

Figure 5-109. Hydraulic System Installation (460SJC) - Sheet 9 of 15

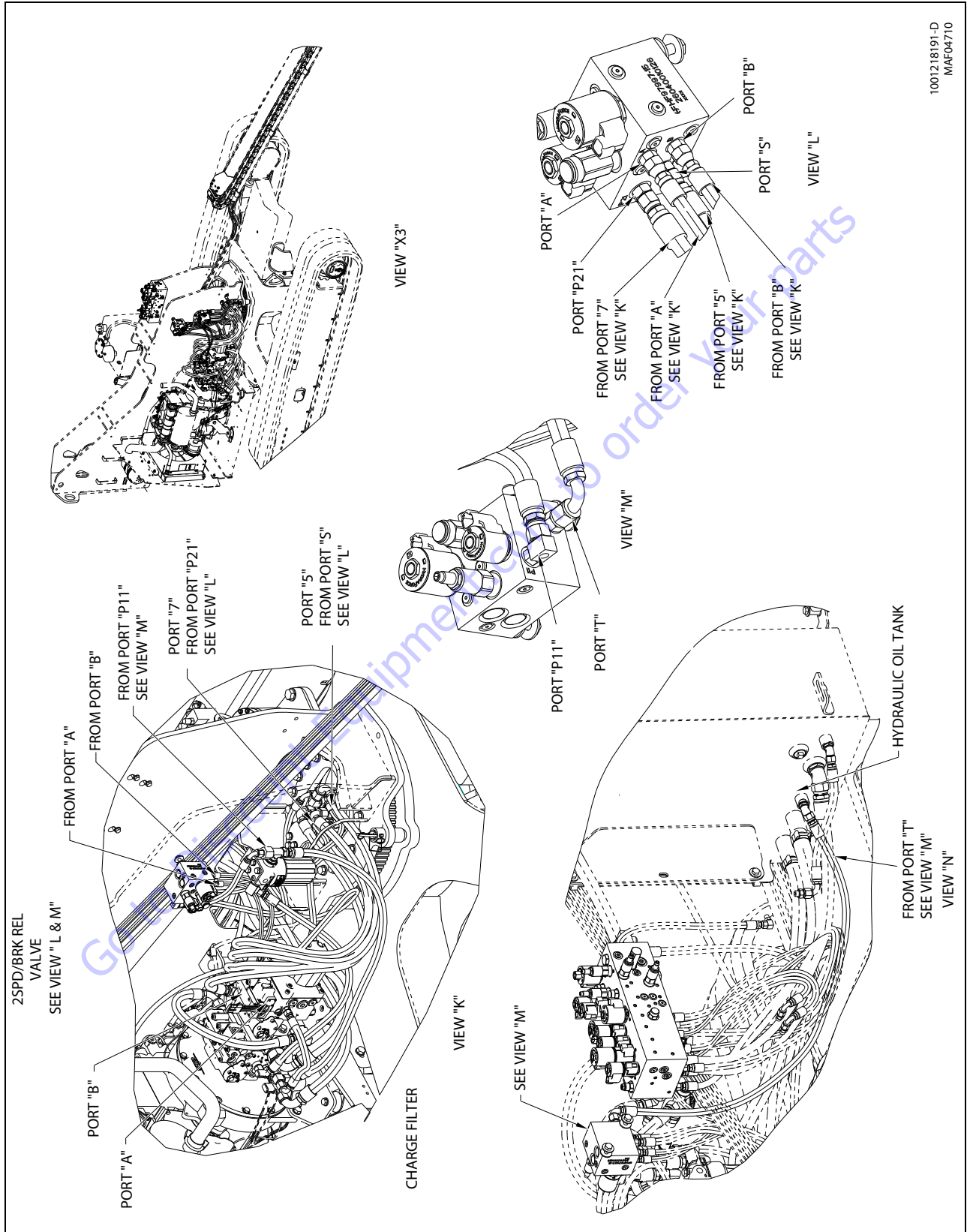
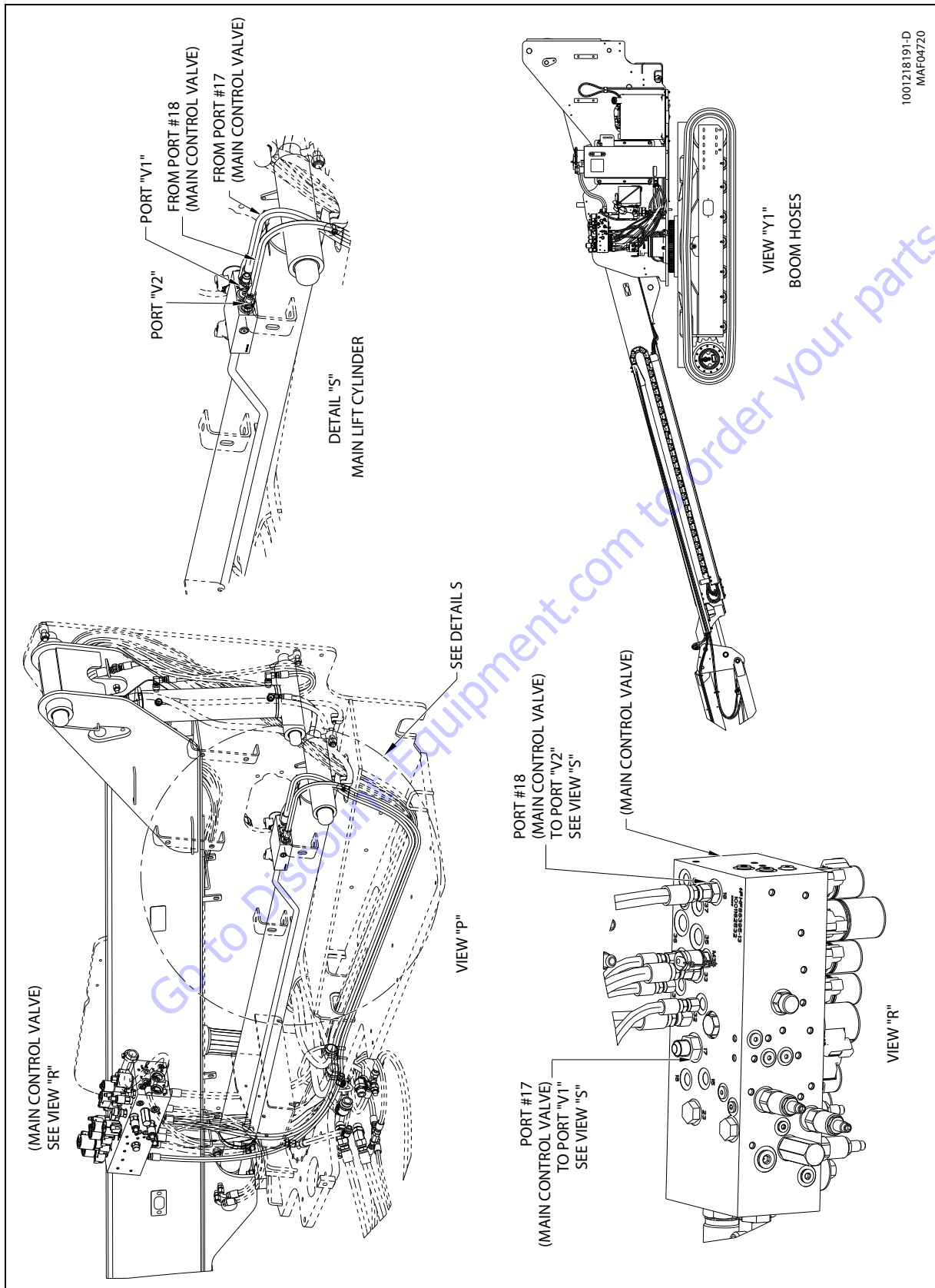


Figure 5-110. Hydraulic System Installation (460SJC) - Sheet 10 of 15



1001218191-D
MAF04720

Figure 5-111. Hydraulic System Installation (460SJC) - Sheet 11 of 15

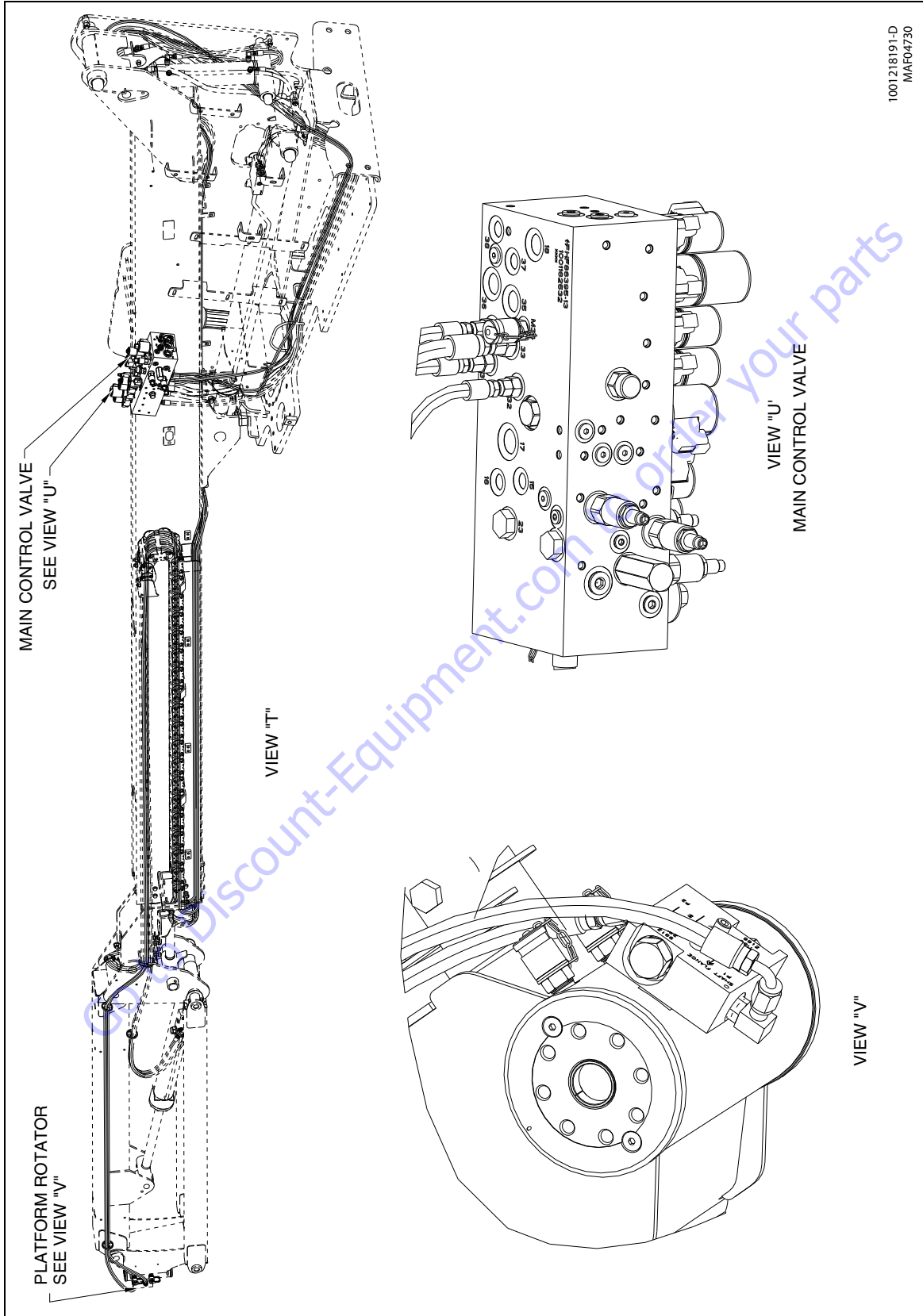
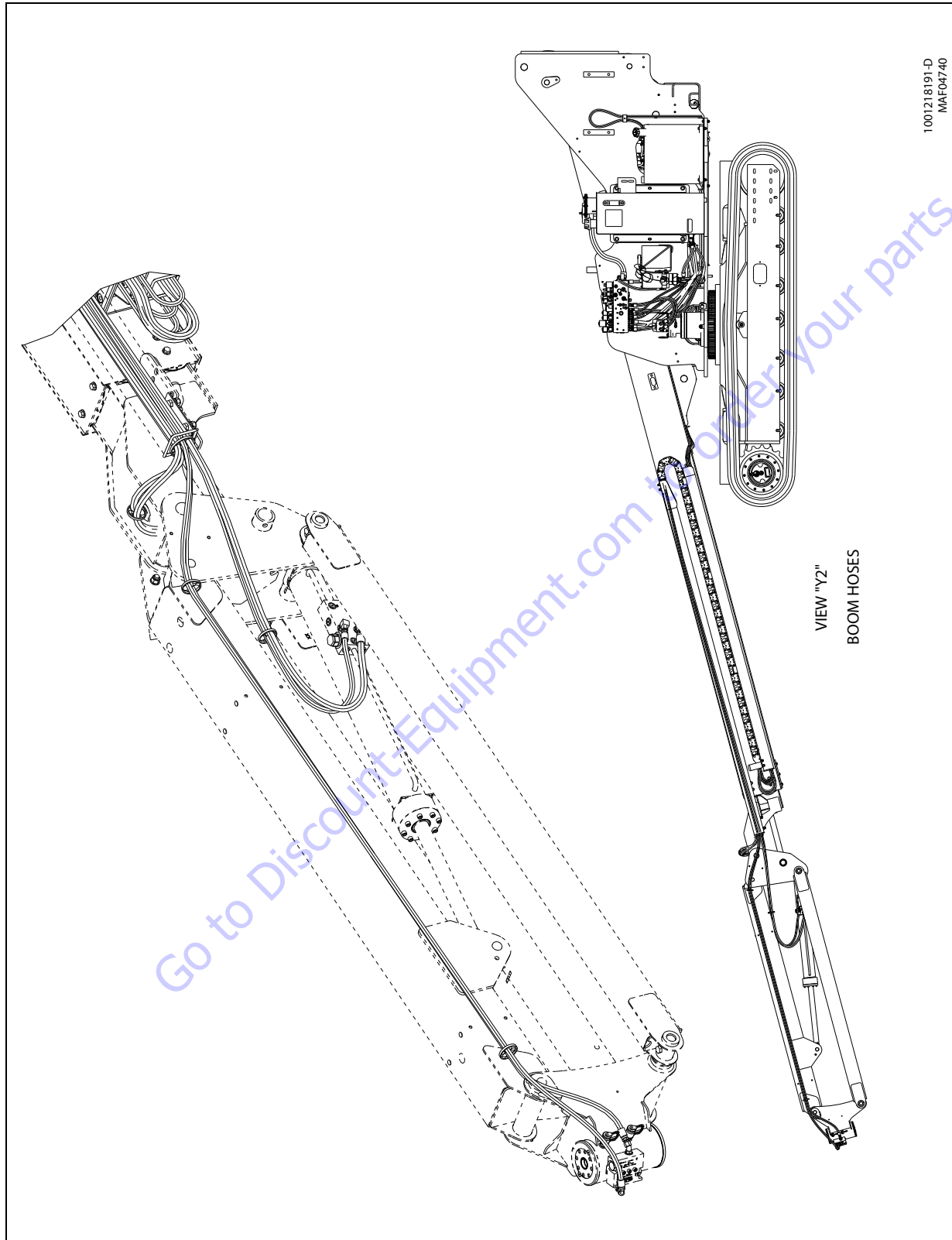


Figure 5-112. Hydraulic System Installation (460SJC) - Sheet 12 of 15



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MAF04740

Figure 5-113. Hydraulic System Installation (460SJC) - Sheet 13 of 15

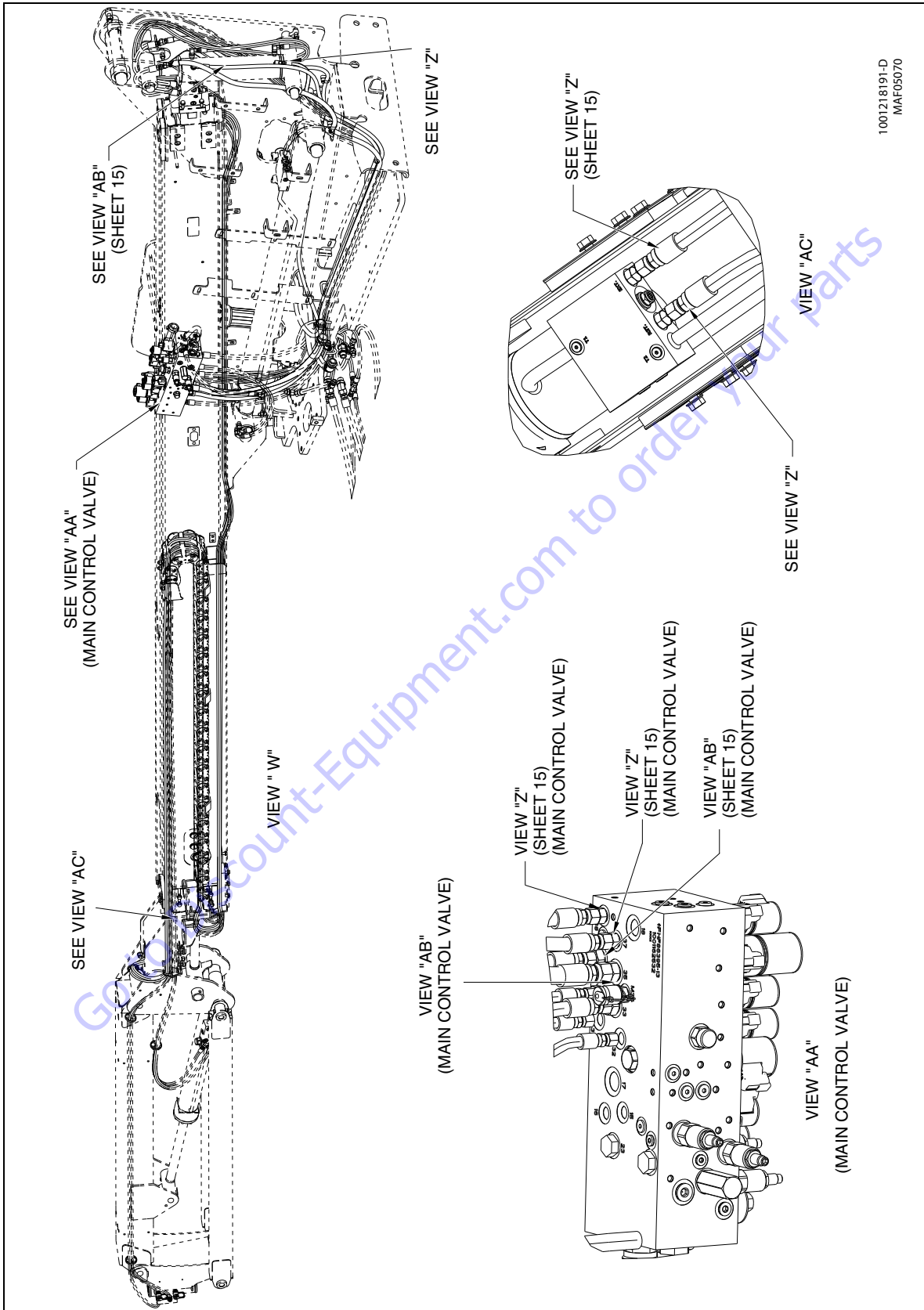


Figure 5-114. Hydraulic System Installation (460SJC) - Sheet 14 of 15

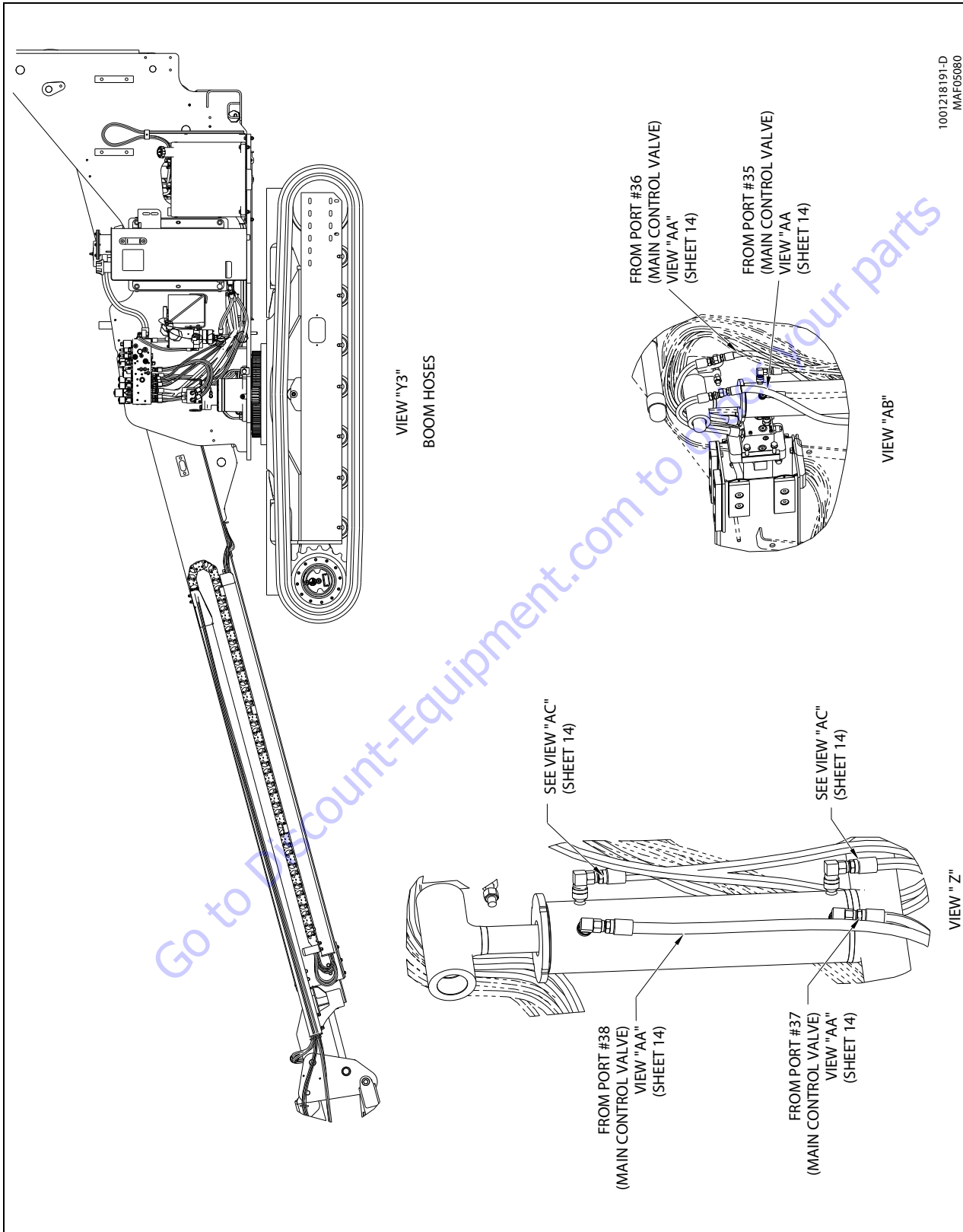


Figure 5-115. Hydraulic System Installation (460SJC) - Sheet 15 of 15

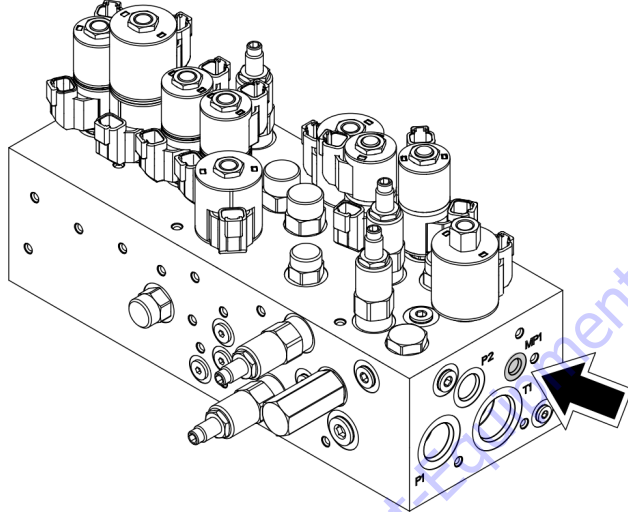
5.5 PRESSURE SETTING PROCEDURE

Cold temperatures have a significant impact on pressure readings. JLG Industries Inc. recommends operating the machine until the hydraulic system has warmed to normal operating temperatures prior to checking pressures. JLG Industries Inc. also recommends the use of a calibrated gauge. Pressure readings are acceptable if they are within $\pm 5\%$ of specified pressures.

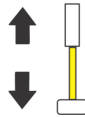
To ensure all pressures are set correctly, the following procedures must be followed.

Main System Relief

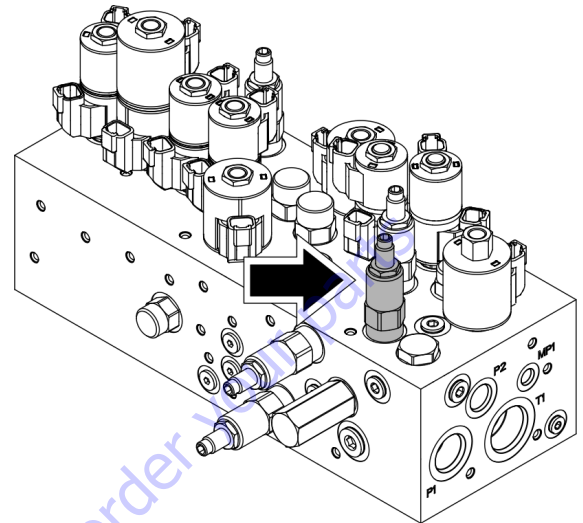
1. Install a pressure gauge at MP1 port of the Main Control Valve capable of reading pressures up to 4000 psi (275 Bar).



2. Activate telescope in function continuously at end of stroke. Observed pressure should be 3000 ± 75 psi (207 ± 6 Bar).

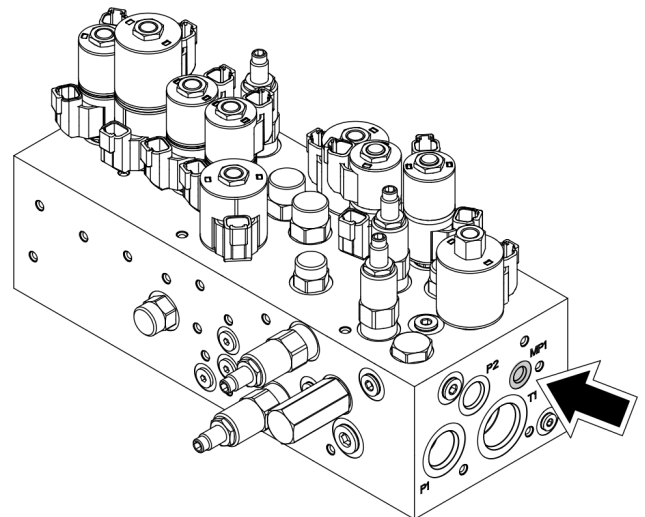


3. If necessary, loosen jam nut and adjust the Main System Relief valve clockwise to increase and counter-clockwise to decrease.



Steer Left Relief

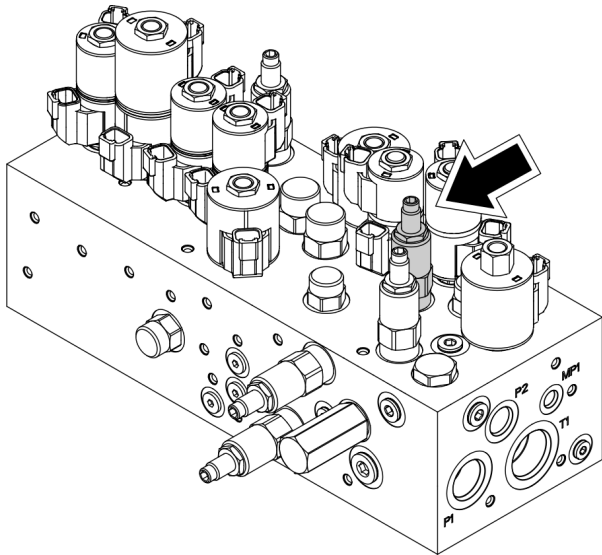
1. Install a pressure gauge at port MP1 of the Main Control Valve capable of reading pressures up to 4000 psi (275 Bar).



2. Activate Steer Left function continuously at end of stroke. Pressure that is observed should be 2750 ± 75 psi (190 ± 6 Bar).

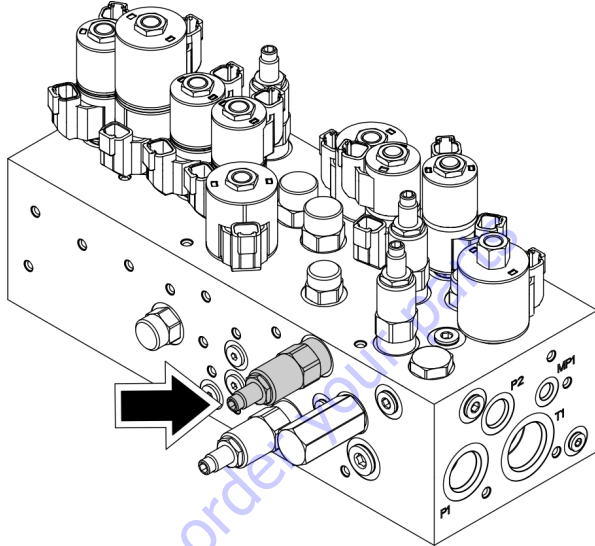
SECTION 5 - HYDRAULICS AND HYDRAULIC SCHEMATICS

3. If necessary, loosen jam nut and adjust the Steer Left Relief valve clockwise to increase and counter-clockwise to decrease.



NOTE: Steer left pressure at port 24 is 2500 psi (173 Bar); a gauge may be placed there for troubleshooting.

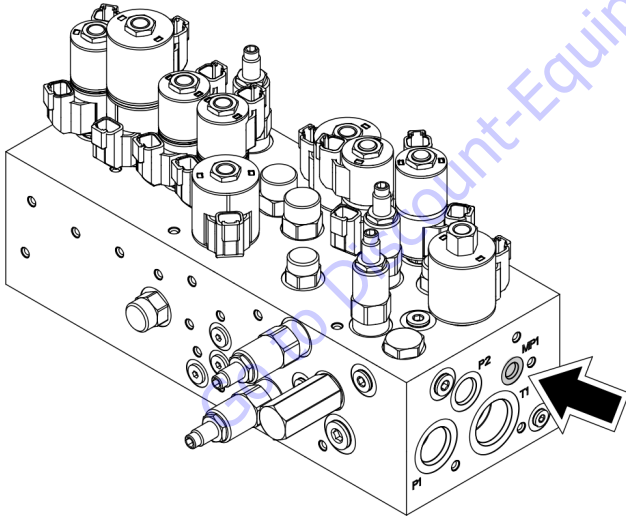
3. If necessary, loosen jam nut and adjust the Steer Right Relief valve clockwise to increase and counter-clockwise to decrease.



NOTE: Steer Right pressure at port 23 is 2500 psi (173 Bar); a gauge may be placed there for troubleshooting.

Steer Right Relief

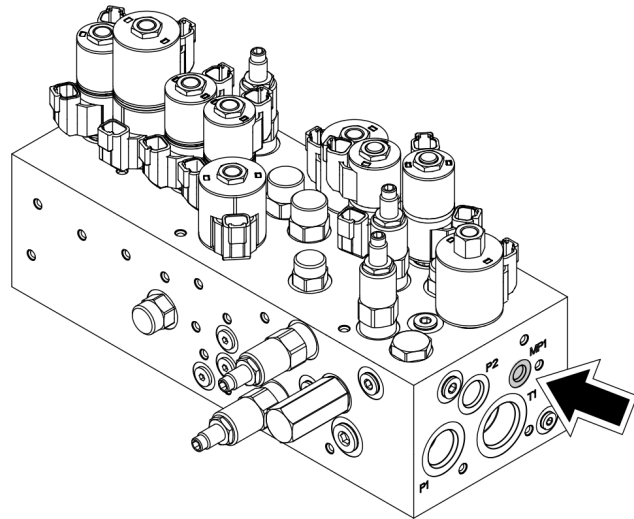
1. Install a pressure gauge at port MP1 of the Main Control Valve capable of reading pressures up to 4000 psi (275 Bar).



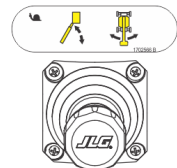
2. Activate Steer Right function continuously at end of stroke. Pressure that is observed should be 2750 ± 75 psi (190 ± 6 Bar).

Boom Swing Relief

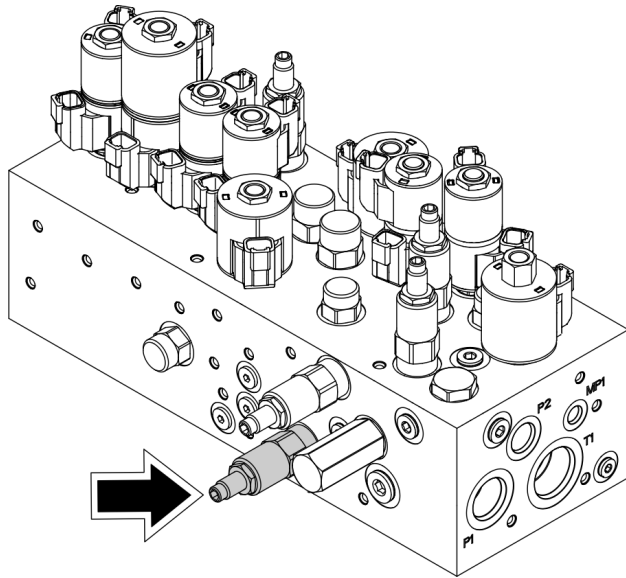
1. Install a pressure gauge at port MP1 of the Main Control Valve capable of reading pressures up to 3000 psi (207 Bar).



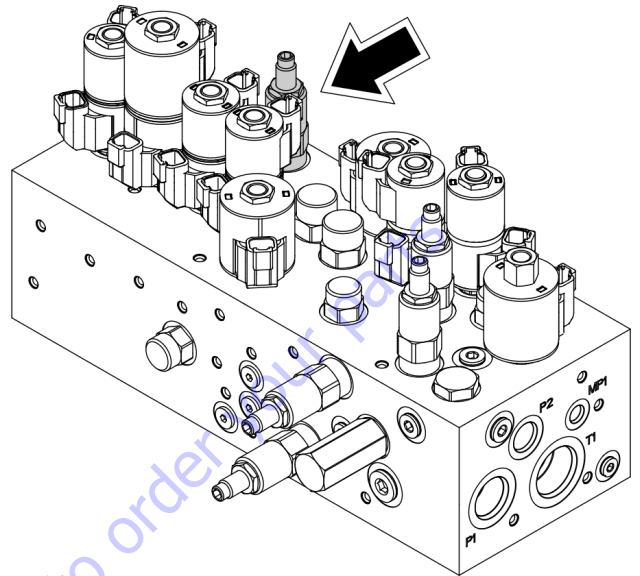
2. Activate Boom Swing Right or Left function continuously against the stop or lock. Observed pressure should be 1700 ± 50 psi (117 ± 4 Bar).



3. If necessary, loosen jam nut and adjust the Boom Swing Relief valve clockwise to increase and counter-clockwise to decrease.



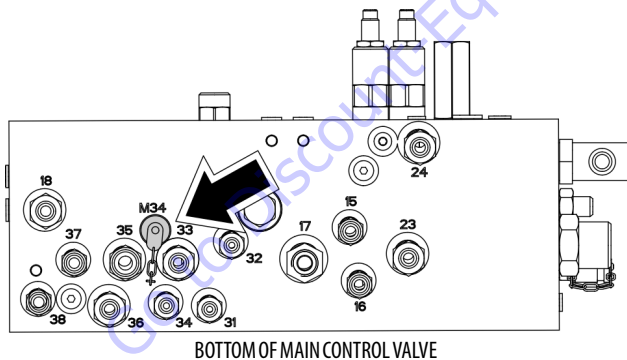
3. If necessary, loosen jam nut and adjust the Jib Lift Down Relief valve clockwise to increase and counter-clockwise to decrease.



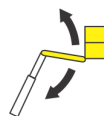
NOTE: Boom Swing Right pressure at port 15 and Boom Swing Left pressure at port 16 is 1600 psi (110 bar); a gauge may be placed there for troubleshooting.

Jib Lift Down Relief (460SJC)

1. Install a pressure gauge at port M34 of the Main Control Valve capable of reading pressures up to 3000 psi (207 Bar)



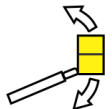
2. Activate Jib Lift Down function continuously at end of stroke. Observed pressure should be 1200 ± 50 psi (83 ± 4 Bar).



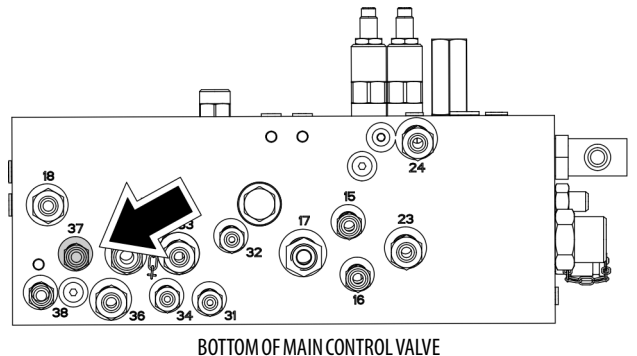
Platform Level Up Relief

The Platform Level Up relief is pre-set and does not normally need to be checked or adjusted. If necessary, the following procedure may be utilized for trouble shooting purposes:

1. Lift the main boom up enough to allow the platform to be fully leveled up.
2. Activate Level Up to end of stroke.

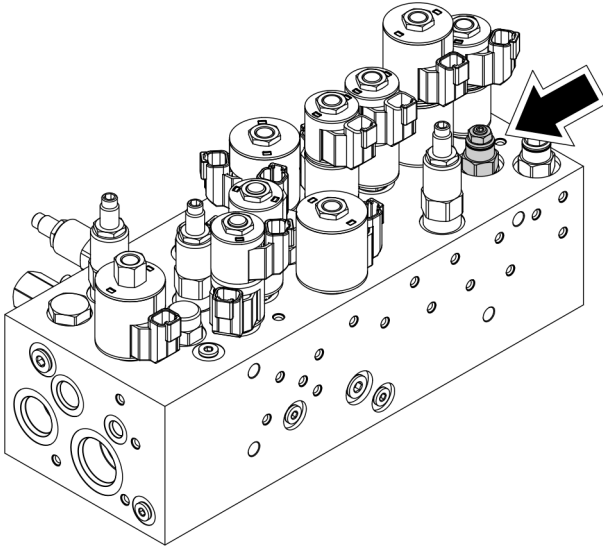


3. Remove hose from Level Up port on main control valve (Port 37) - "T" a pressure gauge capable of reading pressures up to 4000 psi (275 bar) to this port. Reconnect hose.

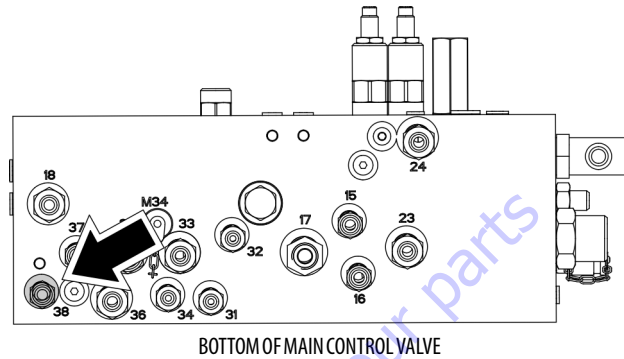


SECTION 5 - HYDRAULICS AND HYDRAULIC SCHEMATICS

4. Activate Main Boom Lift Down function using Auxiliary Mode continuously until fully lowered. Observed pressure should be 220 ± 6 bar (3200 ± 80 psi).
5. If necessary, loosen jam nut and adjust Platform Level Up Relief valve clockwise to decrease and counter-clockwise to increase.



3. Remove the hose from the Level Down port on the main control valve (Port 38) - "T" a pressure gauge capable of reading pressures up to 207 bar (3000 psi) to this port. Reconnect hose.

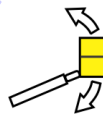


6. Remove the "T" and gauge. Reinstall hose.

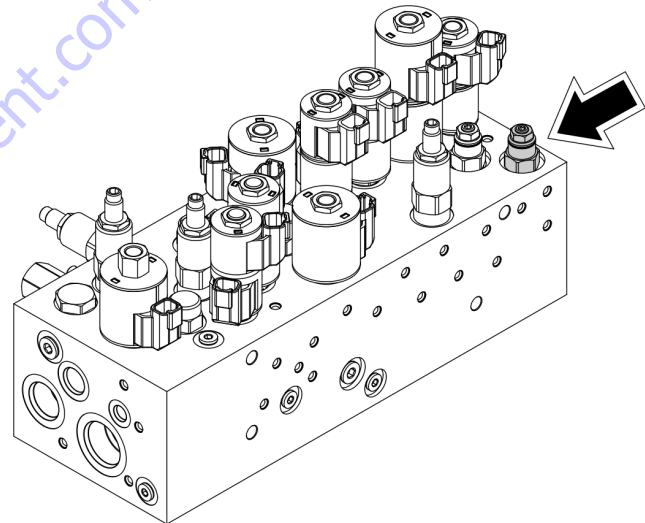
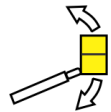
Platform Level Down Relief

The Platform Level Down relief is pre-set and does not normally need checked or adjusted. If necessary, use the following procedure for trouble shooting:

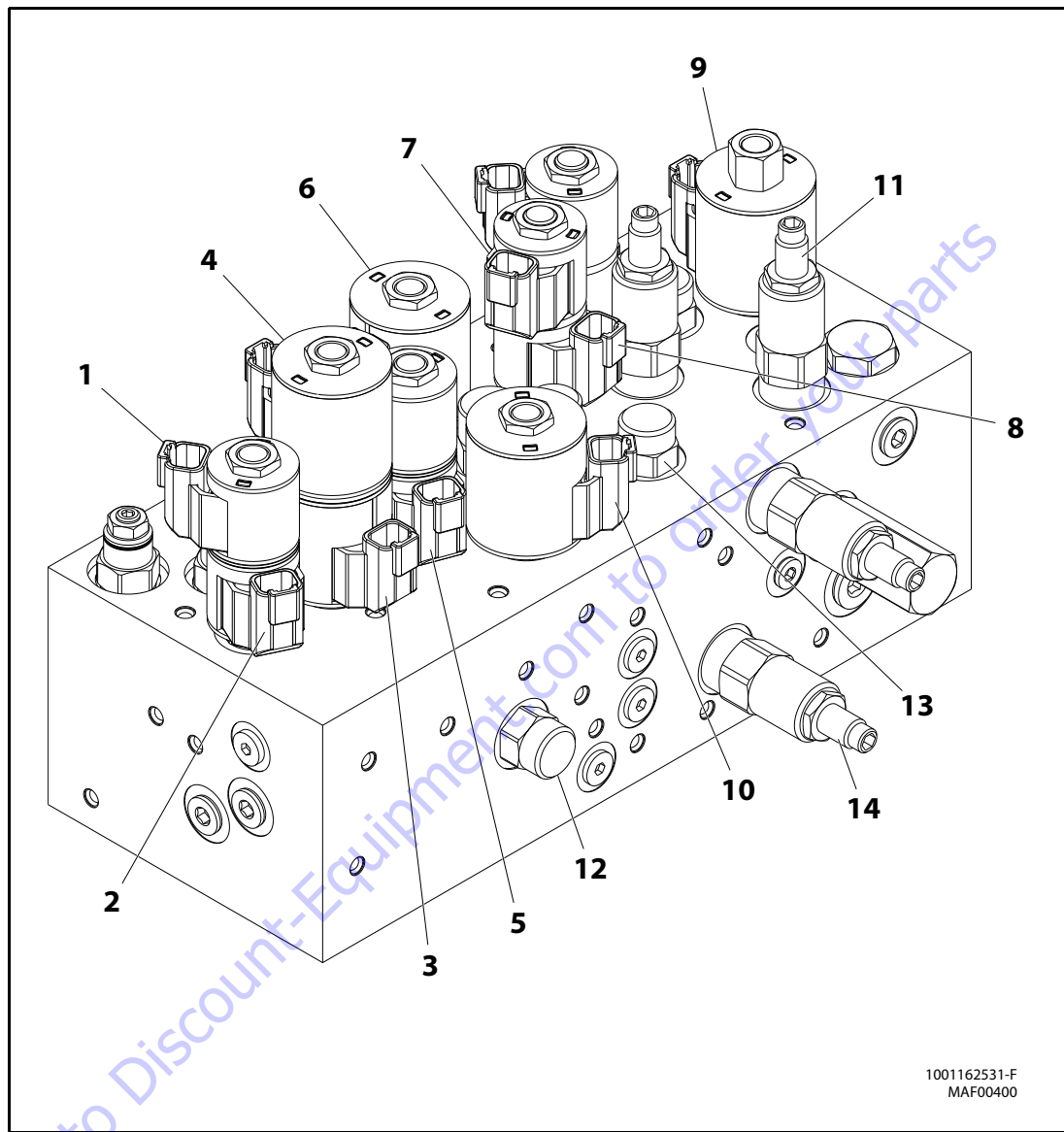
1. Lift main boom up enough to allow platform to be fully leveled down.
2. Activate Level Down to end of stroke.



4. Activate Platform Level Down function continuously at end of stroke. Observed pressure should be 138 ± 4 bar (2000 ± 50 psi).
5. If necessary, loosen jam nut and adjust Platform Level Down Relief valve clockwise to decrease and counter-clockwise to increase.



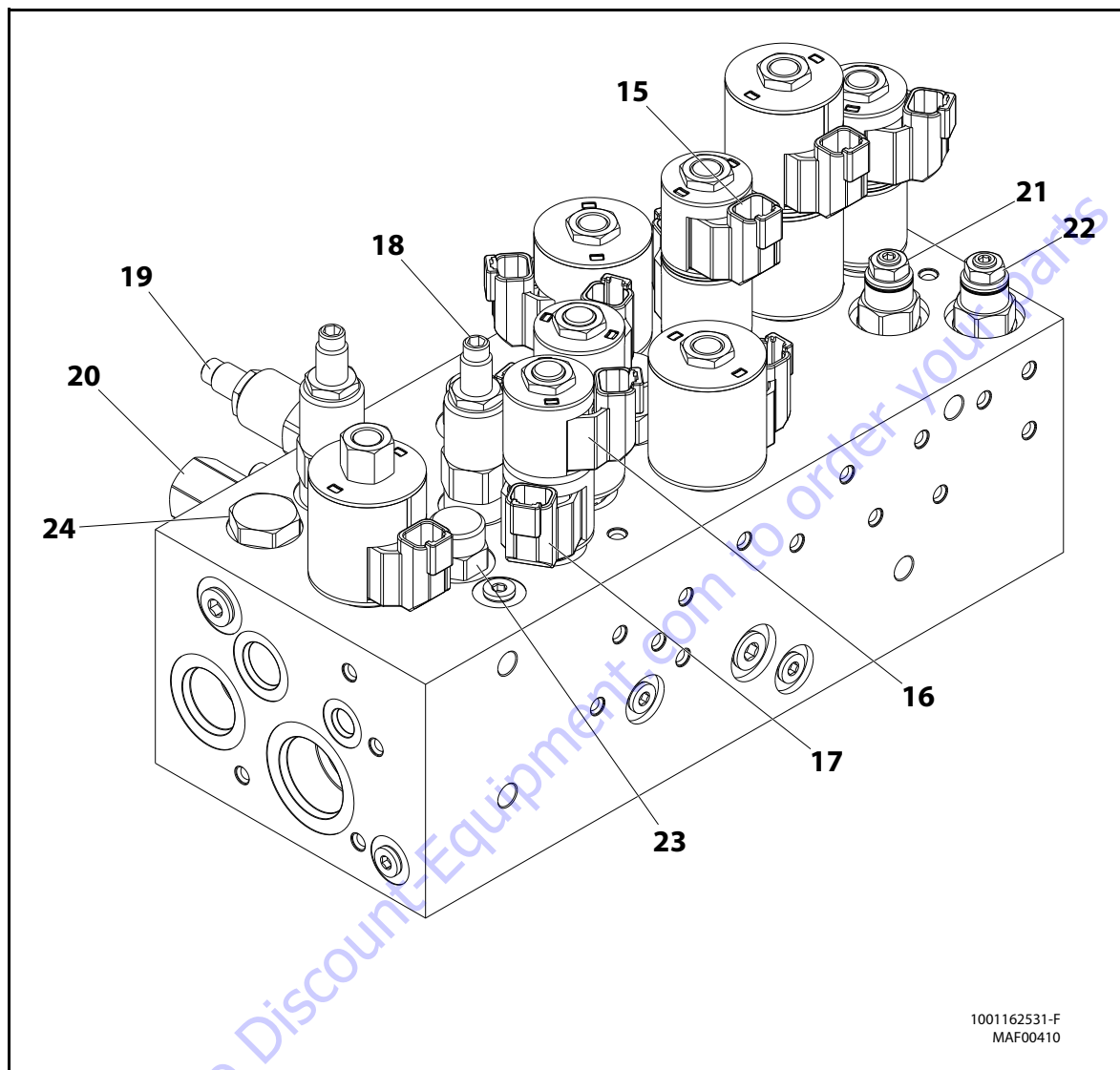
6. Remove the "T" and gauge. Reinstall hose.



