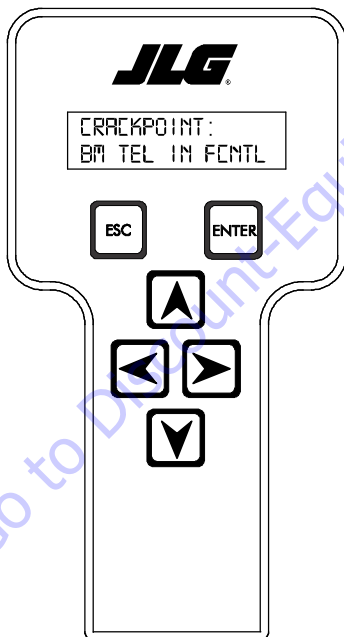


1. Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.


4. Scroll to MENU: CALIBRATIONS and press ENTER .

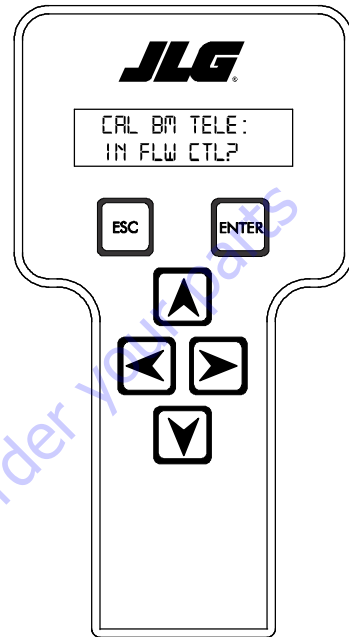


The screen will read:

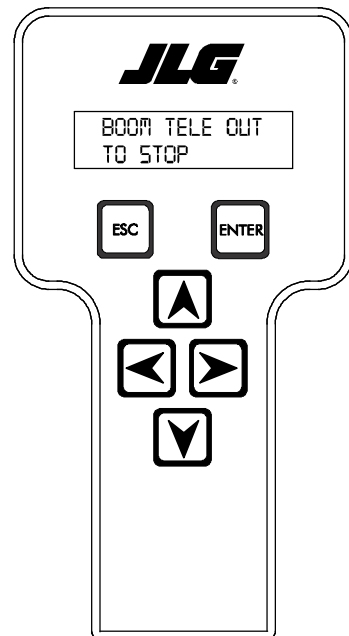


- Press ENTER .

5. Press ENTER  to calibrate Main Telescope In crackpoint.



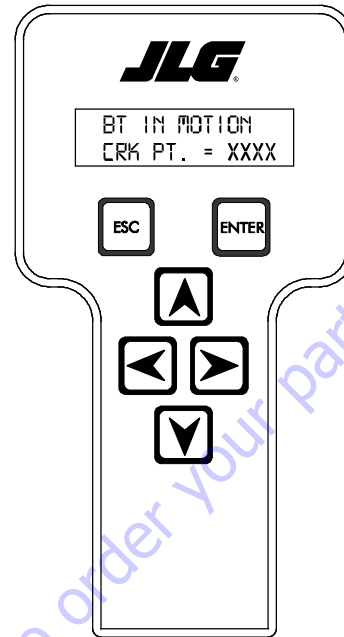
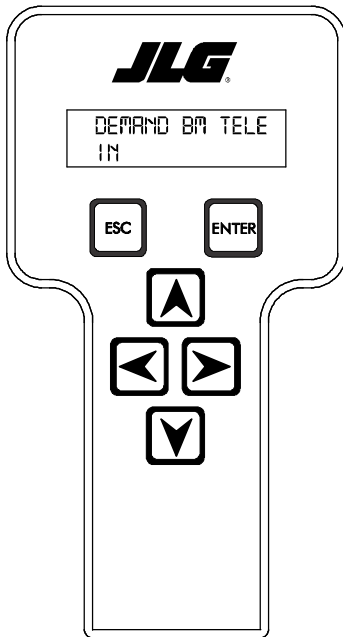
6. Press ENTER . The screen will read:



At the Ground Controls, press and hold the Boom Telescope Out contl switch until the function stops.

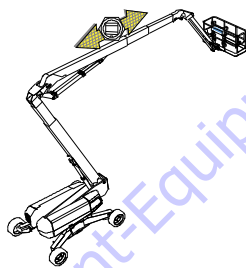
SECTION 6 - JLG CONTROL SYSTEM

7. When the boom is telescoped fully out to stop, the screen will read:



NOTE: Have an assistant help verify that movement occurs.

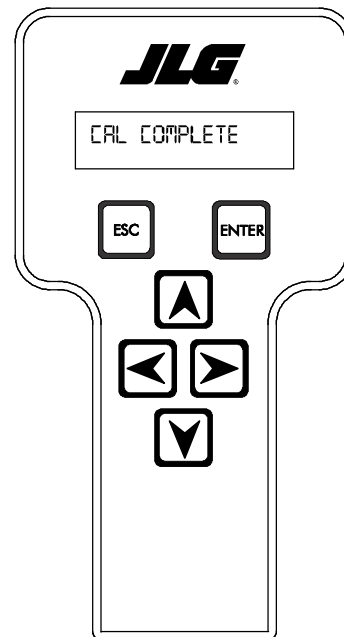
8. At the Ground Controls, press and hold the Telescope In toggle switch until the function starts moving. Release the Telescope In toggle switch. Press ENTER



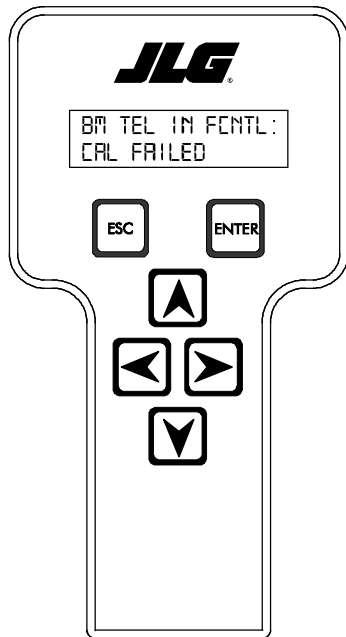
NOTE: If maximum limit is reached the number will stop increasing. Press ESC to exit the calibration.

9. The crackpoint setting procedure for Main Telescope is

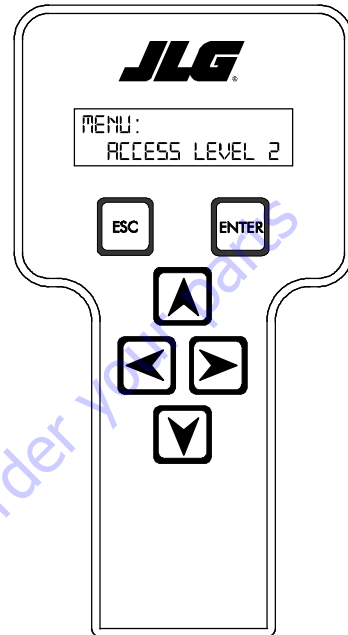
complete. Press ESC  to exit calibrations.



If calibration fails, the screen will read as follows and the problem causing the failure must be resolved and the crackpoint set again



2. Scroll to MENU: OPERATOR ACCESS and press ENTER

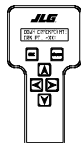
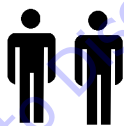


10. Push in Power/Emergency Stop switch to save the calibration changes.



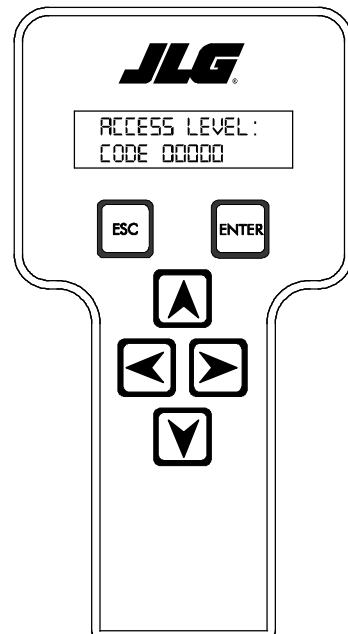
Tower Lift Down Crackpoint (TWR LIFT DN FCNTL)

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




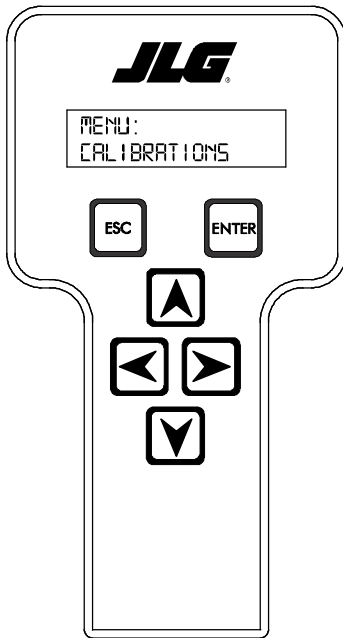
1. Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.


3. Enter code 33271 and press ENTER

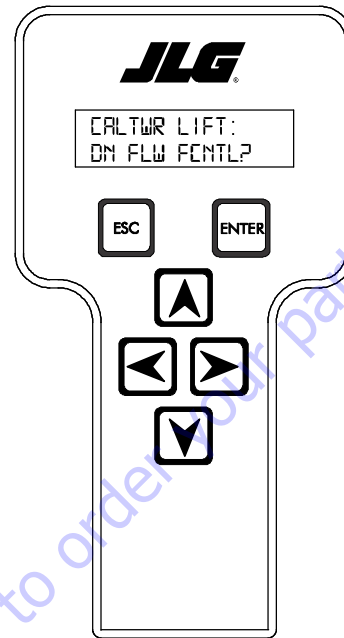


SECTION 6 - JLG CONTROL SYSTEM

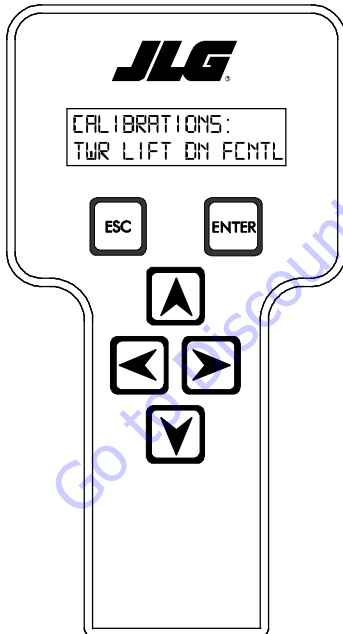
4. Scroll to MENU: CALIBRATIONS and press ENTER .




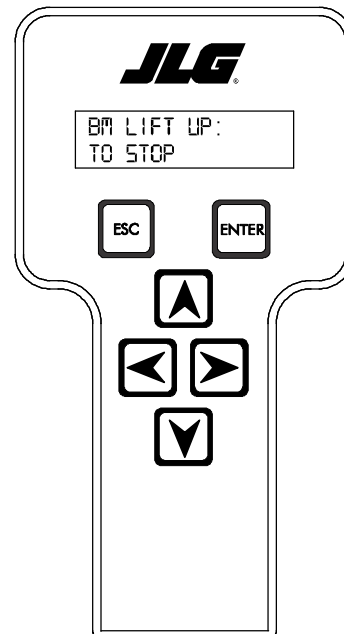
6. Press ENTER .



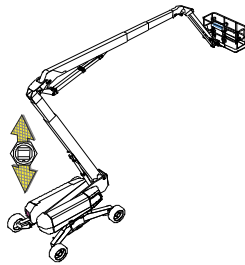
5. Scroll to TWR LFT DN FCNTL and press ENTER .



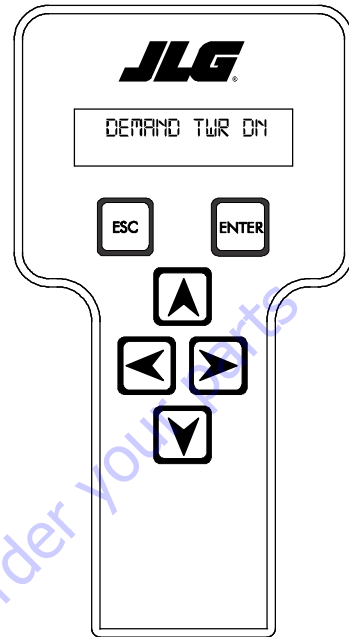
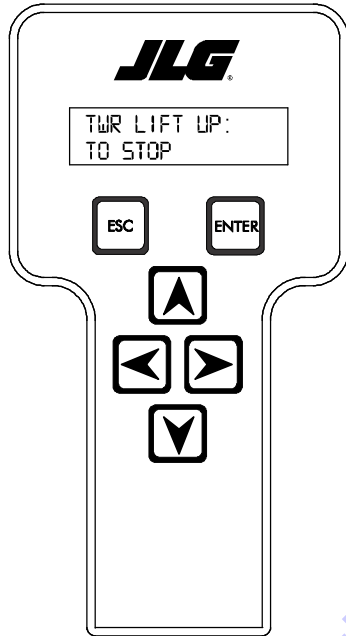
7. Press ENTER  to calibrate Tower Lift Down crack-point.



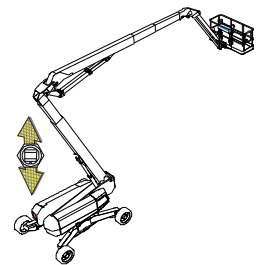
8. At the Ground Controls, press and hold the Boom Lift Up toggle switch until the function hits the stop. Release the Tower Lift Up toggle switch. Press ENTER



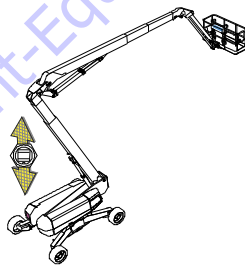
9. The screen will read:



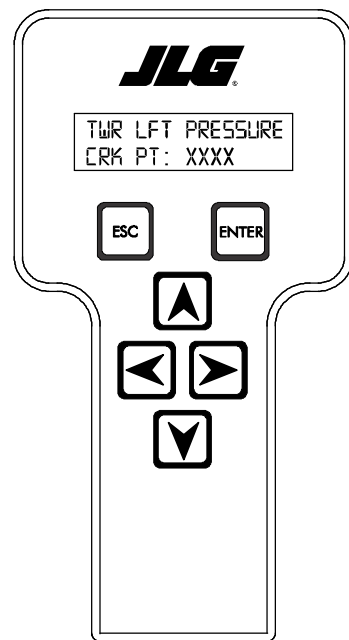
12. At the Ground Controls, press and hold the Tower Lift Down toggle switch. Release the Tower Lift toggle switch.



10. At the Ground Controls, press and hold the Tower Lift Up toggle switch until the function hits the stop. Release the Tower Lift Up toggle switch. Press ENTER



11. The screen will read:

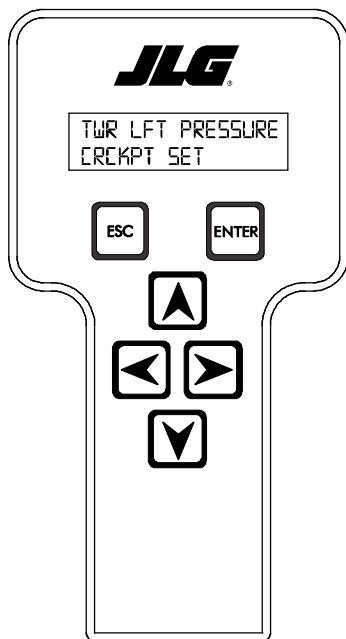


NOTE: No function movement will occur at this point.

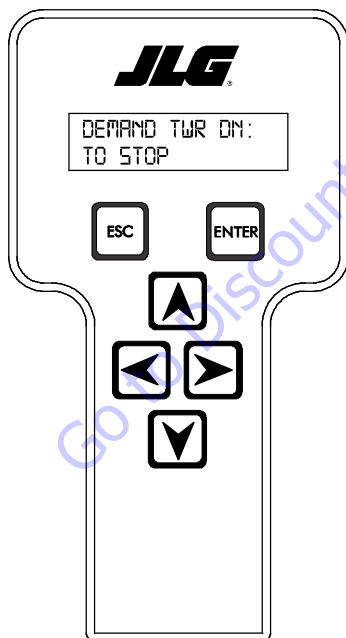
SECTION 6 - JLG CONTROL SYSTEM

NOTE: If maximum limit is reached the number will stop increasing. Press ESC to exit the calibration.

13. The screen will read:

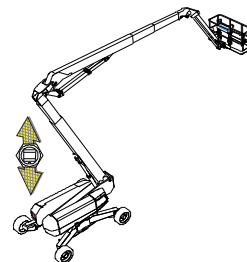


14. Press ENTER .




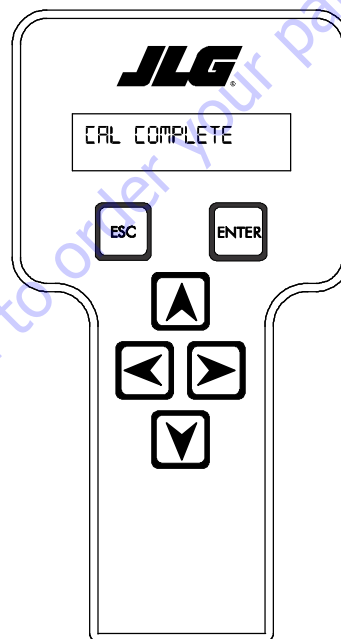
15. At the Ground Controls, press and hold the Tower Lift Down toggle switch until the function hits the stop, then

press ENTER . Release the Tower Lift toggle switch.

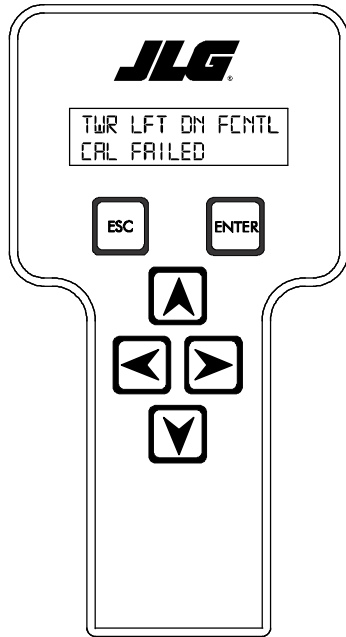


16. This completes the Tower Lift

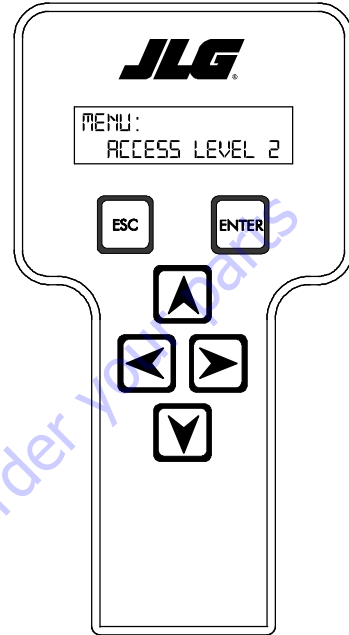
Down crackpoint procedure. Press ENTER .



If calibration fails, the screen will read as follows and the problem causing the failure must be resolved and the crackpoint set again



2. Scroll to MENU: OPERATOR ACCESS and press ENTER

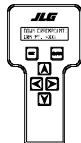
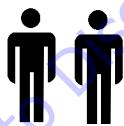


17. Push in Power/Emergency stop switch to save the calibration changes.



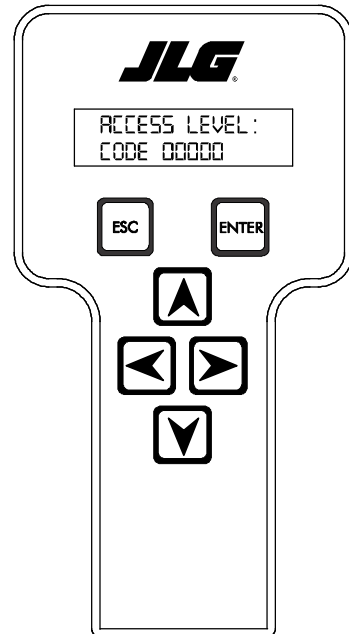
Tower Tele In Crackpoint (TWR TEL IN FCNTL)

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




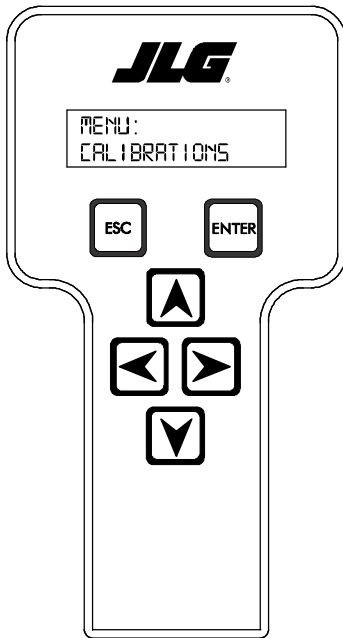
1. Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.


3. Enter code 33271 and press ENTER

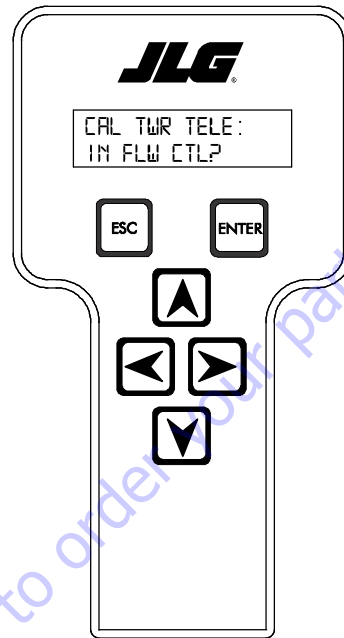


SECTION 6 - JLG CONTROL SYSTEM

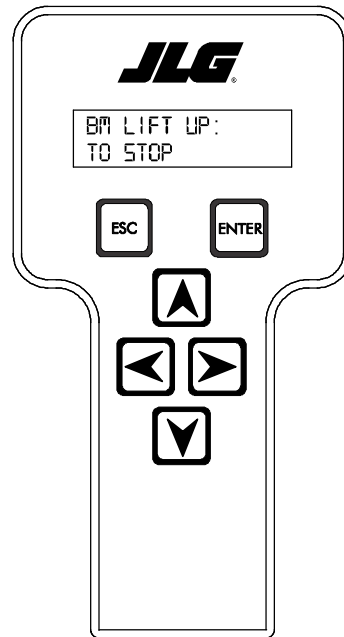
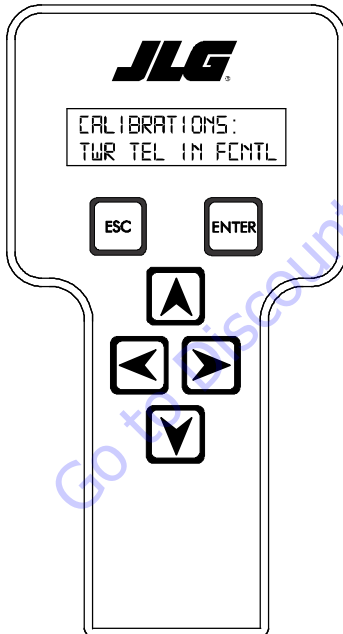
4. Scroll to MENU: CALIBRATIONS and press ENTER .



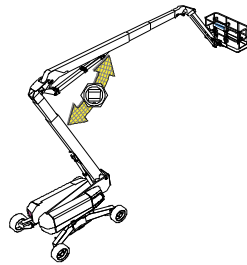
6. Press ENTER .



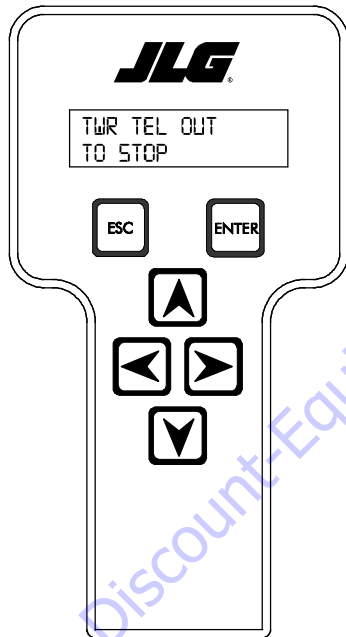
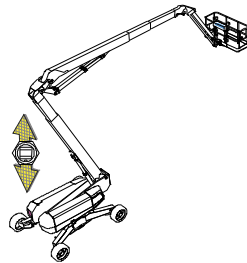
5. Scroll to TWR TEL IN FCNTL and press ENTER .



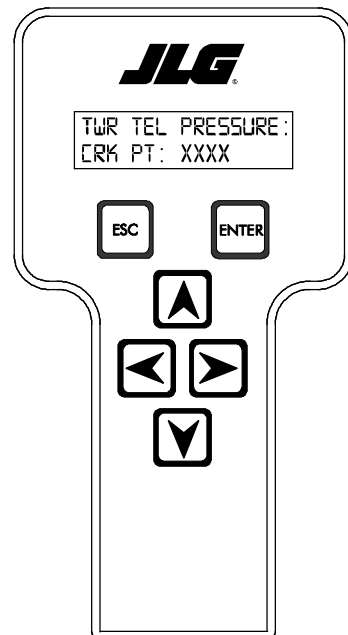
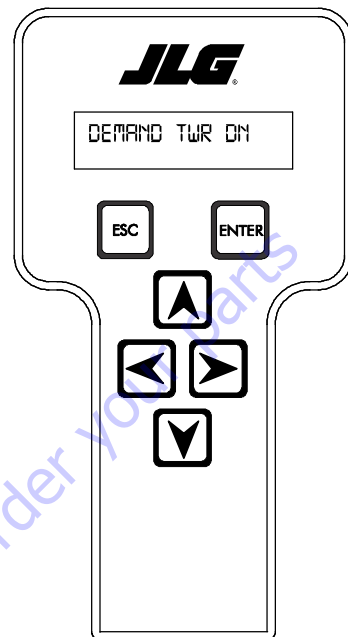
At the Ground Controls, press and hold the Boom Lift Up control switch until the function stops. Press ENTER



- At the Ground Controls, press and hold the Tower Lift Up toggle switch until the function hits the stop. Release the Tower Lift Up toggle switch.



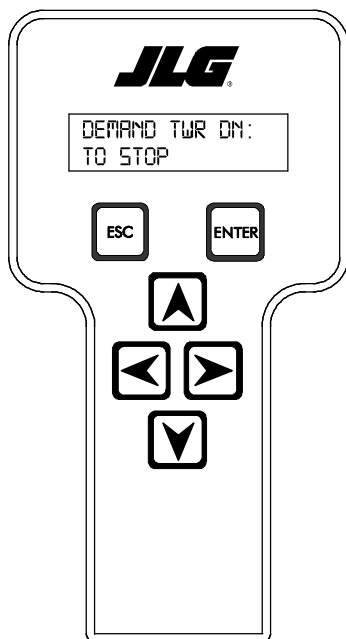
- Press ENTER



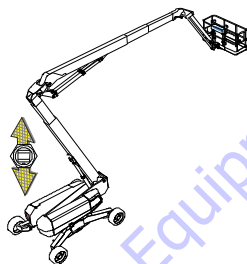
NOTE: No function movement will occur at this point.

NOTE: If maximum limit is reached the number will stop increasing. Press ESC to exit the calibration.

9. Press ENTER .

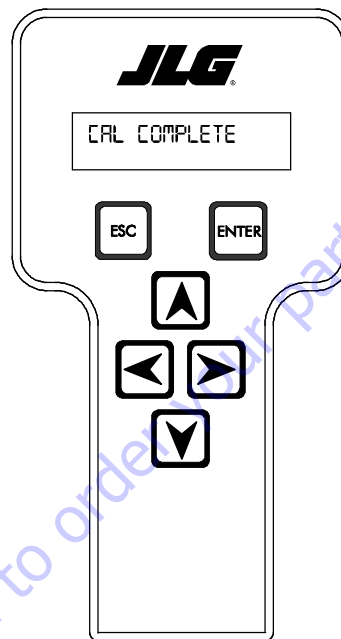


10. At the Ground Controls, press and hold the Tower Lift Down toggle switch until the Tower Tele function hits the stop. Release the Tower Lift Up toggle switch.

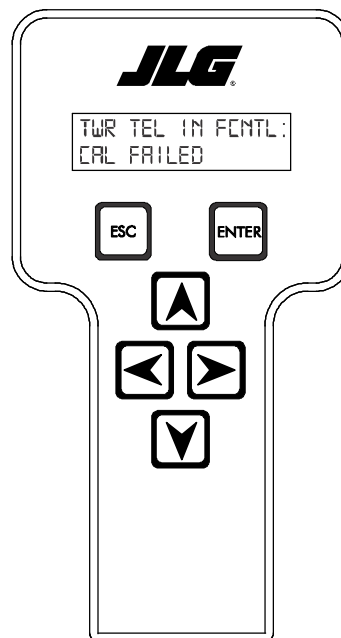


11. This completes the Tower Tele In crackpoint procedure.

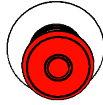
Press ENTER .



If calibration fails, the screen will read as follows and the problem causing the failure must be resolved and the crackpoint set again

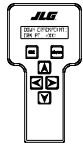


12. Push in Power/Emergency stop switch to save the calibration changes.

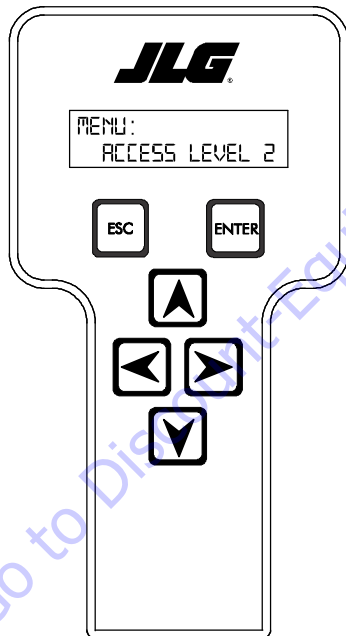


Main Lift Down Enable Crackpoint (BM LFT DN EN)

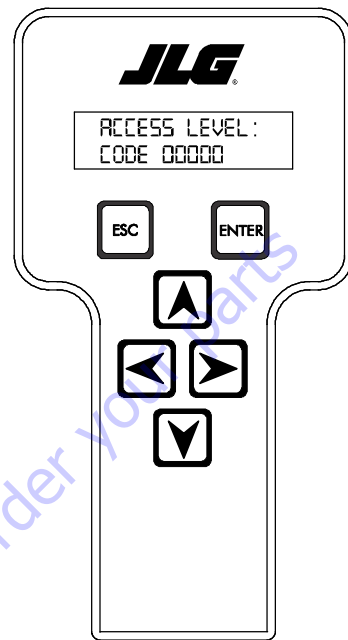
NOTE: To set crackpoints for Main Lift Down, a JLG analyzer is needed. Have an assistant on hand to help verify that movement occurs.



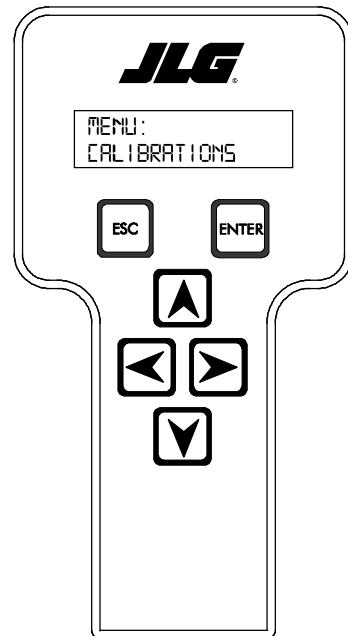
1. Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.
2. Scroll to MENU: OPERATOR ACCESS and press ENTER



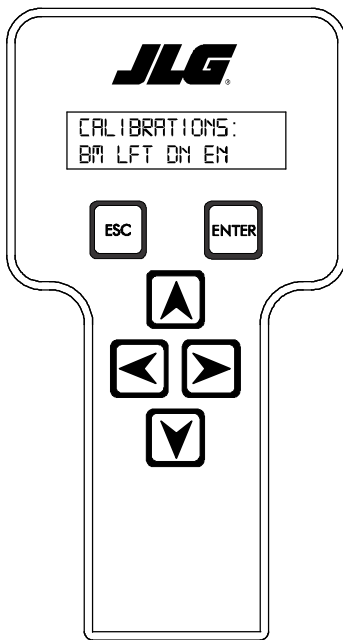
3. Enter code 33271 and press ENTER



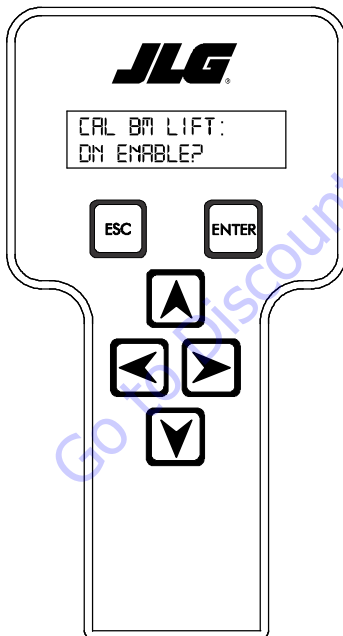
4. Scroll to MENU: CALIBRATIONS and press ENTER



5. Scroll to BM LFT DN EN and press ENTER



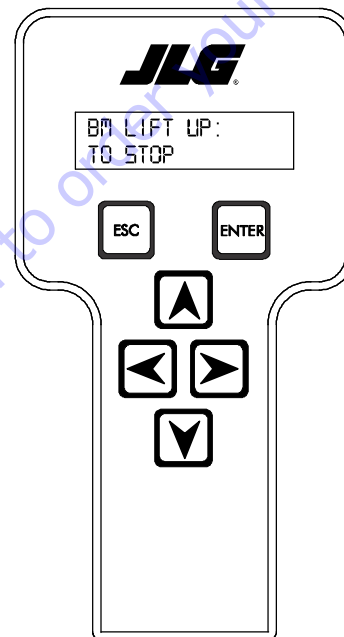
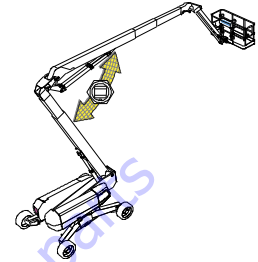
6. Press ENTER to calibrate Main Lift Enable crackpoint.



NOTICE

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

7. At the Ground Controls, press and hold the Lift Up toggle switch until the boom stops moving. Release the Lift Up toggle switch.

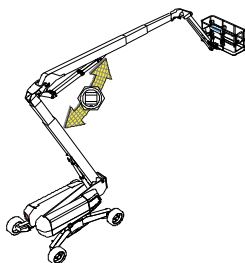


It is suggested to use a tape measure to aid the service technician in being able to see boom movement as shown below. Relying on the ability to see movement, may cause the value to be set incorrectly, resulting in poor performance. Release the switch for boom Lift Down command when the boom has moved approximately 0.25 in (6 mm). An inclinometer can also be used to measure the boom movement. If using this method, release the Boom Lift Down switch when the boom has moved approximately 1 degree.

NOTE: The crackpoint for the Boom Lift Enable valve will be in the 580-650 mA range.



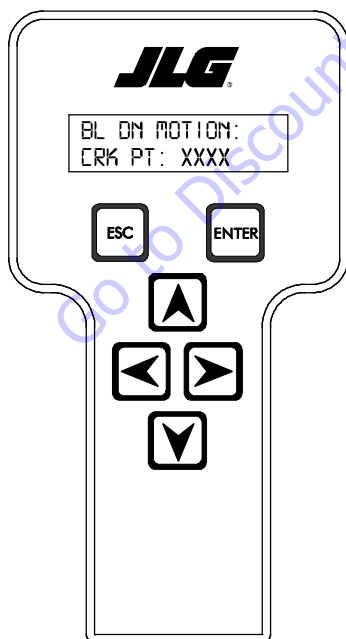
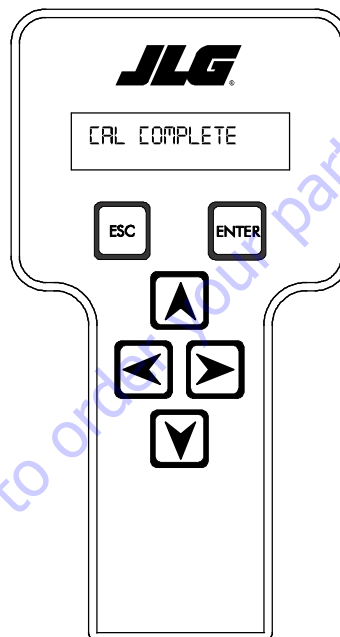
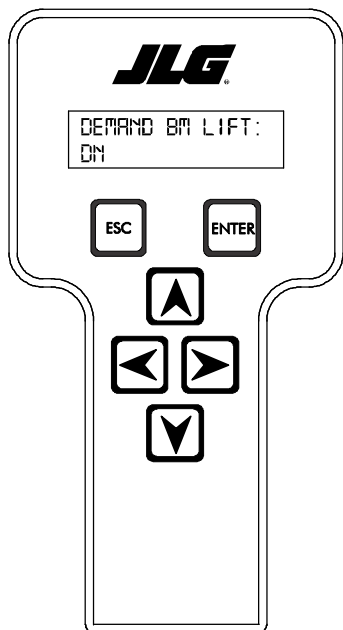
- At the Ground Controls, press and hold the Lift Down toggle switch until the function starts moving. Release the Lift Down toggle switch.



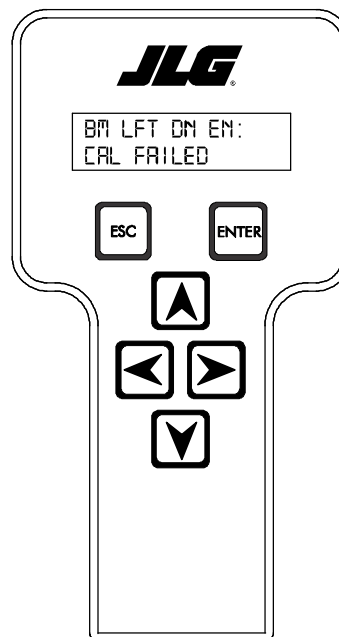
NOTE: If maximum limit is reached the number will stop increasing. Press ESC to exit the calibration.

- This completes the Main Lift Enable crackpoint procedure. Press ESC

to return to the calibrations menu.



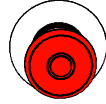
If calibration fails, the screen will read as follows and the problem causing the failure must be resolved and the crackpoint set again



- The crackpoint setting procedure for Main Lift Down

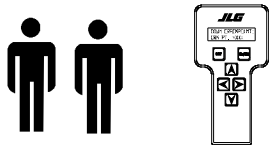
Enable is complete. Press ESC  to exit calibrations.

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

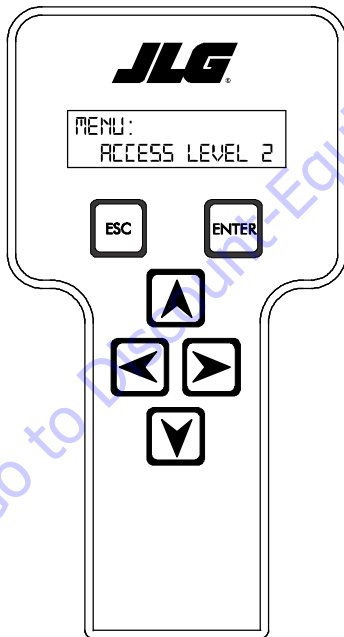



Boom Lift Down Aux Enable Crackpoint (BM LFT DN AUX EN)

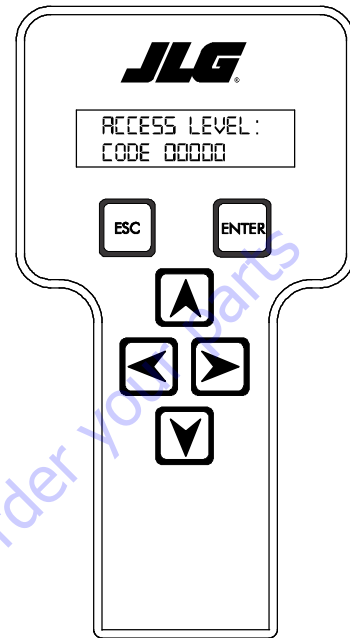
NOTE: To set crackpoints for Boom Lift Down Aux Enable, a JLG analyzer is needed. Have an assistant on hand to help verify that movement occurs.



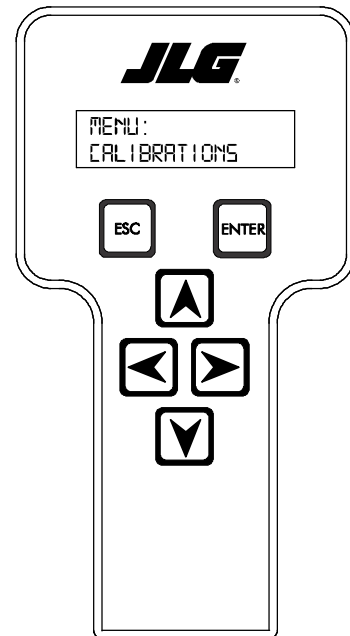
- Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.
- Scroll to MENU: OPERATOR ACCESS and press ENTER



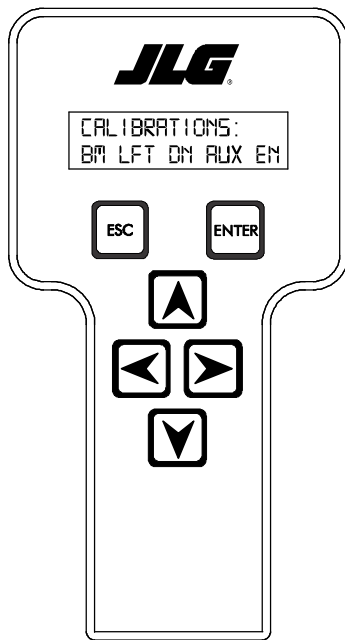
- Enter code 33271 and press ENTER .




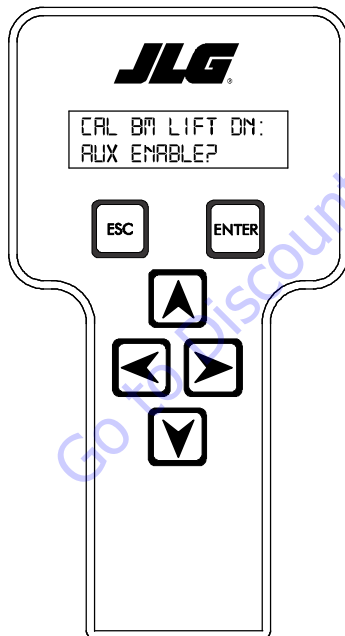
- Scroll to MENU: CALIBRATIONS and press ENTER .



5. Scroll to BM LFT DN AUX EN and press ENTER .



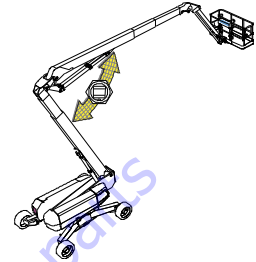
6. Press ENTER  to calibrate Main Lift Aux Enable crackpoint.



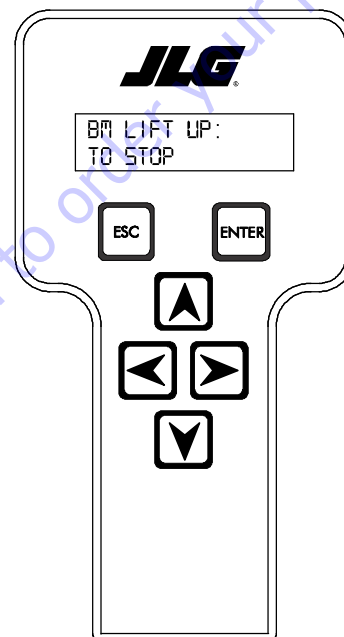
NOTICE

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

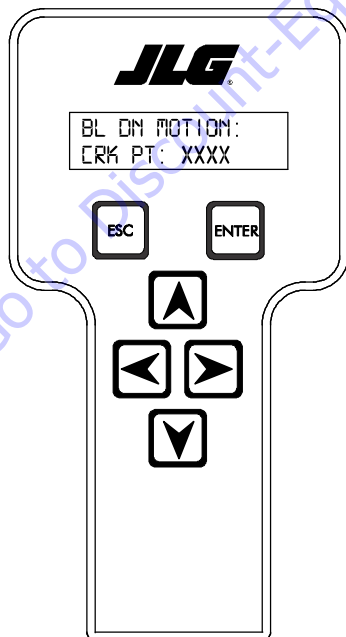
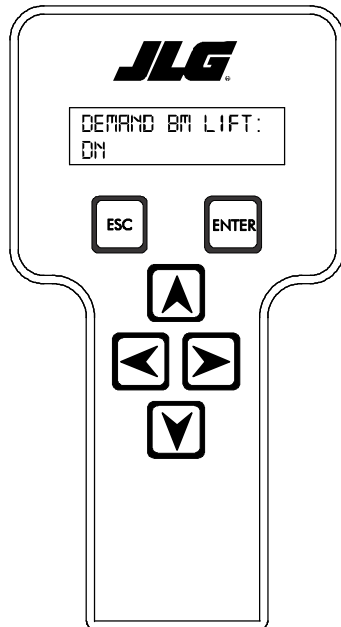
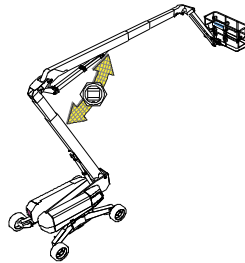
7. At the Ground Controls, press and hold the Lift Up toggle switch until the function stops. Release the Lift Up toggle switch. Press




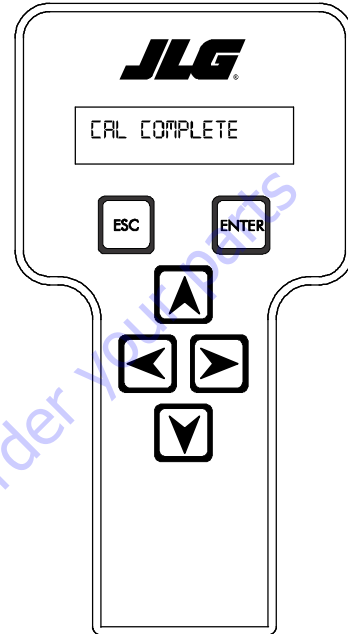
ENTER .



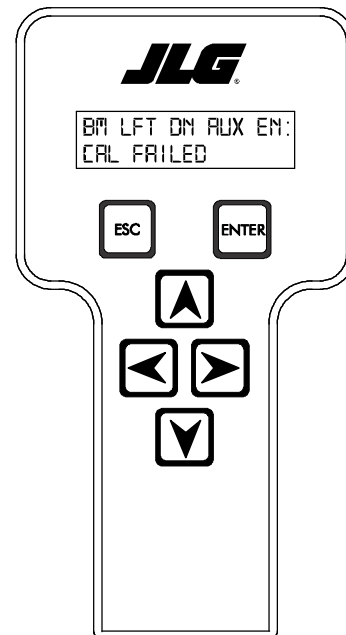
8. At the Ground Controls, press and hold the Lift Down toggle switch until the function starts moving. Release the Lift Down toggle switch. Press ENTER



9. This completes the Main Lift Aux Enable crackpoint procedure. Press ENTER  to return to the calibrations menu.





If calibration fails, the screen will read as follows and the problem causing the failure must be resolved and the crackpoint set again



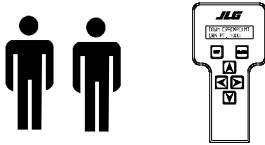
NOTE: If maximum limit is reached the number will stop increasing. Press ESC to exit the calibration.