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MAF00400

- | | | |
|-----------------|------------------|--------------------------|
| 1. Level Up | 6. Main Lift Up | 11. Main System Relief |
| 2. Level Down | 7. Swing Right | 12. Flow Regulator |
| 3. Tele In | 8. Swing Left | 13. Pressure Compensator |
| 4. Tele Out | 9. Main Dump | 14. Swing Relief |
| 5. Rotate Right | 10. Flow Control | |

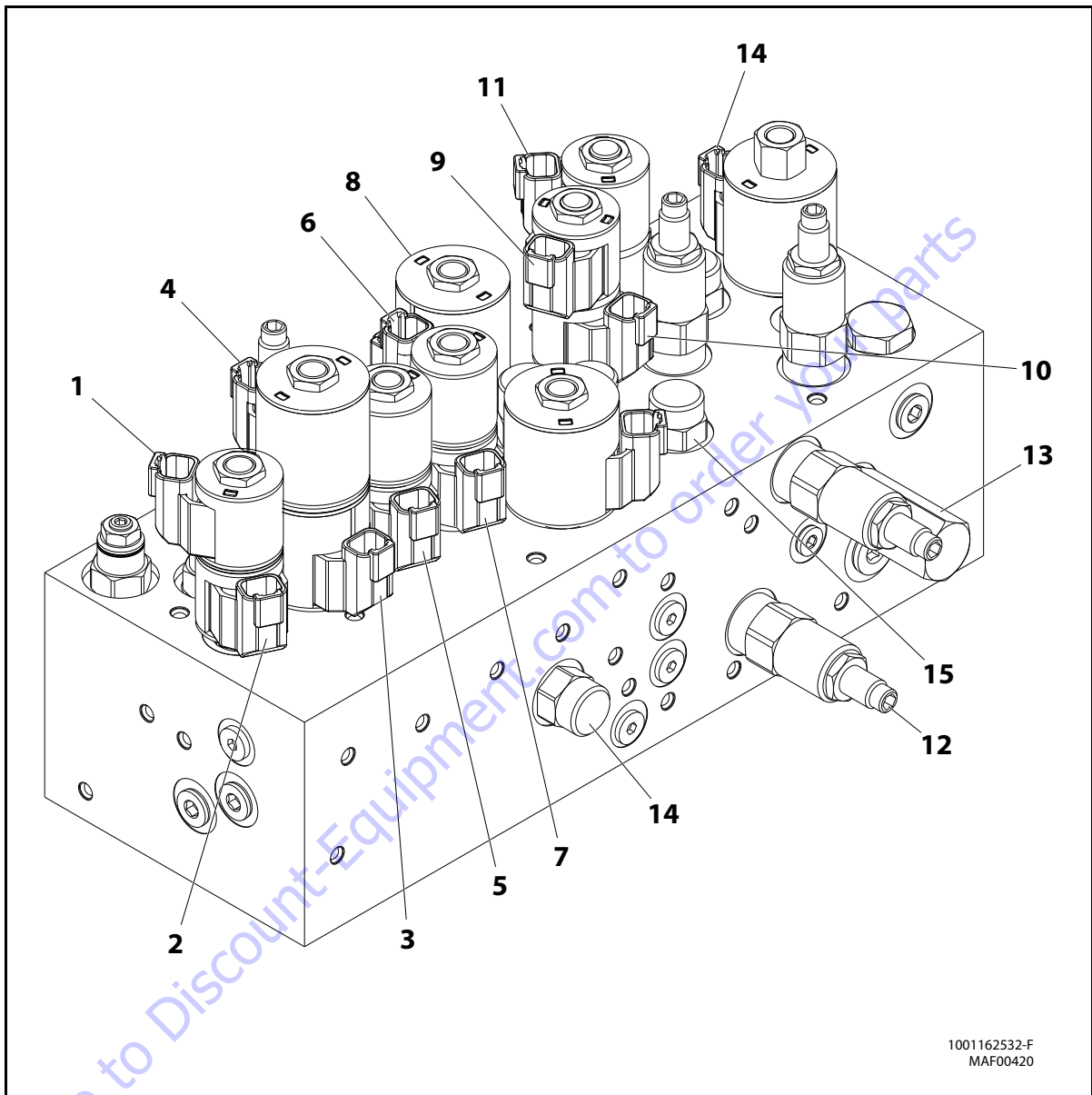
Figure 5-116. Main Control Valve Identification (400SC) - Sheet 1 of 2



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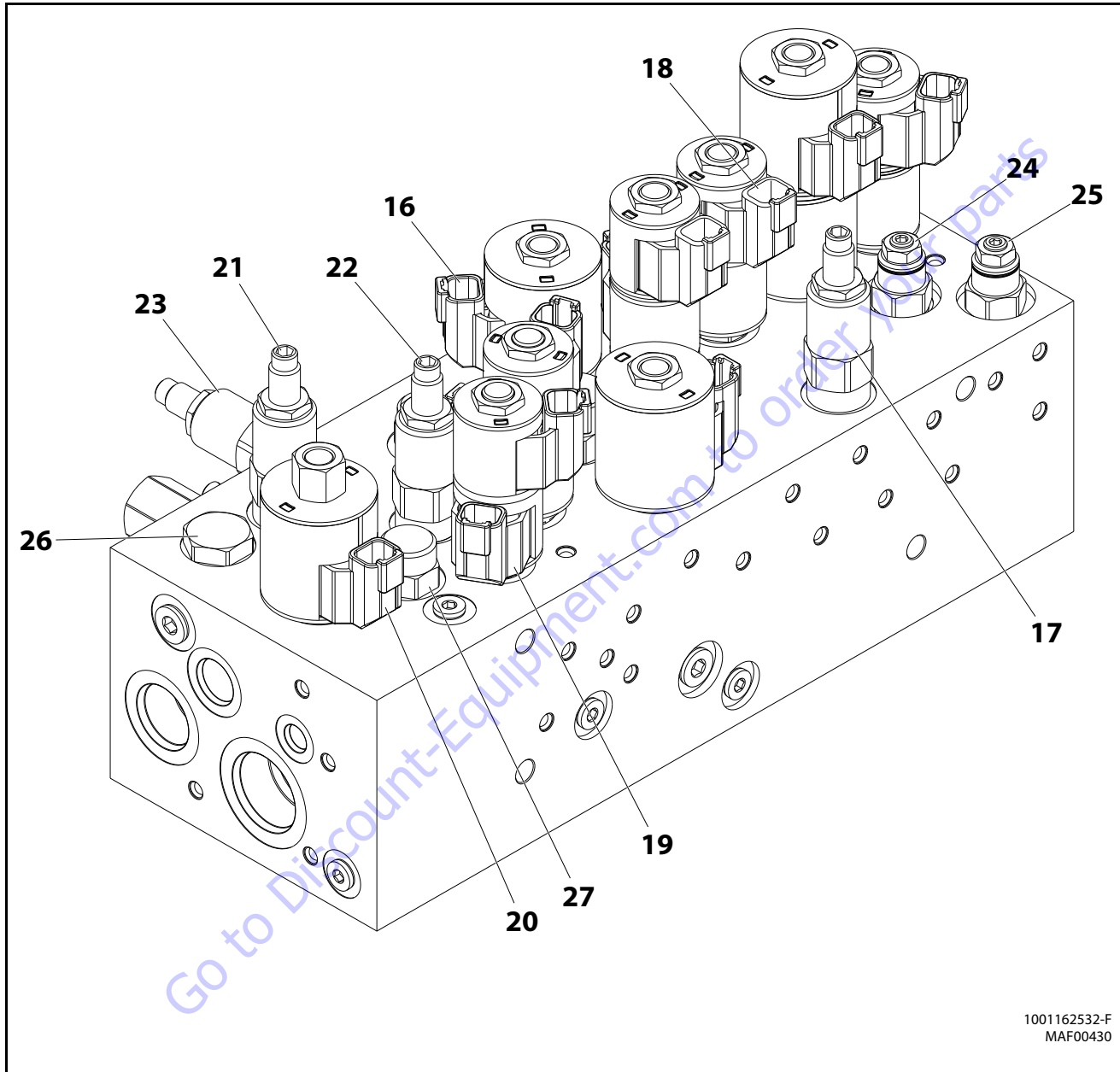
- | | | |
|-----------------------|------------------------|--------------------|
| 15. Rotate Left | 19. Steer Right Relief | 23. Flow Regulator |
| 16. Steer Left | 20. Flow Regulator | 24. Check Valve |
| 17. Steer Right | 21. Level Up Relief | |
| 18. Steer Left Relief | 22. Level Down Relief | |

Figure 5-117. Main Control Valve Identification (400SC) - Sheet 2 of 2



- | | | | |
|---------------|-----------------|------------------|--------------------------|
| 1. Level Up | 5. Jib Down | 9. Swing Right | 13. Flow Regulator |
| 2. Level Down | 6. Rotate Left | 10. Swing Left | 14. Flow Regulator |
| 3. Tele In | 7. Rotate Right | 11. Steer Left | 15. Pressure Compensator |
| 4. Tele Out | 8. Main Lift Up | 12. Swing Relief | |

Figure 5-118. Main Control Valve Identification - 460SJC - Sheet 1 of 2



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MAF00430

- | | | |
|---------------------|------------------------|-----------------------|
| 16. Flow Control | 20. Main Dump | 24. Level Up Relief |
| 17. Jib Lift Relief | 21. Steer Relief | 25. Level Down Relief |
| 18. Jib Up | 22. Swing Left Relief | 26. Check Valve |
| 19. Steer Relief | 23. Swing Right Relief | 27. Flow Regulator |

Figure 5-119. Main Control Valve Identification - 460SJC - Sheet 2 of 2

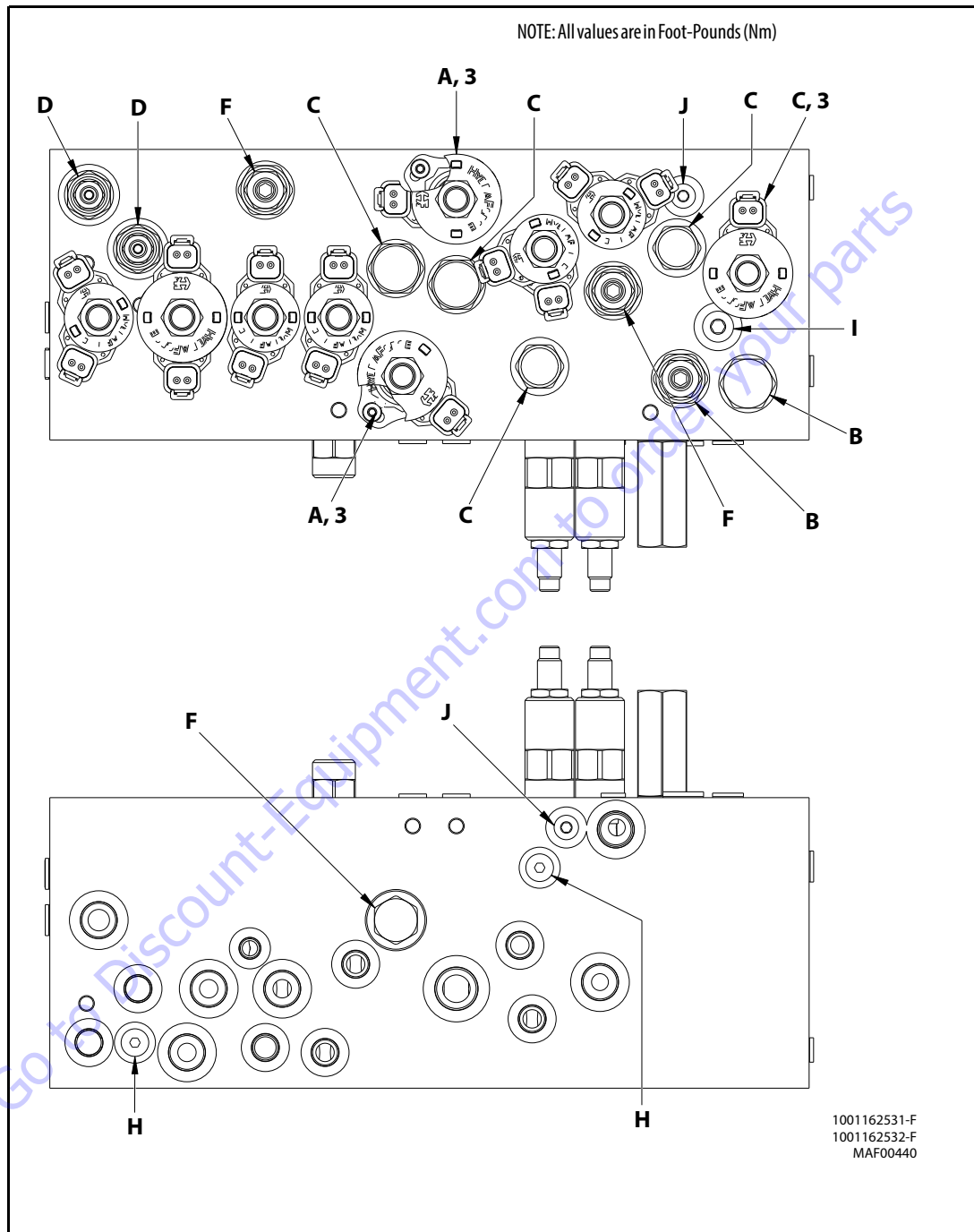


Figure 5-120. Main Control Valve Torque Values - Sheet 1 of 2

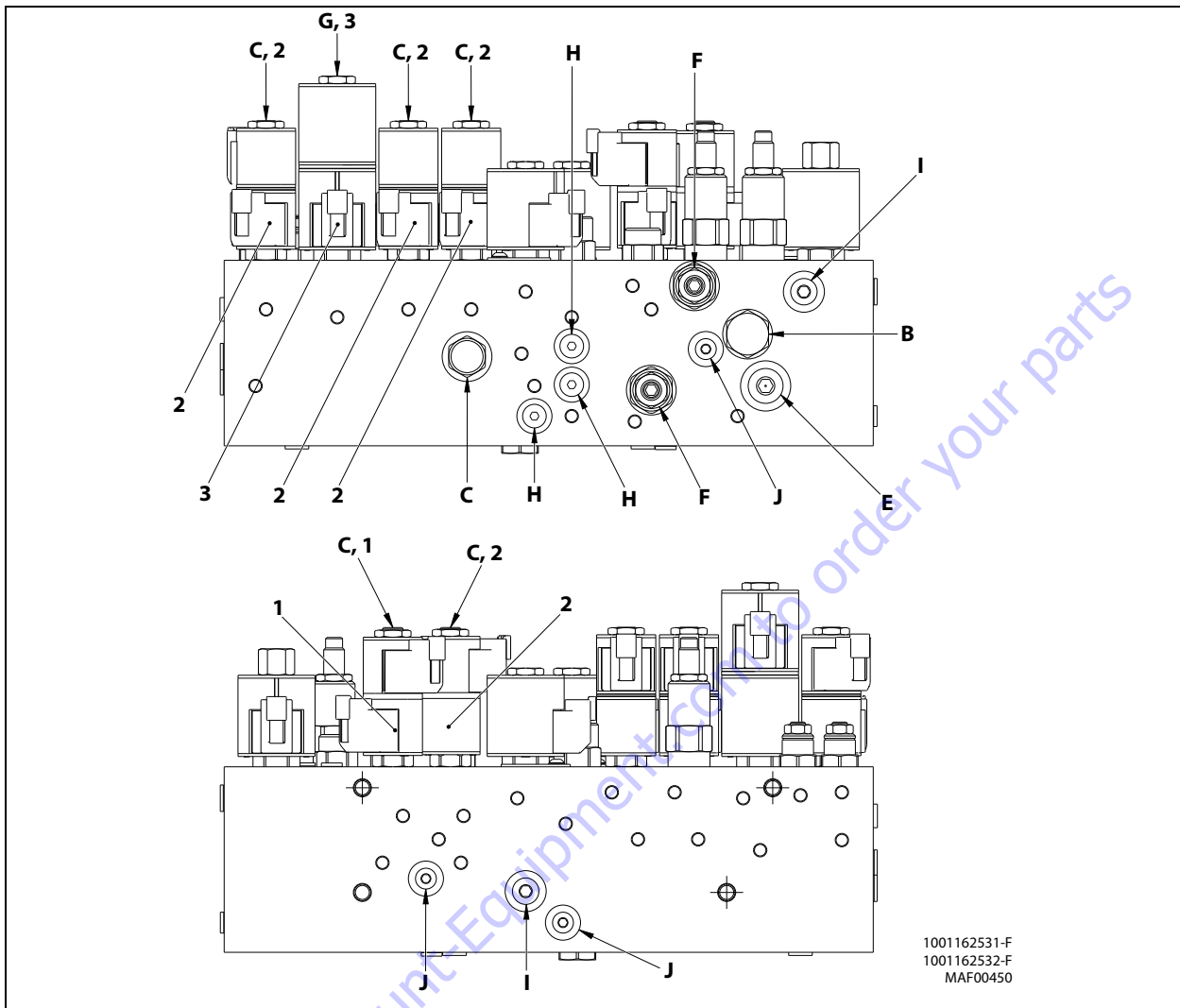


Table 5-33. Cartridge Torque Values

	Ft. lbs.	Nm
A	48	65
B	43	58
C	38	51
D	35	47
E	30	41
F	28	38
G	25	34
H	13	18
I	12	16
J	8	11

Table 5-34. Coil Torque Values

	Ft. lbs.	Nm
1	4.5	6
2	4.5	6
3	6	8

Table 5-35. Coil Resistance Values

	Temperature	Resistance
1	20°C	6.2
2	20°C	8.8
3	20°C	7.1

Figure 5-121. Main Control Valve Torque Values - Sheet 2 of 2

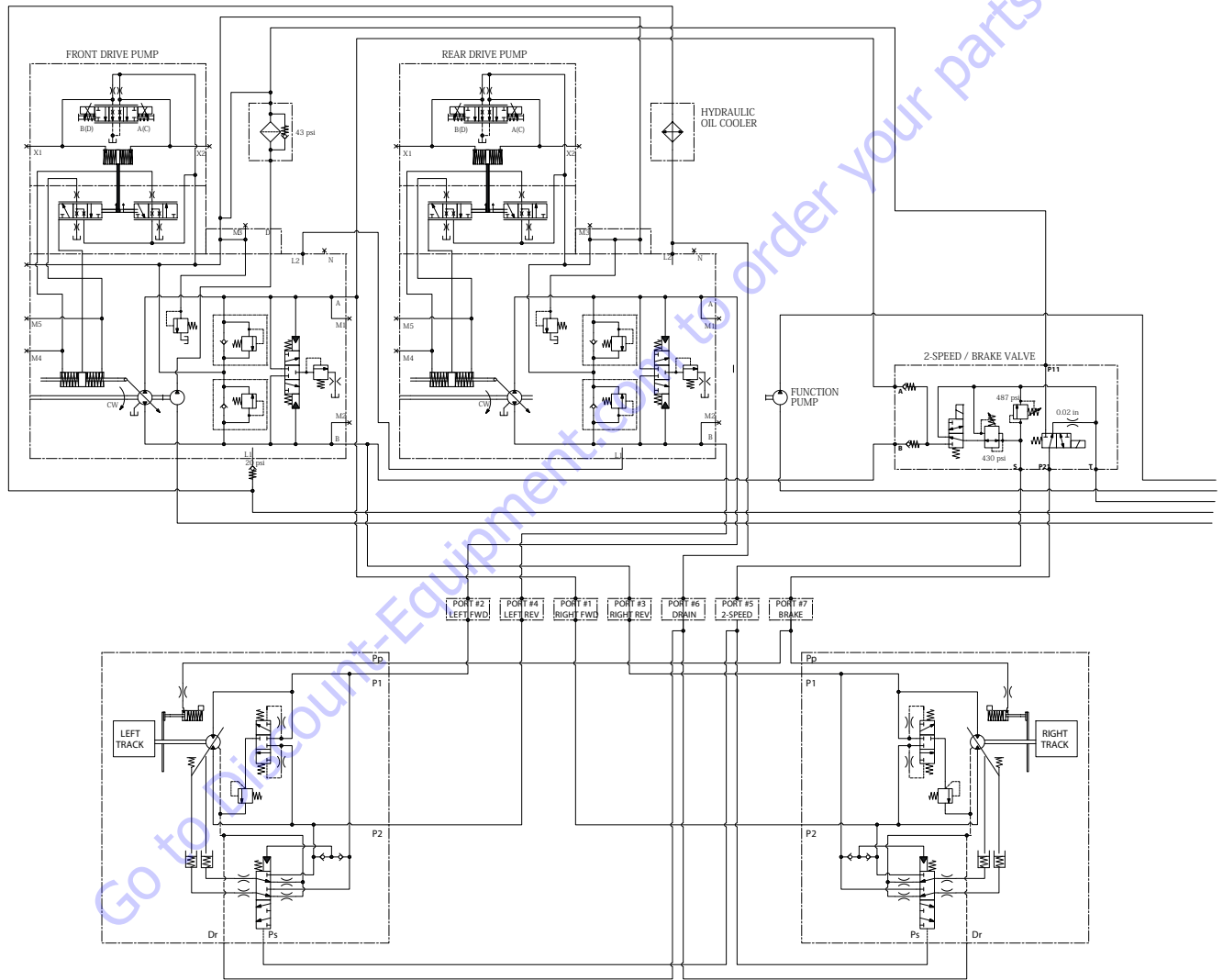
5.6 DRIVE PUMP PRE-FILL PROCEDURE

NOTICE

HYDRAULIC DRIVE PUMP CASE MUST BE PRE-FILLED BEFORE STARTING ENGINE. FAILURE TO DO SO CAN CAUSE PUMP FAILURE.

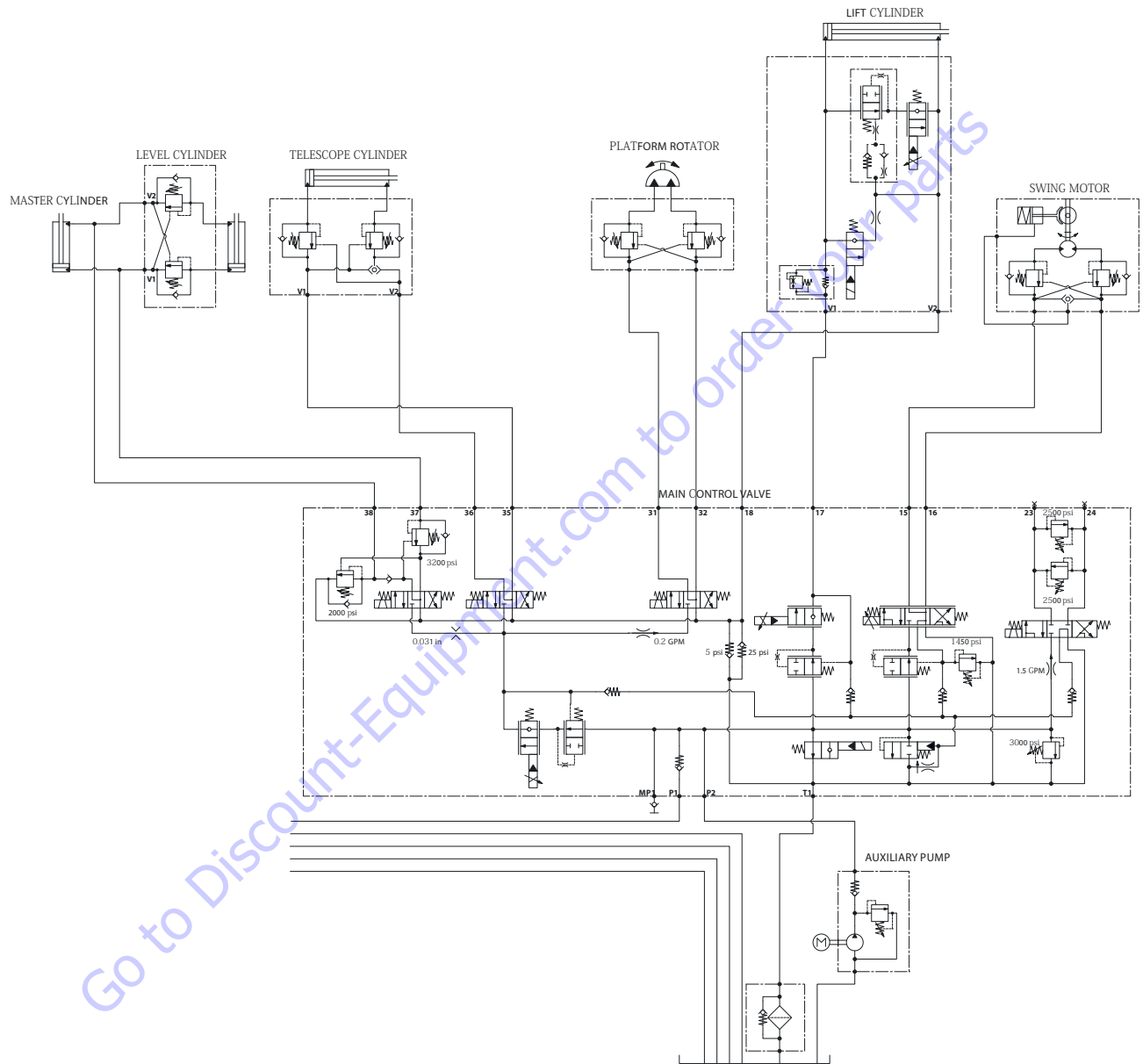
1. Fill hydraulic reservoir.
2. Determine if hydraulic oil tank sight level gauge is higher than other hydraulic components.
 - a. Determine if hydraulic oil tank sight level gauge is higher than hydraulic drive pump assembly.
 - b. Determine if hydraulic oil tank sight level gauge is higher than all hydraulic hose loops or routings between hydraulic tank and drive pump assembly.
 - c. If sight level gauge is the highest hydraulic oil level point, go to step 3.
 - d. If sight level gauge is NOT the highest hydraulic oil level point, low pressure air may need to be applied to the hydraulic oil tank (fill cap via air regulator) in conjunction with step 4 to get hydraulic oil to move over air locks created by these high spots.
3. If machine is equipped with a hydraulic oil cooler option:
 - a. Determine if there is a hydraulic 'tee' fitting installed at the hydraulic drive pump that has a 'cap' fitting attached to it. (this will generally be at or near the top of the hydraulic drive pump body). This 'cap' fitting is used to manually fill the hydraulic drive pump case.
 - b. Remove 'cap' fitting.
 - c. Fill hydraulic drive pump case with hydraulic oil.
 - d. Reattach and torque 'cap' fitting.
 - e. Prefilling hydraulic drive pump w/oil cooler option is complete (Step #4 can be omitted at this point.)
4. If machine is NOT equipped with a hydraulic oil cooler option,
 - a. Locate a case access port on the hydraulic drive pump - preferably one located at or near the top or upper sides of the pump.
 - b. Using the proper wrench, remove O-ring plug to allow air to escape from the hydraulic drive pump case.
 - c. Hydraulic oil will flow by gravity from hydraulic tank to the drive pump.
 - d. When hydraulic oil starts to flow out this port, pump is full.
 - e. Re-install O-ring plug and torque.
5. Pre-filling hydraulic drive pump is complete.

5.7 HYDRAULIC SCHEMATIC



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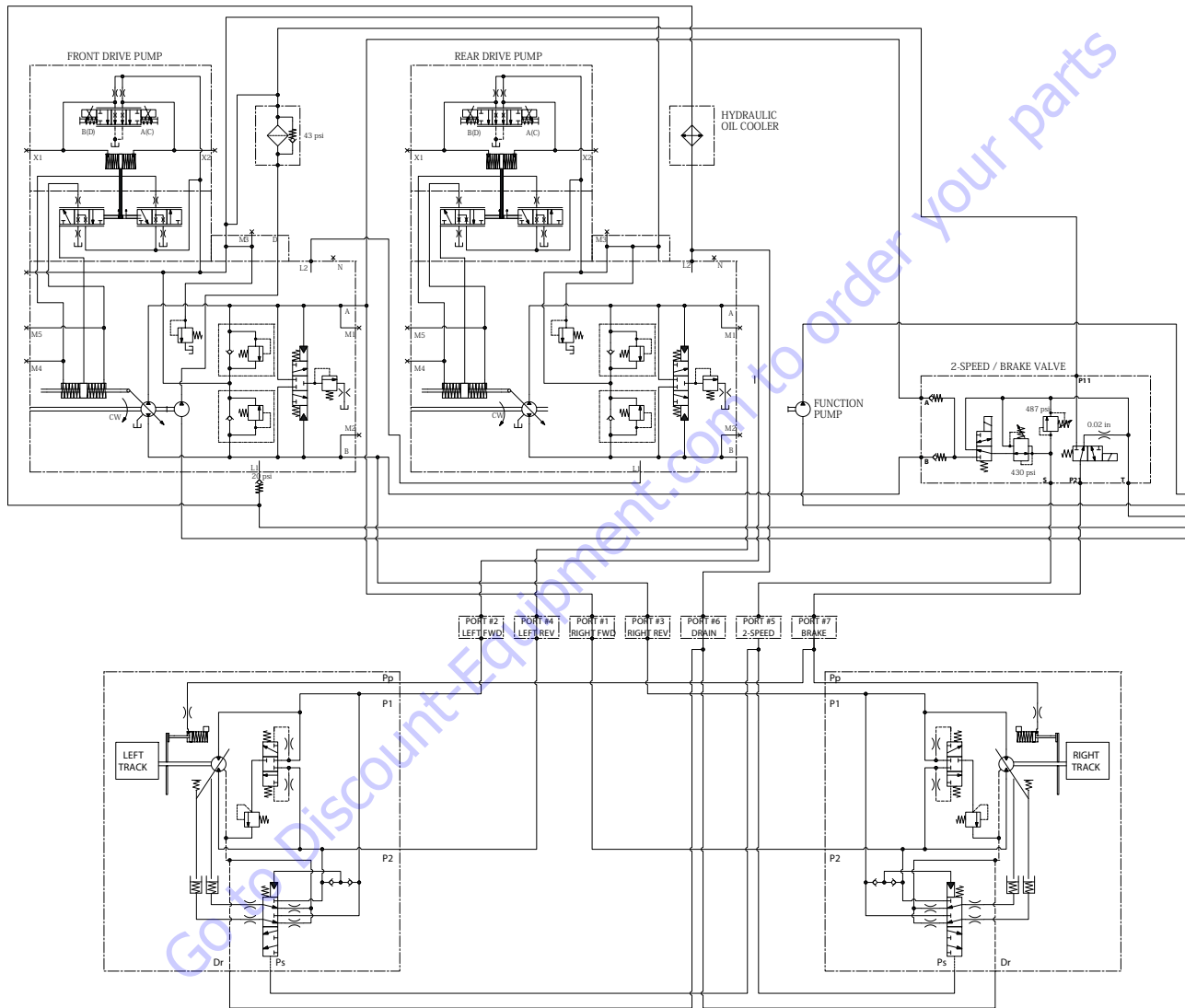
Figure 5-122. Hydraulic Schematic (400SC) - Sheet 1 of 2



1001178276C

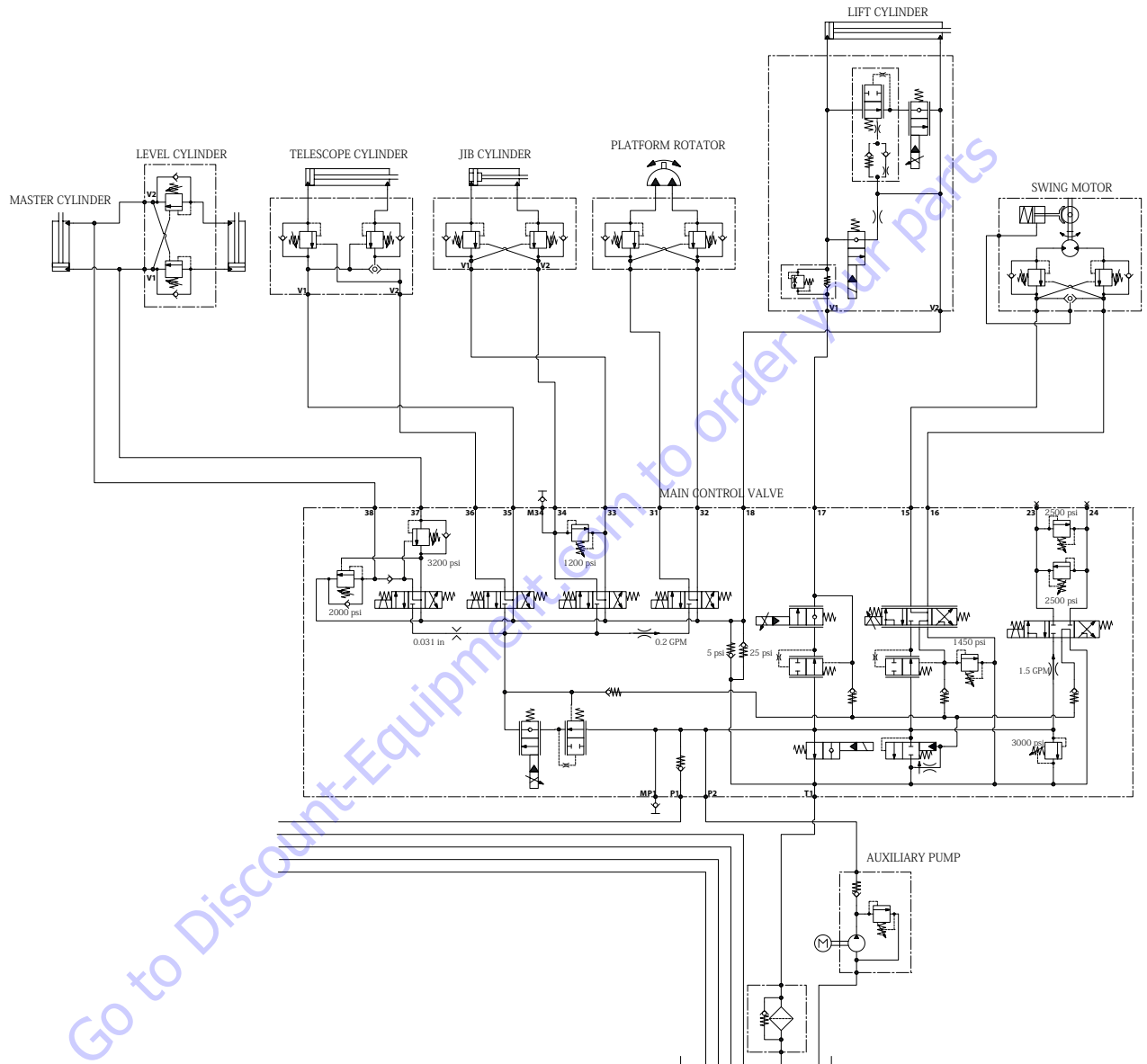
Figure 5-123. Hydraulic Schematic (400SC) - Sheet 2 of 2

SECTION 5 - HYDRAULICS AND HYDRAULIC SCHEMATICS



1001178276C

Figure 5-124. Hydraulic Schematic (460SJC) - Sheet 1 of 2



1001178276C

Figure 5-125. Hydraulic Schematic (460SJC) - Sheet 2 of 2

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We sell worldwide for the brands: Genie, Terex, JLG, MultiQuip, Mikasa, Essick, Whiteman, Mayco, Toro Stone, Diamond Products, Generac Magnum, Airman, Haulotte, Barreto, Power Blanket, Nifty Lift, Atlas Copco, Chicago Pneumatic, Allmand, Miller Curber, Skyjack, Lull, Skytrak, Tsurumi, Husquvarna Target, , Stow, Wacker, Sakai, Mi-T- M, Sullair, Basic, Dynapac, MBW, Weber, Bartell, Bennar Newman, Haulotte, Ditch Runner, Menegotti, Morrison, Contec, Buddy, Crown, Edco, Wyco, Bomag, Laymor, Barreto, EZ Trench, Bil-Jax, F.S. Curtis, Gehl Pavers, Heli, Honda, ICS/PowerGrit, IHI, Partner, Imer, Clipper, MMD, Koshin, Rice, CH&E, General Equipment, ,AMida, Coleman, NAC, Gradall, Square Shooter, Kent, Stanley, Tamco, Toku, Hatz, Kohler, Robin, Wisconsin, Northrock, Oztec, Toker TK, Rol-Air, Small Line, Wanco, Yanmar

SECTION 6. JLG CONTROL SYSTEM

6.1 JLG CONTROL SYSTEM ANALYZER KIT
INSTRUCTIONS

Introduction

NOTICE

WHEN INSTALLING A NEW POWER MODULE CONTROLLER ON THE MACHINE, THE CONTROLLER MUST BE PROGRAMMED FOR PROPER MACHINE CONFIGURATION, INCLUDING OPTIONS.

NOTICE

AVOID PRESSURE-WASHING ELECTRICAL/ELECTRONIC COMPONENTS. IF PRESSURE-WASHING IS USED TO WASH AREAS CONTAINING ELECTRICAL/ELECTRONIC COMPONENTS, JLG INDUSTRIES, INC. RECOMMENDS A MAXIMUM PRESSURE OF 52 BAR (750 PSI) AT A MINIMUM DISTANCE OF 30.5 CM (12 IN) AWAY FROM THESE COMPONENTS. IF ELECTRICAL/ELECTRONIC COMPONENTS ARE SPRAYED, SPRAYING MUST NOT BE DIRECT AND FOR BRIEF TIME PERIODS TO AVOID HEAVY SATURATION.

The JLG designed Control System is a 12 volt based control unit installed on the boom lift.

The JLG Control System has reduced the need for exposed terminal strips, diodes and trimpots and provides simplicity in

viewing and adjusting the various personality settings for smooth control of: acceleration, deceleration, creep, min speed, and max.-speed for all boom, drive, and steering functions.

The main lift, swing, and drive are controlled by individual joysticks, with steering being controlled by a rocker switch built into the top the drive joystick. To activate Drive, Lift, and Swing simply pull up on the slide lock location on the joystick and move the handle into the direction desired.

The control system will control the voltage output to the valves and pump, as programmed for smooth operation and maximum cycle time. Ground control speeds for all boom functions can also be programmed into the control system.

The JLG Control System controller has a built in LED to indicate any faults. The system stores recent faults which may be accessed for troubleshooting. Optional equipment includes a soft touch system, head and tail lights, and ground alarm. These options may be added later but must be programmed into the control system when installed.

The Control System may be accessed utilizing a custom designed, hand held analyzer (Analyzer Kit, JLG part no. 2901443) which will display two lines of information at a time, by scrolling through the program.

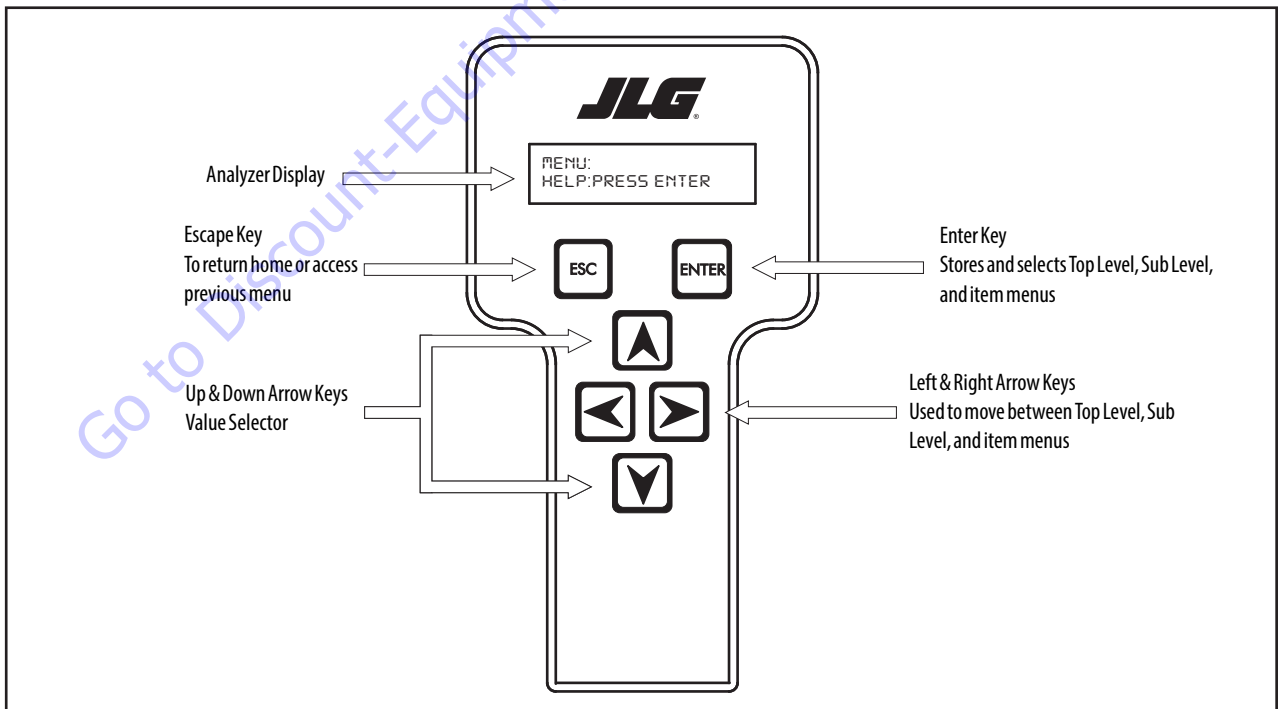


Figure 6-1. Hand Held Analyzer

To Connect the JLG Control System Analyzer

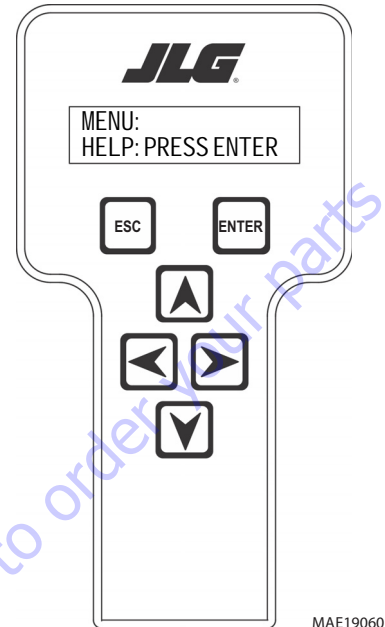
1. Connect four pin end of cable supplied with analyzer, to the motor controller module located in the platform box or at the power module. connect remaining end of cable to the analyzer.

NOTE: The cable has a four pin connector at each end of the cable. the cable cannot be connected backwards.

2. Power up the Control System by turning the lower key to platform or ground position and pulling both emergency stop buttons out.


Using the Analyzer

With machine power on and analyzer connected properly, the analyzer will display the following:



**HELP:
PRESS ENTER**


At this point, using the RIGHT  and LEFT  arrow keys, you can move between the top level menu items. To


select a displayed menu item, press ENTER . To cancel a

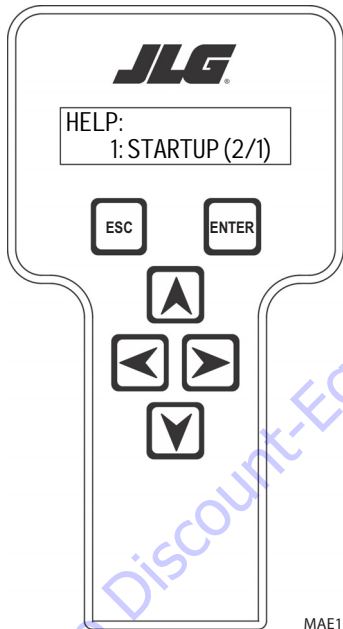
selected menu item, press Escape ; then you will be able to scroll using the right and left arrow keys to select a different menu item.

The top level menus are as follows:

- HELP
- DIAGNOSTICS
- ACTIVATE TEST
- ACCESS LEVEL
- PERSONALITIES
- MACHINE SETUP
- CALIBRATIONS (SERVICE ACCESS ONLY)

If you press **ENTER**  at the **HELP: PRESS ENTER** display, and a fault is present, the analyzer display will scroll the fault across the screen. If there was no fault detected, the display will read: **HELP: EVERYTHING OK**. If powered up at the ground station, the display will read: **GROUND OK**.

If **ENTER**  is pressed again, the display moves to the following display:



MAE19060


LOGGED HELP
1: STARTUP (2/1)

At this point, the analyzer will display the last fault the system has seen, if any are present. You may scroll through the fault logs to view what the last 25 faults were. Use the right and left arrow keys to scroll through the fault logs. To return to the

beginning, press **ESCAPE**  two times. **STARTUP (2/1)** indicates a power up.

When a top level menu is selected, a new set of menu items may be offered: for example:

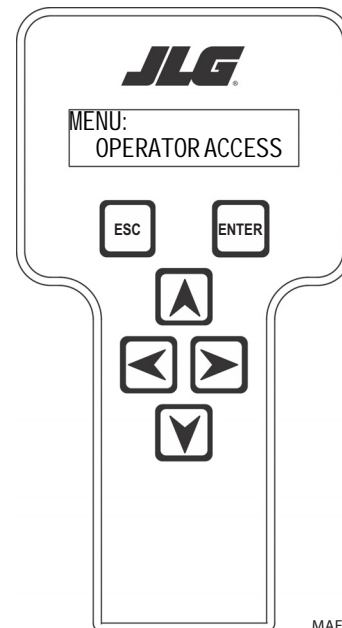
- DRIVE
- BOOM
- SYSTEM
- DATALOG
- VERSIONS

Pressing **ENTER**  with any of the above displayed menus, will display additional sub-menus within the selected menu. In some cases, such as **DRIVE**, the next level is the parameter or information to be changed. Refer to the flow chart for what menus are available within the top level menus. You may only view personality settings for selected menus while in access level 2. Remember, you may always cancel a selected menu

item by pressing the **ESCAPE**  key.


Changing the Access Level of the Hand Held Analyzer

When the analyzer is first connected, you will be in Operator Access which enables you to only view most settings which cannot be changed until you enter a password to advance to a lower level. This ensures a setting cannot be accidentally altered. To change the access level, the correct password must be entered. To enter password, scroll to the **ACCESS LEVEL** menu. For example:




MAE19060


ACCESS LEVEL:
CODE 00000

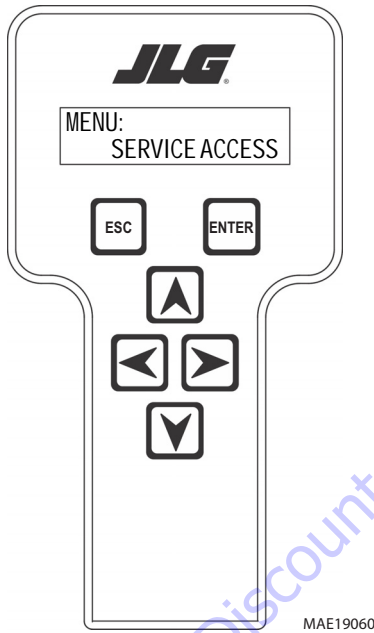
Press **ENTER**  to select the **ACCESS LEVEL** menu.

Using the **UP**  or **DOWN**  arrow keys, enter first digit of the password, 3.

Then using the **RIGHT**  arrow key, position the cursor to the right one space to enter the second digit of the password.

Use the **UP**  or **DOWN**  arrow key to enter the second digit of the password which is 33271.



Once the correct password is displayed, press **ENTER** . The access level should display the following, if password was correctly entered:

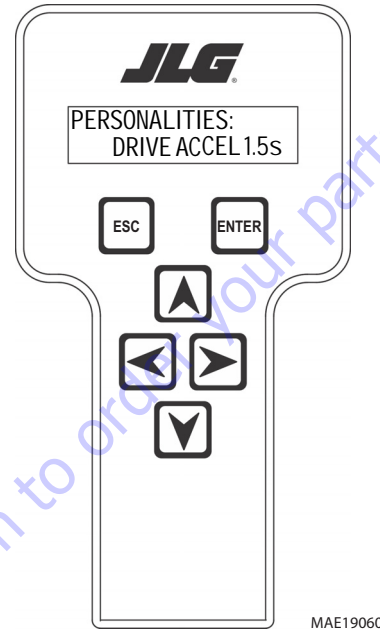


**MENU:
SERVICE ACCESS**

Repeat above steps if correct access level is not displayed or you can not adjust personality settings.


Adjusting Parameters Using Hand Held Analyzer


Once you have gained access to level 1, and a personality item is selected, press the **UP**  or **DOWN**  arrow keys to adjust its value, for example:





**DRIVE:
ACCEL 1.5s**

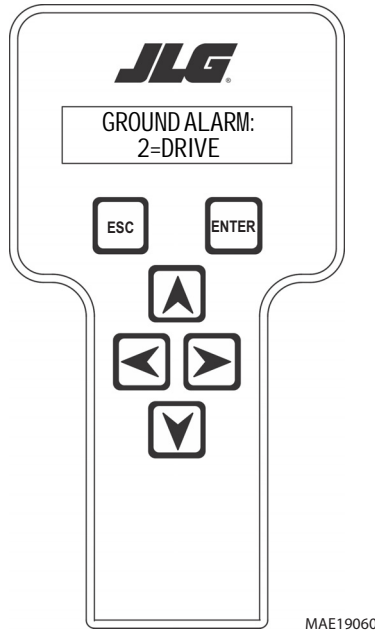
There will be a minimum and maximum for the value to ensure efficient operation. The Value will not increase if the **UP**

 arrow is pressed when at the maximum value nor will

the value decrease if the **DOWN**  arrow is pressed and the value is at the minimum value for any particular personality. If value does not change when pressing up and down arrows, check access level to ensure you are at access level 1.

Machine Setup

When a machine digit item is selected, press **UP**  or **DOWN**  arrow keys to adjust its value, for example:



GROUND ALARM: 2 = DRIVE

The effect of the machine digit value is displayed along with its value. The above display would be selected if the machine was equipped with a ground alarm and you wanted it to sound when driving. There are certain settings allowed to install optional features or select the machine model.

When selecting machine model to match size of the machine, personality settings will default to factory recommended settings.

NOTE: Refer to *Personality Ranges/Defaults* for recommended factory settings.

NOTE: Password 33271 will give you access to level 1, which will permit you to change all machine personality settings.

There is a setting that JLG strongly recommends that you do not change. This setting is so noted below:

ELEVATION CUTBACK

WARNING

CHANGING THIS SETTING MAY ADVERSELY AFFECT MACHINE PERFORMANCE.

NOTICE

AVOID PRESSURE-WASHING ELECTRICAL/ELECTRONIC COMPONENTS. IF PRESSURE-WASHING IS USED TO WASH AREAS CONTAINING ELECTRICAL/ELECTRONIC COMPONENTS, JLG INDUSTRIES INC. RECOMMENDS A MAXIMUM PRESSURE OF 52 BAR (750 PSI) AT A MINIMUM DISTANCE OF 30.5CM (12 IN) AWAY FROM THESE COMPONENTS. IF ELECTRICAL/ELECTRONIC COMPONENTS ARE SPRAYED, SPRAYING MUST NOT BE DIRECT AND BE FOR BRIEF TIME PERIODS TO AVOID HEAVY SATURATION.

Ground Control Console Display Gauge

(See Figure 6-5., Ground Control Console Display Gauge)

The Display Gauge shows engine hours, fuel level (if applicable), and Diagnostic Trouble Codes (DTCs) from the JLG Control System and engine control system. During machine start up, with no active DTCs in the control system, the splash screen displays for 3 seconds and then switches to the main screen. If there is an active DTC while powering up the machine, the splash screen displays for 3 seconds, then launches the Diagnostics Screen. The indicator lamp will light when there is an active DTC in the Fault Log.



Figure 6-2. Splash Screen

The Diagnostic Screen will show active and inactive faults from the JLG Control System on the screen. An asterisk (*) will be displayed to show active faults.

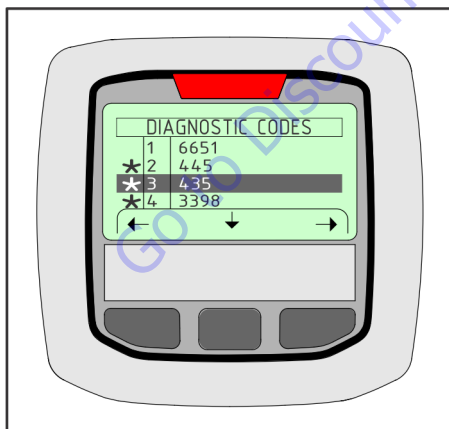


Figure 6-3. Diagnostic Screen

The Engine Diagnostics Screen will show SPN (Suspect Parameter Number), FMI (Failure Mode Identifier), and Occurrence count information. Engine SPN text is not scrollable. If there is more than one engine trouble code, the operator must exit from the Engine DTC Screen to see other SPN and FMI information.

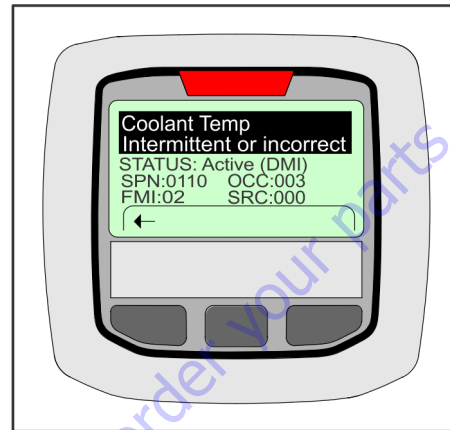


Figure 6-4. Engine Diagnostic Screen

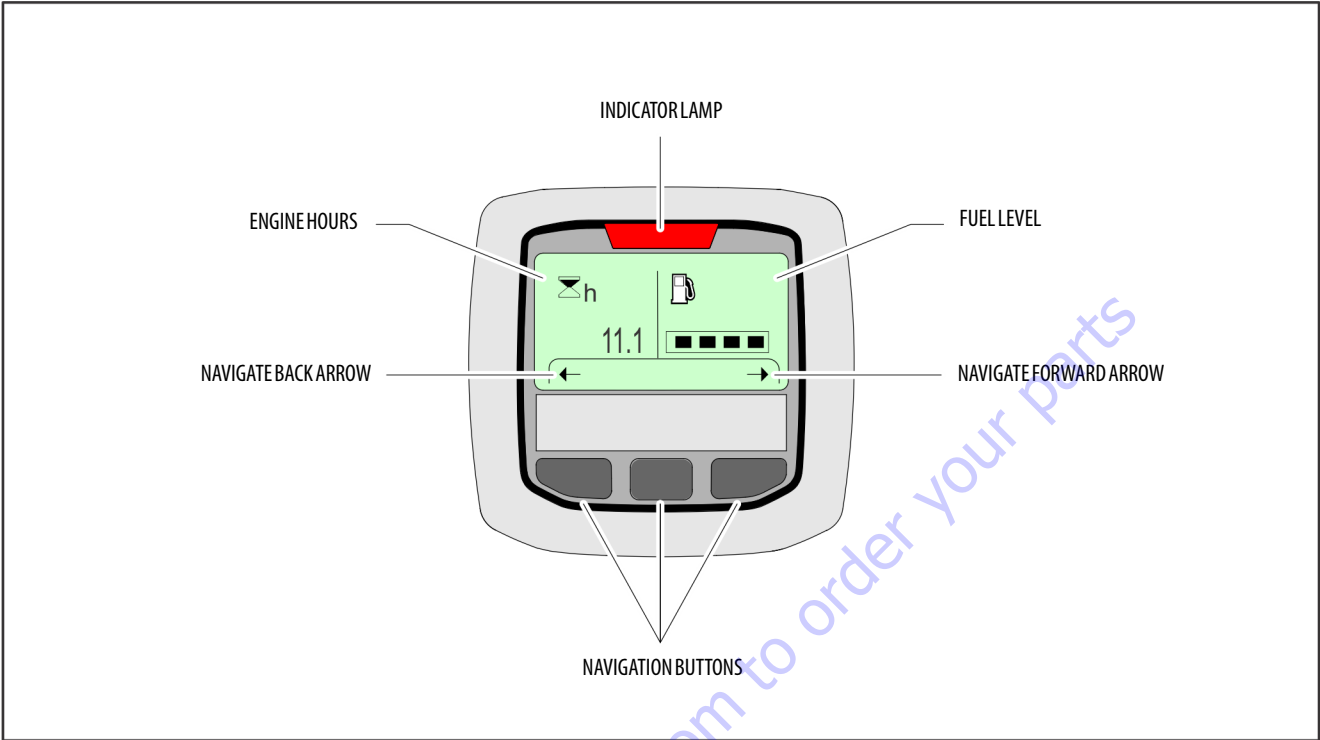


Figure 6-5. Ground Control Console Display Gauge

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SECTION 6 - JLG CONTROL SYSTEM

Table 6-1. Analyzer Abbreviations

ABBREVIATION	MEANING
ACCEL	ACCELERATE
ACT	ACTIVE
A/D	ANALOG DIGITAL CONVERTER COUNT
AMB.	AMBIENT
ANG	ANGLE
AUX	AUXILIARY
BCS	BOOM CONTROL SYSTEM
BM	BOOM LENGTH ANGLE MODULE
BLAM	BOOM LENGTH ANGLE MODULE
BR	BROKEN
BSK	BASKET
CAL	CALIBRATION
CL	CLOSED
CM	CHASSIS MODULE
CNTL	CONTROL
CNTRL	CONTROL
C/O	CUTOUT
CONT(S)	CONTRACTOR(S)
COOR	COORDINATED
CRKPT	CRACK POINT
CRP	CREEP
CUT	CUTOUT
CYL	CYLINDER
DECEL	DECELERATE
D	DOWN
DN	DOWN
DWN	DOWN
DEG.	DEGREE
DOS	DRIVE ORIENTATION SYSTEM
DRV	DRIVE
E	ERROR
E&T	ELEVATED & TILTED
ELEV	ELEVATION
ENG	ENGINE
EXT	EXTEND
F	FRONT
FL	FLOW
FNT	FRONT
FOR	FORWARD
FWD	FORWARD
FSW	FOOT SWITCH
FUNC	FUNCTION
G	GROUND

Table 6-1. Analyzer Abbreviations

ABBREVIATION	MEANING
GND	GROUND
GRN	GREEN
GM	GROUND MODULE
H	HOURS
HW	HARDWARE
HWFS	HARDWARE FAILSAFE
I	IN or CURRENT
JOY	JOYSTICK
L	LEFT
LB	POUND
LEN	LENGTH
LIM	LIMIT
LT	LEFT
LVL	LEVEL
M	MINUTES
MIN	MINIMUM
MAX	MAXIMUM
M	MAIN
MN	MAIN
NO	NORMALLY OPEN or NO
NC	NORMALLY CLOSED
O	OUT
O/C	OPEN CIRCUIT
OP	OPEN
O/R	OVERRIDE or OUTRIGGER
O//R	OVERRIDE
OSC	OSCILLATING
OVRD	OVERRIDE
P	PLATFORM
P	PRESSURE
PCV	PROPORTIONAL CONTROL VALVE
PLAT	PLATFORM
PLT	PLATFORM
PM	PLATFORM MODULE
POT	POTENTIOMETER
PRES	PRESSURE
PRS	PRESSURE
PT	POINT
R	REAR or RIGHT
REV	REVERSE or REVISION
RET	RETRACT
ROT.	ROTATE
RT	RIGHT

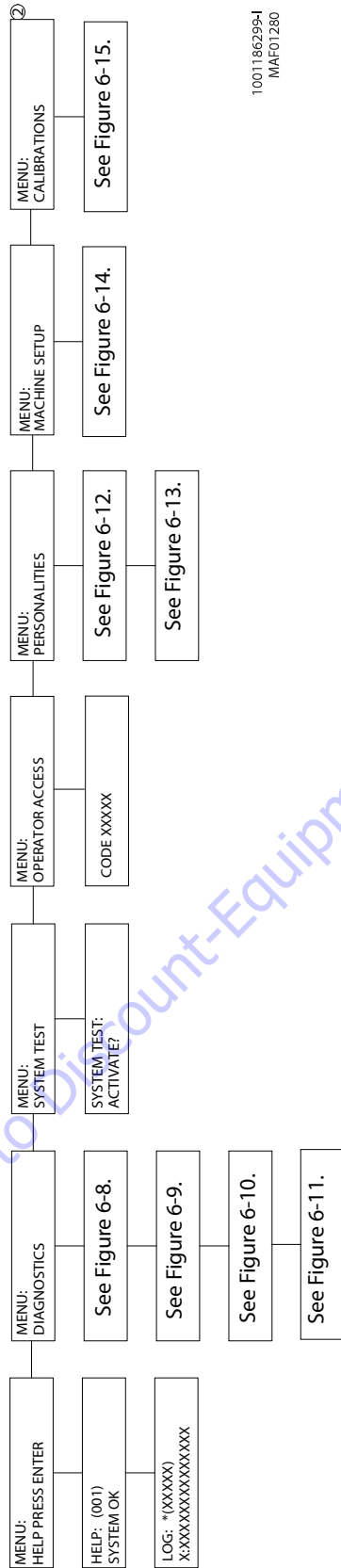
Table 6-1. Analyzer Abbreviations

ABBREVIATION	MEANING
S/C	SHORT CIRCUIT
SEL	SELECTOR
SN	SERIAL NUMBER
SPD	SPEED
STOW	STOWED
STOWD	STOWED
SW	SWITCH or SOFTWARE
TELE	TELESCOPE
TEMP	TEMPERATURE
TORQ.	TORQUE
TRN	TRANSPORT
T/T	TURNTABLE
T	TOWER
TURNTBL	TURNTABLE
TWR	TOWER
U	UPPER or UP
V	VOLT
VER	VERSION
VLV	VALVE
WIT	WITNESS
YEL	YELLOW

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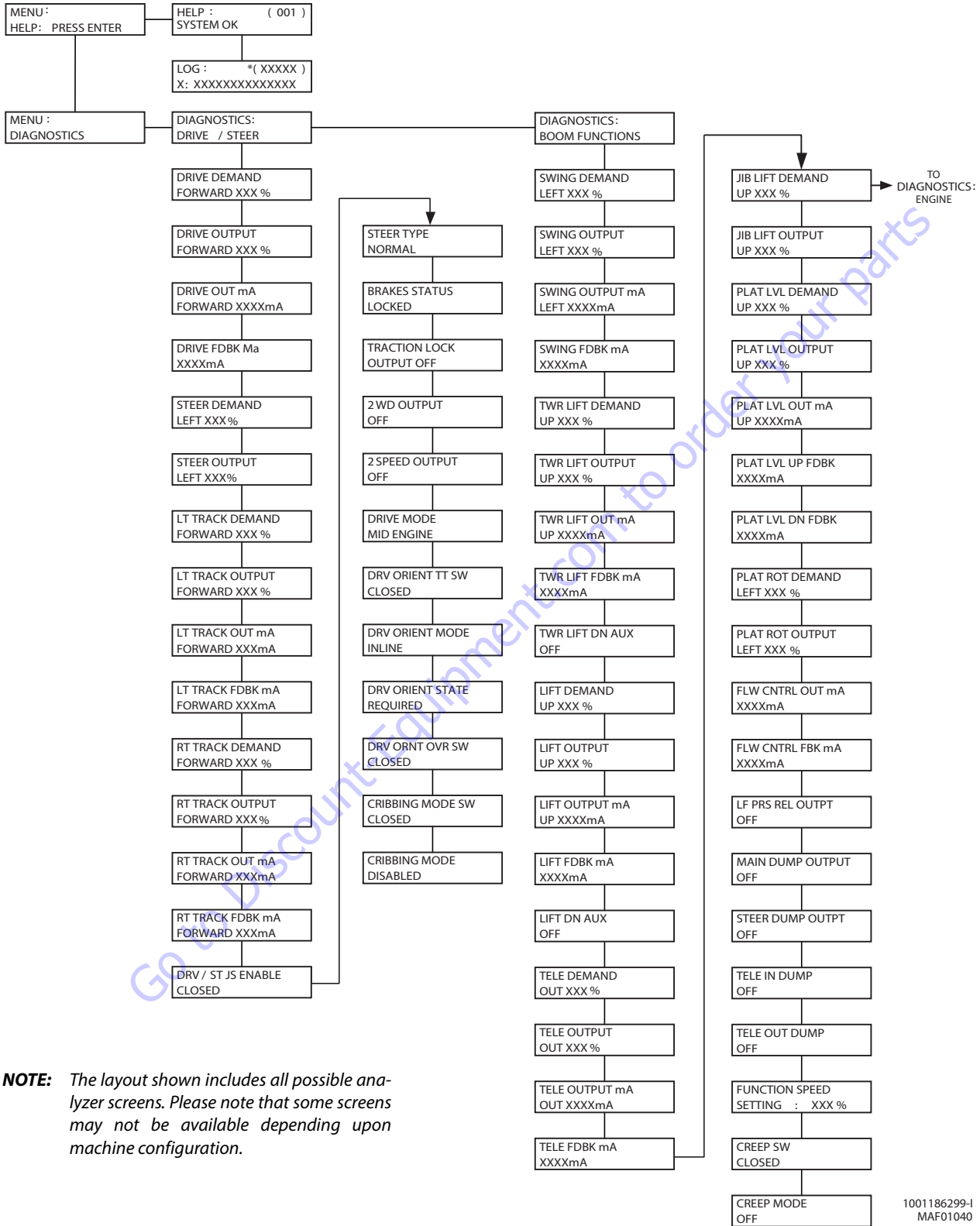
Figure 6-6. Analyzer Connecting Points



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

Figure 6-7. Analyzer Flow Chart (Software Version P2.10)

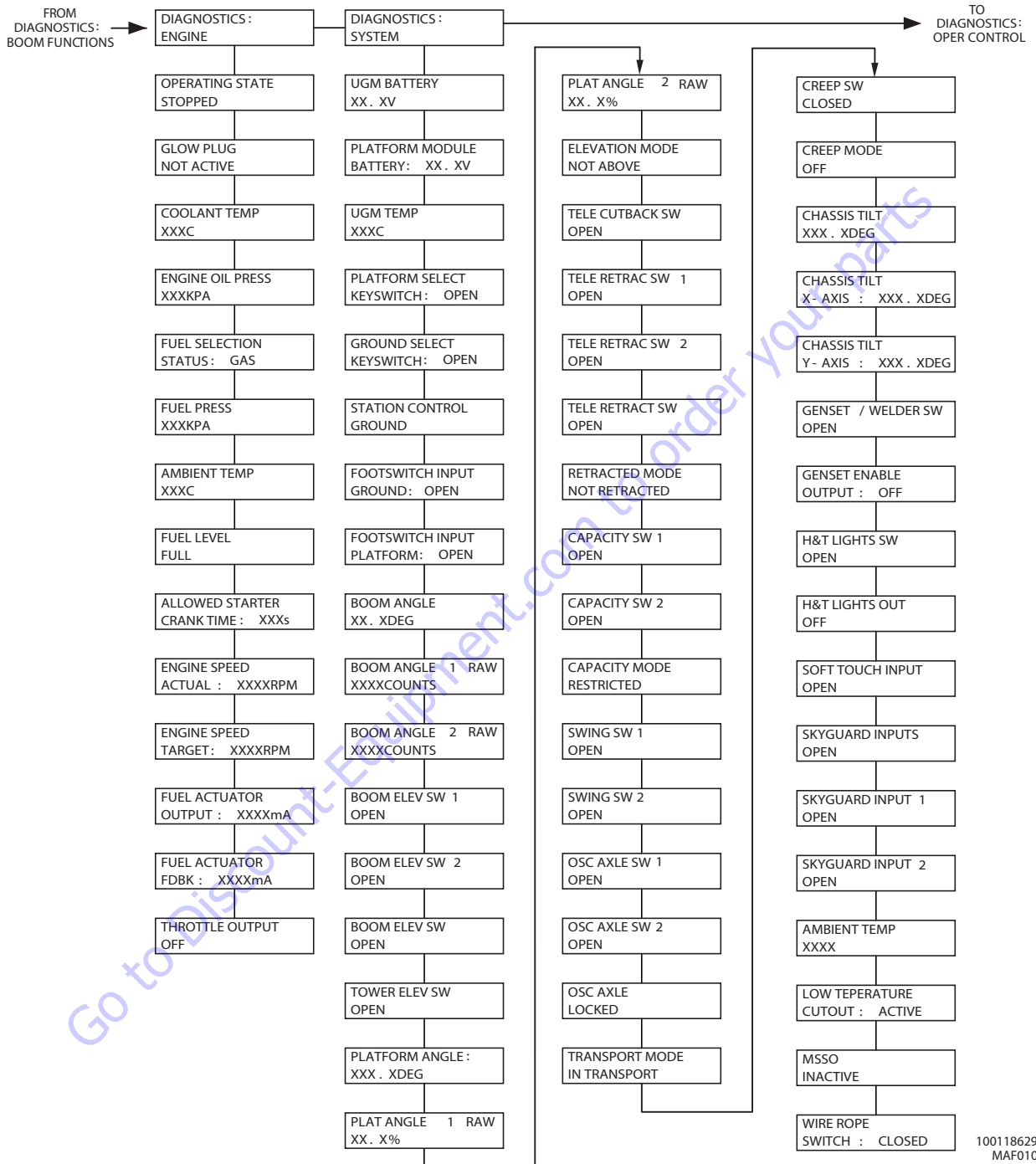
SECTION 6 - JLG CONTROL SYSTEM



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

Figure 6-8. Analyzer Flow Chart - Diagnostics (Software Version P2.10) - Sheet 1 of 4

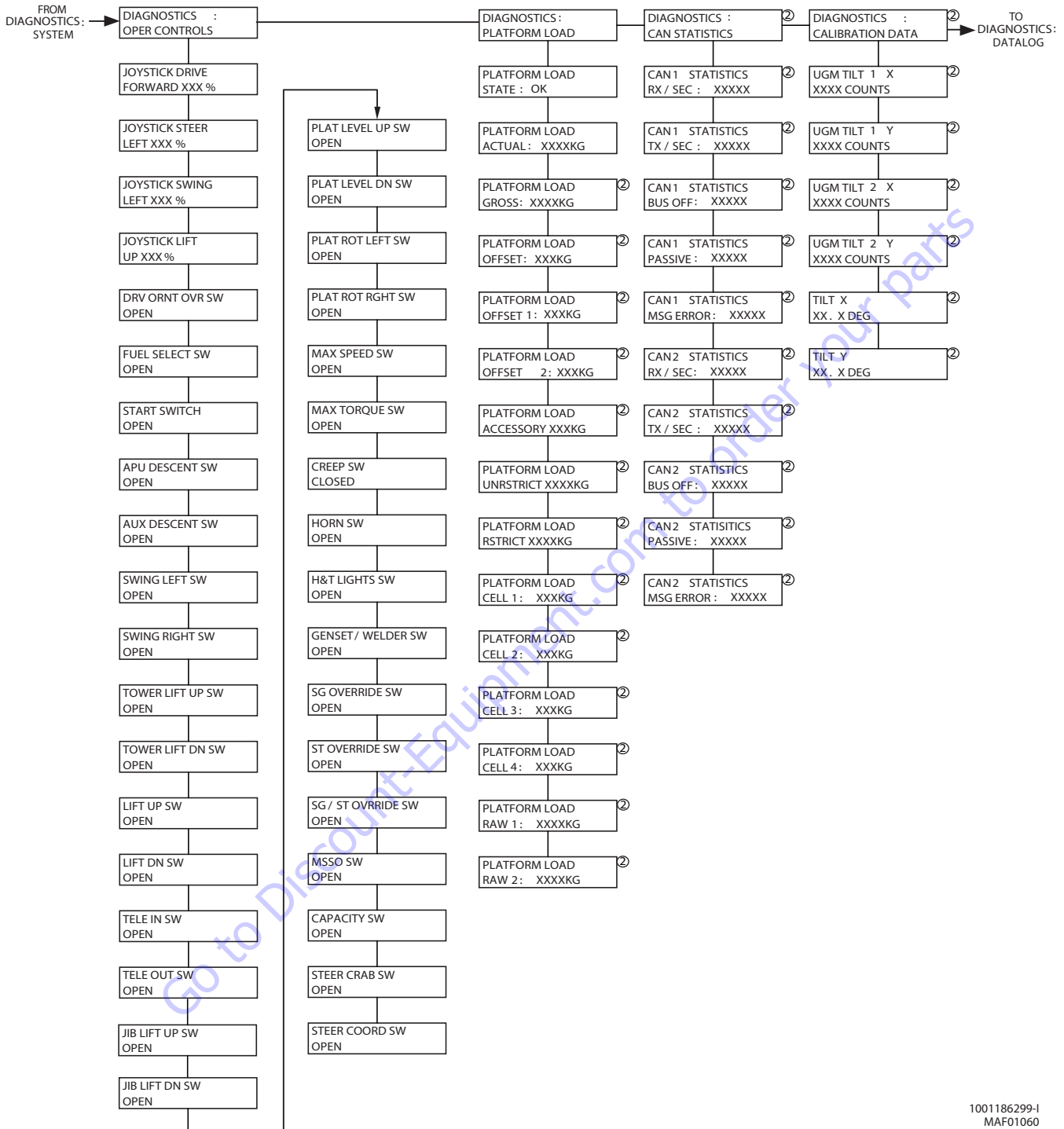
1001186299-1
MAF01040



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

Figure 6-9. Analyzer Flow Chart - Diagnostics (Software Version P2.10) - Sheet 2 of 4

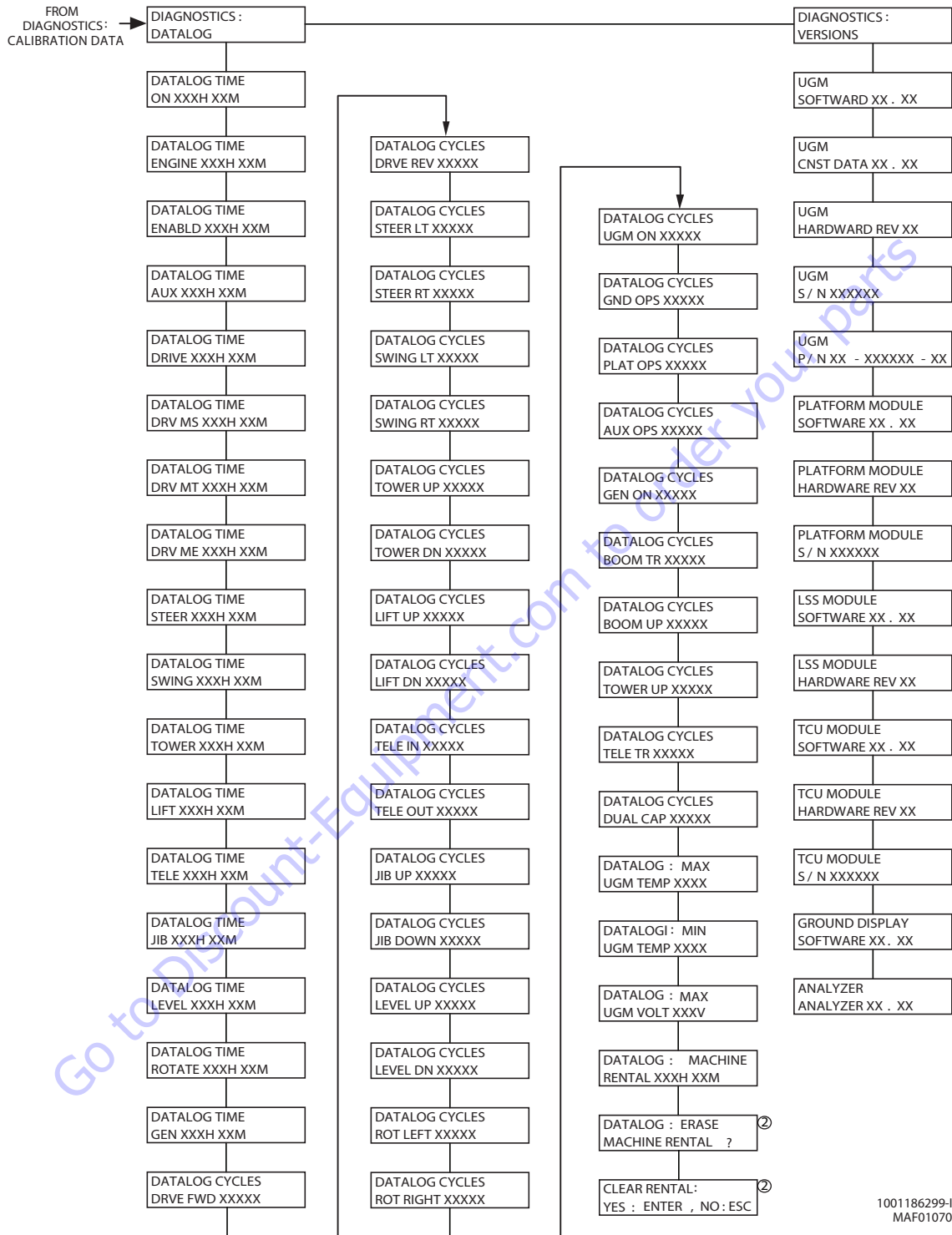
SECTION 6 - JLG CONTROL SYSTEM



1001186299-I
MAF01060

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

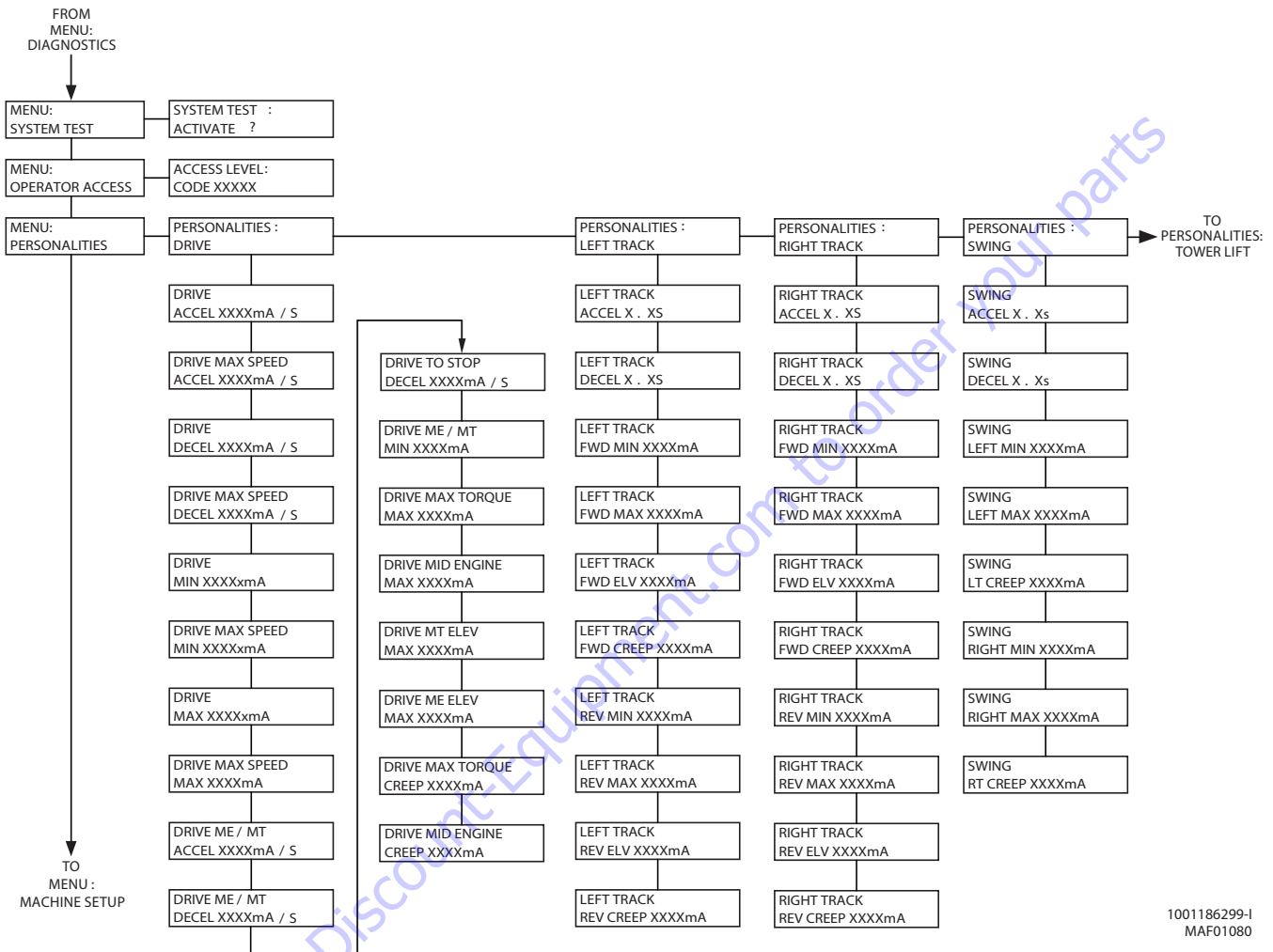
Figure 6-10. Analyzer Flow Chart - Diagnostics (Software Version P2.10) - Sheet 3 of 4



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

Figure 6-11. Analyzer Flow Chart - Diagnostics (Software Version P2.10) - Sheet 4 of 4

SECTION 6 - JLG CONTROL SYSTEM



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

Figure 6-12. Analyzer Flow Chart - Personalities (Software Version P2.10) - Sheet 1 of 2

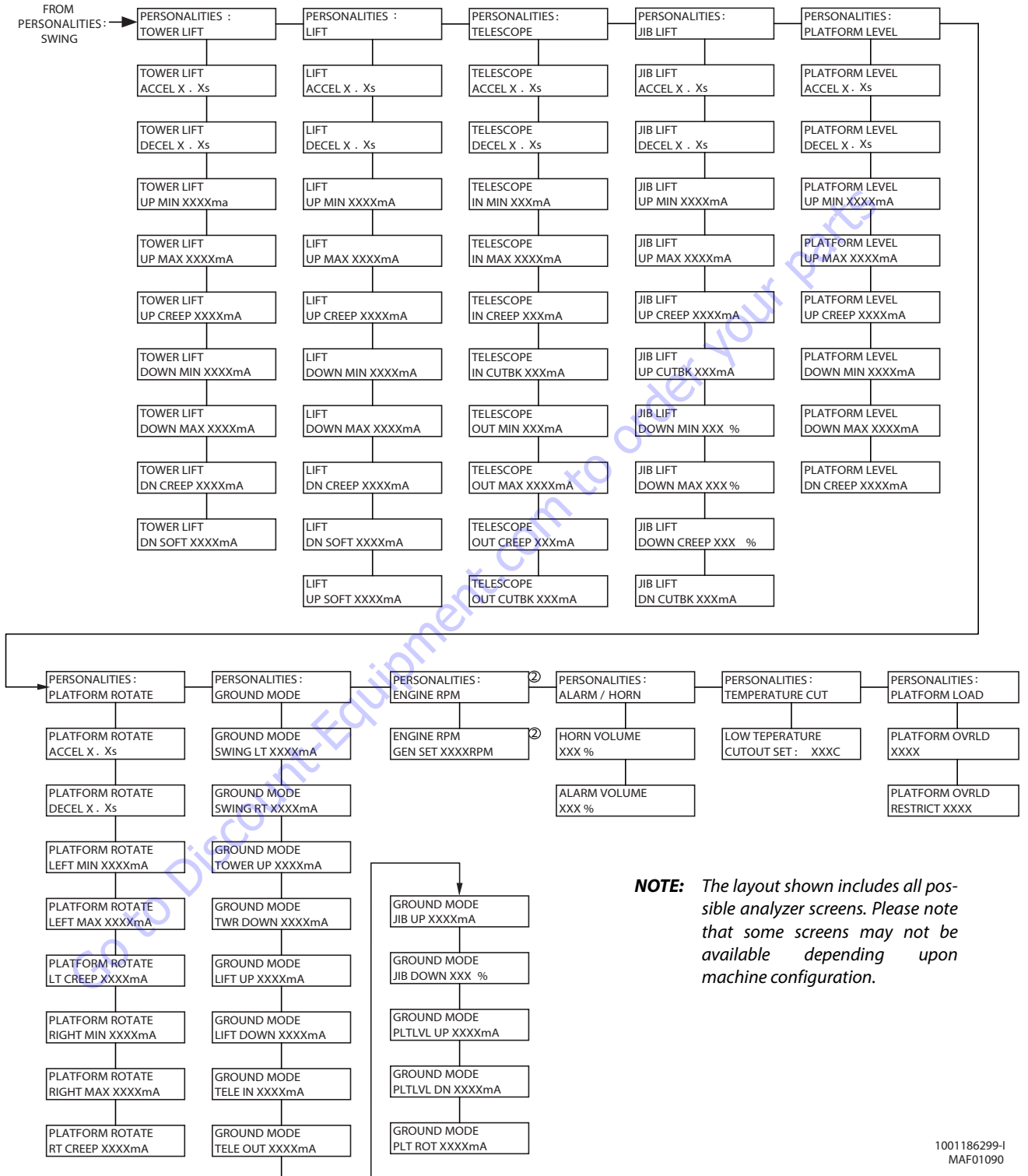
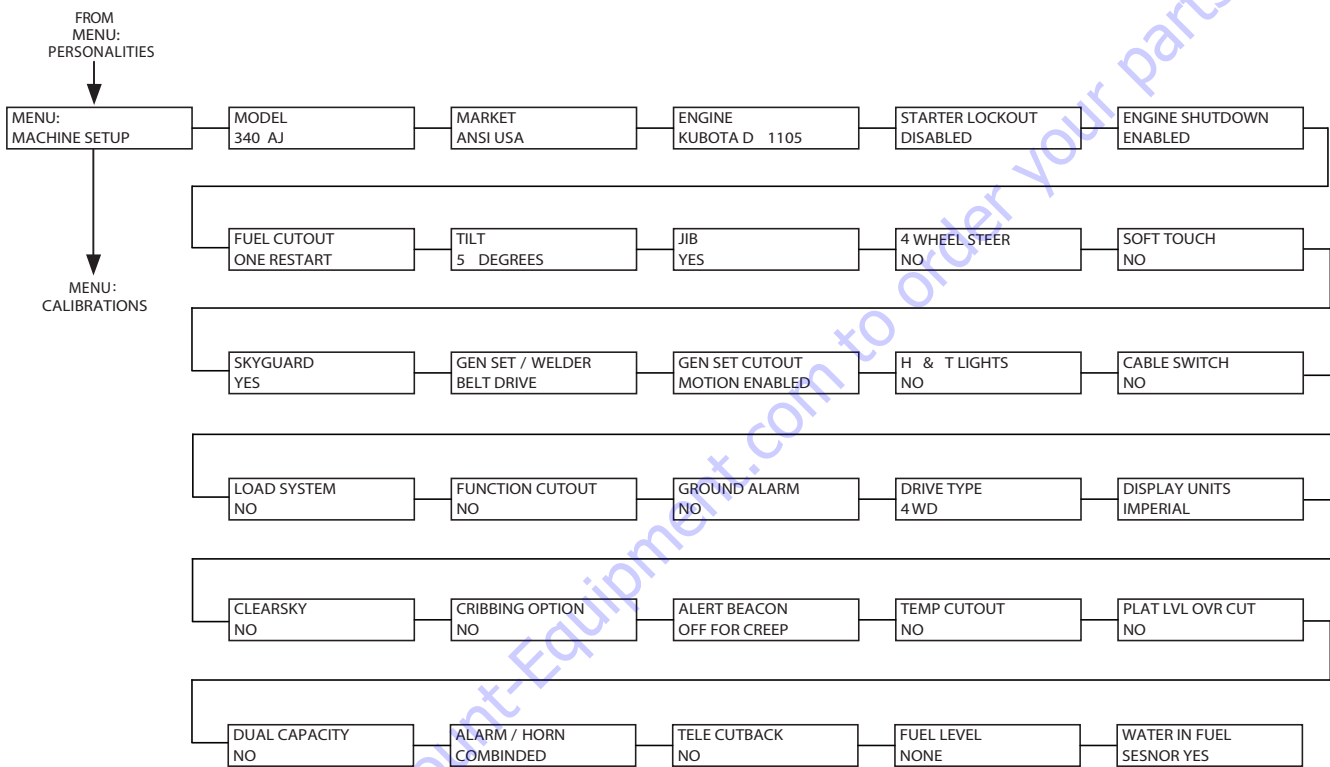


Figure 6-13. Analyzer Flow Chart - Personalities (Software Version P2.10) - Sheet 2 of 2

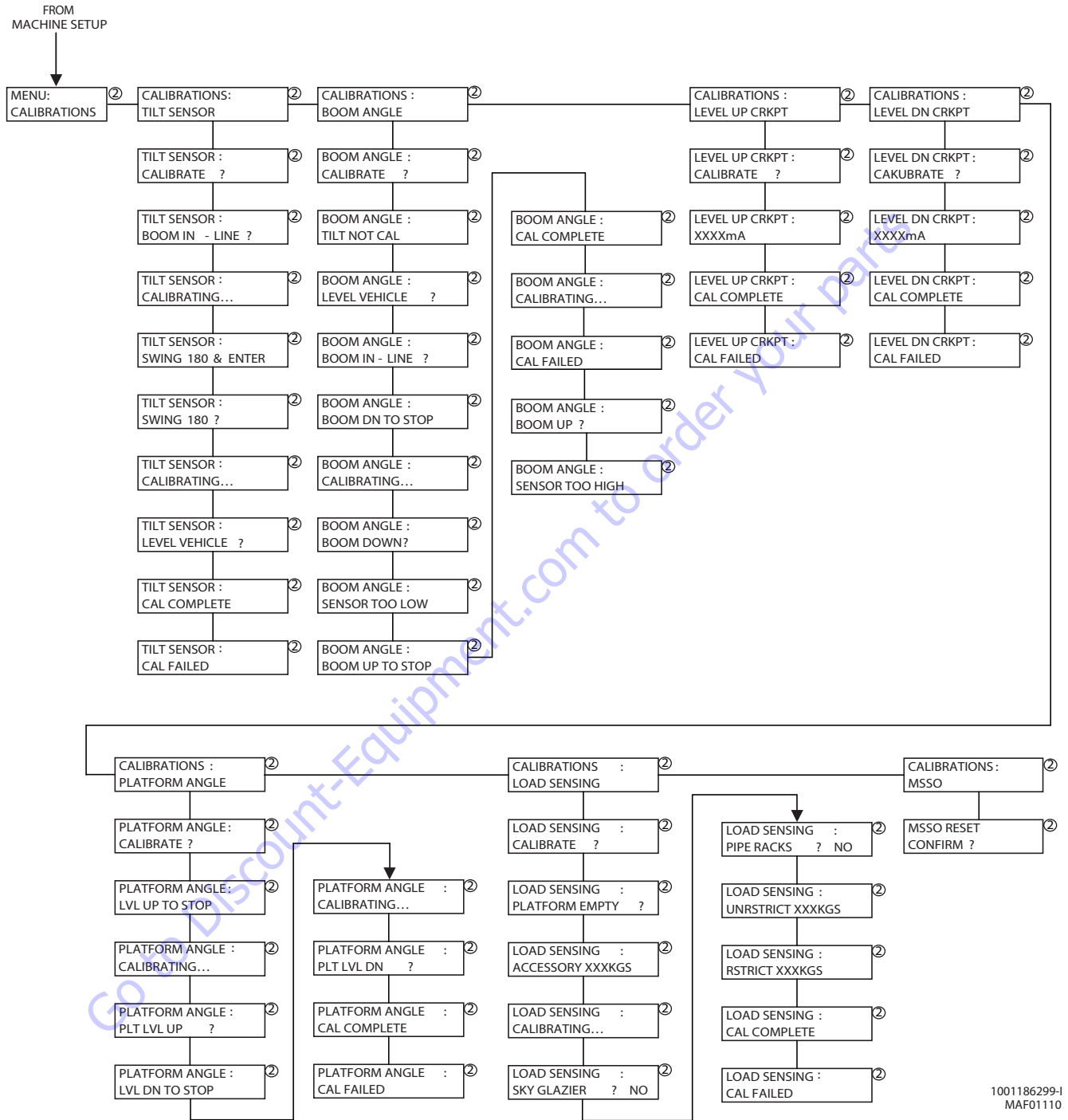
SECTION 6 - JLG CONTROL SYSTEM



1001186299-I
MAF01100

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

Figure 6-14. Analyzer Flow Chart - Machine setup (Software Version P2.10)



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

Figure 6-15. Analyzer Flow Chart - Calibrations (Software Version P2.10)

SECTION 6 - JLG CONTROL SYSTEM

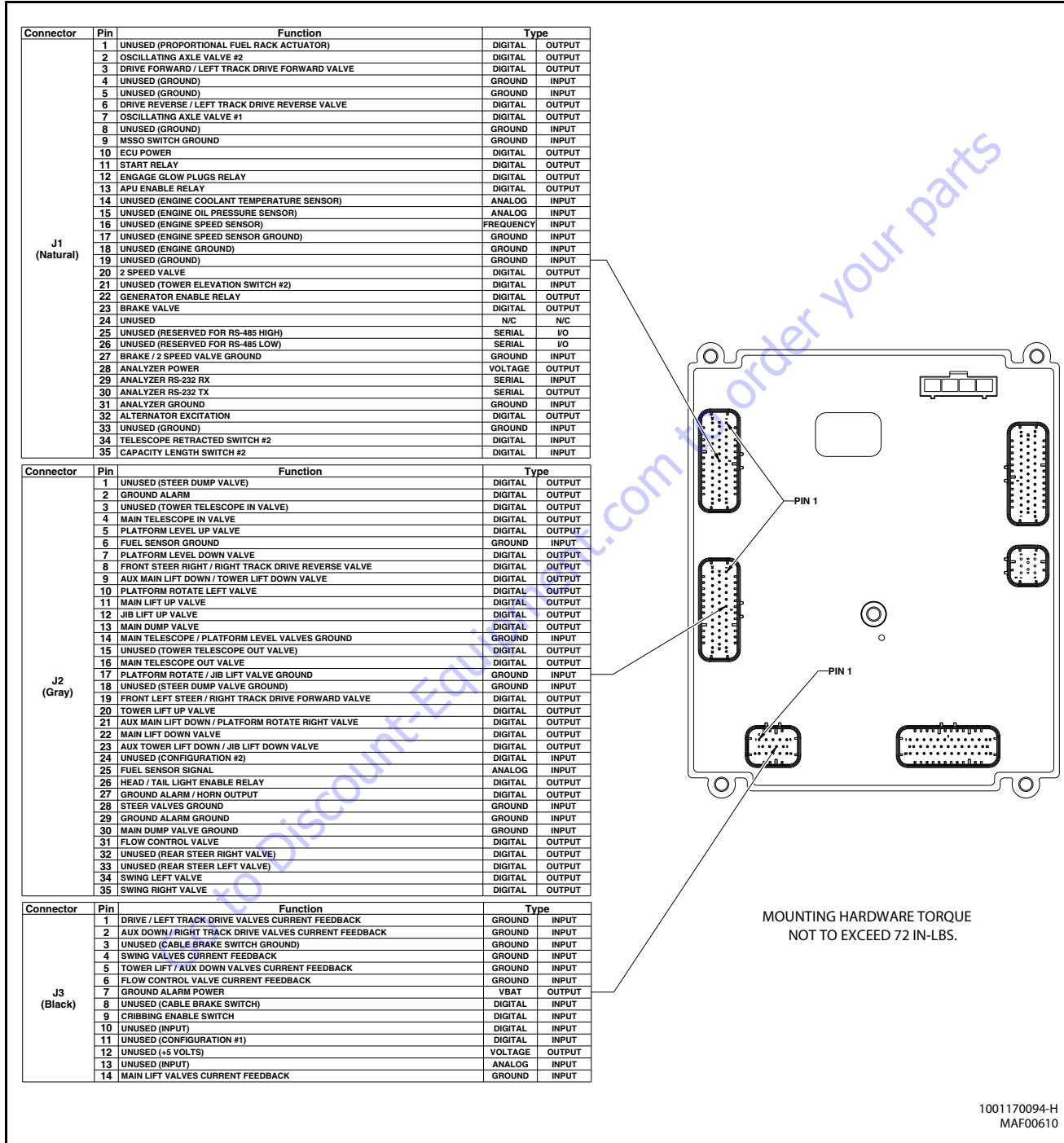
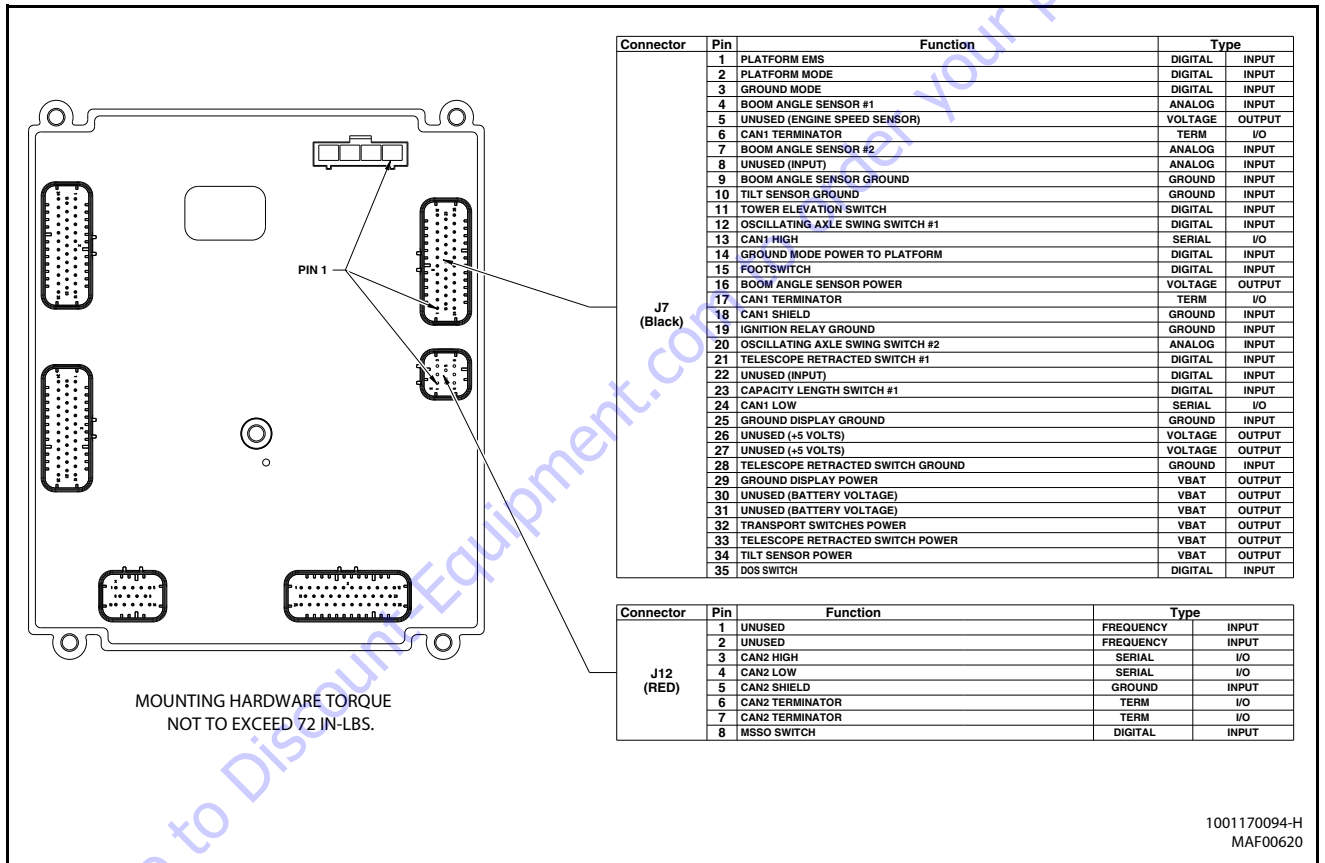


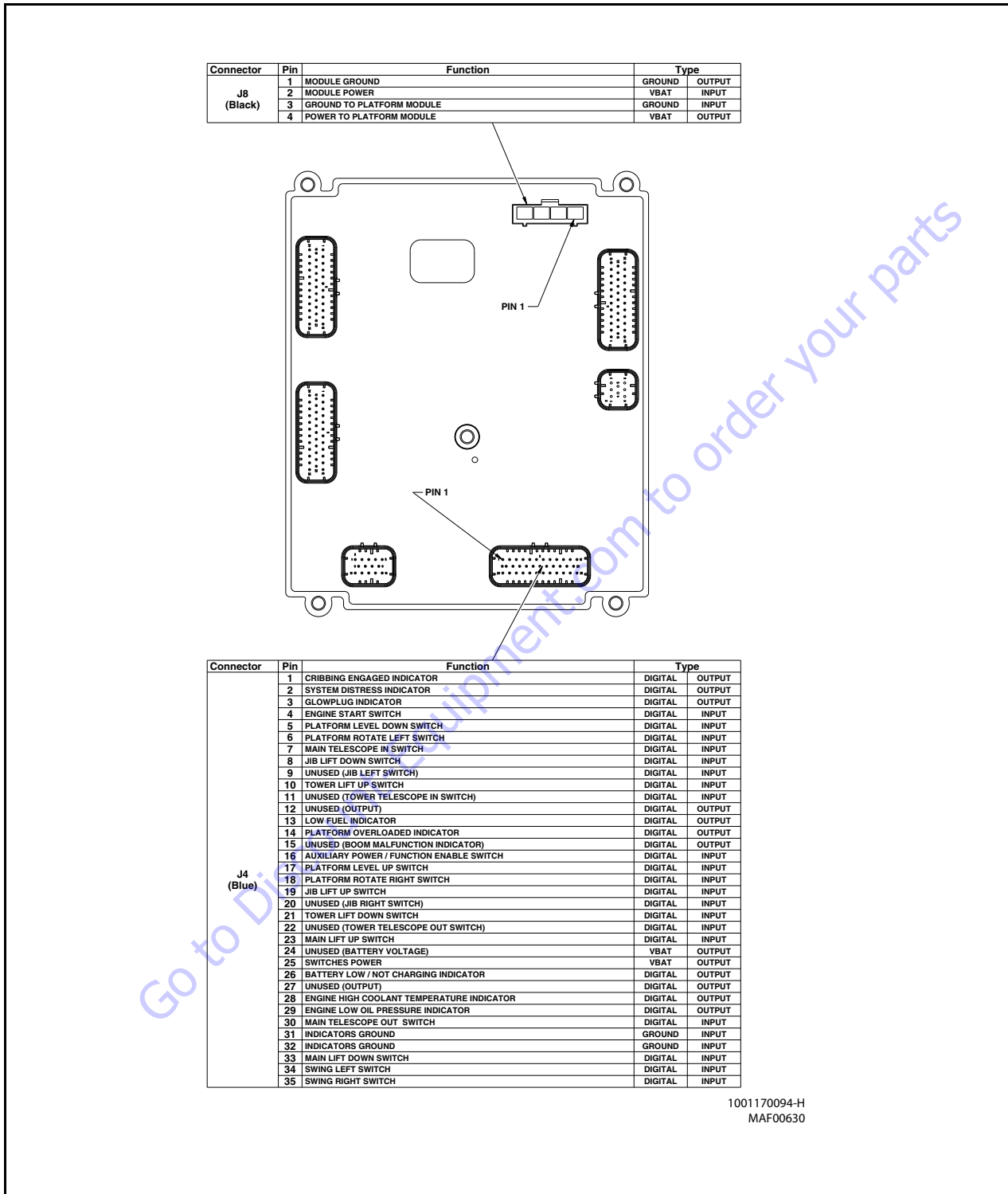
Figure 6-16. Ground Control Module - Sheet 1 of 3



1001170094-H
MAF00620

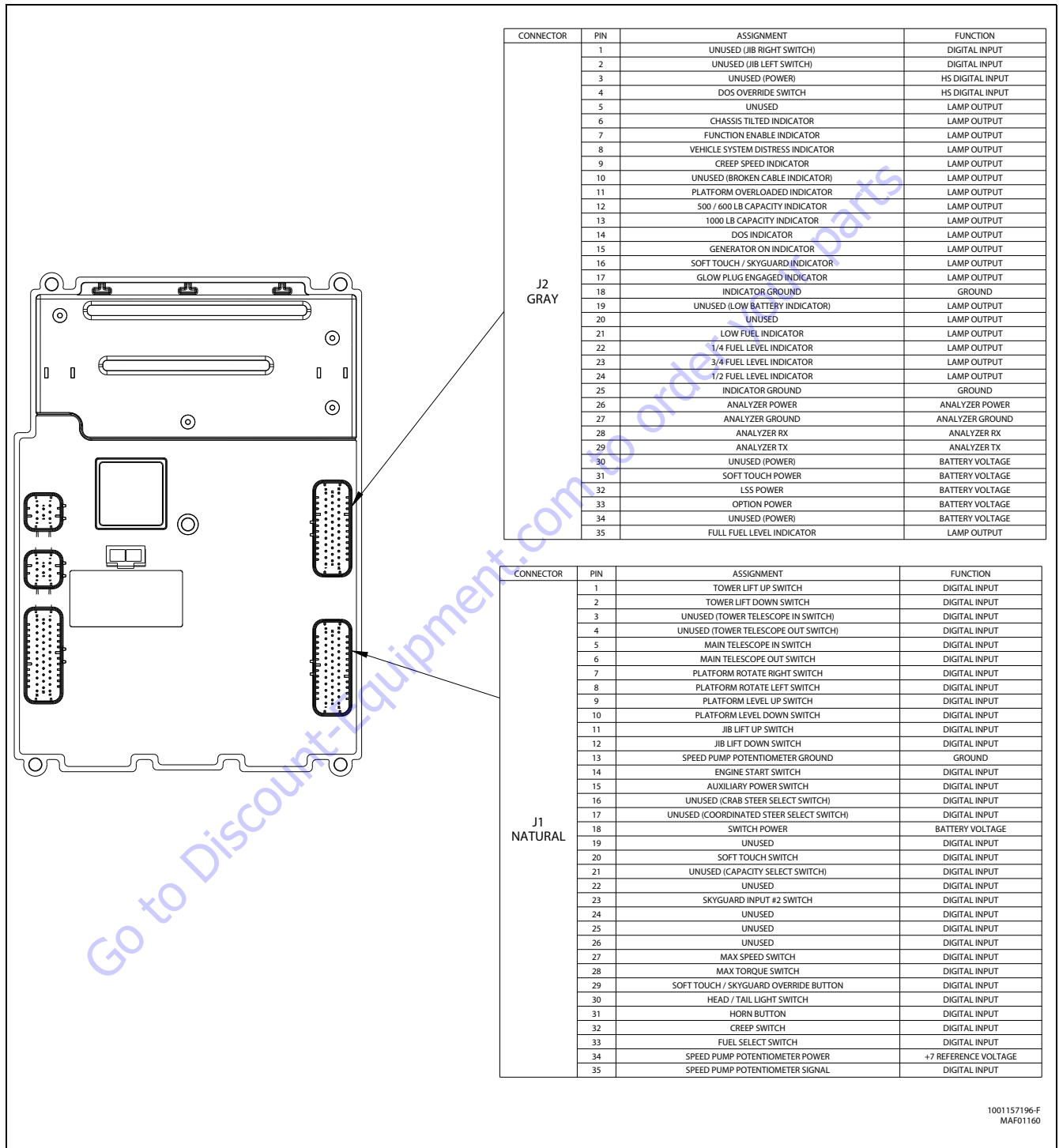
Figure 6-17. Ground Control Module - Sheet 2 of 3

SECTION 6 - JLG CONTROL SYSTEM



1001170094-H
MAF00630

Figure 6-18. Ground Control Module - Sheet 3 of 3



1001157196-F
MAF01160

Figure 6-19. Platform Module - Sheet 1 of 2

SECTION 6 - JLG CONTROL SYSTEM

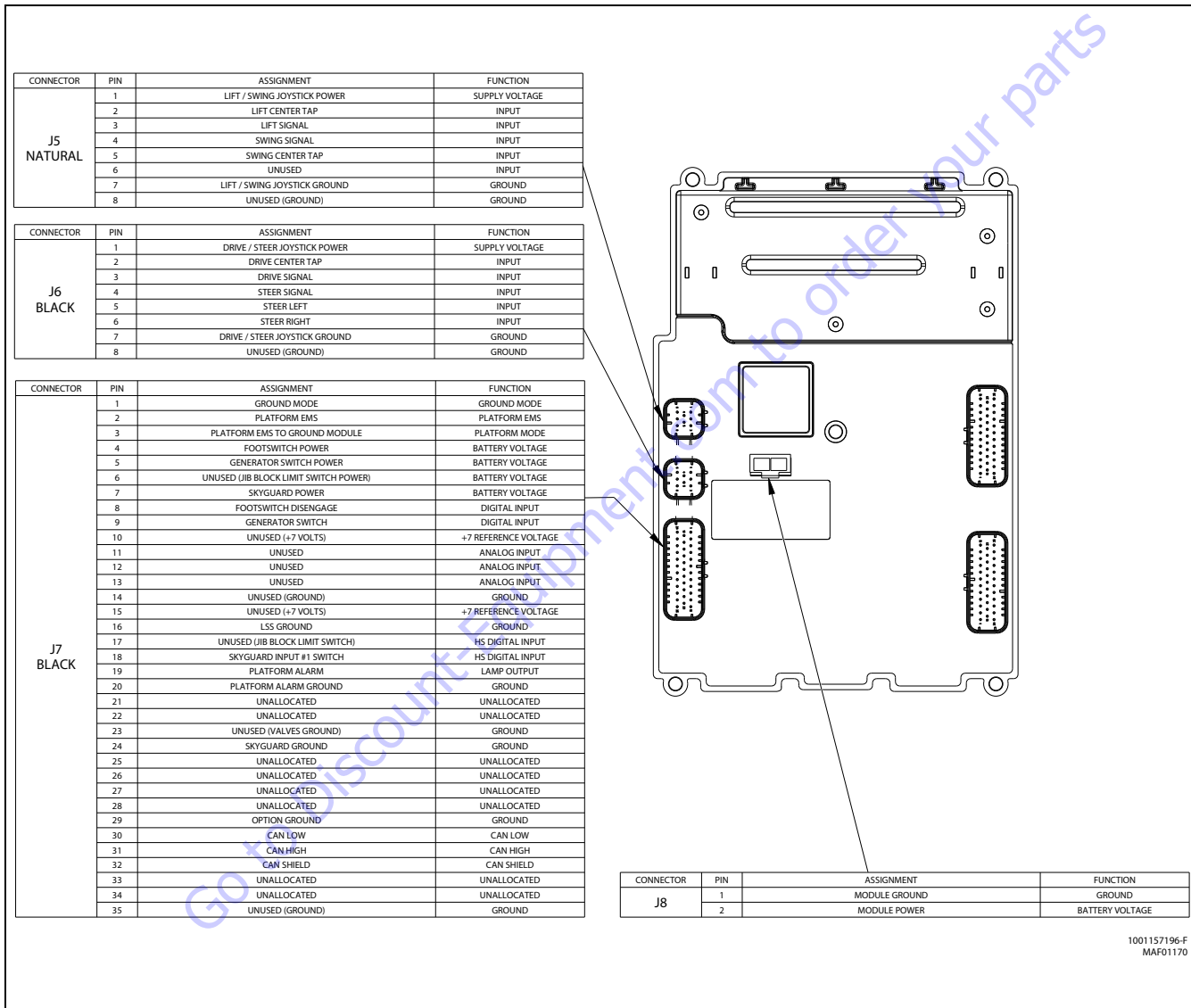


Figure 6-20. Platform Module - Sheet 2 of 2

Table 6-2. Machine Configuration Programming Information (Software Version P2.10)

Configuration Label/Digit	Number	Description	Default Number
MODEL NUMBER: 1	0	????: Visible only on a Non-Configured UGM.	2
	1	400S	
	2	400SC	
	3	450AJ	
MARKET: 2	1	ANSI USA	1
	2	ANSI EXPORT	
	3	CSA	
	4	CE	
	5	AUSTRALIA	
	6	JAPAN	
	7	GB	
* Certain model selections will limit market options.			
ENGINE: 3*	1	KUBOTA D110S	4
	2	GM DUAL FUEL: GM/PS10.97L Dual Fuel (Tier 3)	
	3	KUBOTA DUAL FUEL	
	4	DEUTZ EMR2: (Tier 4i)	
	5	DEUTZ EMR4: (Tier 4f)	
* Only visible under certain model selections. * Certain model selections will limit engine options. * Certain market selections will limit engine options.			
FLYWHEEL TEETH: 4*	1	98 TEETH: 98 flywheel teeth.	1
* This menu item is not visible.			
GLOW PLUG: 5*	1	NO GLOW PLUGS: No glow plugs installed.	2
	2	IN-CYLINDER: Glow plugs installed in each cylinder.	
* This menu item is not visible.			