SECTION 6 - JLG CONTROL SYSTEM

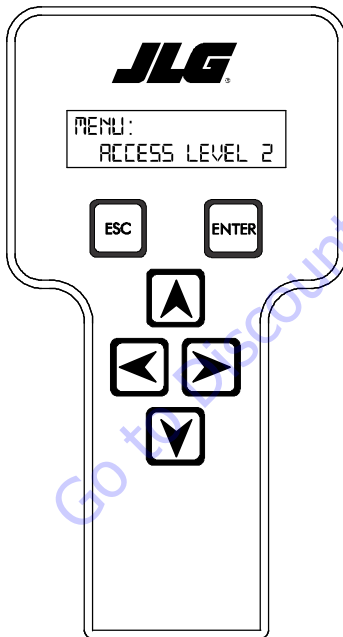
10. The crackpoint setting procedure for Main Lift Up and Down is complete. Press ESC  to exit calibrations.
11. Push in Power/Emergency Stop button to save the calibration changes. 


Tower Lift Down Enable (TWR LFT DN EN)

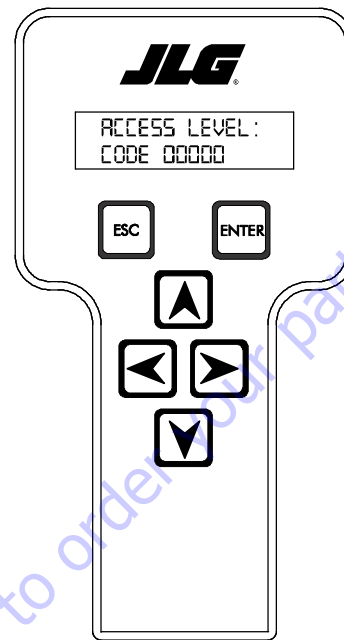
NOTE: To set crackpoints for Tower Lift Down, a JLG analyzer is needed. Have an assistant on hand to help verify that movement occurs.




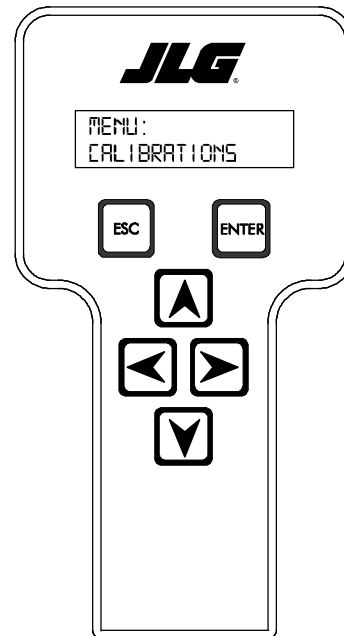
1. Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.
2. Scroll to MENU: OPERATOR ACCESS and press ENTER .



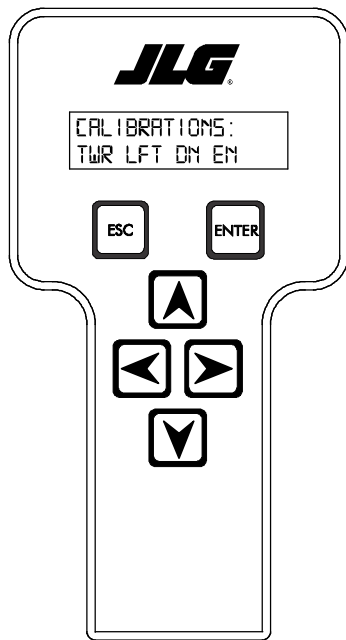
3. Enter code 33271 and press ENTER .



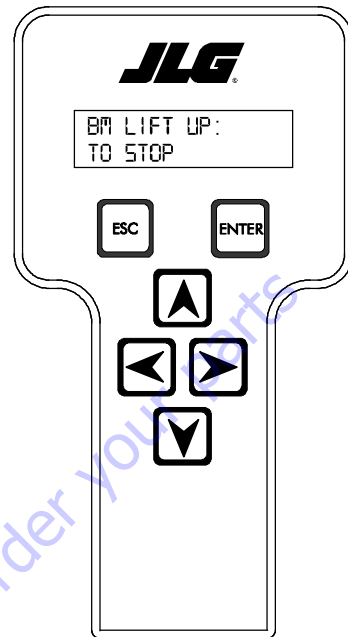
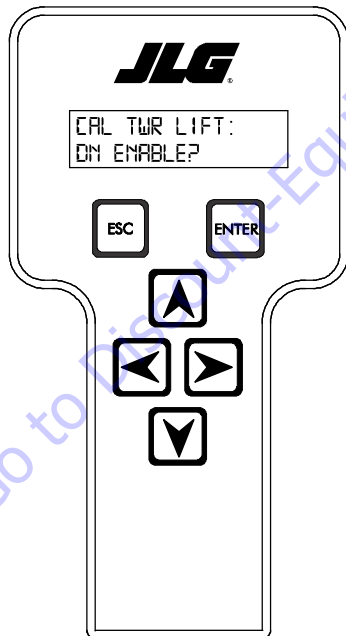
4. Scroll to MENU: CALIBRATIONS and press ENTER .



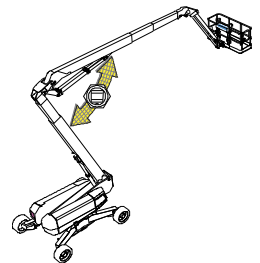
5. Scroll to TWR LFT DN EN and press ENTER .



6. Press ENTER .

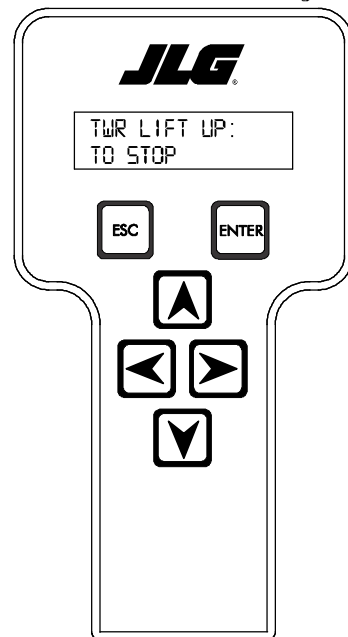


At the Ground Controls, press and hold the Boom Lift Up toggle switch until the function hits the stop. Release the Boom Lift Up toggle switch. ,



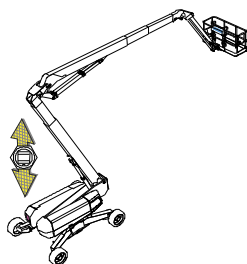
Press ENTER .

7. The screen will read:

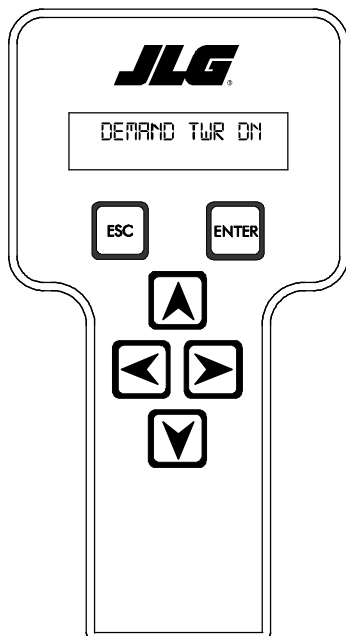


SECTION 6 - JLG CONTROL SYSTEM

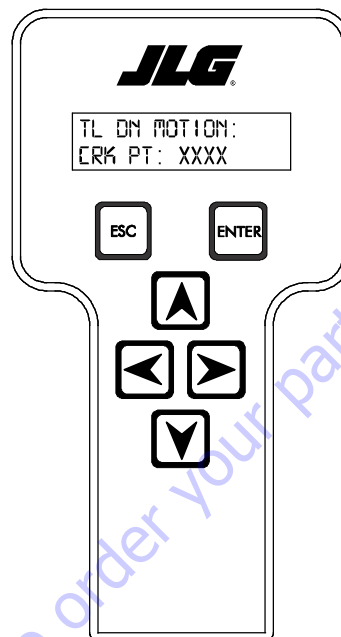
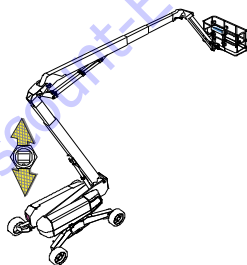
8. At the Ground Controls, press and hold the Tower Lift Up toggle switch until the function hits the stop. Release the Tower Lift Up toggle switch. Press ENTER



9. The screen will read:

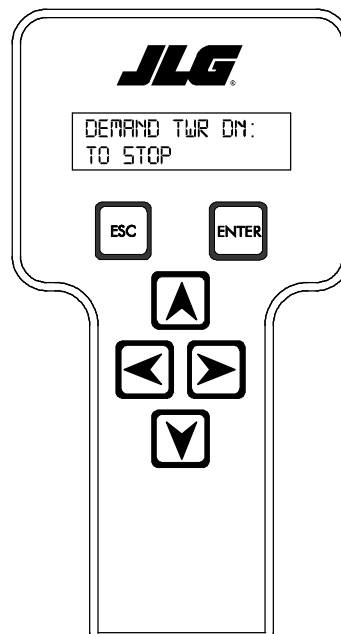


At the Ground Controls, press and hold the Tower Lift Down control switch until movement is detected. Release the Tower Down toggle switch.

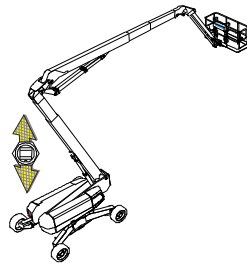



NOTE: If maximum limit is reached the number will stop increasing. Press ESC to exit the calibration.

10. Press ENTER



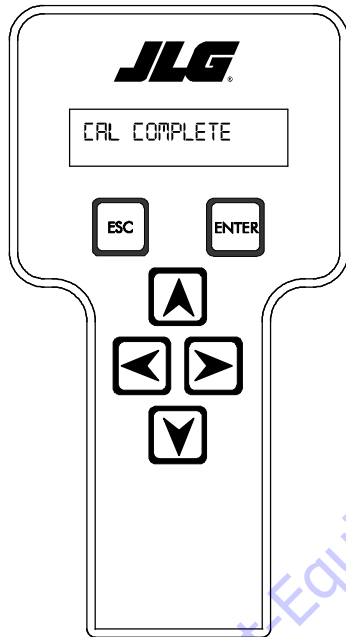
11. At the Ground Controls, press and hold the Tower Lift Down toggle switch until the function hits the stop. Release the Tower Lift toggle



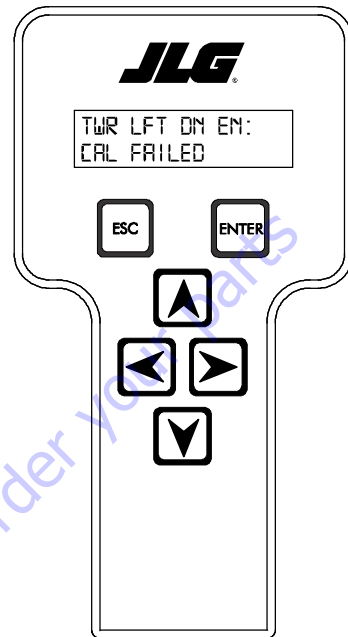
switch. Press ENTER .

12. This completes the Tower Lift Down Enable crackpoint

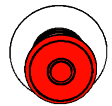
procedure. Press ENTER .



If calibration fails, the screen will read as follows and the problem causing the failure must be resolved and the crackpoint set again

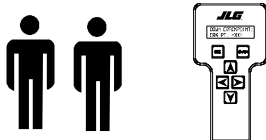


13. Push in Power/Emergency stop switch to save the calibration changes.

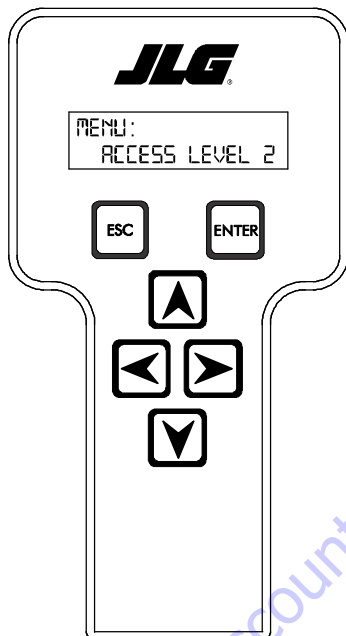


Tower Tele In Enable (TWR TEL IN EN)

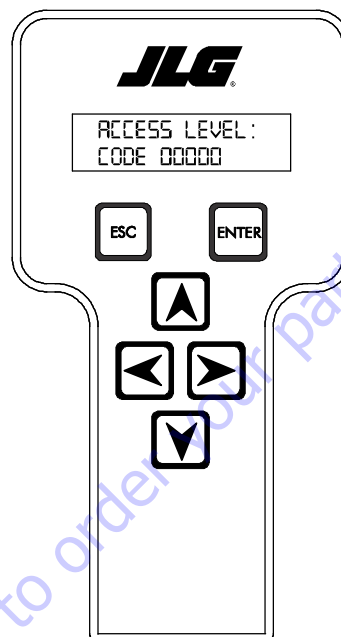
NOTE: To set crackpoints for Tower Telescope In Enable, a JLG analyzer is needed. Have an assistant on hand to help verify that movement occurs.



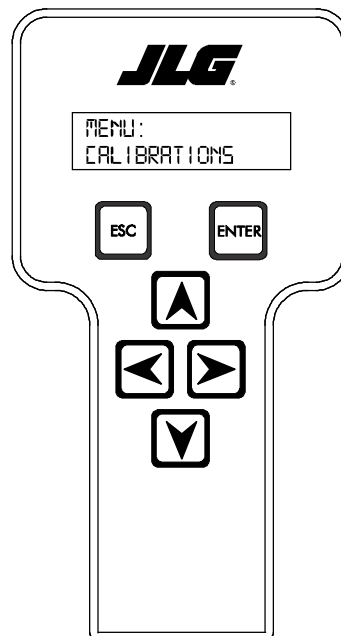
1. Connect the JLG analyzer to the machine at the Ground Controls. Start the engine.
2. Scroll to MENU: OPERATOR ACCESS and press ENTER




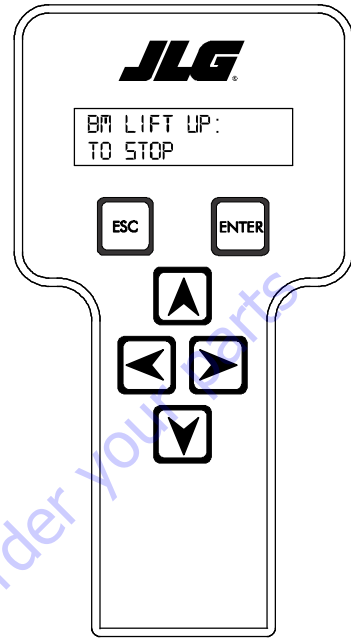
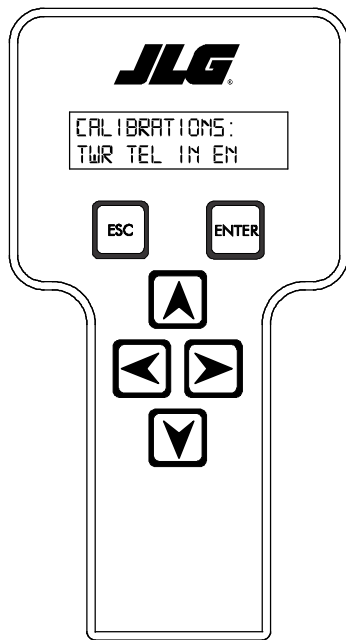
3. Enter code 33271 and press ENTER



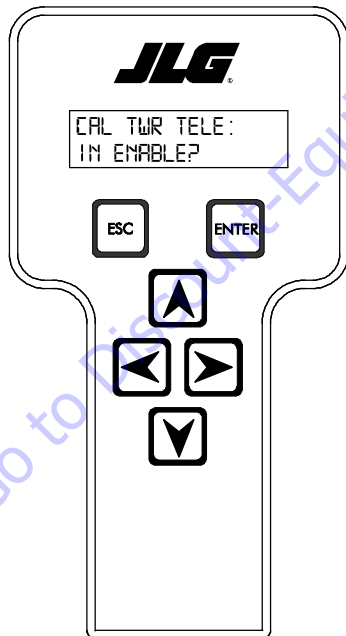
4. Scroll to MENU: CALIBRATIONS and press ENTER



5. Scroll to TWR TEL IN EN and press ENTER .

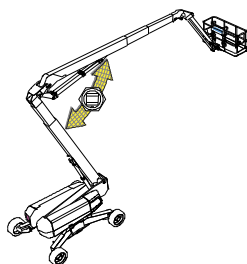


6. Press ENTER .

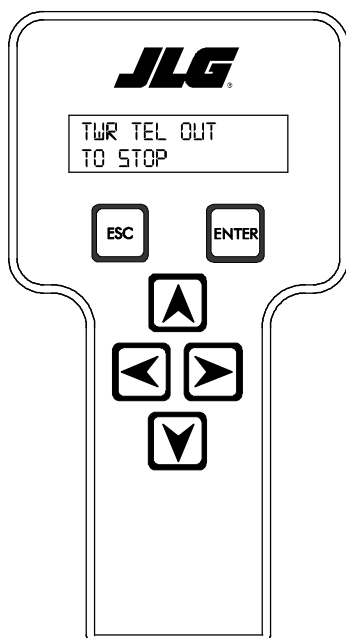


SECTION 6 - JLG CONTROL SYSTEM

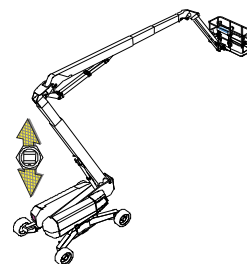
7. At the Ground Controls, press and hold the Boom Lift Up toggle switch until the function hits the stop. Release the Boom Lift Up toggle switch. Press ENTER



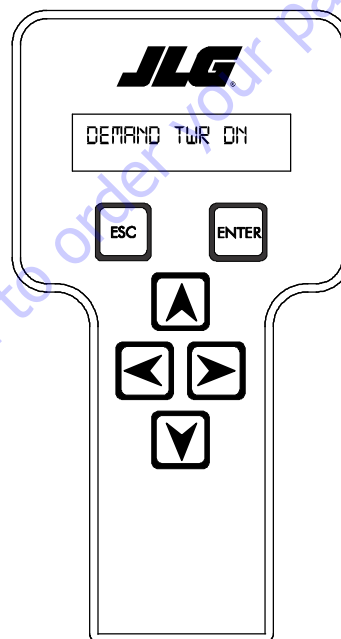
The screen will show.



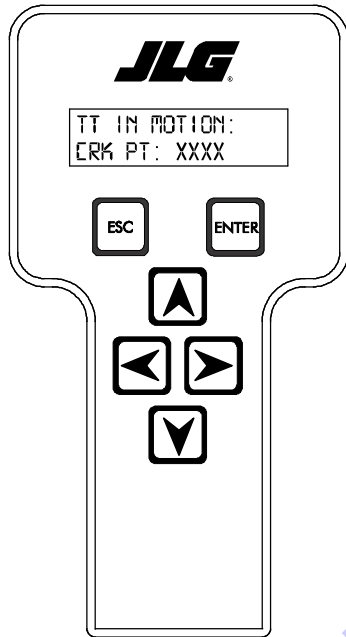
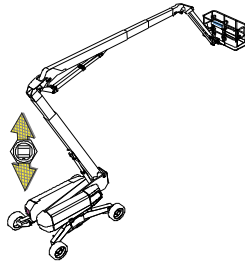
8. At the Ground Controls, press and hold the Tower Lift Up toggle switch until the function hits the stop. Release the Tower Tele Out toggle switch. Press ENTER




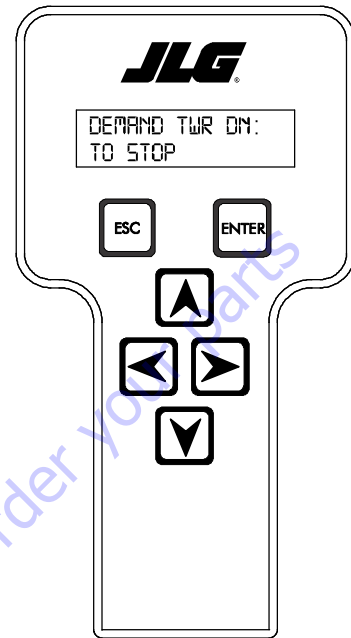
The screen will show.



9. At the Ground Controls, press and hold the Tower Lift Down toggle switch until the function starts moving. Release the Tower Tele In toggle switch. Press ENTER



10. Press ENTER 

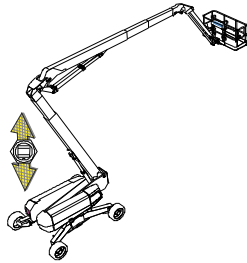


NOTE: If maximum limit is reached the number will stop increasing. Press ESC to exit the calibration.

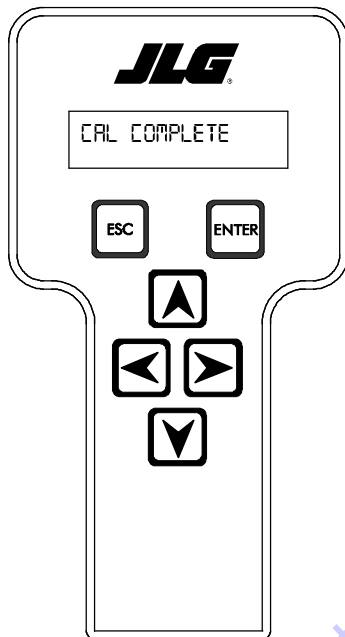
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SECTION 6 - JLG CONTROL SYSTEM

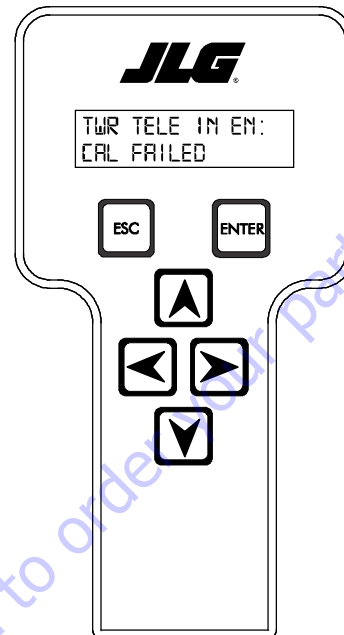
11. At the Ground Controls, press and hold the Tower Lift Down toggle switch until the function hits the stop. Release the Tower Lift Down toggle switch. Press ENTER



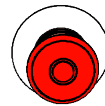
12. This completes the Tower Tele In Enable crackpoint procedure. Press ENTER



If calibration fails, the screen will read as follows and the problem causing the failure must be resolved and the crackpoint set again




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



6.21 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.

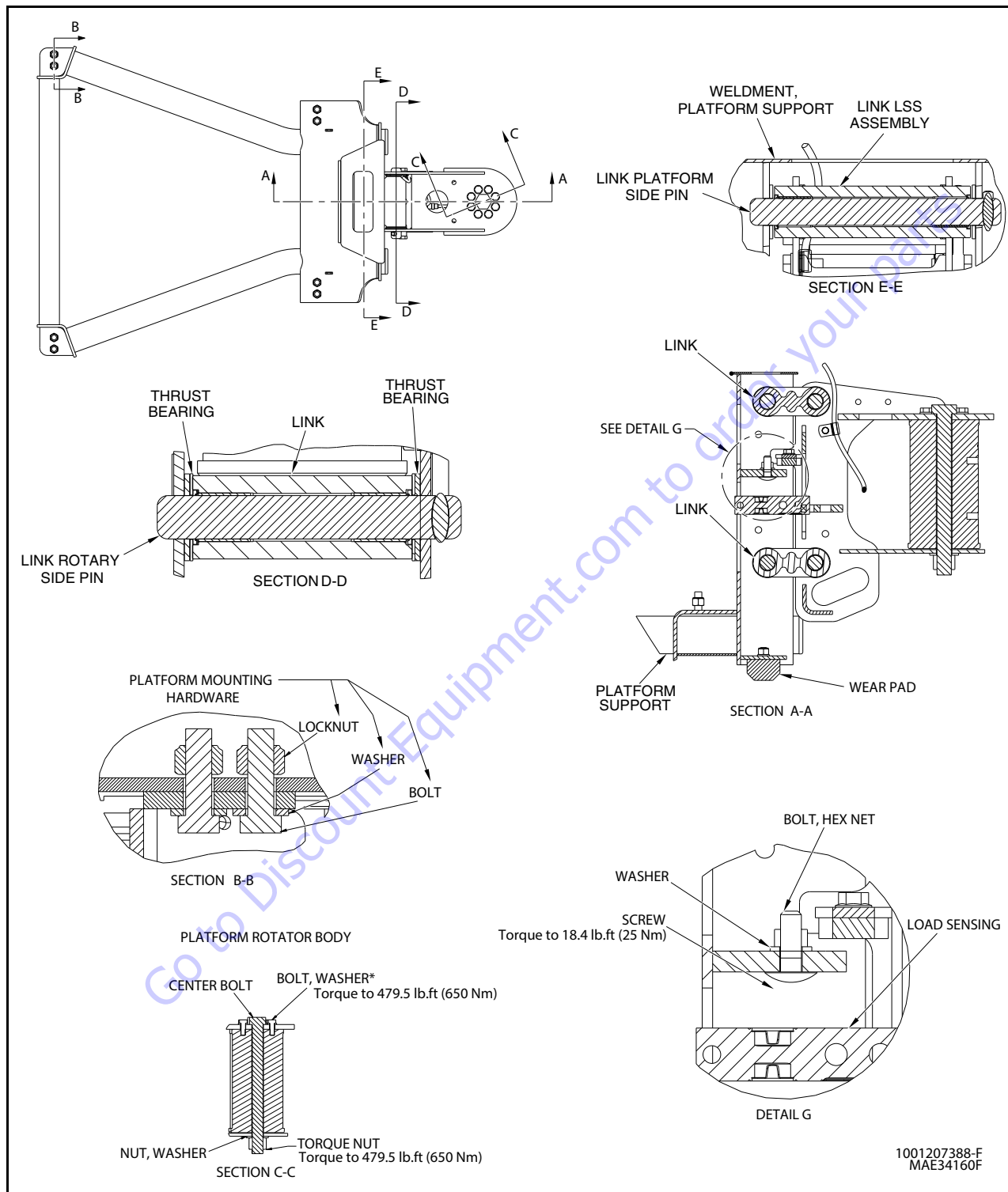


Figure 6-80. LSS Installation - Sheet 1 of 4

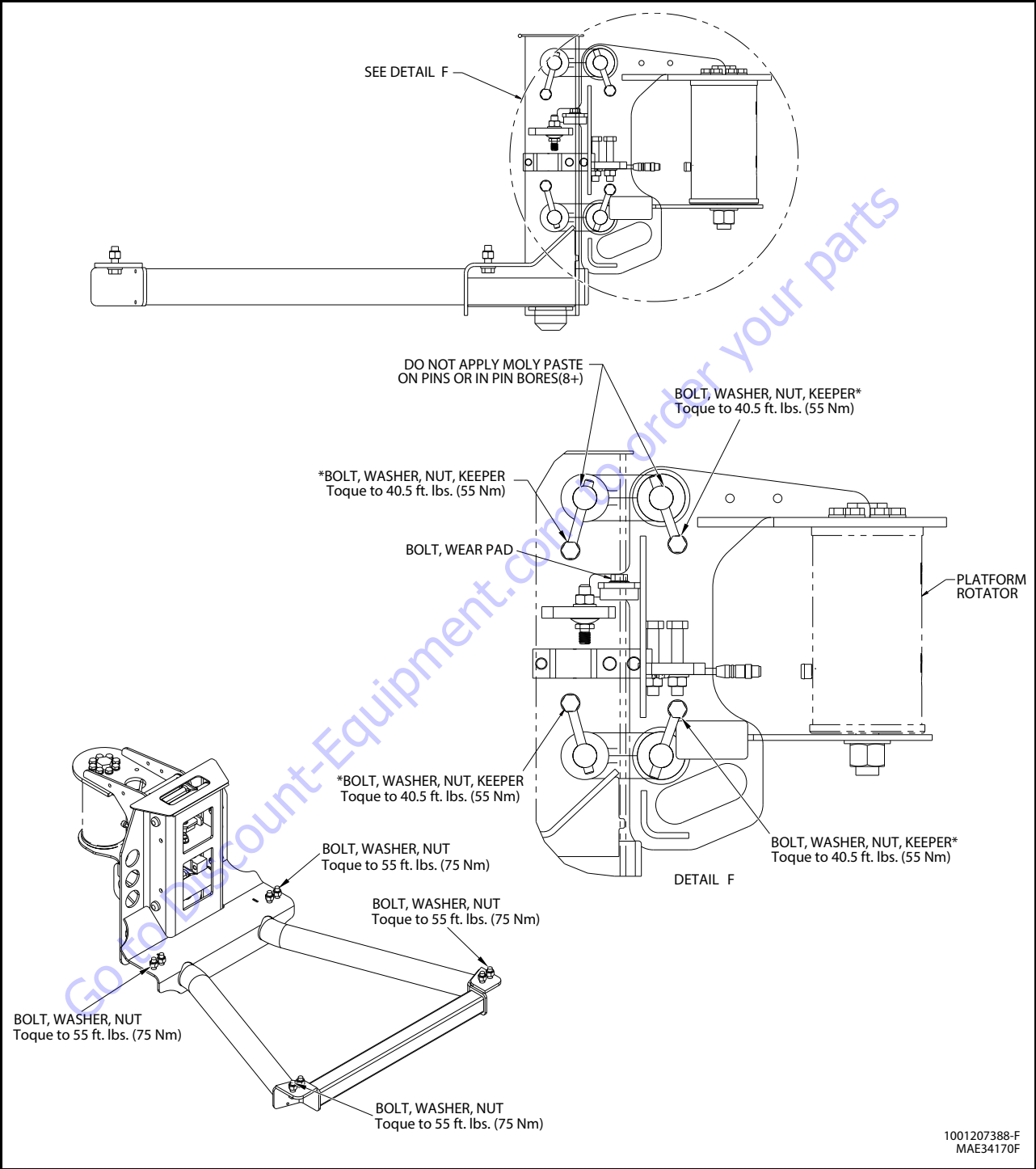


Figure 6-81. LSS Installation - Sheet 2 of 4

SECTION 6 - JLG CONTROL SYSTEM

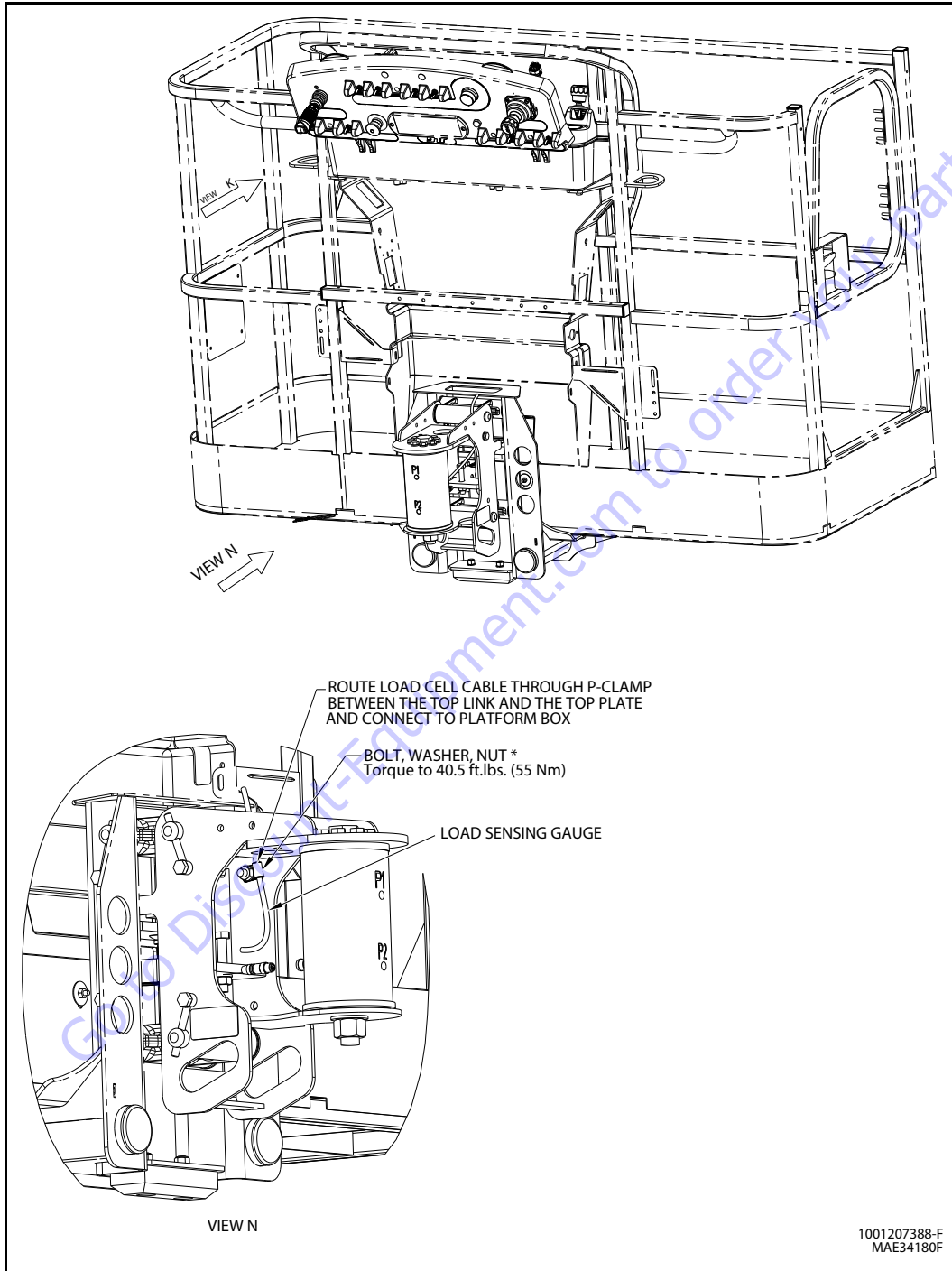


Figure 6-82. LSS Installation - Sheet 3 of 4

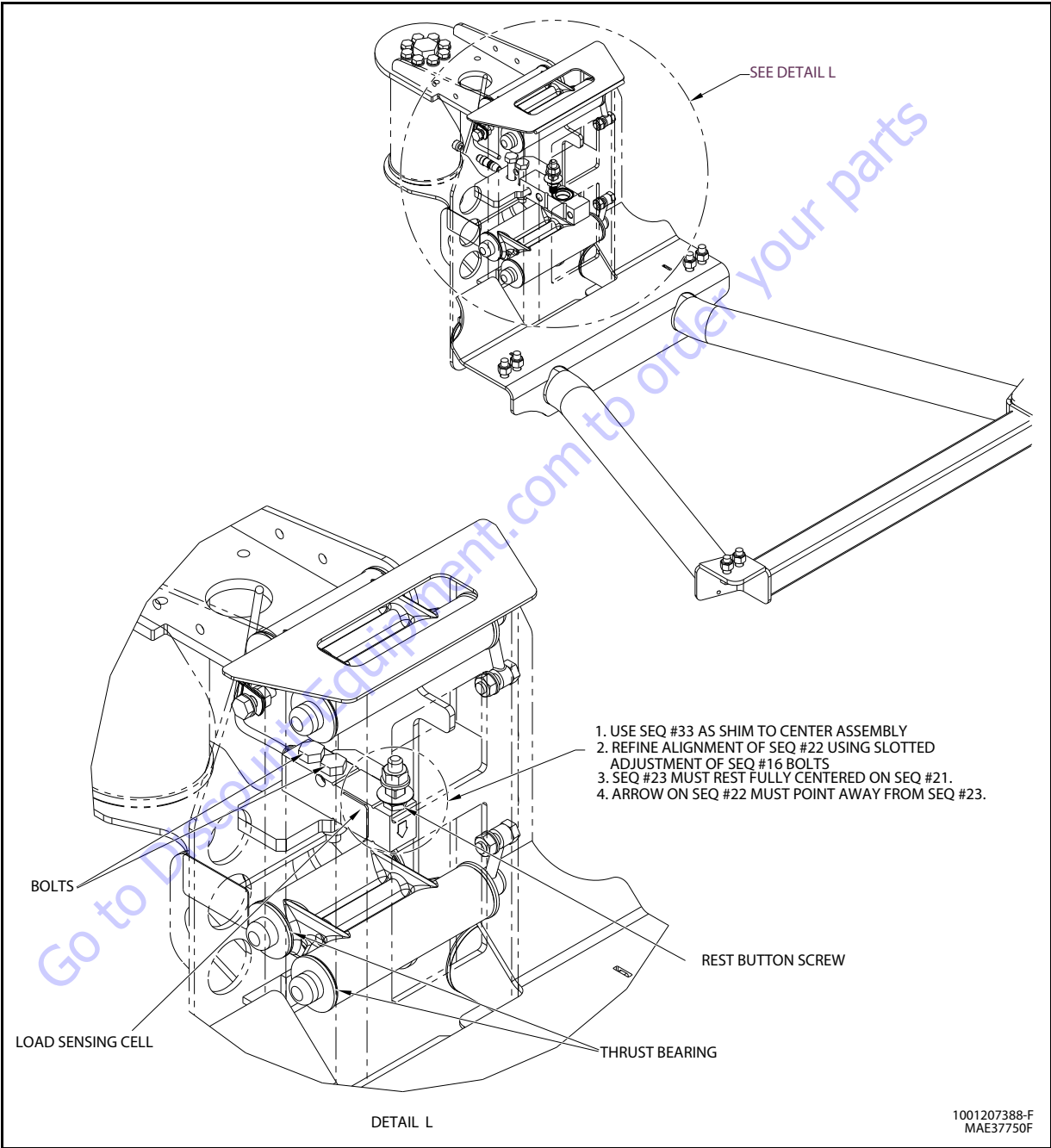




Figure 6-83. LSS Installation - Sheet 4 of 4

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 6-10, Diagnostic Menu Descriptions details the structure of the Diagnostic Menu, and describes the meaning of each piece of information presented.

Table 6-10. Diagnostic Menu Descriptions

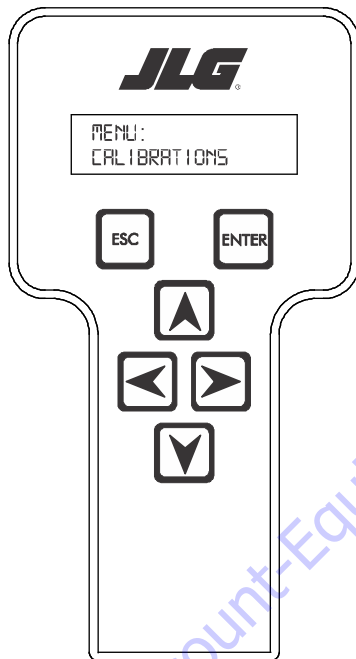
Diagnosics Menu (Displayed on Analyzer 1 st Line)	Parameter (Displayed on Analyzer 2 nd Line)	Parameter Value (Displayed on Analyzer 2 nd Line)	Description
PLATFORM LOAD	STATE:	OK / OVERLOAD	LSS Status.
PLATFORM LOAD	ACTUAL:	XXX.X KG	Calibrated weight of the platform. ??? if Platform Load is Unhealthy**.
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

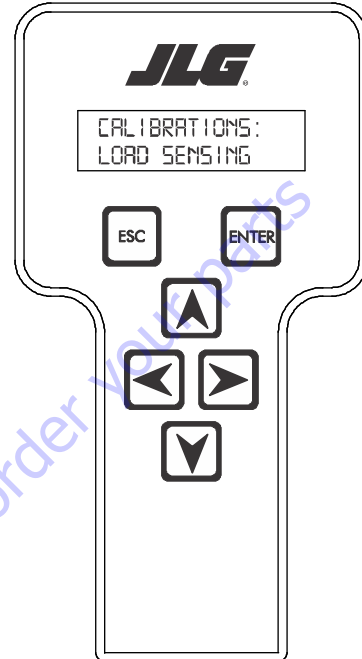
Calibration Procedure

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:

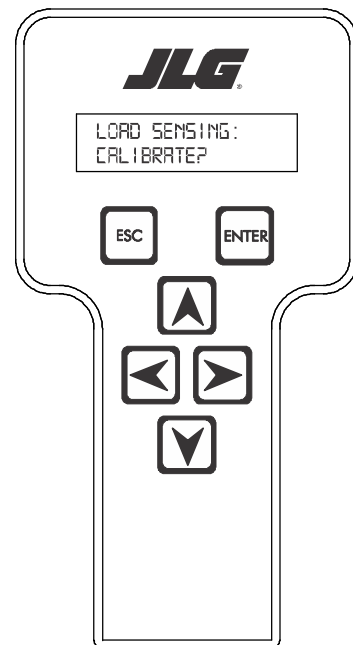


NOTE: The Calibration Menu is not available in OPERATOR ACCESS.


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




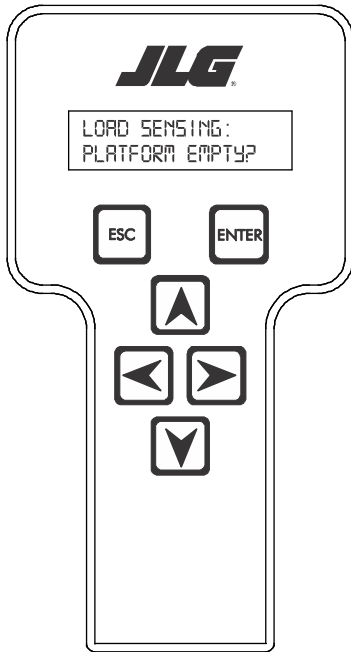
6. Press Enter . The Screen will read:




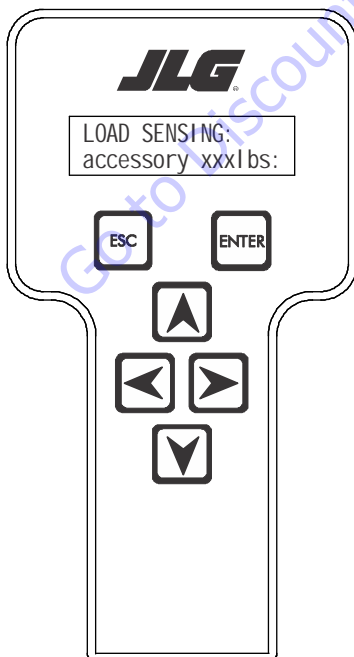
NOTE: Calibration will auto fail if LSS DTC's are active (443, 444, 4479, 4480, 663, 821, 822, 823, 824, 8218, 8222 -> 8238, 991, 992, 993, 994 or 99285).

Pressing the ESC key  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 . The analyzer screen will read:




8. If the platform is empty, press 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 6-11, 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 . The screen will read:

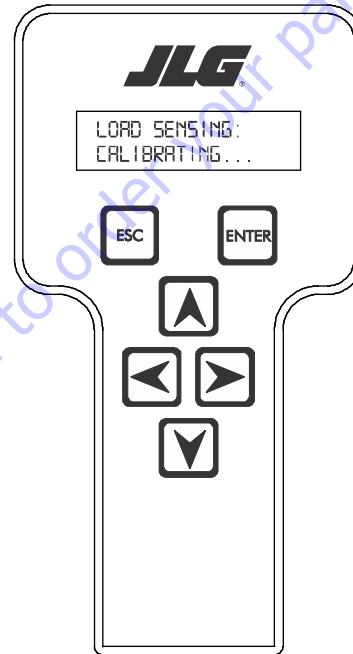


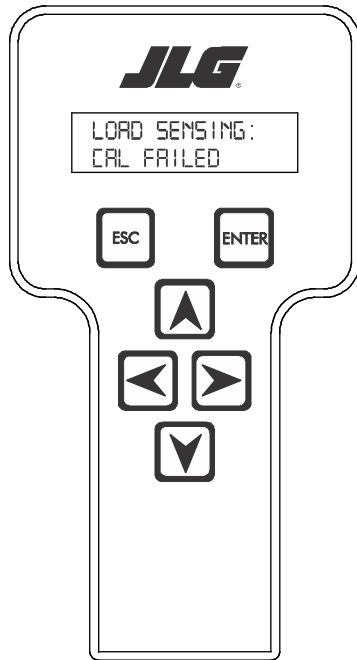
Table 6-11. Accessory Weights


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 SoftTouch	80 lb (36 kg)
WorkSurface	20 lb (9 kg)

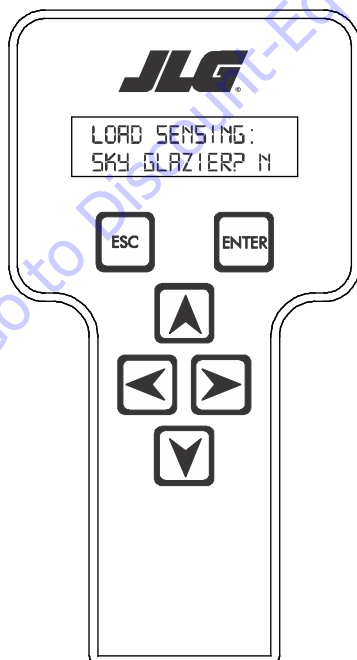
NOTE: Not all Accessories are available on every JLG model. Some Accessory combinations are prohibited due to excessive weight and/or load restriction. If any installed JLG Accessories are labeled with weight decals but are not listed in the table above, include their weight when entering the ACC WEIGHT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

- 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:

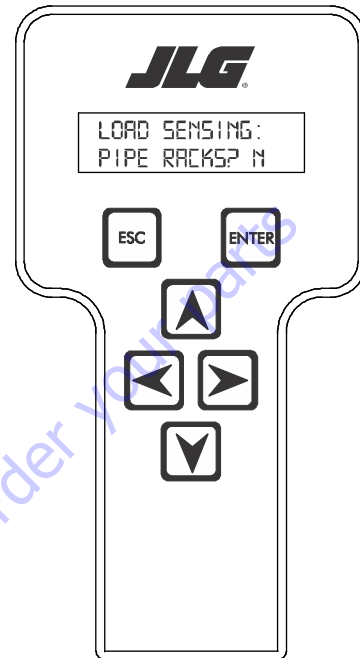


- Press ENTER . The control system will ask for installed accessories. The screen will show the following:




- Use the analyzer keys to select N for no or Y for yes. Press

ENTER . The screen will read:



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12. Use the analyzer keys to select N for no or Y for yes. Press

ENTER . The control system will default to an estimate of unrestricted capacity, which can be adjusted if necessary. Refer to Table 6-12, SkyGlazier Capacity Reductions and Table 6-13, Pipe Rack Capacity Reductions.