SECTION 6 - JLG CONTROL SYSTEM

Configuration Label/Digit	Number	Description	Default Number
STARTER LOCKOUT: 6*	1	DISABLED: Automatic pre-glow time determined by ambient air temperature; engine start can be attempted at any time during pre-glow.	1
	2	ENABLED: Automatic pre-glow time determined by ambient air temperature; engine start is NOT permitted until pre-glow is finished.	
*Only visible for Engine Selection = Kubota D1105, Deutz EMR2 or Deutz EMR4.			
ENGINE SHUTDOWN: 7	1	DISABLED: No engine shutdown.	2
	2	ENABLED: Shutdown engine for high coolant temperature fault or low oil pressure fault.	
FUEL CUTOUT: 8*	1	ONE RESTART: One restart with limited run time when near Empty.	4
	2	ENGINE STOP: No starting permitted when near Empty.	
	3	NONE	
	4	RESTART: Restarts allowed with limited run time when near Empty.	
*Only visible for Engine Selection = Kubota D1105, Deutz EMR2 or Deutz EMR4.			
*Only visible if Fuel Level Menu selection is not NONE.			

Configuration Label/Digit	Number	Description	Default Number
TILT: 9*	1	5 DEGREES: Reduces the maximum speed of all boom functions to creep when tilted more than 5 degrees and above elevation; also reduces drive speed to creep.	9
	2	4.5 DEGREES: Reduces the maximum speed of all boom functions to creep when tilted more than 4.5 degrees and above elevation; also reduces drive speed to creep.	
	3	4 DEGREES: Reduces the maximum speed of all boom functions to creep when tilted more than 4 degrees and above elevation; also reduces drive speed to creep.	
	4	3 DEGREES: Reduces the maximum speed of all boom functions to creep when tilted more than 3 degrees and above elevation; also reduces drive speed to creep.	
	5	5 DEG + CUT: Reduces the maximum speed of all boom functions to creep when tilted more than 5 degrees and above elevation; also disallows tower lift up, drive, telescope out and lift up.	
	6	4.5 DEG + CUT: Reduces the maximum speed of all boom functions to creep when tilted more than 4.5 degrees and above elevation; also disallows tower lift up, drive, telescope out and lift up.	
	7	4 DEG + CUT: Reduces the maximum speed of all boom functions to creep when tilted more than 4 degrees and above elevation; also disallows tower lift up, drive, telescope out and lift up.	
	8	3 DEG + CUT: Reduces the maximum speed of all boom functions to creep when tilted more than 3 degrees and above elevation; also disallows tower lift up, drive, telescope out and lift up.	
	9	5 DEG + DRV CUT: Reduces the maximum speed of all boom functions to creep when tilted more than 5 degrees and above elevation; also reduces drive speed to creep when drive reversal is allowed, drive is disallowed otherwise.	
	10	4.5 DEG + DRV CT: Reduces the maximum speed of all boom functions to creep when tilted more than 4.5 degrees and above elevation; also reduces drive speed to creep when drive reversal is allowed, drive is disallowed otherwise.	
	11	4 DEG + DRV CUT: Reduces the maximum speed of all boom functions to creep when tilted more than 4 degrees and above elevation; also reduces drive speed to creep when drive reversal is allowed, drive is disallowed otherwise.	
	12	3 DEG + DRV CUT: Reduces the maximum speed of all boom functions to creep when tilted more than 3 degrees and above elevation; also reduces drive speed to creep when drive reversal is allowed, drive is disallowed otherwise.	
<p>* Certain market selections will limit tilt options and alter default setting. * Drive Reversal feature of X DEG + DRV CUT does not apply to crawlers. Note: Any of the selections above will light the tilt lamp when a tilted condition occurs and will sound the platform alarm when the machine is also above elevation.</p>			
JIB: 10*	1	NO: No jib installed.	2
	2	YES: Jib installed, which has up and down movements only.	
<p>* Certain model selections will limit visibility.</p>			
SOFT TOUCH: 11	1	NO: No Soft Touch system installed.	1
	2	YES: Soft Touch system installed.	

SECTION 6 - JLG CONTROL SYSTEM

Configuration Label/Digit	Number	Description	Default Number
SKYGUARD: 12	1	NO: No SkyGuard system installed.	2
	2	YES: SkyGuard system installed.	
GEN SET/WELDER: 13	1	NO: No generator installed.	1
	2	BELT DRIVE: Belt driven setup.	
GEN SET CUTOUT: 14*	1	MOTION ENABLED: Motion enabled when generator is ON.	1
	2	MOTION CUTOUT: Motion cutout in platform mode only.	
* Only visible if Gen Set / Welder Menu selection is not NO.			
H & T LIGHTS: 15*	1	NO: No head and tail lights installed.	1
	2	YES: Head and tail lights installed.	
* Only visible under certain model selections.			
LOAD SYSTEM: 16*	1	NO: No load sensor installed.	1
	2	WARN ONLY: Functions in creep, overload lamp lit, platform alarm beeps (5 sec ON, 2 sec OFF).	
	3	CUTOUT PLATFORM: All functions cutout, overload lamp lit, platform alarm beeps (5 sec ON, 2 sec OFF).	
	4	CUTOUT ALL: All functions cutout, flash overload light (500mS on, 500mS off), platform alarm beeps (5 sec ON, 2 sec OFF).	
	5	SPECIAL 1: Functions in creep, overload lamp lit, disables telescope out & lift up, platform alarm beeps (5 sec ON, 2 sec OFF).	
* Only visible under certain market selections.			
* Certain market selections will limit load system options or alter default setting.			
FUNCTION CUTOUT: 17*	1	NO: No drive cutout.	1
	2	BOOM CUTOUT: Boom function cutout while driving above elevation.	
	3	DRIVE CUTOUT: Drive & steer cutout above elevation.	
	4	DRIVE CUT E&T: Drive & steer cutout above elevation and tilted.	
* Only visible under certain market selections.			
* Certain market selections will limit function cutout options or alter default setting.			
GROUND ALARM: 18	1	NO: No ground alarm installed.	4
	2	DRIVE: Travel alarm sounds when the drive function is active.	
	3	DESCENT: Descent alarm sounds when lift down is active.	
	4	MOTION: Motion alarm sounds when any function is active.	

Configuration Label/Digit	Number	Description	Default Number
DRIVE TYPE: 19*	1	4WD: 4 wheel drive.	1
	2	2WD: 2 wheel drive.	
* Only visible under certain model selections.			
DISPLAY UNITS: 20*	1	METRIC: Celsius, Kilograms, KiloPascal.	2
	2	IMPERIAL: Fahrenheit, Pounds, Pounds/in².	
* Certain market selections will alter default setting.			
CLEARSKY: 21	1	NO: ClearSky (telematics) options is disabled.	1
	2	YES: ClearSky (telematics) option is enabled.	
* Only visible under certain model selections.			
CRIBBING OPTION: 22*	1	NO: Cribbing Option is disabled.	1
	2	YES: Cribbing Option is enabled.	
* Only visible under certain model selections.			
* Only visible under certain market selections.			
ALERT BEACON: 23	1	OFF FOR CREEP	1
	2	IN CREEP 20FPM	
TEMP CUTOUT: 24*	1	NO: No Low Temp Cutout system installed.	1
	2	YES: Low Temp Cutout system installed.	
* Only visible under certain market selections.			
PLAT LVL OVR CUT: 25	1	NO: Platform Level functions above elevation.	1
	2	YES: Platform Level does not function above elevation.	
ALARM / HORN: 26	1	SEPARATE: Ambient alarm installed.	2
	2	COMBINED: Single Horn / Alarm installed.	
TELE CUTBACK: 27*	1	NO: Telescope Cutback Option is disabled.	1
	2	YES: Telescope Cutback Option is enabled.	
* Only visible under certain model selections.			

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Configuration Label/Digit	Number	Description	Default Number
FUEL LEVEL: 28*	1	NONE: Fuel Level Switch / Sensor is not installed.	3
	2	SWITCH: Fuel Level Switch is installed.	
	3	SENSOR: Fuel Level Sensor is installed.	
* Only visible under certain model selections.			
WATER IN FUEL SESNOR: 29*	1	NO: Water in Fuel Sensor is not installed.	1
	2	YES: Water in Fuel Sensor is installed.	
* Only visible under certain market selections.			
* Only visible for Engine Selection = Deutz EMR4.			

1001193425-H

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Table 6-3. Machine Configuration Programming Settings - 400SC

400SC	ANSI USA	ANSI Export	CSA	CE	Australia	Japan
Model Number	2	2	2	2	2	2
Market	1	2	3	4	5	6
Engine	X	X	X	X	X	X
	2	2	2	X	X	2
	3	3	3	X	X	3
	4	4	4	4	4	4
	5	5	5	5	5	5
Flywheel Teeth	X	X	X	X	X	X
Glow Plug	2	2	2	2	2	2
Starter Lockout	1	1	1	1	1	1
	2	2	2	2	2	2
Engine Shut-down	1	1	1	1	1	1
	2	2	2	2	2	2
Fuel Cutout	1	1	1	1	1	1
	2	2	2	2	2	2
	X	X	X	X	X	X
	4	4	4	4	4	4
Tilt	1	1	1	1	1	1
	X	X	X	X	X	X
	3	3	3	3	3	3
	4	4	4	4	4	4
	5	5	5	5	5	5
	X	X	X	X	X	X
	7	7	7	7	7	7
	8	8	8	8	8	8
	9	9	9	9	9	9
	X	X	X	X	X	X
	11	11	11	11	11	11
	12	12	12	12	12	12
Jib	1	1	1	1	1	1
	2	2	2	2	2	2
Soft Touch	1	1	1	1	1	1
	2	2	2	2	2	2
SkyGuard	1	1	1	1	1	1
	2	2	2	2	2	2
Gen Set / Welder	1	1	1	1	1	1
	2	2	2	2	2	2
Gen Set Cutout	1	1	1	1	1	1
	2	2	2	2	2	2

Table 6-3. Machine Configuration Programming Settings - 400SC

400SC	ANSI USA	ANSI Export	CSA	CE	Australia	Japan
Head & Taillights	1	1	1	1	1	1
	2	2	2	2	2	2
Load System	1	1	1	X	X	1
	X	2	X	X	X	2
	X	3	X	X	3	3
	X	4	X	4	X	4
	X	X	X	X	X	X
Function Cutout	1	1	1	X	1	1
	X	2	2	2	2	2
	3	3	3	X	3	3
	X	X	X	X	X	X
Ground Alarm	1	1	1	1	1	1
	2	2	2	2	2	2
	3	3	3	3	3	3
	4	4	4	4	4	4
Drive Type	1	1	1	1	1	1
	X	X	X	X	X	X
Display Units	1	1	1	1	1	1
	2	2	2	2	2	2
Clearsky	1	1	1	1	1	1
	2	2	2	2	2	2
Cribbing Option	1	X	X	X	X	X
	2	X	X	X	X	X
Alert Beacon	1	1	1	1	1	1
	2	2	2	2	2	2
Temp Cutout	1	1	1	1	1	1
	X	2	X	2	X	X
Plat Lvl Ovr Cut	1	1	1	1	1	1
	2	2	2	2	2	2
Alarm/Horn	1	1	1	1	1	1
	2	2	2	2	2	2
TELE CUTBACK	X	X	X	X	X	X
	X	X	X	X	X	X
FUEL LEVEL	X	X	X	X	X	X
	X	X	X	X	X	X
	3	3	3	3	3	3
WATER IN FUEL SENSOR	1	1	1	1	1	1
	2	2	2	2	2	2

BOLD BLUE TEXT indicates the default setting. Plain text indicates another available selection. **RED ITALIC TEXT** indicates the default when option is factory installed. SHADED CELLS indicate hidden menu or selection.

SECTION 6 - JLG CONTROL SYSTEM

Table 6-4. Machine Configuration Programming Settings - 460SJC

460SJC	ANSI USA	ANSI Export	CSA	CE	Australia	Japan
Model Number	2	2	2	2	2	2
Market	1	2	3	4	5	6
Engine	X	X	X	X	X	X
	2	2	2	X	X	2
	3	3	3	X	X	3
	4	4	4	4	4	4
	5	5	5	5	5	5
Flywheel Teeth	X	X	X	X	X	X
Glow Plug	2	2	2	2	2	2
Starter Lockout	1	1	1	1	1	1
	2	2	2	2	2	2
Engine Shutdown	1	1	1	1	1	1
	2	2	2	2	2	2
Fuel Cutout	1	1	1	1	1	1
	2	2	2	2	2	2
	X	X	X	X	X	X
	4	4	4	4	4	4
Tilt	1	1	1	1	1	1
	X	X	X	X	X	X
	3	3	3	3	3	3
	4	4	4	4	4	4
	5	5	5	5	5	5
	X	X	X	X	X	X
	7	7	7	7	7	7
	8	8	8	8	8	8
	9	9	9	9	9	9
	X	X	X	X	X	X
	11	11	11	11	11	11
	12	12	12	12	12	12
Jib	1	1	1	1	1	1
	2	2	2	2	2	2
Soft Touch	1	1	1	1	1	1
	2	2	2	2	2	2
SkyGuard	1	1	1	1	1	1
	2	2	2	2	2	2
Gen Set / Welder	1	1	1	1	1	1
	2	2	2	2	2	2
Gen Set Cutout	1	1	1	1	1	1
	2	2	2	2	2	2


Table 6-4. Machine Configuration Programming Settings - 460SJC

460SJC	ANSI USA	ANSI Export	CSA	CE	Australia	Japan
Head & Taillights	1	1	1	1	1	1
	2	2	2	2	2	2
Load System	1	1	1	X	X	1
	X	2	X	X	X	2
	X	3	X	X	3	3
	X	4	X	4	X	4
	X	X	X	X	X	X
Function Cutout	1	1	1	X	1	1
	X	2	2	2	2	2
	3	3	3	X	3	3
	X	X	X	X	X	X
Ground Alarm	1	1	1	1	1	1
	2	2	2	2	2	2
	3	3	3	3	3	3
	4	4	4	4	4	4
Drive Type	1	1	1	1	1	1
	X	X	X	X	X	X
Display Units	1	1	1	1	1	1
	2	2	2	2	2	2
Clearsky	1	1	1	1	1	1
	2	2	2	2	2	2
Cribbing Option	1	X	X	X	X	X
	2	X	X	X	X	X
Alert Beacon	1	1	1	1	1	1
	2	2	2	2	2	2
Temp Cutout	1	1	1	1	1	1
	X	2	X	2	X	X
Plat Lvl Ovr Cut	1	1	1	1	1	1
	2	2	2	2	2	2
Alarm/Horn	1	1	1	1	1	1
	2	2	2	2	2	2
TELE CUTBACK	X	X	X	X	X	X
	X	X	X	X	X	X
FUEL LEVEL	X	X	X	X	X	X
	X	X	X	X	X	X
	3	3	3	3	3	3
WATER IN FUEL SENSOR	1	1	1	1	1	1
	2	2	2	2	2	2

BOLD BLUE TEXT indicates the default setting. Plain text indicates another available selection. **RED ITALIC TEXT** indicates the default when option is factory installed. SHADED CELLS indicate hidden menu or selection.

6.2 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.

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 .

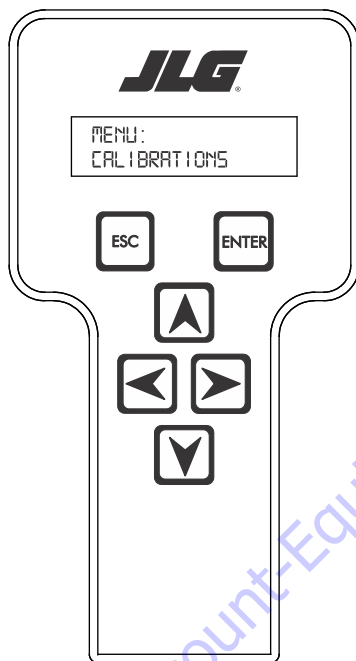
Table 6-5, Diagnostic Menu Descriptions details the structure of the Diagnostic Menu, and describes the meaning of each piece of information presented.

Table 6-5. 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			

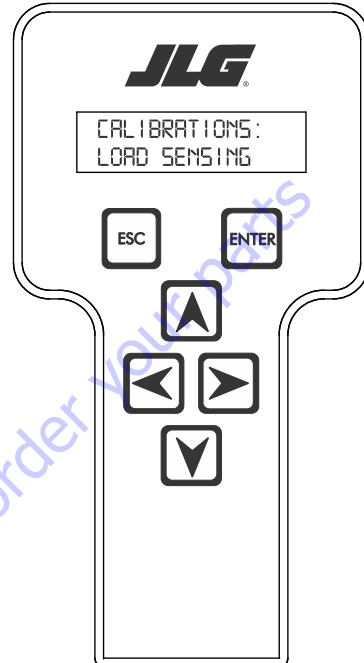
Calibration Procedure

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:

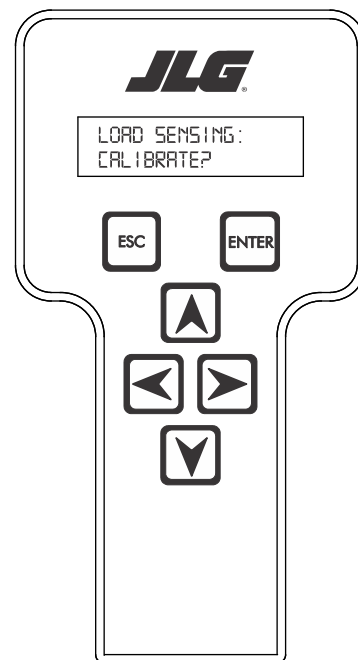


NOTE: The Calibration Menu is not available in OPERATOR ACCESS.


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:




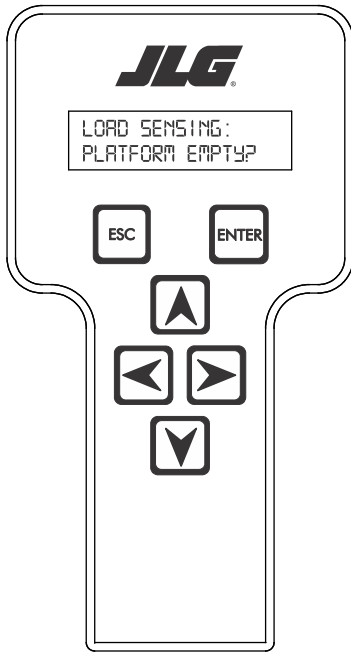
6. Press Enter . The Screen will read:




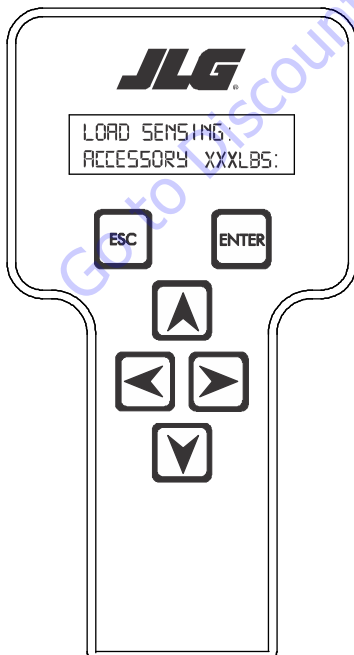
NOTE: Calibration will auto fail if LSS DTC's are active (443, 444, 4479, 4480, 663, 821, 822, 823, 824, 8218, 8222 -> 8238, 991, 992, 993, 994 or 99285).

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 6-6, 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:

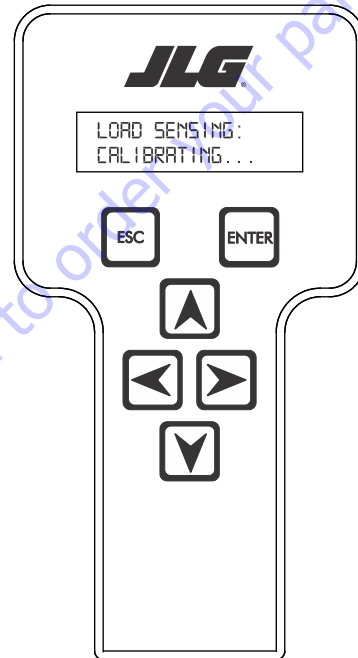


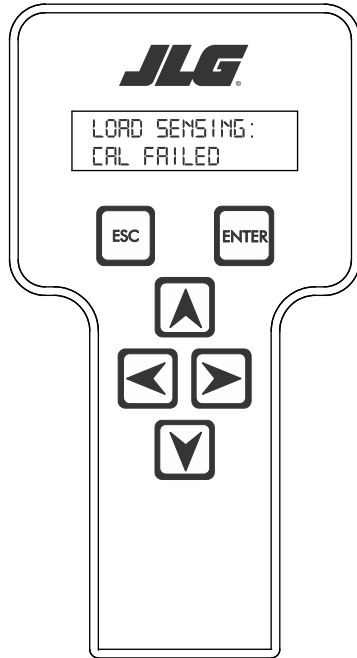
Table 6-6. Accessory Weights


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)
Work Surface	20 lb (9 kg)

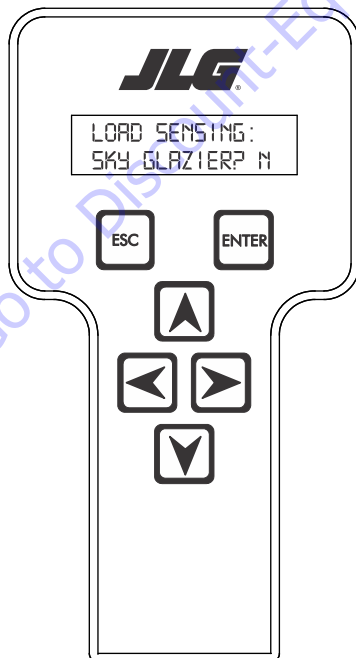
NOTE: Not all Accessories are available on every JLG model. Some Accessory combinations are prohibited due to excessive weight and/or load restriction. If any installed JLG Accessories are labeled with weight decals but are not listed in the table above, include their weight when entering the ACC WEIGHT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

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

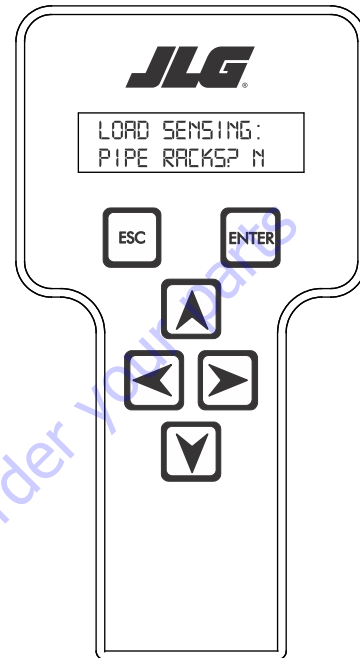


- Press ENTER . The control system will ask for installed accessories. The screen will show the following:




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

ENTER . The screen will read:



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 6-7, SkyGlazier Capacity Reductions and Table 6-8, Pipe Rack Capacity Reductions.

The screen will read:

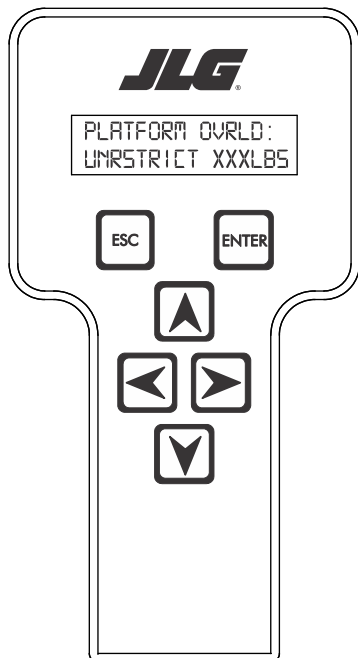


Table 6-7. SkyGlazier Capacity Reductions


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)

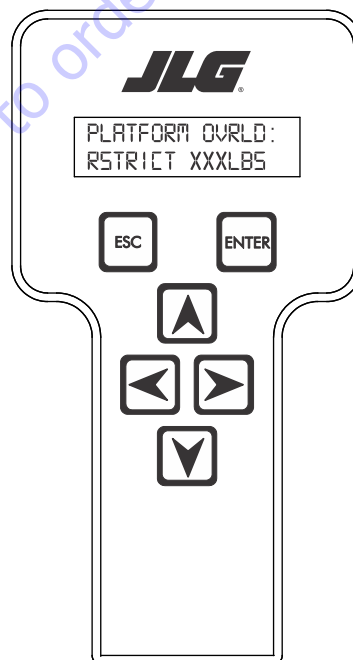
Note: If both SkyGlazier and Pipe Racks are configured, capacity will be the lower of the two values.


Table 6-8. Pipe Rack Capacity Reductions

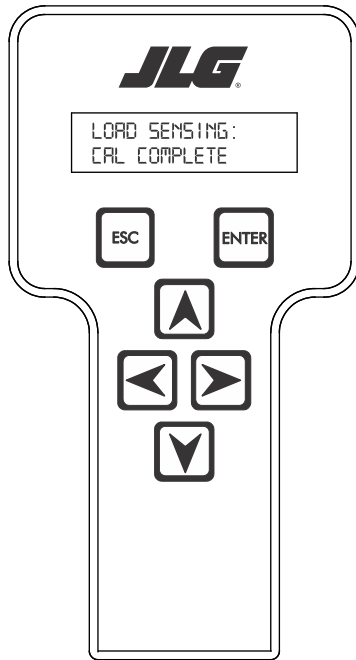
Capacity	PLATFORM OVRLD	PLATFORM OVRLD RESTRICT
500 lb (227 kg)	400 lb (181 kg)	n/a
550 lb (250 kg)	450 lb (204 kg)	n/a
600 lb (272 kg)	500 lb (227 kg)	n/a
750 lb (340 kg)	n/a	650 lb (295 kg)
1000 lb (454 kg)	n/a	900 lb (408 kg)

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 6-7, SkyGlazier Capacity Reductions and Table 6-8, Pipe Rack Capacity Reductions.



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



Go to Discount-Equipment.com to order your parts

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 lbs (± 7 kg). Further, the reading should be stable and should not vary by more than ± 2 lbs (± 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 500lbs (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 6-9. LSS Troubleshooting Chart

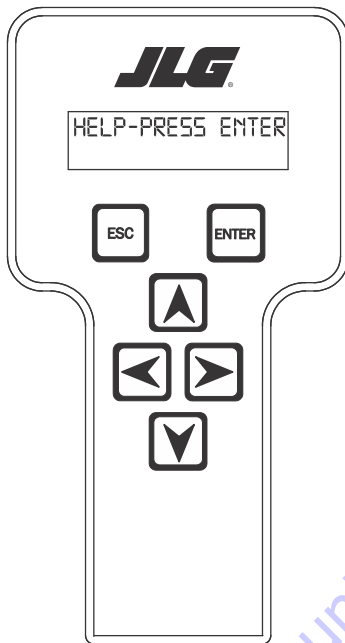
Difficulty	Possible Resolution
<p>Empty Platform Weight (DIAGNOSTICS, PLATFORM LOAD) is not within $\pm 15\text{lbs}$ ($\pm 7\text{kg}$) of zero.</p> <p>or</p> <p>Platform Load readings (DIAGNOSTICS, PLTLOAD) are unstable by more than $\pm 2\text{lbs}$ ($\pm 1\text{kg}$) (without the influence of vibration 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"> The Load Cell is not properly plugged into the LSS Harness. It is possible poor electrical contact is made. 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. 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). 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 $\pm 2\text{lbs}$ ($\pm 1\text{kg}$) (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. 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 ($>6000\text{lbs}$ [$>2722\text{kg}$]).
<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"> 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>

6.3 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

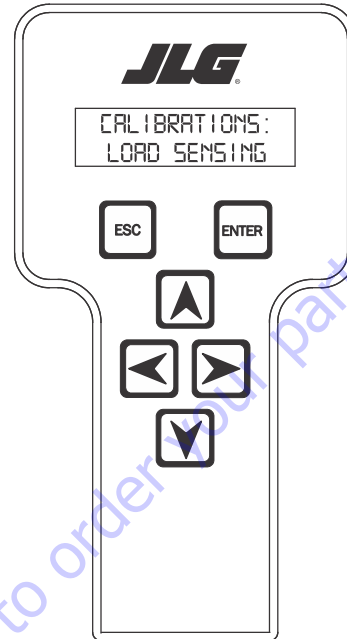


7. Enter the Access Code, 33271.

8. Use the right Arrow key to reach MENU: CALIBRATIONS.



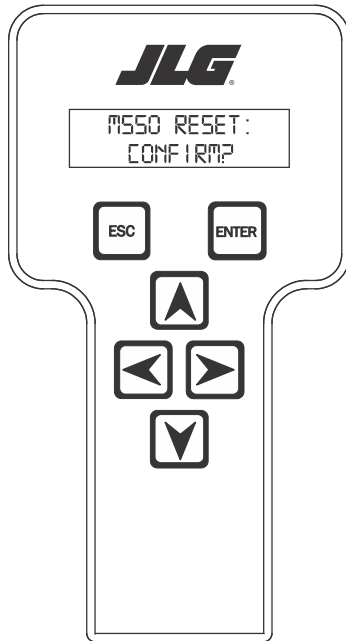
9. Use the arrow keys to reach the LOAD SENSING menu. The screen should read:





10. Press ENTER .

11. Use the left arrow key  or right arrow key  arrow to reach MSSO RESET.

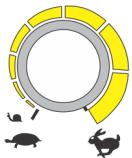

12. Press Enter . The screen will read:



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.

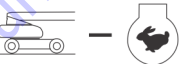
6.4 MACHINE MODEL ADJUSTMENT

Adjustment Notes


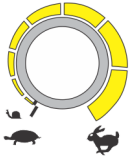


1. Personality settings can be adjusted anywhere within the adjustment range in order to achieve optimum machine performance.
2. Stop watch should be started with the function movement, not with actuation of the joystick or switch.
3. Drive speeds should be set to the values below regardless of the tire size.
4. All speed tests are run from the platform, these speeds do not reflect the ground control operation.
5. Function Speed Control knob must be at full speed (turned clockwise completely) unless noted. 
6. Some flow control functions may not work with the Function Speed Control knob clicked into the creep position. 
7. Functional speeds may vary due to cold thick hydraulic oil. Test should be run with the oil temperature above 38° C (100° F)

Machine Orientation When Performing Test

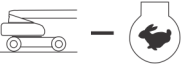
DRIVE (BELOW ELEVATION)

1. Test should be done on a smooth, level surface. The Drive Select Switch should be in the "Max Speed" position. 
2. Start approximately 7.6 m (25 ft) from starting point so the unit is at a maximum speed when starting the test.
3. Results should be recorded for a 61 m (200ft) course.
4. Drive forward, "High Speed", record time.

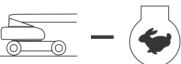
DRIVE (ABOVE ELEVATION)

1. Test should be done on a smooth, level surface. Drive Select Switch should be in the "Max Speed" position. 
2. Boom should be > 10° above horizontal to ensure drive is operating in Max Torque mode.
3. Results should be recorded for a 15.2 m (50 ft) course.
4. Drive forward, record time.
5. Drive Reverse, record time.
6. Turn Platform Speed Control Knob fully counterclockwise to enter Creep mode. 
7. Creep light on Panel must be energized. 
8. Verify that machine will Drive Forward and Reverse.
9. Return Knob to fully clockwise. 

CRAWLER DRIVE (BELOW ELEVATION)

1. Test should be done on a smooth, level surface. The Drive Select Switch should be in the "Max Speed" position. 
2. Start approximately 7.6 m (25 ft) from starting point so the unit is at a maximum speed when starting the test.
3. Results should be recorded for a 61 m (200ft) course.
4. Adjust the Left track/Right track drive FWD/REV maximums to achieve the best straight tracking performance without introducing steer.
5. Drive forward, "High Speed", record time.
6. Drive Reverse, "High Speed", record time.

CRAWLER DRIVE (ABOVE ELEVATION)

1. Test should be done on a smooth, level surface. The Drive Select Switch should be in the "Max Speed" position. 
2. Boom should be > 10° above horizontal to ensure the drive is operating in Max Torque mode.
3. Results should be recorded for a 15.2 m (50ft) course.
4. Adjust the Left track/Right track FWD/REV Elevated drive maximum to achieve the best straight tracking without introducing steer.
5. Drive forward, record time.
6. Drive Reverse, record time.
7. Lower boom below < 5° and retract boom.

8. Turn Platform Speed Control Knob fully counterclockwise to enter Creep mode.



9. Creep light on Panel must be energized.



10. Verify that machine will Drive Forward and Reverse.



11. If needed, Adjust the Left track/Right track drive FWD/REV creep drive maximums to achieve the best straight tracking performance.
12. Return Knob to fully clockwise.

SWING

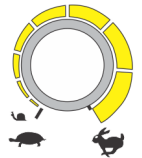
1. Boom at full elevation, Telescope retracted. Swing Right until over rear axle or end stop (if equipped).
2. Swing Left 360° or end stop (if equipped), record time.
3. Swing Right 360° or end stop (if equipped), record time.
4. Turn Platform Speed Control Knob fully counterclockwise to enter Creep mode.



5. Creep light on Panel must be energized.

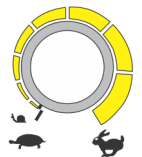


6. Verify that machine will swing left and right.
7. Return Function Speed Knob to fully clockwise.



TOWER LIFT

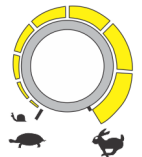
1. Tower Lift in stowed position, Telescope Retracted.
2. Tower Lift Up, record time.
3. Tower Lift Down, record time.
4. Turn Platform Speed Control Knob fully counterclockwise to enter Creep mode.



5. Creep light on Panel must be energized.



6. Verify that machine will Tower Up and Down. Return Knob to fully clockwise.



MAIN LIFT

1. Main Lift in stowed position, Telescope Retracted.
2. Main Lift Up, record time.
3. Main Lift Down, record time.
4. Turn Platform Speed Control Knob fully counterclockwise to enter Creep mode.



5. Creep light on Panel must be energized.



6. Verify that machine will Lift Up and Down.
7. Return Knob to fully clockwise.



TELESCOPE

1. Main Lift at full elevation, Telescope Retracted.
2. Telescope Out, record time.
3. Telescope In, record time.
4. Turn Platform Speed Control Knob fully counterclockwise to enter Creep mode.



5. Creep light on Panel must be energized.



6. Verify that machine will Telescope In and Out.
7. Return Knob to fully clockwise.



JIB LIFT

1. Platform level and centered with the boom. Jib Lift Down until stop.
2. Jib Lift Up, record time.
3. Jib Lift Down, record time.
4. Turn Platform Speed Control Knob fully counterclockwise to enter Creep mode.



5. Creep light on Panel must be energized.



6. Verify that machine will Jib Lift Up and Down.
7. Return Knob to fully clockwise.



PLATFORM ROTATE

1. Platform level, Rotate Platform Right until stop
2. Platform Left, record time.
3. Platform Right, record time.
4. Turn Platform Speed Control Knob fully counterclockwise to enter Creep mode.



5. Creep light on Panel must be energized.



6. Verify that machine will Platform Rotate Left and Right.
7. Return Knob to fully clockwise.



NOTE: When the platform speed control knob is turned fully counterclockwise. The platform rotate may not work, this is acceptable.

Table 6-10. Machine Model Adjustment Speeds

FUNCTION	ADJUSTMENT RANGES	400SC / 460SJC MODEL DEFAULTS	MODEL TIME RANGES (IN SECONDS)		
			400SC	460SJC	
DRIVE					
	Accel	25 – 2000 mA/s	N/A		
	Decel	25 – 2000 mA/s	N/A		
	Min	250 – 1000 mA	N/A		
	Max	250 – 1400 mA	N/A	N/A	N/A
Drive to Stop	Decel	25 – 2000 mA/s	N/A		
MT: Elevated	Max	250 – 1200 mA	N/A	N/A	N/A
ME: Elevated	Max	250 – 1200 mA	N/A	N/A	N/A
Max Torque	Creep	250 – 1200 mA	N/A		
Mid Engine	Creep	250 – 1200 mA	N/A		
ME = Max Engine, MT = Max Torque					
DRIVE LEFT TRACK					
	Accel	0 – 5s	1.0s		
	Decel	0 – 5s	1.0s		
FORWARD	Min	0 – 160 mA	50 mA		
	Max	0 – 160 mA	143 mA	80 – 90	80 – 90
	Elevated	0 – 105 mA	90 mA	80 – 90	80 – 90
	Creep	0 – 105 mA	90 mA		
REVERSE	Min	0 – 160 mA	55 mA		
	Max	0 – 160 mA	135 mA	80 – 90	80 – 90
	Elevated	0 – 105 mA	95 mA	80 – 90	80 – 90
	Creep	0 – 105 mA	95 mA		
DRIVE RIGHT TRACK					
	Accel	0 – 5s	1.0s		
	Decel	0 – 5s	1.0s		
FORWARD	Min	0 – 160 mA	50 mA		
	Max	0 – 160 mA	140 mA	80 – 90	80 – 90
	Elevated	0 – 105 mA	95 mA	80 – 90	80 – 90
	Creep	0 – 105 mA	95 mA		
REVERSE	Min	0 – 160 mA	60 mA		
	Max	0 – 160 mA	145 mA	80 – 90	80 – 90
	Elevated	0 – 105 mA	100 mA	80 – 90	80 – 90
	Creep	0 – 105 mA	100 mA		
SWING					
	Accel	0 – 5s	2.2s		
	Decel	0 – 5s	1.2s		
LEFT	Min	250 – 1400 mA	420 mA		
	Max	250 – 1400 mA	860 mA	70 – 90	70 – 90
	Creep	250 – 1400 mA	650 mA		

SECTION 6 - JLG CONTROL SYSTEM

Table 6-10. Machine Model Adjustment Speeds

FUNCTION		ADJUSTMENT RANGES	400SC / 460SJC MODEL DEFAULTS	MODEL TIME RANGES (IN SECONDS)	
				400SC	460SJC
RIGHT	Min	250 – 1400 mA	400 mA		
	Max	250 – 1400 mA	800 mA	70 – 90	70 – 90
	Creep	250 – 1400 mA	650 mA		
TOWER LIFT					
	Accel	0 – 5s	N/A		
	Decel	0 – 5s	N/A		
UP	Min	250 – 1400 mA	N/A		
	Max	250 – 1400 mA	N/A	N/A	N/A
	Creep	250 – 1400 mA	N/A		
DOWN	Min	250 – 1400 mA	N/A		
	Max	250 – 1400 mA	N/A	N/A	N/A
	Creep	250 – 1400 mA	N/A		
	Soft Down	250 – 1400 mA	N/A		
LIFT					
	Accel	0 – 5 s	1.5 s		
	Decel	0 – 5 s	0.8 s		
UP	Min	250 – 1400 mA	400 mA		
	Max	250 – 1400 mA	900 mA	33 – 40	33 – 40
	Creep	250 – 1400 mA	600 mA		
DOWN	Min	250 – 1400 mA	380 mA		
	Max	250 – 1400 mA	750 mA	33 – 40	33 – 40
	Creep	250 – 1400 mA	500 mA		
	Soft Down	250 – 1400 mA	450 mA		
	Soft Down	250 – 1400 mA	450 mA		
TELESCOPE					
	Accel	0 – 5 s	1 s		
	Decel	0 – 5 s	0.8 s		
IN	Min	250 – 1400 mA	415 mA		
	Max	250 – 1400 mA	890 mA	33 – 40	33 – 40
	Creep	250 – 1400 mA	580 mA		
OUT	Min	250 – 1400 mA	415 mA		
	Max	250 – 1400 mA	780 mA	33 – 40	33 – 40
	Creep	250 – 1400 mA	525 mA		
JIB LIFT					
	Accel	0 – 5 s	1.2 s		
	Decel	0 – 5 s	0.5 s		
UP	Min	250 – 1400 mA	350 mA		
	Max	250 – 1400 mA	690 mA	18 – 22	18 – 22
	Creep	250 – 1400 mA	500 mA		

Table 6-10. Machine Model Adjustment Speeds

FUNCTION		ADJUSTMENT RANGES	400SC / 460SJC MODEL DEFAULTS	MODEL TIME RANGES (IN SECONDS)	
				400SC	460SJC
DOWN	Min	250 – 1400 mA	350 mA		
	Max	250 – 1400 mA	630 mA	18 – 22	18 – 22
	Creep	250 – 1400 mA	450 mA		
PLATFORM LEVEL					
	Accel	0 – 5 s	0 s		
	Decel	0 – 5 s	0 s		
UP	Min	250 – 1400 mA	400 mA		
	Max	250 – 1400 mA	600 mA		
	Creep	250 – 1400 mA	600 mA		
DOWN	Min	250 – 1400 mA	400 mA		
	Max	250 – 1400 mA	600 mA		
	Creep	250 – 1400 mA	600 mA		
PLATFORM ROTATE					
	Accel	0 – 5 s	0 s		
	Decel	0 – 5 s	0 s		
LEFT	Min	250 – 1400 mA	500 mA		
	Max	250 – 1400 mA	600 mA	20 – 25	20 – 25
	Creep	250 – 1400 mA	600 mA		
RIGHT	Min	250 – 1400 mA	500 mA		
	Max	250 – 1400 mA	600 mA	20 – 25	20 – 25
	Creep	250 – 1400 mA	600 mA		
GROUND MODE					
SWING	Left	250 – 1400 mA	855 mA		
	Right	250 – 1400 mA	795 mA		
TOWER LIFT	Up	250 – 1400 mA	N/A		
	Down	250 – 1400 mA	N/A		
LIFT	Up	250 – 1400 mA	895 mA		
	Down	250 – 1400 mA	745 mA		
TELESCOPE	In	250 – 1400 mA	885 mA		
	Out	250 – 1400 mA	775 mA		
JIB	Up	250 – 1400 mA	685 mA		
	Down	250 – 1400 mA	625 mA		
PLATFORM	Up/Down	250 – 1400 mA	595 mA		
PLATFORM	Left/Right	250 – 1400 mA	595 mA		

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6.5 SYSTEM TEST

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

Test from the Platform

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



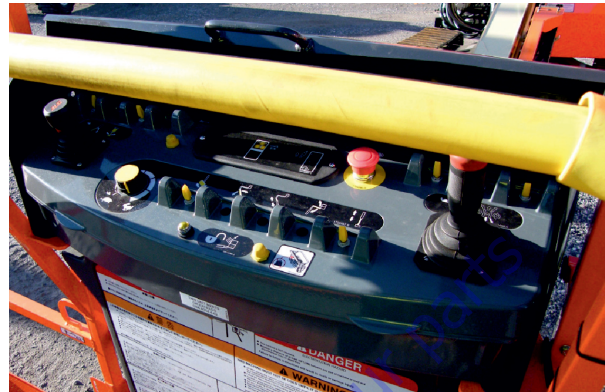
MAE17700

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



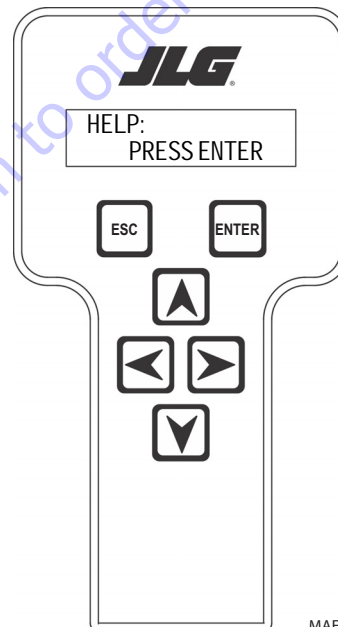
MAE15680

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



MAE17820

4. The analyzer screen should read:



MAE19060

5. Use the arrow button to reach SYSTEM TEST. Hit Enter. The analyzer will prompt you asking if you want to activate the system test; hit Enter again to activate.
6. Follow the flow path in (See Figure 6-21.), System Test Flow Chart - Platform Tests and go through the component tests. Hit the ESC key during any part of the test to return to the main menu without completing all tests or wait until all tests are complete. During the TEST ALL INPUTS sequence, the analyzer allows control switches to be operated and shows if they are closed (CL) or open (OP).

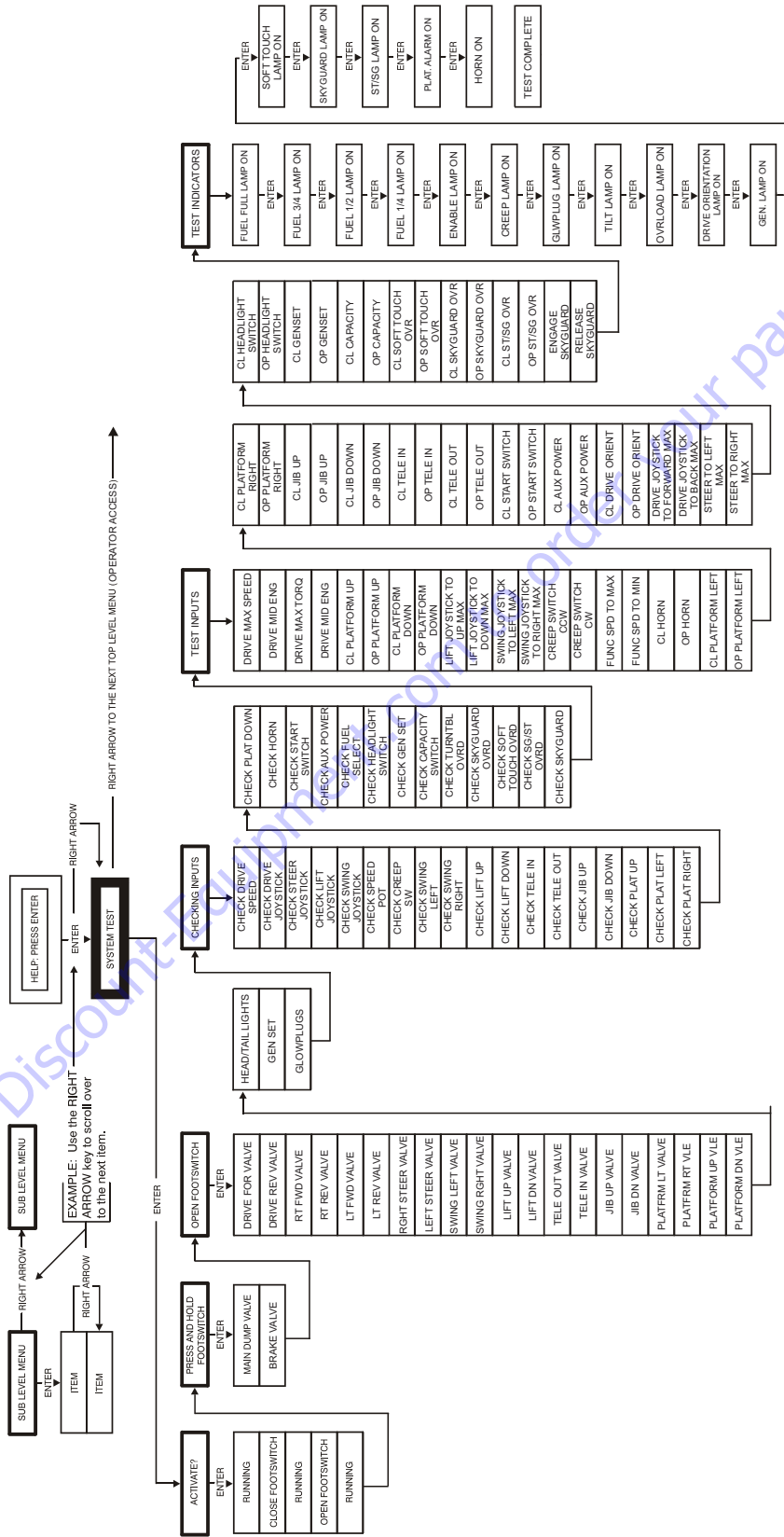


Figure 6-21. System Test Flow Chart- Platform Tests

Test from the Ground Station

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



MAE17700

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



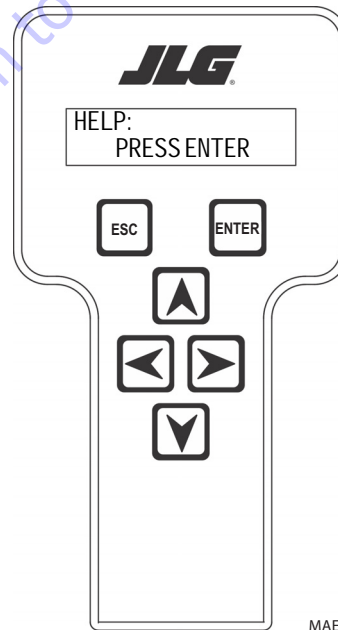
MAE17710

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



MAE17700

4. The analyzer screen should read:



MAE19060

5. Use the arrow button to reach SYSTEM TEST. Hit Enter. The analyzer will prompt you asking if you want to activate the system test; hit Enter again to activate.
6. Follow the flow path in (See Figure 6-22.), System Test Flow Chart - Platform Tests and go through the component tests. Hit the ESC key during any part of the test to return to the main menu without completing all tests or wait until all tests are complete. During the TEST ALL INPUTS sequence, the analyzer allows control switches to be operated and shows if they are closed (CL) or open (OP).

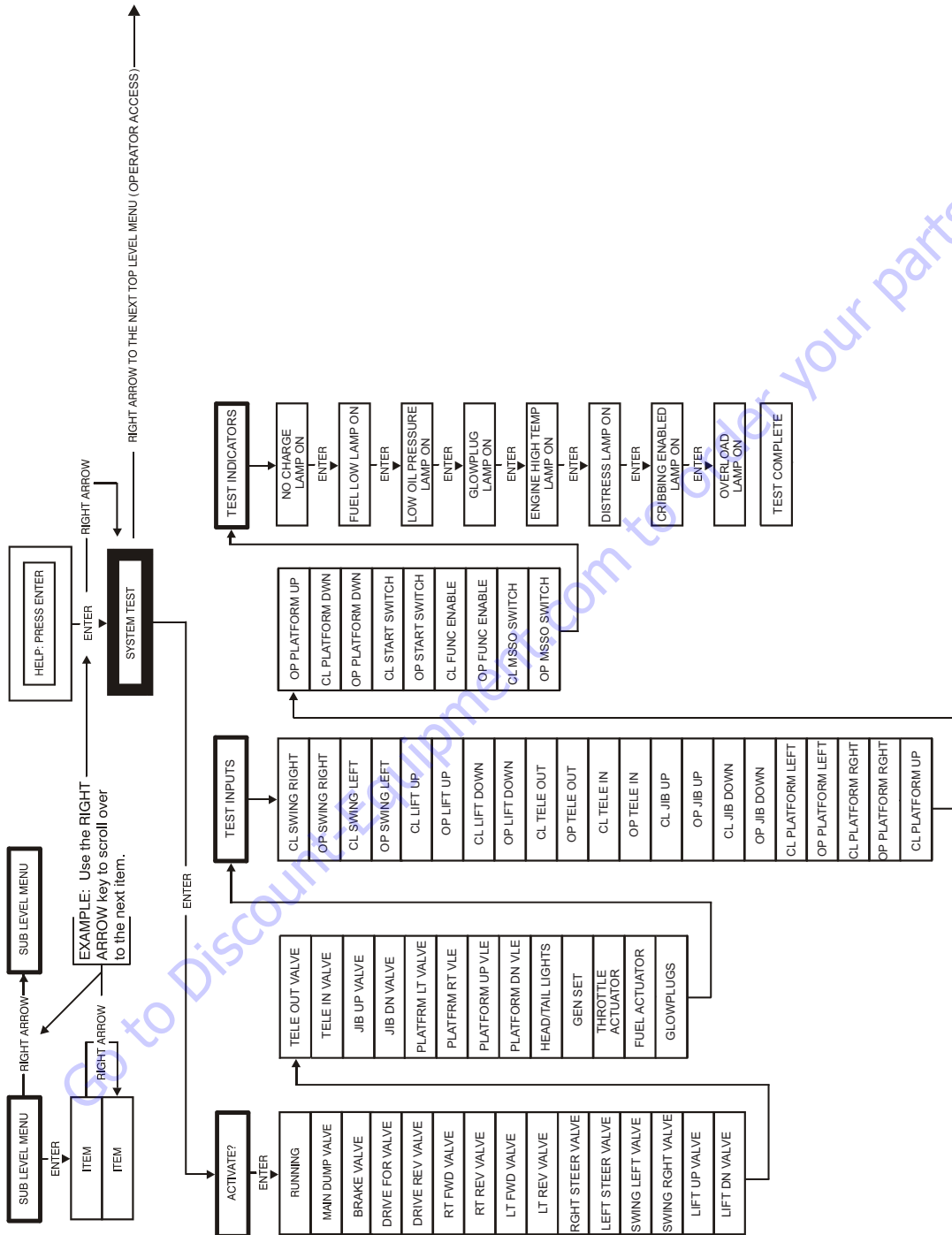


Figure 6-22. System Test Flow Chart - Ground Station Tests

MAE17460

6.6 SYSTEM TEST MESSAGES

Table 6-11. System Test Messages

Message Displayed on Analyzer	Message Displayed on Analyzer	Description
RUNNING		Initial display when system test is run while running certain "critical" checks are made.
	CHECKGROUND/ PLATFORM SELECT	The analyzer must be connected to the active control station to run the system test.
	BATTERY VOLTAGE TOO LOW	The system test may not run properly with battery voltage below 11V.
	BATTERY VOLTAGE TOO HIGH	The system test may not operate properly with the battery voltage above 16V.
	CHECK CAN WIRING	The system test will not operate properly unless the CAN bus is functional.
	ENGINE RUNNING?	The LOSS OF ENGINE SPEED SENSOR fault 4322 is active or CANBUS FAILURE – ENGINE CONTROLLER fault 666 is active
	HIGH TILT ANGLE	The CHASSIS TILT SENSOR OUT OF RANGE fault 814 is active
	HOT ENGINE	The HIGH ENGINE TEMP fault 438 is active
	OPEN FOOTSWITCH	In platform mode, the footswitch must be open at the start of the test.
	CLOSE FOOTSWITCH	In platform mode, the operator must close the footswitch when this message is displayed
	BAD FOOTSWITCH	The two footswitch signals are not changing together, probably because one is open circuit. Check footswitch and wiring.
	OPEN FOOTSWITCH	In platform mode, the operator must open the footswitch when this message is displayed.
PLATFORM OVERLOADED	Load Sensing is configured and the ground module considers the platform to be overloaded	
TESTING VALVES		Indicates that the valve test is beginning. Each valve is alternately energized and de-energized; checks are made for open- and short- circuit valve coils. NOTE: In platform mode, the footswitch must be closed. NOTE: Tower lift valves are not tested if TOWER LIFT=NO. Tower telescope valves are not tested if TOWER TELE=NO. Jib valves are not tested if JIB = NO. Extendable axle valves are not tested if EXT AXLES=NO. Four wheel steer valves are not tested if 4WS=NO. NOTE: Left/right jib valves are not tested unless JIB = SIDESWING. Problems that can be reported include below messages
	CANT TEST VALVES	There is a wiring problem, which prevents the valve test from functioning correctly. Check valve wiring. Check ground alarm & hour meter wiring.
	XXXXXXX S/C	The named valve is drawing too much current so is presumed to be short-circuited. Check valve wiring
	XXXXXXX O/C	The named valve is drawing too little current so is presumed to be open-circuit. Check valve wiring
CHECKING INPUTS		Indicates that the inputs test is beginning. Every input is checked to ensure that it is in its "normal" position; function switches should be open, cutout switches should be closed, joysticks should be in neutral. In platform mode any non-neutral platform switch or joystick is reported; any active cutouts are reported. In ground mode any non-neutral ground switches is reported; any active cutouts are reported. NOTE: Switches, which are not in use (due to the settings of machine digits), are not checked. NOTE: The pump pot is checked only for a wire-off condition; it can be at any demand from creep to maximum. Problems that can be reported include below messages.
	CHECKXXXXXX	The named switch is not in its "normal" position. Check switch & wiring.
	CHECKXXXXXX JOY	The named joystick appears to be faulty. Check joystick.

Table 6-11. System Test Messages

Message Displayed on Analyzer	Message Displayed on Analyzer	Description
TESTING LAMPS		Indicates that the lamps test is beginning. Each lamp is energized in turn; a prompt asks for confirmation that the lamp is lit. ENTER must be pressed or clicked to continue the test. NOTE: Lamps, which are not in use (due to the settings of machine digits), are not checked. NOTE: Platform Lamps are only tested in platform mode. NOTE: The GM overload lamp and 500# capacity lamp are not tested. NOTE: Head and tail lamps are tested in both platform and ground mode if enabled by a machine digit.
TESTING ALARMS		Indicates that the alarms test is beginning. Each alarm is energized in turn; a prompt asks for confirmation that the alarm is sounding.
		ENTER must be pressed or clicked to continue the test.
		NOTE: The platform alarm and the horn are only tested in platform mode.
		NOTE: The ground alarm is not tested if GROUND ALARM = NO.
TEST ALL INPUTS?		Prompts whether to check every operator input. If ESC is pressed or clicked, the system test ends. If ENTER is pressed or clicked, each operator input is prompted for in turn. In platform mode every platform switch and joystick is tested. In ground mode every ground switch is tested. NOTE: Tower lift switches are not tested if TOWER LIFT=NO. Tower telescope switches are not tested if TOWER TELE=NO. Jib switches are not tested if JIB = NO. Extendable axle switches are not tested if EXT AXLES=NO. Four wheel steer switches are not tested if 4WS=NO. NOTE: Left/right jib switches are not tested unless JIB = SIDESWING. Prompts displayed during the operator input test below messages.
	CLOSE XXXXXXX	The named switch should be closed.
	OPEN XXXXXXX	The named switch should be opened.
	XXXXXXX XXXXXXX TO MAX	The named joystick should be pushed to its full extent in the named direction.
	XXXXXXX XXXXXXX TO MIN	The named joystick should be returned to neutral from the named direction.
	PUMP POT TO MAX	The pump pot should be turned to maximum.
	PUMP POT TO MIN	The pump pot should be turned to minimum.
	MULTIPLE CLOSURE	More than one operator input is closed; if only one has been operated, there could be a short between two inputs.
TESTS COMPLETE		Indicates that the system test is complete. Any problems reported should have been noted and should now be rectified. Press ESC/CANCEL to return to the RUN SYSTEM TEST Analyzer menu.

6.7 MACHINE DIAGNOSTICS PARAMETERS

Table 6-12. Machine Diagnostics Parameters

Diagnosics Submenu (Displayed on Analyzer 1 st Line)	Parameter (Displayed on Analyzer 1 st Line)	Parameter Value (Displayed on Analyzer 2 nd Line)	Description
DRIVE/STEER	DRIVE DEMAND	FORWARD/REVERSE XXX%	Direction and command percentage of Drive as reported by PM
	DRIVE OUTPUT	FORWARD/REVERSE XXX%	Direction and current output percentage
	DRIVE OUT mA	FORWARD/REVERSE XXXmA	Direction and current output command
	DRIVE FDBK mA	XXXXmA	Current feedback measurement
	STEER DEMAND	LEFT/RIGHT XXX%	Direction and command percentage of Steer as reported by PM.
	STEER OUPUT	LEFT/RIGHT XXX%	Direction and PWM output percentage
	BRAKES STATUS	LOCKED/RELEASED	Status of Brake Valve output
	2 SPEED OUTPUT	ON/OFF	Status of 2 Speed Valve output
	DRIVE MODE	MAX SPEED/MAX TORQUE/MID ENGINE	Drive Mode Status
	DRV ORIENT TT SW	OPEN/CLOSED	State of DOS Switch
	DRV ORIENT MODE	INLINE/SWUNG	DOS state
	DRV ORIENT STATE	CONFIRMED/REQUIRED	InLine and DOS Active = Confirmed
	DRV ORNT OVR SW	CLOSED/OPEN	State of Drive Orientation Override Switch
	CRIBBING MODE SW	CLOSED/OPEN	State of Cribbing Mode Switch; only displayed if MACHINE SETUP → CRIBBING = YES
	CRIBBING MODE	DISABLED/ENABLED	Reflects state of Cribbing Mode Switch; only displayed if MACHINE SETUP → CRIBBING = YES
	LT TRACK DEMAND	FORWARD/REVERSE XXX%	Direction and command percentage of Left Track Drive as reported by PM (400SC)
	LT TRACK OUTPUT	FORWARD/REVERSE XXX%	Direction and current Left Track output percentage (400SC)
	LT TRACK OUT mA	FORWARD/REVERSE XXXmA	Direction and current Left Track output command
	LT TRACK FDBK mA	XXXXmA	Left Track current feedback measurement (400SC)
	RT TRACK DEMAND	FORWARD/REVERSE XXX%	Direction and command percentage of Right Track Drive as reported by PM (400SC)
RT TRACK OUTPUT	FORWARD/REVERSE XXX%	Direction and current Right Track output percentage (400SC)	
RT TRACK OUT mA	FORWARD/REVERSE XXXmA	Direction and current Right Track output command (400SC)	
RT TRACK FDBK mA	XXXXmA	Right Track current feedback measurement (400SC)	
BOOM FUNCTIONS	SWING DEMAND	LEFT/RIGHT XXX%	Direction and percentage of input command from Swing Joystick or Ground %
	SWING OUTPUT	LEFT/RIGHT XXX%	Direction and current output percentage
	SWING OUTPUT mA	LEFT/RIGHT XXXmA	Direction and current output command
	SWING FDBK mA	XXXXmA	Current feedback measurement
	LIFT DEMAND	UP/DOWN XXX%	Direction and percentage of Lift input command

Table 6-12. Machine Diagnostics Parameters

Diagnosics Submenu (Displayed on Analyzer 1 st Line)	Parameter (Displayed on Analyzer 1 st Line)	Parameter Value (Displayed on Analyzer 2 nd Line)	Description
BOOM FUNCTIONS	LIFT OUTPUT	UP/DOWN XXX%	Direction and current output percentage
	LIFT OUTPUT mA	UP/DOWN XXXmA	Direction and current output command
	LIFT FDBK mA	XXXmA	Current feedback measurement
	LIFT DN AUX	ON/OFF	Status of Aux Lift Down
	TELE DEMAND	IN/OUT XXX%/CREEP	Direction and percentage of input command (or CREEP if selected) from Function Speed Pot or Ground%
	TELE OUTPUT	IN/OUT XXX%	Direction and current output percentage for Flow Control Valve mapped to Tele Personalities
	JIB LIFT DEMAND	UP/DOWN XXX%/CREEP	Direction and percentage of input command (or CREEP if selected) from Function Speed Pot or Ground%; only displayed if MACHINE SETUP → JIB = YES
	JIB LIFT OUTPUT	UP/DOWN XXX%	For Up, direction and current output percentage for Flow Control mapped to Jib Lift Up Personality range; for Down, direction and PWM output percentage; only displayed if MACHINE SETUP → JIB = YES
	PLAT LVL DEMAND	UP/DOWN XXX%/CREEP	"Direction and percentage of input command (or CREEP if selected) from Function Speed Pot or Ground%"
	PLAT LVL OUTPUT	UP/DOWN XXX%	"Direction and current output percentage for Flow Control mapped to Platform Level Personality range"
	PLAT ROT DEMAND	LEFT/RIGHT XXX%/CREEP	"Direction and percentage of input command (or CREEP if selected) from Function Speed Pot or Ground%"
	PLAT ROT OUTPUT	LEFT/RIGHT XXX%	"Direction and current output percentage for Flow Control mapped to Platform Rotate Personality range"
	FLW CNTRL OUT mA	XXXmA	Current output command
	FLW CNTRL FBK mA	XXXmA	Current feedback measurement
	MAIN DUMP OUTPUT	ON/OFF	Status of Main Dump Valve
	FUNCTION SPEED	SETTING: XXX%	Displays the percentage demand from the Function Speed Potentiometer.
	CREEP SW	OPEN/CLOSED	Status of Creep Switch Input
	CREEP MODE	ON/OFF	Displays status of Creep Mode
ENGINE	OPERATING STATE	STOPPED/CRANKING/ STARTING/RUNNING	Displays Engine State
	GLOW PLUG	NOT ACTIVE/ACTIVE	Display diagnostic if glow plugs configured: MACHINE SETUP → GLOW PLUG ≠ NO GLOW PLUGS
	COOLANT TEMP	XXC/XXF	Degrees F or C displayed depending on Machine Setup Configuration
	ENGINE OIL PRESS	XXXPsi/XXXXKPA	If Deutz, display transmitted value
	FUEL PRESS	XXXPsi/XXXXKPA	MACHINE SETUP → ENGINE = EMR 4
	AMBIENT TEMP	XXC/XXF	
	FUEL LEVEL	FULL; ¾; ½; ¼; LOW; EMPTY; OK; ERROR	MACHINE SETUP → FUEL LEVEL ≠ NONE
	ALLOWED STARTER	CRANK TIME: XXs	MACHINE SETUP → ENGINE ≠ DUAL FUEL
	ENGINE SPEED	ACTUAL XXXXRPM	RPM read from speed sensor
ENGINE SPEED	TARGET XXXXRPM	UGM-commanded Target RPM	

Table 6-12. Machine Diagnostics Parameters

Diagnosics Submenu (Displayed on Analyzer 1 st Line)	Parameter (Displayed on Analyzer 1 st Line)	Parameter Value (Displayed on Analyzer 2 nd Line)	Description
SYSTEM	UGM BATTERY	XX.XV	UGM measured battery voltage
	PLATFORM MODULE	BATTERY XX.XV	PM measured battery voltage
	UGM TEMP	XXXC/XXXF	UGM on-board temperature measurement
	PLATFORM SELECT	KEYSWITCH: OPEN KEYSWITCH: CLOSED	Displays whether Platform Keyswitch position is being selected
	GROUND SELECT	KEYSWITCH: OPEN KEYSWITCH: CLOSED	Displays whether Ground Keyswitch position is being selected
	STATION CONTROL	GROUND/PLATFORM	Displays Active control station per System Mode definition
	FOOTSWITCH INPUT	GROUND: OPEN GROUND: CLOSED	State of Footswitch input at UGM
	FOOTSWITCH INPUT	PLATFORM: OPEN PLATFORM: CLOSED	State of Footswitch input at PM (closed when footswitch not activated)
	BOOM ANGLE	XX.XDEG	Boom Angle with respect to sign
	BOOM ANGLE 1 RAW	XXXXCOUNTS	Boom Angle sensor #1 raw A/D counts
	BOOM ANGLE 2 RAW	XXXXCOUNTS	Boom Angle sensor #2 raw A/D counts
SYSTEM	ELEVATION MODE	ABOVE/NOT ABOVE	Elevation State
	TELE RETRAC SW 1	OPEN/CLOSED	"State of Telescope Retracted Proximity Switch #1; High = CLOSED"
	TELE RETRAC SW 2	OPEN/CLOSED	"State of Telescope Retracted Proximity Switch #2; High = OPEN"
	RETRACTED MODE	RETRACTED/NOT RETRACTED	Telescope Retracted State
	CAPACITY SW 1	OPEN/CLOSED	"State of Capacity Length Proximity Switch #1; High = CLOSED; only displayed if Dual Capacity is configured"
	CAPACITY SW 2	OPEN/CLOSED	"State of Capacity Length Proximity Switch #2; High = OPEN; only displayed if Dual Capacity is configured"
	CAPACITY MODE	RESTRICTED/UNRESTRICT ED/ERROR	Dual Capacity State; Dual Capacity is configured
	OSC AXLE	LOCKED/NOT LOCKED	Oscillating Axle State
	TRANSPORT MODE	IN TRANSPORT/OUT OF TRANSPORT	Transport Position
	CREEP SW	OPEN/CLOSED	Status of Creep Switch Input
	CREEP MODE	ON/OFF	Displays status of Creep Mode
	CHASSIS TILT	XX.XDEG	Combined X/Y Absolute Angle
	CHASSIS TILT	X-AXIS: XX.XDEG	X Angle with respect to sign
	CHASSIS TILT	Y-AXIS: XX.XDEG	Y Angle with respect to sign
	GENSET/WELDER SW	OPEN/CLOSED	Platform Generator Enable switch; only displayed if MACHINE SETUP → GEN SET/WELDER ≠ NO
	GENSET ENABLE	OUTPUT: ON/OFF	UGM Generator Relay Enable output; only displayed if MACHINE SETUP → GEN SET/WELDER ≠ NO
	H&T LIGHTS SW	OPEN/CLOSED	Only displayed if in Platform Mode and MACHINE SETUP → H&T LIGHTS = YES
	H&T LIGHTS OUT	ON/OFF	UGM Nite Brite Relay Enable output; only displayed if in Platform Mode and MACHINE SETUP → H&T LIGHTS = YES

Table 6-12. Machine Diagnostics Parameters

Diagnosics Submenu (Displayed on Analyzer 1 st Line)	Parameter (Displayed on Analyzer 1 st Line)	Parameter Value (Displayed on Analyzer 2 nd Line)	Description
SYSTEM	SOFT TOUCH INPUT	OPEN/CLOSED	State of Soft Touch Platform Input (J1-20); closed when active; only displayed if in Platform Mode and MACHINE SETUP → SOFT TOUCH = YES.
	SKYGUARD INPUTS	OPEN/CLOSED/DISAGREE	SkyGuard Input #1 (PLT J7-18) AND SkyGuard Input #2 (PLT J1-23) state; only displayed if in Platform Mode and MACHINE SETUP → SKYGUARD = YES.
	SKYGUARD INPUT 1	OPEN/CLOSED	State of SkyGuard Platform Input #1 (J7-18); relay NC contacts – closed when active; only displayed if in Platform Mode and MACHINE SETUP → SKYGUARD = YES.
	SKYGUARD INPUT 2	OPEN/CLOSED	State of SkyGuard Platform Input #2 (J1-23); relay NC contacts – closed when active; only displayed if in Platform Mode and MACHINE SETUP → SKYGUARD = YES.
	AMBIENT TEMP	XXXC/XXXF	Ambient Temperature sensor reading; Only displayed if MACHINE SETUP → TEMP CUTOUT = YES
	LOW TEMPERATURE	CUTOUT: ACTIVE/INACTIVE/FAULTY	Status of Low Temperature Cutout; Only displayed if MACHINE SETUP → TEMP CUTOUT = YES
	MSSO	ACTIVE/INACTIVE	Status of MSSO; Only displayed if MACHINE SETUP → MARKET = CE
OPER CONTROLS	JOYSTICK DRIVE	FORWARD/REVERSE XXX%	Drive Joystick drive direction and command percentage as reported from PM; only displayed if in Platform Mode
	JOYSTICK STEER	LEFT/RIGHT XXX%	Drive Joystick steer direction and percentage command as reported from PM; only displayed if in Platform Mode
	JOYSTICK SWING	LEFT/RIGHT XXX%	Lift/Swing Joystick Swing direction and percentage command as reported from PM; only displayed if in Platform Mode
	JOYSTICK LIFT	UP/DOWN XXX%	Lift/Swing Joystick Lift direction and percentage command as reported from PM; only displayed if in Platform Mode
	DRV ORNT OVR SW	CLOSED/OPEN	State of Drive Orientation Override Switch if in Platform Mode
	FUEL SELECT SW	OPEN/CLOSED	Status of Platform Toggle Switch Input if in Platform Mode and MACHINE SETUP → ENGINE
	START SWITCH	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input
	SWING LEFT SW	OPEN/CLOSED	Status of Ground Toggle Switch Input if in Ground Mode
	SWING RIGHT SW	OPEN/CLOSED	Status of Ground Toggle Switch Input if in Ground Mode

Table 6-12. Machine Diagnostics Parameters

Diagnostics Submenu (Displayed on Analyzer 1 st Line)	Parameter (Displayed on Analyzer 1 st Line)	Parameter Value (Displayed on Analyzer 2 nd Line)	Description
OPER CONTROLS	LIFT UP SW	OPEN/CLOSED	Status of Ground Toggle Switch Input if in Ground Mode
	LIFT DN SW	OPEN/CLOSED	Status of Ground Toggle Switch Input if in Ground Mode
	TELE IN SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input
	TELE OUT SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input
	JIB LIFT UP SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input; only displayed if MACHINE SETUP → JIB = YES
	JIB LIFT DN SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input; only displayed if MACHINE SETUP → JIB = YES
	PLAT LEVEL UP SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input
	PLAT LEVEL DN SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input
	PLAT ROT LEFT SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input
	PLAT ROT RIGHT SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input
	MAX SPEED SW	OPEN/CLOSED	Status of Platform Toggle Switch Input; only displayed if in Platform Mode
	MAX TORQUE SW	OPEN/CLOSED	Status of Platform Toggle Switch Input; only displayed if in Platform Mode
	CREEP SW	OPEN/CLOSED	Status of Creep Switch Input; only displayed if in Platform Mode
	HORN SW	OPEN/CLOSED	Status of Platform Switch Input; only displayed if in Platform Mode
	H&T LIGHT SW	OPEN/CLOSED	Status of Platform Toggle Switch Input; only displayed if in Platform Mode and MACHINE SETUP → H&T LIGHTS = YES
	GENSET/WELDER SW	OPEN/CLOSED	Status of Platform Toggle Switch Input; only displayed if MACHINE SETUP → GEN SET/WELDER ≠ NO
	SG OVERRIDE SW	OPEN/CLOSED	Status of Platform SkyGuard Override Switch Input; only displayed if in Platform Mode MACHINE SETUP → SOFT TOUCH = NO and MACHINE SETUP → SKYGUARD = YES
	ST OVERRIDE SW	OPEN/CLOSED	Status of Platform SkyGuard Override Switch Input; only displayed if in Platform Mode MACHINE SETUP → SOFT TOUCH = YES and MACHINE SETUP → SKYGUARD = NO
	SG/ST OVRIDE SW	OPEN/CLOSED	Status of Platform SkyGuard Override Switch Input; only displayed if in Platform Mode and MACHINE SETUP → SOFT TOUCH = YES and MACHINE SETUP → SKYGUARD = YES
	MSSO SW	OPEN/CLOSED	Status of Ground MSSO Switch Input; only displayed if MACHINE SETUP → MARKET = CE
CAPACITY SW	OPEN/CLOSED	Status of Platform Dual Capacity Switch Input (400S, 18RS, 24RS); only displayed if Dual Capacity is configured	

Table 6-12. Machine Diagnostics Parameters

Diagnosics Submenu (Displayed on Analyzer 1 st Line)	Parameter (Displayed on Analyzer 1 st Line)	Parameter Value (Displayed on Analyzer 2 nd Line)	Description
PLATFORM LOAD (DISPLAY ONLY IF MACHINE SETUP LOAD SYSTEM NO)	PLATFORM LOAD	STATE: OK/OVERLOAD	LSS Status
	PLATFORM LOAD	ACTUAL: XXX.XKG	Platform Load ??? if Platform Load == Unhealthy
	PLATFORM LOAD2	GROSS: XXX.XKG	If 4-Cell LSS; Combined weight of all cells (accounting for sign) If 1-Cell LSS; Platform Gross used to calculate Platform Load ??? if (Platform Gross 1 == Unhealthy and Platform Gross 2 == Unhealthy)
	PLATFORM LOAD2	OFFSET: XXX.XKG	If 4-Cell LSS; Stored Platform Empty weight
	PLATFORM LOAD2	OFFSET 1: XXX.XKG	If 1-Cell LSS; Stored Unloaded Platform Weight of Strain Gauge 1 ??? if DTC 825 is active
	PLATFORM LOAD2	OFFSET 2: XXX.XKG	If 1-Cell LSS; Stored Unloaded Platform Weight of Strain Gauge 2 ??? if DTC 825 is active
	PLATFORM LOAD2	ACC'Y XXX.XKG	Stored Accessory weight; ??? if DTC 825 is active
	PLATFORM LOAD2	CELL 1: XXX.XKG	If 4-Cell LSS; Gross weight reading of Cell 1
	PLATFORM LOAD2	CELL 2: XXX.XKG	If 4-Cell LSS; Gross weight reading of Cell 2
	PLATFORM LOAD2	CELL 3: XXX.XKG	If 4-Cell LSS; Gross weight reading of Cell 3
	PLATFORM LOAD2	CELL 4: XXX.XKG	If 4-Cell LSS; Gross weight reading of Cell 4
	PLATFORM LOAD2	RAW 1: XXX.XKG	If 1-Cell LSS; Platform Gross 1; ??? if Platform Gross 1 == Unhealthy
	PLATFORM LOAD2	RAW 2: XXX.XKG	If 1-Cell LSS; Platform Gross 2; ??? if Platform Gross 2 == Unhealthy
CAN STATISTICS2	CAN 1 STATISTICS	RX/SEC: XXX	
	CAN 1 STATISTICS	TX/SEC: XXX	
	CAN 1 STATISTICS	BUS OFF: XXX	
	CAN 1 STATISTICS	PASSIVE: XXX	
	CAN 1 STATISTICS	MSG ERROR: XXXX	
	CAN 2 STATISTICS	RX/SEC: XXX	
	CAN 2 STATISTICS	TX/SEC: XXX	
	CAN 2 STATISTICS	BUS OFF: XXX	
	CAN 2 STATISTICS	PASSIVE: XXX	
	CAN 2 STATISTICS	MSG ERROR: XXXX	

Table 6-12. Machine Diagnostics Parameters

Diagnostics Submenu (Displayed on Analyzer 1 st Line)	Parameter (Displayed on Analyzer 1 st Line)	Parameter Value (Displayed on Analyzer 2 nd Line)	Description
DEBUG UGM I/O ²	DEBUG DIAG DIGITAL INPUTS	DIG IN J1-21 HIGH/LOW DIG IN J1-34 HIGH/LOW DIG IN J1-35 HIGH/LOW DIG IN J2-24 HIGH/LOW DIG IN J3-8 HIGH/LOW DIG IN J3-9 HIGH/LOW DIG IN J3-10 HIGH/LOW DIG IN J3-11 HIGH/LOW DIG IN J4-4 HIGH/LOW DIG IN J4-5 HIGH/LOW DIG IN J4-6 HIGH/LOW	Left and Right arrow keys scroll through the inputs. 1 st Line = DIG IN JX.XX and 2 nd Line displays measurement value
DEBUG UGM I/O ²	DEBUG DIAG DIGITAL INPUTS	DIG IN J4-7 HIGH/LOW DIG IN J4-8 HIGH/LOW DIG IN J4-9 HIGH/LOW DIG IN J4-10 HIGH/LOW DIG IN J4-11 HIGH/LOW DIG IN J4-16 HIGH/LOW DIG IN J4-17 HIGH/LOW DIG IN J4-18 HIGH/LOW DIG IN J4-19 HIGH/LOW DIG IN J4-20 HIGH/LOW DIG IN J4-21 HIGH/LOW DIG IN J4-22 HIGH/LOW DIG IN J4-23 HIGH/LOW DIG IN J4-30 HIGH/LOW DIG IN J4-33 HIGH/LOW DIG IN J4-34 HIGH/LOW DIG IN J4-35 HIGH/LOW DIG IN J7-2 HIGH/LOW DIG IN J7-3 HIGH/LOW DIG IN J7-12 HIGH/LOW DIG IN J7-15 HIGH/LOW DIG IN J7-21 HIGH/LOW DIG IN J12-8 HIGH/LOW	Left and Right arrow keys scroll through the inputs. 1 st Line = DIG IN JX.XX and 2 nd Line displays measurement value

Table 6-12. Machine Diagnostics Parameters

Diagnostics Submenu (Displayed on Analyzer 1 st Line)	Parameter (Displayed on Analyzer 1 st Line)	Parameter Value (Displayed on Analyzer 2 nd Line)	Description
DEBUG UGM I/O ²	DEBUG DIAG DIGITAL OUTPUTS	DIG OUT J1-2 ON/OFF	Left and Right arrow keys scroll through the inputs. 1 st Line = DIG OUT JX.XX and 2 nd Line displays output value
		DIG OUT J1-7 ON/OFF	
		DIG OUT J1-11 ON/OFF	
		DIG OUT J1-12 ON/OFF	
		DIG OUT J1-13 ON/OFF	
		DIG OUT J1-23 ON/OFF	
		DIG OUT J1-32 ON/OFF	
		DIG OUT J2-2 ON/OFF	
		DIG OUT J2-3 ON/OFF	
		DIG OUT J2-4 ON/OFF	
		DIG OUT J2-5 ON/OFF	
		DIG OUT J2-7 ON/OFF	
		DIG OUT J2-10 ON/OFF	
		DIG OUT J2-12 ON/OFF	
		DIG OUT J2-13 ON/OFF	
		DIG OUT J2-15 ON/OFF	
		DIG OUT J2-16 ON/OFF	
		DIG OUT J2-21 ON/OFF	
		DIG OUT J2-23 ON/OFF	
		DIG OUT J2-32 ON/OFF	
DIG OUT J2-33 ON/OFF			
DIG OUT J4-1 ON/OFF	Left and Right arrow keys scroll through the inputs. 1 st Line = DIG OUT JX.XX and 2 nd Line displays output value		
DIG OUT J4-2 ON/OFF			
DIG OUT J4-3 ON/OFF			
DIG OUT J4-13 ON/OFF			
DIG OUT J4-14 ON/OFF			
DIG OUT J4-15 ON/OFF			
DIG OUT J4-26 ON/OFF			
DIG OUT J4-27 ON/OFF			
DIG OUT J4-28 ON/OFF	Left and Right arrow keys scroll through the inputs. 1 st Line = DIG OUT JX.XX and 2 nd Line displays output value		
DIG OUT J4-29 ON/OFF			
DIG OUT LED ON/OFF			

Table 6-12. Machine Diagnostics Parameters

Diagnostics Submenu (Displayed on Analyzer 1 st Line)	Parameter (Displayed on Analyzer 1 st Line)	Parameter Value (Displayed on Analyzer 2 nd Line)	Description
DEBUG UGM I/O ²	DEBUG DIAG PWM OUTPUTS	PWM J1-1 XXX.XX% XXXHz PWM J1-3 XXX.XX% XXXHz PWM J1-6 XXX.XX% XXXHz PWM J1-10 XXX.XX% XXXHz PWM J1-20 XXX.XX% XXXHz PWM J1-22 XXX.XX% XXXHz PWM J2-8 XXX.XX% XXXHz PWM J2-9 XXX.XX% XXXHz PWM J2-11 XXX.XX% XXXHz PWM J2-19 XXX.XX% XXXHz PWM J2-20 XXX.XX% XXXHz PWM J2-22 XXX.XX% XXXHz PWM J2-26 XXX.XX% XXXHz PWM J2-27 XXX.XX% XXXHz PWM J2-31 XXX.XX% XXXHz PWM J2-34 XXX.XX% XXXHz PWM J2-35	Left and Right arrow keys scroll through the inputs. 1 st Line = PWM JX.XX and 2 nd Line displays output duty cycle and frequency.

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Table 6-12. Machine Diagnostics Parameters

Diagnosics Submenu (Displayed on Analyzer 1 st Line)	Parameter (Displayed on Analyzer 1 st Line)	Parameter Value (Displayed on Analyzer 2 nd Line)	Description			
DEBUG UGM I/O ²	DEBUG DIAG PWM OUTPUTS	XXX.XX% XXXHz	Left and Right arrow keys scroll through the inputs. 1 st Line = PWM JX.XX and 2 nd Line displays output duty cycle and frequency.			
		FET J3-1				
		XXX.XX% XXXHz				
		FET J3-2				
		XXX.XX% XXXHz				
		FET J3-4				
		XXX.XX% XXXHz				
		FET J3-5				
		XXX.XX% XXXHz				
		FET J3-6				
		XXX.XX% XXXHz				
		FET J3-14				
		XXX.XX% XXXHz				
		PWM J4-12				
XXX.XX% XXXHz						
DEBUG UGM I/O ²	ANALOG INPUTS	ADC J1-14 XXXX	Left and Right arrow keys scroll through the inputs. 1 st Line = ADC JX.XX and 2 nd Line displays raw A/D counts XXXX of measurement			
		ADC J1-15 XXXX				
DEBUG UGM I/O ²	ANALOG INPUTS	ADC J2-25 XXXX	Left and Right arrow keys scroll through the inputs. 1 st Line = ADC JX.XX and 2 nd Line displays raw A/D counts XXXX of measurement			
		ADC J3-13 XXXX				
		ADC J7-2 XXXX				
		ADC J7-04 XXXX				
		ADC J7-07 XXXX				
		ADC J7-08 XXXX				
		ADC J7-20 XXXX				
		ADC J8-02 XXXX				
		FREQUENCY INPUTS		FREQ IN J1-16 XXXXX Hz	FREQ IN J1-16 XXXXX Hz	Left and Right arrow keys scroll through the inputs. 1 st Line = FREQ IN JX.XX and 2 nd Line displays frequency of measurement XXXXX Hz
					FREQ IN J12-1 XXXXX Hz	
FREQ IN J12-2 XXXXX Hz						
CALIBRATION DATA ²	TILT X	XX.XX Deg	Calibration X offset for mechanical mounting of External Tilt sensor			
	TILT Y	XX.XX Deg	Calibration Y offset for mechanical mounting of External Tilt sensor			

Table 6-12. Machine Diagnostics Parameters

Diagnosics Submenu (Displayed on Analyzer 1 st Line)	Parameter (Displayed on Analyzer 1 st Line)	Parameter Value (Displayed on Analyzer 2 nd Line)	Description
DATALOG	DATALOG TIME	ON XXXXH XXM	*Controller On time
	DATALOG TIME	ENGINE XXXXH XXM	*Engine Running time
	DATALOG TIME	ENABLD XXXXH XXM	*Combined time for Machine Enabled in Platform Mode while ENGINE RUNNING + any function active while in Ground Mode (excludes APU/Emergency Descent)
	DATALOG TIME	AUX XXXXH XXM	Auxiliary Power/Emergency Descent Active time
	DATALOG TIME	DRIVE XXXXH XXM	Drive Forward + Reverse time
	DATALOG TIME	DRV MS XXXXH XXM	Max Speed Drive Forward + Reverse time
	DATALOG TIME	DRV MT XXXXH XXM	Max Torque Drive Forward + Reverse time
	DATALOG TIME	DRV ME XXXXH XXM	Mid Engine Drive Forward + Reverse time
	DATALOG TIME	DRV CP XXXXH XXM	Creep Drive Forward + Reverse time
	DATALOG TIME	STEER XXXXH XXM	Steer Left + Right time
	DATALOG TIME	SWING XXXXH XXM	Swing Left + Right time
	DATALOG TIME	LIFT XXXXH XXM	Lift Up + Down time
	DATALOG TIME	TELE XXXXH XXM	Tele In + Out time
	DATALOG TIME	JIB XXXXH XXM	Jib Lift Up + Down time (MACHINE SETUP → JIB = YES)
	DATALOG TIME	LEVEL XXXXH XXM	Platform Level Up + Down time
	DATALOG TIME	ROTATE XXXXH XXM	Platform Rotate Left + Right time
	DATALOG TIME	GEN XXXXH XXM	*Generator Enable Relay on time
	For time logging of functions with 30-second resolution, the first 15 seconds of function run time shall be logged as a ½ minute increment and there after every 30 seconds of run time shall be logged as a ½ minute increment.		
	*The functions annotated with an asterisk in the description are function timers with 60-second resolution, for which the timer in the rule above is doubled.		
	DATALOG CYCLES	DRVE FWD XXXXXXXX	Number of times Drive Forward is commanded
DATALOG CYCLES	DRVE REV XXXXXXXX	Number of times Drive Reverse is commanded	
DATALOG CYCLES	STEER LT XXXXXXXX	Number of times Steer Left Output is commanded	
DATALOG CYCLES	STEER RT XXXXXXXX	Number of times Steer Right Output is commanded	
DATALOG CYCLES	SWING LT XXXXXXXX	Number of times Swing Left output is commanded	
DATALOG CYCLES	SWING RT XXXXXXXX	Number of times Swing Right output is commanded	
DATALOG CYCLES	LIFT UP XXXXXXXX	Number of times Lift Up output is commanded	
DATALOG CYCLES	LIFT DN XXXXXXXX	Number of times Lift Down output is commanded	
DATALOG CYCLES	TELE IN XXXXXXXX	Number of times Tele In output is commanded	
DATALOG CYCLES	TELE OUT XXXXXXXX	Number of times Tele Out output is commanded	
DATALOG CYCLES	JIB UP XXXXXXXX	Number of times Jib Lift Up is commanded (MACHINE SETUP → JIB = YES)	
DATALOG CYCLES	JIB DOWN XXXXXXXX	Number of times Jib Lift Down is commanded (MACHINE SETUP → JIB = YES)	
DATALOG CYCLES	LEVEL UP XXXXXXXX	Number of times Level Up is commanded	

Table 6-12. Machine Diagnostics Parameters

Diagnostics Submenu (Displayed on Analyzer 1 st Line)	Parameter (Displayed on Analyzer 1 st Line)	Parameter Value (Displayed on Analyzer 2 nd Line)	Description
DATALOG	DATALOG CYCLES	LEVEL DN XXXXXXXX	Number of times Level Down is commanded
	DATALOG CYCLES	ROT LEFT XXXXXXXX	Number of times Rotate Left is commanded
	DATALOG CYCLES	ROT RIGHT XXXXXXXX	Number of times Rotate Right is commanded
	DATALOG CYCLES	UGM ON XXXXXXXX	Number of times Power is applied
	DATALOG CYCLES	GND OPS XXXXXXXX	Number of times machine is in Ground Mode and any function is active (excludes APU/Emergency Descent)
	DATALOG CYCLES	PLAT OPS XXXXXXXX	Number of times machine is Enabled from Platform Station (excludes APU/Emergency Descent)
	DATALOG CYCLES	AUX OPS XXXXXXXX	Number of times machine Auxiliary Power/Emergency Descent is Enabled
	DATALOG CYCLES	GEN ON XXXXXXXX	Number of times Generator Enable Relay is turned On; information logged and stored only if machine configured for generator.
	DATALOG CYCLES	BOOM TR XXXXXXXX	Number of times the Boom transitions from Below Elevation to Above Elevation
	DATALOG CYCLES	BOOM UP XXXXXXXX	Number of times the Boom transitions from < 47 deg to > 50 deg
	DATALOG CYCLES	TELE TR XXXXXXXX	"Number of times the Boom transitions from Retracted to Not Retracted position"
	DATALOG CYCLES	DUAL CAP XXXXXXXX	Number of times the Boom transitions from Restricted to Unrestricted mode (Dual Capacity is configured)
	Cycle counter shall increment up to a limit of 1,000,000, except Steer shall have a limit of 2,000,000 per direction.		
	DATALOG: MAX	UGM TEMP XXXC/ UGM TEMP XXXF	Hottest Temp observed by UGM
	DATALOG: MIN	UGM TEMP XXXC/ UGM TEMP XXXF	Coldest Temp observed by UGM
	DATALOG: MAX	UGM VOLT XX.XV	Maximum input voltage observed by UGM
DATALOG: MACHINE	RENTAL XXXXH XXM	*Stores Machine hours since last memory clear	
DATALOG: ERASE ²	MACHINE RENTAL?	Erases stored machine rental hours	
VERSIONS:	UGM	SOFTWARE PX.X	
	UGM	CNST DATA PX.X	
	UGM	HARDWARE REV X	
	UGM	S/N XXXXXXX	
	UGM	P/N XXXXXXXXXX	
VERSIONS:	PLATFORM MODULE	SOFTWARE PX.X	
	PLATFORM MODULE	HARDWARE REV X	
	PLATFORM MODULE	S/N XXXXXXX	
	LSS MODULE	SOFTWARE PX.X	Displayed on if LSS is configured (4-Cell LSS)
	LSS MODULE	HARDWARE REV X	Display if LSS is configured (4-Cell LSS)
	TCU MODULE	SOFTWARE X.Xx	Displayed on if TCU is configured
	TCU MODULE	HARDWARE REV X	Displayed on if TCU is configured
	TCU MODULE	S/N XXXXXXX	Displayed on if TCU is configured
	GROUND DISPLAY	SOFTWARE PX.X	Displayed
	ANALYZER	ANALYZER vX.X	

6.8 MACHINE FAULT CODES

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	4005C	4605JC
Note: "Controls Initialized" means all controls have been released / returned to neutral, and the machine enable (footswitch) has been released.					
001	EVERYTHING OK	"Machine is in Platform Mode; The UGM determines no problems exist"		X	X
002	GROUND MODE OK	"Machine is in Ground Mode; The UGM determines no problems exist"		X	X
0010	RUNNING AT CUTBACK – OUT OF TRANSPORT POSITION	Machine is in the Out of Transport position	Machine is not in the Out of Transport position	X	X
0011	FSW OPEN	"Machine is in Platform Mode; Any of the following Platform inputs become active after power up, but before Machine Enabled: Drive joystick is not in the neutral position Steer; Telescope; Platform Level; Platform Rotate; Jib Lift (if MACHINE SETUP ? JIB = YES)"	Controls initialized	X	X
0012	RUNNING AT CREEP - CREEP SWITCH OPEN	"Machine is in Platform Mode; Platform Creep switch input = HIGH; DTC 0013 is not active"	Platform Creep switch input = Low	X	X
0013	RUNNING AT CREEP - TILTED AND ABOVE ELEVATION	"Machine is in Platform Mode; The Boom is Above Elevation; Machine chassis is considered Tilted"	Not all of the trigger conditions are met	X	X
0015	LOAD SENSOR READING UNDER WEIGHT	"MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 1-Cell LSS; UGM determines that the Platform Load < - 50 lbs. for 2 seconds; Do not report if DTC (0030, 825 or 8211) is active or if Platform Load == Unhealthy"	"UGM determines that the Platform Load >= -50 lbs. for 5 seconds"	X	X
0030 ¹	RUNNING AT CREEP – PLATFORM STOWED	Platform Stowed State = Set	Platform Stowed State = Cleared	X	X
0031	FUEL LEVEL LOW – ENGINE SHUTDOWN	MACHINE SETUP → FUEL LEVEL ≠ NONE; Engine Shutdown has occurred due to Fuel Level = EMPTY condition.	Power Cycled	X	X
0035	APU ACTIVE	Auxiliary Power/Emergency Descent Mode is active	Auxiliary Power/Emergency Descent Mode is not active	X	X
0036	FUNCTION PREVENTED - FUNCTION SELECTED BEFORE GROUND ENABLE	Machine is in Ground Mode; Any of the following Ground inputs become active after power up, but before Machine Enabled: Lift; Swing; Telescope; Platform Level; Platform Rotate; Jib Lift (if MACHINE SETUP → JIB = YES)	Controls initialized	X	X
0039	SKYGUARD ACTIVE – FUNCTIONS CUTOUT	MACHINE SETUP → SKYGUARD = YES; Machine is in Platform Mode; SkyGuard Enabled	Not all of the trigger conditions are met	X	X

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	4605JC
211	POWER CYCLE			X	X
212	KEYSWITCH FAULTY	UGM Ground Mode input J7-3 input = High; UGM Platform Mode input J7-2 input = High	(J7-3 input = LOW) or (J7-2 input = LOW)	X	X
213	FSW FAULTY	The ground footswitch input and platform footswitch input have been both HIGH or both LOW for greater than or equal to 1 second	Power Cycled	X	X
221	FUNCTION PROBLEM - HORN PERMANENTLY SELECTED	Machine is in Platform Mode; The Horn switch input = High at Startup	The Horn switch input = Low	X	X
224	FUNCTION PROBLEM - STEER LEFT PERMANENTLY SELECTED	Machine is in Platform Mode; The Steer Left switch input = High at Startup	The Steer Left switch input = Low; Steer Left and Right and full Drive speed permitted after controls are initialized	X	X
225	FUNCTION PROBLEM - STEER RIGHT PERMANENTLY SELECTED	Machine is in Platform Mode; The Steer Right switch input = High at Startup	The Steer Right switch input = Low; Steer Left and Right and full Drive speed permitted after controls are initialized	X	X
227	STEER SWITCHES FAULTY	The Steer Left switch input = High; The Steer Right switch input = High; (detectable in Platform or Ground mode)	The Steer Left switch input = Low; The Steer Right switch input = Low; Steer and full Drive speed permitted after controls are initialized	X	X
2211	FSW INTERLOCK TRIPPED	Machine is in Platform Mode; The Footswitch is active for more than seven seconds with no Drive, Steer, or Boom commands	The footswitch is released	X	X
2212	DRIVE LOCKED - JOYSTICK MOVED BEFORE FOOTSWITCH	Machine is in Platform Mode; The UGM detects one of the following conditions: Drive joystick is not in the neutral position at Startup; Drive joystick is not in the neutral position when Footswitch becomes active or while DTC 2213, 2221 or 2223 is active	If triggered by the Drive joystick not being in the neutral position at Startup, then (Drive joystick is returned to its neutral position) and (Drive and Steer permitted after controls initialized) If triggered by the Drive joystick not being in the neutral position when Footswitch becomes active or while DTC 2213, 2221 or 2223, then controls initialized	X	X
2213	STEER LOCKED - SELECTED BEFORE FOOTSWITCH	Machine is in Platform Mode; A Steer input is active when Footswitch becomes active or while DTC 2212, 2221 or 2223 is active	Controls initialized	X	X
2216	D/S JOY. OUT OF RANGE HIGH	The PM detects that the Drive or Steer joystick signal voltage > 8.1V and reports the fault to the UGM.	The PM no longer reports the fault	X	X
2217	D/S JOY. CENTER TAP BAD	The PM detects that the Drive or Steer center tap voltage is not between 3.31 volts and 3.75 volts and reports the fault to the UGM	The PM detects that the drive/steer center tap voltage is between 3.31 and 3.75 volts and no longer reports the fault to the UGM	X	X
2219	L/S JOY. OUT OF RANGE HIGH	The PM detects that the Lift or Swing joystick signal voltage > 8.1V and reports the fault to the UGM.	The PM detects that the Lift and Swing joystick signal voltage is < 8.1V and no longer reports the fault to the UGM	X	X

SECTION 6 - JLG CONTROL SYSTEM

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	4605JC
2220	L/S JOY. CENTER TAP BAD	The PM detects that the Lift or Swing center tap voltage is not between 3.31 volts and 3.75 volts and reports the fault to the UGM	The PM detects that the lift/swing center tap voltage is between 3.31 and 3.75 volts and no longer reports the fault to the UGM	X	X
2221	LIFT/SWING LOCKED - JOYSTICK MOVED BEFORE FOOTSWITCH	Machine is in Platform Mode; The UGM detects one of the following conditions: Lift and/or Swing joystick is not in the neutral position at Startup; Lift and/or Swing joystick is not in the neutral position when Footswitch becomes active or while DTC 2212, 2213 or 2223 is active	If triggered by the Lift and/or Swing joystick not being in the neutral position at Startup, then (Lift and/or Swing joystick is returned to its neutral position) and (Lift and Swing permitted after controls initialized) If triggered by the Lift and/or Swing joystick is not in the neutral position when Footswitch becomes active or while DTC 2212, 2213 or 2223 is active, then controls initialized	X	X
2222	WAITING FOR FSW TO BE OPEN	Machine is in Platform Mode; Footswitch is active at Start Up	Controls initialized	X	X
2223	FUNCTION SWITCHES LOCKED - SELECTED BEFORE ENABLE	Machine is in Platform Mode; Any of the following Platform inputs are active when Footswitch becomes active or while DTC 2212, 2213 or 2221 is active: Tower Lift; Telescope; Platform Level; Platform Rotate; Jib Lift (if MACHINE SETUP → JIB = YES)	Controls initialized	X	X
2224	FOOTSWITCH SELECTED BEFORE START	Machine is in Platform Mode; The engine is stopped; Startup time has expired; The Footswitch is active before the Platform Engine Start switch input = High	The Platform Engine Start switch input = Low;	X	X
2247	FUNCTION PROBLEM - PLATFORM ROTATE LEFT PERMANENTLY SELECTED	Machine is in Platform Mode; The Platform Rotate Left switch input = High at Startup	The Platform Rotate Left switch input = Low; Platform Rotate Left and Right permitted after controls are initialized	X	X
2248	FUNCTION PROBLEM - PLATFORM ROTATE RIGHT PERMANENTLY SELECTED	Machine is in Platform Mode; The Platform Rotate Right switch input = High at Startup	The Platform Rotate Right switch input = Low; Platform Rotate Left and Right permitted after controls are initialized	X	X
2249	FUNCTION PROBLEM - JIB LIFT UP PERMANENTLY SELECTED	Machine is in Platform Mode; MACHINE SETUP → JIB = YES; The Jib Lift Up switch input = High at Startup	The Jib Lift Up switch input = Low; Jib Lift Up and Down permitted after controls are initialized	X	X
2250	FUNCTION PROBLEM - JIB LIFT DOWN PERMANENTLY SELECTED	Machine is in Platform Mode; MACHINE SETUP → JIB = YES; The Jib Lift Down switch input = High at Startup	The Jib Lift Down switch input = Low; Jib Lift Up and Down permitted after controls are initialized	X	X
2251	FUNCTION PROBLEM - TELESCOPE IN PERMANENTLY SELECTED	Machine is in Platform Mode; The Telescope In switch input = High at Startup	The Telescope In switch input = Low; Telescope permitted after controls are initialized	X	X
2252	FUNCTION PROBLEM - TELESCOPE OUT PERMANENTLY SELECTED	Machine is in Platform Mode; The Telescope Out switch input = High at Startup	The Telescope Out switch input = Low; Telescope permitted after controls are initialized	X	X
2257	FUNCTION PROBLEM - TOWER LIFT UP PERMANENTLY SELECTED	Machine is in Platform Mode; The Tower Lift Up switch input = High at Startup	The Tower Lift In switch input = Low; Tower Lift Up and Down permitted after controls are initialized		

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	460SJC
2258	FUNCTION PROBLEM - TOWER LIFT DOWN PERMANENTLY SELECTED	Machine is in Platform Mode; The Tower Lift Down switch input = High at Startup	The Tower Lift Down switch input = Low; Tower Lift Up and Down permitted after controls are initialized		
2262	FUNCTION PROBLEM - PLATFORM LEVEL UP PERMANENTLY SELECTED	Machine is in Platform Mode; The Platform Level Up switch input = High at Startup	The Platform Level Up switch input = Low; Platform Level Up and Down permitted after controls are initialized	X	X
2263	FUNCTION PROBLEM - PLATFORM LEVEL DOWN PERMANENTLY SELECTED	Machine is in Platform Mode; The Platform Level Down switch input = High at Startup	The Platform Level Down switch input = Low; Platform Level Up and Down permitted after controls are initialized	X	X
2264	FUNCTION PROBLEM - DOS OVERRIDE PERMANENTLY SELECTED	Machine is in Platform Mode; The DOS Override switch input = High at Startup	The DOS Override switch input = Low	X	X
2286	FUNCTION PROBLEM - SOFT TOUCH / SKYGUARD OVERRIDE PERMANENTLY SELECTED	[(MACHINE SETUP → SKYGUARD = YES) or (MACHINE SETUP → SOFT TOUCH = YES)]; Machine is in Platform Mode; The Soft Touch / SkyGuard Override switch input = High at Startup	The Soft Touch / SkyGuard Override switch input = Low	X	X
234	FUNCTION SWITCHES FAULTY - CHECK DIAGNOSTICS/BOOM	The UGM detects one of the following conditions (continuous monitoring): The machine is in Ground Mode and both direction inputs of the following boom controls are engaged at the same time: Engine Start/Aux, Telescope, Platform Level, Platform Rotate, Jib Lift, Tower Lift, Lift, or Swing. The machine is in Platform Mode and both direction inputs of the following boom controls are engaged at the same time: Engine Start/Aux, Telescope, Platform Level, Platform Rotate, Jib Lift (MACHINE SETUP → JIB = YES); or for Drive Mode – Max Speed/ Max Torque	None of the boom controls that trigger this fault have both of their direction inputs engaged at the same time	X	X
235	FUNCTION SWITCHES LOCKED - SELECTED BEFORE AUX POWER	The UGM detects one of the following conditions: The machine is in Ground Mode and the engine is stopped and the ground APU/Function Enable switch becomes engaged while a Ground control input is already engaged. The machine is in Platform Mode and the engine is stopped and the platform APU/Auxiliary Descent switch becomes engaged while a Platform control input is already engaged.	The applicable APU/Auxiliary Descent switch is disengaged or all applicable control inputs become disengaged or the engine state becomes ENGINE RUNNING	X	X
236	FUNCTION SWITCHES LOCKED - SELECTED BEFORE START SWITCH	The UGM detects one of the following conditions: The machine is in Ground Mode and the engine is stopped and any configured boom control is already engaged and the ground start switch changes from not engaged to engaged. The machine is in Platform Mode and the engine is stopped and any drive/steer or configured boom control is already engaged and the footswitch is not engaged and the platform start switch changes from not engaged to engaged.	The selected station's start switch is no longer engaged	X	X

SECTION 6 - JLG CONTROL SYSTEM

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	4605JC
237	START SWITCH LOCKED - SELECTED BEFORE KEYSWITCH	The start switch for the selected station is engaged during the UGM startup sequence	The selected station's start switch is no longer engaged	X	X
2310	FUNCTION PROBLEM - GROUND ENABLE PERMANENTLY SELECTED	Machine is in Ground Mode; The Ground Enable switch input = High at Startup	Controls initialized	X	X
2343	BOOM ANGLE SENSOR - NOT CALIBRATED	The Boom Angle Sensor has not been calibrated	Boom angle sensor calibrated	X	X
2344	BOOM ANGLE SENSOR - OUT OF RANGE HIGH	The UGM detects that Boom Angle Sensor #1 or Boom Angle Sensor #2 signal voltage > 4.5V.	Power Cycled	X	X
2345	BOOM ANGLE SENSOR - OUT OF RANGE LOW	The UGM detects that Boom Angle Sensor #1 or Boom Angle Sensor #2 signal voltage < 0.5V.	Power Cycled	X	X
2346	BOOM ANGLE SENSOR - NOT RESPONDING	The UGM detects the following conditions: The UGM detects < 1 deg change of Boom Angle Main Lift Up or Main Lift Down output value ≥ Creep output value Main Lift Up or Main Lift Down has been active longer than 5 seconds.	Power Cycled	X	X
2370	FUNCTION PROBLEM - JIB LIFT UP PERMANENTLY SELECTED	Machine is in Ground Mode; MACHINE SETUP → JIB = YES; The Jib Lift Up switch input = High at Startup	The Jib Lift Up switch input = Low; Jib Lift Up and Down permitted after controls are initialized	X	X
2371	FUNCTION PROBLEM - JIB LIFT DOWN PERMANENTLY SELECTED	Machine is in Ground Mode; MACHINE SETUP → JIB = YES; The Jib Lift Down switch input = High at Startup	The Jib Lift Down switch input = Low; Jib Lift Up and Down permitted after controls are initialized	X	X
2372	FUNCTION PROBLEM - SWING LEFT PERMANENTLY SELECTED	Machine is in Ground Mode; The Swing Left switch input = High at Startup	The Swing Left switch input = Low; Swing Left and Right permitted after controls are initialized	X	X
2373	FUNCTION PROBLEM - SWING RIGHT PERMANENTLY SELECTED	Machine is in Ground Mode; The Swing Right switch input = High at Startup	The Swing Left switch input = Low; Swing Left and Right permitted after controls are initialized	X	X
2396	BOOM ANGLE SENSOR DISAGREEMENT	The UGM detects that Boom Angle Sensor #1 and Boom Angle Sensor #2 readings disagree ≥ 2.5 deg for longer than 5 seconds; Do not report if DTC 2343 is active	Power Cycled	X	X
23104	BOOM TRANSPORT SWITCH DISAGREEMENT	The UGM detects that Boom Elevation switch #1 and switch #2 are not reporting congruent switch states, as defined in the Boom Elevation Switch Evaluation section.	Power Cycled		
23105	FUNCTION PROBLEM - TOWER LIFT UP PERMANENTLY SELECTED	Machine is in Ground Mode; The Tower Lift Up switch input = High at Startup	The Tower Lift Up switch input = Low; Tower Lift Up and Down permitted after controls are initialized		