The screen will read:

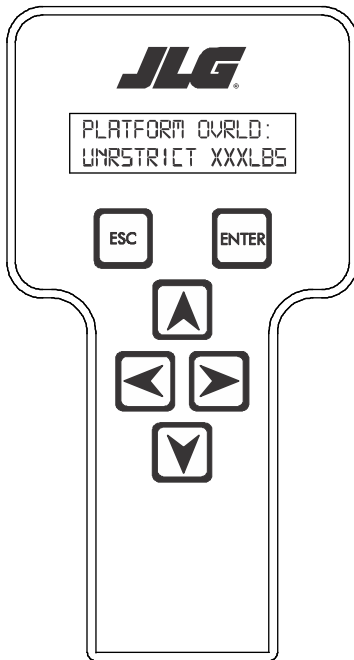


Table 6-12. SkyGlazier Capacity Reductions


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)

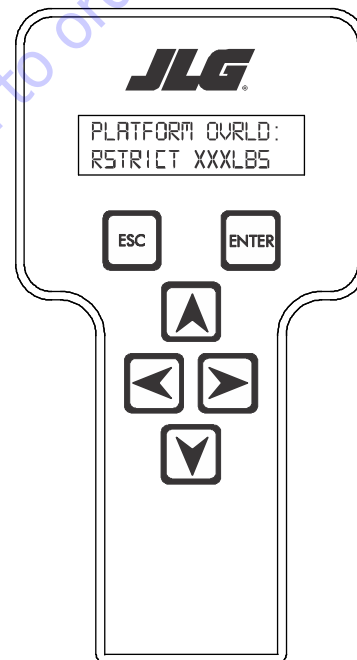
Note: If both SkyGlazier and Pipe Racks are configured, capacity will be the lower of the two values.


Table 6-13. Pipe Rack Capacity Reductions

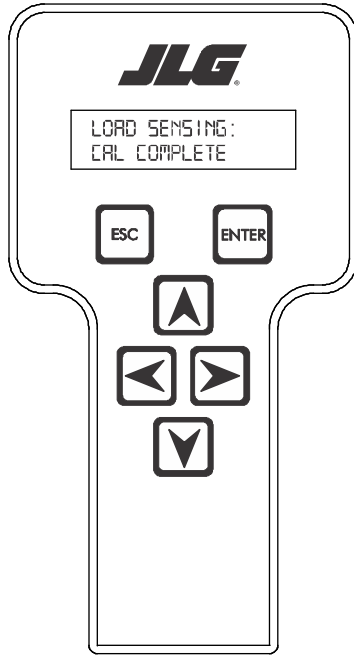
Capacity	PLATFORM OVRLD	PLATFORM OVRLD RESTRICT
500 lb (227 kg)	400 lb (181 kg)	n/a
550 lb (250 kg)	450 lb (204 kg)	n/a
600 lb (272 kg)	500 lb (227 kg)	n/a
750 lb (340 kg)	n/a	650 lb (295 kg)
1000 lb (454 kg)	n/a	900 lb (408 kg)

Note: If both SkyGlazier and Pipe Racks are configured, capacity will be the lower of the two values.

13. Press ENTER . The following screen will be displayed for restricted capacity, which can be adjusted if necessary. Refer to Table 6-12, SkyGlazier Capacity Reductions and Table 6-13, Pipe Rack Capacity Reductions.



14. Press ENTER . If calibration is successful, the screen will read:



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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 (± 7 kg). Further, the reading should be stable and should not vary by more than ± 2 lb (± 1 kg) (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 500lb (230kg) in the platform and ensure that PLTLOAD is with $\pm 5\%$ 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 6-14. LSS Troubleshooting Chart

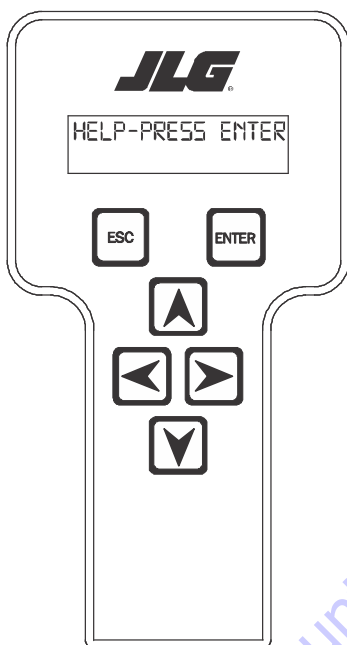
Difficulty	Possible Resolution
<p>Empty Platform Weight (DIAGNOSTICS, PLAT-FORM LOAD) is not within $\pm 15\text{lb}$ ($\pm 7\text{kg}$) of zero.</p> <p>or</p> <p>Platform Load readings (DIAGNOSTICS, PLTLOAD) are unstable by more than $\pm 2\text{lb}$ ($\pm 1\text{kg}$) (without the influence of vibration or wind).</p> <p>or</p> <p>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 $\pm 5\%$ of Rated Load when using calibrated weights.</p>	<p>The LSS System is unable to properly measure the platform weight.</p> <ol style="list-style-type: none"> 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 $\pm 2\text{lb}$ ($\pm 1\text{kg}$)) (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 ($>6000\text{lb}$ [$>2722\text{kg}$]).
<p>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.</p>	<p>The Control System is failing to regard the overload signal from the LSS System, or the signal is shorted.</p> <ol style="list-style-type: none"> 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).
<p>The Ground Audible Warning fails to sound, but the Platform Audible Warning sounds properly.</p>	<p>The Ground Alarm is missing or improperly installed. Verify that the device is mounted. Verify wiring from the Main Terminal Box and Ground Module.</p>
<p>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.</p>	<p>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.</p> <p>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.</p>



6.22 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.

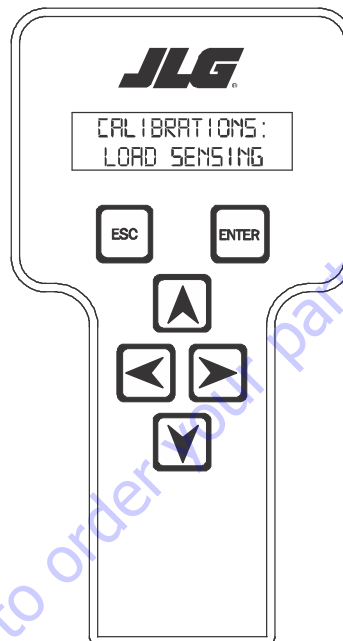
NOTE: If performing the procedure from the platform console, the Emergency Stop switch on the ground console must also be pulled out.

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



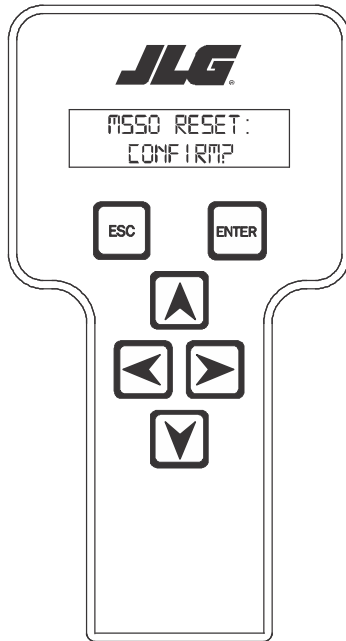
6. Use the arrow button to reach OPERATOR ACCESS. Press  Enter.
7. Enter the Access Code, 33271.
8. Use the right Arrow key to reach MENU: CALIBRATIONS. Press Enter .



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 . The screen will read:



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

6.23 ELECTRONIC PLATFORM LEVELING

Platform Leveling Fault Warning

The JLG Control System has an absolute check and a relative check for gravity vs protractor sensor disagreement. These checks functions so that if one or the other occurs the Disagreement DTC is reported. The absolute check is reported when the difference between the two is > 10 degrees at any time. The relative check works by taking a snapshot of the difference between the two sensors when a new leveling set point is taken. While the set point for leveling has not changed if the difference between the instantaneous sensor disagreement becomes greater than 5 degrees more than what the error was when the last set point is taken the DTC will be annunciated.

If the Leveling Protractor Sensor is determined to be unhealthy leveling will continue to function using the gravity sensor. If the Gravity sensor is determined to be unhealthy leveling will continue to function using only the protractor sensor. In each of these cases the leveling indicator will turn on, and the platform alarm will sound.

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 $\pm 5.5^\circ$ for more than 2 seconds when the platform is not in the transport position or 10 seconds in transport, the following events will occur:

1. The level system fault lamp will flash (to indicate that the leveling function has been lost).
2. The platform alarm will sound.
3. A system fault will be logged.
4. 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). Jib and Rotate functions are still allowed.

When the unit is in the transport position and driving and the current setpoint varies by $\pm 5.5^\circ$ for more than 10 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 Platform Level Up and Platform Level Down **Short to Battery and/or Open Circuit** Turning off the platform dump will cause the following to occur:
 - a. All Upper Functions (jib and platform rotate) are prevented.
2. 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. Machine will be put in to creep mode.
 - b. Level Warn indicator and platform alarm will sound.
 - c. Automatic Leveling is disabled.

3. 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)
4. 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 Upper Functions prevented (jib and platform rotate).
 - b. Level indicator on
 - c. Alarm on.
 - d. Machine placed in creep mode.

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.

SINGLE LEVELING SYSTEM SENSOR FAILURE

If the Leveling Protractor Sensor is determined to be unhealthy leveling will continue to function using the gravity sensor. If the Gravity sensor is determined to be unhealthy leveling will continue to function using only the protractor sensor. In each of these cases the leveling indicator will turn on, and the platform alarm will sound.

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.

6.24 DIAGNOSTIC TROUBLE CODE CHART

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
1	0	1	EVERYTHING OK	The normal help message in Platform Mode.	
10	0	10	RUNNING AT CUTBACK - OUT OF TRANSPORT POSITION	Drive speed is limited to "ELEVATED MAX" while the vehicle is out of transport position.	
20	0	0	TOWER ENVELOPE ENCROACHED - HYDRAULICS SUSPENDED	<p>Tower lift and telescope is in a position outside of its prescribed path. This fault is continuously monitored after boom sensor calibration and when electrical retrieval is not active</p> <p>There are two types of encroachments, Forward and Backward.</p> <p>Common machine reaction regardless of type of encroachment: Swing, Drive, Jib Lift, Jib Swing, Platform Rotate, Platform Level, Boom Lift, Boom Telescope and Normal Tower Path function are all disabled</p> <p>Forward encroachment: Tower telescope in and tower lift up are additionally disabled If the operator demands a tower lift up, tower telescope out shall be automatically commanded to get the machine back onto its tower path If the operator demands a tower lift down, tower lift down shall be commanded to get the machine back onto its tower path</p> <p>Backward encroachment:</p>	
49	0	0	SCR CLEANING REQUIRED	<p>If ignored the ECM will derate the engine and machine performance will be derated based on severity.</p> <p>ECM will clear fault once successful SCR Cleaning has been performed.</p> <p>The Engine Control Module is reporting that the SCR regular maintenance is due.</p>	Run SCR Cleaning via SCR Cleaning Switch on the ground panel or JLG Analyzer
50	0	50	BOOM UNLOCK REQUIRED	Triggers if machine is 1850S J and DTC 23127 and DTC 8413 become active	
0	0	0	<<< HELP COMMENT >>>		
11	0	11	FSW OPEN	A drive / boom function was selected with the Footswitch open.	
12	0	12	RUNNING AT CREEP - CREEP SWITCH OPEN	All functions at creep while the Creep Switch is open.	

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
13	0	13	RUNNING AT CREEP - TILTED AND ABOVE ELEVATION	All functions at creep while the Platform is elevated and the Chassis is tilted.	
0015	0	15	LOAD SENSOR READING UNDER WEIGHT	LSS has been calibrated and the UGM has determined that the load sensing system reading is less than -50lbs for 2 seconds. If the load sensing system determines that the reading is greater than -50lbs for 5 seconds this fault will no longer be annunciated. No control system interlocks present when DTC is active.	Ensure platform is not resting on the ground or is not leveled at an extreme negative angle. Re-calibrate the load sensing system if the above items are not a factor.
30	0	30	RUNNING AT CREEP - PLATFORM STOWED		
31	0	0	FUEL LEVEL LOW - ENGINE SHUTDOWN	Machine will shutdown the engine, based on configuration machine may allow restarting of the engine. The fuel level sensor is reporting empty as the fuel level.	Check Fuel Level
35	0	35	APU ACTIVE		
210	2	1	<<< POWER-UP >>>		
212	2	1	KEYSWITCH FAULTY	Both Platform and Ground modes are selected simultaneously.	
213	2	1	FSW FAULTY	Both Footswitches are closed for more than one second.	
220	2	2	<<< PLATFORM CONTROLS >>>		
221	2	2	FUNCTION PROBLEM - HORN PERMANENTLY SELECTED	The UGM detects the horn switch is permanently detected on power up in platform mode. Fault cleared once horn is not permanently selected.	Verify wiring is correct and no internal switch issue.
227	2	2	STEER SWITCHES FAULTY	Both Steer Left and Steer Right inputs are closed simultaneously.	
2211	2	2	FSW INTERLOCK TRIPPED	The Footswitch was closed for more than seven seconds.	- Can be reported during power-up.
2212	2	2	DRIVE LOCKED - JOYSTICK MOVED BEFORE FOOTSWITCH	A drive function was selected with Footswitch open.	- Can be reported during power-up.
2213	2	2	STEER LOCKED - SELECTED BEFORE FOOTSWITCH	A steer function was selected with Footswitch open.	
2215	2	2	D/S JOY. OUT OF RANGE LOW	The D/S Joystick reference volt-age is low.	- Resistive joysticks, these faults do not occur.
2216	2	2	D/S JOY. OUT OF RANGE HIGH	The D/S Joystick reference volt-age is > 8.1V.	- Resistive joysticks. - If the reference voltage is > 7.7V then the reference voltage is out of tolerance of a short to battery has occurred.
2217	2	2	D/S JOY. CENTER TAP BAD	The D/S Joystick center tap volt-age is < 3.08V or > 3.83V.	- Resistive joysticks. - There is a +/- 0.1V range. around these values due to resistor tolerances
2218	2	2	L/S JOY. OUT OF RANGE LOW	The L/S Joystick reference volt-age is low.	- Resistive joysticks, these faults do not occur.

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
2219	2	2	L/S JOY. OUT OF RANGE HIGH	The L/S Joystick reference volt- age is > 8.1V.	- Resistive joysticks. - If the reference voltage is > 7.7V then the reference voltage is out of tolerance of a short to battery has occurred.
2220	2	2	L/S JOY. CENTERTAP BAD	The L/S Joystick center tap volt- age is < 3.08V or > 3.83V.	- Resistive joysticks. - There is a +/- 0.1V range. around these values due to resistor tolerances
2221	2	2	LIFT/SWING LOCKED - JOYSTICK MOVED BEFORE FOOTSWITCH	A lift / swing function was selected with Footswitch open.	
2222	2	2	WAITING FORFSW TO BE OPEN	The Footswitch was closed during Platform selection.	- Can be reported during power- up.
2223	2	2	FUNCTION SWITCHES LOCKED - SELECTED BEFORE ENABLE	A boom function was selected with Footswitch open.	
2224	2	2	FOOTSWITCH SELECTED BEFORE START	The Footswitch was closed during engine start.	
230	2	3	<<<Ground Inputs >>>		
23103	2	3	TOWER LIFT CYLINDER – OVER PRESSURE	After the operator demanded tower lift up is complete, tower rod side pressure is monitored to see if rod-side pressure increases indicating a seal leak If rod-side pressure > 3000psi for 3sec Fault, once triggered, is maintained through key-cycle. Boom Unlock required Machine will be trapped in transport	Check hardware
23124	2	3	LIFT PRESSURE SENSOR - OUT OF RANGE LOW	<0.4V for 240ms Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check sensor hardware and wiring
23125	2	3	LIFT PRESSURE SENSOR - OUT OF RANGE HIGH	>4.5V for 240ms Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check sensor hardware and wiring
23126	2	3	LIFT ROD SIDE PRESSURE - NOT DETECTING CHANGE	On a tower lift down, tower rod side pressure does not change 20psi over 10sec Disable Tower path Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware
23127	2	3	LIFT CYLINDER - OVER PRESSURE	After the operator demanded tower lift up is complete, tower rod side pressure is monitored to see if rod-side pressure increases indicating a seal leak If rod-side pressure > 3000psi for 3sec Fault, once triggered, is maintained through key-cycle. Boom Unlock required Machine will be trapped in transport	Check hardware
23128	2	3	REDUCTION CHECK PRESSURE SENSOR - OUT OF RANGE LOW	Pressure sensor voltage output < 0.4V for 240ms	Check sensor hardware and wiring

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
23129	2	3	REDUCTION CHECK PRESSURE SENSOR - OUT OF RANGE HIGH	Pressure sensor voltage output > 4.5V for 240ms	Check sensor hardware and wiring
23130	2	3	REDUCTION CHECK PRESSURE SENSOR - HIGH	The control system detects that the pressure on the pressure reducing circuit is above 3400 PSI for 5 seconds. Machine is trapped in transport until issue resolved. Fault cleared on power cycle.	Verify Pressures are set correctly on pressure reducing hydraulic circuit
23131	2	3	REDUCTION CHECK PRESSURE SENSOR - LOW	The control system detects that the pressure on the pressure reducing circuit is less than 3400 PSI for 2 seconds. Machine is trapped in transport and drive speed reduced to elevated speed until issue resolved. Fault cleared on power cycle.	Verify Pressures are set correctly on pressure reducing hydraulic circuit
23163	2	3	FUNCTION PROBLEM - MSSO PERMANENTLY SELECTED		
23207	2	3	TOWER LIFT ROD SIDE PRESSURE SENSOR#1 - OUT OF RANGE HIGH	Sensor reading >4.6V for 240ms Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check hardware and wiring
23208	2	3	TOWER LIFT ROD SIDE PRESSURE SENSOR#1 - OUT OF RANGE LOW	Sensor reading <0.4V for 240ms Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check hardware and wiring
23209	2	3	TOWER LIFT ROD SIDE PRESSURE SENSOR#2 - OUT OF RANGE HIGH	Sensor reading >4.6V for 240ms Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check hardware and wiring
23210	2	3	TOWER LIFT ROD SIDE PRESSURE SENSOR#2 - OUT OF RANGE LOW	Sensor reading <0.4V for 240ms Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check hardware and wiring
23211	2	3	TOWER ROD SIDE PRESSURE DISAGREEMENT	Pressure sensors are healthy and difference between sensor readings is 150psi for 1sec Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check hardware and wiring

SECTION 6 - JLG CONTROL SYSTEM

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
23212	2	3	TOWER LIFT BARREL SIDE PRESSURE SENSOR#1 – OUT OF RANGE HIGH	Sensor reading >4.6V for 240ms Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check hardware and wiring
23213	2	3	TOWER LIFT BARREL SIDE PRESSURE SENSOR#1 – OUT OF RANGE LOW	Sensor reading <0.4V for 240ms Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check hardware and wiring
23214	2	3	TOWER LIFT BARREL SIDE PRESSURE SENSOR#2 – OUT OF RANGE HIGH	Sensor reading >4.6V for 240ms Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check hardware and wiring
23215	2	3	TOWER LIFT BARREL SIDE PRESSURE SENSOR#2 – OUT OF RANGE LOW	Sensor reading <0.4V for 240ms Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check hardware and wiring
23216	2	3	TOWER BARREL SIDE PRESSURE DISAGREEMENT	Pressure sensors are healthy and difference between sensor readings is 150psi for 1sec Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check hardware and wiring
23217*	2	3	ROD SIDE PRESSURE SENSOR – FAULTY	After the operator demand is complete (enable valve de-energized after a tower lift down or boom lift down) and footswitch still active, the flow control are directional valves are appropriately held for 3sec to check the tower lift enable valve. This diagnostic is run at the same time as DTC 33563 If Rod side pressure is greater than 1800psi or less than 1000psi, fault is detected Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check relief setting or pressure transducer
*This fault will not be active if Boom Sensors are not calibrated, a subsequent function is activated, any retrieval mode is active, any valves or sensors involved in the diagnostics are not healthy, ground mode is selected or dump valve is energized for less than 3sec after a function is complete					
23218	2	3	TOWER TELESCOPE CYLINDER – OVER PRESSURE	After the operator demanded tower lift up is complete, tower rod side pressure is monitored to see if rod-side pressure increases indicating a seal leak If rod-side pressure > 3000psi for 3sec Fault, once triggered, is maintained through key-cycle. Boom Unlock required Machine will be trapped in transport	Check hardware

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
23219	2	3	TOWER TELESCOPE ROD SIDE PRESSURE SENSOR – OUT OF RANGE HIGH	Sensor reading >4.6V for 240ms Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware
23220	2	3	TOWER TELESCOPE ROD SIDE PRESSURE SENSOR – OUT OF RANGE LOW	Sensor reading <0.4V for 240ms Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware
23225*	2	3	TOWER LIFT ROD SIDE PRESSURE SENSOR - FAULTY	After the operator demand is complete (enable valve de-energized after a tower lift down) and footswitch still active, the flow control are directional valves are appropriately held for 3sec to check the tower lift enable valve. This diagnostic is run at the same time as DTC 33143 If Rod side pressure is greater than 2500psi or less than 1200psi, fault is detected Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check relief setting or pressure transducer
*This fault will not be active if Boom Sensors are not calibrated, a subsequent function is activated, any retrieval mode is active, any valves or sensors involved in the diagnostics are not healthy, ground mode is selected or dump valve is energized for less than 3sec after a function is complete					
23226	2	3	TOWER LIFT ROD SIDE PRESSURE - NOT DETECTING CHANGE	On a tower lift down, tower rod side pressure does not change 20psi over 10sec Disable all tower lift function Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware
23229*	2	3	TOWER TELESCOPE ROD SIDE PRESSURE SENSOR – FAULTY	After the operator demand is complete (enable valve de-energized after a tower telescope in) and footswitch still active, the flow control are directional valves are appropriately held for 3sec to check the tower lift enable valve. This diagnostic is run at the same time as DTC 33163 If Rod side pressure is greater than 3000psi or less than 1500psi, fault is detected Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check relief setting or pressure transducer
*This fault will not be active if Boom Sensors are not calibrated, a subsequent function is activated, any retrieval mode is active, any valves or sensors involved in the diagnostics are not healthy, ground mode is selected or dump valve is energized for less than 3sec after a function is complete					
23230	2	3	TOWER TELESCOPE ROD SIDE PRESSURE - NOT DETECTING CHANGE	On a tower lift down, tower rod side pressure does not change 20psi over 10sec Disable all tower telescope function Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
23233	2	3	TOWERLIFT BARREL PRESSURE SENSOR #1 – PRESSURE TOO HIGH	This check is done to check the integrity of the rod side pressure transducer when the tower lifts down onto its rest. Tower is on the rest, operator has disengaged the tower lift demand, tower barrel side pressure sensors are healthy and both are within agreement: if barrel side pressure is > 300psi, fault is detected. Fault, once triggered, is maintained within a given key-cycle. Machine will be trapped in transport.	Check hardware
240	2	4	<<< OTHER CONTROLS >>>		
250	2	5	<<< FUNCTION PREVENTED >>>		
259	2	5	MODEL CHANGED - HYDRAULICS SUSPENDED - CYCLE EMS	The model selection has been changed.	
2513	2	5	GENERATOR MOTION CUTOUT ACTIVE	Driving is not possible while the vehicle generator is running AND is configured to prevent drive.	
2514	2	5	BOOM PREVENTED - DRIVE SELECTED	Boom functions are not possible while the vehicle is being driven AND is configured to not allow simultaneous drive & boom operation.	
2515	2	5	DRIVE PREVENTED - BOOM SELECTED	Driving is not possible while the vehicle above elevation AND is configured to prevent drive while above elevation.	
2516	2	5	DRIVE PREVENTED - ABOVE ELEVATION	Driving is not possible while Boom functions are selected AND is configured to not allow simultaneous drive & boom operation.	
2517	2	5	DRIVE PREVENTED - TILTED & ABOVE ELEVATION	Driving is not possible while the vehicle is tilted and above elevation AND is configured to prevent drive while tilted and above elevation.	
2521	2	5	JIB SWING PREVENTED - IN 1000# MODE	JIB Swing is not possible while the vehicle is in 1000 LB Mode.	
2522	2	5	CAN DONGLE ATTACHED - HYDRAULICS NOT RESTRICTED	CAN Dongle attached. Very limited restrictions for all hydraulics systems.	
2546	2	5	MACHINE SETUP FAULT - JIB SWING		
2547	2	5	MACHINE SETUP FAULT - MODEL		
2549	2	5	DRIVE & BOOM PREVENTED - SOFT TOUCH ACTIVE	The machine will cutout all boom and drive functions. Fault cleared once controls are returned to neutral and Soft Touch is not active. The UGM detects Soft Touch has been activated.	

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
2568	2	5	TEMPERATURE CUTOUT ACTIVE – AMBIENT TEMPERATURE TOO LOW	If the machine is Out of Transport and functions shall be suspended until returned to neutral at which time functions shall be in creep. If the machine is In Transport all functions are in creep except Drive and Steer. Fault cleared when ambient temperature is above the temperature cutout set point. The UGM receives an ambient temperature reading less than the temperature cutout set point (default -30°C).	
2576	2	5	PLATFORM LEVEL PREVENTED - ABOVE ELEVATION	Manual platform level override of more than 8 degrees from level has been attempted. Platform level in the direction of violation will be prevented.	
2577	2	5	PLATFORM LEVEL OVERRIDE CUTOFF - NOT CALIBRATED	Platform Level override Cutout is configured but has not been calibrated.	Calibrate Platform level override Cutout
2583	2	5	DRIVE PREVENTED – CRIBBING MODE ENABLED	The UGM detects Cribbing is enabled and drive or steer was demanded by the operator. Drive and steer are disabled when cribbing is enabled. Fault clears upon controls returning to neutral.	
2587	2	5	RUNNING AT CREEP - PLATFORM LEVELED UNDER	Machine will be put in creep. Fault cleared once platform is not leveled under. The control system has determined that the platform is leveled under and is being considered to be in a loading/unloading position. Boom, Tower, and Level Override functions will operate at creep speed.	Demand Platform Level up until level.
260	2	6	<<<Chassis Inputs>>>		
261	2	6	FRONT LEFT AXLE SWING SENSOR - VOLTAGE OUT OF RANGE LOW	Sensor output < 0.1V	Check sensor hardware and wiring
262	2	6	FRONT LEFT AXLE SWING SENSOR - VOLTAGE OUT OF RANGE HIGH	Sensor output > 4.9V	Check sensor hardware and wiring
263	2	6	FRONT RIGHT AXLE SWING SENSOR - VOLTAGE OUT OF RANGE LOW	Sensor output < 0.1V	Check sensor hardware and wiring
264	2	6	FRONT RIGHT AXLE SWING SENSOR - VOLTAGE OUT OF RANGE HIGH	Sensor output > 4.9V	Check sensor hardware and wiring
265	2	6	REAR LEFT AXLE SWING SENSOR - VOLTAGE OUT OF RANGE LOW	Sensor output < 0.1V	Check sensor hardware and wiring
266	2	6	REAR LEFT AXLE SWING SENSOR - VOLTAGE OUT OF RANGE HIGH	Sensor output > 4.9V	Check sensor hardware and wiring
267	2	6	REAR RIGHT AXLE SWING SENSOR - VOLTAGE OUT OF RANGE LOW	Sensor output < 0.1V	Check sensor hardware and wiring
268	2	6	REAR RIGHT AXLE SWING SENSOR - VOLTAGE OUT OF RANGE HIGH	Sensor output > 4.9V	Check sensor hardware and wiring

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
2611	2	6	FRONT LEFT AXLE SENSOR - NOT RESPONDING	<0.4deg travel detected for 5 seconds with a deploy or retract command	Check sensor hardware and wiring
2612	2	6	FRONT RIGHT AXLE SENSOR - NOT RESPONDING		Check sensor hardware and wiring
2613	2	6	REAR LEFT AXLE SENSOR - NOT RESPONDING		Check sensor hardware and wiring
2614	2	6	REAR RIGHT AXLE SENSOR - NOT RESPONDING		Check sensor hardware and wiring
2615	2	6	AXLE RETRACT POSITION - NOT CALIBRATED	Axles are not calibrated	Calibrate axles
2616	2	6	AXLE DEPLOY POSITION - NOT CALIBRATED	Axles are not calibrated	Calibrate axles
330	3	3	<<< GROUND OUTPUT DRIVER >>>		
331	3	3	BRAKE - SHORT TO BATTERY	There is a Short to Battery to the Brake Valve.	
332	3	3	BRAKE - OPEN CIRCUIT	There is an Open Circuit to the Brake Valve.	
3311	3	3	GROUND ALARM - SHORT TO BATTERY	There is a Short to Battery to the Ground Alarm.	-Ground Alarm equipped vehicles only.
33143*	3	3	TOWER LIFT ENABLE VALVE - STUCK OPEN	After the operator demand is complete (enable valve de-energized after a tower lift down) and footswitch still active, the flow control are directional valves are appropriately held for 3sec to check the tower lift enable valve If Tower cylinder angle changes by ≥ 1 deg, a stuck tower lift enable valve is detected Fault, once triggered, is maintained through key-cycle. Boom Unlock required Machine will be trapped in transport	Check hardware
*This fault will not be active if Boom Sensors are not calibrated, a subsequent function is activated, any retrieval mode is active, any valves or sensors involved in the diagnostics are not healthy, ground mode is selected or dump valve is energized for less than 3sec after a function is complete					
33150	3	3	LIFT PILOT VALVE – SHORT TO GROUND	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33151	3	3	LIFT PILOT VALVE – OPEN CIRCUIT	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33152	3	3	LIFT PILOT VALVE – SHORT TO BATTERY	Machine will inhibit certain diagnostic tests Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33159	3	3	MAIN LIFT ENABLE – SHORT TO GROUND	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
3316	3	3	RIGHT FORWARD DRIVE PUMP - SHORT TO GROUND (Right Forward Drive Coil)	Fault cleared by power cycle No machine response	Check Wiring

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
33160	3	3	MAIN LIFT ENABLE – OPEN CIRCUIT	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33161	3	3	MAIN LIFT ENABLE – SHORT TO BATTERY	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33163*	3	3	TOWER TELESCOPE ENABLED VALVE - STUCK OPEN	After the operator demand is complete (enable valve de-energized after a tower telescope in) and footswitch still active, the flow control directional valves are appropriately held for 3sec to check the tower lift enable valve If tower length changes by ≥ 6 in, a stuck tower telescope enable valve is detected Fault, once triggered, is maintained through key-cycle. Boom Unlock required Machine will be trapped in transport	Check hardware
*This fault will not be active if Boom Sensors are not calibrated, a subsequent function is activated, any retrieval mode is active, any valves or sensors involved in the diagnostics are not healthy, ground mode is selected or dump valve is energized for less than 3sec after a function is complete					
3317	3	3	RIGHT FORWARD DRIVE PUMP - OPEN CIRCUIT (Right Forward Drive Coil)	Fault cleared by power cycle No machine response	Check Wiring
3318	3	3	RIGHT FORWARD DRIVE PUMP - SHORT TO BATTERY (Right Forward Drive Coil)	Fault cleared by power cycle Engine will be shutdown and not permitted to restart while fault active	Check Wiring
33190	3	3	TELESCOPE IN VALVE – SHORT TO GROUND	Machine will disable all Boom Telescope function Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
3320	3	3	RIGHT REVERSE DRIVE PUMP - SHORT TO GROUND (Right Reverse Drive Coil)	Fault cleared by power cycle No machine response	Check Wiring
3321	3	3	RIGHT REVERSE DRIVE PUMP - OPEN CIRCUIT (Right Reverse Drive Coil)	Fault cleared by power cycle No machine response	Check Wiring
3322	3	3	RIGHT REVERSE DRIVE PUMP - SHORT TO BATTERY (Right Reverse Drive Coil)	Fault cleared by power cycle Engine will be shutdown and not permitted to restart while fault active	Check Wiring
3324	3	3	LEFT FORWARD DRIVE PUMP - SHORT TO GROUND (Left Forward Drive Coil)	Fault cleared by power cycle No machine response	Check Wiring
3325	3	3	LEFT FORWARD DRIVE PUMP - OPEN CIRCUIT (Left Forward Drive Coil)	Fault cleared by power cycle No machine response	Check Wiring
3326	3	3	LEFT FORWARD DRIVE PUMP - SHORT TO BATTERY (Left Forward Drive Coil)	Fault cleared by power cycle Engine will be shutdown and not permitted to restart while fault active	Check Wiring
3328	3	3	LEFT REVERSE DRIVE PUMP - SHORT TO GROUND (Left Reverse Drive Coil)	Fault cleared by power cycle No machine response	Check Wiring
3329	3	3	LEFT REVERSE DRIVE PUMP - OPEN CIRCUIT (Left Reverse Drive Coil)	Fault cleared by power cycle No machine response	Check Wiring

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
333	3	3	MAIN LIFT UP VALVE – SHORT TO BATTERY	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
3330	3	3	LEFT REVERSE DRIVE PUMP - SHORT TO BATTERY (Left Reverse Drive Coil)	Fault cleared by power cycle Engine will be shutdown and not permitted to restart while fault active	Check Wiring
33307	3	3	TELESCOPE FLOW CONTROL VALVE – SHORT TO GROUND	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33311	3	3	MAIN LIFT FLOW CONTROL VALVE – SHORT TO GROUND	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33312	3	3	MAIN LIFT FLOW CONTROL VALVE - OPEN CIRCUIT	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring
33313	3	3	MAIN LIFT FLOW CONTROL VALVE – SHORT TO BATTERY	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
3336	3	3	ALTERNATOR/ECM POWER - SHORT TO GROUND	There is a Short to Ground to the Alternator/ECM.	
3338	3	3	ALTERNATOR POWER - OPEN CIRCUIT	There is an Open Circuit to the Alternator.	
3339	3	3	ALTERNATOR POWER - SHORT TO BATTERY	There is a Short to Battery to the Alternator	
334	3	3	MAIN LIFT UP VALVE – OPEN CIRCUIT	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
3340	3	3	AUX POWER - SHORT TO GROUND	There is a Short to Ground to the Auxiliary Power Pump Relay.	
33406	3	3	MAIN LIFT UP VALVE – SHORT TO GROUND	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33407	3	3	MAIN LIFT DOWN VALVE – SHORT TO GROUND	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
3341	3	3	AUX POWER - OPEN CIRCUIT	There is an Open Circuit to the Auxiliary Power Pump Relay.	
3342	3	3	AUX POWER - SHORT TO BATTERY	There is a Short to Battery to the Auxiliary Power Pump Relay.	
3343	3	3	COLD START ADVANCE SOLENOID - SHORT TO GROUND	There is a Short to Ground to the Cold Start Advance Solenoid.	-CAT engines only.

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
3344	3	3	COLD START ADVANCE SOLENOID - OPEN CIRCUIT	There is an Open Circuit to the Cold Start Advance Solenoid.	- CAT engines only.
3345	3	3	COLD START ADVANCE SOLENOID - SHORT TO BATTERY	There is a Short to Battery to the Cold Start Advance Solenoid.	- CAT engines only.
3349	3	3	ELECTRIC PUMP - SHORT TO GROUND	There is a Short to Ground to the Pump Relay.	- CAT engines only.
335	3	3	LIFT DOWN VALVE – SHORT TO BATTERY	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
3350	3	3	ELECTRIC PUMP - OPEN CIRCUIT	There is an Open Circuit to the Pump Relay.	- CAT engines only.
3351	3	3	ELECTRIC PUMP - SHORT TO BATTERY	There is a Short to Battery to the Pump Relay.	- CAT engines only.
33563*	3	3	LIFT ENABLED VALVE STUCK OPEN -	After the operator demand is complete (enable valve de-energized after a tower lift down or boom lift down) and footswitch still active, the flow control are directional valves are appropriately held for 3sec to check the tower lift enable valve If Boom angle with respect to tower changes by ≥ 1 deg, a stuck boom lift enable valve is detected Fault, once triggered, is maintained through key-cycle. Boom Unlock required Machine will be trapped in transport	Check hardware
*This fault will not be active if Boom Sensors are not calibrated, a subsequent function is activated, any retrieval mode is active, any valves or sensors involved in the diagnostics are not healthy, ground mode is selected or dump valve is energized for less than 3sec after a function is complete					
33564*	3	3	COUNTER BALANCE VALVE – STUCK OPEN	After an operator demanded boom lift down or tower lift down is complete, this is the last valve check performed With the boom lift enable valve energized and if boom angle with respect to tower changes by ≥ 1 deg, a stuck boom lift enable valve is detected Fault, once triggered, is maintained through key-cycle. Boom Unlock required Machine will be trapped in transport	Check hardware
*This faults will not be active if the respective pilot valve or sensor is faulty, footswitch is active or if another function is activated					
3358	3	3	MAIN DUMP VALVE - SHORT TO GROUND	There is a Short to Ground to the Main Dump Valve.	
3359	3	3	MAIN DUMP VALVE - OPEN CIRCUIT	There is an Open Circuit to the Main Dump Valve.	
336	3	3	MAIN LIFT DOWN VALVE – OPEN CIRCUIT	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
3360	3	3	MAIN DUMP VALVE - SHORT TO BATTERY	There is a Short to Battery to the Main Dump Valve.	

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
3361	3	3	BRAKE - SHORT TO GROUND	There is a Short to Ground to the Brake Valve.	
3362	3	3	START SOLENOID - SHORT TO GROUND	There is a Short to Ground to the Start Relay.	- Diesel engines only.
3363	3	3	START SOLENOID - OPEN CIRCUIT	There is an Open Circuit to the Start Relay.	- Diesel engines only.
3364	3	3	START SOLENOID - SHORT TO BATTERY	There is a Short to Battery to the Start Relay.	- Diesel engines only.
33678*	3	3	TOWER LIFT COUNTER BALANCE VALVE – STUCK OPEN	After the operator demanded tower lift down is complete, this is the last valve check performed With enable valve energized and if tower cylinder angle changes by ≥ 1 deg, a stuck tower lift counterbalance valve is detected Fault, once triggered, is maintained through key-cycle. Boom Unlock required Machine will be trapped in transport	Check hardware
*This faults will not be active if the respective pilot valve or sensor is faulty, footswitch is active or if another function is activated					
33679*	3	3	TOWER TELESCOPE COUNTER BALANCE VALVE – STUCK OPEN	After the operator demanded tower lift down is complete, this is the last valve check performed With the tower lift enable valve energized and if tower length changes by ≥ 6 in Fault, once triggered, is maintained through key-cycle. Boom Unlock required Machine will be trapped in transport	Check hardware
*This faults will not be active if the respective pilot valve or sensor is faulty, footswitch is active or if another function is activated					
3368	3	3	LIFT DOWN DECOMPRESSION – SHORT TO GROUND	Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33680	3	3	TELESCOPE IN VALVE – SHORT TO BATTERY OR OPEN CIRCUIT	Machine will disable all Boom Telescope Out function. Boom Telescope In function will be activated using Boom Telescope In Override valve Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33682	3	3	LIFT DOWN DECOMPRESSION VALVE – SHORT TO BATTERY OR OPEN CIRCUIT	Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33683	3	3	LIFT DOWN DECOMPRESSION – SHORT TO GROUND	Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
3369	3	3	TWO SPEED VALVE - OPEN CIRCUIT	There is an Open Circuit to the Two Speed Valve.	
33691	3	3	LIFT UP OVERRIDE VALVE – OPEN CIRCUIT		Check Wiring
33692	3	3	LIFT UP OVERRIDE VALVE – SHORT TO BATTERY		Check Wiring

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
33693	3	3	LIFT UP OVERRIDE VALVE – SHORT TO GROUND		Check Wiring
3370	3	3	TWO SPEED VALVE - SHORT TO BATTERY	There is a Short to Battery to the Two Speed Valve.	
3371	3	3	GROUND ALARM - SHORT TO GROUND	There is a Short to Ground to the Ground Alarm.	- Ground Alarm equipped vehicles only.
3372	3	3	GROUND ALARM - OPEN CIRCUIT	There is an Open Circuit to the Ground Alarm.	- Ground Alarm equipped vehicles only.
3373	3	3	GEN SET/WELDER - SHORT TO GROUND	There is a Short to Ground to the Generator Relay.	- Generator / Welder equipped vehicles only.
3374	3	3	GEN SET/WELDER - OPEN CIRCUIT	There is an Open Circuit to the Generator Relay.	- Generator / Welder equipped vehicles only.
3375	3	3	GEN SET/WELDER - SHORT TO BATTERY	There is a Short to Battery to the Generator Relay.	- Generator / Welder equipped vehicles only.
3376	3	3	HEAD TAIL LIGHT - SHORT TO GROUND	There is a Short to Ground to the Head Light Relay.	- Head Light equipped vehicles only.
3377	3	3	HEAD TAIL LIGHT - OPEN CIRCUIT	There is an Open Circuit to the Head Light Relay.	- Head Light equipped vehicles only.
3378	3	3	HEAD TAIL LIGHT - SHORT TO BATTERY	There is a Short to Battery to the Head Light Relay.	- Head Light equipped vehicles only.
3379	3	3	HOUR METER - SHORT TO GROUND	There is a Short to Ground to the Hour Meter.	
3380	3	3	HOUR METER - OPEN CIRCUIT	There is an Open Circuit to the Hour Meter.	- Can be reported during power-up.
3381	3	3	HOUR METER - SHORT TO BATTERY	There is a Short to Battery to the Hour Meter.	
3385	3	3	PLATFORM LEVEL UP OVERRIDE VALVE - SHORT TO GROUND	There is a Short to Ground to the Platform Level Up Override Valve.	- Electronic leveling system equipped vehicles only.
3386	3	3	PLATFORM LEVEL UP OVERRIDE VALVE - OPEN CIRCUIT	There is an Open Circuit to the Platform Level Up Override Valve.	- Electronic leveling system equipped vehicles only.
3387	3	3	PLATFORM LEVEL UP OVERRIDE VALVE - SHORT TO BATTERY	There is a Short to Battery to the Platform Level Up Override Valve.	- Electronic leveling system equipped vehicles only.
3391	3	3	PLATFORM LEVEL DOWN OVERRIDE VALVE - SHORT TO GROUND	There is a Short to Ground to the Platform Level Down Override Valve.	- Electronic leveling system equipped vehicles only.
3392	3	3	PLATFORM LEVEL DOWN OVERRIDE VALVE - OPEN CIRCUIT	There is an Open Circuit to the Platform Level Down Override Valve.	- Electronic leveling system equipped vehicles only.
3393	3	3	PLATFORM LEVEL DOWN OVERRIDE VALVE - SHORT TO BATTERY	There is a Short to Battery to the Platform Level Down Override Valve.	- Electronic leveling system equipped vehicles only.
3394	3	3	PLATFORM ROTATE LEFT VALVE - SHORT TO GROUND	There is a Short to Ground to the Platform Rotate Left Valve.	
3395	3	3	PLATFORM ROTATE LEFT VALVE - OPEN CIRCUIT	There is an Open Circuit to the Platform Rotate Left Valve.	
3396	3	3	PLATFORM ROTATE LEFT VALVE - SHORT TO BATTERY	There is a Short to Battery to the Platform Rotate Left Valve.	
3397	3	3	PLATFORM ROTATE RIGHT VALVE - SHORT TO GROUND	There is a Short to Ground to the Platform Rotate Right Valve.	
3398	3	3	PLATFORM ROTATE RIGHT VALVE - OPEN CIRCUIT	There is an Open Circuit to the Platform Rotate Right Valve.	

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
3399	3	3	PLATFORM ROTATE RIGHT VALVE - SHORT TO BATTERY	There is a Short to Battery to the Platform Rotate Right Valve.	
33100	3	3	JIB LIFT UP VALVE - SHORT TO GROUND	The control system detects a Short to Ground at this output. This DTC is only detectable at start up and during System Test If out of transport and in platform mode all functions will operate at creep speed. If in transport or operating in ground mode all functions will operate at normal speed. Fault, once triggered, is maintained within a given key cycle.	Check Wiring
33101	3	3	JIB LIFT UP VALVE - OPEN CIRCUIT	The control system detects an Open Circuit at this output. The control system will allow jib lift in the opposite direction of the failed valve. If out of transport and in platform mode all functions will operate at creep speed. If in transport or operating in ground mode all functions will operate at normal speed. Fault, once triggered, is maintained within a given key cycle. Machine will be trapped in Transport.	Check Wiring
33102	3	3	JIB LIFT UP VALVE - SHORT TO BATTERY	The control system detects a Short to Battery at this output. The control system will close the platform dump valve thereby restricting jib swing, jib lift, platform rotate, and platform level If out of transport and in platform mode all functions will operate at creep speed. If in transport or operating in ground mode all functions will operate at normal speed. Fault, once triggered, is maintained within a given key cycle. Machine will be trapped in Transport.	Check Wiring

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
33103	3	3	JIB LIFT DOWN VALVE - SHORT TO GROUND	<p>The control system detects a Short to Ground at this output.</p> <p>This DTC is only detectable at start up and during System Test</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p>	Check Wiring
33104	3	3	JIB LIFT DOWN VALVE - OPEN CIRCUIT	<p>The control system detects an Open Circuit at this output.</p> <p>The control system will allow jib lift in the opposite direction of the failed valve.</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p> <p>Machine will be trapped in Transport.</p>	Check Wiring
33105	3	3	JIB LIFT DOWN VALVE - SHORT TO BATTERY	<p>The control system detects a Short to Battery at this output.</p> <p>The control system will close the platform dump valve thereby restricting jib swing, jib lift, platform rotate, and platform level</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p> <p>Machine will be trapped in Transport.</p>	Check Wiring
33106	3	3	TOWER LIFT UP VALVE - SHORT TO GROUND	<p>Machine will disable all Tower functions</p> <p>Fault, once triggered, is maintained within a given key-cycle</p> <p>Machine will be trapped in transport</p>	Check Wiring
33107	3	3	TOWER LIFT UP VALVE - OPEN CIRCUIT	<p>Machine will disable all Tower functions</p> <p>Fault, once triggered, is maintained within a given key-cycle</p> <p>Machine will be trapped in transport</p>	Check Wiring

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
33108	3	3	TOWERLIFT UP VALVE – SHORT TO BATTERY	Machine will disable all Tower functions Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33109	3	3	TOWERLIFT DOWN VALVE – SHORT TO GROUND	Machine will disable all Tower Lift functions Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33110	3	3	TOWERLIFT DOWN VALVE – OPEN CIRCUIT	Machine will disable all Tower Lift functions Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33111	3	3	TOWERLIFT DOWN VALVE – SHORT TO BATTERY	Machine will disable all Tower Lift Up and Telescope Out functions Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33112	3	3	TOWER TELESCOPE IN VALVE – SHORT TO GROUND	Machine will disable all Boom Telescope function Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33113	3	3	TOWER TELESCOPE IN VALVE – OPEN CIRCUIT	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33114	3	3	TOWER TELESCOPE IN VALVE – SHORT TO BATTERY	Machine will disable all Tower Lift Up and Telescope Out functions Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33115	3	3	TOWER TELESCOPE OUT VALVE – SHORT TO GROUND	Machine will disable all Tower Lift Up and Telescope Out function Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33116	3	3	TOWER TELESCOPE OUT VALVE – OPEN CIRCUIT	Machine will disable all Tower Lift Up and Telescope Out function Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33117	3	3	TOWER TELESCOPE OUT VALVE – SHORT TO BATTERY	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33120	3	3	MAIN TELESCOPE IN VALVE - SHORT TO BATTERY	There is a Short to Battery to the Main Telescope In Valve.	
33123	3	3	MAIN TELESCOPE OUT VALVE - SHORT TO BATTERY	There is a Short to Battery to the Main Telescope Out Valve.	

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
33130	3	3	THROTTLE ACTUATOR - SHORT TO GROUND	There is a Short to Ground to the Throttle Actuator.	
33131	3	3	THROTTLE ACTUATOR - OPEN CIRCUIT	There is an Open Circuit to the Throttle Actuator.	
33132	3	3	THROTTLE ACTUATOR - SHORT TO BATTERY	There is a Short to Battery to the Throttle Actuator.	
33133	3	3	PLATFORM CONTROL VALVE - SHORT TO GROUND	<p>The control system detects a Short to Ground at this output.</p> <p>The control system will sound the platform alarm, turn the platform level warn indicator on, and close the platform dump valve thereby restricting jib swing, jib lift, platform rotate, and platform level</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p>	Check Wiring
33134	3	3	PLATFORM CONTROL VALVE - OPEN CIRCUIT	<p>The control system detects an Open Circuit at this output.</p> <p>The control system will sound the platform alarm, turn the platform level warn indicator on, and close the platform dump valve thereby restricting jib swing, jib lift, platform rotate, and platform level</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p> <p>Machine will be trapped in Transport.</p>	Check Wiring

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
33135	3	3	PLATFORM CONTROL VALVE - SHORT TO BATTERY	<p>The control system detects a Short to Battery at this output.</p> <p>The control system will sound the platform alarm, turn the platform level warn indicator on, and close the platform dump valve thereby restricting jib swing, jib lift, platform rotate, and platform level</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p> <p>Machine will be trapped in Transport.</p>	Check Wiring
33144	3	3	TOWER LIFT ENABLE VALVE - SHORT TO GROUND	<p>Machine will disable all Tower functions</p> <p>Fault, once triggered, is maintained within a given key-cycle</p> <p>Machine will be trapped in transport</p>	Check wiring
33145	3	3	TOWER LIFT ENABLE VALVE - OPEN CIRCUIT	<p>Machine will disable all Tower functions</p> <p>Fault, once triggered, is maintained within a given key-cycle</p> <p>Machine will be trapped in transport</p>	Check wiring
33146	3	3	TOWER LIFT ENABLE VALVE - SHORT TO BATTERY	<p>Machine will disable all Tower functions</p> <p>Fault, once triggered, is maintained within a given key-cycle</p> <p>Machine will be trapped in transport</p>	Check wiring
33153	3	3	LIFT DOWN AUX VALVE - SHORT TO GROUND	<p>There is a Short to Ground to the Lift Down Auxiliary Valve.</p>	- Gravity Lift Down equipped vehicles only.
33154	3	3	LIFT DOWN AUX VALVE - OPEN CIRCUIT	<p>There is an Open Circuit to the Lift Down Auxiliary Valve.</p>	- Gravity Lift Down equipped vehicles only.
33155	3	3	LIFT DOWN AUX VALVE - SHORT TO BATTERY	<p>There is a Short to Battery to the Lift Down Auxiliary Valve.</p>	- Gravity Lift Down equipped vehicles only.
33159	3	3	MAIN LIFT ENABLE VALVE - SHORT TO GROUND	<p>Machine will be put into Hydraulic Retrieval</p> <p>Fault, once triggered, is maintained within a given key-cycle</p> <p>Machine will be trapped in transport</p>	Check wiring
33160	3	3	MAIN LIFT ENABLE VALVE - OPEN CIRCUIT	<p>Machine will be put into Hydraulic Retrieval</p> <p>Fault, once triggered, is maintained within a given key-cycle</p> <p>Machine will be trapped in transport</p>	Check wiring
33164	3	3	TOWER TELESCOPE ENABLE VALVE - SHORT TO GROUND	<p>Machine will disable all Tower functions</p> <p>Fault, once triggered, is maintained within a given key-cycle</p> <p>Machine will be trapped in transport</p>	Check wiring
33165	3	3	TOWER TELESCOPE ENABLE VALVE - OPEN CIRCUIT	<p>Machine will disable all Tower functions</p> <p>Fault, once triggered, is maintained within a given key-cycle</p> <p>Machine will be trapped in transport</p>	Check wiring

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
33166	3	3	TOWER TELESCOPE ENABLE VALVE – SHORT TO BATTERY	Machine will disable all Tower functions Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33173	3	3	RESTRICTED TO TRANSPORT - AXLE LOCK-OUT VALVE - SHORT TO BATTERY OR OPEN CIRCUIT	There is a Short to Battery or an Open Circuit to the Axle Lockout Valve.	
33174	3	3	RESTRICTED TO TRANSPORT - BRAKE - SHORT TO BATTERY OR OPEN CIRCUIT	There is a Short to Battery or an Open Circuit to the Brake.	
33175	3	3	JIB ROTATE LEFT VALVE - OPEN CIRCUIT	The control system detects an Open Circuit at this output. The control system will allow jib rotate in the opposite direction of the failed valve. If out of transport and in platform mode all functions will operate at creep speed. If in transport or operating in ground mode all functions will operate at normal speed. Fault, once triggered, is maintained within a given key cycle. Machine will be trapped in Transport.	Check Wiring
33176	3	3	JIB ROTATE LEFT VALVE - SHORT TO BATTERY	The control system detects a Short to Battery at this output. The control system will close the platform dump valve thereby restricting jib swing, jib lift, platform rotate, and platform level If out of transport and in platform mode all functions will operate at creep speed. If in transport or operating in ground mode all functions will operate at normal speed. Fault, once triggered, is maintained within a given key cycle. Machine will be trapped in Transport.	Check Wiring
33177	3	3	JIB ROTATE LEFT VALVE - SHORT TO GROUND	The control system detects a Short to Ground at this output. This DTC is only detectable at start up and during System Test If out of transport and in platform mode all functions will operate at creep speed. If in transport or operating in ground mode all functions will operate at normal speed. Fault, once triggered, is maintained within a given key cycle.	Check Wiring

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
33178	3	3	JIB ROTATE RIGHT VALVE - OPEN CIRCUIT	<p>The control system detects an Open Circuit at this output.</p> <p>The control system will allow jib rotate in the opposite direction of the failed valve. If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p> <p>Machine will be trapped in Transport.</p>	Check Wiring
33179	3	3	JIB ROTATE RIGHT VALVE - SHORT TO BATTERY	<p>The control system detects a Short to Battery at this output.</p> <p>The control system will close the platform dump valve thereby restricting jib swing, jib lift, platform rotate, and platform level. If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p> <p>Machine will be trapped in Transport.</p>	Check Wiring
33180	3	3	JIB ROTATE RIGHT VALVE - SHORT TO GROUND	<p>The control system detects a Short to Ground at this output.</p> <p>This DTC is only detectable at start up and during System Test</p> <p>Fault, once triggered, is maintained within a given key cycle.</p>	Check Wiring
33182	3	3	LIFT VALVES - SHORT TO BATTERY		
33186	3	3	MAINT ETELESCOPE OUT VALVE - OPEN CIRCUIT	There is an Open Circuit to the Main Telescope Out Valve.	
33188	3	3	MAINT ETELESCOPE OUT VALVE - SHORT TO GROUND	<p>Machine will disable Boom Telescope Out function</p> <p>Fault, once triggered, is maintained within a given key-cycle</p> <p>Machine will be trapped in transport</p>	Check Wiring
33189	3	3	MAINT ETELESCOPE IN VALVE - OPEN CIRCUIT	There is an Open Circuit to the Main Telescope In Valve.	
33207	3	3	HORN - OPEN CIRCUIT	There is an Open Circuit to the Horn.	
33208	3	3	HORN - SHORT TO BATTERY	There is a Short to Battery to the Horn.	

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
33209	3	3	HORN - SHORT TO GROUND	There is a Short to Ground to the Horn.	
33279	3	3	GLOWPLUG - OPEN CIRCUIT	There is an Open Circuit to the Glow Plugs.	- Glow plugs equipped vehicles only.
33280	3	3	GLOWPLUG - SHORT TO BATTERY	There is a Short to Battery to the Glow Plugs.	- Glow plugs equipped vehicles only.
33281	3	3	GLOWPLUG - SHORT TO GROUND	There is a Short to Ground to the Glow Plugs.	- Glow plugs equipped vehicles only.
33285	3	3	ALTERNATOR EXCITATION LINE - SHORT TO BATTERY		
33308	3	3	MAIN TELESCOPE FLOW CONTROL VALVE - OPEN CIRCUIT	There is an Open Circuit to the Main Telescope Flow Control Valve.	
33309	3	3	MAIN TELESCOPE FLOW CONTROL VALVE - SHORT TO BATTERY	There is a Short to Battery to the Main Telescope Flow Control Valve.	
33311	3	3	MAIN LIFT FLOW CONTROL VALVE - SHORT TO GROUND	There is a Short to Ground to the Main Lift Flow Control Valve.	
33313	3	3	MAIN LIFT FLOW CONTROL VALVE - SHORT TO BATTERY	There is a Short to Battery to the Main Lift Flow Control Valve.	Check wiring
33414	3	3	SWING - CURRENT FEEDBACK READING TOO LOW	Current feedback into controller is below threshold value	Check wiring and coil
33418	3	3	SWING - CURRENT FEEDBACK READING LOST	Current feedback into controller not detected	Check wiring and coil
33429	3	3	JIB LIFT UP OVERRIDE VALVE - SHORT TO GROUND		
33430	3	3	JIB LIFT UP OVERRIDE VALVE - OPEN CIRCUIT		
33431	3	3	JIB LIFT UP OVERRIDE VALVE - SHORT TO BATTERY		
33432	3	3	JIB LIFT DOWN OVERRIDE VALVE - SHORT TO GROUND		
33433	3	3	JIB LIFT DOWN OVERRIDE VALVE - OPEN CIRCUIT		
33434	3	3	JIB LIFT DOWN OVERRIDE VALVE - SHORT TO BATTERY		
33435	3	3	JIB CONTROL VALVE - SHORT TO GROUND		
33436	3	3	JIB CONTROL VALVE - OPEN CIRCUIT		
33437	3	3	JIB CONTROL VALVE - SHORT TO BATTERY		
33456	3	3	MAIN LIFT FLOW CONTROL VALVE - CURRENT FEEDBACK READING LOST	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and coil
33457	3	3	MAIN LIFT FLOW CONTROL VALVE - CURRENT FEEDBACK READING TOO LOW	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and coil
33460	3	3	TELESCOPE FLOW CONTROL VALVE - CURRENT FEEDBACK READING LOST	Current feedback into controller not detected	

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
33461	3	3	TELESCOPE FLOW CONTROL VALVE - CURRENT FEEDBACK READING TOO LOW	Current feedback into controller is below threshold value	
33462	3	3	WARM UP VALVE - SHORT TO BATTERY	Short to Battery detected	Check wiring
33463	3	3	WARM UP VALVE - OPEN CIRCUIT	Open Circuit detected	Check wiring
33464	3	3	WARM UP VALVE - SHORT TO GROUND	Short to Ground detected	Check wiring
33465	3	3	CHASSIS ENABLE VALVE - SHORT TO BATTERY	Short to Battery detected	Check wiring
33466	3	3	CHASSIS ENABLE VALVE - OPEN CIRCUIT	Open Circuit detected	Check wiring
33467	3	3	CHASSIS ENABLE VALVE - SHORT TO GROUND	Short to Ground detected	Check wiring
33487	3	3	TWO SPEED OR BRAKE VALVE - STUCK OPEN	The control system detects pressure on the 2 speed/brake hydraulic circuit after drive command has stopped. Fault maintained within a give power cycle.	Verify hydraulic spools are not stuck in the open position
33488	3	3	SWING FLOW CONTROL VALVE - SHORT TO GROUND	Short to Ground detected	Check wiring
33489	3	3	SWING FLOW CONTROL VALVE - OPEN CIRCUIT	Open Circuit detected	Check wiring
33490	3	3	SWING FLOW CONTROL VALVE - SHORT TO BATTERY	Short to Battery detected	Check wiring
33565	3	3	LIFT ENABLE VALVE - CURRENT FEEDBACK READING LOST	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and coil
33566	3	3	LIFT ENABLE VALVE - CURRENT FEEDBACK READING TOO LOW	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and coil
33677	3	3	PLATFORM CONTROL VALVE - STUCK OPEN	While the engine is running if pressure is not detected at the platform dump valve pressure switch within 1s the platform dump valve will be declared stuck open and the platform alarm will sound constant. While operating under APU mode if pressure is not detected at the platform dump valve pressure switch within 5s the platform dump valve will be declared stuck open and the platform alarm will sound constant. Fault, once triggered, is maintained within a given key cycle.	Check platform dump valve pressure switch wiring. If wiring is OK the platform dump valve is stuck open.
33681	3	3	TELESCOPE OUT VALVE - SHORT TO BATTERY OR OPEN CIRCUIT	Machine will disable all Boom Telescope function Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
33684	3	3	MAIN LIFT ENABLE AUX VALVE – OPEN CIRCUIT	Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33685	3	3	MAIN LIFT ENABLE AUX VALVE – SHORT TO BATTERY	Machine will disable all Boom Lift function. Electrical and Hydraulic Retrieval cannot be activated with this fault being active Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33686	3	3	MAIN LIFT ENABLE AUX VALVE – SHORT TO GROUND	Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33687	3	3	TELESCOPE FLOW CONTROL VALVE – SHORT TO BATTERY OR OPEN CIRCUIT	Machine will disable all Boom Telescope function if the engine is running Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33688	3	3	LOAD SENSE CUTOFF VALVE – OPEN CIRCUIT	Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33689	3	3	LOAD SENSE CUTOFF VALVE – SHORT TO BATTERY	Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33690	3	3	LOAD SENSE CUTOFF VALVE – SHORT TO GROUND	Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33694	3	3	TELESCOPE FLOW CONTROL OVERRIDE VALVE – OPEN CIRCUIT	Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33695	3	3	TELESCOPE FLOW OVERRIDE VALVE – SHORT TO BATTERY	Machine will disable all Boom Telescope function if the engine is running Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33696	3	3	TELESCOPE FLOW CONTROL OVERRIDE VALVE – SHORT TO GROUND	Machine will disable all Boom Telescope function Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33697	3	3	TELESCOPE IN OVERRIDE VALVE – OPEN CIRCUIT	Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33698	3	3	TELESCOPE IN OVERRIDE VALVE – SHORT TO BATTERY	Machine will disable Boom Telescope Out function Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
33699	3	3	TELESCOPE IN OVERRIDE VALVE – SHORT TO GROUND	Machine will disable Boom Telescope Out function Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33700	3	3	TOWER LIFT DOWN ENABLE VALVE – CURRENT FEEDBACK LOST	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33701	3	3	TOWER LIFT DOWN ENABLE VALVE – CURRENT FEEDBACK TOO LOW	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33702	3	3	TOWER LIFT FLOW CONTROL VALVE – OPEN CIRCUIT	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33703	3	3	TOWER LIFT FLOW CONTROL VALVE – SHORT TO BATTERY	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33704	3	3	TOWER LIFT FLOW CONTROL VALVE – SHORT TO GROUND	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33705	3	3	TOWER LIFT FLOW CONTROL VALVE – CURRENT FEEDBACK LOST	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33706	3	3	TOWER LIFT FLOW CONTROL VALVE – CURRENT FEEDBACK TOO LOW	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33707	3	3	TOWER LIFT PILOT VALVE – OPEN CIRCUIT	Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33708	3	3	TOWER LIFT PILOT VALVE – SHORT TO BATTERY	Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33709	3	3	TOWER LIFT PILOT VALVE – SHORT TO GROUND	Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33710	3	3	TOWER TELESCOPE IN ENABLE – CURRENT FEEDBACK LOST	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33711	3	3	TOWER TELESCOPE IN ENABLE VALVE – CURRENT FEEDBACK TOO LOW	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
33712	3	3	TOWERTELESCOPE FLOW CONTROL VALVE – OPEN CIRCUIT	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33713	3	3	TOWERTELESCOPE FLOW CONTROL VALVE – SHORT TO BATTERY	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33714	3	3	TOWERTELESCOPE FLOW CONTROL VALVE – SHORT TO GROUND	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33715	3	3	TOWERTELESCOPE FLOW CONTROL VALVE – CURRENT FEEDBACK LOST	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33716	3	3	TOWERTELESCOPE FLOW CONTROL VALVE – CURRENT FEEDBACK READING TOO LOW	Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33717	3	3	TOWERTELESCOPE PILOT VALVE – OPEN CIRCUIT	Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33718	3	3	TOWERTELESCOPE PILOT – SHORT TO BATTERY	Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33719	3	3	TOWERTELESCOPE PILOT VALVE – SHORT TO GROUND	Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring
33720	3	3	WARM UP VALVE – OPEN CIRCUIT		Check Wiring
33721	3	3	WARM UP VALVE – SHORT TO BATTERY		Check Wiring
33722	3	3	WARM UP VALVE – SHORT TO GROUND		Check Wiring
3385	3	3	PLATFORM UP OVERRIDE - SHORT TO GROUND	The control system detects an Short to Ground at this output. If out of transport and in platform mode all functions will operate at creep speed. If in transport or operating in ground mode all functions will operate at normal speed. Fault, once triggered, is maintained within a given key cycle.	Check Wiring
3386	3	3	PLATFORM UP OVERRIDE - OPEN CIRCUIT	The control system detects an Open Circuit at this output. If out of transport and in platform mode all functions will operate at creep speed. If in transport or operating in ground mode all functions will operate at normal speed. Fault, once triggered, is maintained within a given key cycle.	Check Wiring

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
3387	3	3	PLATFORM UP OVERRIDE - SHORT TO BATTERY	The control system detects an Short to Battery at this output. If out of transport and in platform mode all functions will operate at creep speed. If in transport or operating in ground mode all functions will operate at normal speed. Fault, once triggered, is maintained within a given key cycle.	Check Wiring
3391	3	3	PLATFORM DOWN OVERRIDE - SHORT TO GROUND	The control system detects a Short to Ground at this output. If out of transport and in platform mode all functions will operate at creep speed. If in transport or operating in ground mode all functions will operate at normal speed. Fault, once triggered, is maintained within a given key cycle.	Check Wiring
3392	3	3	PLATFORM DOWN OVERRIDE - OPEN CIRCUIT	The control system detects a Open Circuit at this output. If out of transport and in platform mode all functions will operate at creep speed. If in transport or operating in ground mode all functions will operate at normal speed. Fault, once triggered, is maintained within a given key cycle.	Check Wiring
3393	3	3	PLATFORM DOWN OVERRIDE - SHORT TO BATTERY	The control system detects a Short to Battery at this output. If out of transport and in platform mode all functions will operate at creep speed. If in transport or operating in ground mode all functions will operate at normal speed. Fault, once triggered, is maintained within a given key cycle.	Check Wiring
3394	3	3	PLATFORM ROTATE LEFT VALVE - SHORT TO GROUND	The control system detects a Short To Ground at this output. This DTC is only detectable at start up and during System Test. If out of transport and in platform mode all functions will operate at creep speed. If in transport or operating in ground mode all functions will operate at normal speed. Fault, once triggered, is maintained within a given key cycle.	Check Wiring

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
3395	3	3	PLATFORM ROTATE LEFT VALVE - OPEN CIRCUIT	<p>The control system detects an Open Circuit at this output.</p> <p>The control system will allow platform rotate in the opposite direction of the failed valve.</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p> <p>Machine will be trapped in Transport.</p>	Check Wiring
3396	3	3	PLATFORM ROTATE LEFT VALVE - SHORT TO BATTERY	<p>The control system detects a Short to Battery at this output.</p> <p>The control system will close the platform dump valve thereby restricting jib swing, jib lift, platform rotate, and platform level.</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p> <p>Machine will be trapped in Transport.</p>	Check Wiring
3397	3	3	PLATFORM ROTATE RIGHT VALVE - SHORT TO GROUND	<p>The control system detects a Short To Ground at this output.</p> <p>This DTC is only detectable at start up and during System Test</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p>	Check Wiring

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
3398	3	3	PLATFORM ROTATE RIGHT VALVE - OPEN CIRCUIT	<p>The control system detects an Open Circuit at this output.</p> <p>The control system will allow platform rotate in the opposite direction of the failed valve</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p> <p>Machine will be trapped in Transport.</p>	Check Wiring
3399	3	3	PLATFORM ROTATE RIGHT VALVE - SHORT TO BATTERY	<p>The control system detects a Short to Battery at this output.</p> <p>The control system will close the platform dump valve thereby restricting jib swing, jib lift, platform rotate, and platform level.</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p> <p>Machine will be trapped in Transport.</p>	Check Wiring
340	3	4	<<< PLATFORM OUTPUT DRIVER >>>		
343	3	4	PLATFORM LEVEL UP VALVE - SHORT TO GROUND	<p>The control system detects a Short to Ground at this output.</p> <p>The control system will sound the platform alarm, and turn the platform level warning indicator on.</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p>	Check Wiring

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
344	3	4	PLATFORM LEVEL UP VALVE - SHORT TO BATTERY OR OPEN CIRCUIT	<p>The control system detects a Short to Battery or Open Circuit at this output.</p> <p>The control system will sound the platform alarm, turn the platform level warning indicator on, and close the platform dump valve thereby restricting jib swing, jib lift, platform rotate, and platform level.</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p> <p>Machine will be trapped in Transport.</p>	Check Wiring
347	3	4	PLATFORM LEVEL DOWN VALVE - SHORT TO GROUND	<p>The control system detects a Short to Ground at this output.</p> <p>The control system will sound the platform alarm, and turn the platform level warning indicator on.</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p>	Check Wiring
348	3	4	PLATFORM LEVEL DOWN VALVE - SHORT TO BATTERY OR OPEN CIRCUIT	<p>The control system detects a Short to Battery or Open Circuit at this output.</p> <p>The control system will sound the platform alarm, turn the platform level warning indicator on, and close the platform dump valve thereby restricting jib swing, jib lift, platform rotate, and platform level.</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p> <p>Machine will be trapped in Transport.</p>	Check Wiring
3427	3	4	JIB LOCK VALVE - OPEN CIRCUIT		
3428	3	4	JIB LOCK VALVE - SHORT TO BATTERY		
3429	3	4	JIB LOCK VALVE - SHORT TO GROUND		

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
3430	3	4	JIB UNLOCK VALVE - OPEN CIRCUIT		
3431	3	4	JIB UNLOCK VALVE - SHORT TO BATTERY		
3432	3	4	JIB UNLOCK VALVE - SHORT TO GROUND		
350	3	5	<<< OTHER OUTPUT DRIVERS >>>		
351	3	5	JIB LEVEL UP VALVE - SHORT TO GROUND		
352	3	5	JIB LEVEL UP VALVE - SHORT TO BATTERY OR OPEN CIRCUIT		
353	3	5	JIB LEVEL DOWN VALVE - SHORT TO GROUND		
354	3	5	JIB LEVEL DOWN VALVE - SHORT TO BATTERY OR OPEN CIRCUIT		
355	3	5	JIB LIFT UP VALVE - SHORT TO GROUND		
356	3	5	JIB LIFT UP VALVE - SHORT TO BATTERY OR OPEN CIRCUIT		
357	3	5	JIB LIFT DOWN VALVE - SHORT TO GROUND		
358	3	5	JIB LIFT DOWN VALVE - SHORT TO BATTERY OR OPEN CIRCUIT		
359	3	5	JIB ROTATE LEFT VALVE - SHORT TO GROUND		
3510	3	5	JIB ROTATE LEFT VALVE - SHORT TO BATTERY OR OPEN CIRCUIT		
3511	3	5	JIB ROTATE RIGHT VALVE - SHORT TO GROUND		
3512	3	5	JIB ROTATE RIGHT VALVE - SHORT TO BATTERY OR OPEN CIRCUIT		
3513	3	5	JIB TELESCOPE IN VALVE - SHORT TO GROUND		
3514	3	5	JIB TELESCOPE IN VALVE - SHORT TO BATTERY OR OPEN CIRCUIT		
3515	3	5	JIB TELESCOPE OUT VALVE - SHORT TO GROUND		
3516	3	5	JIB TELESCOPE OUT VALVE - SHORT TO BATTERY OR OPEN CIRCUIT		

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
360	3	6	<<<Chassis Output Driver>>>		
361	3	6	FRONT AXLE EXTEND VALVE - SHORT TO BATTERY	Short to Battery detected	Check wiring
362	3	6	FRONT AXLE EXTEND VALVE - SHORT TO GROUND	Short to Ground detected	
363	3	6	FRONT AXLE RETRACT VALVE - SHORT TO BATTERY	Short to Battery detected	
364	3	6	FRONT AXLE RETRACT VALVE - SHORT TO GROUND	Short to Ground detected	
365	3	6	REAR AXLE EXTEND VALVE - SHORT TO BATTERY	Short to Battery detected	
366	3	6	REAR AXLE EXTEND VALVE - SHORT TO GROUND	Short to Ground detected	
367	3	6	REAR AXLE RETRACT VALVE - SHORT TO BATTERY	Short to Battery detected	
368	3	6	REAR AXLE RETRACT VALVE - SHORT TO GROUND	Short to Ground detected	
369	3	6	FRONT AXLE EXTEND VALVE - OPEN CIRCUIT	Open Circuit detected	
3610	3	6	FRONT AXLE VALVE - CURRENT FEEDBACK READING LOST	Current feedback into controller not detected	
3611	3	6	FRONT AXLE RETRACT VALVE - OPEN CIRCUIT	Open Circuit detected	Check wiring
3612	3	6	REAR AXLE VALVE - CURRENT FEEDBACK READING LOST	Current feedback into controller not detected	Check wiring and coil
3613	3	6	REAR AXLE EXTEND VALVE - OPEN CIRCUIT	Open Circuit detected	Check wiring
3514	3	6	FRONT AXLE VALVE - CURRENT FEEDBACK READING TOO LOW	Current feedback into controller is below threshold value	Check wiring and coil
3615	3	6	REAR AXLE RETRACT VALVE - OPEN CIRCUIT	Open Circuit detected	Check wiring
3616	3	6	REAR AXLE VALVE - CURRENT FEEDBACK READING TOO LOW	Current feedback into controller is below threshold value	Check wiring and coil
3617	3	6	CHASSIS BRAKE - OPEN CIRCUIT	Open Circuit detected	Check wiring
3618	3	6	CHASSIS BRAKE - SHORT TO BATTERY	Short to Battery detected	Check wiring
3619	3	6	CHASSIS BRAKE - SHORT TO GROUND	Short to Ground detected	Check wiring
3620	3	6	FRONT AXLE VALVE - SHORT TO BATTERY	Short to Battery detected	Check wiring
3621	3	6	REAR AXLE VAVE - SHORT TO BATTERY	Short to Battery detected	Check wiring

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
39	3	9	SKYGUARD ACTIVE - FUNCTIONS CUTOUT	<p>When activated the following function will reverse direction for the applicable time: Drive Forward (when DOS = Enabled), Drive Reverse, Swing, Boom Lift (operator demanded), Boom Telescope Out. All other functions will cutout when Skyguard becomes activated [Drive Forward (when DOS not Enabled), Steer, Tower Lift, Boom Lift (none operator demanded), Boom Telescope In, Jib Lift, Jib Swing, Platform Level, Platform Rotate].</p> <p>Fault cleared when controls returned to neutral and SkyGuard is no longer active.</p> <p>The UGM detects SkyGuard has been activated.</p>	
430	4	3	<<< ENGINE >>>		
431	4	3	FUEL SENSOR SHORT TO BATTERY	The Fuel Sensor reading is > 4.3V.	
432	4	3	FUEL SENSOR SHORT TO GROUND	The Fuel Sensor reading is < 0.2V.	
433	4	3	OIL PRESSURE SHORT TO BATTERY	The Oil Pressure Sensor reading is > 6.6V.	- Deutz engine only.
434	4	3	OIL PRESSURE SHORT TO GROUND	The Oil Pressure Sensor reading is < 0.1V for more then 5 seconds.	- Deutz engine only. - Not reported during engine start.
435	4	3	COOLANT TEMPERATURE SHORT TO GROUND	The Coolant Temperature Sensor reading is < 0.1V.	- Deutz engine only.
437	4	3	ENGINE TROUBLE CODE <SPN:FMI>	<p>Machine will respond accordingly, if JLG DTC number exists machine response will be described there otherwise ECM will clear fault once issue is no longer detected.</p> <p>The UGM received engine trouble code from the Engine Control Module.</p>	Run SCR Cleaning via SCR Cleaning Switch on the ground panel or JLG Analyzer
438	4	3	HIGH ENGINE TEMP	<p>Machine will shutdown the engine and restart prevented.</p> <p>Fault cleared on power cycle but re-evaluated on engine start.</p> <p>The UGM received high engine temperature trouble code from the Engine Control Module. The engine has detected an engine temperature greater than 130°C.</p>	Refer to Engine Manufacture's Take Action for Repair procedure in Diagnostic Trouble Code list using the SPN:FMI provided to diagnose and repair (Engine Trouble Code SPN:FMI = 110:0). Check coolant system blockage, fan malfunction, coolant level, thermostat malfunction, etc.
439	4	3	AIR FILTER BYPASSED	The Air Filter is clogged.	
4310	4	3	NO ALTERNATOR OUTPUT	Battery voltage is < 11.5 volts for more then 15 seconds after engine start.	Check the alternator output wiring. If the wiring is OK check for alternator output while the engine is running. Could possibly be a bad alternator.

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
4311	4	3	LOW OIL PRESSURE	Machine will shutdown the engine and restart prevented. Fault cleared on power cycle but re-evaluated on engine start. The UGM received low oil pressure trouble code from the Engine Control Module. The engine has detected an oil pressure less than 8 PSI.	Refer to Engine Manufacture's Take Action for Repair procedure in Diagnostic Trouble Code list using the SPN:FMI provided to diagnose and repair (Engine Trouble Code SPN:FMI = 100:1). Check oil level, oil leak, sensor malfunction, etc.
4313	4	3	THROTTLE ACTUATOR FAILURE	The engine RPM is > XXX for more then XX seconds.	
4314	4	3	WRONG ENGINE SELECTED - ECM DETECTED	A ECM was detected with a non- ECM type engine selected.	
4322	4	3	LOSS OF ENGINE SPEED SENSOR	The engine RPM sensor indicates 0 RPM AND the Oil Pressure Sensor indicates > 8 PSI for three seconds.	- Diesel engine only.
4323	4	3	SPEED SENSOR READING INVALID SPEED	The engine RPM sensor indicates > 4000 RPM.	- Diesel engine only.
4334	4	3	ENGINE COOLANT - LOW LEVEL	Machine will shutdown the engine and restart prevented. Fault cleared on power cycle but re-evaluated on engine start. The UGM received low coolant level trouble code from the Engine Control Module. The engine has detected coolant level is too low.	Refer to Engine Manufacture's Take Action for Repair procedure in Diagnostic Trouble Code list using the SPN:FMI provided to diagnose and repair (Engine Trouble Code SPN:FMI = 111:1). Check coolant level, coolant level sensor for malfunction, etc.
4364	4	3	SCR CLEANING NOT INITIATED	Fault cleared by power cycle. SCR Cleaning was requested by operator but engine did rejected the request.	Refer to SCR Cleaning requirements per engine documentation
4365	4	3	RUNNING AT CREEP - ENGINE POWER REDUCTION	The ECM is derating the engine, machine placed in creep. ECM will clear fault once issue is no longer detected. The Engine Control Module is reporting that a SCR system trouble code has been ignored too long. Triggered by SPN:FMI 524190:14	Refer to Engine Manufacture's Take Action for Repair procedure in Diagnostic Trouble Code list using the SPN:FMI provided to diagnose and repair.
4366	4	3	SCR CLEANING REQUIRED - SOOT DETECTED	If ignored the ECM will derate the engine and machine performance will be derated based on severity. ECM will clear fault once successful SCR Cleaning has been preformed. The Engine Control Module is reporting that SCR Crystallization has been detected.	Run SCR Cleaning via SCR Cleaning Switch on the ground panel or JLG Analyzer

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
4368	4	3	ALL FUNCTIONS PREVENTED - ENGINE POWER REDUCTION SEVERE	<p>The ECM is derating the engine, machine will lock out engine powered functions but allow APU.</p> <p>ECM will clear fault once issue is no longer detected.</p> <p>The Engine Control Module is reporting that a SCR system trouble code has been ignored too long. Triggered by SPN:FMI 524191:14</p>	Refer to Engine Manufacture's Take Action for Repair procedure in Diagnostic Trouble Code list using the SPN:FMI provided to diagnose and repair.
4375	4	3	WATER IN FUEL	<p>Machine will shutdown the engine.</p> <p>ECM will clear fault once issue is no longer detected.</p> <p>The UGM received water in fuel trouble code from the Engine Control Module. The engine has detected an unacceptable amount of water in the fuel or there is an issue with the water in fuel sensor.</p>	Refer to Engine Manufacture's Take Action for Repair procedure in Diagnostic Trouble Code list using the SPN:FMI provided to diagnose and repair (Engine Trouble Code SPN = 97). Check for Water in fuel filter separator or water in fuel sensor for malfunction.
4376	4	3	FUNCTIONS PREVENTED - ENGINE OIL WARM UP ACTIVE	<p>Machine functions prevented until Engine Oil Warmup has completed.</p> <p>Fault cleared upon successful completion of Engine Oil Warmup.</p> <p>Engine Oil Warmup is active due to engine coolant temperature less than 32°F or the engine has not been running for more than 60 seconds.</p>	Allow Engine Oil Warmup to complete successfully.
440	4	4	<<< BATTERY SUPPLY >>>		
441	4	4	BATTERY VOLTAGE TOO LOW - SYSTEM SHUTDOWN SHUTDOWN	<p>The control system has detected that the system battery voltage is less than 9V</p> <p>Digital outputs and CAN communication are disabled.</p>	Check the control system battery as the control system has indicated that its voltage is too low.
442	4	4	BATTERY VOLTAGE TOO HIGH - SYSTEM SHUTDOWN	<p>The control system has detected that the system battery voltage is too high.</p> <p>Digital outputs and CAN communication are disabled.</p> <p>This fault is retained through a given key cycle.</p>	Check the control system battery as the control system has indicated that its voltage is too high.
443	4	4	LSS BATTERY VOLTAGE TOO HIGH	<p>The load sensor has determined that its supply voltage is too high (> 16V).</p> <p>The machine will assume the platform is overloaded.</p>	Check for issue with sensor supply voltage.

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
4430	4	4	BATTERY VOLTAGE TOO LOW	The control system has detected that the system battery voltage is less than 11 volts for 5s and the engine is not cranking and auxiliary mode is not active.	Check the control system battery as the control system has indicated that its voltage is low.
444	4	4	LSS BATTERY VOLTAGE TOO LOW	The load sensor has determined that its supply voltage is too low (> 8V). The machine will assume the platform is overloaded.	Check for issue with sensor supply voltage.
445	4	4	BATTERY VOLTAGE LOW	Battery voltage is < 11V for more than 5 seconds.	
4479	4	4	LSS BATTERY VOLTAGE - INITIALIZATION ERROR	The shear beam is reporting a Sensor Supply Voltage Initialization Error The machine will assume the platform is overloaded. This fault, once annunciated is latched within a given key cycle.	Possible sensor hardware issue.
4480	4	4	LSS BATTERY VOLTAGE - NOT CALIBRATED	The shear beam is reporting a Sensor Supply Voltage calibration error. The machine will assume the platform is overloaded. This fault, once annunciated is latched within a given key cycle.	Possible sensor hardware issue.
4486	4	4	STARTER/AUXILIARY BATTERY VOLTAGE LOW	The control system detects that the logic for detection of low voltage on the starter/auxiliary battery has been satisfied. This fault shall be retained through a given key cycle.	Check the starter/auxiliary battery as the control system has indicated that its voltage is low.
660	6	6	<<< COMMUNICATION >>>		
662	6	6	CANBUS FAILURE - PLATFORM MODULE	Platform Module CAN communication lost.	
663	6	6	CANBUS FAILURE - LOAD SENSING SYSTEM MODULE	The control system has lost communication with the load sensing system load pin. The machine will assume the platform is overloaded.	Check wiring to load sensor.
666	6	6	CANBUS FAILURE - ENGINE CONTROLLER	Engine Control Module CAN communication lost.	- ECM equipped engine only.
6610	6	6	CANBUS FAILURE - BLAM	BLAM CAN communication lost.	- BLAM equipped vehicles only.
6611	6	6	CANBUS FAILURE - CHASSIS MODULE	Engine Control Module CAN communication lost.	- ECM equipped engine only.
6612	6	6	CANBUS FAILURE - CYLINDER LOAD PIN	Cylinder Load Pin CAN communication lost.	- Cylinder Load Pin equipped engine only.
6613	6	6	CANBUS FAILURE - EXCESSIVE CANBUS ERRORS	There has been > 500 Bus Off errors or > 500 Bus Passive Errors.	
6622	6	6	CANBUS FAILURE - TCU MODULE	Machine Setup/Telematics= YES, No device heartbeat for 30 sec	

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
6623	6	6	CANBUS FAILURE - GATEWAY MODULE	Machine Setup/Telematics=YES, No device heartbeat for 30 sec	
6629	6	6	CANBUS FAILURE - TELEMATICS CANBUS LOADING TOO HIGH	X	-Telematics only
6635	6	6	CANBUS FAILURE - CHASSISTILT SENSOR	CANbus communication with the external Chassis Tilt sensor has been lost. The machine will behave as if it is tilted. The Fault, once triggered, is maintained within a given key cycle. The machine will behave as if it is tilted. The Fault, once triggered, is maintained within a given key cycle.	Check external chassis tilt sensor PWR, GND, CAN wiring. Faulty Sensor
6639	6	6	CANBUS FAILURE - JIB CONTROL MODULE		
6640	6	6	CANBUS FAILURE - JIB LIFT ANGLE SENSOR		
6641	6	6	CANBUS FAILURE - PLATFORM LEVEL ANGLE SENSOR		
6651	6	6	CANBUS FAILURE - GROUND DISPLAY	Fault cleared once the UGM starts receiving the Heartbeat CAN message. The UGM has not received the Heartbeat CAN message from the Ground Display	Verify CAN Channel 2 wiring Verify CANbus resistance (60 ohms) for CAN Channel 2
6657	6	6	CANBUS FAILURE – TEMPERATURE SENSOR	If the machine is Out of Transport and functions shall be suspended until returned to neutral at which time functions shall be in creep. If the machine is In Transport all functions are in creep except Drive and Steer. Fault cleared when UGM receives temperature sensor information from ambient temperature sensor. The UGM does not receive temperature information from the ambient temperature sensor for 250ms.	Verify CAN Channel 1 wiring Verify CANbus resistance (60 ohms) for CAN Channel 1
6663	6	6	CANBUS FAILURE – CRIBBING MODULE	The UGM detects loss of communication with the Cribbing Module. Drive and steer are disabled until communication is restored. Fault cleared once communication is restored	Check wiring
6667	6	6	CANBUS FAILURE - PLATFORM DISPLAY	Fault cleared once the UGM starts receiving the Heartbeat CAN message. The UGM has not received the Heartbeat CAN message from the Ground Display	Verify CAN Channel 1 wiring Verify CANbus resistance (60 ohms) for CAN Channel 1
680	6	8	<<< TELEMATICS >>>		
681	6	8	REMOTE CONTRACT MANAGEMENT OVER-RIDE - ALL FUNCTIONS IN CREEP	X	-Telematics only

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
810	8	1	<<<TILT SENSOR>>>		
813	8	1	CHASSIS TILT SENSOR NOT CALIBRATED	The external chassis tilt sensor has not been calibrated. The machine will behave as if it is tilted. Machine will be trapped in Transport.	
814	8	1	CHASSIS TILT SENSOR OUT OF RANGE	The external chassis tilt sensor X or Y axis is reading a value > 45 degrees. The machine will behave as if it is tilted.	Faulty Sensor. Check sensor hardware and wiring
815	8	1	CHASSIS TILT SENSOR DISAGREEMENT	If any hydraulic function is active OR the engine is cranking and the UGM's internal chassis tilt sensors redundant X or Y axis readings disagree by more than 3 degrees over 5 seconds OR The UGM's internal chassis tilt sensors redundant X or Y axis readings disagree by more than 1.5 degrees over 3 seconds The machine will behave as if it is tilted. Fault, once triggered, is maintained within a given key cycle. Machine will be trapped in Transport.	UGM Internal tilt sensor readings are not valid
8111	8	1	CHASSIS TILT READING DISAGREEMENT	If any hydraulic function is active OR the engine is cranking and the external chassis tilt sensor and the UGM's internal chassis tilt sensor disagree by more than 5 degrees for 30 seconds OR The external chassis tilt sensor and the UGM's internal chassis tilt sensor disagree by more than 3 degrees for 30 seconds The machine will behave as if it is tilted. Fault, once triggered, is maintained within a given key cycle.	Check External and Internal chassis tilt sensor readings for validity via Analyzer.
8116	8	1	UGM TILT SENSOR OUT OF RANGE	The UGM's internal tilt sensor's X or Y axis readings are greater than 19 degrees. The machine will behave as if it is tilted.	UGM Internal tilt sensor readings are not valid

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
818	8	1	TILT SENSOR STAGNANT	<p>The external Chassis Tilt Sensor readings have stagnated.</p> <p>The machine will behave as if it is tilted.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p>	Faulty Sensor
820	8	2	<<< PLATFORM LOAD SENSE >>>		
821	8	2	LSS CELL #1 ERROR		
8211	8	2	LSS READING UNDER WEIGHT	<p>LSS has been calibrated and the UGM has determined that the load sensing system reading is underweight while a period of time while operating drive or boom lift up at speeds greater than creep OR the UGM has determined that the load sensing system reading is less than -1.5 x Gross Platform Weight.</p> <p>The machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	<p>Ensure platform is not resting on the ground or is not leveled at an extreme negative angle.</p> <p>Re-calibrate the load sensing system if the above items are not a factor.</p>
8218	8	2	LSS SENSOR DISAGREEMENT	<p>The control system has determined that the difference between the calculated load for sensor 1 and sensor 2 differ by more than 50lbs OR the internal strain gauge sensor 1 gross platform weight reading and the internal strain gauge sensor 2 gross platform weight reading differ by more than 200lbs.</p> <p>If the platform is not considered to be overloaded boom functions will be restricted to creep.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	<p>Attempt to re-calibrate the load sensing system.</p> <p>Possible sensor hardware issue.</p>
822	8	2	LSS CELL #2 ERROR 822822		
8222	8	2	LSS STRAIN GAUGE 1 - STAGNANT	<p>The control system has determined that the strain gauge 1 reading in the load sensor is stagnant (not changing).</p> <p>If the platform is not considered to be overloaded boom functions will be restricted to creep..</p> <p>If DTC 8223 is active in combination with DTC 8222 the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
8223	8	2	LSS STRAIN GAUGE 2 - STAGNANT	<p>The control system has determined that the strain gauge 2 reading in the load sensor is stagnant (not changing).</p> <p>If the platform is not considered to be overloaded boom functions will be restricted to creep.</p> <p>If DTC 8222 is active in combination with DTC 8223 the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8224	8	2	LSS STRAIN GAUGE 1 - OUT OF RANGE LOW	<p>The shear beam is reporting an out of range low issue with the strain gauge 1 reading.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8225 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8225	8	2	LSS STRAIN GAUGE 2 - OUT OF RANGE LOW	<p>The shear beam is reporting an out of range low issue with the strain gauge 2 reading.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8224 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8226	8	2	LSS STRAIN GAUGE 1 - OUT OF RANGE HIGH	<p>The shear beam is reporting an out of range high issue with the strain gauge 1 reading.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8227 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
8227	8	2	LSS STRAIN GAUGE 2 - OUT OF RANGE HIGH	<p>The shear beam is reporting an out of range high issue with the strain gauge 2 reading.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8226 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8228	8	2	LSS STRAIN GAUGE 1 - INITIALIZATION ERROR	<p>The shear beam is reporting an initialization issue with the strain gauge 1 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8229 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8229	8	2	LSS STRAIN GAUGE 2 - INITIALIZATION ERROR	<p>The shear beam is reporting an initialization issue with the strain gauge 2 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8228 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8230	8	2	LSS STRAIN GAUGE 1 - NOT CALIBRATED	<p>The shear beam is reporting a calibration issue with the strain gauge 1 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8231 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
823	8	2	LSS CELL #3 ERROR823823		

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
8231	8	2	LSS STRAIN GAUGE 2 - NOT CALIBRATED	<p>The shear beam is reporting a calibration issue with the strain gauge 2 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8230 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8232	8	2	LSS STRAIN GAUGE 1 - SENSOR DEFECT	<p>The shear beam is reporting a sensor defect issue with the strain gauge 1 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8233 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8233	8	2	LSS STRAIN GAUGE 2 - SENSOR DEFECT	<p>The shear beam is reporting a sensor defect issue with the strain gauge 2 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8232 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8234	8	2	LSS STRAIN GAUGE 1 - NOT INSTALLED	<p>The shear beam is reporting a not installed issue with the strain gauge 1 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8235 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
8235	8	2	LSS STRAIN GAUGE 2 - NOT INSTALLED	<p>The shear beam is reporting a not installed issue with the strain gauge 2 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8234 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8236	8	2	LSS NOT DETECTING CHANGE	<p>The control system has determined that the load sensor reading has not deviated by more than 1lb for 5s while operating drive or boom functions at greater than creep speed.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8237	8	2	LSS STRAIN GAUGE 1 - A/D DEFECT	<p>The shear beam is reporting an internal issue with the strain gauge 1 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8238 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8238	8	2	LSS STRAIN GAUGE 2 - A/D DEFECT	<p>The shear beam is reporting an internal issue with the strain gauge 2 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8237 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
824	8	2	LSS CELL #4 ERROR 824824		
825	8	2	LSS HAS NOT BEEN CALIBRATED	<p>The load sensing system is configured but has not been calibrated.</p> <p>The machine will assume the platform is overloaded.</p>	Calibrate the load sensing system.
826	8	2	RUNNING AT CREEP - PLATFORM OVER-LOADED	<p>All functions at creep, the Load Sensing System indicates the Platform is overloaded AND is configured to warn only while the Platform is overloaded.</p>	

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
827	8	2	DRIVE & BOOM PREVENTED - PLATFORM OVERLOADED	Driving and boom functions are not possible while the Load Sensing System indicates the Platform is overloaded AND is configured to prevent drive and boom functions while the Platform is overloaded.	
828	8	2	LIFT UP & TELE OUT PREVENTED - PLATFORM OVERLOADED	Lift up and telescope out are not possible while the Load Sensing System indicates the Platform is overloaded AND is configured to prevent Lift up and telescope out while the Platform is overloaded.	
830	8	3	<<< PLATFORM LEVELING >>>		
831	8	3	PLATFORM LEVELING OVERRIDE ON	Platform Leveling forced on with Access Level 0 selection.	
832	8	3	PLATFORM LEVELING OVERRIDE OFF	Platform Leveling forced off with Access Level 0 selection.	
833	8	3	PLATFORM LEVEL UP CRACKPOINT - NOT CALIBRATED	The Platform Level Up Valve Crackpoint has not been calibrated.	Calibrate Platform Level Up Valve Crack Point
834	8	3	PLATFORM LEVEL DOWN CRACKPOINT - NOT CALIBRATED	The Platform Level Down Valve Crackpoint has not been calibrated.	Calibrate Platform Level Up Valve Crack Point
837	8	3	PLATFORM LEVEL SENSOR #1 - SHORT TO BATTERY	There is a Short to Battery to the Platform Level Sensor #1.	- Electronic leveling system equipped vehicles only.
838	8	3	PLATFORM LEVEL SENSOR #1 - SHORT TO GROUND OR OPEN CIRCUIT	There is a Short to Ground or an Open Circuit to the Platform Level Sensor #1.	- Electronic leveling system equipped vehicles only.
8311	8	3	PLATFORM LEVEL SENSOR #2 - SHORT TO BATTERY	There is a Short to Battery to the Platform Level Sensor #2.	- Electronic leveling system equipped vehicles only.
8312	8	3	PLATFORM LEVEL SENSOR #2 - SHORT TO GROUND OR OPEN CIRCUIT	There is a Short to Ground or an Open Circuit to the Platform Level Sensor #2.	- Electronic leveling system equipped vehicles only.
8313	8	3	PLATFORM LEVEL SENSOR #1 - REFERENCE VOLTAGE OUT OF RANGE	Platform Level Sensor #1 reference voltage is outside acceptable range (4.9 to 5.1 volts).	- Electronic leveling system equipped vehicles only.
8314	8	3	PLATFORM LEVEL SENSOR #2 - REFERENCE VOLTAGE OUT OF RANGE	Platform Level Sensor #2 reference voltage is outside acceptable range (4.9 to 5.1 volts).	- Electronic leveling system equipped vehicles only.