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	4605JC
23106	FUNCTION PROBLEM – TOWER LIFT DOWN PERMANENTLY SELECTED	Machine is in Ground Mode; The Tower Lift Down switch input = High at Startup	The Tower Lift Down switch input = Low; Tower Lift Up and Down permitted after controls are initialized		
23107	FUNCTION PROBLEM - LIFT UP PERMANENTLY SELECTED	Machine is in Ground Mode; The Lift Up switch input = High at Startup	The Lift Up switch input = Low; Lift Up and Down permitted after controls are initialized	X	X
23108	FUNCTION PROBLEM - LIFT DOWN PERMANENTLY SELECTED	Machine is in Ground Mode; The Lift Down switch input = High at Startup	The Lift Down switch input = Low; Lift Up and Down permitted after controls are initialized	X	X
23109	FUNCTION PROBLEM - TELESCOPE IN PERMANENTLY SELECTED	Machine is in Ground Mode; The Telescope In switch input = High at Startup	The Telescope In switch input = Low; Telescope In and Out permitted after controls are initialized	X	X
23110	FUNCTION PROBLEM - TELESCOPE OUT PERMANENTLY SELECTED	Machine is in Ground Mode; The Telescope Out switch input = High at Startup	The Telescope Out switch input = Low; Telescope In and Out permitted after controls are initialized	X	X
23111	FUNCTION PROBLEM - PLATFORM LEVEL UP PERMANENTLY SELECTED	Machine is in Ground Mode; The Platform Level Up switch input = High at Startup	The Platform Level Up switch input = Low; Platform Level Up and Down permitted after controls are initialized	X	X
23112	FUNCTION PROBLEM - PLATFORM LEVEL DOWN PERMANENTLY SELECTED	Machine is in Ground Mode; The Platform Level Down switch input = High at Startup	The Platform Level Down switch input = Low; Platform Level Up and Down permitted after controls are initialized	X	X
23113	FUNCTION PROBLEM - PLATFORM ROTATE LEFT PERMANENTLY SELECTED	Machine is in Ground Mode; The Platform Rotate Left switch input = High at Startup	The Platform Rotate Left switch input = Low; Platform Rotate Left and Right permitted after controls are initialized	X	X
23114	FUNCTION PROBLEM - PLATFORM ROTATE RIGHT PERMANENTLY SELECTED	Machine is in Ground Mode; The Platform Rotate Right switch input = High at Startup	The Platform Rotate Right switch input = Low; Platform Rotate Left and Right permitted after controls are initialized	X	X
23154	TELESCOPE RETRACT SWITCHES - DISAGREEMENT	The UGM detects the following conditions: Telescope Retracted Switch #1 and Telescope Retracted Switch #2 readings disagree for longer than 5 seconds; Telescope In or Telescope Out output value \geq Creep output value	Power Cycled	X	X
23155	SWING SWITCHES - DISAGREEMENT	The UGM detects the following conditions: Swing Switch #1 and Swing Switch #2 readings disagree for longer than 5 seconds; Swing Left or Swing Right value \geq Creep output value	Power Cycled		
23163	FUNCTION PROBLEM – MSSO PERMANENTLY SELECTED	The MSSO switch input = Low at Startup	Power Cycled	X	X
23170	BOOM ANGLE SENSOR - SINGLE POINT CALIBRATION PERFORMED	Single point Boom Angle calibration is successfully completed	Fault shall be retentive through Power Cycled; Can be reset if CALIBRATIONS → BOOM ANGLE is successfully completed	X	X

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Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	460SJC
23173	CAPACITY LENGTH SWITCHES - DISAGREEMENT	Dual Capacity is configured; The UGM detects the following conditions: Capacity Length Switch #1 and Capacity Length Switch #2 readings disagree for longer than 5 seconds; Telescope In or Telescope Out output value \geq Creep output value	Power Cycled	X	X
23193	TELESCOPE CUTBACK SWITCH - NOT RESPONDING	Telescope Cutback is configured; The UGM detects the following conditions: Telescope Cutback Switch input = Low for longer than 10 seconds; Telescope In or Telescope Out output value \geq Creep output value	Power Cycled		
241	AMBIENT TEMPERATURE SENSOR – OUT OF RANGE LOW	MACHINE SETUP \rightarrow TEMP CUTOUT = YES; Ambient Temperature sensor reading \leq - 50C; Do not report if DTC 6657 is active	Ambient Temperature sensor reading $>$ - 50C; Full Speed permitted after controls are initialized	X	X
242	AMBIENT TEMPERATURE SENSOR – OUT OF RANGE HIGH	MACHINE SETUP \rightarrow TEMP CUTOUT = YES; Ambient Temperature sensor reading \geq 85C; Do not report if DTC 6657 is active	Ambient Temperature sensor reading $<$ 85C; Full Speed permitted after controls are initialized	X	X
259	MODEL CHANGED – HYDRAULICS SUSPENDED – CYCLE EMS	The MACHINE SETUP \rightarrow MODEL NUMBER is changed using the analyzer	Power Cycled	X	X
2513	GENERATOR MOTION CUTOUT ACTIVE	MACHINE SETUP \rightarrow GEN SET = BELT DRIVE; MACHINE SETUP \rightarrow GEN SET CUTOUT = MOTION CUTOUT; The platform Generator Switch is engaged Footswitch State = Depressed The machine is in Platform mode	Not all of the trigger conditions are met	X	X
2514	BOOM PREVENTED – DRIVE SELECTED	MACHINE SETUP \rightarrow FUNCTION CUTOUT = BOOM CUTOUT; Drive or Steer is already engaged; The boom is Above Elevation The operator is attempting to activate one of the boom functions DTC 2514 supercedes DTC 2518 if drive/steer and boom functions are both active when machine transitions from Below Elevation to Above Elevation.	Not all of the trigger conditions are met	X	X
2516	DRIVE PREVENTED – ABOVE ELEVATION	MACHINE SETUP \rightarrow FUNCTION CUTOUT = DRIVE CUTOUT The boom is Above Elevation The operator is attempting to activate Drive or Steer	Not all of the trigger conditions are met	X	X
2517	DRIVE PREVENTED – TILTED & ABOVE ELEVATION	MACHINE SETUP \rightarrow FUNCTION CUTOUT = DRIVE CUT E&T The boom is Above Elevation The chassis is considered Tilted The operator is attempting to activate Drive or Steer	Not all of the trigger conditions are met	X	X
2518	DRIVE PREVENTED – BOOM SELECTED	MACHINE SETUP \rightarrow FUNCTION CUTOUT = BOOM CUTOUT The boom is Above Elevation Any boom function is already active The operator attempts to activate Drive or Steer	Not all of the trigger conditions are met	X	X

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	4605JC
2519	DRIVE PREVENTED - TILTED & EXTENDED OR HIGH ANGLE	Chassis Tilt is > 1.8 degrees and either the boom is above 55 degrees main boom angle and/or the boom is telescoped out beyond the drive disable switches. (Dual Cap Prox.)	Boom lifted below 55 degrees and/or the boom retracted to inside the drive disable length switches. (Dual Cap)	X	X
2548	SYSTEM TEST MODE ACTIVE	UGM determines that System Test Mode is active	Power Cycle	X	X
2549	DRIVE & BOOM PREVENTED - SOFT TOUCH ACTIVE	MACHINE SETUP → SOFT TOUCH = YES; Machine is in Platform Mode; Soft Touch State = Enabled	Not all of the trigger conditions are met	X	X
2563	SKYGUARD SWITCH – DISAGREEMENT	MACHINE SETUP → SKYGUARD = YES; Machine is in Platform Mode; [(SkyGuard input #1 Platform Module J7-18) ≠ (SkyGuard input #2 Platform Module J1-23)] > 160ms	[(SkyGuard inputs (Platform Module J7- 18 = High) and (Platform Module J1-23 = High)) and (Footswitch State = Not Depressed)]	X	X
2564	DRIVE PREVENTED - LEFT BRAKE NOT RELEASING			X	X
2568	TEMPERATURE CUTOUT ACTIVE – AMBIENT TEMPERATURE TOO LOW	Low Temperature Cutout = Active	Low Temperature Cutout = Inactive; Full Speed permitted after controls are initialized	X	X
2576	PLATFORM LEVEL PREVENTED – ABOVE ELEVATION	Platform Level Override Cutout = Enabled; The Platform Level Up or Down switch input = High; Footswitch is active	Controls initialized	X	X
331	BRAKE – SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled	X	X
332	BRAKE – OPEN CIRCUIT	The UGM detects an open circuit at this output	Power Cycled	X	X
334	LIFT UP VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Full speed Lift Up and Down permitted after controls are initialized	X	X
336	LIFT DOWN VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Full speed Lift Up and Lift Down permitted after controls are initialized	X	X
3311	GROUND ALARM – SHORT TO BATTERY	MACHINE SETUP → ALARM / HORN = SEPARATE; The UGM detects a short to battery on J2-2	Power Cycled	X	X
3358	MAIN DUMP VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
3359	MAIN DUMP VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	Power Cycled	X	X
3360	MAIN DUMP VALVE – SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled	X	X
3361	BRAKE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X

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Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	460SJC
3362	START SOLENOID – SHORT TO GROUND	UGM detects a short to ground at this output	Power Cycled	X	X
3363	START SOLENOID – OPEN CIRCUIT	UGM detects an open circuit at this output; if MACHINE SETUP → ENGINE, only evaluate until first Start is attempted for each power cycle due to possibility of ECU opening ground solenoid return path to disable Start and causing erroneous diagnostics.	Power Cycled	X	X
3364	START SOLENOID – SHORT TO BATTERY	UGM detects a short to battery at this output	Power Cycled	X	X
3365	STEER DUMP VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled		
3366	STEER DUMP VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	Power Cycled		
3367	STEER DUMP VALVE – SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled		
3368	TWO SPEED VALVE - SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
3369	TWO SPEED VALVE - OPEN CIRCUIT	The UGM detects an open circuit at this output	Power Cycled	X	X
3370	TWO SPEED VALVE - SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled	X	X
3371	GROUND ALARM – SHORT TO GROUND	MACHINE SETUP → ALARM / HORN = SEPARATE; The UGM detects a short to ground on J2-2	Power Cycled	X	X
3372	GROUND ALARM – OPEN CIRCUIT	MACHINE SETUP → ALARM / HORN = SEPARATE; The UGM detects an open circuit on J2-2	Power Cycled	X	X
3373	GEN SET/WELDER – SHORT TO GROUND	MACHINE SETUP → GEN SET = BELT DRIVE and the UGM detects a short to ground at this output	Power Cycled	X	X
3374	GEN SET/WELDER – OPEN CIRCUIT	MACHINE SETUP → GEN SET = BELT DRIVE and the UGM detect an open circuit at this output	Power Cycled	X	X
3375	GEN SET/WELDER – SHORT TO BATTERY	MACHINE SETUP → GEN SET = BELT DRIVE and the UGM detects a short to battery at this output	Power Cycled	X	X
3376	HEAD TAIL LIGHT – SHORT TO GROUND	MACHINE SETUP → H & T LIGHTS = YES and the UGM detects a short to ground at this output	Power Cycled	X	X

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	4605JC
3377	HEAD TAIL LIGHT – OPEN CIRCUIT	MACHINE SETUP → H & T LIGHTS =YES and the UGM detects an open circuit at this output	Power Cycled	X	X
3378	HEAD TAIL LIGHT – SHORT TO BATTERY	MACHINE SETUP → H & T LIGHTS =YES and the UGM detects a short to battery at this output	Power Cycled	X	X
3379	HOURLY METER – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled		
3381	HOURLY METER – SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled		
3382	PLATFORM LEVEL UP VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
3383	PLATFORM LEVEL UP VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Full speed Platform Level Up and Down permitted after controls are initialized	X	X
3384	PLATFORM LEVEL UP VALVE – SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled	X	X
3388	PLATFORM LEVEL DOWN VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
3389	PLATFORM LEVEL DOWN VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Full speed Platform Level Up and Platform Level Down permitted after controls are initialized	X	X
3390	PLATFORM LEVEL DOWN VALVE – SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled	X	X
3394	PLATFORM ROTATE LEFT VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
3395	PLATFORM ROTATE LEFT VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Full speed Platform Rotate Left and Right permitted after controls are initialized	X	X
3396	PLATFORM ROTATE LEFT VALVE – SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled	X	X
3397	PLATFORM ROTATE RIGHT VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
3398	PLATFORM ROTATE RIGHT VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Full speed Platform Rotate Left and Right permitted after controls are initialized	X	X

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Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	4605JC
3399	PLATFORM ROTATE RIGHT VALVE – SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled	X	X
33100	JIB LIFT UP VALVE - SHORT TO GROUND	MACHINE SETUP → JIB = YES; The UGM detects a short to ground at this output	Power Cycled	X	X
33101	JIB LIFT UP VALVE - OPEN CIRCUIT	MACHINE SETUP → JIB = YES; The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Full speed Jib Lift Up and Down permitted after controls are initialized	X	X
33102	JIB LIFT UP VALVE - SHORT TO BATTERY	MACHINE SETUP → JIB = YES; The UGM detects a short to battery at this output	Power Cycled	X	X
33103	JIB LIFT DOWN VALVE - SHORT TO GROUND	MACHINE SETUP → JIB = YES; The UGM detects a short to ground at this output	Power Cycled	X	X
33104	JIB LIFT DOWN VALVE - OPEN CIRCUIT	MACHINE SETUP → JIB = YES; The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Jib Lift Up permitted after controls are initialized Full speed Jib Lift Down permitted after controls are initialized	X	X
33105	JIB LIFT DOWN VALVE - SHORT TO BATTERY	MACHINE SETUP → JIB = YES; The UGM detects a short to battery at this output	Power Cycled	X	X
33106	TOWER LIFT UP VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled		
33107	TOWER LIFT UP VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Full speed Tower Lift Up and Down permitted after controls are initialized		
33109	TOWER LIFT DOWN VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled		
33110	TOWER LIFT DOWN VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Tower Lift Up permitted after controls are initialized; Full speed Tower Lift Down permitted after controls are initialized		
33118	SWING RIGHT VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
33119	SWING RIGHT VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Full speed Swing Left and Right permitted after controls are initialized	X	X
33120	TELESCOPE IN VALVE – SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled	X	X
33122	SWING LEFT VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	4605JC
33123	TELESCOPE OUT VALVE – SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled	X	X
33130	THROTTLE ACTUATOR – SHORT TO GROUND	MACHINE SETUP → ENGINE The UGM detects a short to ground at this output	Power Cycled		
33131	THROTTLE ACTUATOR – OPEN CIRCUIT	MACHINE SETUP → ENGINE The UGM detects an open circuit at this output	Power Cycled		
33132	THROTTLE ACTUATOR – SHORT TO BATTERY	MACHINE SETUP → ENGINE The UGM detects a short to battery at this output	Power Cycled		
33182	LIFT VALVES – SHORT TO BATTERY	The UGM detects a short to battery at either the Lift Up or Lift Down valve	Power Cycled	X	X
33186	TELESCOPE OUT VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Full speed Telescope In and Out permitted after controls are initialized	X	X
33187	TELESCOPE VALVES – SHORT TO BATTERY	The UGM detects a short to battery at either the Tele In or Tele Out valve.	Power Cycled		
33188	TELESCOPE OUT VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
33189	TELESCOPE IN VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Telescope Out permitted after controls are initialized; Full speed Telescope In permitted after controls are initialized	X	X
33190	TELESCOPE IN VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
33208	HORN – SHORT TO BATTERY	The UGM detects a short to battery on J2-27	Power Cycled	X	X
33276	APU PUMP RELAY - OPEN CIRCUIT	The UGM detects an open circuit at this output	Power Cycled	X	X
33277	APU PUMP RELAY - SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled	X	X
33278	APU PUMP RELAY - SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
33279	GLOWPLUG – OPEN CIRCUIT	MACHINE SETUP → ENGINE ≠ DEUTZ EMR4 MACHINE SETUP → GLOW PLUG ≠ NO The UGM detects an open circuit at this output	Power Cycled	X	X

SECTION 6 - JLG CONTROL SYSTEM

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	460SJC
33280	GLOWPLUG – SHORT TO BATTERY	MACHINE SETUP → ENGINE ≠ DEUTZ EMR4 MACHINE SETUP → GLOW PLUG ≠ NO The UGM detects a short to battery at this output	Power Cycled	X	X
33281	GLOWPLUG – SHORT TO GROUND	MACHINE SETUP → ENGINE ≠ DEUTZ EMR4 MACHINE SETUP → GLOW PLUG ≠ NO The UGM detects a short to ground at this output	Power Cycled	X	X
33287	LIFT – CURRENT FEEDBACK READING TOO LOW	The Engine State = ENGINE RUNNING; The UGM commanded current > 250mA; The difference between the commanded current and the measured feedback current > [the larger of (125mA) or (15% of the commanded function Max)] for longer than 1 second	Power Cycled	X	X
33288	TELESCOPE – CURRENT FEEDBACK READING TOO LOW	The Engine State = ENGINE RUNNING; The UGM commanded current > 250mA; The difference between the commanded current and the measured feedback current > [the larger of (125mA) or (15% of the commanded function Max)] for longer than 1 second	Power Cycled		
33295	SWING LEFT VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Full speed Swing Left and Right permitted after controls are initialized	X	X
33314	FLOW CONTROL VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Full speed Telescope, Jib Lift Up, Jib Lift Down, Platform Rotate and Platform Level permitted after controls are initialized	X	X
33315	FLOW CONTROL VALVE – SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled	X	X
33316	FLOW CONTROL VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
33317	DRIVE FORWARD VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Full speed Drive Forward and Reverse permitted after controls are initialized	X	X
33318	DRIVE VALVES – SHORT TO BATTERY	The UGM detects a short to battery at either the Drive Forward or Drive Reverse valve.	Power Cycled	X	X
33319	DRIVE FORWARD VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled		
33320	DRIVE REVERSE VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Full speed Drive Forward and Reverse permitted after controls are initialized		

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	4605JC
33322	DRIVE REVERSE VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled		
33331	DRIVE – CURRENT FEEDBACK READING TOO LOW	The Engine State = ENGINE RUNNING; The UGM commanded current > 250mA; The difference between the commanded current and the measured feedback current > [the larger of (125mA) or (15% of the commanded function Max)] for longer than 1 second	Power Cycled		
33406	LIFT UP VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
33407	LIFT DOWN VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
33410	DRIVE – LOSS OF CURRENT FEEDBACK	Measured feedback current < 225mA while PWM output > 40% for a period of 100ms.	Power Cycled		
33412	SWING VALVES – SHORT TO BATTERY	The UGM detects a short to battery at either the Swing Right or Swing Left valve	Power Cycled	X	X
33413	TOWER LIFT – CURRENT FEEDBACK READING TOO LOW	The Engine State = ENGINE RUNNING; The UGM commanded current > 250mA; The difference between the commanded current and the measured feedback current > [the larger of (125mA) or (15% of the commanded function Max)] for longer than 1 second	Power Cycled		
33414	SWING – CURRENT FEEDBACK READING TOO LOW	The Engine State = ENGINE RUNNING; The UGM commanded current > 250mA; The difference between the commanded current and the measured feedback current > [the larger of (125mA) or (15% of the commanded function Max)] for longer than 1 second	Power Cycled	X	X
33415	FLOW CONTROL VALVE – CURRENT FEEDBACK READING TOO LOW	The Engine State = ENGINE RUNNING; The UGM commanded current > 250mA; The difference between the commanded current and the measured feedback current > [the larger of (125mA) or (15% of the commanded function Max)] for longer than 1 second	Power Cycled	X	X
33416	TOWER LIFT – CURRENT FEEDBACK READING LOST	Measured feedback current < 225mA while PWM output > 40% for a period of 100ms.	Power Cycled		
33417	LIFT – CURRENT FEEDBACK READING LOST	Measured feedback current < 225mA while PWM output > 40% for a period of 100ms.	Power Cycled	X	X
33418	SWING – CURRENT FEEDBACK READING LOST	Measured feedback current < 225mA while PWM output > 40% for a period of 100ms.	Power Cycled	X	X
33419	FLOW CONTROL VALVE – CURRENT FEEDBACK READING LOST	Measured feedback current < 225mA while PWM output > 40% for a period of 100ms.	Power Cycled	X	X

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Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	460SJC
33420	TRACTION LOCK VALVE – SHORT TO BATTERY	The UGM detects a short to battery at the Drive Lock valve.	Power Cycled		
33421	TRACTION LOCK VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	Power Cycled		
33422	TRACTION LOCK VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled		
33423	OSCILLATING AXLE VALVES – SHORT TO BATTERY	The UGM detects a short to battery condition on the J1-7 output.	Power Cycled		
33424	OSCILLATING AXLE VALVES – SHORT TO GROUND	The UGM detects a short to ground condition on the J1-7 output.	Power Cycled		
33425	TOWER LIFT VALVES – SHORT TO BATTERY	The UGM detects a short to battery at either the Tower Lift Up or Tower Lift Down valve.	Power Cycled		
33443	TELESCOPE – CURRENT FEEDBACK READING LOST	Measured feedback current < 225mA while PWM output > 40% for a period of 100ms.	Power Cycled		
33444	TELESCOPE DUMP VALVE – SHORT TO BATTERY	The UGM detects a short to battery at the Telescope Dump Valve	Power Cycled		
33445	TELESCOPE DUMP VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled		
33446	TELESCOPE DUMP VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit; Full speed Telescope In and Out permitted after controls are initialized		
33447	2WD VALVE – SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled		
33448	2WD VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	Power Cycled		
33449	2WD VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled		
33537	AUXILIARY LIFT DOWN VALVE - SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	4605JC
33538	AUXILIARY LIFT DOWN VALVE - OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit	X	X
33539	AUXILIARY LIFT DOWN VALVE - SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled	X	X
33540	AUXILIARY TOWER LIFT DOWN VALVE - SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled		
33541	AUXILIARY TOWER LIFT DOWN VALVE - OPEN CIRCUIT	The UGM detects an open circuit at this output	The UGM no longer detects open circuit		
33543	OSCILLATING AXLE #1 VALVE - SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled		
33544	OSCILLATING AXLE #1 VALVE - OPEN CIRCUIT	The UGM detects an open circuit at this output	Power Cycled		
33545	OSCILLATING AXLE #1 VALVE - SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled		
33546	OSCILLATING AXLE #2 VALVE - SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled		
33547	OSCILLATING AXLE #2 VALVE - OPEN CIRCUIT	The UGM detects an open circuit at this output	Power Cycled		
33548	OSCILLATING AXLE #2 VALVE - SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled		
33567	AUXILIARY VALVES - SHORT TO BATTERY	The UGM detects a short to battery at either the Aux Lift Down or Aux Tower Lift Down valve	Power Cycled		
33568	AUXILIARY - CURRENT FEEDBACK READING LOST	Measured feedback current < 225mA while output is active for a period of 100ms.	Power Cycled	X	X
33575	ECM PULL DOWN RESISTOR - OPEN CIRCUIT	MACHINE SETUP → ENGINE = DEUTZ EMR4; Pull down resistor not detected	Power Cycled	X	X
33642	LOW FLOW PRESSURE RELEASE – SHORT TO BATTERY	Low Flow Pressure Release is Configured; The UGM detects a short to battery at this output	Power Cycled		
33643	LOW FLOW PRESSURE RELEASE – SHORT TO GROUND	Low Flow Pressure Release is Configured; The UGM detects a short to ground at this output	Power Cycled		

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Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	460SJC
33644	LOW FLOW PRESSURE RELEASE – OPEN CIRCUIT	Low Flow Pressure Release is Configured; The UGM detects an open circuit at this output	The UGM no longer detects open circuit;		
349	PLATFORM ROTATE LEFT VALVE – OPEN CIRCUIT	The PM detects an open circuit at this output and reports it to the UGM	The PM no longer detects open circuit; Full speed Platform Rotate Right and Left permitted after controls are initialized		
3410	PLATFORM ROTATE LEFT VALVE – SHORT TO BATTERY	The PM detects a short to battery at this output and reports it to the UGM	Power Cycled		
3411	PLATFORM ROTATE LEFT VALVE – SHORT TO GROUND	The PM detects a short to ground at this output and reports it to the UGM	Power Cycled		
3412	PLATFORM ROTATE RIGHT VALVE – OPEN CIRCUIT	The PM detects an open circuit at this output and reports it to the UGM	The PM no longer detects open circuit; Full speed Platform Rotate Right and Left permitted after controls are initialized		
3413	PLATFORM ROTATE RIGHT VALVE – SHORT TO BATTERY	The PM detects a short to battery at this output and reports it to the UGM	Power Cycled		
3414	PLATFORM ROTATE RIGHT VALVE – SHORT TO GROUND	The PM detects a short to ground at this output and reports it to the UGM	Power Cycled		
3415	JIB LIFT UP VALVE – OPEN CIRCUIT	MACHINE SETUP → JIB = YES The PM detects an open circuit at this output and reports it to the UGM	The PM no longer detects open circuit; Full speed Jib Lift Up and Down permitted after controls are initialized		
3416	JIB LIFT UP VALVE – SHORT TO BATTERY	MACHINE SETUP → JIB = YES The PM detects a short to battery at this output and reports it to the UGM	Power Cycled		
3417	JIB LIFT UP VALVE – SHORT TO GROUND	MACHINE SETUP → JIB = YES The PM detects a short to ground at this output and reports it to the UGM	Power Cycled		
3418	JIB LIFT DOWN VALVE – OPEN CIRCUIT	MACHINE SETUP → JIB = YES The PM detects an open circuit at this output and reports it to the UGM	The PM no longer detects open circuit; Jib Lift Up permitted after controls are initialized Full speed Jib Lift Down permitted after controls are initialized		
3419	JIB LIFT DOWN VALVE – SHORT TO BATTERY	MACHINE SETUP → JIB = YES The PM detects a short to battery at this output and reports it to the UGM	Power Cycled		
3420	JIB LIFT DOWN VALVE – SHORT TO GROUND	MACHINE SETUP → JIB = YES The PM detects a short to ground at this output and reports it to the UGM; detection occurs for PWM output approximately ≤ 15% or for STG condition.	Power Cycled		
431	FUEL SENSOR - SHORT TO BATTERY OR OPEN CIRCUIT	MACHINE SETUP → FUEL LEVEL = SENSOR; UGM fuel sensor analog input J2-25 detects a voltage higher than 2.50 volts (A/D > 512)	Power Cycled	X	X

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	4605JC
432	FUEL SENSOR - SHORT TO GROUND	MACHINE SETUP → FUEL LEVEL = SENSOR; UGM fuel sensor analog input J2-25 detects a voltage less than or equal to 0.3 volts (A/D < 61)	Power Cycled	X	X
433	OIL PRESSURE - SHORT TO BATTERY	MACHINE SETUP → ENGINE Oil Pressure = Ok at Startup with Engine RPM = 0 (occurs for STB or OC – wire off switch)	Power Cycled		
435	COOLANT TEMPERATURE - SHORT TO GROUND	MACHINE SETUP → ENGINE UGM coolant temperature analog input J1- 14 detects a voltage less than or equal to 0.05 volts	Not all of the trigger conditions are met		
437	ENGINE TROUBLE CODE	An engine with a CAN engine controller is configured in MACHINE SETUP The engine controller reports a J1939 fault	Power Cycled	X	X
438	HIGH ENGINE TEMP	An engine with a CAN engine controller is <u>not</u> configured in MACHINE SETUP: - The Engine State = ENGINE RUNNING > 10 seconds - The coolant temperature is greater than or equal to the configured engines max allowed temperature. The maximum allowed temperature > 110°C. An engine with a CAN engine controller is configured in MACHINE SETUP: - ECM transmits a J1939 DM1 message for an engine coolant high temperature critical fault (SPN:FMI 110:0) on CAN2 or uses the J1939 Transport Protocol every one second to send this information if multiple engine faults exist.	Power Cycled	X	X
4310	NO ALTERNATOR OUTPUT	The Engine State = ENGINE RUNNING > 10 seconds and UGM system voltage < 11.5 volts for 10 seconds	UGM system voltage > 11.7 volts	X	X
4311	LOW OIL PRESSURE	An engine with a CAN engine controller is not configured in MACHINE SETUP - The Engine State = ENGINE RUNNING > 10 seconds - The engine oil pressure is LOW (debounce 3s). An engine with a CAN engine controller is configured in MACHINE SETUP - ECM transmits a J1939 DM1 message for an engine oil low pressure critical fault (SPN:FMI 100:1) on CAN2 or uses the J1939 Transport Protocol every one second to send this information if multiple engine faults exist.	Power Cycled	X	X
4313	THROTTLE ACTUATOR FAILURE	MACHINE SETUP → ENGINE THROTTLE ACTUATOR – OPEN CIRCUIT (33131) is not active THROTTLE ACTUATOR – SHORT TO GROUND (33130) is not active LOSS OF ENGINE SPEED SENSOR (4322) is not active If Target Engine RPM ≥ Mid-Engine RPM and Actual RPM ≤ 1400 (debounce time = 3s) when no fault exists with Proportional Fuel Rack actuator	Power Cycled		

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Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	460SJC
4314	WRONG ENGINE SELECTED – ECM DETECTED	An engine with an electronic engine controller is not configured	Power Cycled		
4322	LOSS OF ENGINE SPEED SENSOR	An engine with a CAN engine controller is not configured in MACHINE SETUP LOW OIL PRESSURE (4311) is not active OIL PRESSURE SHORT TO BATTERY (433) is not active. No engine shutdown command exists Engine State = ENGINE RUNNING Engine RPM = 0 for 1500ms and Engine oil pressure is not LOW.	Engine RPM > 0		
4323	SPEED SENSOR READING INVALID SPEED	An engine with a CAN engine controller is not configured in MACHINE SETUP The engine RPM reading is greater than 4000	Power Cycled		
4326	FUEL ACTUATOR – SHORT TO GROUND	MACHINE SETUP → ENGINE The UGM detects a short to ground at this output	Power Cycled		
4327	FUEL ACTUATOR – OPEN CIRCUIT	MACHINE SETUP → ENGINE The UGM detects an open circuit at this output	Power Cycled		
4328	FUEL ACTUATOR – SHORT TO BATTERY	MACHINE SETUP → ENGINE The UGM detects a short to battery at this output	Power Cycled		
4329	FUEL ACTUATOR - CURRENT FEEDBACK READING TOO LOW	MACHINE SETUP → ENGINE; The Engine State = ENGINE RUNNING; The UGM commanded current > 250mA; The difference between the commanded current and the measured feedback current > [the larger of (125mA) or (15% of the commanded function Max)] for longer than 1 second	Power Cycled		
4330	FUEL ACTUATOR – CURRENT FEEDBACK READING LOST	MACHINE SETUP → ENGINE Measured feedback current < 225mA while PWM output > 40% for a period of 100ms.	Power Cycled		
4334	ENGINE COOLANT – LOW LEVEL	MACHINE SETUP → ENGINE = DEUTZ EMR4; ECM transmits a J1939 DM1 message for an engine coolant low level fault (SPN:FMI 111:1) on CAN2 or uses the J1939 Transport Protocol every one second to send this information if multiple engine faults exist.	Power Cycled	X	X
4375	WATER IN FUEL			X	X
441	BATTERY VOLTAGE TOO LOW – SYSTEM SHUTDOWN	The UGM detects that its supply voltage is less than 9 volts Engine State ≠ ENGINE CRANKING Auxiliary Power/Emergency Descent Mode is not active	Voltage is greater than 9.25 volts	X	X
442	BATTERY VOLTAGE TOO HIGH – SYSTEM SHUTDOWN	The UGM detects that its supply voltage >16.0 volts	Power Cycled	X	X

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	460SJC
443	LSS BATTERY VOLTAGE TOO HIGH	MACHINE SETUP → LOAD SYSTEM ≠NO; The UGM determines that the LSS reports supply voltage > 16.0V	Not all of the trigger conditions are met	X	X
444	LSS BATTERY VOLTAGE TOO LOW	MACHINE SETUP → LOAD SYSTEM ≠ NO; Engine State ≠ ENGINE CRANKING or ENGINE STARTING; Auxiliary Power/Emergency Descent Mode is not active; If Load System is the 4-Cell LSS; The UGM determines that the LSS reports supply voltage < 9.0V If Load System is the 1-Cell LSS; The UGM determines that the LSS reports supply voltage < 8.0V or the LSS Supply Voltage reports Out of Range Low Error	Not all of the trigger conditions are met	X	X
445	BATTERY VOLTAGE LOW	The UGM detects that its supply voltage < 11 volts for 5 seconds. Engine State ≠ ENGINE CRANKING Auxiliary Power/Emergency Descent Mode is not active Glow Plugs are not energized	Voltage is greater than 11.25 volts	X	X
4479	LSS BATTERY VOLTAGE - INITIALIZATION ERROR	MACHINE SETUP → LOAD SYSTEM ≠NO; Load System is the 1-Cell LSS; LSS Supply Voltage reports Initialization Error	Power Cycled	X	X
4480	LSS BATTERY VOLTAGE - NOT CALIBRATED	MACHINE SETUP → LOAD SYSTEM ≠NO; Load System is the 1-Cell LSS; LSS Supply Voltage reports Not Calibrated Error	Power Cycled	X	X
662	CANBUS FAILURE – PLATFORM MODULE	UGM does not receive any CAN messages from the PM in 250ms	CAN messages are received from the PM	X	X
663	CANBUS FAILURE – LOAD SENSING SYSTEM MODULE	MACHINE SETUP → LOAD SYSTEM ≠ NO UGM does not receive any CAN messages from the LSS module in 250ms	Not all of the trigger conditions are met	X	X
666	CANBUS FAILURE – ENGINE CONTROLLER	An engine with a CAN engine controller is configured in MACHINE SETUP. No CAN messages are received from the engine controller for more than 250ms	CAN messages are received from the engine controller; UGM shall require re-activation of Footswitch (Platform Mode) or Ground Enable (Ground Mode) to enable functions and resume operation.	X	X
6613	CANBUS FAILURE – EXCESSIVE CANBUS ERRORS	More than 22 error frames per second for 4 seconds or more than 500 Buss Off conditions since last power cycle.	Power Cycled	X	X
6622	CANBUS FAILURE – TCU MODULE	MACHINE SETUP → CLEARSKY = YES No CAN2 messages are received from the TCU module for more than 30 seconds	Not all of the trigger conditions are met	X	X
6635	CANBUS FAILURE – CHASSIS TILT SENSOR	UGM does not receive any CAN messages from the Chassis Tilt Sensor in 250ms	CAN messages are received from the Chassis tilt Sensor and controls are initialized	X	X
6651	CANBUS FAILURE - GROUND DISPLAY	UGM does not receive any CAN messages from the Ground Display in 250ms	CAN messages are received from the Ground Display	X	X

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Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	460SJC
6657	CANBUS FAILURE – TEMPERATURE SENSOR	MACHINE SETUP → TEMP CUTOUT = YES; UGM does not receive any CAN messages from the Ambient Temperature sensor in 250ms	CAN messages are received from the Ambient Temperature sensor	X	X
681	REMOTE CONTRACT MANAGEMENT OVERRIDE – ALL FUNCTIONS IN CREEP	MACHINE SETUP → CLEARSKY = YES Value set by ClearSky TCU	Cleared by ClearSky TCU	X	X
813	CHASSIS TILT SENSOR NOT CALIBRATED	"The UGM detects one of the follow conditions: The tilt sensor has not been calibrated; A new Tilt Sensor has been installed.	Tilt sensor calibrated	X	X
814	CHASSIS TILT SENSOR OUT OF RANGE	Fault CHASSIS TILT SENSOR NOT CALIBRATED (813) is not present and Tilt sensor measurement > 19° for 4 seconds (internal tilt sensor based machines) or > 35° (external tilt sensor based machines) Not to be reported during Tilt Sensor calibration.	Not all of the trigger conditions are met.	X	X
815	CHASSIS TILT SENSOR DISAGREEMENT	The UGM detects one of the following conditions: If a Drive, Steer, or Boom function is active or if the engine is cranking or if the primary raw Tilt Sensor readings > ±5° then: if the two ground board tilt sensors disagree by more than or equal to 3 degrees for either the X axis or the Y axis for longer than 5 seconds then the fault will be logged. If no Drive, Steer, or Boom functions are active and the engine is not cranking or the primary raw Tilt Sensor readings < ±5° then: if the two ground board tilt sensors disagree by more than or equal to 1 degrees for either the X axis or the Y axis for longer than 3 seconds then the fault will be logged. Do not report if DTC 814 is active.	Power Cycled		
818	TILT SENSOR STAGNANT	The UGM detects the following conditions: The X axis or Y axis raw readings change by < ±0.05° in 5 second; Drive Forward or Drive Reverse output value is ≥ Creep output value; Do not report if DTC 6635, 813 or 814 are active	Power Cycled	X	X
8112	CHASSIS TILT SENSOR - SINGLE POINT CALIBRATION PERFORMED	Single point Chassis Tilt calibration is successfully completed	Fault shall be retentive through Power Cycled; Can be reset if CALIBRATIONS → TILT SENSOR is successfully completed	X	X
821	LSS CELL #1 ERROR	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 4-Cell LSS; The UGM detects that LSS is reporting error with Cell #1	Not all of the trigger conditions are met	X	X
822	LSS CELL #2 ERROR	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 4-Cell LSS; The UGM detects that LSS is reporting error with Cell #2	Not all of the trigger conditions are met	X	X
823	LSS CELL #3 ERROR	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 4-Cell LSS; The UGM detects that LSS is reporting error with Cell #3	Not all of the trigger conditions are met	X	X

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	4605JC
824	LSS CELL #4 ERROR	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 4-Cell LSS; The UGM detects that LSS is reporting error with Cell #4.	Not all of the trigger conditions are met	X	X
825	LSS HAS NOT BEEN CALIBRATED	MACHINE SETUP → LOAD SYSTEM ≠ NO If Load System is the 4-Cell LSS; The load sensor has not been calibrated, or DTC 992 (LSS EEPROM ERROR) is active, or DTC 9977 (LSS CORRUPT EEPROM) is active If Load System is the 1-Cell LSS; The LSS serial number does not match	Not all of the trigger conditions are met	X	X
826	RUNNING AT CREEP – PLATFORM OVERLOADED	Refer to Table 7-1 for trigger conditions and machine response requirements	Not all of the trigger conditions are met	X	X
828	LIFT UP & TELE OUT PREVENTED – PLATFORM OVERLOADED	Refer to Table 7-1 for trigger conditions and machine response requirements	Not all of the trigger conditions are met	X	X
829	FUNCTIONS CUTOUT – PLATFORM OVERLOADED	Refer to Table 7-1 for trigger conditions and machine response requirements	Not all of the trigger conditions are met	X	X
8211	LSS READING UNDER WEIGHT	MACHINE SETUP → LOAD SYSTEM ≠ NO; If Load System is the 4-Cell LSS; The load sensor has been calibrated and Gross Platform Weight < (0.5 * Empty Platform Weight); If Load System is the 1-Cell LSS; UGM determines that the Platform Load < (-1.5 * Unloaded Platform Weight); If Load System is the 1-Cell LSS; Drive Forward / Reverse or Lift Up output value is ≥ Creep output value; Platform Load is < -50 lbs. for the first 5 seconds of command; Do not report if DTC (0030 or 825) is active or if Platform Load == Unhealthy	If Load System is the 4-Cell LSS; Not all of the trigger conditions are met If Load System is the 1-Cell LSS; Power Cycled	X	X
8218	LSS SENSOR DISAGREEMENT	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 1-Cell LSS; The UGM detects that (Platform Load 1 and Platform Load 2 disagree by 50 lbs. for longer than 3 seconds) or (that Platform Gross 1 and Platform Gross 2 disagree by 200 lbs. for longer than 3 seconds); Do not report if (DTC 8222 or 8223) is active or if Platform Load == Unhealthy, Platform Gross 1 == Unhealthy or Platform Gross 2 == Unhealthy	Power Cycled	X	X
8222	LSS STRAIN GAUGE 1 - STAGNANT	MACHINE SETUP → LOAD SYSTEM ≠ NO; Engine State ≠ (ENGINE CRANKING or ENGINE STARTING) > 2 seconds; Load System is the 1-Cell LSS; Strain Gauge 1 raw reading does change value for 5 seconds; Do not report if Platform Gross 1 == Unhealthy	Power Cycled	X	X

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Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	460SJC
8223	LSS STRAIN GAUGE 2 - STAGNANT	MACHINE SETUP → LOAD SYSTEM ≠ NO; Engine State ≠ (ENGINE CRANKING or ENGINE STARTING) > 2 seconds; Load System is the 1-Cell LSS; Strain Gauge 2 raw reading does change value for 5 seconds; Do not report if DTC Platform Gross 2= = Unhealthy	Power Cycled	X	X
8224	LSS STRAIN GAUGE 1 - OUT OF RANGE LOW	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 1-Cell LSS; Strain Gauge 1 reports an Out of Range Low error	Power Cycled	X	X
8225	LSS STRAIN GAUGE 2 - OUT OF RANGE LOW	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 1-Cell LSS; Strain Gauge 2 reports an Out of Range Low error	Power Cycled	X	X
8226	LSS STRAIN GAUGE 1 - OUT OF RANGE HIGH	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 1-Cell LSS; Strain Gauge 1 reports an Out of Range High error	Power Cycled	X	X
8227	LSS STRAIN GAUGE 2 - OUT OF RANGE HIGH	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 1-Cell LSS; Strain Gauge 2 reports an Out of Range High error	Power Cycled	X	X
8228	LSS STRAIN GAUGE 1 - INITIALIZATION ERROR	MACHINE SETUP → LOAD SYSTEM ≠ NO; Engine State ≠ (ENGINE CRANKING or ENGINE STARTING) > 2 seconds; Load System is the 1-Cell LSS; Strain Gauge 1 reports an Initialization error	Power Cycled	X	X
8229	LSS STRAIN GAUGE 2 - INITIALIZATION ERROR	MACHINE SETUP → LOAD SYSTEM ≠ NO; Engine State ≠ (ENGINE CRANKING or ENGINE STARTING) > 2 seconds; Load System is the 1-Cell LSS; Strain Gauge 2 reports an Initialization error	Power Cycled	X	X
8230	LSS STRAIN GAUGE 1 - NOT CALIBRATED	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 1-Cell LSS; Strain Gauge 1 reports a Not Calibrated error	Power Cycled	X	X
8231	LSS STRAIN GAUGE 2 - NOT CALIBRATED	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 1-Cell LSS; Strain Gauge 2 reports a Not Calibrated error	Power Cycled	X	X
8232	LSS STRAIN GAUGE 1 - SENSOR DEFECT	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 1-Cell LSS; Strain Gauge 1 reports a Sensor Defect error	Power Cycled	X	X
8233	LSS STRAIN GAUGE 2 - SENSOR DEFECT	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 1-Cell LSS; Strain Gauge 2 reports a Sensor Defect error	Power Cycled	X	X
8234	LSS STRAIN GAUGE 1 - NOT INSTALLED	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 1-Cell LSS; Strain Gauge 1 reports a Not Installed error	Power Cycled	X	X

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	460SJC
8235	LSS STRAIN GAUGE 2 - NOT INSTALLED	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 1-Cell LSS; Strain Gauge 2 reports a Not Installed error	Power Cycled	X	X
8236	LSS NOT DETECTING CHANGE	MACHINE SETUP → LOAD SYSTEM ≠ NO; Machine is in Platform Mode; Load System is the 1-Cell LSS; Drive Forward / Reverse or Lift Up output value is ≥ Creep output value; Platform Load does not change (peak to peak) by more than 1 lbs. within the first 5 seconds of the command; Do not report if Platform Load == Unhealthy	Power Cycled	X	X
8237	LSS STRAIN GAUGE 1 - A/D DEFECT	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 1-Cell LSS; Strain Gauge 1 reports a A/D Defect error	Power Cycled	X	X
8238	LSS STRAIN GAUGE 2 - A/D DEFECT	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 1-Cell LSS; Strain Gauge 2 reports a A/D Defect error	Power Cycled	X	X
8639	FRONT LEFT STEER VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	Power Cycled		
8640	FRONT LEFT STEER VALVE – SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled		
8641	FRONT LEFT STEER VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled		
8642	FRONT RIGHT STEER VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	Power Cycled		
8643	FRONT RIGHT STEER VALVE – SHORT TO BATTERY	The UGM detects a short to battery at this output	Power Cycled		
8644	FRONT RIGHT STEER VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled		
8652	RIGHT TRACK FORWARD VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	Power Cycled	X	X
8654	RIGHT TRACK FORWARD VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
8655	RIGHT TRACK REVERSE VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	Power Cycled	X	X

SECTION 6 - JLG CONTROL SYSTEM

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	460SJC
8657	RIGHT TRACK REVERSE VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
8658	LEFT TRACK FORWARD VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	Power Cycled	X	X
8660	LEFT TRACK FORWARD VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
8661	LEFT TRACK REVERSE VALVE – OPEN CIRCUIT	The UGM detects an open circuit at this output	Power Cycled	X	X
8663	LEFT TRACK REVERSE VALVE – SHORT TO GROUND	The UGM detects a short to ground at this output	Power Cycled	X	X
8669	OSCILLATING AXLE SWITCH DISAGREEMENT	The UGM detects that Oscillating Axle switch #1 and switch #2 are not reporting congruent switch states, as defined in the Oscillating Axle Switch Evaluation section. Not to be reported if DTC 23104 BOOM TRANSPORT SWITCH DISAGREEMENT is active.	Power Cycled		
8690	LEFT TRACK VALVES – SHORT TO BATTERY	The UGM detects a short to battery at either the Left Track Forward or Left Track Reverse valves	Power Cycled	X	X
8691	RIGHT TRACK VALVES – SHORT TO BATTERY	The UGM detects a short to battery at either the Right Track Forward or Right Track Reverse valves	Power Cycled	X	X
873	MACHINE SAFETY SYSTEM OVERRIDE OCCURRED	MSSO = Active	Fault shall be retentive through Power Cycled; Can be reset only with an Analyzer via the CALIBRATIONS → MSSO → MSSO RESET menu	X	X
991	LSS WATCHDOG RESET	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 4-Cell LSS; UGM detects LSS report of an anomaly exists that has caused a WatchDog Timer reset.	Power Cycled	X	X
992	LSS EEPROM ERROR	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 4-Cell LSS; UGM detects LSS report of an anomaly that exists in the LSS EEPROM	Power Cycled	X	X
993	LSS INTERNAL ERROR – PIN EXCITATION	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 4-Cell LSS; UGM detects LSS report of improper excitation voltage	Power Cycled	X	X
994	LSS INTERNAL ERROR – DRDY MISSING FROM A/D	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 4-Cell LSS; UGM detects LSS report of an anomaly that exists in the LSS A/D converter operations.	Power Cycled	X	X
998	EEPROM FAILURE - CHECK ALL SETTINGS	The UGM has detected an anomaly in EEPROM	Power Cycled	X	X

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	4605JC
9910	FUNCTIONS LOCKED OUT - PLATFORM MODULE SOFTWARE VERSION IMPROPER	The UGM software version type is 'P' The UGM has received valid version information from the PM The PM software version type is 'P' The UGM software major version number does not match the major version number of the platform software	Not all of the trigger conditions are met	X	X
9911	FUNCTION LOCKED OUT - LSS MODULE SOFTWARE VERSION IMPROPER	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 4-Cell LSS; The UGM determines that the LSS software version is not compatible with existing code per the referenced Software Version Compatibility table.	Power Cycled	X	X
9915	CHASSIS TILT SENSOR NOT GAIN CALIBRATED	The tilt sensor gain calibration values recorded to flash memory during Phoenix International's manufacturing test are not present	Valid values are present	X	X
9919	GROUND SENSOR REF VOLTAGE OUT OF RANGE	The UGM has detected reference voltage is out of range: 2.3V < Reference Voltage < 2.7V	Power Cycled		
9920	PLATFORM SENSOR REF VOLTAGE OUT OF RANGE	The PM detects that its reference voltage is out of range and reports the fault to the UGM	Power Cycled	X	X
9921	GROUND MODULE FAILURE:HIGH SIDE DRIVER CUTOUT FAULTY	The engine is not running The engine is not cranking The UGM footswitch input J7-15 is LOW The machine is in Platform Mode The Main Dump output J2-13 is detected as HIGH via the analog feedback 300ms after it is attempted to be activated during the one time startup test of the UGM hardware shutoff circuitry	Power Cycled	X	X
9922	PLATFORM MODULE FAILURE: HWFS CODE 1	The PM detects that its V(low) FET has failed and reports this fault to the UGM	Power Cycled	X	X
9924	FUNCTIONS LOCKED OUT - MACHINE NOT CONFIGURED	The machine is powered up and no model has been selected yet in the MACHINE SETUP menu	Power Cycled	X	X
9927	GROUND MODULE CONSTANT DATA UPDATE REQUIRED	The UGM detects one of the following conditions when software type is 'P' or 'B': The Version Verification Word #1 or the Version Verification Word #2 values located in the constant data sector of flash memory (found on constant data spreadsheet tab pstConstantDataVersion) do not match the values located in the code area of flash memory. The Version Major value located in the constant data sector of flash memory (found on constant data spreadsheet tab pstConstantDataVersion) does not match the value located in the code area of flash memory.	A different application code or constant data version is programmed so that the values match Power Cycled	X	X
9944	CURRENT FEEDBACK GAINS OUT OF RANGE	One or more of the current feedback gains that are calculated and written to flash memory during the PIC manufacturing test process are detected as being out of range.	Power Cycled	X	X

Table 6-13. Diagnostic Trouble Code Chart

DTC	Help Message	Fault Condition/Trigger (For configurable items, fault applies only if configured. All listed conditions to be met unless stated otherwise)	Conditions Required for Movement and/or to Clear Fault	400SC	460SJC
9945	CURRENT FEEDBACK CALIBRATION CHECKSUM INCORRECT	The current feedback gains checksum that is calculated and written to flash memory during the PIC manufacturing test process is detected as being incorrect.	Power Cycled	X	X
9949	MACHINE CONFIGURATION OUT OF RANGE – CHECK ALL SETTINGS	UGM has detected an anomaly in EEPROM with regard to the Machine Setup configuration.	Power Cycled and EEPROM data in associated area is changed	X	X
9977	LSS CORRUPT EEPROM	MACHINE SETUP → LOAD SYSTEM ≠ NO;	Power Cycled	X	X
9979	FUNCTIONS LOCKED OUT - GROUND MODULE SOFTWARE VERSION IMPROPER	Ground software has been installed on a UGM with a ST10F274 processor (Hardware Rev < 6), which does not have guaranteed flash storage in the sector where Constant Data is written.	Power Cycled	X	X
9986	GROUND MODULE VLOW FET FAILURE	VLow FET determined to be failed because all Digital Inputs are high; UGM unable to read high-sensing inputs.	Power Cycled	X	X
99285	LSS - FACTORY CALIBRATION ERROR	MACHINE SETUP → LOAD SYSTEM ≠ NO; Load System is the 1-Cell LSS; LSS reports an Error Status (other than 0,1,2,8,30,31)	Power Cycled	X	X

6.9 TILT SENSOR CALIBRATION

Refer to Figure 6-23., Tilt Sensor Location.

⚠ WARNING

DO NOT CALIBRATE THE TILT SENSOR EXCEPT ON A LEVEL SURFACE.

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



MAE17700

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



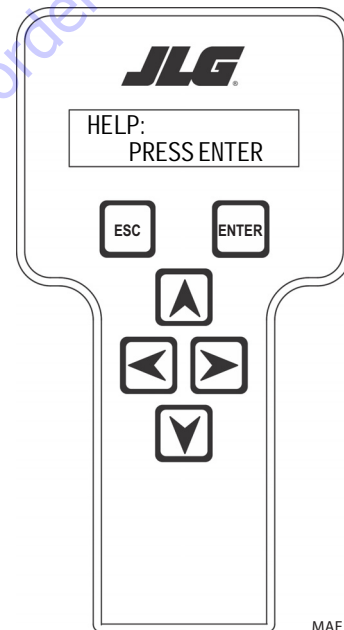
MAE15680

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



MAE17820


4. The analyzer screen should read:

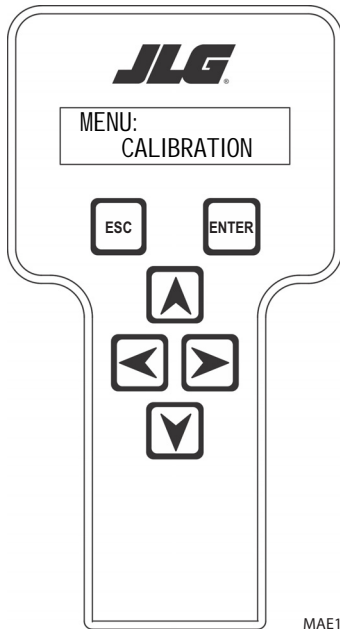


MAE19060

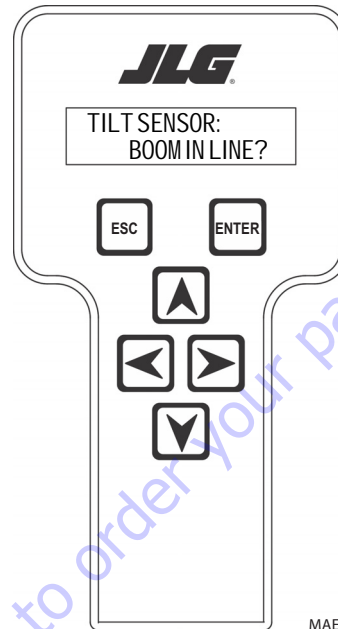
5. Use the arrow button to reach ACCESS LEVEL. Hit Enter.
6. Enter the Access Code, 33271.
7. Place the machine on a firm, level surface.


8. Using the arrow keys, navigate to Calibrations Menu as


shown below and press **ENTER** .

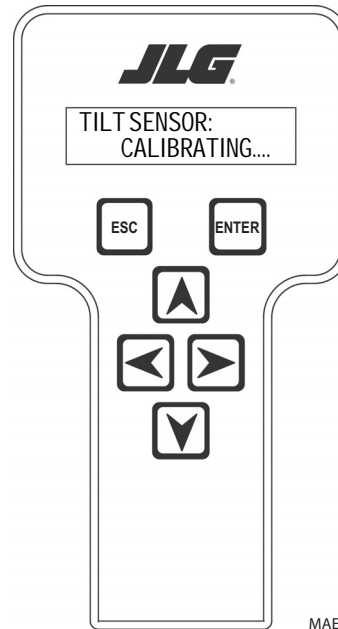
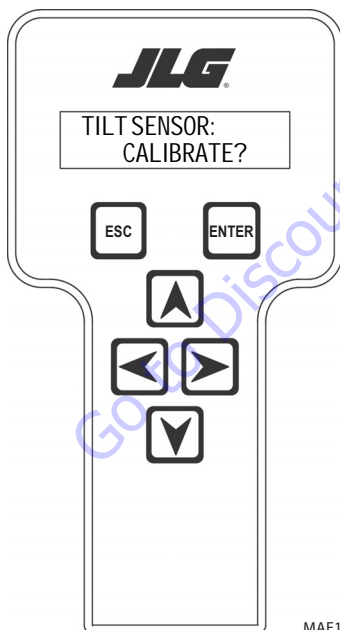


UGM will confirm the position of the boom, then the screen will read:

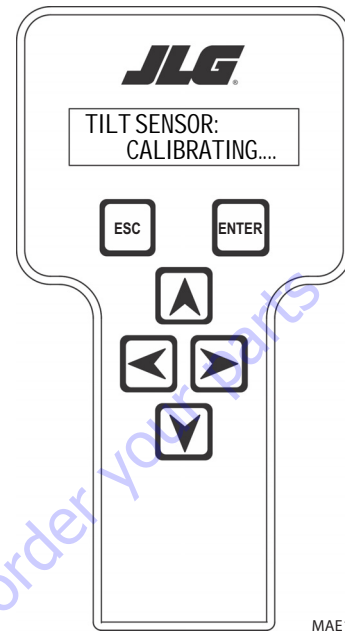
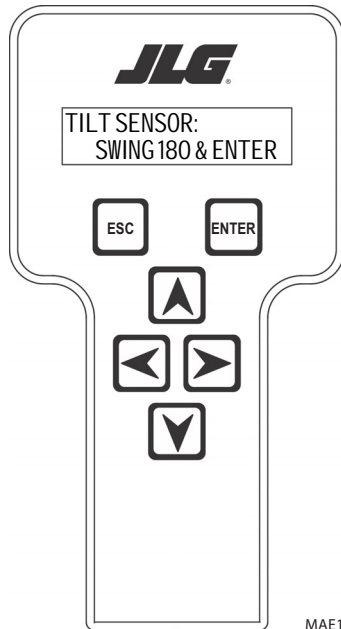


9. Using the arrow keys, navigate to the Tilt Sensor calibration as shown below and press **ENTER** .

tion as shown below and press **ENTER** .



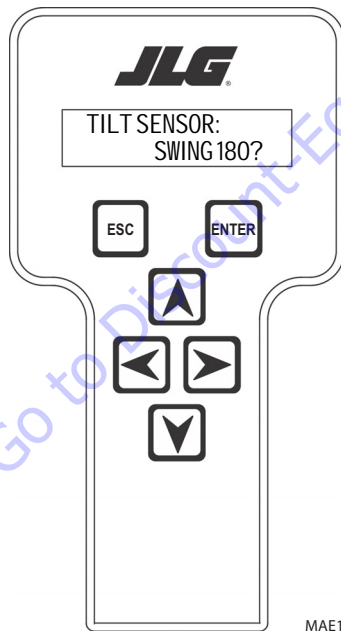
5. When the sensor is calibrated in that position, the screen will read:



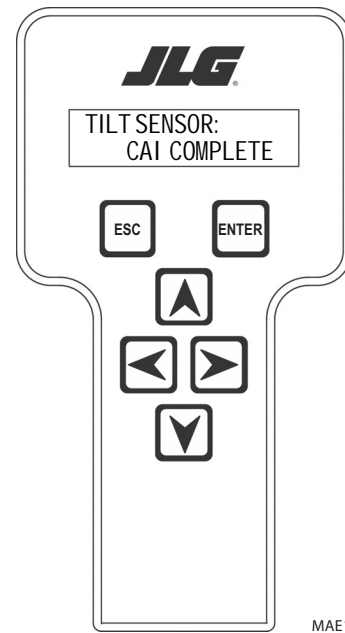
6. Swing the machine 180 degrees, making sure the boom is centered and in the transport position, and **ENTER**

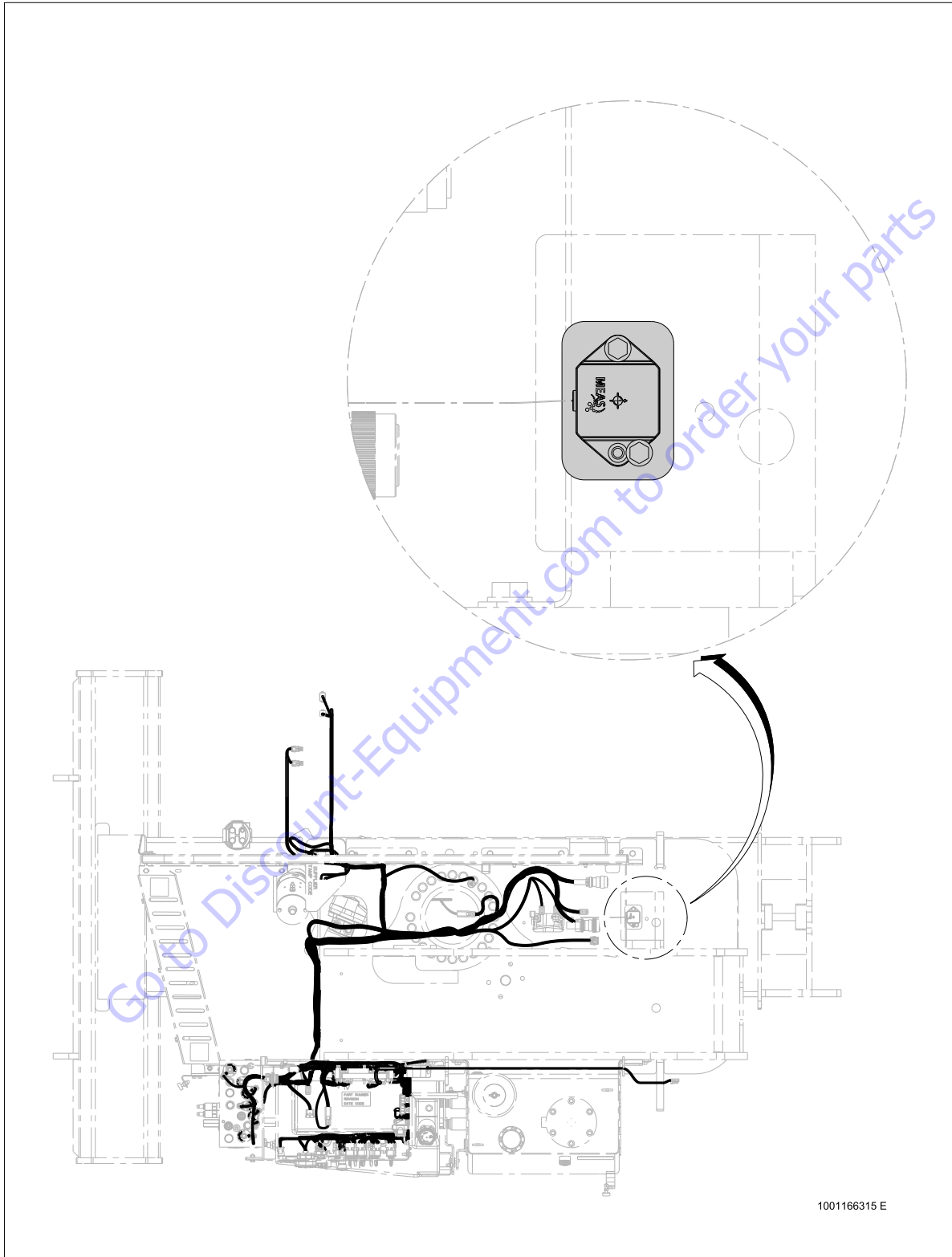


. The screen will read:



7. When the calibration is complete the screen will read as shown below. Return the machine to the travel position.





1001166315 E

Figure 6-23. Tilt Sensor Location

6.10 CALIBRATING BOOM ANGLE

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



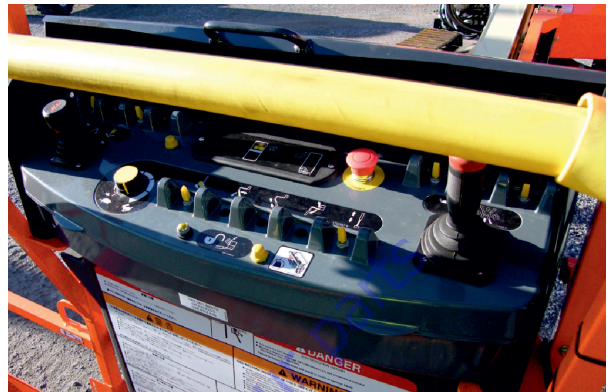
MAE17700

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



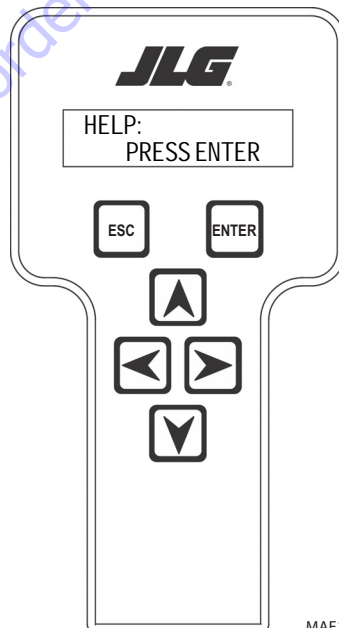
MAE15680

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



MAE17820

4. The analyzer screen should read:

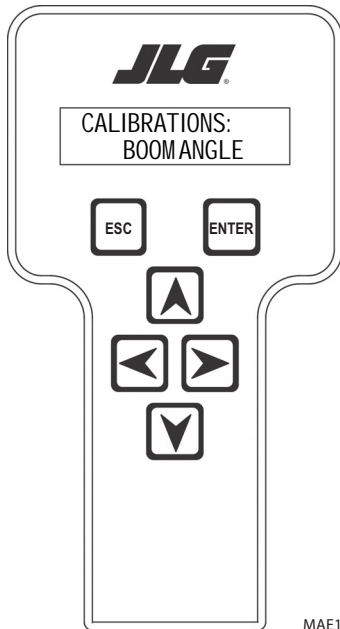


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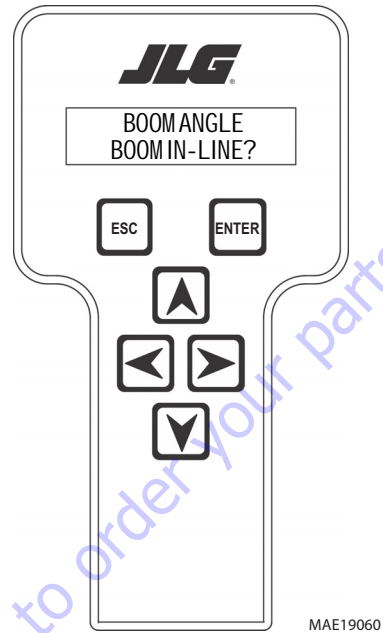
5. Use the arrow button to reach ACCESS LEVEL. Hit Enter.
6. Enter the Access Code, 33271.
7. Use the right Arrow key to reach CALIBRATIONS. Hit Enter.

SECTION 6 - JLG CONTROL SYSTEM

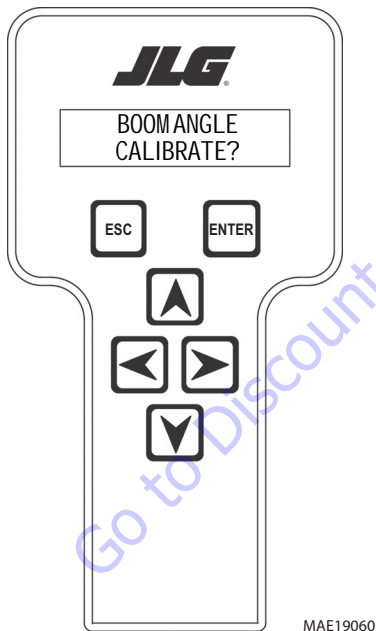
8. Use arrow keys to reach BOOM ANGLE. The Screen will read:



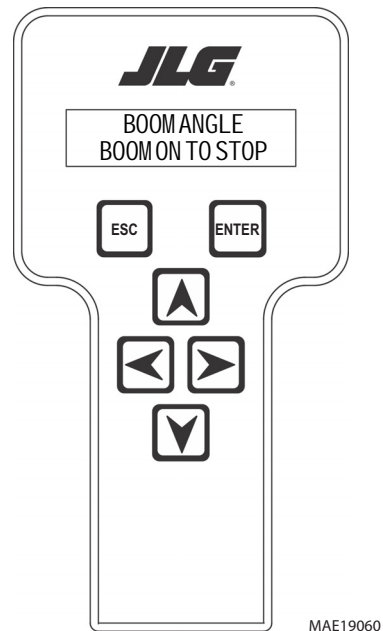
10. UGM will confirm the Boom In-Line position. The screen will read:



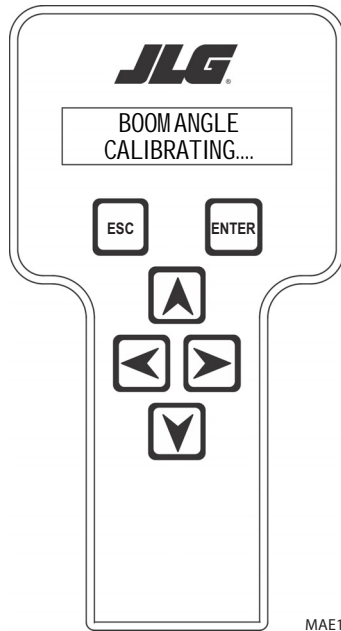
9. Hit Enter. The screen will read:



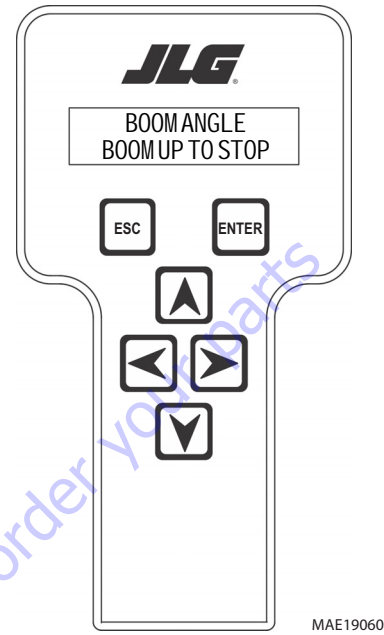
11. Hit Enter. The Screen will read:



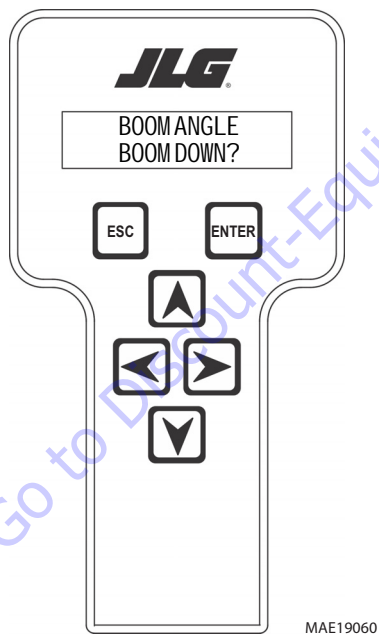
12. When the sensor is calibrated at lower position of the boom. The screen will read:



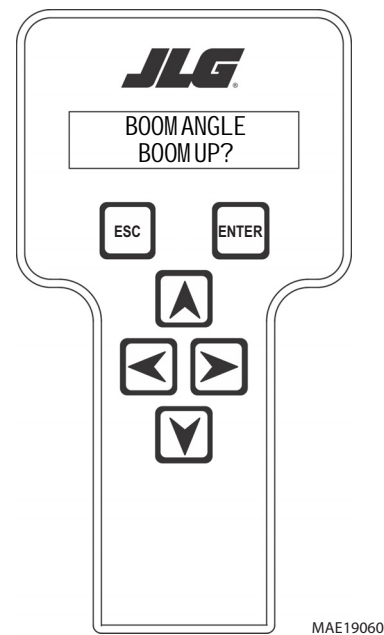
14. If the calibrating values are under acceptable limits, Raise the boom and press Enter. The screen will read:



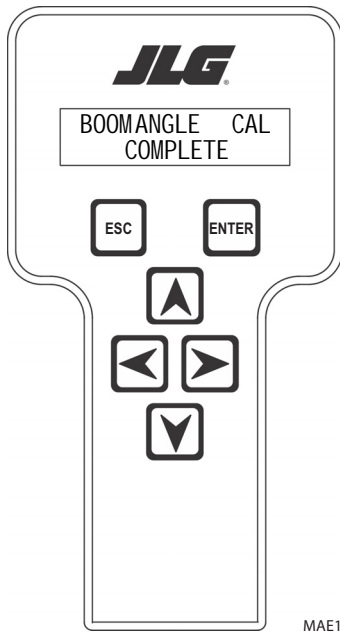
13. UGM will confirm the position of the boom. Press Enter. The screen will read:



15. UGM will confirm the position of the boom. Press Enter. The screen will read:



16. After few seconds. The screen will read:



17. Hit ESC twice to go back to CALIBRATIONS.

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6.11 CALIBRATING LOAD SENSING

NOTE: Calibration sub-menu *LOAD SENSING* is visible only if *MACHINE SET-UP* sub-menu *LOAD SYSTEM* is selected to *NO*.

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



MAE17700

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



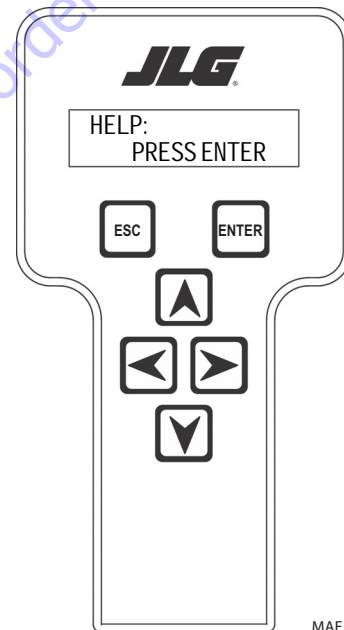
MAE15680

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



MAE17820

4. The analyzer screen should read:

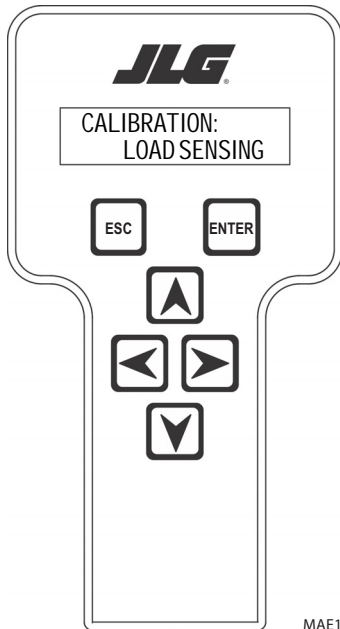


MAE19060

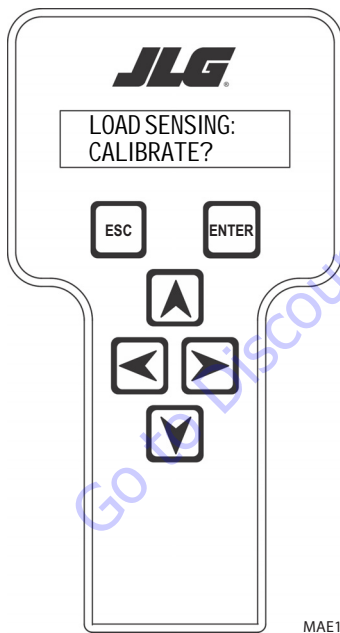
5. Use the arrow button to reach ACCESS LEVEL. Hit Enter.
6. Enter the Access Code, 33271.
7. Use the right Arrow key to reach CALIBRATIONS. Hit Enter.

SECTION 6 - JLG CONTROL SYSTEM

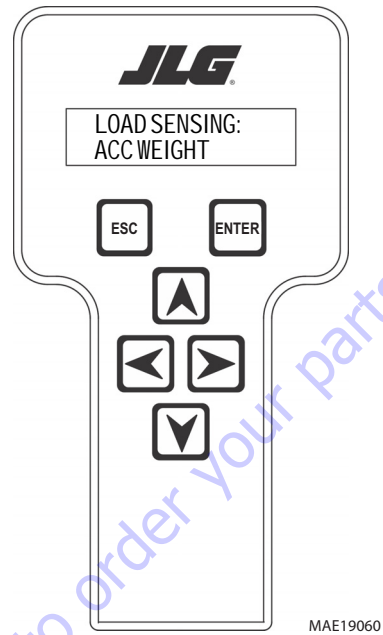
8. Use the arrow keys to navigate the Load Sensing calibration as shown below.



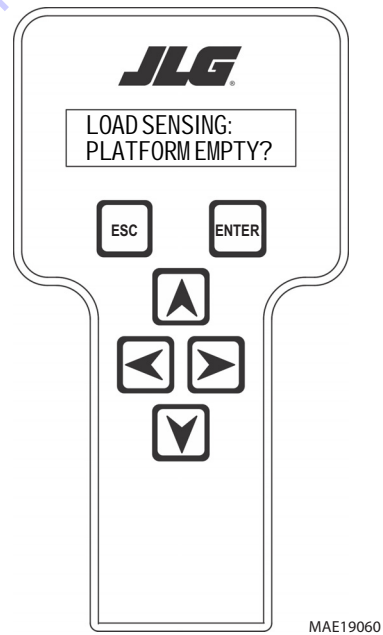
9. Press **ENTER** . The screen will read:



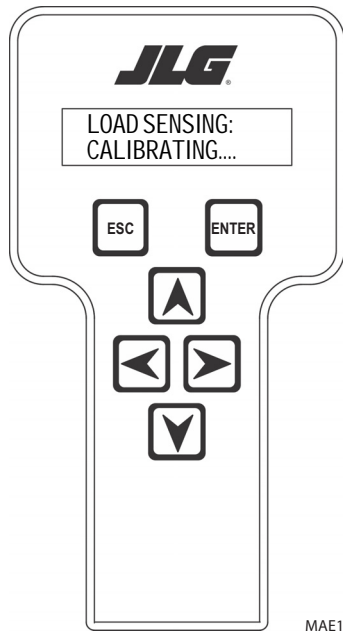
10. Hit Enter. The screen will read:



11. Hit Enter. The screen will read:

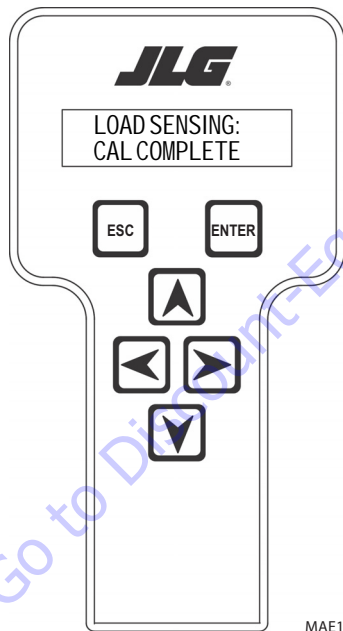


12. Hit Enter. The screen will read:



MAE19060

13. After few seconds, the screen will read:



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14. Hit ESC twice to go back to CALIBRATIONS.

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Part Safety:

Part Environmental:

Part Performance:

Part Reliability:

Part Durability:

Part Efficiency:

Part Productivity:

Part Quality:

Part Consistency:

Part Accuracy:

Part Precision:

Part Detail:

Part Craftsmanship:

Part Innovation:

Part Creativity:

Part Problem Solving:

Part Teamwork:

Part Communication:

Part Leadership:

Part Motivation:

Part Inspiration:

Part Encouragement:

Part Support:

Part Guidance:

Part Assistance:

Part Help:

Part Advice:

Part Information:

Part Knowledge:

Part Skills:

Part Abilities:

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Part Risk Management:

Part Crisis Management:

Part Business Development:

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Part Sales Strategy:

Part Distribution Strategy:

Part Logistics Strategy:

Part Supply Chain Management:

Part Inventory Management:

Part Procurement Strategy:

Part Contract Management:

Part Legal Compliance:

Part Tax Management:

Part Financial Management:

Part Accounting:

Part Budgeting:

Part Forecasting:

Part Reporting:

Part Analytics:

Part Data Management:

Part Information Technology:

Part Software Development:

Part Hardware Management:

Part Network Management:

Part Security Management:

Part Disaster Recovery:

Part Business Continuity:

Part Risk Assessment:

Part Incident Response:

Part Crisis Communication:

Part Public Relations:

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Part Social Media Management:

Part Content Marketing:

Part Search Engine Optimization:

Part Pay Per Click Advertising:

Part Email Marketing:

Part Direct Marketing:

Part Telemarketing:

Part Sales Training:

Part Customer Service Training:

Part Employee Training:

Part Leadership Training:

Part Management Training:

Part Professional Development:

Part Career Development:

Part Work-Life Balance:

Part Employee Wellness:

Part Diversity and Inclusion:

Part Sustainability:

Part Environmental Management:

Part Social Responsibility:

Part Corporate Governance:

Part Board of Directors:

Part Executive Compensation:

Part Shareholder Value:

Part Investor Relations:

Part Public Policy:

Part Government Relations:

Part Industry Associations:

Part Trade Shows:

Part Conferences:

Part Seminars:

Part Webinars:

Part Podcasts:

Part YouTube Channel:

Part Blog:

Part White Paper:

Part EBook:

Part Newsletter:

Part Press Release:

Part Media Kit:

Part Brand Guidelines:

Part Style Guide:

Part Logo:

Part Color Palette:

Part Typography:

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Part Distribution Plan:

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Part Supply Chain Plan:

Part Inventory Plan:

Part Procurement Plan:

Part Contract Plan:

Part Legal Plan:

Part Tax Plan:

Part Financial Plan:

Part Accounting Plan:

Part Reporting Plan:

Part Analytics Plan:

Part Information Technology Plan:

Part Software Plan:

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Part Network Plan:

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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

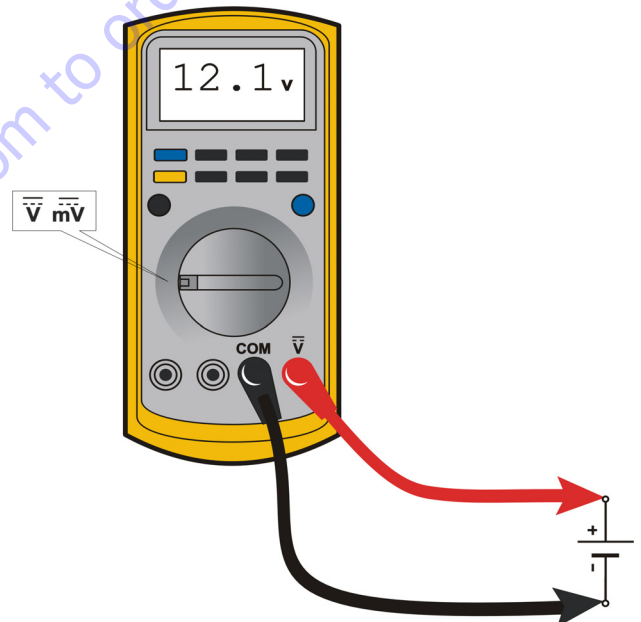


Figure 7-1. Voltage Measurement (DC)

- 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

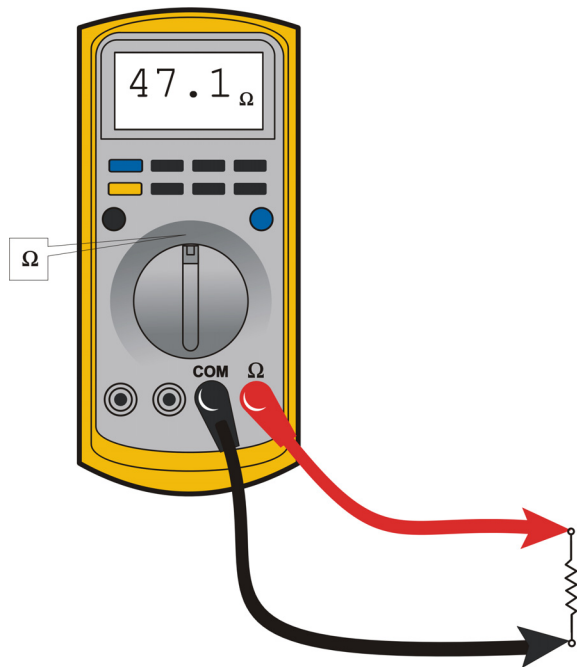


Figure 7-2. Resistance Measurement

- 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

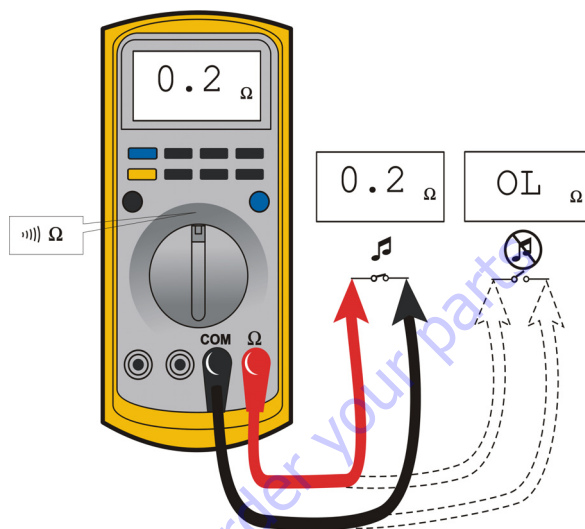


Figure 7-3. Continuity Measurement

- 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

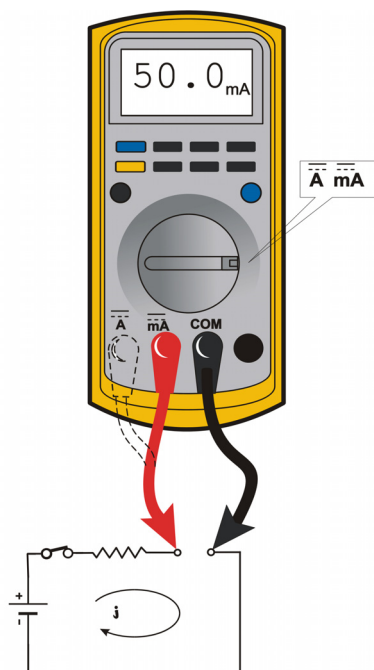


Figure 7-4. Current Measurement (DC)

- 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 P/N 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.*

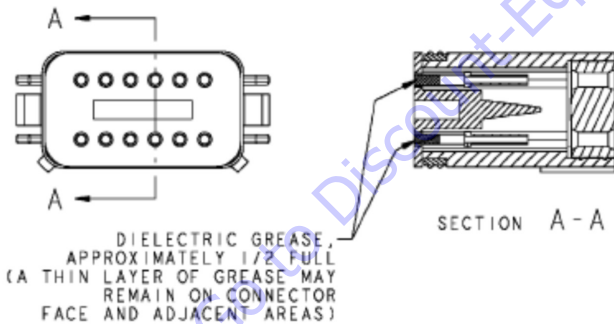
When applied to electrical connections, dielectric grease helps to prevent corrosion of electrical contacts and improper conductivity between contacts from moisture intrusion. Open and sealed connectors benefit from the application of dielectric grease.

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

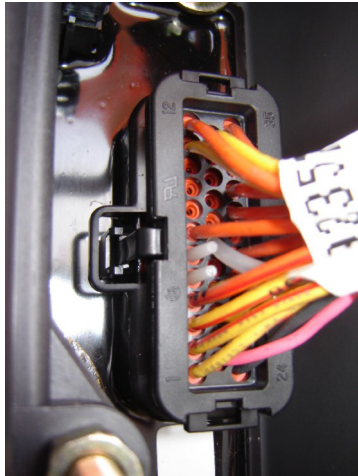


Figure 7-6. Use of Seal Plugs

DIN Connectors

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

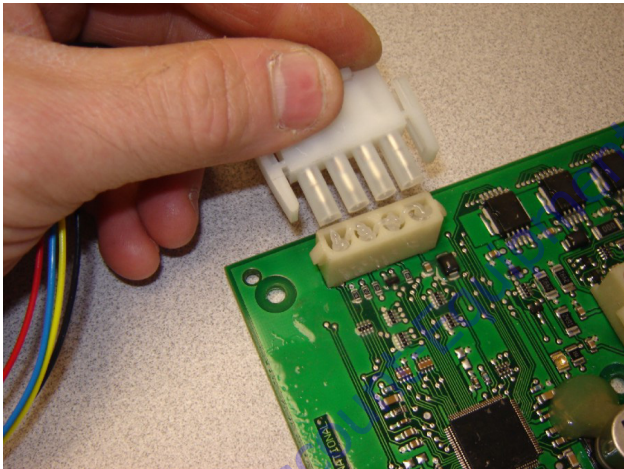


Exclusions

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.

AMP Mate-N-Lok

Follow the installation instructions.



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 1250AJP Rotary Angle Sensors are examples of components with the M12 connector system.



AMP JUNIOR TIMER

This type of connector uses 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 EMR2 engine control module from Deutz employs this connector system (for example).



7.4 AMP CONNECTOR

Assembly

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

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 7-9.).

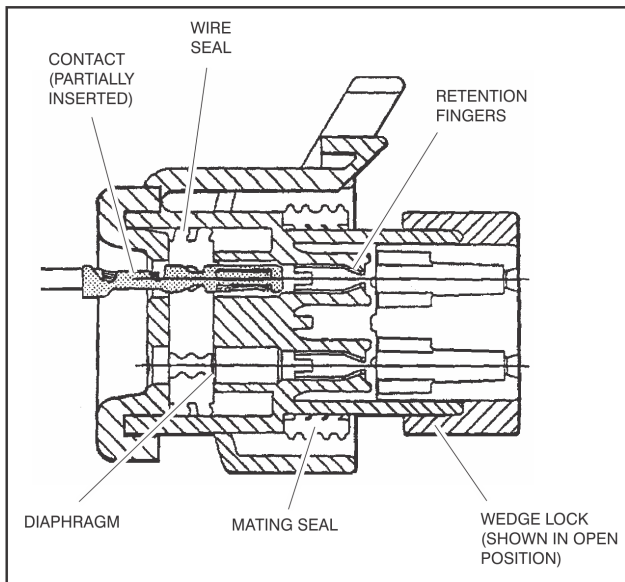


Figure 7-7. Connector Assembly Figure 1

1. To insert a contact, push it straight into the appropriate circuit cavity as far as it will go (See Figure 7-9.).

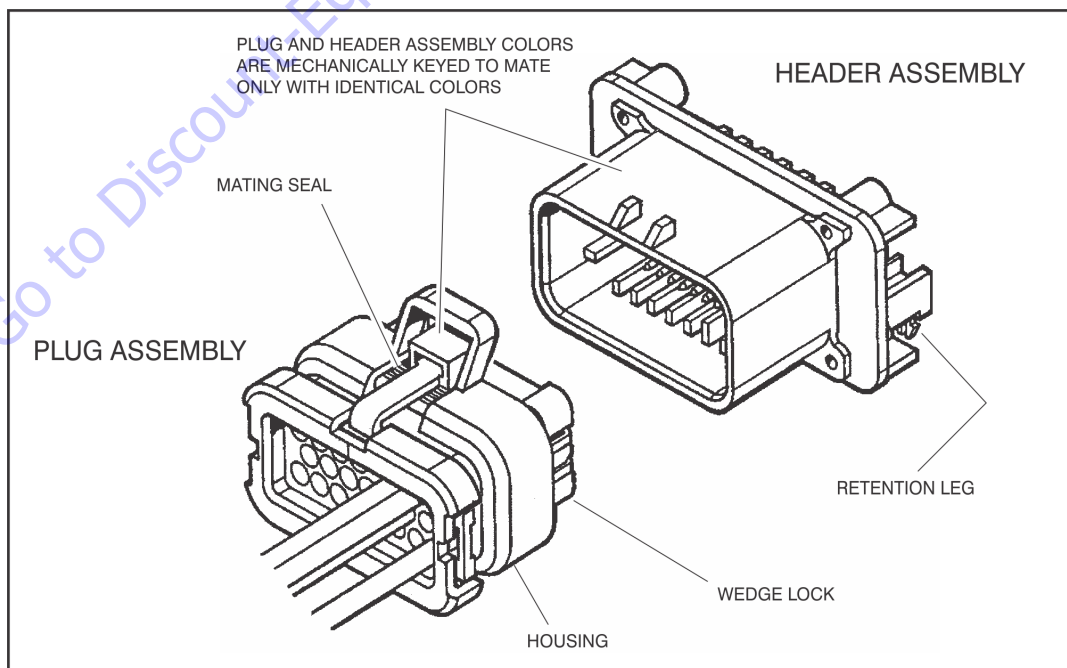


Figure 7-8. AMP Connector

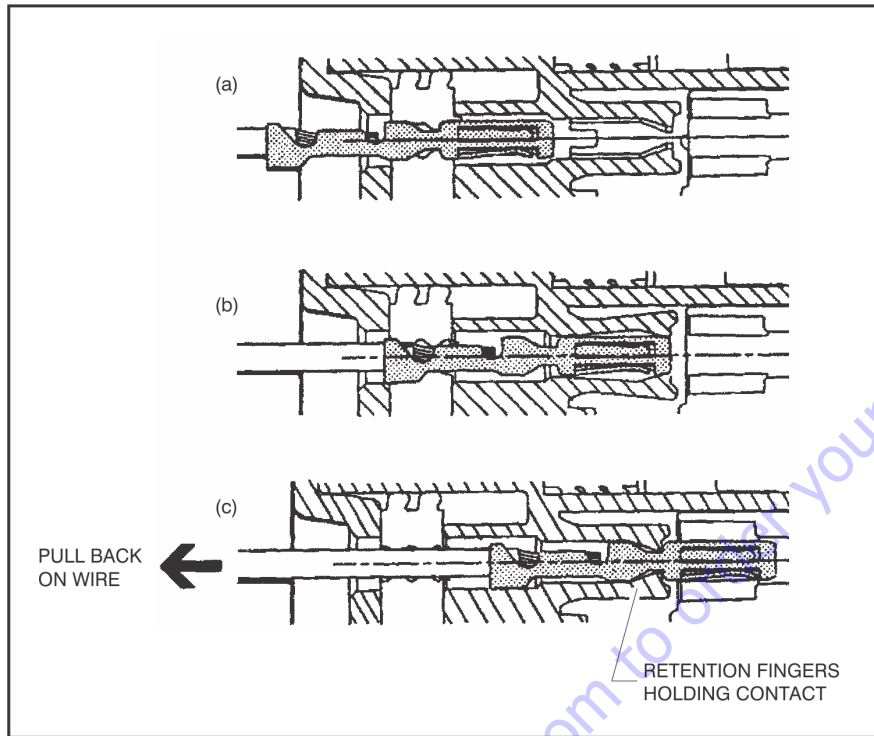


Figure 7-9. Connector Assembly Figure 2

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 7-10.).
4. Slide the wedge lock into the housing until it is flush with the housing (See Figure 7-11.).

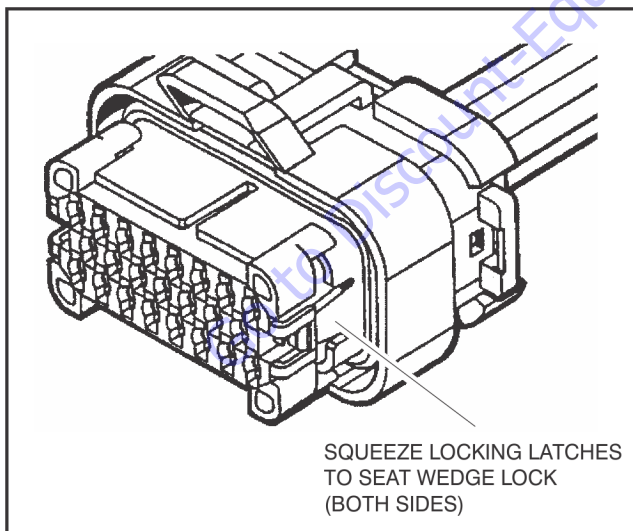


Figure 7-10. Connector Assembly Figure 3

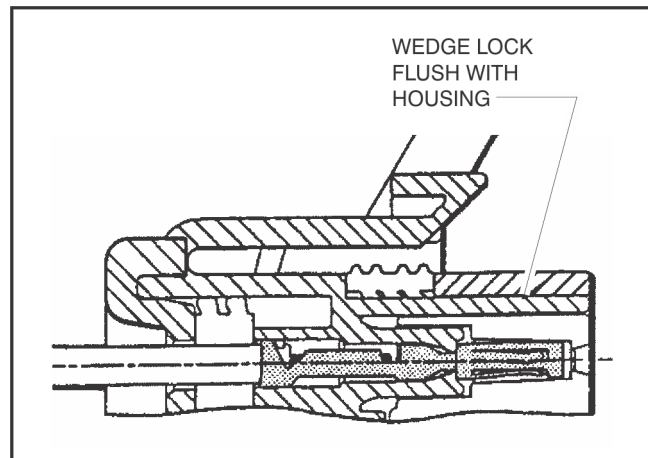


Figure 7-11. Connector Assembly Figure 4

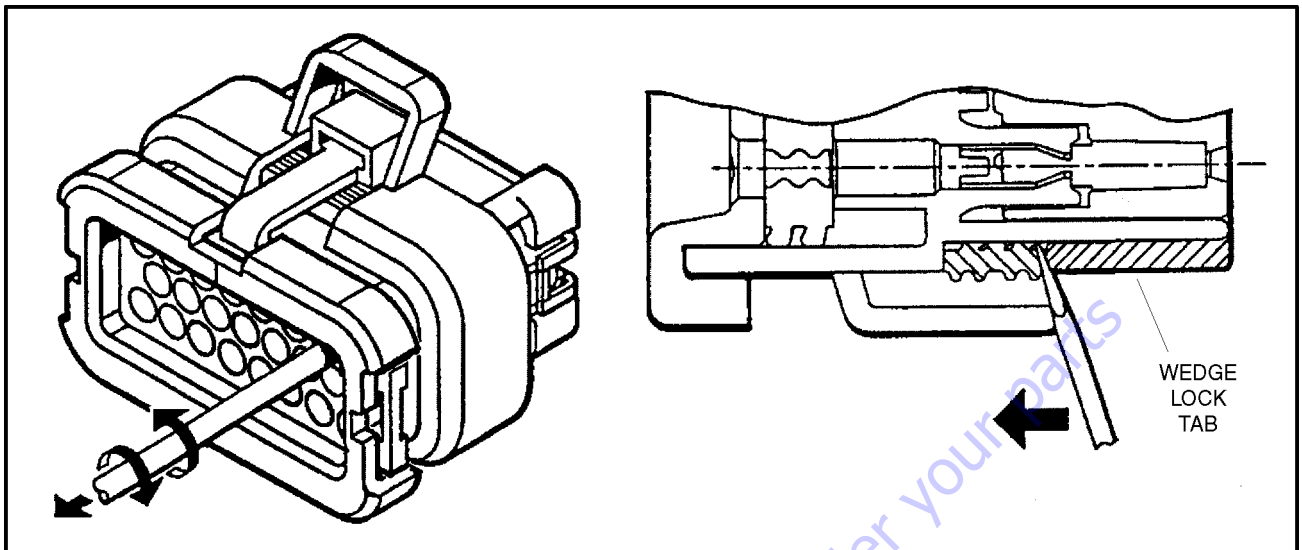


Figure 7-12. Connector Disassembly

Disassembly

1. Insert a 4.8 mm (3/16") wide screwdriver blade between the mating seal and one of the red wedge lock tabs.
2. Pry open the wedge lock to the open position.
3. 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 AMPSEAL 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.

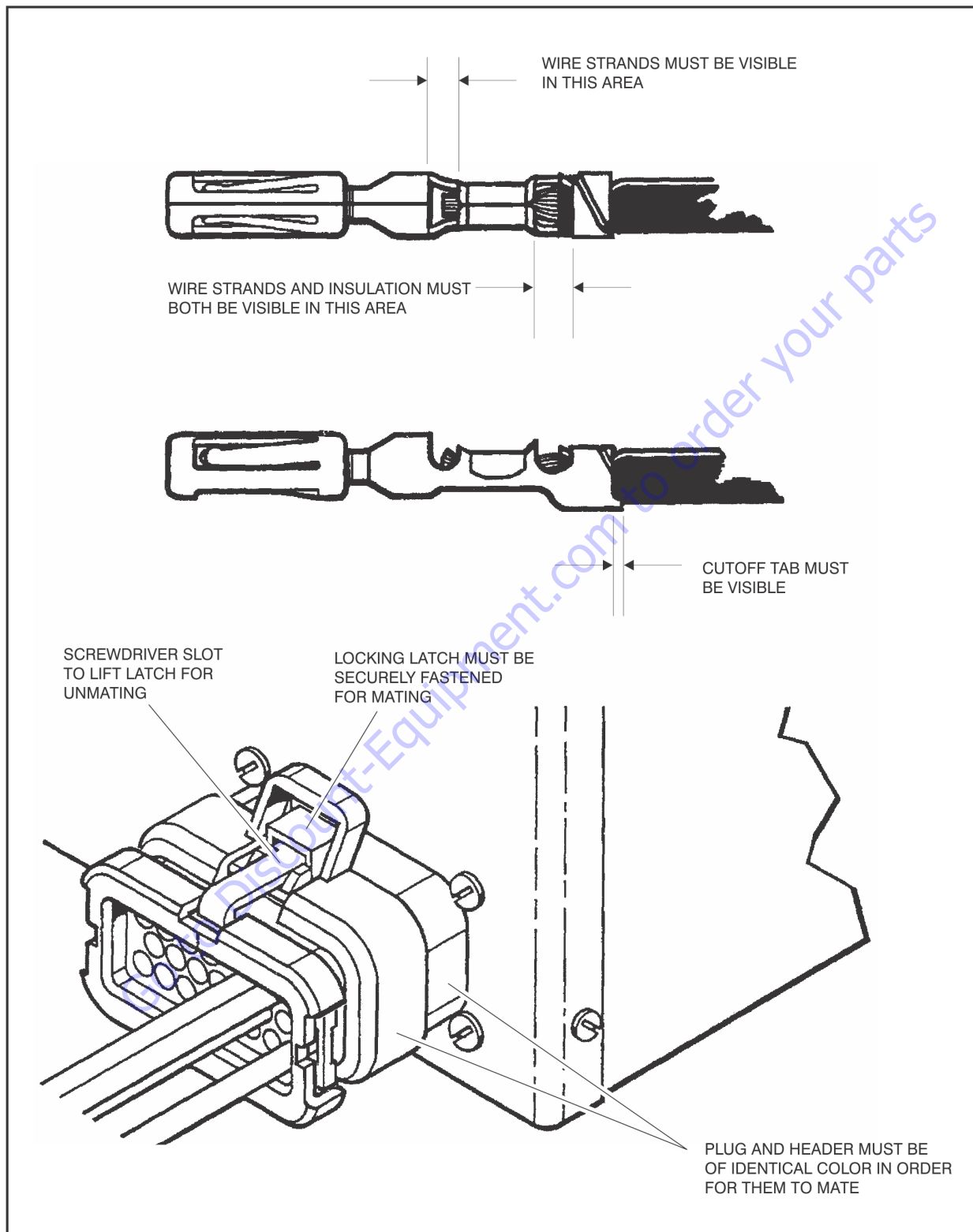


Figure 7-13. Connector Installation

7.5 DEUTSCH CONNECTORS

DT/DTP Series Assembly

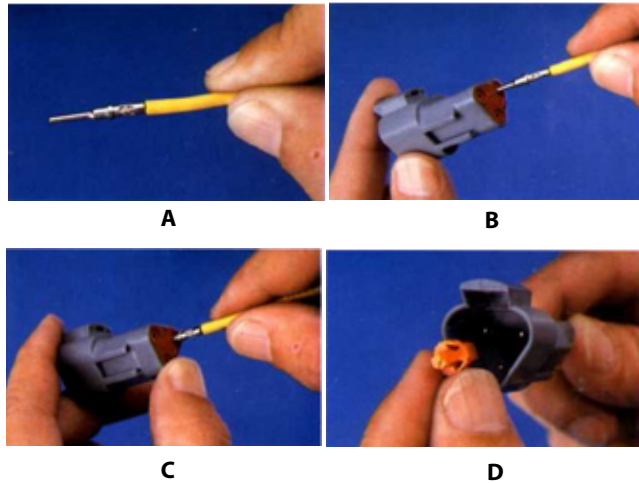


Figure 7-14. DT/DTP Contact Installation

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

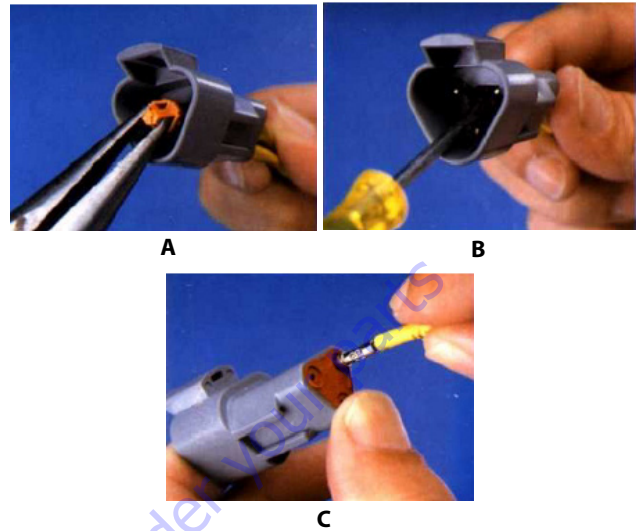


Figure 7-15. DT/DTP Contact Removal

1. Remove wedgelock using needlenose pliers or a hook shaped wire to pull wedge straight out.
2. 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.
3. Hold the rear seal in place, as removing the contact may displace the seal.