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
8315	8	3	PLATFORM LEVELING SENSOR - DISAGREEMENT	<p>The platform level gravity sensor and platform level protractor sensor disagree.</p> <p>Absolute disagreement checks occur all the time and if driving and the sensors disagree by more than 15 degrees this fault will be annunciated. If NOT driving and the sensors disagree by more than 10 degrees this DTC will be annunciated.</p> <p>Relative checks are disagreement checks which compare the current difference between the two sensors to a snapshot difference that is taken each time a new automatic platform leveling set point is taken. If driving and the relative difference is greater than 10 degrees this DTC will be annunciated. If NOT driving and the difference is greater than 5 degrees this DTC will be annunciated.</p> <p>The platform level warn indicator will illuminate, the platform alarm will sound constant, automatic platform leveling will stop (manual platform level override still exists)</p>	<p>Recalibrate platform level sensors.</p> <p>Faulty platform level gravity or protractor sensor</p>
8316	8	3	PLATFORM LEVEL SENSOR #1 - COMMUNICATIONS LOST	Platform Level Sensor #1 serial communication lost.	
8317	8	3	PLATFORM LEVEL SENSOR #2 - COMMUNICATIONS LOST	Platform Level Sensor #2 serial communication lost.	
8318	8	3	PLATFORM LEVELING SYSTEM TIMEOUT	<p>The automatic platform leveling position has deviated by more than 5 degrees from its last automatic leveling position set point.</p> <p>The platform level warn indicator will illuminate, the platform alarm will sound constant, automatic platform leveling will stop (manual platform level override still exists)</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p> <p>Machine will be trapped in Transport.</p>	<p>Incorrect hydraulic pressure settings for platform level.</p> <p>Recalibrate platform level sensors.</p> <p>Could be caused by extremely cold hydraulic fluid.</p>
8319	8	3	JIB LEVEL SENSOR #1 - OUT OF RANGE LOW		
8320	8	3	JIB LEVEL SENSOR #1 - OUT OF RANGE HIGH		

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
8321	8	3	JIB LEVEL SENSOR #2 - OUT OF RANGE LOW		
8322	8	3	JIB LEVEL SENSOR #2 - OUT OF RANGE HIGH		
8323	8	3	JIB LEVEL SENSORS - NOT CALIBRATED		
8324	8	3	JIB LEVEL SENSORS - DISAGREEMENT		
8325	8	3	JIB SWING SENSOR #1 - OUT OF RANGE LOW		
8326	8	3	JIB SWING SENSOR #1 - OUT OF RANGE HIGH		
8327	8	3	JIB SWING SENSOR #2 - OUT OF RANGE LOW		
8328	8	3	JIB SWING SENSOR #2 - OUT OF RANGE HIGH		
8329	8	3	JIB SWING SENSORS - NOT CALIBRATED		
8330	8	3	JIB SWING SENSORS - DISAGREEMENT		
8331	8	3	JIB LOCK PIN SENSOR - DISAGREEMENT		
8332	8	3	JIB TRANSPORT SENSOR #1 - DISAGREEMENT		
8333	8	3	JIB TRANSPORT SENSOR #2 - DISAGREEMENT		
8334	8	3	JIB LIFT ANGLE SENSOR - NOT CALIBRATED		
8335	8	3	JIB LEVEL UP CRACKPOINT - NOT CALIBRATED		
8336	8	3	JIB LEVEL DOWN CRACKPOINT - NOT CALIBRATED		
8337	8	3	JIB LEVELING SYSTEM TIMEOUT		
8338	8	3	WRONG JIB LOCK PIN RESPONSE		
8339	8	3	PLATFORM LEVEL ANGLE SENSOR - NOT CALIBRATED		
840	8	4	<<< ENVELOPE >>>		
841	8	4	BOOM ANGLE SENSOR DISAGREEMENT	There is a disagreement between the Boom Angle Sensors.	- Envelope Control equipped vehicles only.
84105	8	4	PLATFORM LEVEL ANGLE SENSOR - NOT DETECTING CHANGE	<p>The control system had commanded platform level movement and the platform level protractor sensor is not detecting change.</p> <p>The platform level warn indicator will illuminate, the platform alarm will sound constant, automatic platform leveling will stop (manual platform level override still exists)</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p> <p>Machine will be trapped in Transport.</p>	Faulty platform level protractor sensor or damaged/broken linkage on the platform level protractor sensor.

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
84108	8	4	PLATFORM LEVEL MOVEMENT WITHOUT COMMAND	<p>Platform level movement without control system or operator command has been detected.</p> <p>All functions will operate in creep speed, the platform dump valve will de-energize thereby preventing platform level, platform rotate, jib swing, jib lift from functioning. The platform level warn indicator will turn on and the platform alarm will sound constant.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p>	<p>This is likely caused by a platform level up valve or platform level down valve being stuck open when the platform dump valve is energized when the footswitch is pressed.</p> <p>Check for faulty platform level valves in the direction of uncommanded motion.</p>
84111	8	4	PLATFORM LEVEL GRAVITY SENSOR - FREQUENCY OUT OF RANGE	<p>The Platform level gravity sensors frequency reading is out of range.</p> <p>Using the platform level protractor sensor only automatic platform leveling will continue to function with degraded performance.</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p>	<p>Faulty sensor or a wiring issue with the platform level gravity sensor.</p>
84112	8	4	PLATFORM LEVEL GRAVITY SENSOR - DUTY CYCLE OUT OF RANGE LOW	<p>The Platform level gravity sensors frequency reading is out of range.</p> <p>Using the platform level protractor sensor only automatic platform leveling will continue to function with degraded performance.</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p>	<p>Faulty sensor or a wiring issue with the platform level gravity sensor.</p>

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
84113	8	4	PLATFORM LEVEL GRAVITY SENSOR - DUTY CYCLE OUT OF RANGE HIGH	<p>The Platform level gravity sensors frequency reading is out of range.</p> <p>Using the platform level protractor sensor only automatic platform leveling will continue to function with degraded performance.</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p>	Faulty sensor or a wiring issue with the platform level gravity sensor.
84114	8	4	PLATFORM LEVEL PROTRACTOR SENSOR - FREQUENCY OUT OF RANGE	<p>The Platform level gravity sensors frequency reading is out of range.</p> <p>Using the platform level gravity sensor only automatic platform leveling will continue to function with degraded performance.</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p>	Faulty sensor or a wiring issue with the platform level protractor sensor.
84115	8	4	PLATFORM LEVEL PROTRACTOR SENSOR - DUTY CYCLE OUT OF RANGE LOW	<p>The Platform level gravity sensors frequency reading is out of range.</p> <p>Using the platform level gravity sensor only automatic platform leveling will continue to function with degraded performance.</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p>	Faulty sensor or a wiring issue with the platform level protractor sensor.

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
84116	8	4	PLATFORM LEVEL PROTRACTOR SENSOR - DUTY CYCLE OUT OF RANGE HIGH	<p>The Platform level gravity sensors frequency reading is out of range.</p> <p>Using the platform level gravity sensor only automatic platform leveling will continue to function with degraded performance.</p> <p>If out of transport and in platform mode all functions will operate at creep speed.</p> <p>If in transport or operating in ground mode all functions will operate at normal speed.</p> <p>Fault, once triggered, is maintained within a given key cycle.</p>	Faulty sensor or a wiring issue with the platform level protractor sensor.
84117	8	4	TOWER TELE CRACKPOINTS NOT CALIBRATED	<p>One of the following Tower Telescope Valve Crackpoints has not been calibrated:</p> <p>Tower Telescope Out Flow Control Valve</p> <p>Tower Telescope In Flow Control Valve</p> <p>Tower Telescope In Enable Valve</p>	Calibrate the corresponding Tower Telescope valve crack point
84118	8	4	TOWER LIFT CRACKPOINTS NOT CALIBRATED	<p>One of the following Tower Lift Valve Crackpoints has not been calibrated:</p> <p>Tower Lift Up Flow Control Valve</p> <p>Tower Lift Down Flow Control Valve</p> <p>Tower Lift Down Enable Valve</p>	Calibrate the corresponding Tower Lift valve crack point
845	8	4	BOOM LENGTH SENSOR - OUT OF RANGE HIGH	Boom Length Sensor out of range high.	- Envelope Control equipped vehicles only.
846	8	4	BOOM LENGTH SENSOR - OUT OF RANGE LOW	Boom Length Sensor out of range low.	- Envelope Control equipped vehicles only.
847	8	4	BOOM LENGTH SENSOR - VALUE OUT OF RANGE HIGH	Boom Length out of range high.	- Envelope Control equipped vehicles only.
848	8	4	BOOM LENGTH SENSOR - VALUE OUT OF RANGE LOW	Boom Length out of range low.	- Envelope Control equipped vehicles only.
849	8	4	BOOM ANGLE SENSOR #1 - COMMUNICATIONS FAULT	Boom Angle Sensor #1 communications lost.	- Envelope Control equipped vehicles only.
8410	8	4	BOOM ANGLE SENSOR #2 - COMMUNICATIONS FAULT	Boom Angle Sensor #2 communications lost.	- Envelope Control equipped vehicles only.
8411	8	4	BOOM ANGLE SENSOR #1 - INVALID ANGLE	Boom Angle Sensor #1 out of range.	- Envelope Control equipped vehicles only.
8412	8	4	BOOM ANGLE SENSOR #2 - INVALID ANGLE	Boom Angle Sensor #2 out of range.	- Envelope Control equipped vehicles only.
8417	8	4	MAIN ANGLE SENSOR DISAGREEMENT	<p>Boom angle sensors are healthy and 3deg difference between sensors over a 2sec time period</p> <p>Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle</p> <p>Machine will be trapped in transport</p>	Check Hardware, Wiring

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
84119	8	4	TOWER ANGLE SENSOR #1 – DUTY CYCLE OUT OF RANGE	Sensor duty cycle > 90% or < 10% for 240ms Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84120	8	4	TOWER ANGLE SENSOR #1 – FREQUENCY OUT OF RANGE	Sensor frequency not within 100Hz +/- 10Hz Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84121	8	4	TOWER ANGLE SENSOR #2 – DUTY CYCLE OUT OF RANGE	Sensor duty cycle > 90% or < 10% for 240ms Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84122	8	4	TOWER ANGLE SENSOR #2 – FREQUENCY OUT OF RANGE	Sensor frequency not within 100Hz +/- 10Hz Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84123	8	4	MAIN BOOM LENGTH SENSOR #2 - OUT OF RANGE HIGH	Voltage > 4.94V Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84124	8	4	MAIN BOOM LENGTH SENSOR #2 - OUT OF RANGE LOW	Voltage < 0.01V Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84125	8	4	BOOM LENGTH SENSOR DISAGREEMENT	Sensors are healthy and 2in difference between sensors over time period of 2sec Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84126	8	4	TELESCOPE MOVEMENT WITHOUT COMMAND	Sensor moves 5in within a 5min time period 5 sec after a boom telescope command has been completed. Note: This fault, under the right conditions, is also evaluated when Boom Sensors are not calibrated Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
84127	8	4	TOWERLENGTHSWITCH – FAILED	Both N.O and N.C. switches read the same state Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84128	8	4	MAIN BOOM LENGTH SENSOR#1 - OUT OF RANGE HIGH	Voltage > 4.94V Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware
84129	8	4	MAIN BOOM LENGTH SENSOR#1 - OUT OF RANGE LOW	Voltage < 0.01V Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84130	8	4	TOWER CYLINDER ANGLE SENSOR #1 – OUT OF RANGE HIGH	PWM value > 90% for 240ms Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84131	8	4	TOWER CYLINDER ANGLE SENSOR #1 – OUT OF RANGE LOW	PWM value < 10% for 240ms Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84132	8	4	TOWER CYLINDER ANGLE SENSOR #2 – OUT OF RANGE HIGH	PWM value > 90% for 240ms Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84133	8	4	TOWER CYLINDER ANGLE SENSOR #2 – OUT OF RANGE LOW	PWM value < 10% for 240ms Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84134	8	4	TOWER CYLINDER ANGLE SENSOR DIS-AGREEMENT	Tower lift cylinder angle sensor is healthy and 1.5deg difference over a time period of 2sec. Note: This fault, under the right conditions, is also evaluated when Boom Sensors are not calibrated Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84136	8	4	LIFT CRACKPOINTS - NOT CALIBRATED	One of the following Boom Lift Valve Crack-points has not been calibrated: Boom Lift Up Flow Control Valve Boom Lift Down Flow Control Valve Boom Lift Down Enable Valve	Calibrate the corresponding Boom Lift valve crack point

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
84137	8	4	TELESCOPE CRACKPOINTS - NOT CALIBRATED	One of the following Boom Telescope Valve Crackpoints has not been calibrated: Boom Telescope Out Flow Control Valve Boom Telescope In Flow Control Valve Boom Telescope In Enable Valve	Calibrate the corresponding Boom Telescope valve crack point
84139	8	4	BOOM ANGLE SENSOR #1 – DUTY CYCLE OUT OF RANGE	Sensor duty cycle > 90% or < 10% for 240ms Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware
84140	8	4	BOOM ANGLE SENSOR #1 – FREQUENCY OUT OF RANGE	Sensor frequency not within 100Hz +/- 10Hz Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84141	8	4	BOOM ANGLE SENSOR #2 – DUTY CYCLE OUT OF RANGE	Sensor duty cycle > 90% or < 10% for 240ms Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84142	8	4	BOOM ANGLE SENSOR #2 – FREQUENCY OUT OF RANGE	Sensor frequency not within 100Hz +/- 10Hz Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84143	8	4	TOWER CYLINDER ANGLE SENSOR #1 – FREQUENCY OUT OF RANGE	Sensor frequency is not within 100Hz +/- 10Hz Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84144	8	4	TOWER CYLINDER ANGLE SENSOR #2 – FREQUENCY OUT OF RANGE	Sensor frequency is not within 100Hz +/- 10Hz Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
84145	8	4	BOOM LENGTH SENSOR #1 – LENGTH OUT OF RANGE HIGH	Sensor is healthy and reports length > 1048in Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
84146	8	4	BOOM LENGTH SENSOR#1 – LENGTH OUT OF RANGE LOW	Sensor is healthy and reports length < 440in Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware
84147	8	4	BOOM LENGTH SENSOR#2 – LENGTH OUT OF RANGE HIGH	Sensor is healthy and reports length > 1048in Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware
84148	8	4	BOOM LENGTH SENSOR#2 – LENGTH OUT OF RANGE LOW	Sensor is healthy and reports length <440in Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware
8415	8	4	TOWER ANGLE SENSOR DISAGREEMENT	Tower angle gravity sensors are healthy and 1.5deg difference between sensors over a 2sec time period Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
84151	8	4	TOWERLENGTHSENSOR 1 FAULTY	<p>There are three ways (a, b, c) that these faults can be set:</p> <p>(a) If the length sensor voltage changes more than 0.0168 volts within 40 milliseconds a counter for the respective length sensor shall be incremented to aid service in diagnosing bad sensor performance. The counter below shall be incremented any time the description above is met. It is cleared/reset by a power cycle TwrLenSnr(1/2)FaultCounter_PowerCycle > 30</p> <p>(b) The counter below shall be incremented every time TwrLenSnr(1/2)FaultCounter_PowerCycle (described above) reached its threshold. This value is stored in EEPROM in order to track the history of the issue. (A successful Boom Sensor Calibration will reset this counter – this is reflected in the boom sensor calibration document) TwrLenSnr(1/2)FaultCounter_EEPROM > 3</p> <p>(c) The fault counter below shall be incremented every time the trigger condition described in section (a) is observed during certain steps during Boom Sensor Calibration (please see that document section for further details) TwrLenSnr(1/2)FaultCounter_BmSnrCal > 20</p> <p>If (a) or (b) or (c) are met (fault triggered) the machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport</p>	Check Hardware, Wiring

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
84152	8	4	TOWERLENGTHSENSOR 2 FAULTY	<p>There are three ways (a, b, c) that these faults can be set:</p> <p>(a) If the length sensor voltage changes more than 0.0168 volts within 40 milliseconds a counter for the respective length sensor shall be incremented to aid service in diagnosing bad sensor performance. The counter below shall be incremented anytime the description above is met. It is cleared/reset by a power cycle TwrLenSnsr(1/2)FaultCounter_PowerCycle > 30</p> <p>(b) The counter below shall be incremented every time TwrLenSnsr(1/2)FaultCounter_PowerCycle (described above) reached its threshold. This value is stored in EEPROM in order to track the history of the issue. (A successful Boom Sensor Calibration will reset this counter – this is reflected in the boom sensor calibration document) TwrLenSnsr(1/2)FaultCounter_EEPROM > 3</p> <p>(c) The fault counter below shall be incremented every time the trigger condition described in section (a) is observed during certain steps during Boom Sensor Calibration (please see that document section for further details) TwrLenSnsr(1/2)FaultCounter_BmSnsrCal > 20</p> <p>If (a) or (b) or (c) are met (fault triggered) the machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport</p>	Check Hardware, Wiring

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
84153	8	4	BOOM LENGTH SENSOR 1 FAULTY	<p>There are three ways (a, b, c) that these faults can be set:</p> <p>(a) If the length sensor voltage changes more than 0.0168 volts within 40 milliseconds a counter for the respective length sensor shall be incremented to aid service in diagnosing bad sensor performance. The counter below shall be incremented any time the description above is met. It is cleared/reset by a power cycle BmLenSnr(1/2)FaultCounter_PowerCycle > 30</p> <p>(b) The counter below shall be incremented every time BmLenSnr(1/2)FaultCounter_PowerCycle (described above) reached its threshold. This value is stored in EEPROM in order to track the history of the issue. (A successful Boom Sensor Calibration will reset this counter – this is reflected in the boom sensor calibration document) BmLenSnr(1/2)FaultCounter_EEPROM > 3</p> <p>(c) The fault counter below shall be incremented every time the trigger condition described in section (a) is observed during certain steps during Boom Sensor Calibration (please see that document section for further details) BmLenSnr(1/2)FaultCounter_BmSnrCal > 20</p> <p>If (a) or (b) or (c) are met (fault triggered) the machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport</p>	Check wiring and hardware

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
84154	8	4	BOOM LENGTH SENSOR 2 FAULTY	<p>There are three ways (a, b, c) that these faults can be set:</p> <p>(a) If the length sensor voltage changes more than 0.0168 volts within 40 milliseconds a counter for the respective length sensor shall be incremented to aid service in diagnosing bad sensor performance. The counter below shall be incremented anytime the description above is met. It is cleared/reset by a power cycle BmLenSnsr(1/2)FaultCounter_PowerCycle > 30</p> <p>(b) The counter below shall be incremented every time BmLenSnsr(1/2)FaultCounter_PowerCycle (described above) reached its threshold. This value is stored in EEPROM in order to track the history of the issue. (A successful Boom Sensor Calibration will reset this counter – this is reflected in the boom sensor calibration document) BmLenSnsr(1/2)FaultCounter_EEPROM > 3</p> <p>(c) The fault counter below shall be incremented every time the trigger condition described in section (a) is observed during certain steps during Boom Sensor Calibration (please see that document section for further details) BmLenSnsr(1/2)FaultCounter_BmSnsrCal > 20</p> <p>If (a) or (b) or (c) are met (fault triggered) the machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport</p>	Check wiring and hardware
8416	8	4	TOWER LENGTH SENSOR DISAGREEMENT	<p>Tower length sensor is healthy and 2in difference between sensors over time a period of 2sec Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport</p>	Check Wiring and component

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
8418	8	4	TOWER LENGTH SENSOR #1 - OUT OF RANGE HIGH	Length sensor reports voltage > 4.94V Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring and component
8419	8	4	TOWER LENGTH SENSOR #1 - OUT OF RANGE LOW	Length sensor reports voltage < 0.01V Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring and component
842	8	4	BOOM LENGTH SWITCH – FAILED	Both N.O and N.C. switches read the same state Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware
8420	8	4	TOWER LENGTH SENSOR #2 - OUT OF RANGE HIGH	Length sensor reports voltage > 4.94V Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring and component
8421	8	4	TOWER LENGTH SENSOR #2 - OUT OF RANGE LOW	Length sensor reports voltage < 0.01V Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring and component
8422	8	4	TOWER LENGTH SENSOR - NOT DETECTING LENGTH CHANGE	Boom sensors have been calibrated, sensors are healthy and booms are functioning under engine power and tower length sensor moves < 0.3in over a time period of 3sec with a minimum function command of 45% Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring and component
8423	8	4	TOWER LENGTH MOVEMENT WITHOUT COMMAND	Tower moves > 5in within a 5min time period 5 sec after a Tower Telescope command has been completed. Note: This fault, under the right conditions, is also evaluated when Boom Sensors are not calibrated Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware
8424	8	4	TOWER LENGTH SENSOR #1 – LENGTH OUT OF RANGE HIGH	Tower length sensor is healthy and length sensor reports a length > 685in Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring and component

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
8425	8	4	TOWER LENGTH SENSOR #1 - LENGTH OUT OF RANGE LOW	Tower length sensor is healthy and length sensor reports a length < 299.4in Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring and component
8426	8	4	TOWER LENGTH SENSOR #2 – LENGTH OUT OF RANGE HIGH	Tower length sensor is healthy and length sensor reports a length > 685in Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring and component
8427	8	4	TOWER LENGTH SENSOR #2 – LENGTH OUT OF RANGE LOW	Tower length sensor is healthy and length sensor reports a length < 299.4in Machine will be put into Electrical Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Wiring and component
843	8	4	BOOM LENGTH SWITCH/SENSOR DISAGREEMENT	Monitored after boom angle sensor calibration is complete. Switch trip point (stored during calibration) and boom length sensor are in disagreement Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware
8434	8	4	BOOM ANGLE SENSOR - NOT DETECTING CHANGE	Boom sensors have been calibrated, sensors are healthy and booms are functioning under engine power and tower lift cylinder angle sensor moves <0.2deg over a time period of 3sec with a minimum function command of 35% Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware
8435	8	4	MAIN ANGLE MOVEMENT WITHOUT COMMAND	Sensor moves 2.5deg within a 5min time period 5 sec after a Tower lift command has been completed. Note: This fault, under the right conditions, is also evaluated when Boom Sensors are not calibrated Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware
8436	8	4	WRONG TOWER TELESCOPE RESPONSE	Boom sensors have been calibrated, sensors are healthy and tower length sensor moves >4in in the wrong direction over a time period of 2sec Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
8437	8	4	WRONG TOWER LIFT RESPONSE	Boom sensors have been calibrated, sensors are healthy and tower lift cylinder angle sensor moves >2.5deg in the wrong direction over a time period of 3sec Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware
844	8	4	MAIN LENGTH SENSOR NOT DETECTING CHANGE	Boom sensors have been calibrated, sensors are healthy and booms are functioning under engine power and tower length sensor moves <0.3in over a time period of 3sec with a minimum function command of 45% Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware
8440	8	4	TOWER CYLINDER ANGLE SENSOR - NOT DETECTING CHANGE	Boom sensors have been calibrated, sensors are healthy and booms are functioning under engine power and tower lift cylinder angle sensor moves <0.2deg over a time period of 3sec with a minimum function command of 35% Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check wiring and hardware
8441	8	4	TOWER CYLINDER ANGLE MOVEMENT WITHOUT COMMAND	Sensor moves 2.5deg within a 5min time period 5 sec after a Tower lift command has been completed. Note: This fault, under the right conditions, is also evaluated when Boom Sensors are not calibrated Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
8442	8	4	MAIN TRANSPORT ANGLE SWITCH FAILED	Both N.O and N.C. switches read the same state Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
8448	8	4	MAIN TRANSPORT ANGLE SWITCH/SENSOR DISAGREEMENT	Monitored after boom angle sensor calibration is complete. Switch trippoint (stored during calibration) and boom angle sensor are in disagreement Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
8452	8	4	TOWER LENGTH SWITCH/SENSOR DIS-AGREEMENT	(Tower Length is > 315in and tower length transport switches report retracted) or (Tower Length < 306.4in and tower length transport switches report extended). Note: This check is only evaluated after Boom Sensors are calibrated. All machine functions will be in creep Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
8453	8	4	WRONG MAIN TELERESPONSE	Boom sensors have been calibrated, sensors are healthy and tower length sensor moves >4in in the wrong direction over a time period of 2sec Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
8454	8	4	WRONG BOOM LIFT RESPONSE	Boom sensors have been calibrated, sensors are healthy and boom angle sensor moves >2.5deg in the wrong direction over a time period of 3sec Machine will be put into Hydraulic Retrieval Fault, once triggered, is maintained within a given key-cycle Machine will be trapped in transport	Check Hardware, Wiring
8479	8	4	MAIN CYLINDER ANGLE SENSOR #1 - OUT OF RANGE LOW		
8480	8	4	MAIN CYLINDER ANGLE SENSOR #1 - OUT OF RANGE HIGH		
8492	8	4	MAIN CYLINDER ANGLE SENSOR #2 - OUT OF RANGE LOW		
8493	8	4	MAIN CYLINDER ANGLE SENSOR #2 - OUT OF RANGE HIGH		
8494	8	4	MAIN CYLINDER ANGLE SENSORS - DIS-AGREEMENT		
8495	8	4	TURN TABLE SENSOR #1 - FREQUENCY OUT OF RANGE LOW		
8496	8	4	TURN TABLE SENSOR #1 - FREQUENCY OUT OF RANGE HIGH		
8497	8	4	TURN TABLE SENSOR #2 - FREQUENCY OUT OF RANGE LOW		
8498	8	4	TURN TABLE SENSOR #2 - FREQUENCY OUT OF RANGE HIGH		
8499	8	4	CHASSIS TURN TABLE SENSORS - DISAGREEMENT		
84100	8	4	CHASSIS TURN TABLE SENSORS AND DRIVE ORIENTATION SWITCH - DIS-AGREEMENT		
84101	8	4	CHASSIS TURN TABLE SENSORS - NOT CALIBRATED		

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
84102	8	4	MAIN CYLINDER ANGLE SENSOR - NOT DETECTING CHANGE		
84103	8	4	JIB LEVEL ANGLE SENSOR - NOT DETECTING CHANGE		
84104	8	4	JIB LIFT ANGLE SENSOR - NOT DETECTING CHANGE		
84105	8	4	PLATFORM LEVEL ANGLE SENSOR - NOT DETECTING CHANGE		
84106	8	4	JIB LEVEL MOVEMENT WITHOUT COMMAND		
84107	8	4	JIB LIFT MOVEMENT WITHOUT COMMAND		
84108	8	4	PLATFORM LEVEL MOVEMENT WITHOUT COMMAND		
850	8	5	<<< MOMENT/LOAD PINS >>>		
851	8	5	MOMENT PIN - HORIZONTAL FORCE OUT OF RANGE	The Moment Pin horizontal force is out of range.	
852	8	5	MOMENT PIN - VERTICAL FORCE OUT OF RANGE	The Moment Pin vertical force is out of range.	
855	8	5	MOMENT PIN - SENSOR FAULT	The Moment Pin has reported a fault.	
857	8	5	NEW MOMENT PIN DETECTED	A new Moment Pin has been detected.	
860	8	6	<<< STEERING/AXLE >>>		
861	8	6	RESTRICTED TO TRANSPORT - OSCILLATING AXLE PRESSURE SWITCH DIS- AGREEMENT	The Oscillating Axle Pressure Switch indicates pressure while not driving or does not indicate pressure while driving and restricted to transport.	- Electrically released Oscillated Axles equipped vehicles only.
862	8	6	AXLE EXTEND VALVE - SHORT TO BATTERY OR OPEN CIRCUIT	The control system detected a short to battery or open circuit on the axle extend valve	
863	8	6	AXLE EXTEND VALVE - SHORT TO GROUND	There is a Short to Ground to the Axle Extend Valve.	
864	8	6	AXLE RETRACT VALVE - SHORT TO BATTERY OR OPEN CIRCUIT	There is a Short to Battery or an Open Circuit to the Axle Retract Valve.	
865	8	6	AXLE RETRACT VALVE - SHORT TO GROUND	There is a Short to Ground to the Axle Retract Valve.	
866	8	6	RIGHT FRONT STEER RIGHT VALVE - SHORT TO BATTERY OR OPEN CIRCUIT	There is a Short to Battery or an Open Circuit to the Right Front Steer Right Valve.	
867	8	6	RIGHT FRONT STEER RIGHT VALVE - SHORT TO GROUND	There is a Short to Ground to the Right Front Steer Right Valve.	
868	8	6	RIGHT FRONT STEER LEFT VALVE - SHORT TO BATTERY OR OPEN CIRCUIT	There is a Short to Battery or an Open Circuit to the Right Front Steer Left Valve.	
869	8	6	RIGHT FRONT STEER LEFT VALVE - SHORT TO GROUND	There is a Short to Ground to the Right Front Steer Left Valve.	
8610	8	6	LEFT FRONT STEER RIGHT VALVE - SHORT TO BATTERY OR OPEN CIRCUIT	There is a Short to Battery or an Open Circuit to the Left Front Steer Right Valve.	
8611	8	6	LEFT FRONT STEER RIGHT VALVE - SHORT TO GROUND	There is a Short to Ground to the Left Front Steer Right Valve.	
8612	8	6	LEFT FRONT STEER LEFT VALVE - SHORT TO BATTERY OR OPEN CIRCUIT	There is a Short to Battery or an Open Circuit to the Left Front Steer Left Valve.	

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
8613	8	6	LEFT FRONT STEER LEFT VALVE - SHORT TO GROUND	There is a Short to Ground to the Left Front Steer Left Valve.	
8614	8	6	RIGHT REAR STEER RIGHT VALVE - SHORT TO BATTERY OR OPEN CIRCUIT	There is a Short to Battery or an Open Circuit to the Right Rear Steer Right Valve.	
8615	8	6	RIGHT REAR STEER RIGHT VALVE - SHORT TO GROUND	There is a Short to Ground to the Right Rear Steer Right Valve.	
8616	8	6	RIGHT REAR STEER LEFT VALVE - SHORT TO BATTERY OR OPEN CIRCUIT	There is a Short to Battery or an Open Circuit to the Right Rear Steer Left Valve.	
8617	8	6	RIGHT REAR STEER LEFT VALVE - SHORT TO GROUND	There is a Short to Ground to the Right Rear Steer Left Valve.	
8618	8	6	LEFT REAR STEER RIGHT VALVE - SHORT TO BATTERY OR OPEN CIRCUIT	There is a Short to Battery or an Open Circuit to the Left Rear Steer Right Valve.	
8619	8	6	LEFT REAR STEER RIGHT VALVE - SHORT TO GROUND	There is a Short to Ground to the Left Rear Steer Right Valve.	
8620	8	6	LEFT REAR STEER LEFT VALVE - SHORT TO BATTERY OR OPEN CIRCUIT	There is a Short to Battery or an Open Circuit to the Left Rear Steer Left Valve.	
8621	8	6	LEFT REAR STEER LEFT VALVE - SHORT TO GROUND	There is a Short to Ground to the Left Rear Steer Left Valve.	
8622	8	6	FRONT RIGHT STEER SENSOR - DECOUPLED	The Front Right Steer Sensor has become decoupled.	
8623	8	6	FRONT LEFT STEER SENSOR - DECOUPLED	The Front Left Steer Sensor has become decoupled.	
8624	8	6	REAR RIGHT STEER SENSOR - DECOUPLED	The Rear Right Steer Sensor has become decoupled.	
8625	8	6	REAR LEFT STEER SENSOR - DECOUPLED	The Rear Left Steer Sensor has become decoupled.	
8626	8	6	FRONT LEFT STEER SENSOR - NOT RESPONDING	The Front Right Steer Sensor is not responding to steer commands.	
8627	8	6	FRONT RIGHT STEER SENSOR - NOT RESPONDING	The Front Left Steer Sensor is not responding to steer commands.	
8628	8	6	REAR LEFT STEER SENSOR - NOT RESPONDING	The Rear Right Steer Sensor is not responding to steer commands.	
8629	8	6	REAR RIGHT STEER SENSOR - NOT RESPONDING	The Rear Left Steer Sensor is not responding to steer commands.	
8630	8	6	FRONT RIGHT STEER SENSOR - SHORT TO GROUND OR OPEN CIRCUIT	There is a Short to Ground or an Open Circuit to the Front Right Steer Sensor.	
8631	8	6	FRONT RIGHT STEER SENSOR - SHORT TO BATTERY	There is a Short to Battery to the Front Right Steer Sensor.	
8632	8	6	FRONT LEFT STEER SENSOR - SHORT TO GROUND OR OPEN CIRCUIT	There is a Short to Ground or an Open Circuit to the Front Left Steer Sensor.	
8633	8	6	FRONT LEFT STEER SENSOR - SHORT TO BATTERY	There is a Short to Battery to the Front Left Steer Sensor.	
8634	8	6	REAR RIGHT STEER SENSOR - SHORT TO GROUND OR OPEN CIRCUIT	There is a Short to Ground or an Open Circuit to the Rear Right Steer Sensor.	
8635	8	6	REAR RIGHT STEER SENSOR - SHORT TO BATTERY	There is a Short to Battery to the Rear Right Steer Sensor.	

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
8636	8	6	REAR LEFT STEER SENSOR - SHORT TO GROUND OR OPEN CIRCUIT	There is a Short to Ground or an Open Circuit to the Rear Left Steer Sensor.	
8637	8	6	REAR LEFT STEER SENSOR - SHORT TO BATTERY	There is a Short to Battery to the Rear Left Steer Sensor.	
8651	8	6	ENGINE SHUTDOWN - AXLE LOCKOUT VALVE FAULT	Engine Start is prevented while there is an Oscillating Axle fault and vehicle is out of transport position	
8670	8	6	RIGHT FRONT STEER RIGHT VALVE - OPEN CIRCUIT	Open Circuit detected	Check wiring
8671	8	6	RIGHT FRONT STEER RIGHT VALVE - SHORT TO BATTERY	Short to Battery detected	
8672	8	6	RIGHT FRONT STEER LEFT VALVE - OPEN CIRCUIT	Open Circuit detected	
8673	8	6	RIGHT FRONT STEER LEFT VALVE - SHORT TO BATTERY	Short to Battery detected	
8674	8	6	LEFT FRONT STEER RIGHT VALVE - OPEN CIRCUIT	Open Circuit detected	
8675	8	6	LEFT FRONT STEER RIGHT VALVE - SHORT TO BATTERY	Short to Battery detected	
8676	8	6	LEFT FRONT STEER LEFT VALVE - OPEN CIRCUIT	Open Circuit detected	
8677	8	6	LEFT FRONT STEER LEFT VALVE - SHORT TO BATTERY	Short to Battery detected	
8678	8	6	RIGHT REAR STEER RIGHT VALVE - OPEN CIRCUIT	Open Circuit detected	
8679	8	6	RIGHT REAR STEER RIGHT VALVE - SHORT TO BATTERY	Short to Battery detected	
8680	8	6	RIGHT REAR STEER LEFT VALVE - OPEN CIRCUIT	Open Circuit detected	
8681	8	6	RIGHT REAR STEER LEFT VALVE - SHORT TO BATTERY	Short to Battery detected	
8682	8	6	LEFT REAR STEER RIGHT VALVE - OPEN CIRCUIT	Open Circuit detected	
8683	8	6	LEFT REAR STEER RIGHT VALVE - SHORT TO BATTERY	Short to Battery detected	
8684	8	6	LEFT REAR STEER LEFT VALVE - OPEN CIRCUIT	Open Circuit detected	
8685	8	6	LEFT REAR STEER LEFT VALVE - SHORT TO BATTERY	Short to Battery detected	
8686	8	6	FRONT LEFT AXLE - MOVEMENT WITHOUT COMMAND	Axle is set to extend position, no axle retract or extend is demanded by the operator and one or more of the axle sensors detects motion	
8687	8	6	FRONT RIGHT AXLE - MOVEMENT WITHOUT COMMAND		
8688	8	6	REAR RIGHT AXLE - MOVEMENT WITHOUT COMMAND		
8689	8	6	REAR LEFT AXLE - MOVEMENT WITHOUT COMMAND		

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
873	8	7	MACHINE SAFETY SYSTEM OVERRIDE OCCURRED		
876	87	6	WIRE ROPE SERVICE REQUIRED	MACHINE SETUP → CABLE SWITCH = YES; Wire Rope Service = Enabled	
990	9	9	<<< HARDWARE >>>		
991	9	9	LSS WATCHDOG RESET		
992	9	9	LSS EEPROM ERROR		
993	9	9	LSS INTERNAL ERROR - PIN EXCITATION		
994	9	9	LSS INTERNAL ERROR - DRDY MISSING FROM A/D		
998	9	9	EEPROM FAILURE - CHECK ALL SETTINGS	The Ground Module has reported an EEPROM failure.	
9910	9	9	FUNCTIONS LOCKED OUT - PLATFORM MODULE SOFTWARE VERSION IMPROPER	The Platform Module software version is not compatible with the rest of the system.	
9911	9	9	FUNCTIONS LOCKED OUT		
9914	9	9	PLATFORM MODULE SOFTWARE UPDATE REQUIRED	The Platform Module software requires an updated.	
9915	9	9	CHASSIS TILT SENSOR NOT GAIN CALIBRATED	UGM Internal tilt sensor failure. The machine will behave as if it is tilted.	Contact JLG Service Representative.
9916	9	9	CHASSIS TILT SENSOR GAIN OUT OF RANGE	The Chassis Tilt Sensor gain calibration has become corrupted.	
9917	9	9	HIGH RESOLUTION A2D FAILURE - INTERRUPT LOST	The Platform Module has reported that its ADS1213 chip has stopped asserting its interrupt.	
9918	9	9	HIGH RESOLUTION A2D FAILURE - REINIT LIMIT	The Platform Module has reported that its ADS1213 chip had to be reset 3 or more times.	
9919	9	9	GROUND SENSOR REF VOLTAGE OUT OF RANGE	The Ground Module has reported that its sensor reference voltage is outside acceptable range.	- Not reported during power-up.
9920	9	9	PLATFORM SENSOR REF VOLTAGE OUT OF RANGE	The Platform Module has reported that its sensor reference voltage is outside acceptable range.	- Not reported during power-up.
9921	9	9	GROUND MODULE FAILURE - HIGH SIDE DRIVER CUTOFF FAULTY	The Ground Module has reported that its high side driver cutoff failed.	
9922	9	9	PLATFORM MODULE FAILURE - HWFS CODE 1	The Platform Module has reported that the V(Low) FET has failed.	
9923	9	9	GROUND MODULE FAILURE - HWFS CODE 1	The Ground Module has reported that the V(Low) FET has failed.	
9924	9	9	FUNCTIONS LOCKED OUT - MACHINE NOT CONFIGURED		
9925	9	9	FUNCTIONS LOCKED OUT - CHASSIS MODULE SOFTWARE VERSION IMPROPER	The Chassis Module software version is not compatible with the rest of the system.	
9926	9	9	FUNCTIONS LOCKED OUT - BLAM MODULE SOFTWARE VERSION IMPROPER	The BLAM software version is not compatible with the rest of the system.	

Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
9927	9	9	GROUND MODULE CONSTANT DATA UPDATE REQUIRED	The Ground Module constant data requires an updated.	
9928	9	9	ENVELOPE CONTROL DISABLED	Envelope Control has been disabled by the user from Access Level 0.	- Envelope Control equipped vehicles only.
99282	9	9	GROUND DISPLAY SOFTWARE VERSION IS IMPROPER	Machine will be put in creep until software updated. The UGM has detected an improper software version on the ground display.	Update Ground Display software or replace the Ground Display
99285	9	9	LSS - FACTORY CALIBRATION ERROR	The load sensor is reporting a factor calibration issue (internal error) The machine will assume the platform is overloaded. This fault, once annunciated is latched within a given key cycle.	Possible sensor hardware issue.
9929	9	9	MOMENT CONTROL DISABLED	Moment Control has been disabled by the user from Access Level 0.	- Envelope Control equipped vehicles only.
99296	9	9	PLATFORM DISPLAY SOFTWARE VERSION IMPROPER	Machine will be put in creep until software updated. The UGM has detected an improper software version on the platform display.	Update Platform Display software or replace the Platform Display
9930	9	9	STEER SENSORS NOT CALIBRATED	The Steer Sensors have not been calibrated.	
9931	9	9	BOOM SENSORS NOT CALIBRATED	Machine restricted to in transport position. Boom Sensor not calibrated.	Calibrate Boom Sensors
9932	9	9	LIFT CRACKPOINTS NOT CALIBRATED	The Lift Crackpoints have not been calibrated.	
9933	9	9	TELESCOPE CRACKPOINTS NOT CALIBRATED	The Telescope Crackpoints have not been calibrated.	
9934	9	9	DRIVE CRACKPOINTS NOT CALIBRATED	The Drive Crackpoints have not been calibrated.	
9935	9	9	BLAM SENSOR SUPPLY OUT OF RANGE HIGH	The Boom Angle Sensors supply voltage is high.	- BLAM equipped vehicles only.
9936	9	9	BLAM SENSOR SUPPLY OUT OF RANGE LOW	The Boom Angle Sensors supply voltage is low.	- BLAM equipped vehicles only.
9937	9	9	LENGTH SENSOR REF VOLTAGE HIGH	Fault, once triggered, is maintained within a given key-cycle Machine will be put into Electrical Retrieval Machine will be trapped in transport	Check Wiring, Control Module
9938	9	9	LENGTH SENSOR REF VOLTAGE LOW	Fault, once triggered, is maintained within a given key-cycle Machine will be put into Electrical Retrieval Machine will be trapped in transport	Check Wiring, Control Module
9939	9	9	BLAM HIGH RES A/D FAILURE	The BLAM high resolution analog to digital converter has failed.	- BLAM equipped vehicles only.
9940	9	9	CHASSIS SENSOR SUPPLY OUT OF RANGE HIGH	The Chassis Sensors supply voltage is high.	
9941	9	9	CHASSIS SENSOR SUPPLY OUT OF RANGE LOW	The Chassis Sensors supply voltage is low.	

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Table 6-15. Diagnostic Trouble Code Chart

DTC	Flash Code	Sequence	Fault Message	Fault Description	Check
9944	9	9	CURRENT FEEDBACK GAINS OUT OF RANGE	The factory set current feedback gains are out of range.	
9945	9	9	CURRENT FEEDBACK CALIBRATION CHECKSUM INCORRECT	The factory set current feedback checksum is not correct.	
99155	9	9	JIB CONTROL MODULE - HIGH RESOLUTION A2D FAILURE		
99156	9	9	JIB CONTROL MODULE - HIGH RESOLUTION A2D REFERENCE LOW		
99157	9	9	JIB CONTROL MODULE - HIGH RESOLUTION A2D REFERENCE HIGH		
99158	9	9	PLATFORM LEVEL ANGLE SENSOR - INTERNAL ERROR		
99159	9	9	JIB LIFT ANGLE SENSOR - INTERNAL ERROR		
99160	9	9	FUNCTIONS LOCKED OUT - JIB CONTROL MODULE SOFTWARE VERSION IMPROPER		
99290	9	9	BLAP SENSOR REFERENCE VOLTAGE HIGH	The BLAP detected high voltage (> 5.4V) on the reference voltage input.	Verify wiring to the 5V reference input on BLAP module. Verify voltage on 5V reference input
99291	9	9	BLAP SENSOR REFERENCE VOLTAGE LOW	The BLAP detected low voltage (< 4.5V) on the reference voltage input.	Verify wiring to the 5V reference input on BLAP module. Verify voltage on 5V reference input

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Part Coating:

Part Treatment:

Part Certification:

Part Compliance:

Part Approval:

Part License:

Part Registration:

Part Inspection:

Part Testing:

Part Calibration:

Part Adjustment:

Part Repair:

Part Replacement:

Part Removal:

Part Installation:

Part Operation:

Part Maintenance:

Part Safety:

Part Training:

Part Documentation:

Part Record Keeping:

Part Reporting:

Part Communication:

Part Collaboration:

Part Partnership:

Part Alliance:

Part Joint Venture:

Part Acquisition:

Part Merger:

Part Divestiture:

Part Liquidation:

Part Bankruptcy:

Part Reorganization:

Part Restructuring:

Part Turnaround:

Part Revitalization:

Part Transformation:

Part Innovation:

Part Research and Development:

Part Intellectual Property:

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SECTION 7. BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

7.1 GENERAL

This section contains basic electrical information and schematics to be used for locating and correcting most of the operating problems which may develop. If a problem should develop which is not presented in this section or which is not corrected by listed corrective actions, technically qualified guidance should be obtained before proceeding with any maintenance.

NOTE: Some of the procedures/connectors shown in this section may not be applicable to all models.

7.2 MULTIMETER BASICS

A wide variety of multimeters or Volt Ohm Meters (VOM) can be used for troubleshooting your equipment. This section shows diagrams of a common, digital VOM configured for several different circuit measurements. Instructions for your VOM may vary. Please consult the meter operator's manual for more information.

Grounding

"Grounding the meter" means to take the black lead (which is connected to the COM (common) or negative port) and touch it to a good path to the negative side of the Voltage source.

Backprobing

To "backprobe" means to take the measurement by accessing a connector's contact on the same side as the wires, the back of the connector. Readings can be done while maintaining circuit continuity this way. If the connector is the sealed type, great care must be taken to avoid damaging the seal around the wire. It is best to use probes or probe tips specifically designed for this technique, especially on sealed connectors. Whenever possible insert probes into the side of the connector such that the test also checks both terminals of the connection. It is possible to inspect a connection within a closed connector by backprobing both sides of a connector terminal and measuring resistance. Do this after giving each wire a gentle pull to ensure the wires are still attached to the contact and contacts are seated in the connector.

Min/Max

Use of the "Min/Max" recording feature of some meters can help when taking measurements of intermittent conditions while alone. For example, you can read the Voltage applied to a solenoid when it is only operational while a switch, far from the solenoid and meter, is held down.

Polarity

Getting a negative Voltage or current reading when expecting a positive reading frequently means the leads are reversed. Check what reading is expected, the location of the signal and that the leads are connected to the device under test correctly. Also check that the lead on the "COM" port goes to the Ground or negative side of the signal and the lead on the other port goes to the positive side of the signal.

Scale

M = Mega = 1,000,000 * (Displayed Number)

k = kilo = 1,000 * (Displayed Number)

m = milli = (Displayed Number) / 1,000

μ = micro = (Displayed Number) / 1,000,000

Example: 1.2 kW = 1200 W

Example: 50 mA = 0.05 A

Voltage Measurement

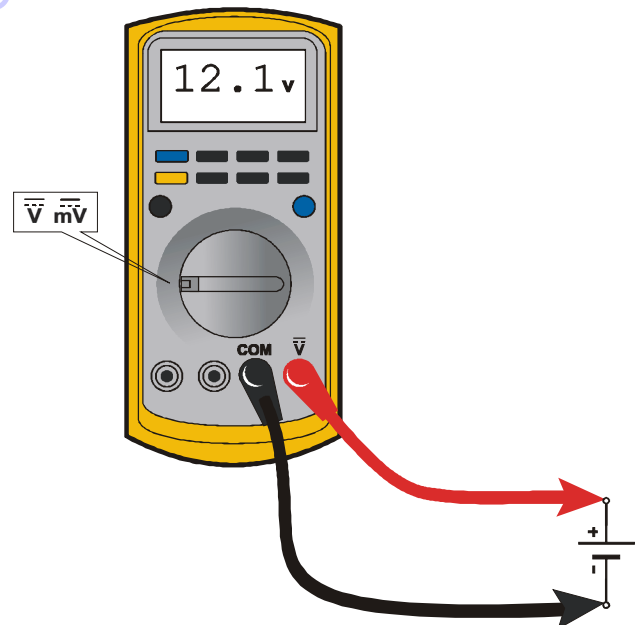


Figure 7-1. Voltage Measurement (DC)

- If meter is not auto ranging, set it to the correct range (See multimeter's operation manual)
- Use firm contact with meter leads

Resistance Measurement

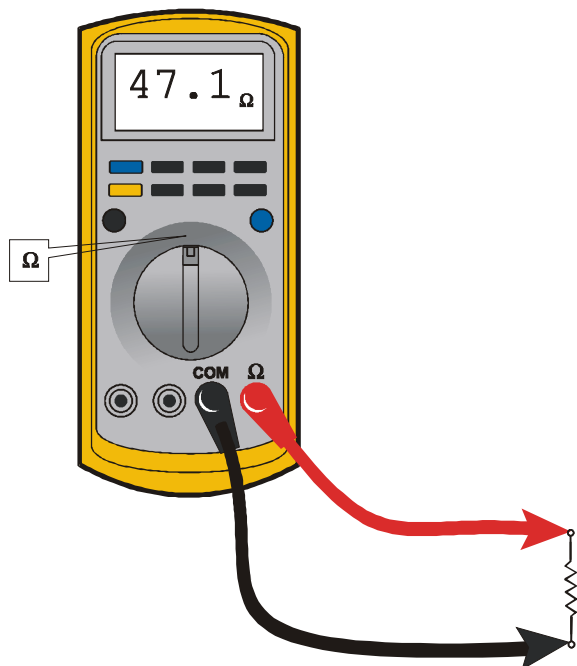


Figure 7-2. Resistance Measurement

- First test meter and leads by touching leads together. Resistance should read a short circuit (very low resistance)
- Circuit power must be turned OFF before testing resistance
- Disconnect component from circuit before testing
- If meter is not auto ranging, set it to the correct range (See multimeter's operation manual)
- Use firm contact with meter leads

Continuity Measurement

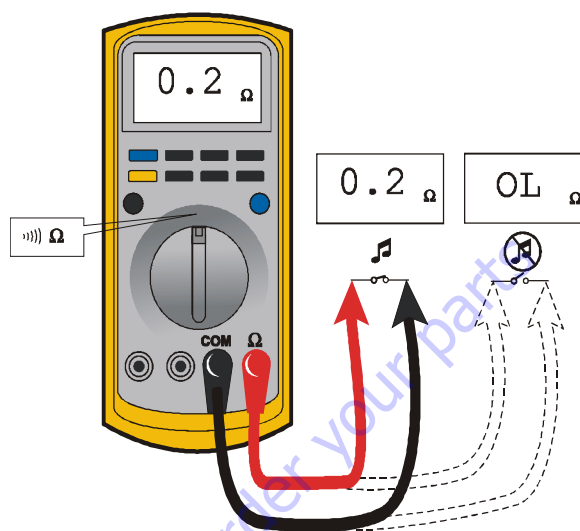


Figure 7-3. Continuity Measurement

- Some meters require a separate button press to enable audible continuity testing
- Circuit power must be turned OFF before testing continuity
- Disconnect component from circuit before testing
- Use firm contact with meter leads
- First test meter and leads by touching leads together. Meter should produce an audible alarm, indicating continuity

Current Measurement

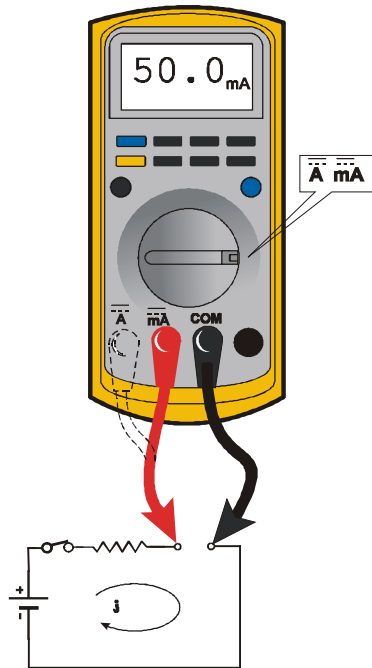


Figure 7-4. Current Measurement (DC)

- Set up the meter for the expected current range
- Be sure to connect the meter leads to the correct jacks for the current range you have selected
- If meter is not auto ranging, set it to the correct range (See multi meter's operation manual)
- Use firm contact with meter leads

7.3 APPLYING SILICONE DIELECTRIC COMPOUND TO ELECTRICAL CONNECTIONS

NOTE: This section is not applicable for battery terminals.

NOTICE

JLG PN 0100048 DIELECTRIC GREASE (NOVAGARD G661) IS THE ONLY MATERIAL APPROVED FOR USE AS A DIELECTRIC GREASE.

NOTE: Do NOT apply dielectric grease to the following connections:

- Main Boom Rotary sensor connections (on Celesco Sensor),
- LSS Modules connections,
- Deutz EMR 2 ECM connection.

Silicone Dielectric Compound must be used on all electrical connections except for those mentioned above for the following reasons:

- To prevent oxidation at the mechanical joint between male and female pins.
- To prevent electrical malfunction caused by low level conductivity between pins when wet.

Use the following procedure to apply Silicone Dielectric Compound to the electrical connectors. This procedure applies to all plug connections not enclosed in a box. Silicone grease should not be applied to connectors with external seals.

1. To prevent oxidation, silicone grease must be packed completely around male and female pins on the inside of the connector prior to assembly. This is most easily achieved by using a syringe.

NOTE: Over a period of time, oxidation increases electrical resistance at the connection, eventually causing circuit failure.

2. To prevent shorting, silicone grease must be packed around each wire where they enter the outside of the connector housing. Also, silicone grease must be applied at the joint where the male and female connectors come together. Any other joints (around strain reliefs, etc.) where water could enter the connector should also be sealed.

NOTE: This condition is especially common when machines are pressure washed since the washing solution is much more conductive than water.

- Anderson connectors for the battery boxes and battery chargers should have silicone grease applied to the contacts only.

NOTE: *Curing-type sealants might also be used to prevent shorting and would be less messy, but would make future pin removal more difficult.*

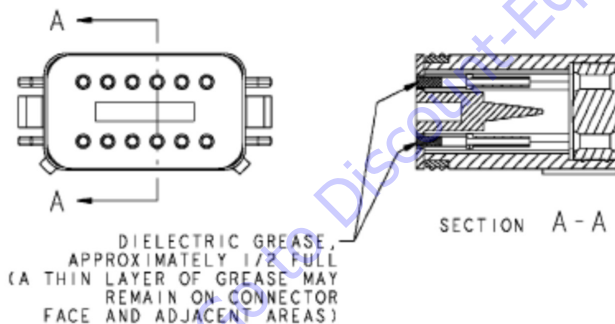
When applied to electrical connections, dielectric grease helps to prevent corrosion of electrical contacts and improper conductivity between contacts from moisture intrusion. Open and sealed connectors benefit from the application of dielectric grease.

Dielectric grease shall be applied to all electrical connectors at the time of connection (except those noted under Exclusions).

Installation of Dielectric Grease

Before following these instructions, refer to excluded connector types (See Exclusions below).

- Use dielectric grease in a tube for larger connection points or apply with a syringe for small connectors.
- Apply dielectric grease to the female contact (fill it approximately 1/2 full; see example below)
- Leave a thin layer of dielectric grease on the face of the connector
- Assemble the connector system immediately to prevent moisture ingress or dust contamination
- Pierce one of the unused wire seals prior to assembly if the connector system tends to trap air (i.e. AMP Seal) and then install a seal plug.



Deutsch HD, DT, DTM, DRC Series

The Deutsch connector system is commonly used for harsh environment interconnect. Follow the installation instructions.



AMP Seal

The AMP Seal connector system is used on the Control ADE Platform and Ground Modules.

Apply dielectric grease to the female contact. If trapped air prevents the connector from latching, pierce one of the unused wire seals. After assembly, install a seal plug (JLG #4460905) in that location to prevent moisture ingress.

Note that seal plugs may be installed by the wire harness manufacturer if an unused wire seal becomes compromised (wire inserted in the wrong cavity during assembly and then corrected).



Figure 7-5. Application to Female Contacts

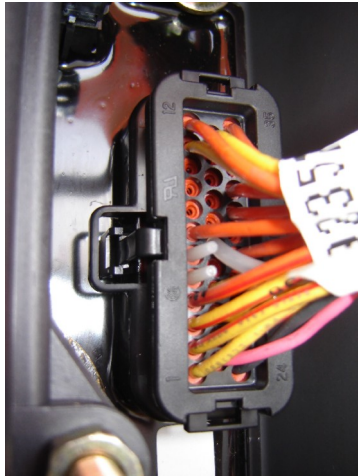
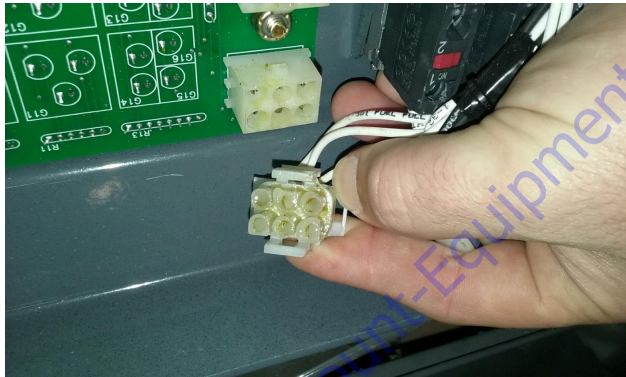


Figure 7-6. Use of Seal Plugs

AMP Mate-N-Lok

This connector system is widely used inside enclosures for general purpose interconnect. Follow the installation instructions.



DIN Connectors

This connector is typically used on hydraulic valves. Follow the installation instructions.



Exclusions

A limited number of connectors do not benefit from dielectric grease, or may be permanently damaged by application. Dielectric grease may not be required in properly sealed enclosures.

BRAD HARRISON / PHOENIX CONTACT M12

The connector uses gold contact material to resist corrosion and an o-ring seal for moisture integrity. If dielectric grease is mistakenly applied to this connector system, the low-force contacts cannot displace the grease to achieve electrical contact. Once contaminated, there is no practical way to remove the dielectric grease (replacement of female contacts required). The JLG Load Sensing System and 1500AJP Rotary Angle Sensors are examples of components with the M12 connector system.



Figure 7-7. Brad-Harrison M12



Figure 7-8. Phoenix Contact M12

ENGINE CONTROL UNIT CONNECTORS

These connectors use back-seals for moisture integrity. However, the low-force contacts cannot displace dielectric grease and create electrical contact. It is possible to use solvents (i.e. contact cleaner or mineral spirits) for the removal of improperly applied dielectric grease. The EMR4 engine control module from Deutz employs this connector system (for example).



SEALED ENCLOSURES

Application of dielectric grease is not required in properly sealed enclosures. To meet criteria, the enclosure must be rated to at least IP66 (dust tight; protected from powerful jets of water). The enclosure must be fitted with a high quality, continuous gasket and all wiring must pass through cable entrances.



MIL-C-5015 SPEC CONNECTOR'S

Crown Connector Inc's recommendation is to not use dielectric grease for this series connector. For similar model series connectors, the manufacturer should be contacted for confirmation before applying dielectric grease. A typical application for this connector is on David Clark Intercom connections in Mobile Elevating Work Platforms.



MOLEX CMC SERIES CONNECTORS

The CMC connector family is a sealed, high-density connection system using matte-seal technology for CP 0.635 and 1.50 mm terminals. To guarantee IP6K7 and IP6K9 sealing, a seal plug option is used. However, the low-force contacts cannot displace dielectric grease and create electrical contact. It is possible to use solvents (i.e. contact cleaner or mineral spirits) for the removal of improperly applied dielectric grease. The flexbox control modules from JDES employ this connector system (for example).



Go to Discount-Equipment.com to purchase your parts

7.4 AMP CONNECTOR

Assembly

Check to be sure the wedge lock is in the open, or as-shipped, position (See Figure 7-9.). Proceed as follows:

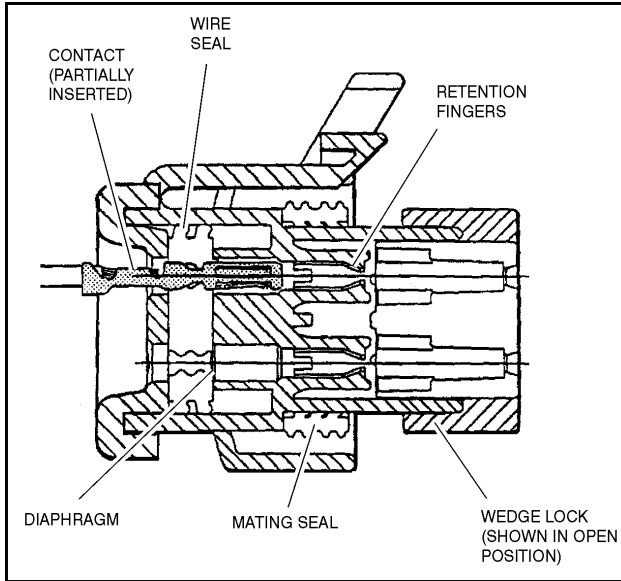


Figure 7-9. Connector Assembly Figure 1

1. To insert a contact, push it straight into the appropriate circuit cavity as far as it will go (See Figure 7-11.).

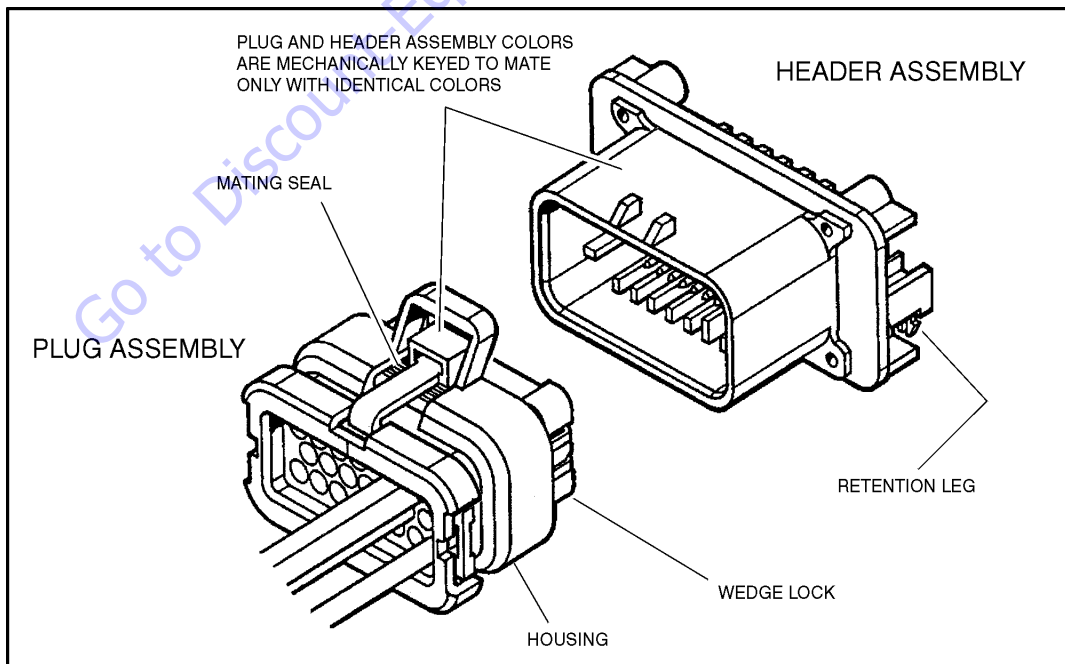


Figure 7-10. AMP Connector

2. Pull back on the contact wire with a force of 1 or 2 lbs. to be sure the retention fingers are holding the contact (See Figure 7-11.).

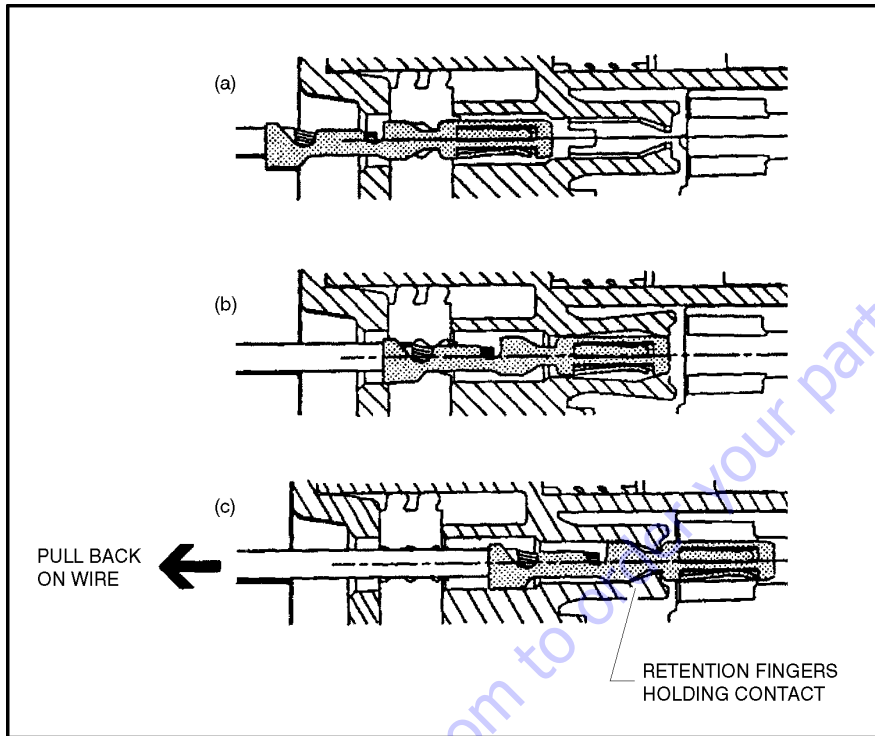


Figure 7-11. Connector Assembly Figure 2

3. After all required contacts have been inserted, the wedge lock must be closed to its locked position. Release the locking latches by squeezing them inward (See Figure 7-12.).

4. Slide the wedge lock into the housing until it is flush with the housing (See Figure 7-13.).

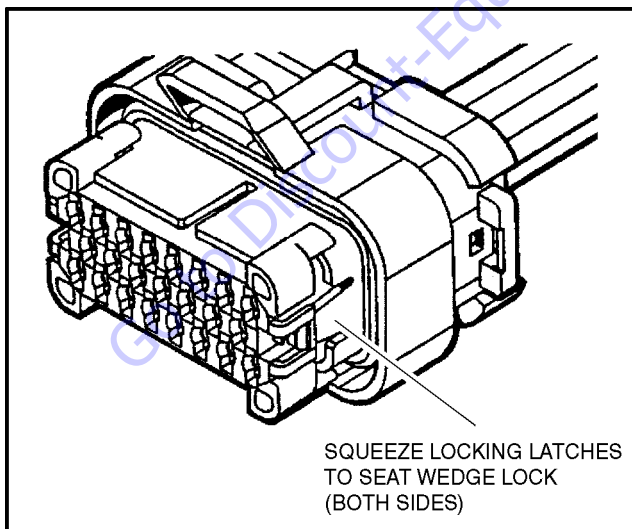


Figure 7-12. Connector Assembly Figure 3

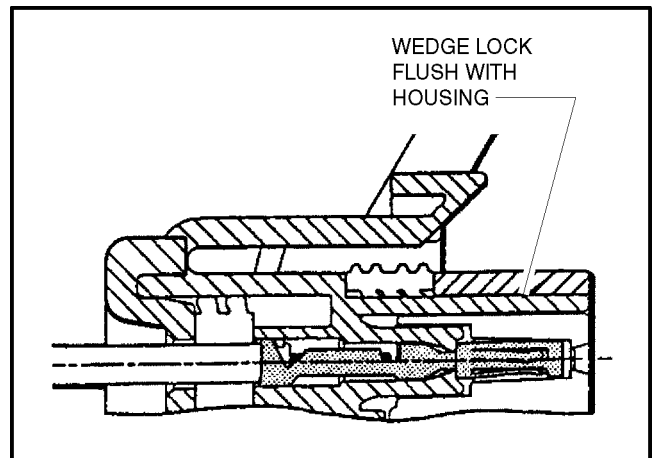


Figure 7-13. Connector Assembly Figure 4

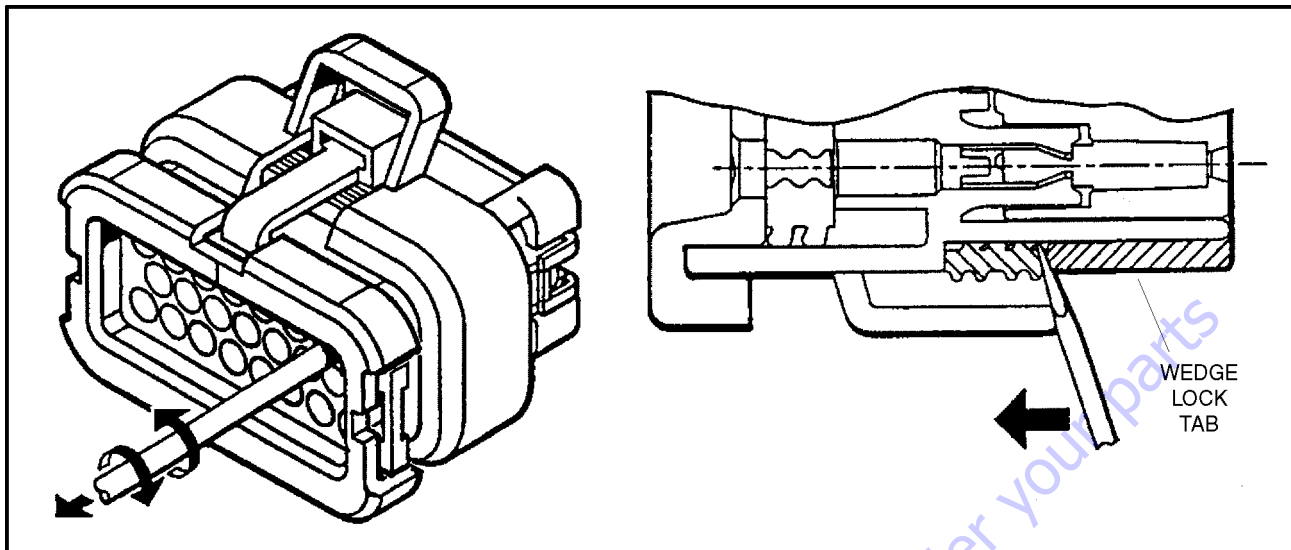


Figure 7-14. Connector Disassembly

Disassembly

5. Insert a 4.8 mm (3/16") wide screwdriver blade between the mating seal and one of the red wedge lock tabs.
6. Pry open the wedge lock to the open position.
7. While rotating the wire back and forth over a half turn (1/4 turn in each direction), gently pull the wire until the contact is removed.

NOTE: The wedge lock should never be removed from the housing for insertion or removal of the contacts.

Wedge Lock

The wedge lock has slotted openings in the forward, or mating end. These slots accommodate circuit testing in the field, by using a flat probe such as a pocket knife. DO NOT use a sharp point such as an ice pick.

Service - Voltage Reading

NOTICE

DO NOT PIERCE WIRE INSULATION TO TAKE VOLTAGE READINGS.

It has been common practice in electrical troubleshooting to probe wires by piercing the insulation with a sharp point. This practice should be discouraged when dealing with the AMP-SEAL plug assembly, or any other sealed connector system. The resulting pinholes in the insulation will allow moisture to invade the system by traveling along the wire strands. This nullifies the effectiveness of the connector seals and could result in system failure.

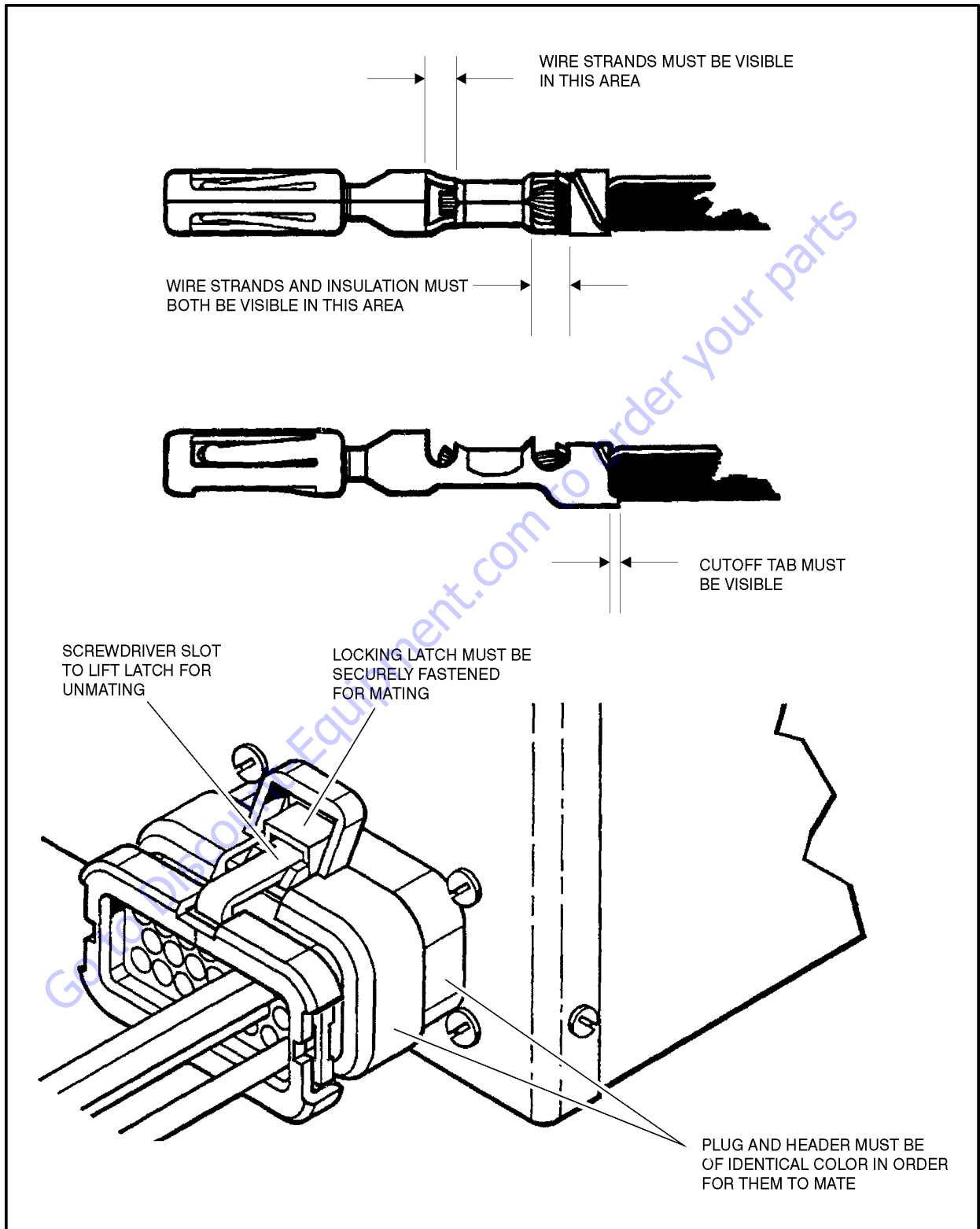


Figure 7-15. Connector Installation

7.5 DEUTSCH CONNECTORS

DT/DTP Series Assembly

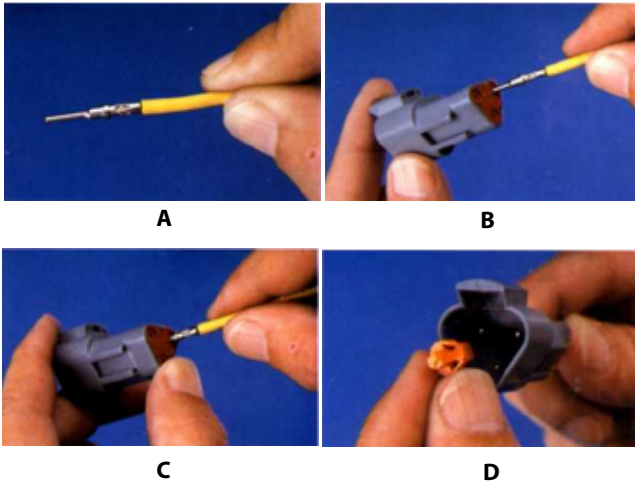


Figure 7-16. DT/DTP Contact Installation

1. Grasp crimped contact about 25mm behind the contact barrel.
2. Hold connector with rear grommet facing you.
3. Push contact straight into connector grommet until a click is felt. A slight tug will confirm that it is properly locked in place.
4. Once all contacts are in place, insert wedgelock with arrow pointing toward exterior locking mechanism. The wedgelock will snap into place. Rectangular wedges are not oriented. They may go in either way.

NOTE: The receptacle is shown - use the same procedure for plug.

DT/DTP Series Disassembly

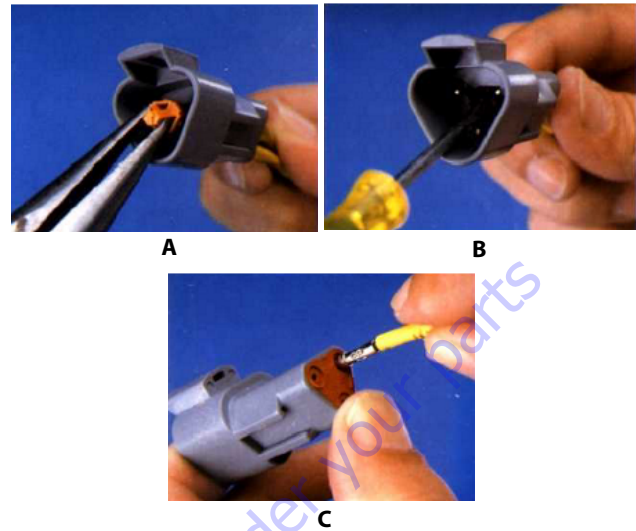


Figure 7-17. DT/DTP Contact Removal

5. Remove wedgelock using needlenose pliers or a hook shaped wire to pull wedge straight out.
6. To remove the contacts, gently pull wire backwards, while at the same time releasing the locking finger by moving it away from the contact with a screwdriver.
7. Hold the rear seal in place, as removing the contact may displace the seal.

HD30/HDP20 Series Assembly

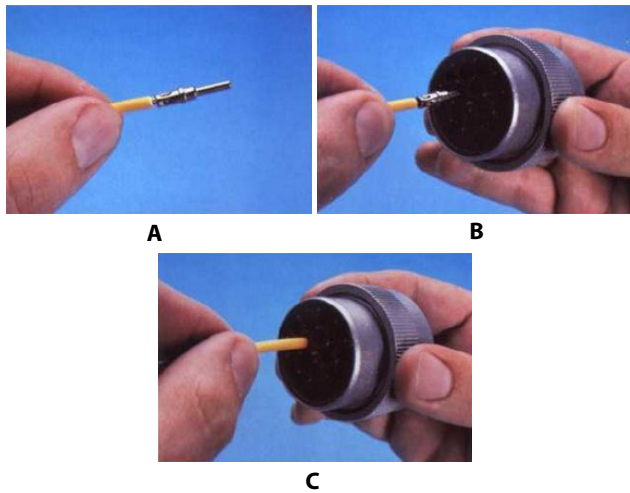


Figure 7-18. HD/HDP Contact Installation

8. Grasp contact about 25mm behind the contact crimp barrel.
9. Hold connector with rear grommet facing you.
10. Push contact straight into connector grommet until a positive stop is felt. A slight tug will confirm that it is properly locked in place.

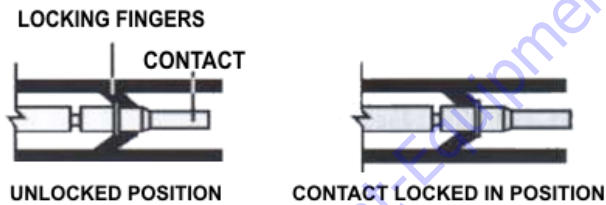


Figure 7-19. HD/HDP Locking Contacts Into Position

NOTE: For unused wire cavities, insert sealing plugs for full environmental sealing

HD30/HDP20 Series Disassembly

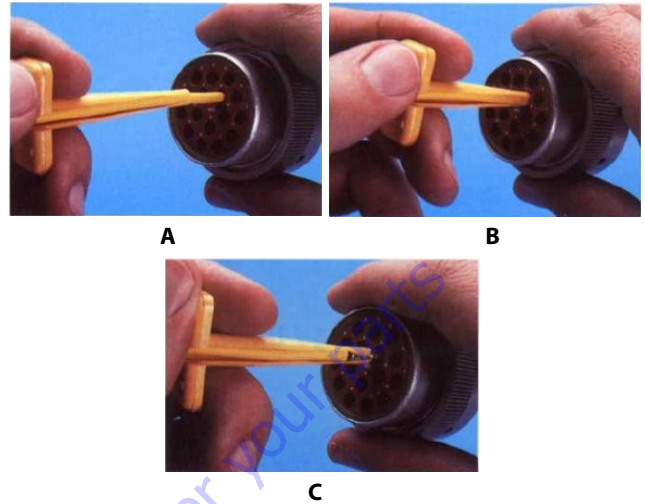


Figure 7-20. HD/HDP Contact Removal

11. With rear insert toward you, snap appropriate size extractor tool over the wire of contact to be removed.
12. Slide tool along into the insert cavity until it engages contact and resistance is felt.
13. Pull contact-wire assembly out of connector.

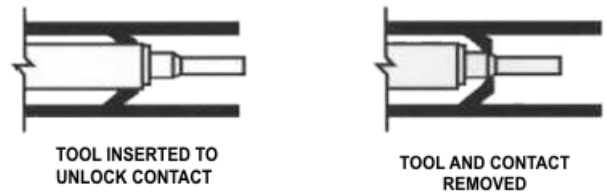


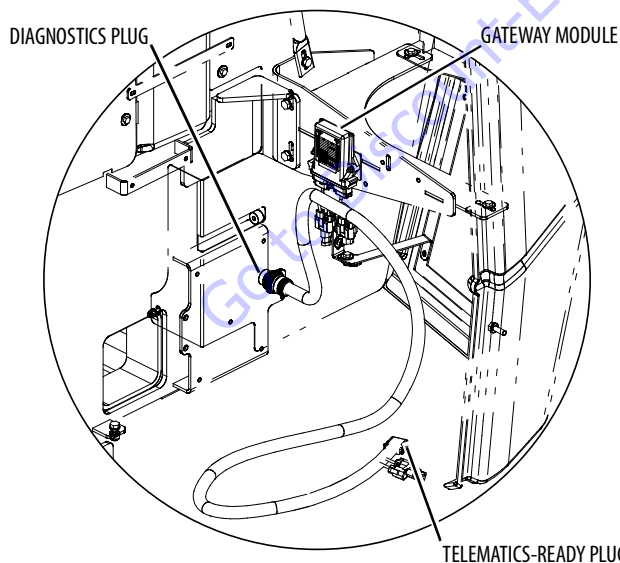
Figure 7-21. HD/HDP Unlocking Contacts

NOTE: Do Not twist or insert tool at an angle.

7.6 TELEMATICS GATEWAY

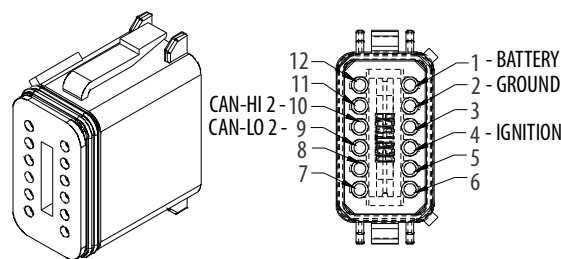
Personnel using machines equipped with an optional telematics gateway will be able to view the following data through their telematics device:

JLG LABEL	DESCRIPTION	UNIT
Engine Speed	Actual engine speed.	RPM
DEF Tank Level (If Equipped)	Indicates the level of DEF (diesel exhaust fluid) within the DEF tank if the machine is equipped with DEF tank. <ul style="list-style-type: none"> • 0% = Empty • 100% = Full 	Percentage (%)
JLG Machine Faults: Active / Not-Active	<ul style="list-style-type: none"> • 00 - No Machine Faults • 01 - Active Machine Fault • 10 - Error • 11 - Not available 	Bit
Total Idle Fuel Used	Total amount of fuel used during vehicle operation during idle conditions.	Liters
Total Idle Hours	Total time of engine operation during idle conditions.	Seconds
Total Engine Hours	Total time of engine operation.	Seconds
Total Fuel Used	Total amount of fuel used during vehicle operation.	Liters
Fuel Rate	Amount of fuel consumed by engine per unit of time.	Liters/Hour
Fuel Level	Ratio of fuel volume to the total volume of the fuel storage container. When a low fuel limit switch is present, the fuel level will indicate "full" until the switch opens, which will then indicate 10% fuel remaining. When Fuel Level 2 (SPN 38) is not used, Fuel Level 1 represents the total fuel in all fuel storage containers. When Fuel Level 2 is used, Fuel Level 1 represents the fuel level in the primary or left side fuel storage container.	Percentage (%)
DM1 Engine Faults	Shows actual engine fault codes.	N/A



Telematics-Ready (TCU) Plug

The telematics-ready (TCU) plug is a standard 12-pin Deutsch connector. Pin-out locations are shown below:



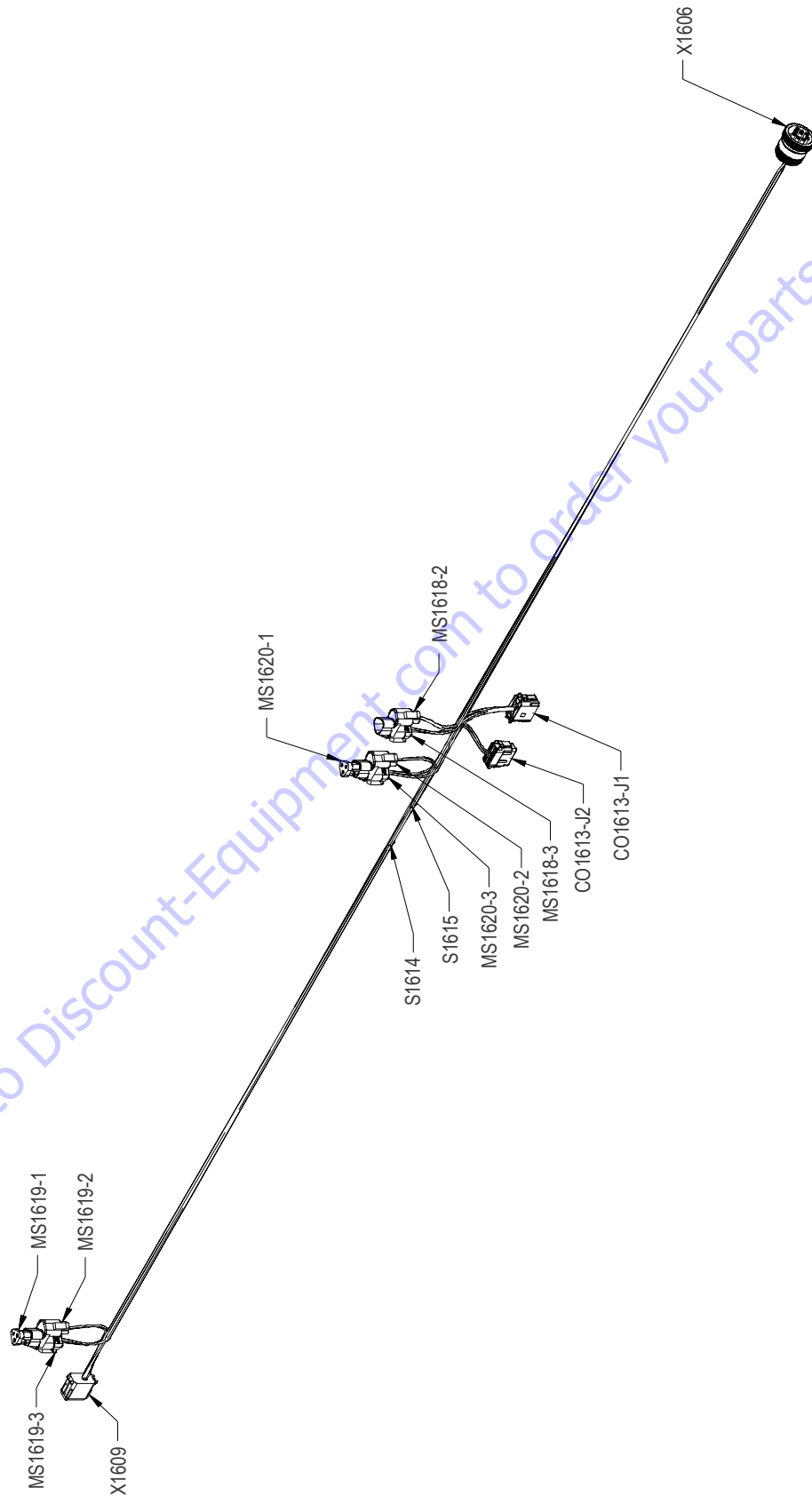


Figure 7-22. Telematics Gateway Harness - Sheet 1 of 3

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

X1609 (TCU)					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	RED	1-0 BAT	16 AWG	GXL	X1606 (B)
2	BLK	0-0 GND	16 AWG	GXL	S1615 (1)
4	ORN	2-0 IGN	16 AWG	GXL	S1614 (1)
9	GRN	CANL2	18 AWG	GXL	MS1619-2 (B)
10	YEL	CANH2	18 AWG	GXL	MS1619-2 (A)

MS1619-2 (CAN-T 2)					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
A	YEL	CANH2	18 AWG	GXL	X1609 (10)
B	GRN	CANL2	18 AWG	GXL	X1609 (9)

MS1619-3 (CAN-T 2)					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
A	YEL	CANH2	18 AWG	GXL	MS1620-2 (A)
B	GRN	CANL2	18 AWG	GXL	MS1620-2 (B)

CO1613-J1 (GATEWAY 1)					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
9	GRN	CAN1	18 AWG	GXL	MS1618-2 (B)
10	YEL	CANH1	18 AWG	GXL	MS1618-2 (A)
11	BLK	0-2 GND	16 AWG	GXL	S1615 (2)
12	ORN	2-2 IGN	16 AWG	GXL	S1614 (2)

CO1613-J2 (GATEWAY 2)					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
9	GRN	CANL2	18 AWG	GXL	MS1620-3 (B)
10	YEL	CANH2	18 AWG	GXL	MS1620-3 (A)

MS1620-2 (CAN-T 2)					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
A	YEL	CANH2	18 AWG	GXL	MS1619-3 (A)
B	GRN	CANL2	18 AWG	GXL	MS1619-3 (B)

MS1620-3 (CAN-T 2)					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
A	YEL	CANH2	18 AWG	GXL	CO1613-J2 (10)
B	GRN	CANL2	18 AWG	GXL	CO1613-J2 (9)

S1614					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	ORN	2-0 IGN	16 AWG	GXL	X1609 (4)
2	ORN	2-1 IGN	16 AWG	GXL	X1606 (H)
2	ORN	2-2 IGN	16 AWG	GXL	CO1613-J1 (12)

S1615					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	BLK	0-0 GND	16 AWG	GXL	X1609 (2)
2	BLK	0-1 GND	16 AWG	GXL	X1606 (A)
2	BLK	0-2 GND	16 AWG	GXL	CO1613-J1 (11)

MS1618-2 (CAN-T 1)					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
A	YEL	CANH1	18 AWG	GXL	CO1613-J1 (10)
B	GRN	CANL1	18 AWG	GXL	CO1613-J1 (9)

MS1618-3 (CAN-T 1)					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
A	YEL	CANH1	18 AWG	GXL	X1606 (C)
B	GRN	CANL1	18 AWG	GXL	X1606 (D)

X1606 (DIAG)					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
A	BLK	0-1 GND	16 AWG	GXL	S1615 (2)
B	RED	1-0 BAT	16 AWG	GXL	X1609 (1)
C	YEL	CANH1	18 AWG	GXL	MS1618-3 (A)
D	GRN	CANL1	18 AWG	GXL	MS1618-3 (B)
H	ORN	2-1 IGN	16 AWG	GXL	S1614 (2)

Figure 7-23. Telematics Gateway Harness - Sheet 2 of 3

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

					FROM		TO	
WIRE NO.	COLOR	WIRE GAUGE	LENGTH (mm)	JACKET	REFERENCE	PIN	REFERENCE	PIN
CAN L2	GRN	18 AWG	1151	GXL	MS1619-3	B	MS1620-2	B
CAN L2	GRN	18 AWG	151	GXL	X1609	9	MS1619-2	B
CAN L1	GRN	18 AWG	157	GXL	MS1618-2	B	CO1613-J1	9
CAN L2	GRN	18 AWG	225	GXL	MS1620-3	B	CO1613-J2	9
CAN L1	GRN	18 AWG	1076	GXL	MS1618-3	B	X1606	D
CAN H2	YEL	18 AWG	155	GXL	X1609	10	MS1619-2	A
CAN H2	YEL	18 AWG	233	GXL	MS1620-3	A	CO1613-J2	10
CAN H1	YEL	18 AWG	157	GXL	MS1618-2	A	CO1613-J1	10
CAN H2	YEL	18 AWG	1150	GXL	MS1619-3	A	MS1620-2	A
CAN H1	YEL	18 AWG	1079	GXL	MS1618-3	A	X1606	C
0-0 GND	BLK	16 AWG	1006	GXL	X1609	2	S1615	1
0-1 GND	BLK	16 AWG	1145	GXL	X1606	A	S1615	2
0-2 GND	BLK	16 AWG	223	GXL	CO1613-J1	11	S1615	2
1-0 BAT	RED	16 AWG	2150	GXL	X1609	1	X1606	B
2-0 IGN	ORN	16 AWG	939	GXL	X1609	4	S1614	1
2-1 IGN	ORN	16 AWG	1212	GXL	S1614	2	X1606	H
2-2 IGN	ORN	16 AWG	287	GXL	CO1613-J1	12	S1614	2

Figure 7-24. Telematics Gateway Harness - Sheet 3 of 3

7.7 WIRING HARNESS CONNECTOR LABELS

Connector Labels

Connectors between harnesses are identified by the prefix "X" and a sequentially assigned number. An optional suffix (letters & numbers) may be added when multiple terminations occur at one device or when there are optional connections.

Examples:

X25 connects to X25 in another harness.

X65A, X65B connect to different portions of one device

X163 connects to X163A in ANSI and X163B in CE machines

Component Labels

Every component on the vehicle has a unique identification. A standard prefix letter is assigned according to the table below, followed by a unique sequential number. An optional suffix (letters & numbers) may be added when multiple terminations occur at one device.

Terminals that are not loaded into connectors are considered independent components and labeled in the same fashion.

Table 7-1. Wiring Harness Connector Labels

Component	Category	Label
Audible	Alarms	AH
	Horns	
Battery	Batteries	BT
	Battery Terminals	
Control Module	Ground	CO
	LSS	
	Platform	
Engine	Alternator	EC
	Cold Start	
	Controller	
	Coolant Temp	
	Fuel Pump	
	Fuel Solenoid	
	Glow Plugs	
	Oil Pressure	
Fuse & CB Fuse FC	Fuse	FC
	Fusible Link	FC
	Circuit Breaker	CB
Gauge & Display	Board	GD
	Cluster	
	Hourmeter	
	LMI	
	Speedometer	
Inline	Resistor	R
	Diode	D
Joystick & Steering	Electronic	JS
	Hydraulic	
Lights	Dome	LB
	Headlights	
	Simple	
	Taillights	
Membrane Panel		MP
Miscellaneous	Radio	MS
	Speakers	
	Splice Blocks	
	T-Connectors	

Table 7-1. Wiring Harness Connector Labels

Component	Category	Label
Other Switches	Disconnect	SW
	EMS	
	Foot	
	HVAC	WH
	Key	SW
	Park brake	
	Pump pot	
	Push	
	Shifter	
	Turn signal	
Relay	5 Pin	RL
	4 Pin	
	Contactors	
	Power module	
Rocker Switch		SW
Sensor	Angle	SN
	Fuel	
	Length	
	Limit	
	Load	
	Pressure	
	Proximity	
	Speed	
	Temperature	
	Terminals	
Sockets		
Male Blades		
Female Blades		
Rings		
Forks		
Toggle Switch	DPDT	SW
	DPST	
	SPDT	
	SPST	
	Special	
Valves	Simple	HV
	Suppression	

Examples:

T67 is a ring terminal connected during installation.
 C01-J3 is the J3 connector for a UGM control module.
 EC9 is a glow plug supplied with the engine

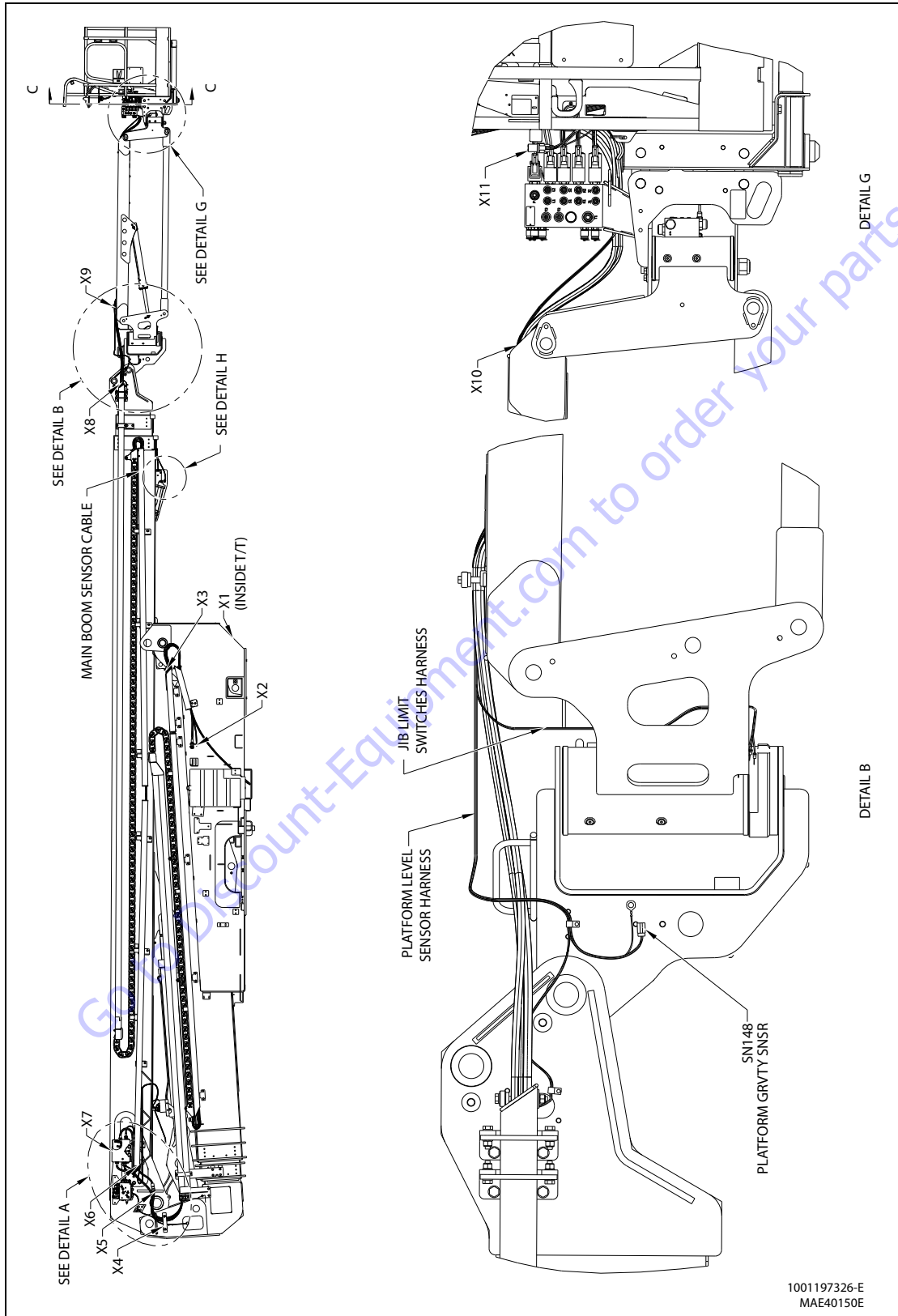


Figure 7-25. Boom Electrical Installation (ANSI) - Sheet 1 of 5

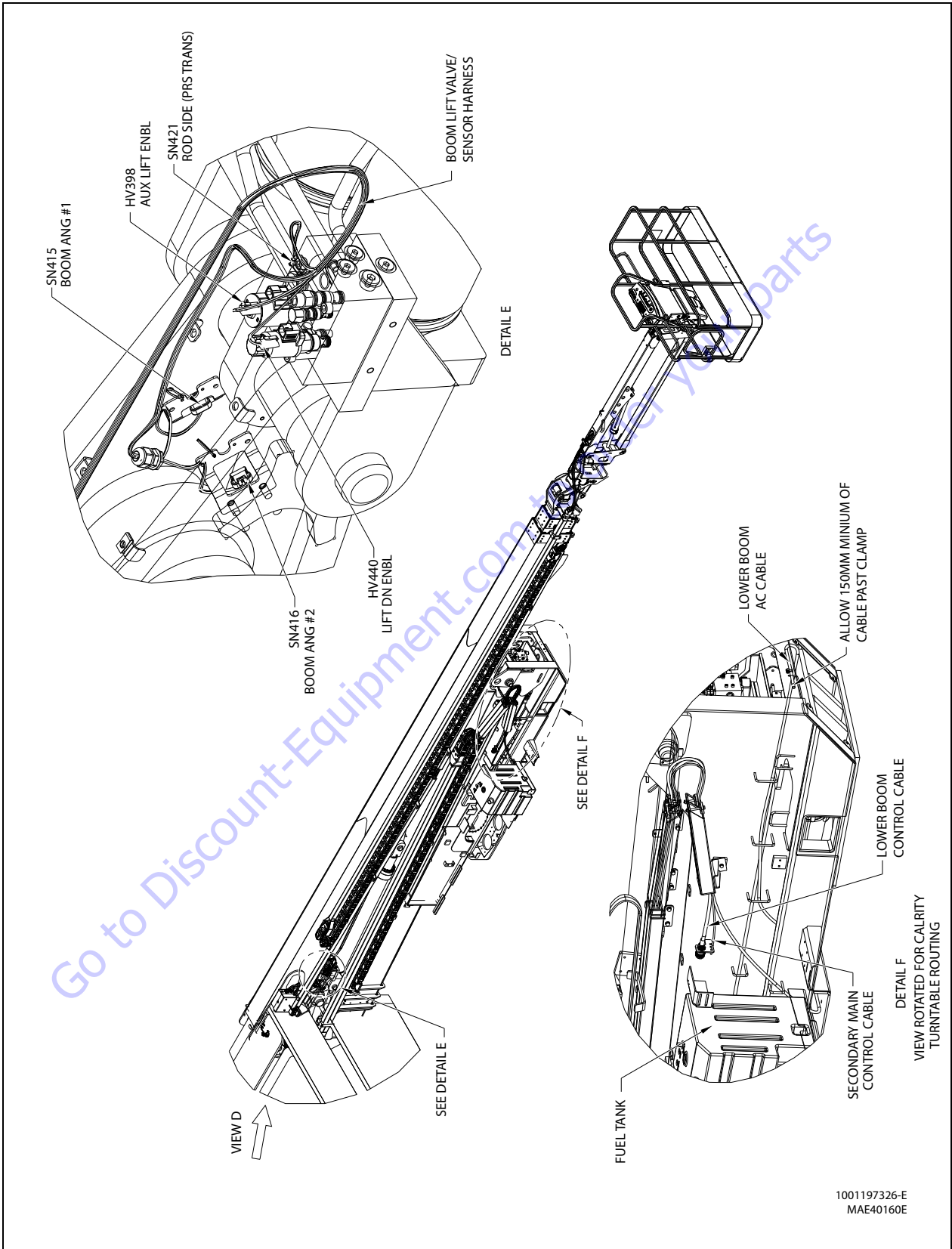


Figure 7-26. Boom Electrical Installation (ANSI) - Sheet 2 of 5

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

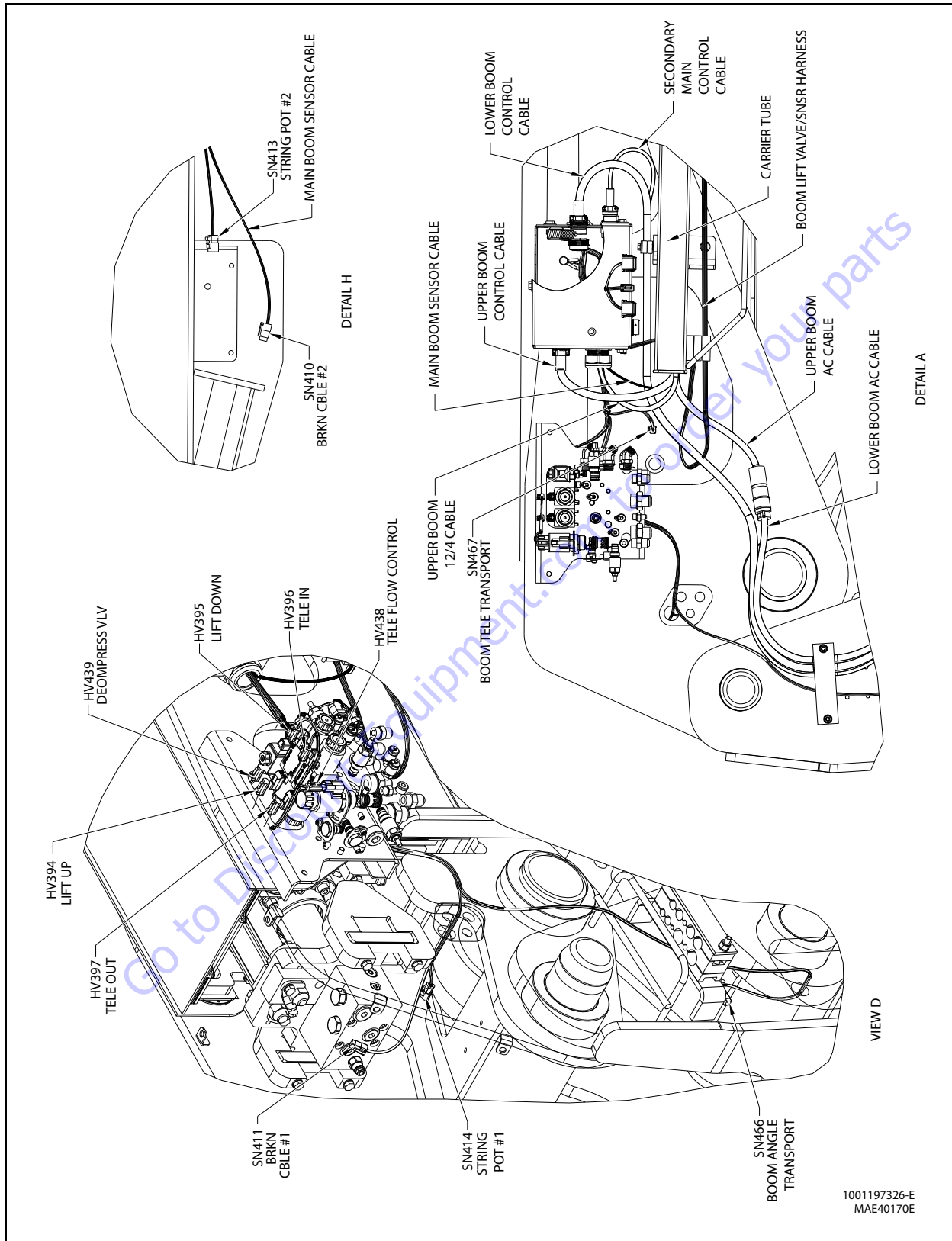


Figure 7-27. Boom Electrical Installation (ANSI) - Sheet 3 of 5

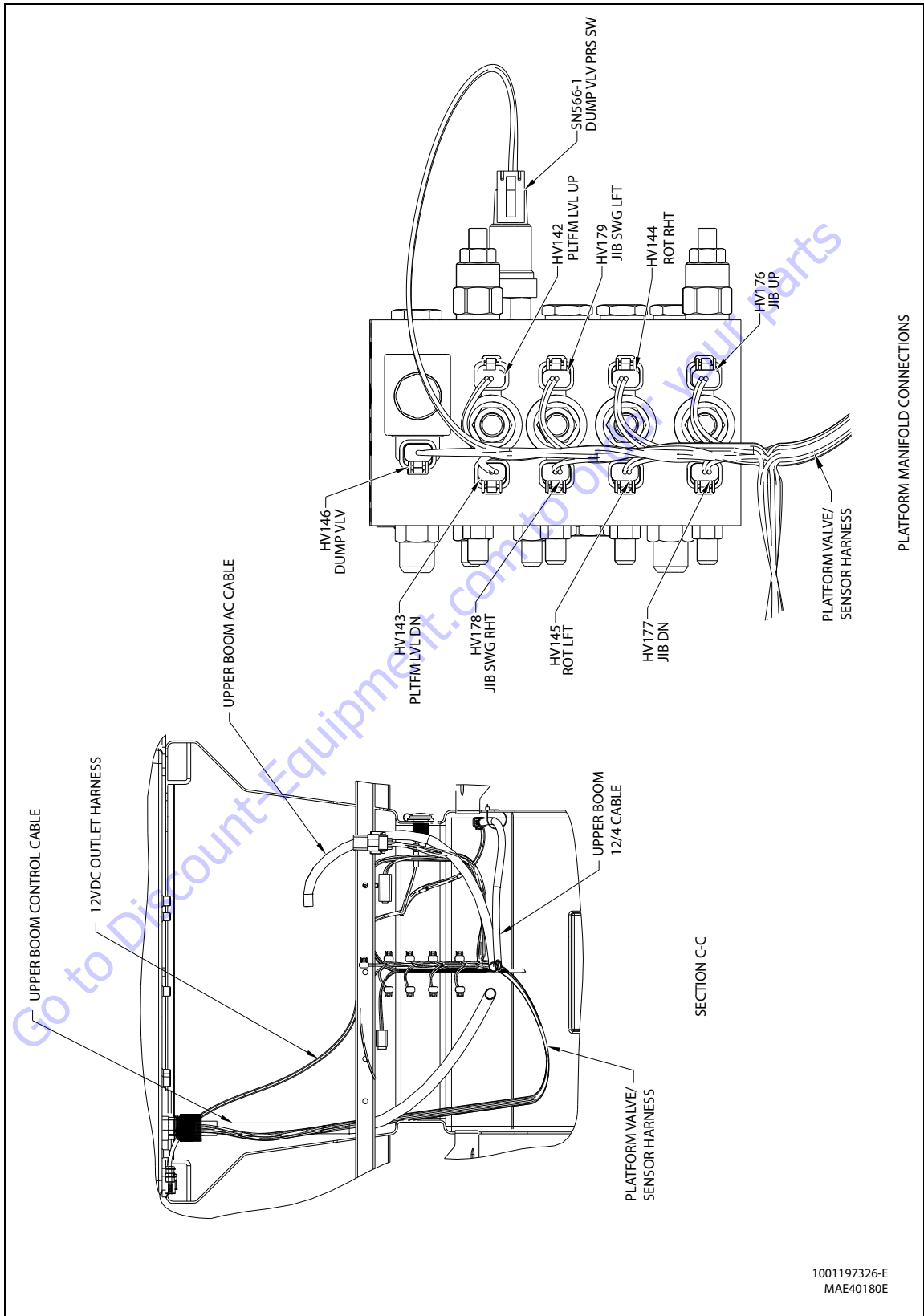


Figure 7-28. Boom Electrical Installation (ANSI) - Sheet 4 of 5

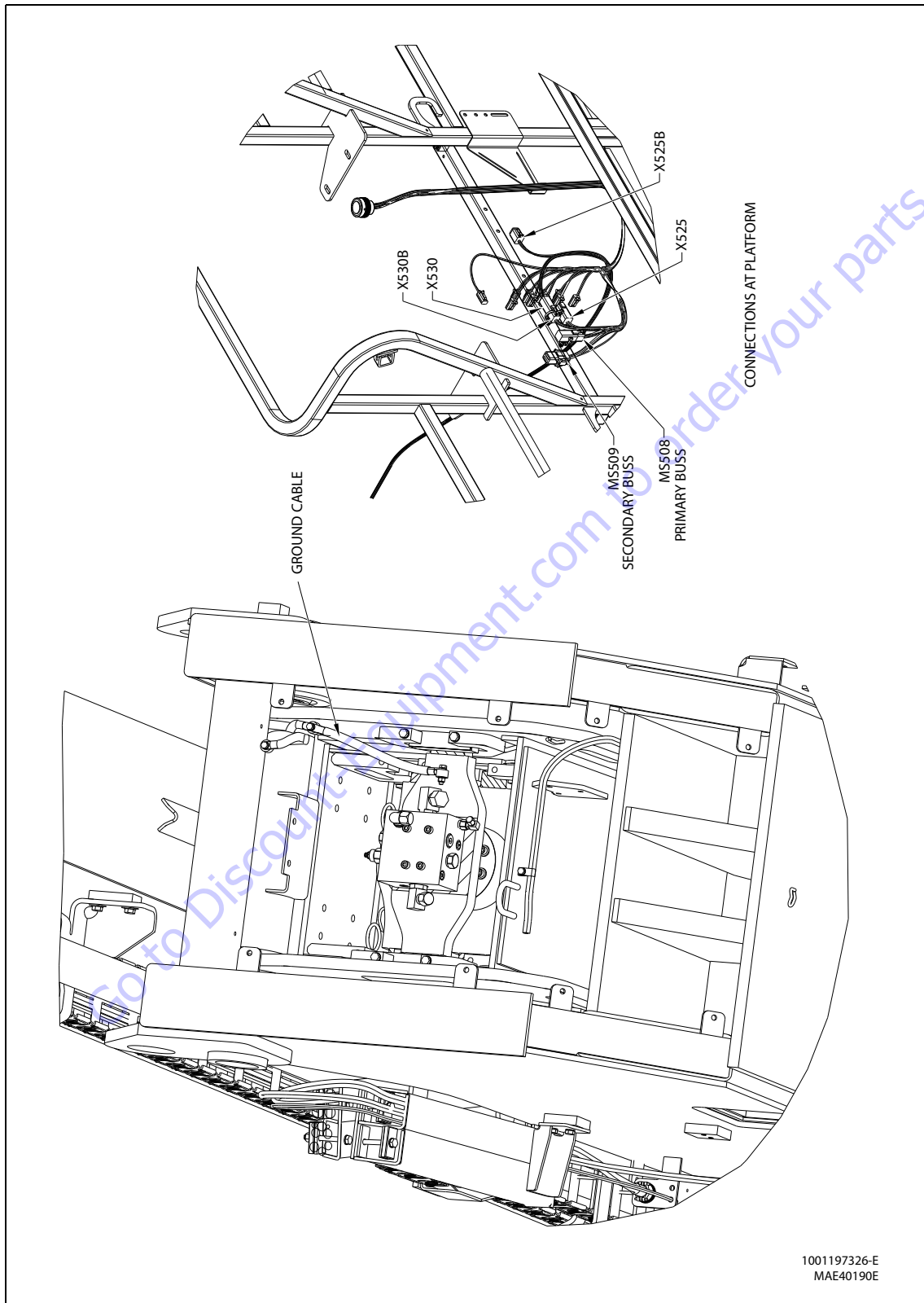
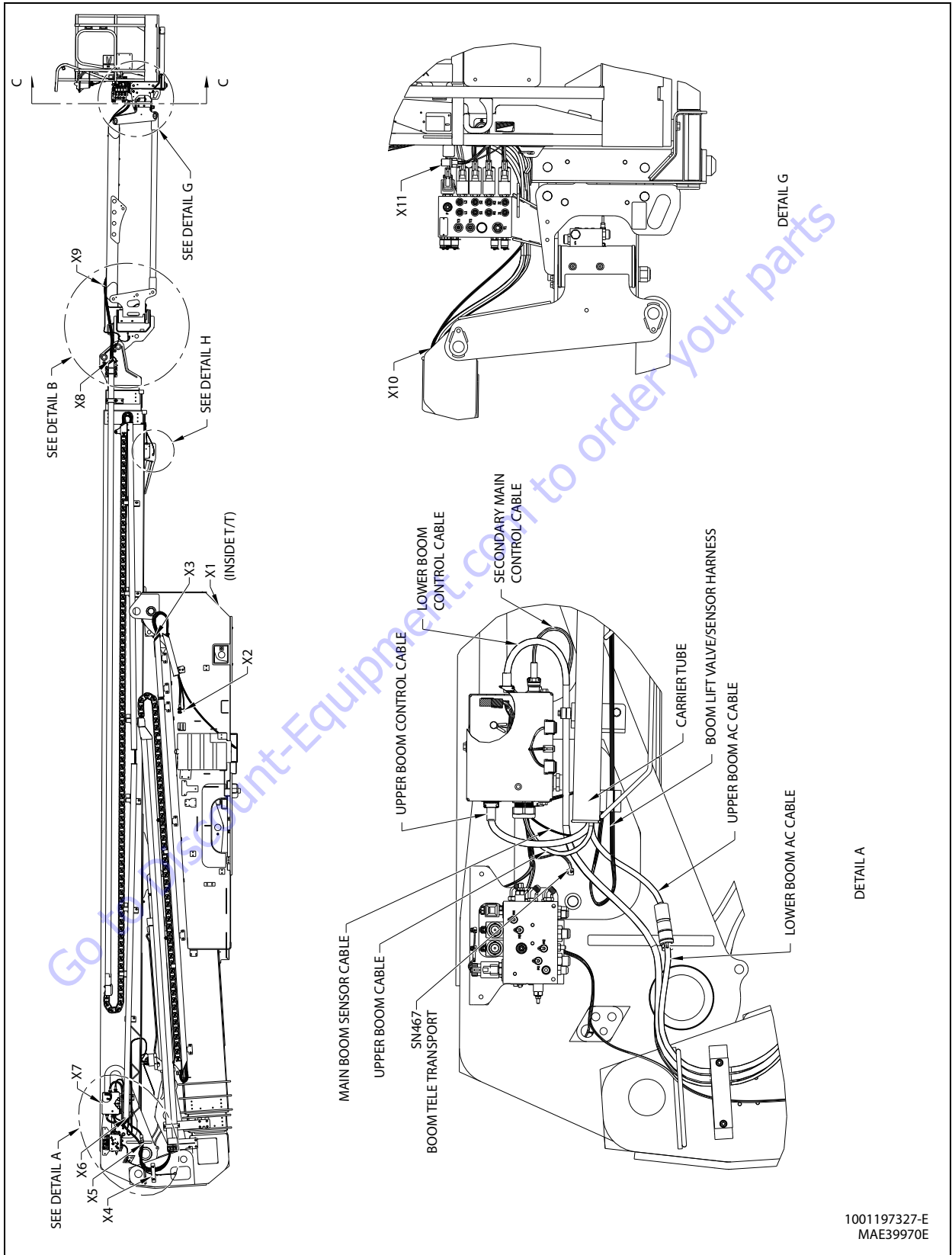


Figure 7-29. Boom Electrical Installation (ANSI) - Sheet 5 of 5



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Figure 7-30. Boom Electrical Installation (CE) - Sheet 1 of 5

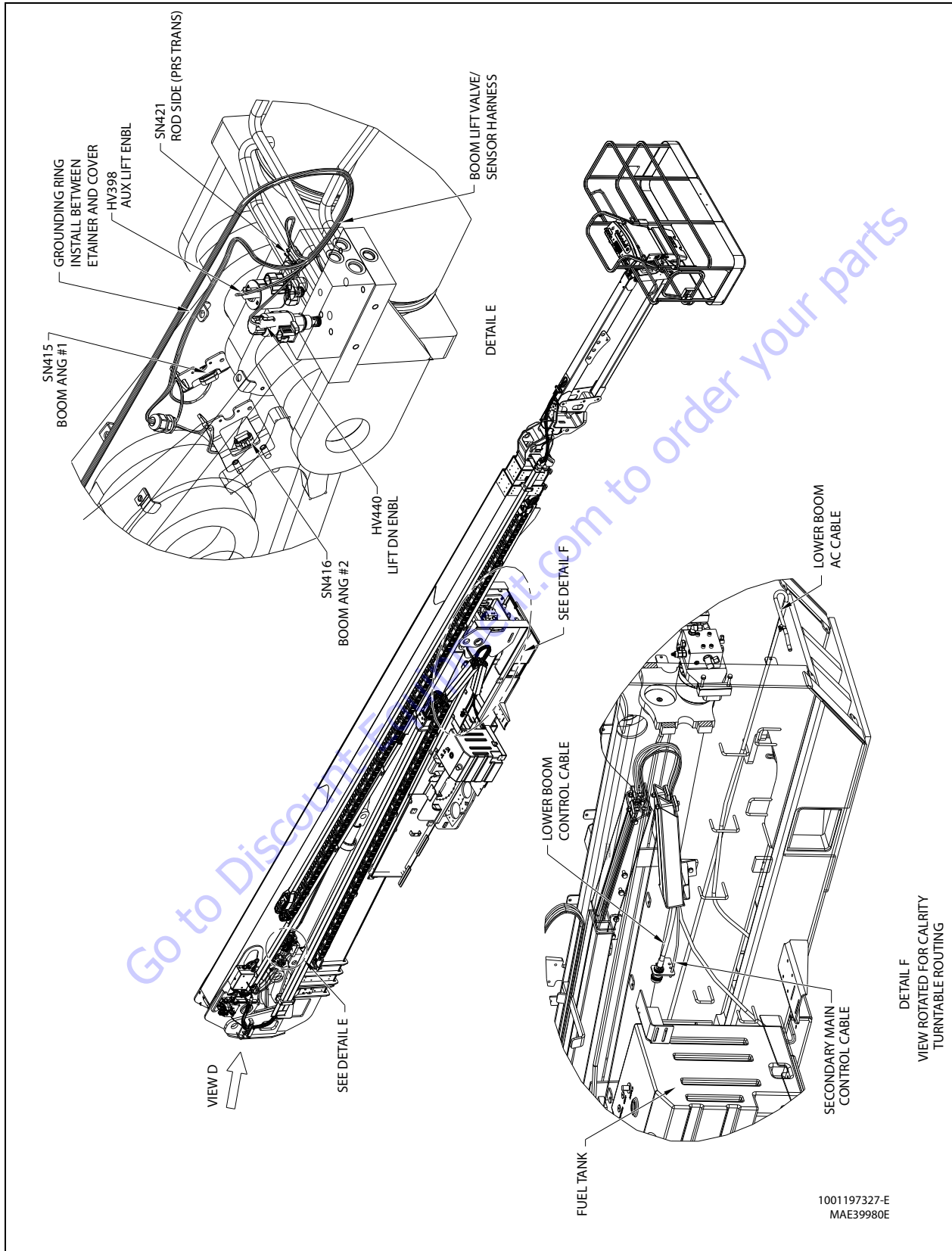


Figure 7-31. Boom Electrical Installation (CE) - Sheet 2 of 5

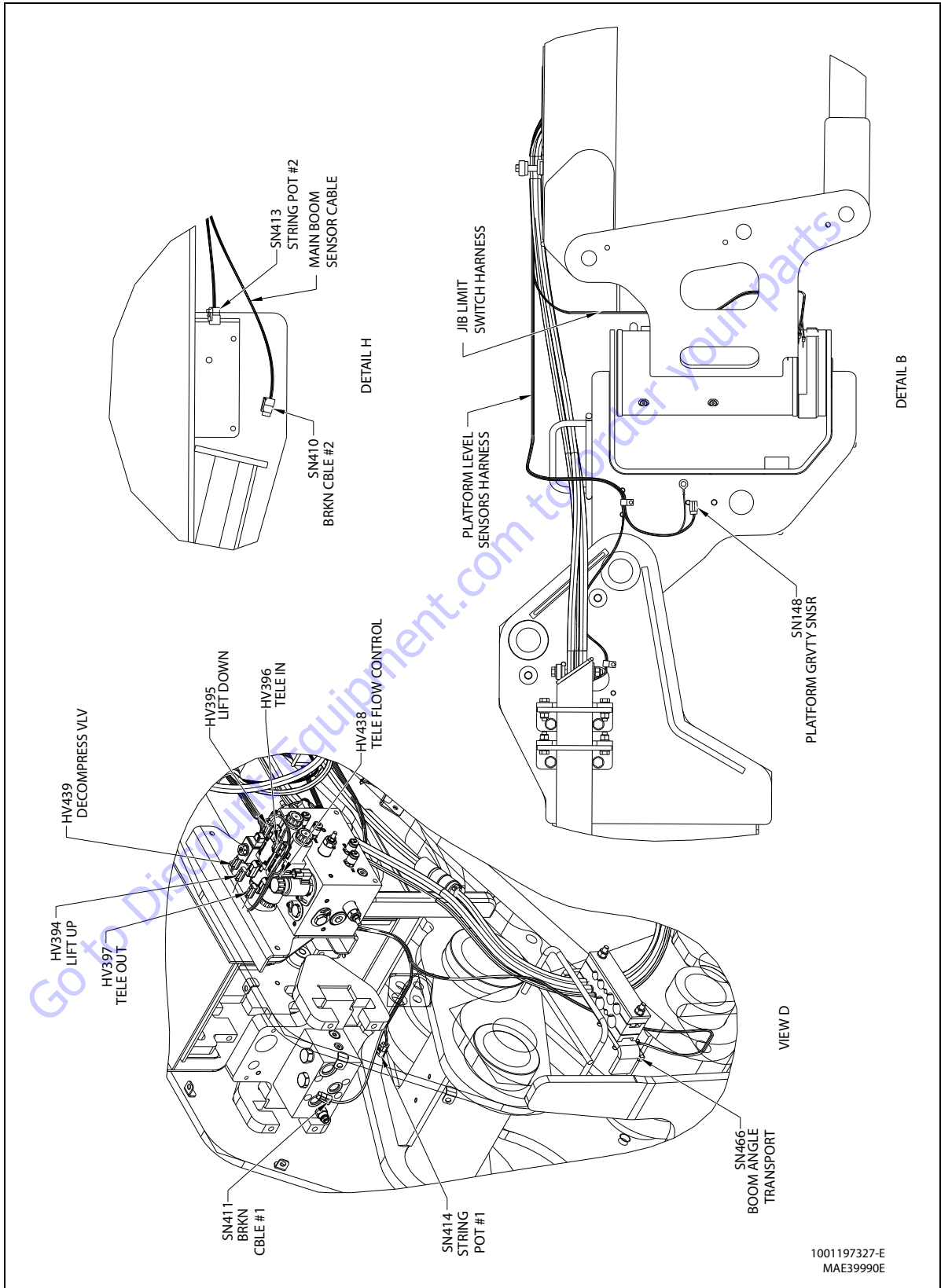


Figure 7-32. Boom Electrical Installation (CE) - Sheet 3 of 5

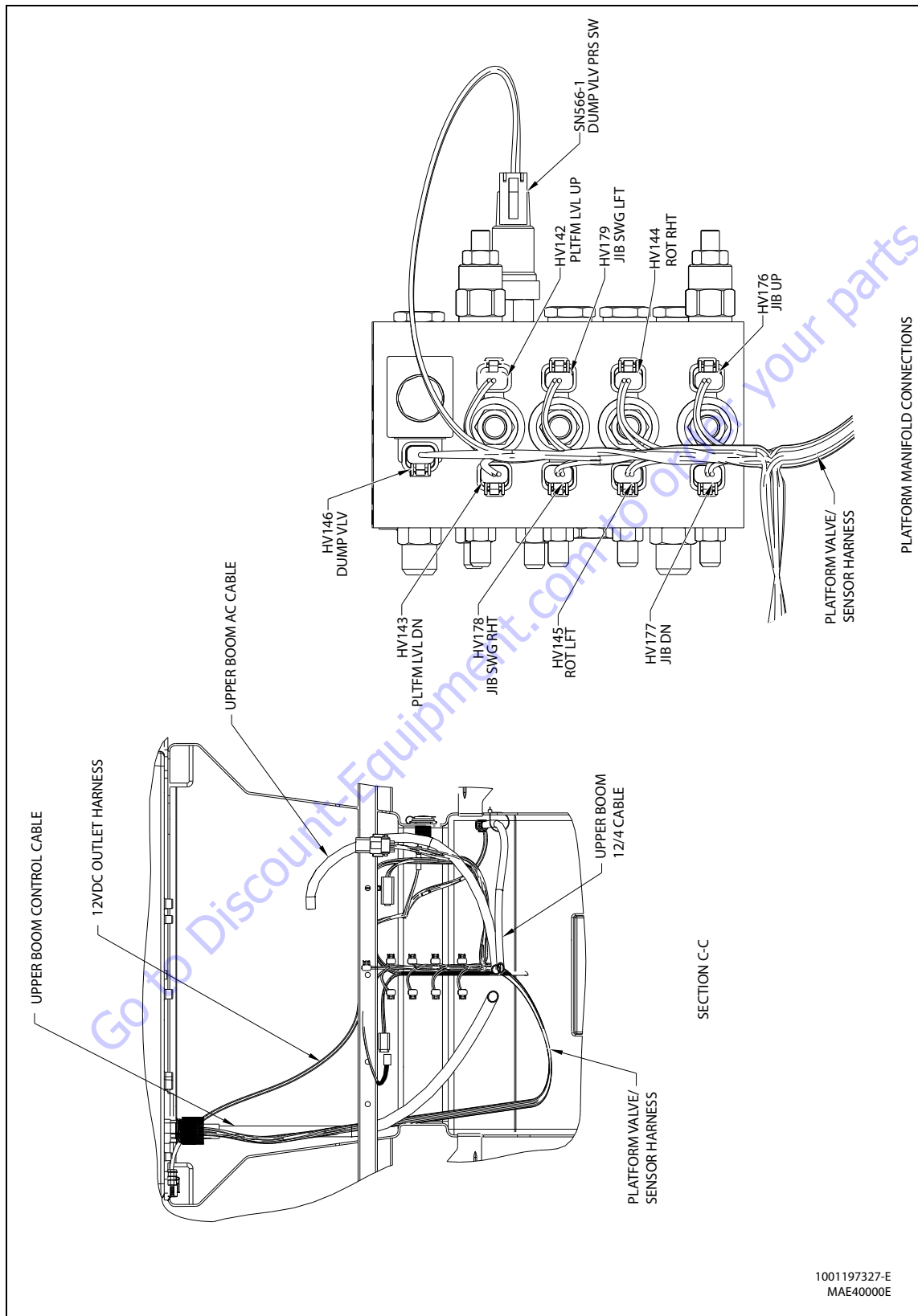


Figure 7-33. Boom Electrical Installation (CE) - Sheet 4 of 5

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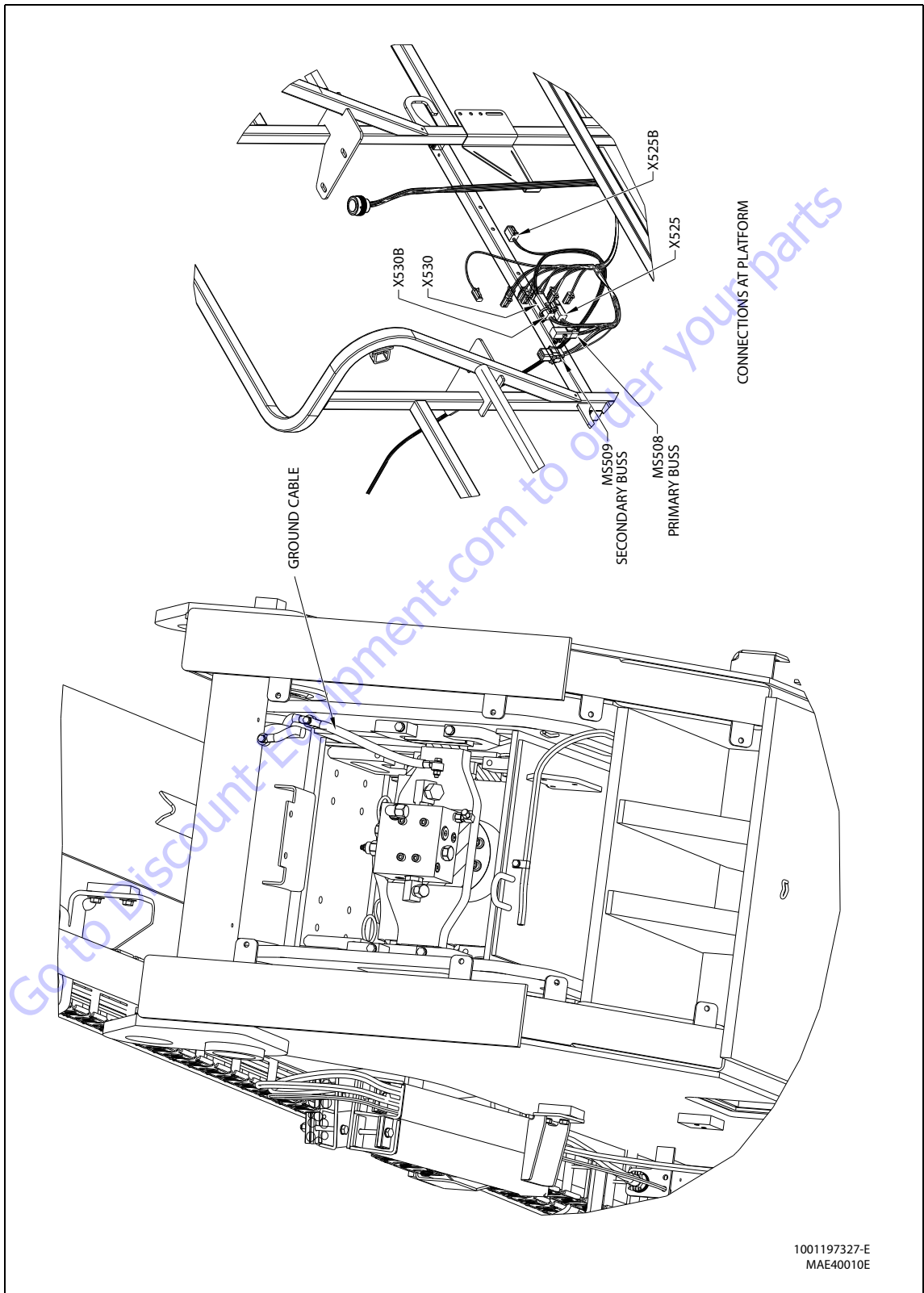


Figure 7-34. Boom Electrical Installation (CE) - Sheet 5 of 5

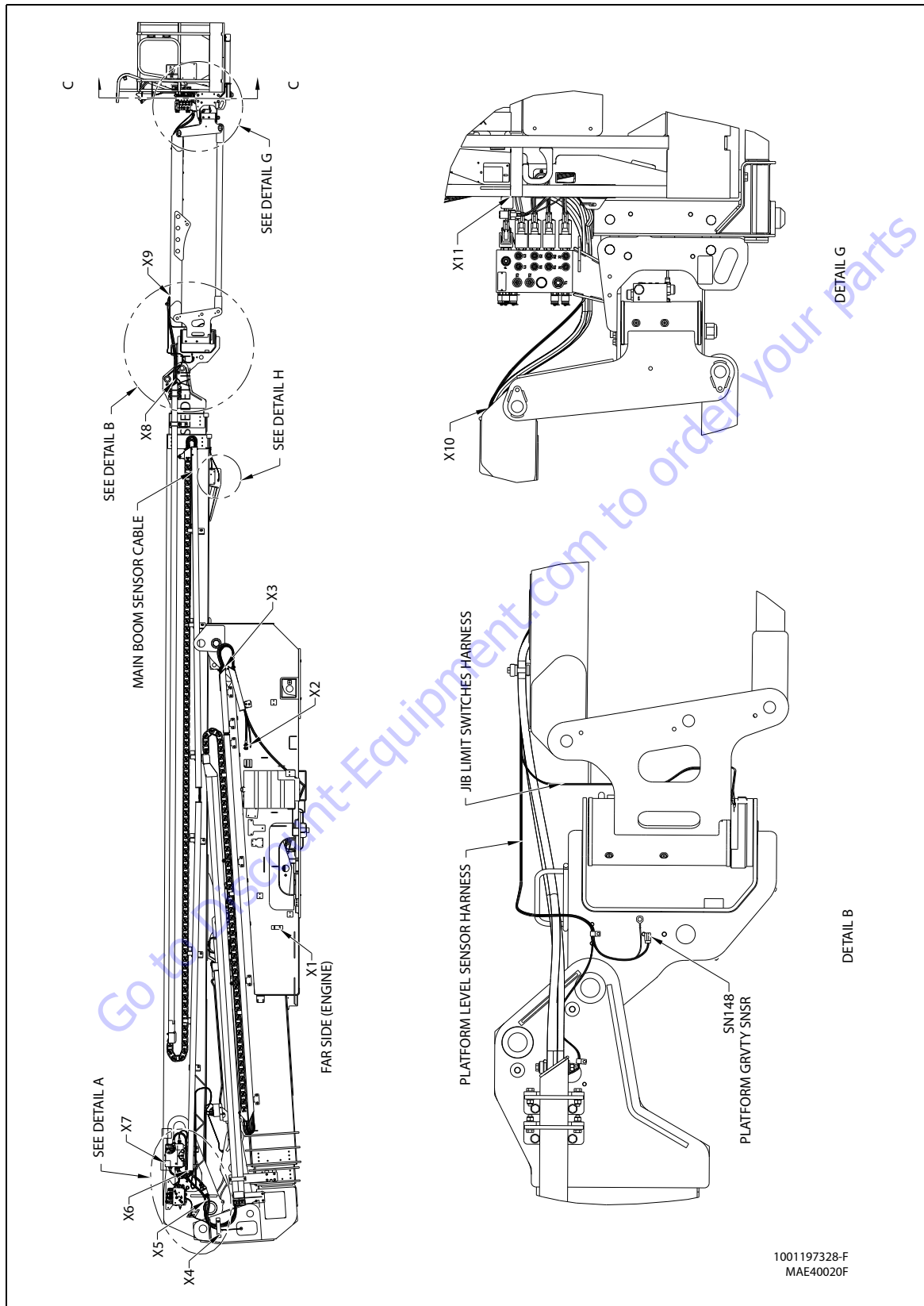


Figure 7-35. Boom Electrical Installation (SkyPower) - Sheet 1 of 6

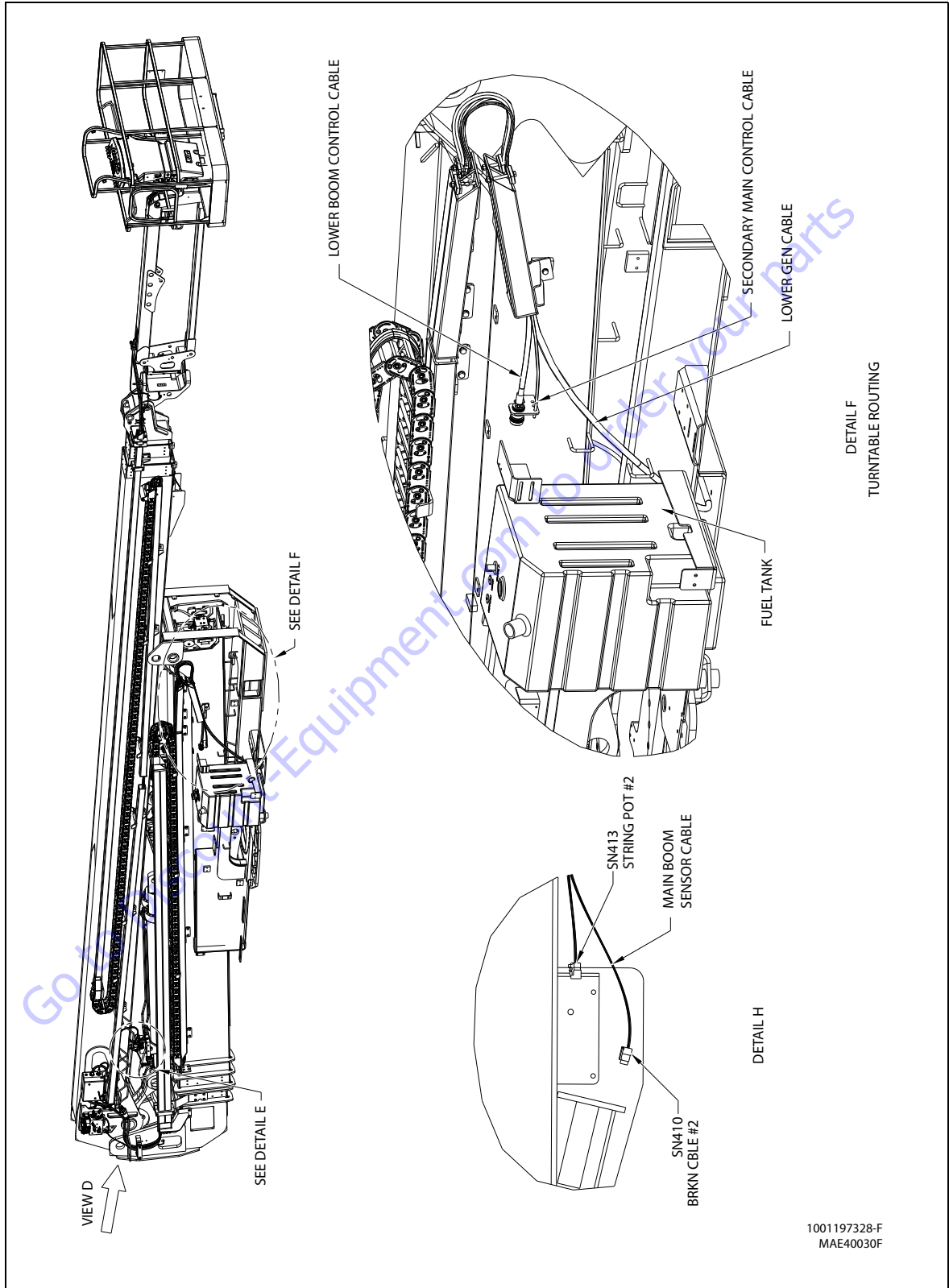


Figure 7-36. Boom Electrical Installation (SkyPower) - Sheet 2 of 6

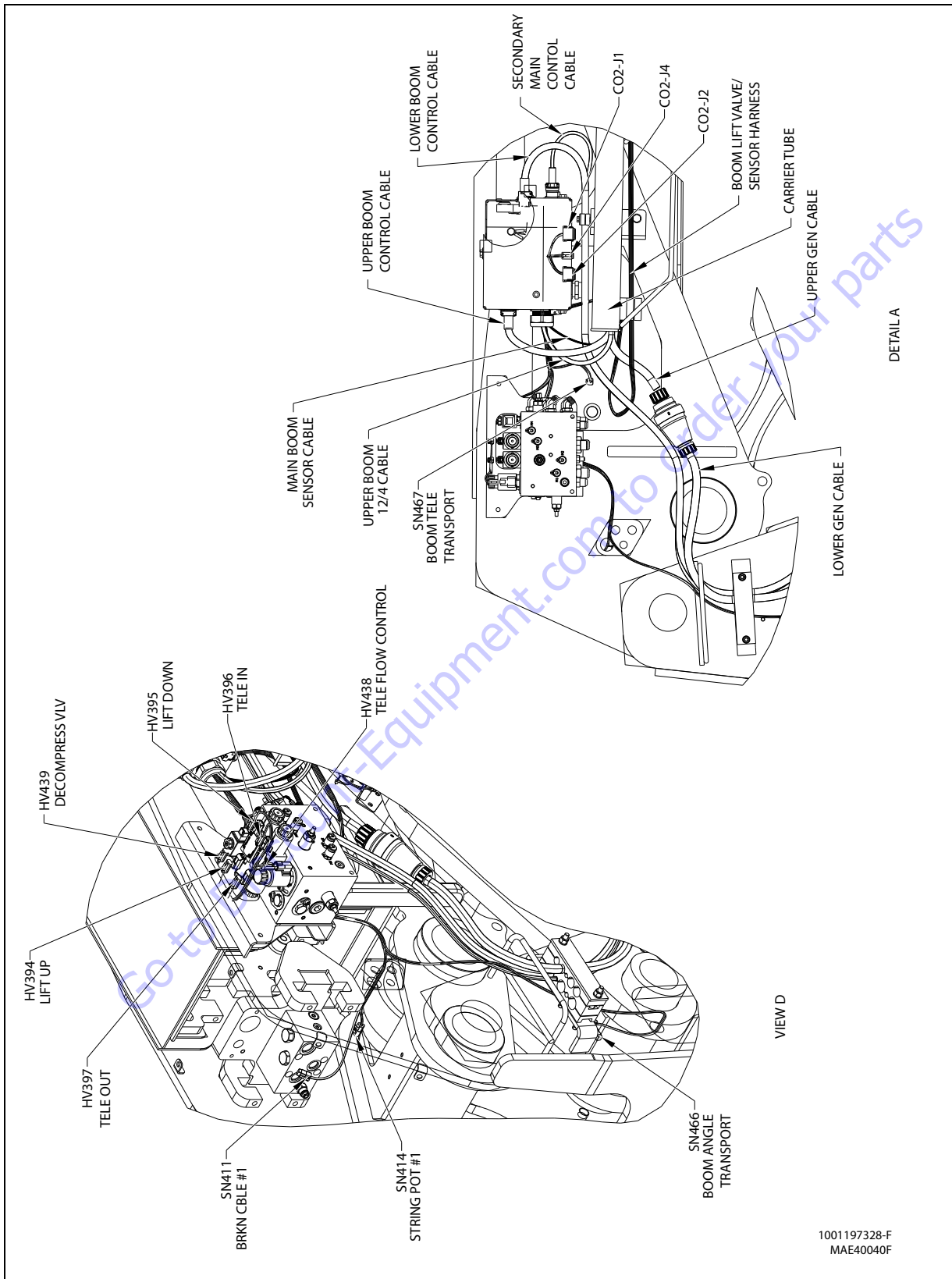


Figure 7-37. Boom Electrical Installation (SkyPower) - Sheet 3 of 6

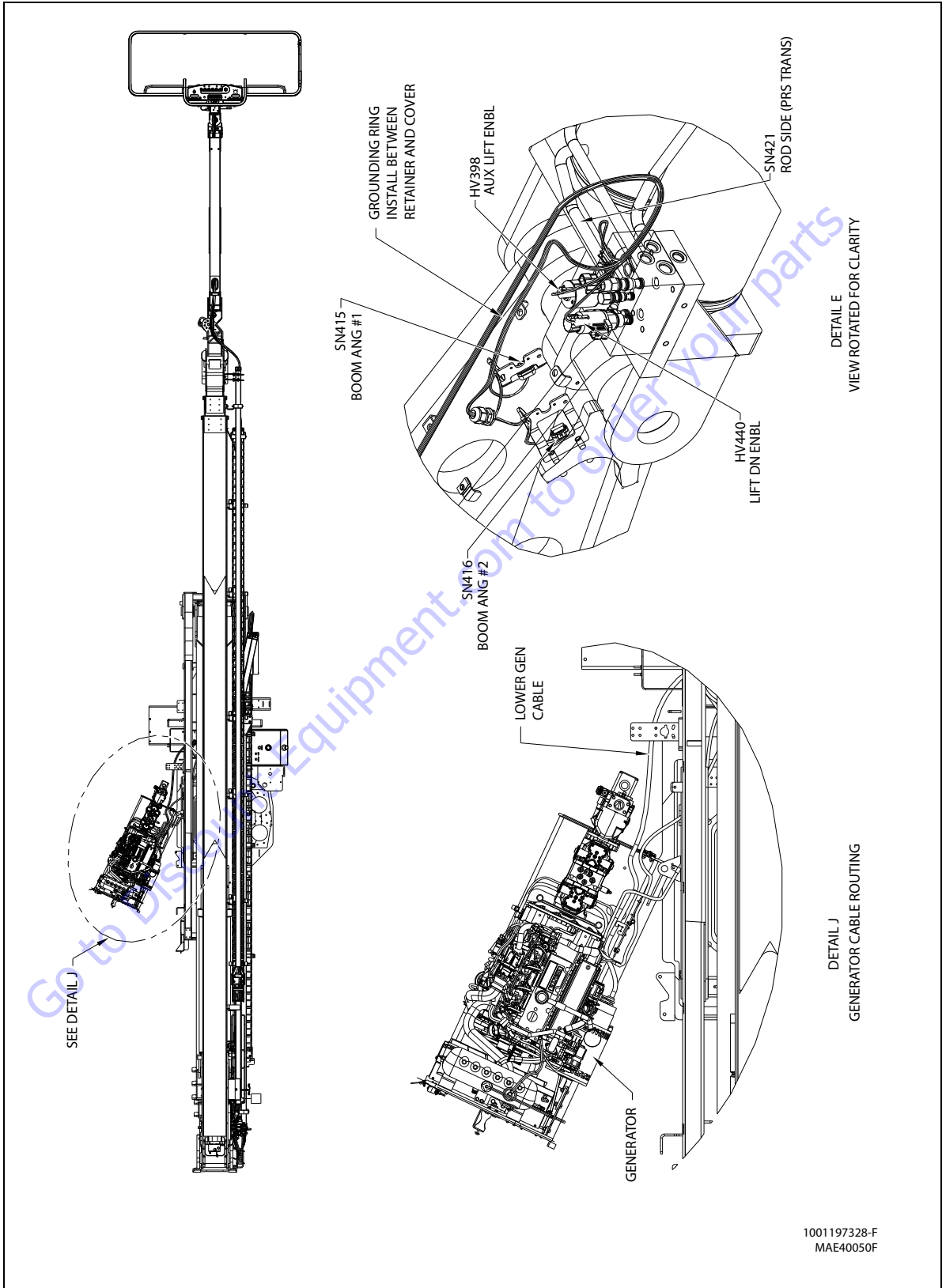


Figure 7-38. Boom Electrical Installation (SkyPower) - Sheet 4 of 6

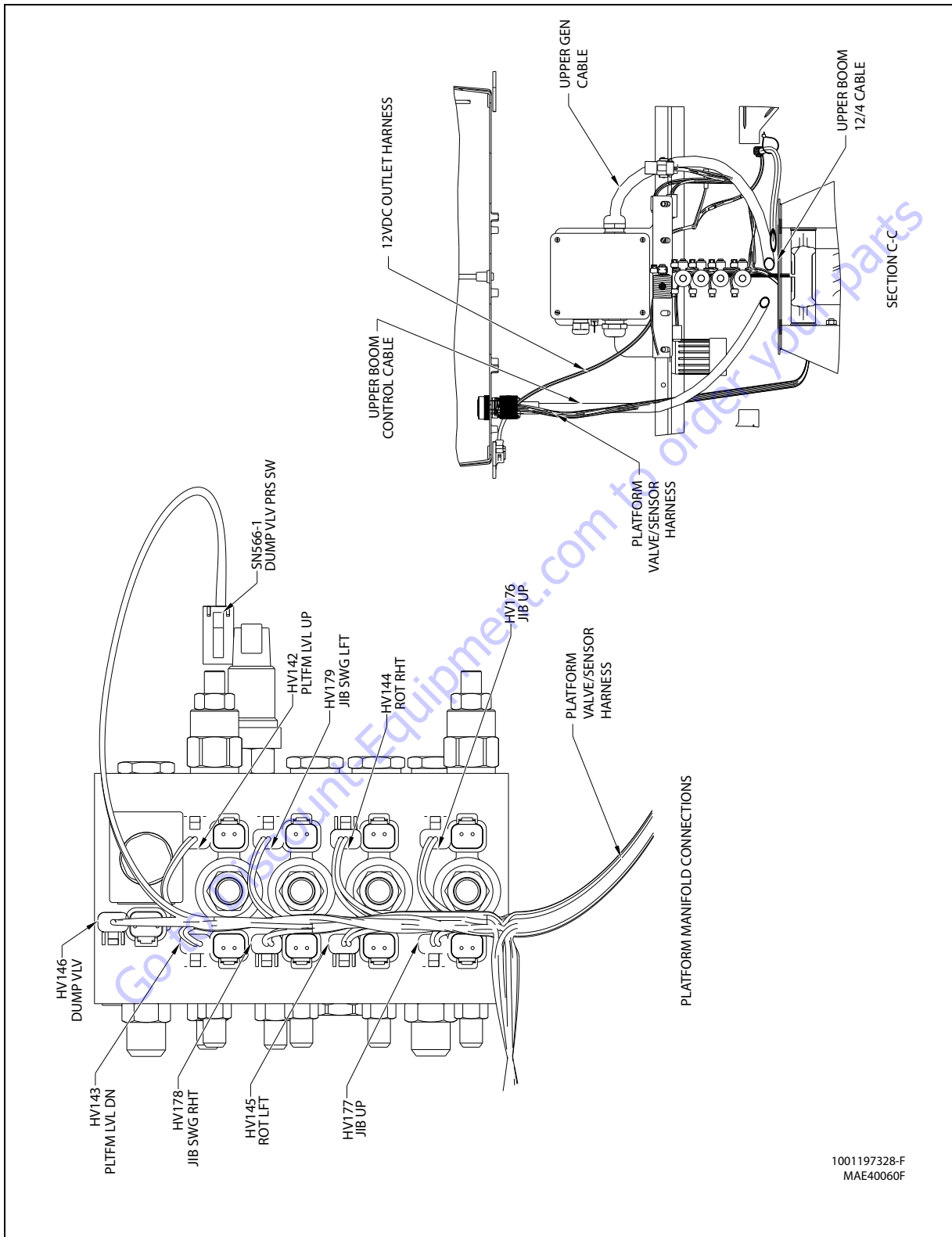
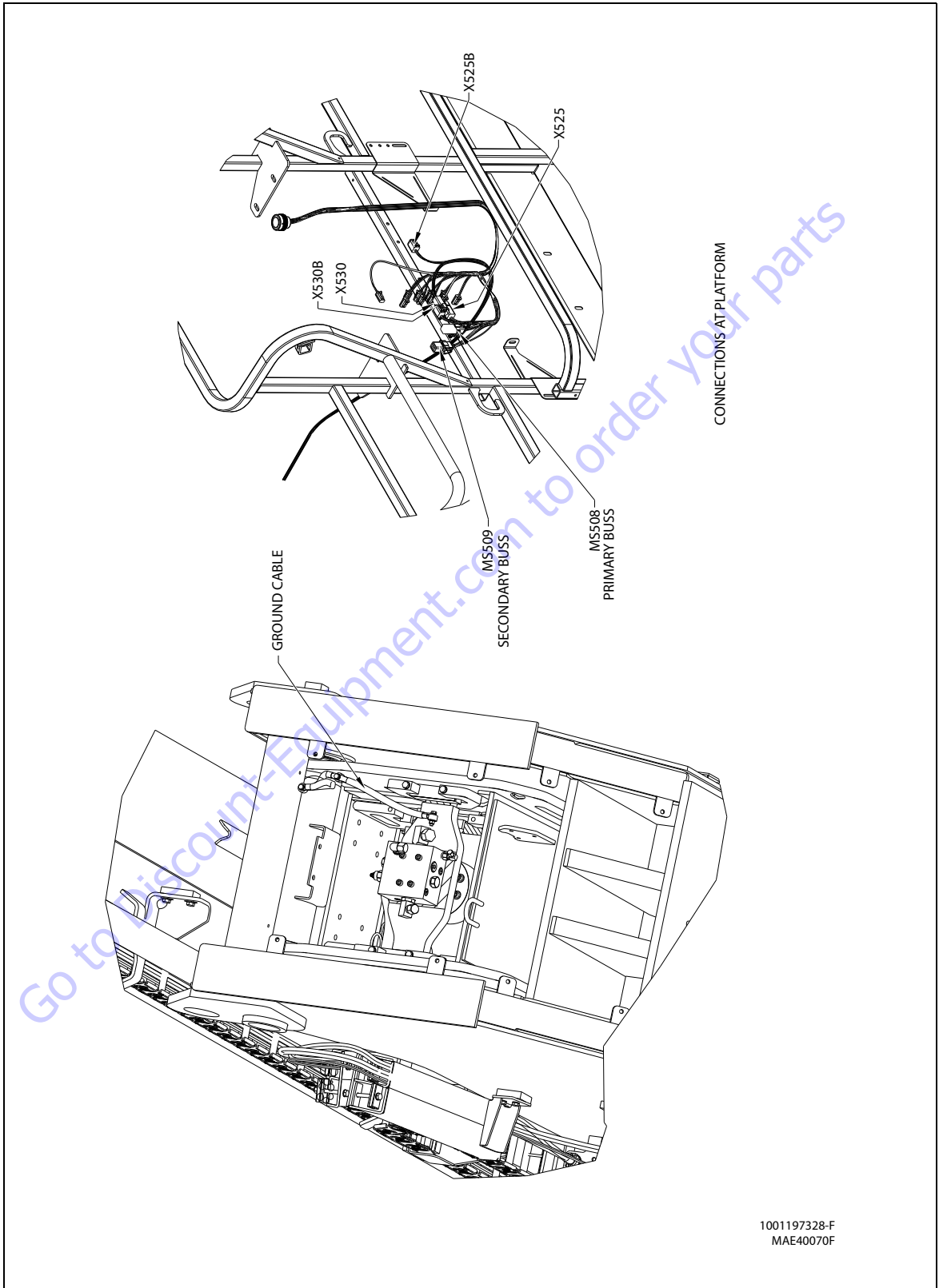


Figure 7-39. Boom Electrical Installation (SkyPower) - Sheet 5 of 6



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Figure 7-40. Boom Electrical Installation (SkyPower) - Sheet 6 of 6

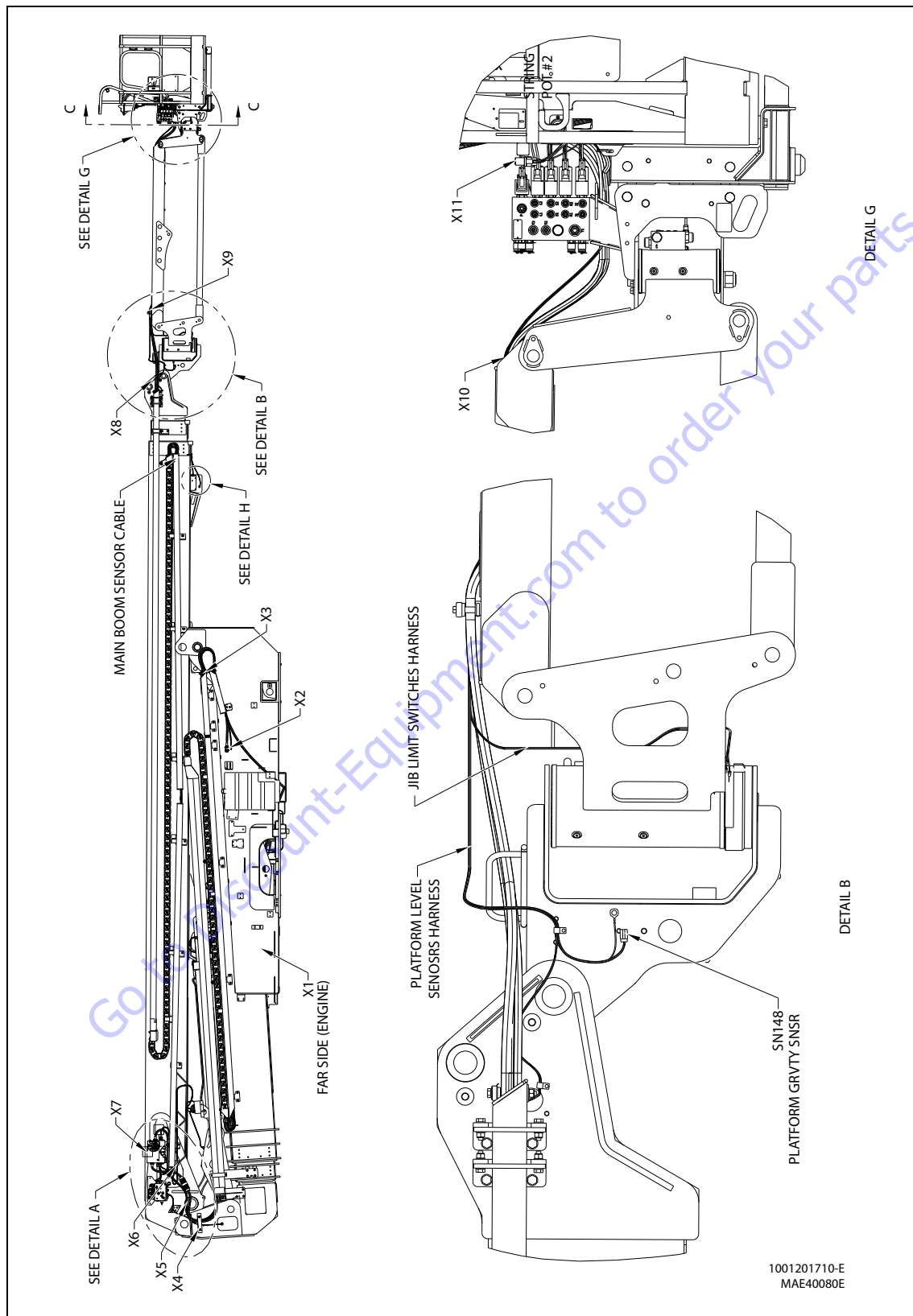


Figure 7-41. Boom Electrical Installation (4000W Generator) - Sheet 1 of 5

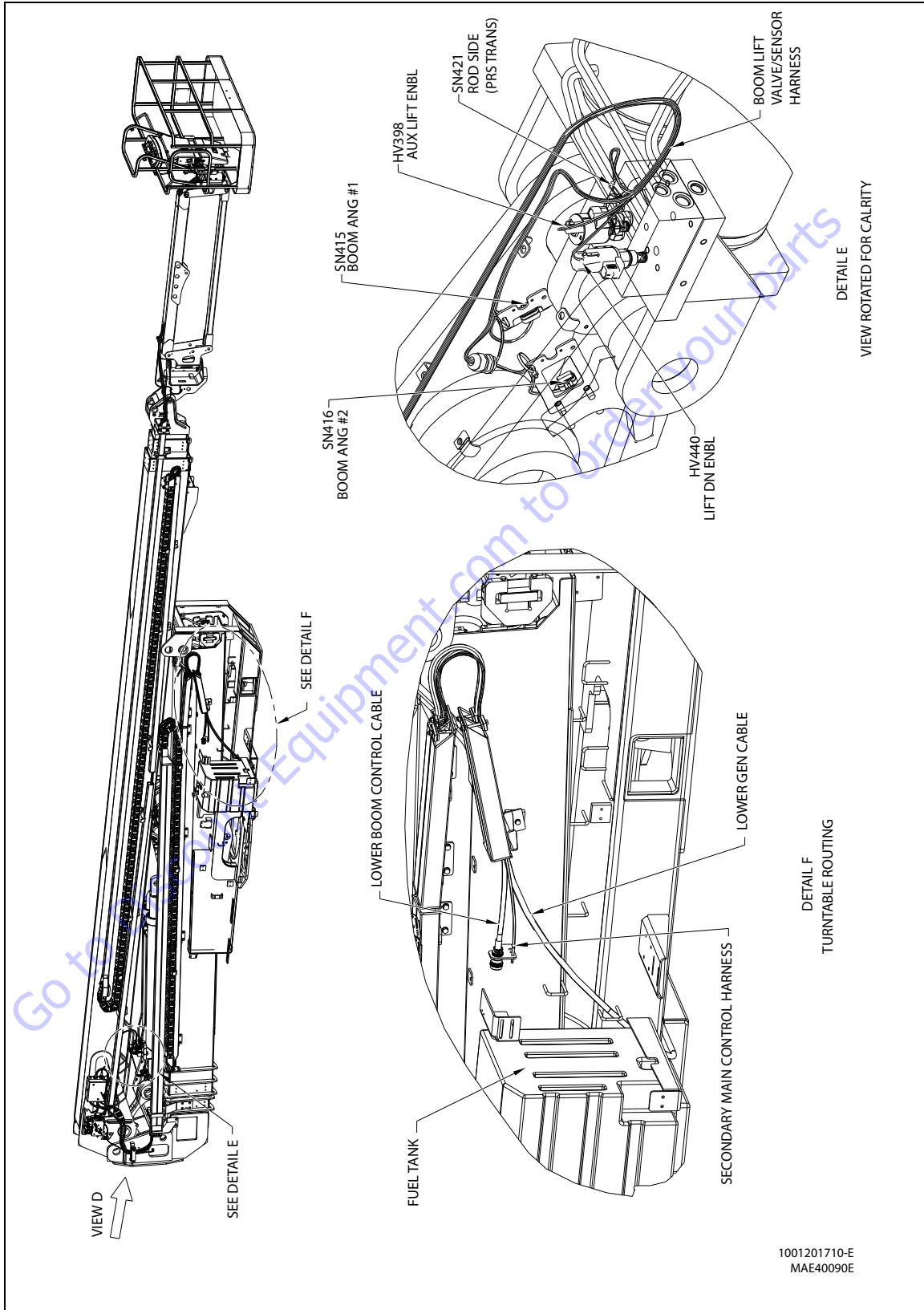


Figure 7-42. Boom Electrical Installation (4000W Generator) - Sheet 2 of 5

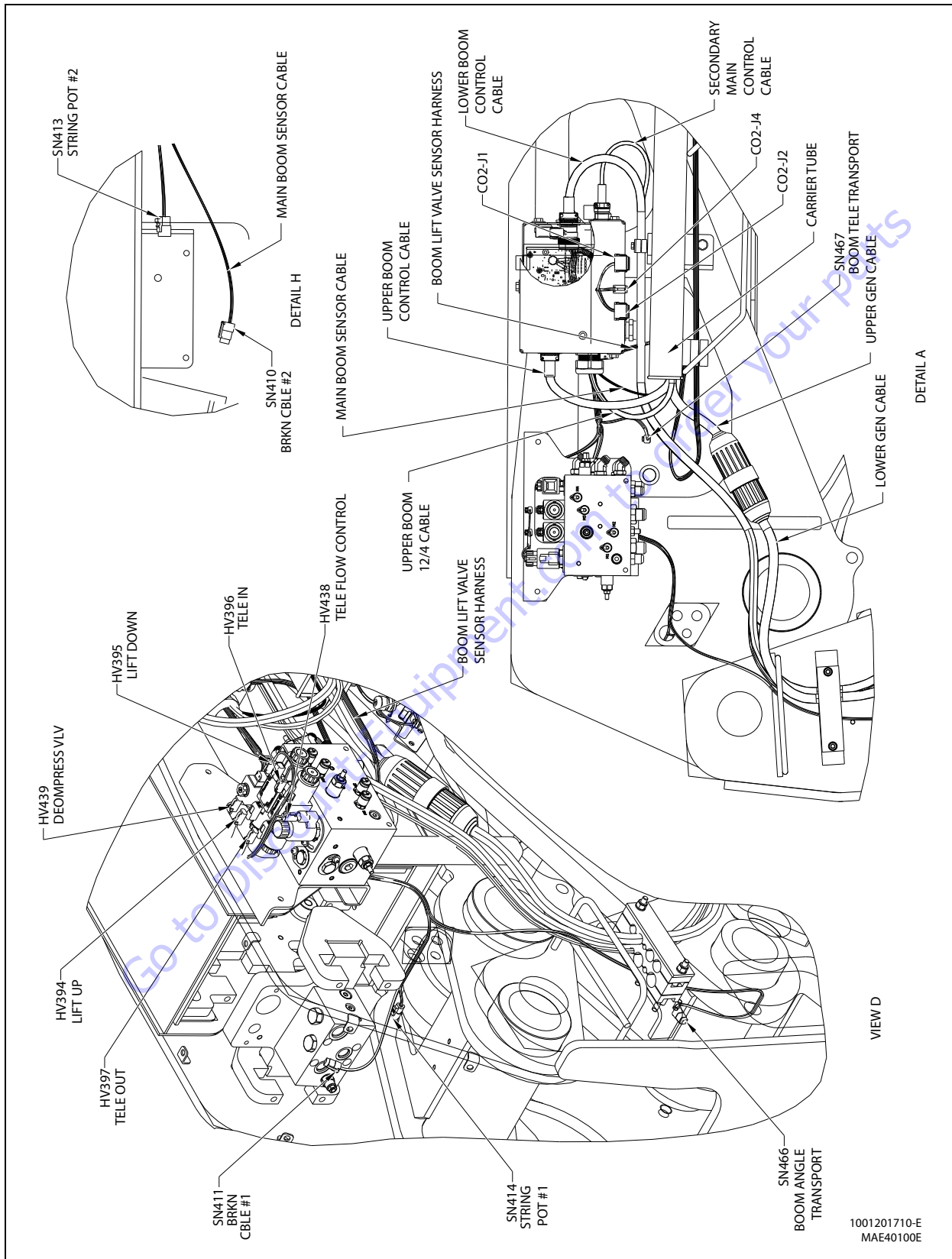


Figure 7-43. Boom Electrical Installation (4000W Generator) - Sheet 3 of 5

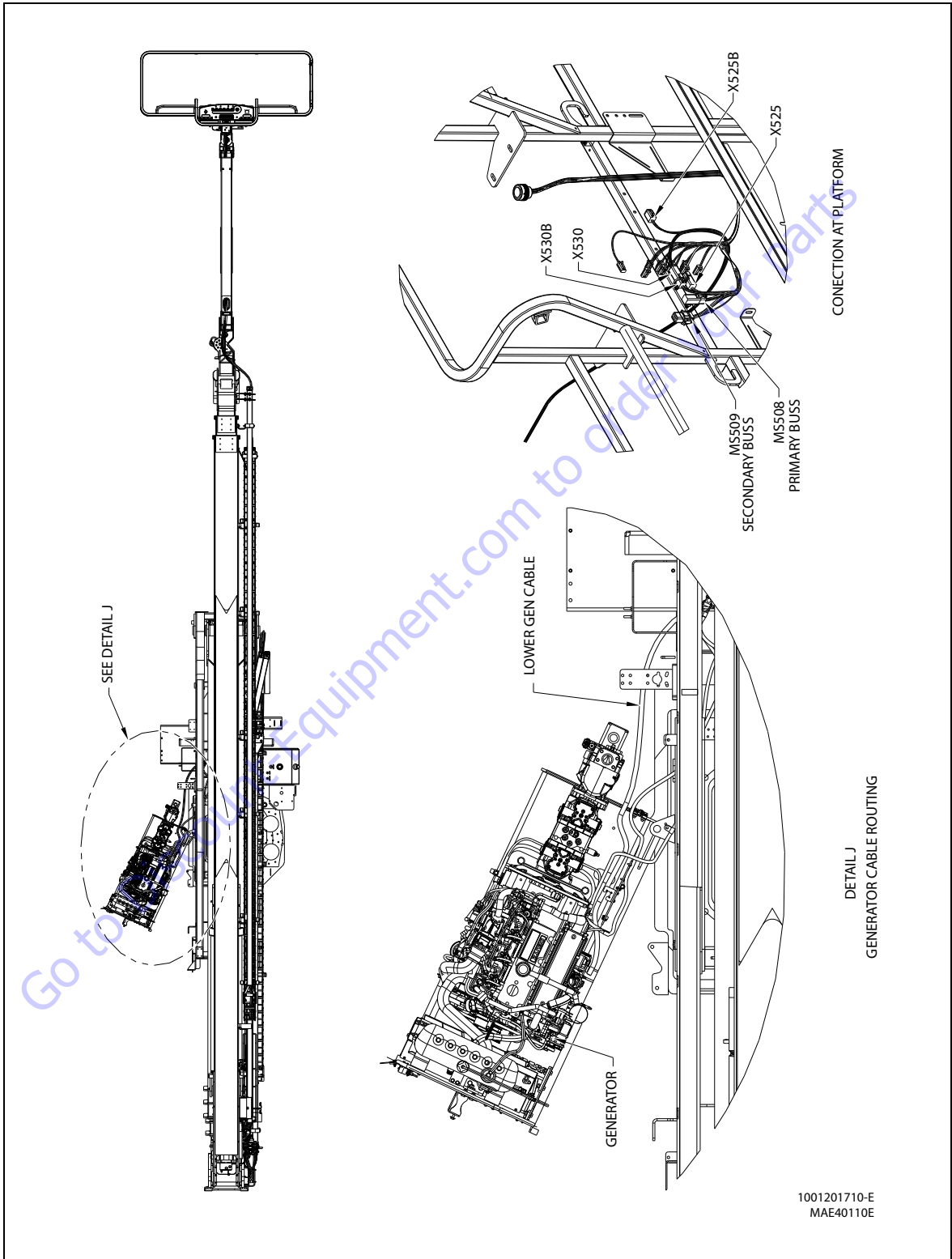


Figure 7-44. Boom Electrical Installation (4000W Generator) - Sheet 4 of 5

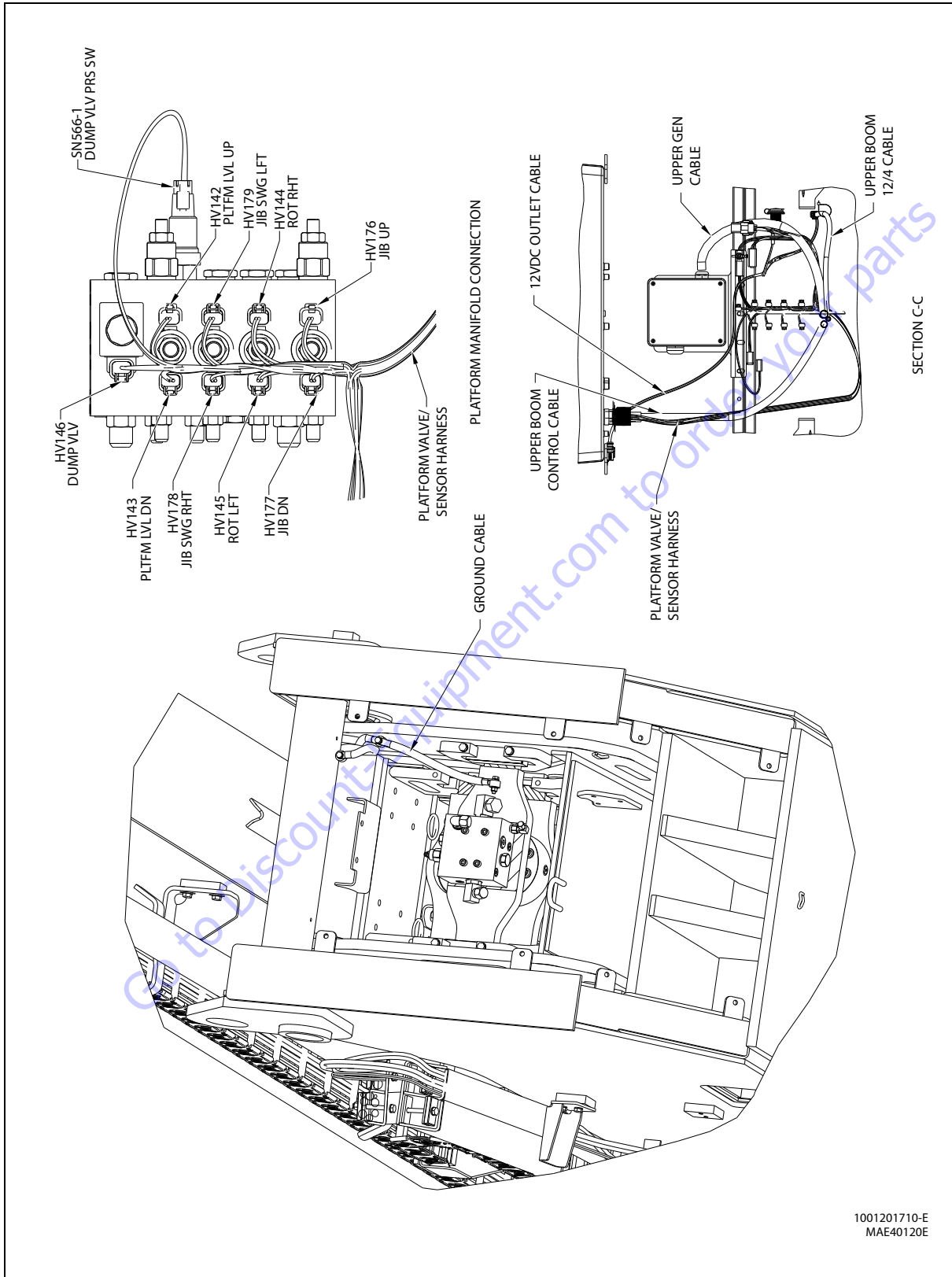


Figure 7-45. Boom Electrical Installation (4000W Generator) - Sheet 5 of 5

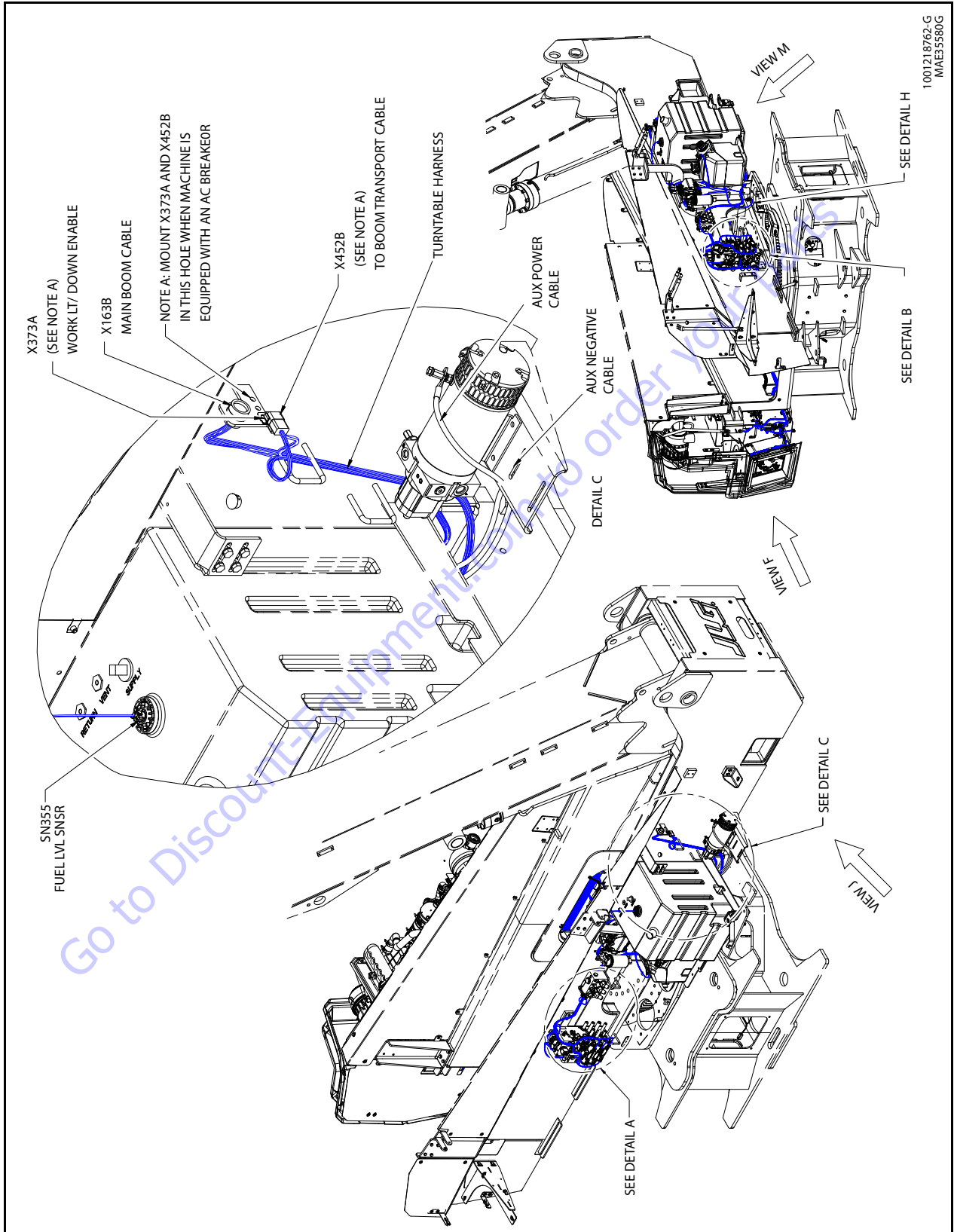


Figure 7-46. Chassis & Turntable Electrical Installation (HRC) - Sheet 1 of 11

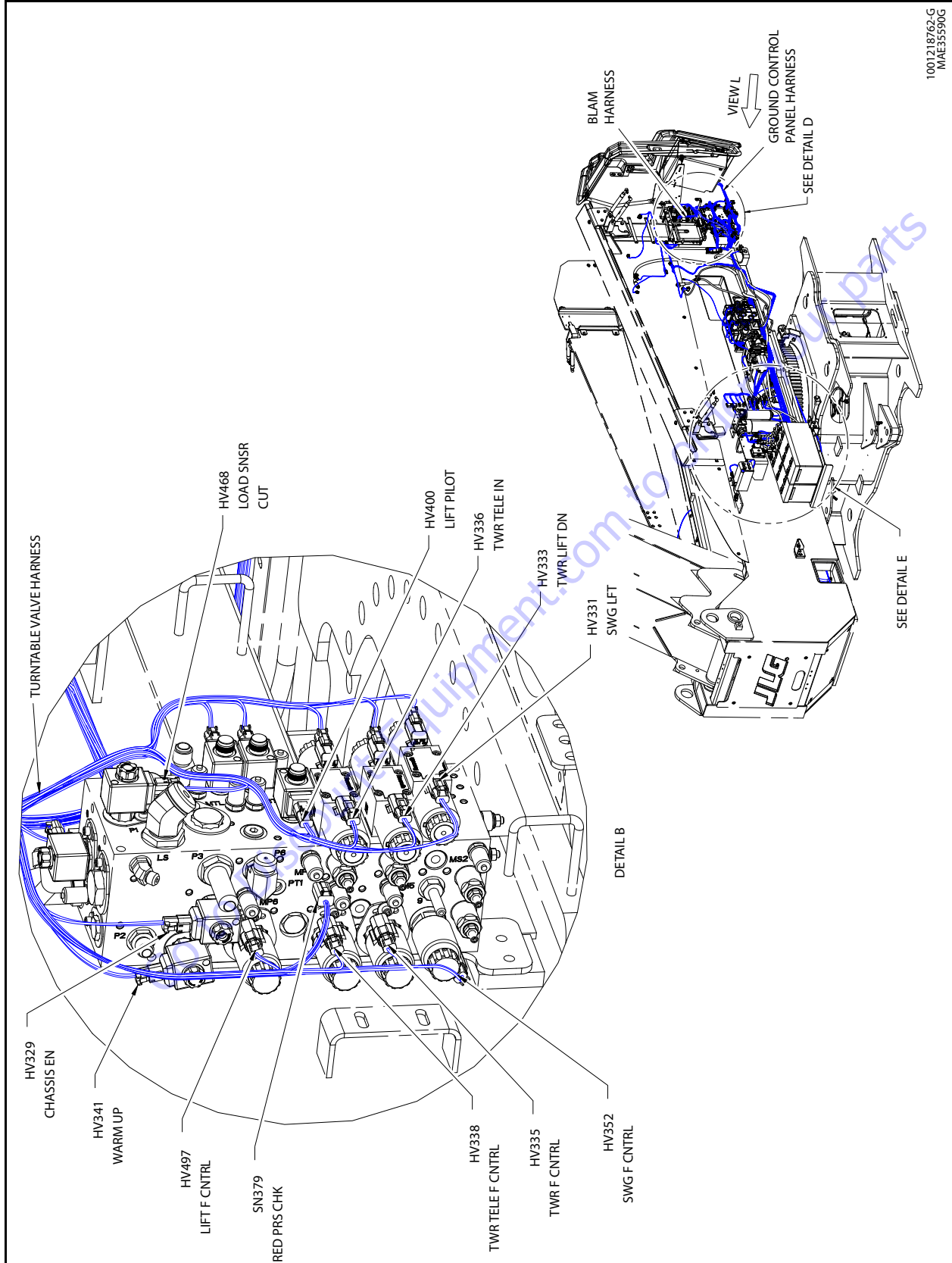
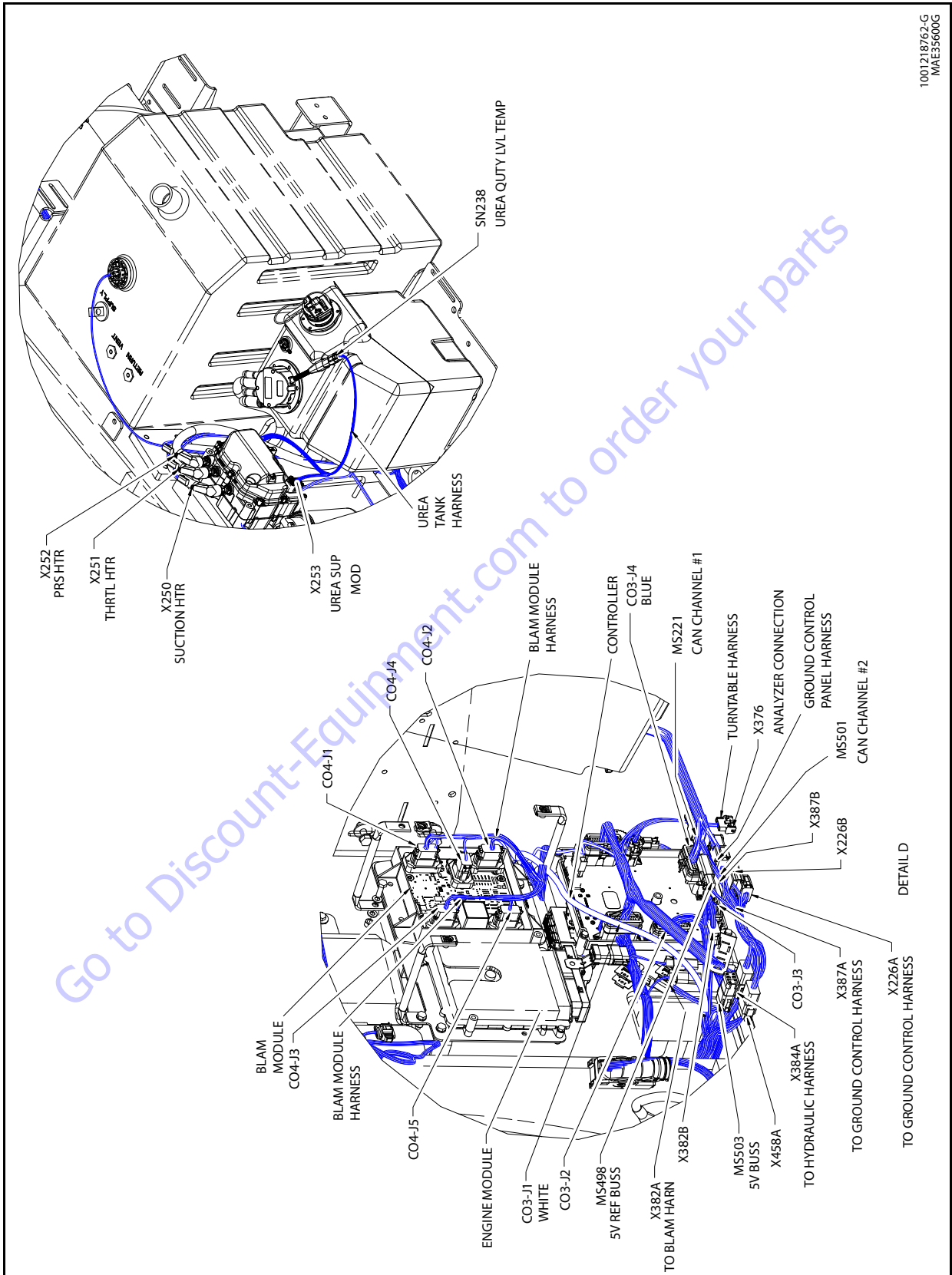


Figure 7-47. Chassis & Turntable Electrical Installation (HRC) - Sheet 2 of 11



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Figure 7-48. Chassis & Turntable Electrical Installation (HRC) - Sheet 3 of 11