HD30/HDP20 Series Assembly

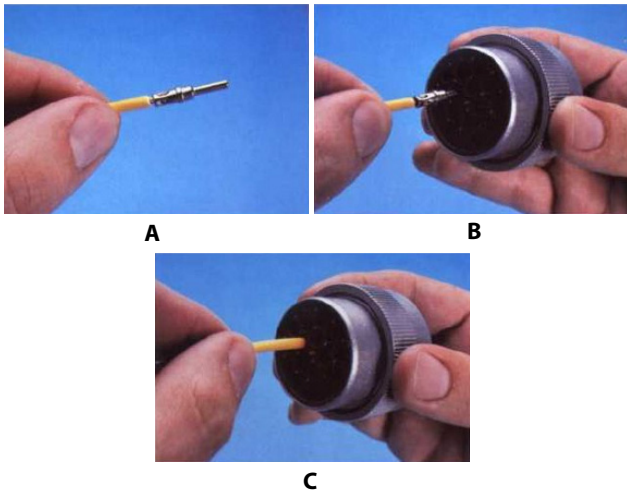


Figure 7-16. HD/HDP Contact Installation

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

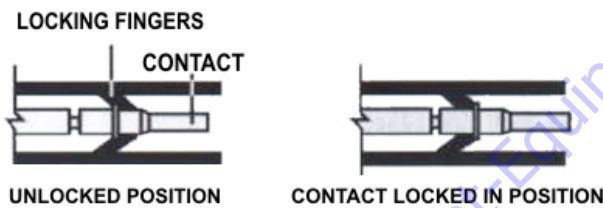


Figure 7-17. HD/HDP Locking Contacts Into Position

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

HD30/HDP20 Series Disassembly

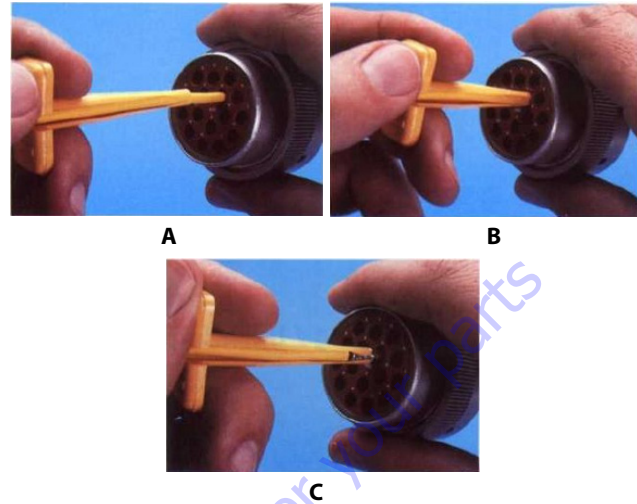


Figure 7-18. HD/HDP Contact Removal

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

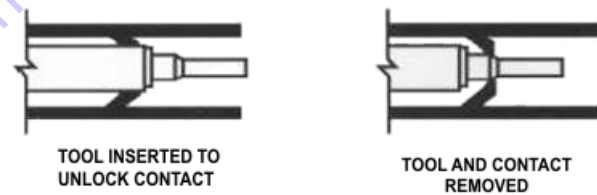


Figure 7-19. HD/HDP Unlocking Contacts

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

7.6 WIRING HARNESS

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	
	Starter	
Fuse & CB Fuse FC	Fuse	FC
	Fusible Link	FC
	Circuit Breaker	CB
Gauge & Display	Board	GD
	Cluster	
	Hour meter	
	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	

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

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

7.7 ELECTRICAL INSTALLATION

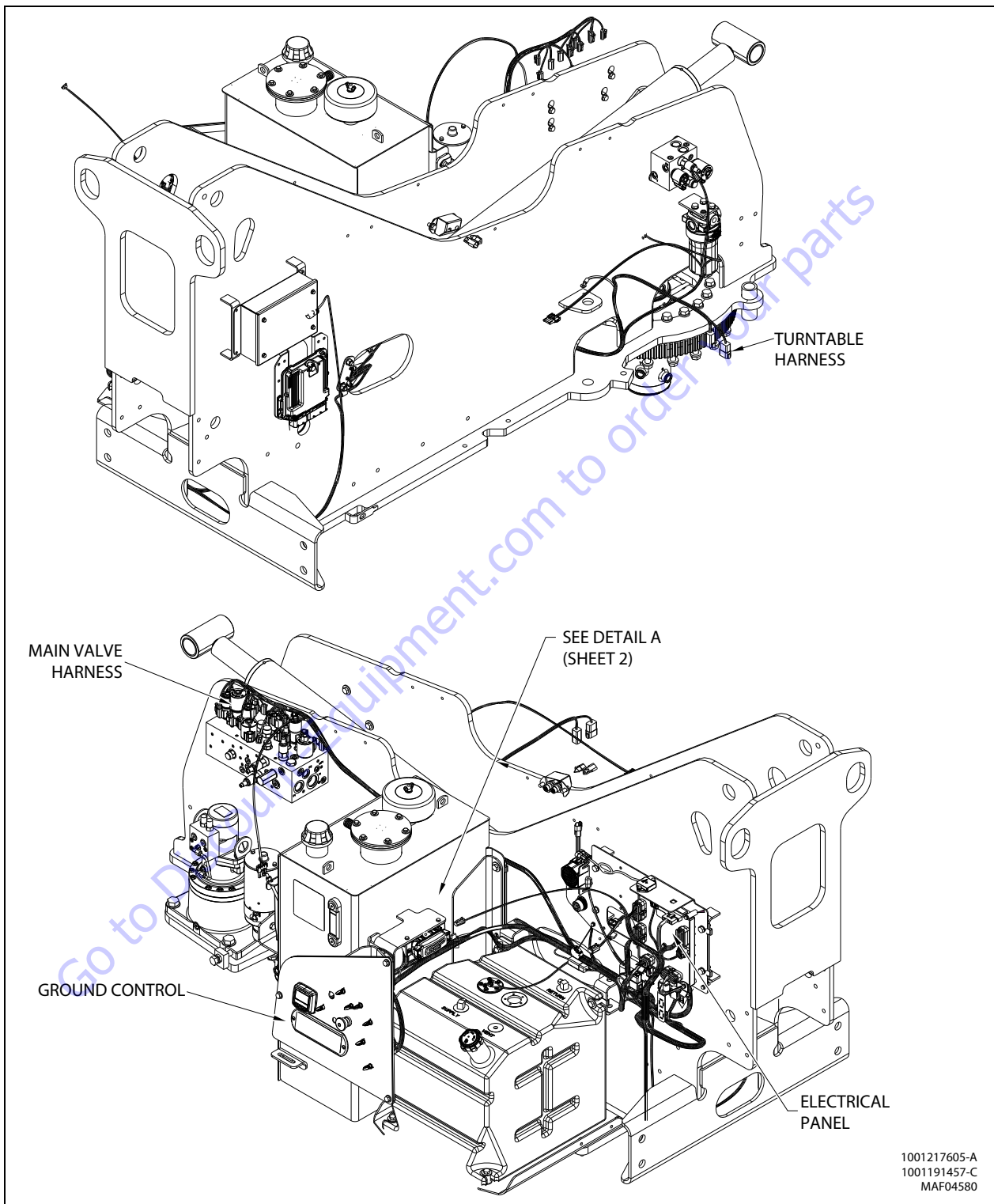


Figure 7-20. Electrical Installation - Sheet 1 of 4

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

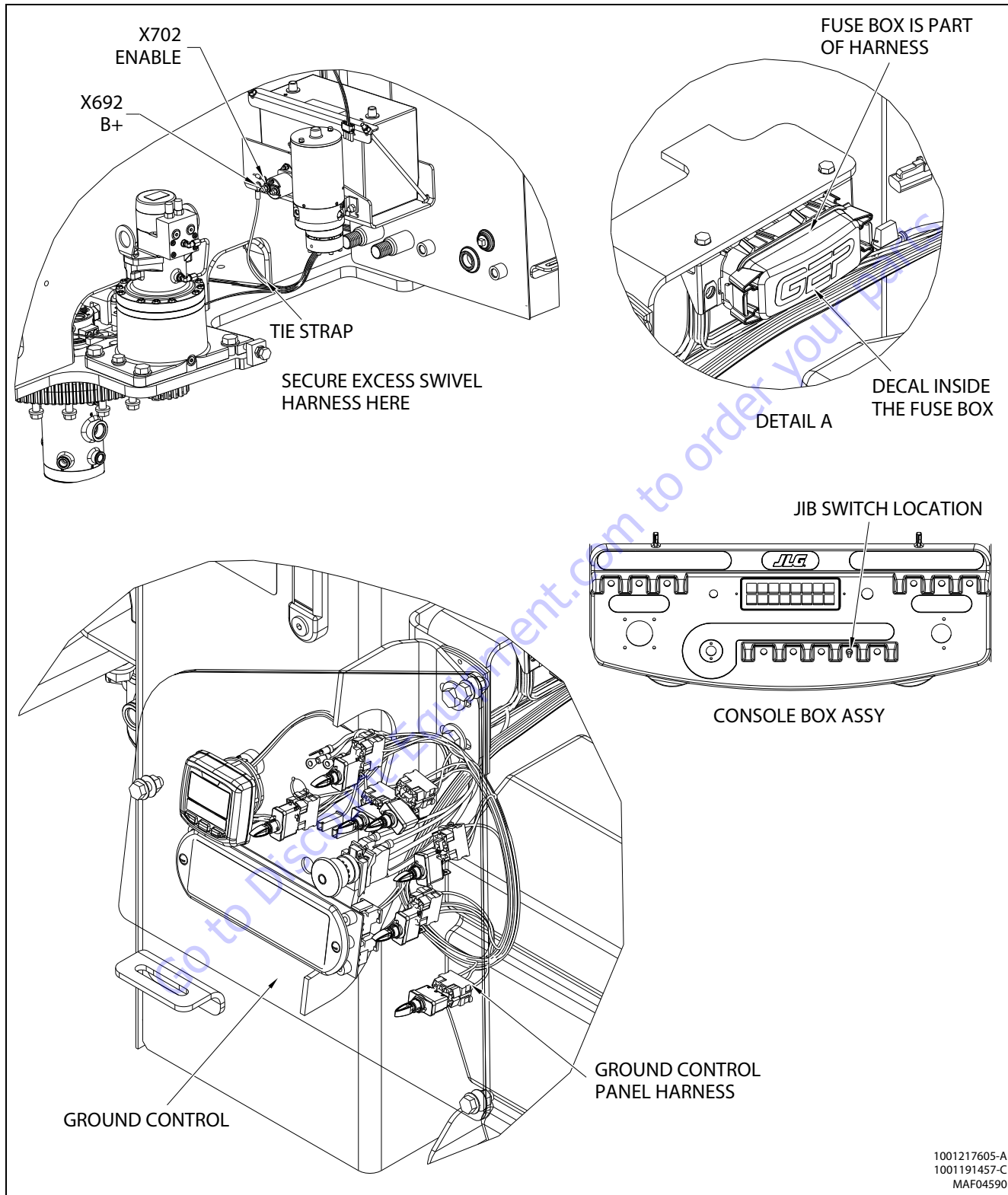


Figure 7-21. Electrical Installation - Sheet 2 of 4

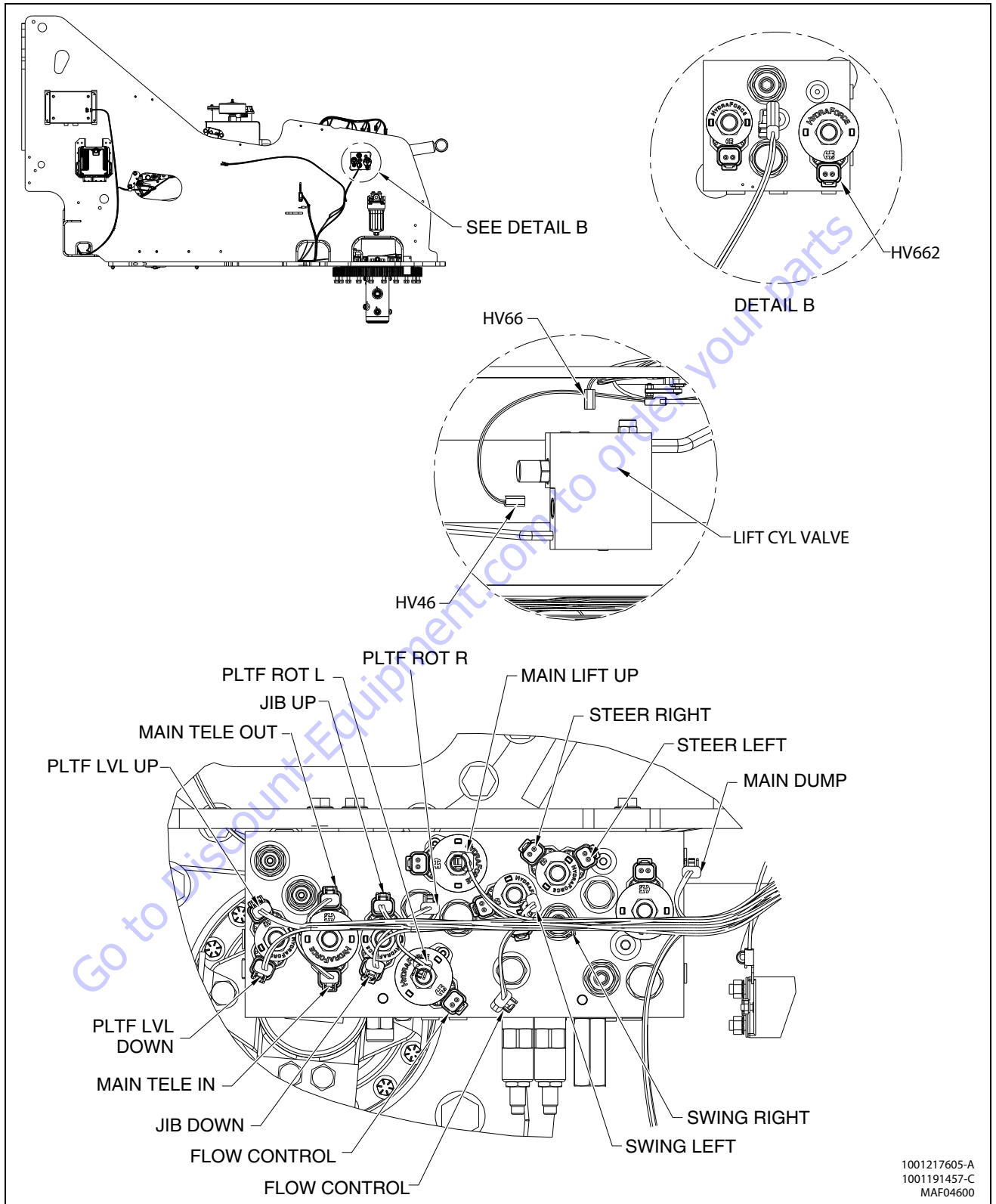


Figure 7-22. Electrical Installation - Sheet 3 of 4

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

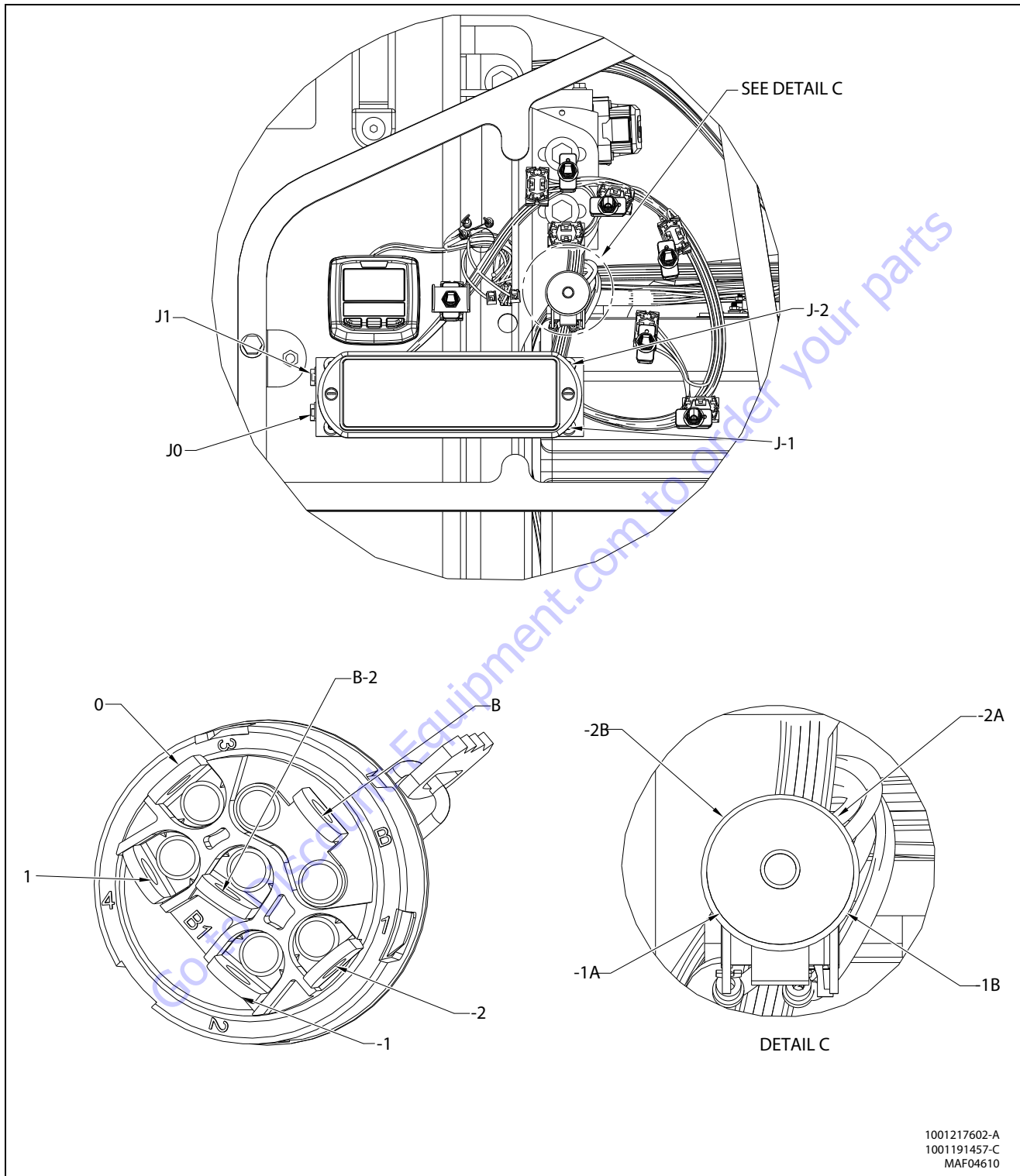


Figure 7-23. Electrical Installation - Sheet 4 of 4

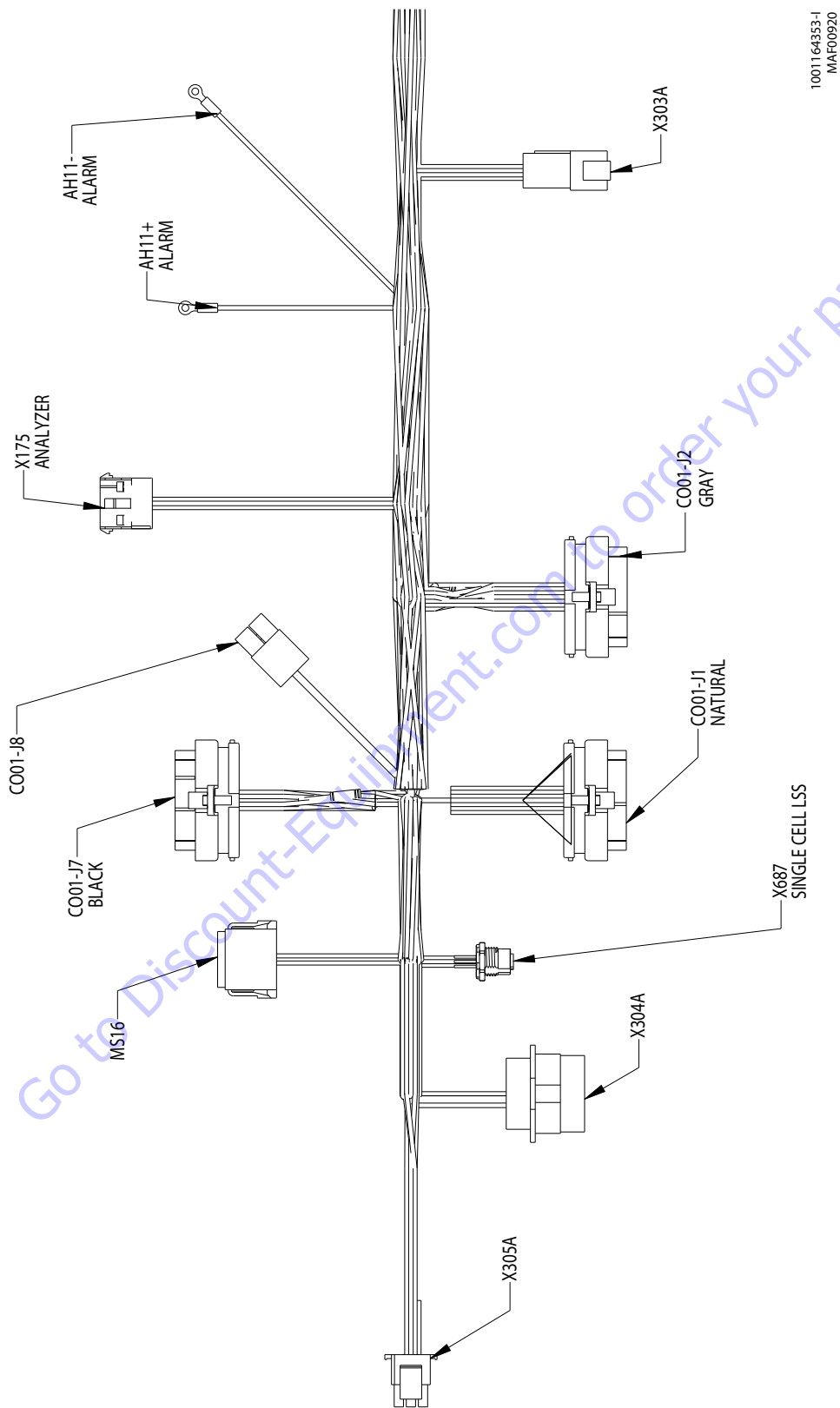


Figure 7-25. Platform Control Box Harness Without Skyguard - Sheet 2 of 12

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

X305A					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-35 GENERATORSWITCH	18AWG	GXL	C001-J7(9)
2	WHT	1-38 GENONSWITCH	18AWG	GXL	C001-J7(5)
3					
4	WHT	1-39 FOOTSW DISENGAGED	18AWG	GXL	C001-J7(8)
5	WHT	1-40 FOOTSW	18AWG	GXL	C001-J7(4)
6					
7	WHT	1-90SG POWER	18AWG	GXL	C001-J7(7)
8	BLK	1-86 SG GND	18AWG	GXL	C001-J7(24)
9	WHT	1-85 ST POWER	18AWG	GXL	C001-J2(31)
10	WHT	1-87 SG INPUT 1	18AWG	GXL	C001-J7(18)
11	WHT	1-88 SG INPUT 2	18AWG	GXL	C001-J1(23)
12	WHT	1-91 ST SWITCH	18AWG	GXL	C001-J1(20)
13					
14	WHT	1-551	18AWG	GXL	X305A (15)
15	WHT	1-551	18AWG	GXL	X305A (14)

X303A					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-41 PLATFROTATE LEFT	18AWG	GXL	C001-J7(33)
2	WHT	1-42 PLATFROTATE RIGHT	18AWG	GXL	C001-J7(34)
3	WHT	1-36 JIB UP	18AWG	GXL	C001-J7(25)
4	WHT	1-43 JIB DOWN	18AWG	GXL	C001-J7(26)
5	BLK	000-10-11 VALVES GND	18AWG	GXL	C001-J7(23)
6	BLK	000-10-34 OPTION GND	18AWG	GXL	C001-J7(29)
7	WHT	1-89 OPTION POWER	18AWG	GXL	C001-J2(33)
8	YEL	CAN	20AWG	J1939 CABL	MS16(3)
9	GRN	CAN	20AWG	J1939 CABL	MS16(6)
10					
11	BLK	000-10-30-2 LSS GND	18AWG	GXL	S688(2)
12	WHT	1-33-2 LSS PWR	18AWG	GXL	S689(2)

X304A					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2	GRN	CAN	20AWG	J1939 CABL	MS16(5)
3	YEL	CAN	20AWG	J1939 CABL	MS16(2)
4	WHT	1-44 EMS	18AWG	GXL	C001-J7(3)
5					
6					
7					
8					
9	WHT	1-62 EMS B+	18AWG	GXL	SW14-1B(1B)
10					
11	WHT	1-37 GROUND MODE	18AWG	GXL	C001-J7(1)
12	WHT	1-1	18AWG	GXL	C001-J8(2)
13					
14					
15					
16	BLK	000-10-14 GND	12AWG	GXL	C001-J8(1)
17					
18					
19					

X175 ANALIZER					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-66 POWER	18 AWG	GXL	C001-J2 (26)
2	WHT	1-81 RECEIVE	18 AWG	GXL	C001-J2 (28)
3	WHT	1-82 TRANSMIT	18 AWG	GXL	C001-J2 (29)
4	BLK	000-10-12 GND	18 AWG	GXL	C001-J2 (27)

Figure 7-26. Platform Control Box Harness Without Skyguard - Sheet 3 of 12

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

C001-J2 GRAY					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	T0
1					
2					
3					
4	WHT	1-67 PLTF ORIENT OVERRIDE	18AWG	GXL	SW174 (1)
5					
6	WHT	1-20 TILT	18AWG	GXL	GD153-J4 (5)
7	WHT	1-32FT SWITCH ENABLE	18AWG	GXL	GD153-J2 (2)
8	WHT	1-25 SYSTEM DISTRESS	18AWG	GXL	GD153-J3 (6)
9	WHT	1-24CREEP	18AWG	GXL	GD153-J2 (1)
10					
11	WHT	1-22 PLATFORM OVERLOAD	18AWG	GXL	GD153-J4 (3)
12	WHT	1-21500#/600# MODE	18AWG	GXL	GD153-J4 (4)
13	WHT	1-271000# MODE	18AWG	GXL	GD153-J3 (4)
14	WHT	1-28DRIVE ORIENT SW	18AWG	GXL	GD153-J3 (3)
15	WHT	1-23GENERATOR ON	18AWG	GXL	GD153-J4 (2)
16	WHT	1-31SOFT TCH/SKY GUARD	18AWG	GXL	LB478+ (1)
17	WHT	1-29 GLOW PLUG	18AWG	GXL	GD153-J4 (6)
18	BLK	000-10-27 GND	18AWG	GXL	GD153-J2 (6)
19					
20	WHT	1-92 DRIVE DISABLE	18AWG	GXL	GD153-J3 (1)
21	WHT	1-30 LOW FUEL	18AWG	GXL	GD153-J2 (3)
22	WHT	1_498 1/4 FUEL	18AWG	GXL	GD153-J1 (1)
23	WHT	1_499 3/4 FUEL	18AWG	GXL	GD153-J1 (3)
24	WHT	1_500 1/2 FUEL	18AWG	GXL	GD153-J1 (2)
25	BLK	1_497FUEL GND	18AWG	GXL	GD153-J1 (4)
26	WHT	1-66 POWER	18AWG	GXL	X175 (1)
27	BLK	000-10-12 GND	18AWG	GXL	X175 (4)
28	WHT	1-81 RECEIVE	18AWG	GXL	X175 (2)
29	WHT	1-82 TRANSMIT	18AWG	GXL	X175 (3)
30					
31	WHT	1-85 ST POWER	18AWG	GXL	X305A (9)
32	WHT	1-33 LSS PWR	18AWG	GXL	S689 (1)
33	WHT	1-89 OPTION POWER	18AWG	GXL	X303A (7)
34					
35	WHT	1_501 FUEL FULL	18AWG	GXL	GD153-J1 (6)

C001-J7 BLACK					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	T0
1	WHT	1-37GROUND MODE	18AWG	GXL	X304A(11)
2	WHT	1-45 PLATF EMS	18AWG	GXL	SW14-2B (2B)
3	WHT	1-44EMS	18AWG	GXL	X304A(4)
4	WHT	1-40FOOT SW	18AWG	GXL	X305A(5)
5	WHT	1-38GEN ON SWITCH	18AWG	GXL	X305A(2)
6					
7	WHT	1-90SG POWER	18AWG	GXL	X305A(7)
8	WHT	1-39 FOOTSW DISENGAGED	18AWG	GXL	X305A(4)
9	WHT	1-35GENERATOR SWITCH	18AWG	GXL	X305A(1)
10					
11					
12					
13					
14					
15					
16	BLK	000-10-30LSSGND	18AWG	GXL	S688 (1)
17					
18	WHT	1-87SG INPUT1	18AWG	GXL	X305A(10)
19	WHT	1-34PLATALRM	18AWG	GXL	AH11+ (1)
20	WHT	000-10-16PLATALARM GND	18AWG	GXL	AH11- (1)
21					
22					
23	BLK	000-10-11 VALVES GND	18AWG	GXL	X303A(5)
24	BLK	1-86SG GND	18AWG	GXL	X305A(8)
25	WHT	1-36 JIB UP	18AWG	GXL	X303A(3)
26	WHT	1-43 JIB DOWN	18AWG	GXL	X303A(4)
27					
28					
29	BLK	000-10-34OPTION GND	18AWG	GXL	X303A(6)
30	GRN	CAN	20AWGJ	J1939 CABL	MS16(4)
31	YEL	CAN	20AWGJ	J1939 CABL	MS16(1)
32					
33	WHT	1-41PLATF ROTATE LEFT	18AWG	GXL	X303A(1)
34	WHT	1-42PLATF ROTATE RIGHT	18AWG	GXL	X303A(2)
35					

Figure 7-27. Platform Control Box Harness Without Skyguard - Sheet 4 of 12

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

C001-J8					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	BLK	000-10-14 GND	12AWG	GXL	X304A (16)
2	WHT	1-1	18AWG	GXL	X304A (12)

AH11- ALARM					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	000-10-16 PLAT ALARM GND	18 AWG	GXL	C001-J7 (20)

X687					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2	WHT	LSS PWR	20AWG	CABLE	S689 (2)
3	BLU	LSS GND	20AWG	CABLE	S688 (2)
4	BLK	CAN H1	20AWG	CABLE	MS16 (10)
5	GRY	CAN LO	20AWG	CABLE	MS16 (7)

MS16					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	YEL	CAN	20AWG	J1939 CABLE	C001-J7(31)
2	YEL	CAN	20AWG	J1939 CABLE	X304A (3)
3	YEL	CAN	20AWG	J1939 CABLE	X303 A (8)
4	GRN	CAN	20AWG	J1939 CABLE	C001-J7(30)
5	GRN	CAN	20AWG	J1939 CABLE	X304 A (2)
6	GRN	CAN	20AWG	J1939 CABLE	X303 A (9)
7	GRY	CAN LO	20AWG	CABLE	X687 (5)
8					
9					
10	BLK	CAN HI	20 AWG	CABLE	X687 (4)
11					
12					

AH11+ ALARM					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-34 PLAT ALRM	18AWG	GXL	C001-J7 (19)

Figure 7-28. Platform Control Box Harness Without Skyguard - Sheet 5 of 12

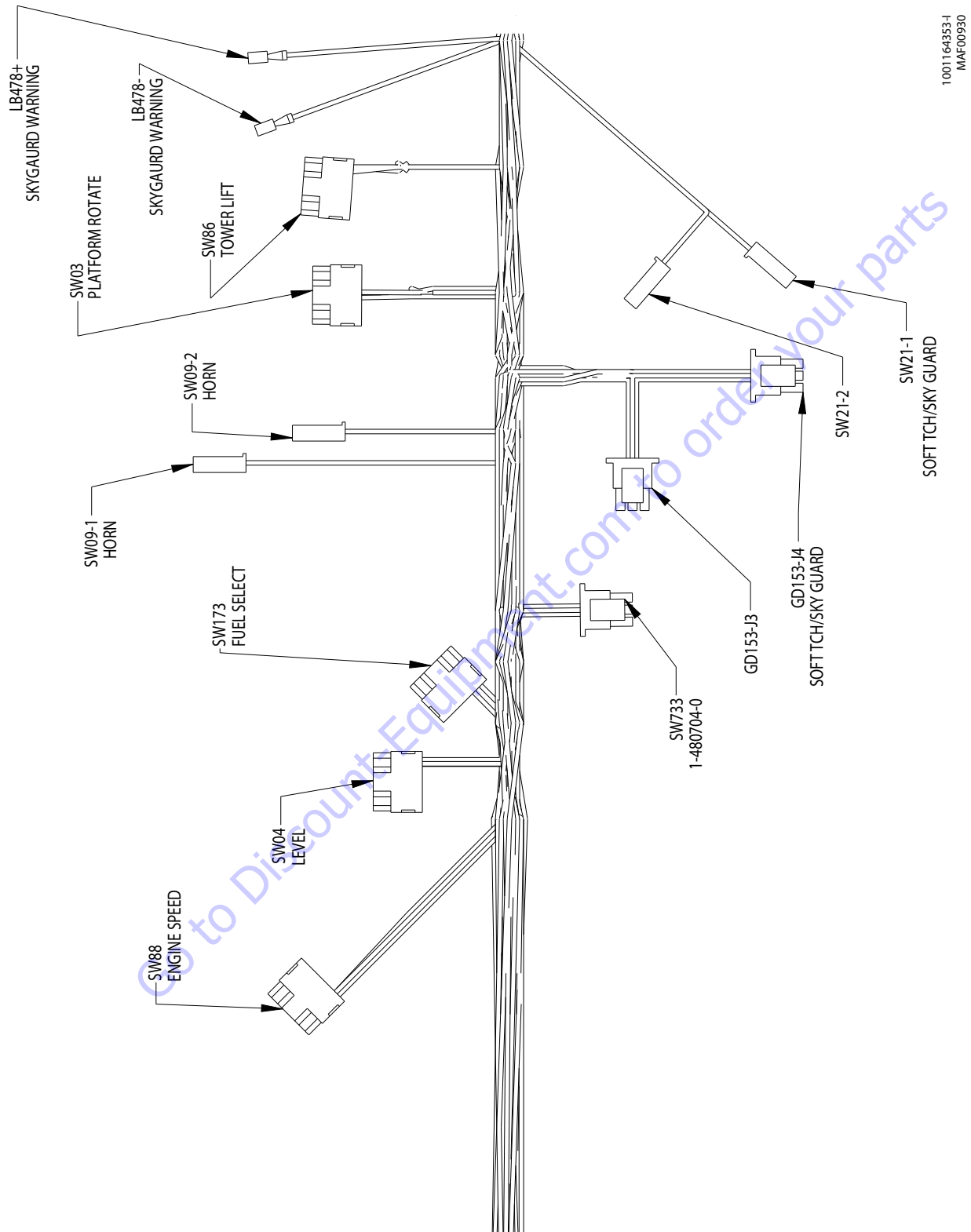


Figure 7-29. Platform Control Box Harness Without Skyguard - Sheet 6 of 12

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

SW88 ENGINE SPEED					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-11 MINSPEED	18AWG	GXL	C001-J1(28)
2	WHT	1-70SWITCHESPWR	18AWG	GXL	C001-J1(18)
2	WHT	1-80 SWITCHESPWR	18AWG	GXL	SW04(2)
3	WHT	1-12 MAXSPEED	18AWG	GXL	C001-J1(27)
4					
5					
6					

SW733 PUMP POT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2	WHT	1-101 RSII PORT 2	18AWG	GXL	C001-J1(32)
3	WHT	1-102SWITCHESPWR	18AWG	GXL	SW09-2(1)
3	WHT	1-80SWITCHESPWR	18AWG	GXL	SW174(2)
4	WHT	1-105 POTCCW	18AWG	GXL	C001-J1(34)
5	WHT	1-103 POTCW	18AWG	GXL	C001-J1(13)
6	WHT	1-104 POTW	18AWG	GXL	C001-J1(35)

SW04 LEVEL					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	LEVELDOWN	18AWG	GXL	C001-J1(10)
2	WHT	1-73 SWITCHESPWR	18AWG	GXL	SW173(2)
2	WHT	1-80 SWITCHESPWR	18AWG	GXL	SW88(2)
3	WHT	1-8 LEVELUP	18AWG	GXL	C001-J1(9)
4					
5					
6					

SW09-2 HORN					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-102 SWITCHESPWR	18AWG	GXL	SW733(3)
1	WHT	1-87 SWITCHESPWR	18AWG	GXL	SW21-2(1)

GD153-J3					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-92 DRIVEDISABLE	18AWG	GXL	C001-J2(20)
2					
3	WHT	1-28 DRIVEORIENTSW	18AWG	GXL	C001-J2(14)
4	WHT	1-27 1000#MODE	18AWG	GXL	C001-J2(13)
5					
6	WHT	1-25SYSTEMDISTRESS	18AWG	GXL	C001-J2(8)

SW09-1 HORN					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-2 HORN	18AWG	GXL	C001-J1(31)

SW173 FUEL SELECT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2	WHT	1-73 SWITCHES PWR	18AWG	GXL	SW04(2)
2	WHT	1-74 SWITCHES PWR	18AWG	GXL	SW03(2)
3	WHT	1-68 FUEL SELECT	18AWG	GXL	C001-J1(33)
4					
5					
6					

Figure 7-30. Platform Control Box Harness Without Skyguard - Sheet 7 of 12

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

GD153-J4					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	T0
1					
2	WHT	1-23 GENERATOR ON	18 AWG	GXL	C001-J2 (15)
3	WHT	1-22 PLATFORM OVERLOAD	18 AWG	GXL	C001-J2 (11)
4	WHT	1-21 500#/600# MODE	18 AWG	GXL	C001-J2 (12)
5	WHT	1-20 TILT	18 AWG	GXL	C001-J2 (6)
6	WHT	1-29 GLOW PLUG	18 AWG	GXL	C001-J2 (17)

SW86 TOWER LIFT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	T0
1	WHT	1-17TOWER DOWN	18 AWG	GXL	C001-J1 (2)
2	WHT	1-72 SWITCHES PWR	18 AWG	GXL	SW03 (2)
2	WHT	1-78 SWITCHES PWR	18 AWG	GXL	SW19 (2)
3	WHT	1-16 TOWER UP	18 AWG	GXL	C001-J1 (1)
4					
5					
6					

SW03 PLATFORM ROTATE					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	T0
1	WHT	1-7 PLTF ROTATE LEFT	18 AWG	GXL	C001-J1 (8)
2	WHT	1-72 SWITCHES PWR	18 AWG	GXL	SW86 (2)
2	WHT	1-74 SWITCHES PWR	18 AWG	GXL	SW173 (2)
3	WHT	1-6 PLTF ROTATE RIGHT	18 AWG	GXL	C001-J1 (7)
4					
5					
6					

SW21-1 SOFT TCH/SKY GUARD					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	T0
1	WHT	1-4 SOFT TOUCH	18 AWG	GXL	C001-J1 (29)

LB478- SKYGAURD WARNING					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	T0
1	BLK	000-10-501 GND	18 AWG	GXL	GD153-J2 (6)

SW21-2 SOFT TCH/SKY GUARD					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	T0
1	WHT	1-87 SWITCHES PWR	18 AWG	GXL	SW09-2 (1)

LB478+ SKYGAURD WARNING					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	T0
1	WHT	1-31 SOFT TCH/SKY GUARD	18 AWG	GXL	C001-J2 (16)

Figure 7-31. Platform Control Box Harness Without Skyguard - Sheet 8 of 12

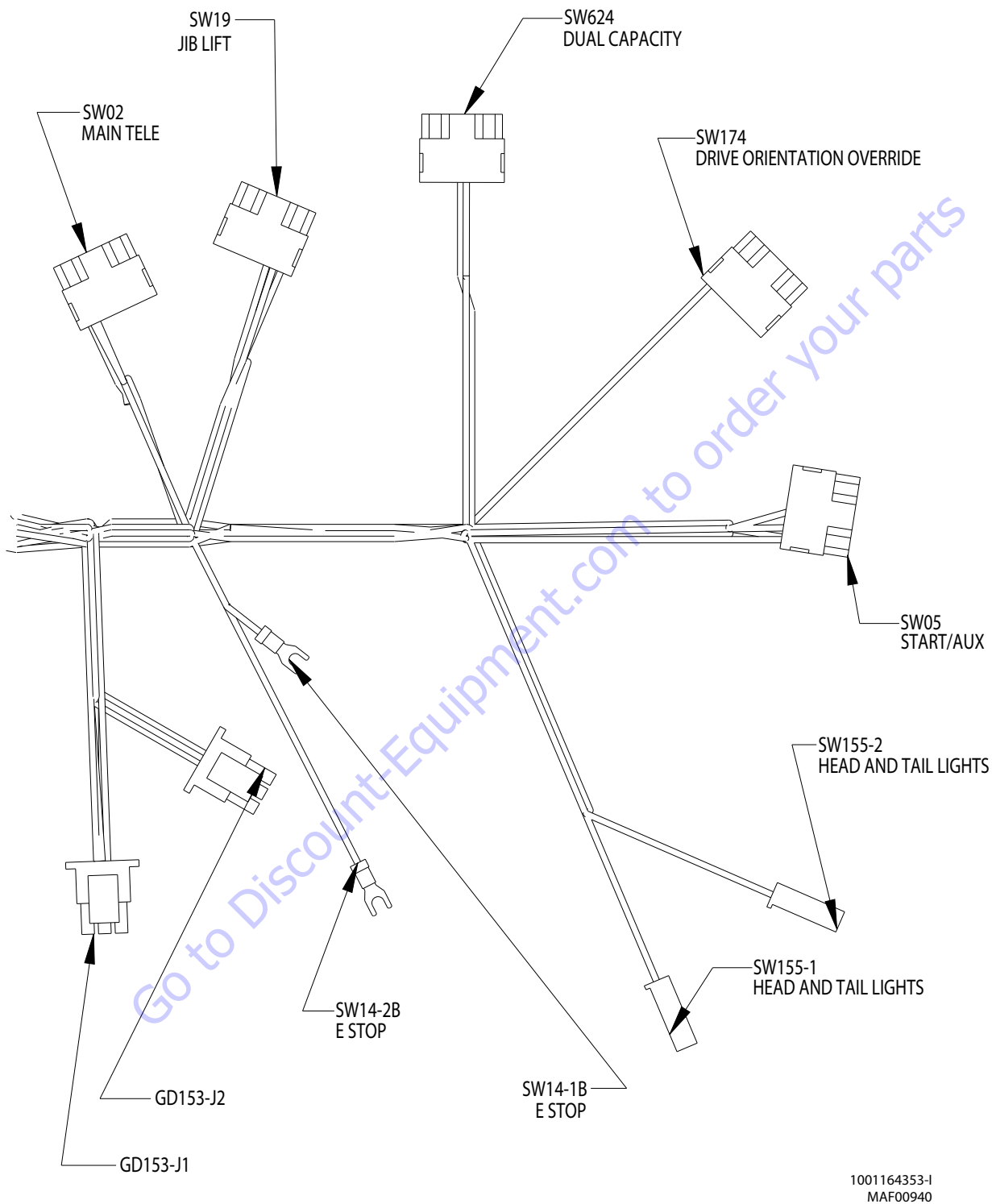


Figure 7-32. Platform Control Box Harness Without Skyguard - Sheet 9 of 12

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

GD153-J2					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-24 CREEP	18 AWG	GXL	C001-J2 (9)
2	WHT	1-32 FT SWITCH ENABLE	18 AWG	GXL	C001-J2 (7)
3	WHT	1-30 LOW FUEL	18 AWG	GXL	C001-J2 (21)
4					
5					
6	BLK	000-10-27 GND	18 AWG	GXL	C001-J2 (18)
6	BLK	000-10-501 GND	18 AWG	GXL	LB478- (1)

SW14-1B E STOP					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1B	WHT	1-62 EMS B+	18 AWG	GXL	X304A (9)

SW02 MAIN TELE					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-5 TELE OUT	18 AWG	GXL	C001-J1 (6)
2	WHT	1-71 SWITCHES PWR	18 AWG	GXL	SW155-2 (1)
2	WHT	1-76 SWITCHES PWR	18 AWG	GXL	SW19 (2)
3	WHT	1-3 TELE IN	18 AWG	GXL	C001-J1 (5)
4					
5					
6					

GD153-J1					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1_498 1/4 FUEL	18 AWG	GXL	C001-J2 (22)
2	WHT	1_500 1/2 FUEL	18 AWG	GXL	C001-J2 (24)
3	WHT	1_499 3/4 FUEL	18 AWG	GXL	C001-J2 (23)
4	BLK	1_497 FUEL GND	18 AWG	GXL	C001-J2 (25)
5					
6	WHT	1_501 FUEL FULL	18 AWG	GXL	C001-J2 (35)

SW19 JIB LIFT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-14 JIB DOWN	18 AWG	GXL	C001-J1 (12)
2	WHT	1-76 SWITCHES PWR	18 AWG	GXL	SW02 (2)
2	WHT	1-78 SWITCHES PWR	18 AWG	GXL	SW86 (2)
3	WHT	1-13 JIB UP	18 AWG	GXL	C001-J1 (11)
4					
5					
6					

Figure 7-33. Platform Control Box Harness Without Skyguard - Sheet 10 of 12

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

SW624 DUAL CAPACITY					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2	WHT	1-75 SWITCHES PWR	18AWG	GXL	SW174 (2)
2	WHT	1-79 SWITCHES PWR	18AWG	GXL	SW05 (2)
3	WHT	1-50 DUAL CAPACITY	18AWG	GXL	C001-J1 (21)
4					
5					
6					

SW155-2 HEAD AND TAIL LIGHTS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-71 SWITCHES PWR	18AWG	GXL	SW02 (2)
1	WHT	1-77 SWITCHES PWR	18AWG	GXL	SW05 (2)

SW05 START/AUX					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-10 AUX POWER	18AWG	GXL	C001-J1 (15)
2	WHT	1-77 SWITCHES PWR	18AWG	GXL	SW155-2 (1)
2	WHT	1-79 SWITCHES PWR	18AWG	GXL	SW624 (2)
3	WHT	1-9 START SWITCH	18AWG	GXL	C001-J1 (14)
4					
5					
6					

SW174 DRIVE ORIENTATION OVERRIDE					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-67 PLTF ORIENT OVERRIDE	18AWG	GXL	C001-J2 (4)
2	WHT	1-75 SWITCHES PWR	18AWG	GXL	SW624 (2)
2	WHT	1-80 SWITCHES PWR	18AWG	GXL	SW733 (3)
3					
4					
5					
6					

SW155-1 HEAD AND TAIL LIGHTS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-15 HEAD LIGHTS	18AWG	GXL	C001-J1 (30)

SW14-2B E STOP					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
2B	WHT	1-45 PLATF EMS	18AWG	GXL	C001-J7 (2)

Figure 7-34. Platform Control Box Harness Without Skyguard - Sheet 11 of 12

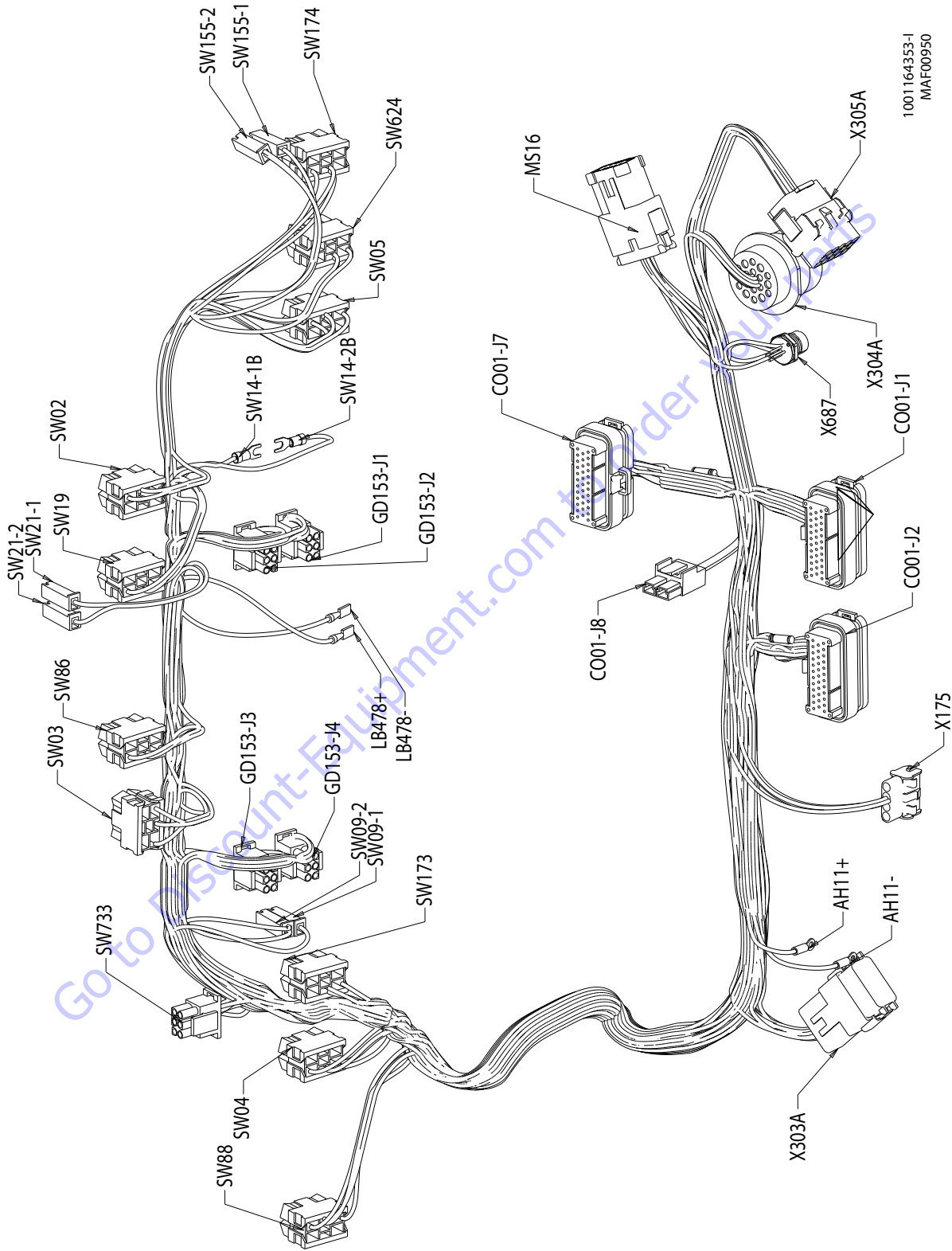
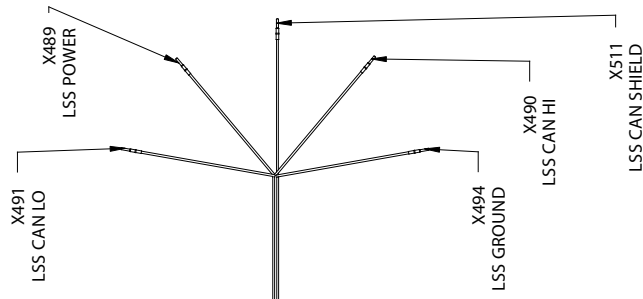


Figure 7-35. Platform Control Box Harness Without Skyguard - Sheet 12 of 12

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS



CONNECTOR PART NUMBER: 1001177612						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
2	RED	POWER	22 AWG	GXL		X489 (1)
4	WHT	CAN HI	24 AWG	GXL		X490 (1)
5	BLU	CAN LO	24 AWG	GXL		X491 (1)
3	BLK	V-	22 AWG	GXL		X494 (1)
1	SIR	SHLD	22 AWG	SHLD		X511 (1)

CONNECTOR PART NUMBER: 100116692						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	SIR	SHLD	22 AWG	SHLD		X510 (1)

CONNECTOR PART NUMBER: 100116692						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	RED	POWER	22 AWG	GXL		X510 (2)

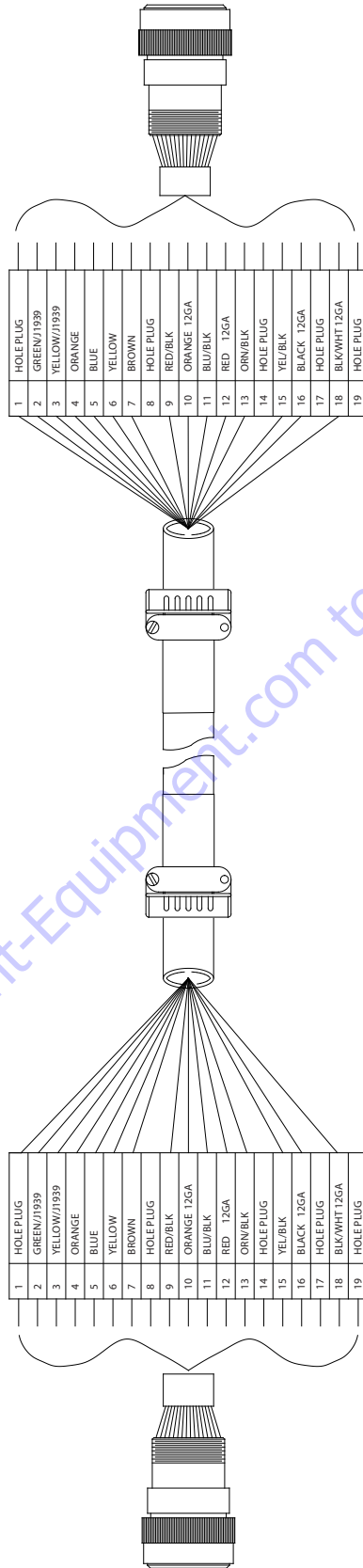
CONNECTOR PART NUMBER: 100116692						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	BLK	V-	22 AWG	GXL		X510 (3)

CONNECTOR PART NUMBER: 100116692						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	BLU	CAN LO	24 AWG	GXL		X510 (5)

CONNECTOR PART NUMBER: 100116692						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	WHT	CAN HI	24 AWG	GXL		X510 (4)

MAE18520D

Figure 7-36. LSS Harness



MAE18530C

Go to Discount-Equipment.com to order your parts

Figure 7-37. Main Boom Harness - 4005C

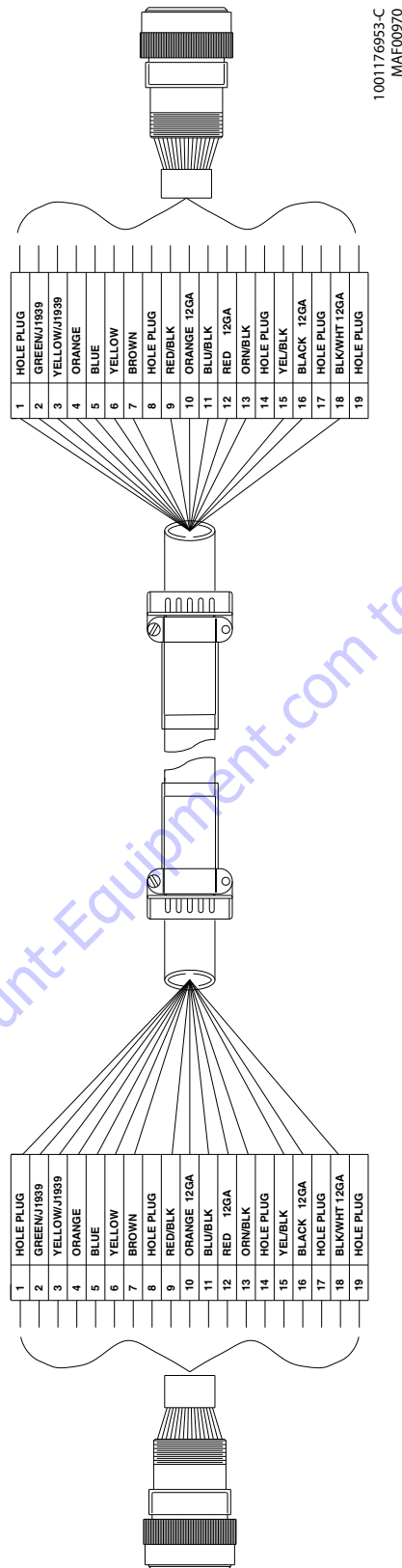
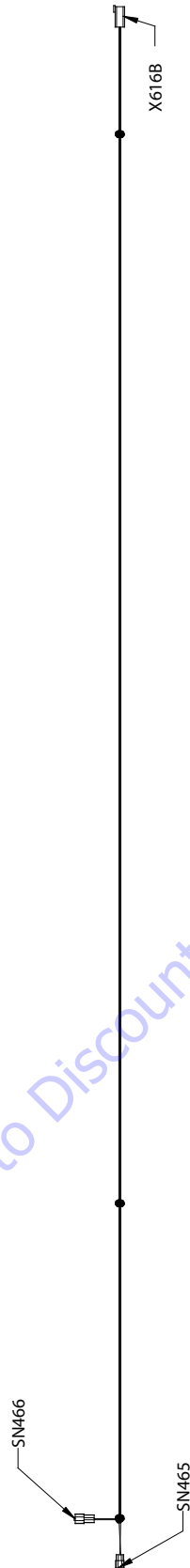


Figure 7-38. Main Boom with Jib Harness - 460SJC



CONNECTOR PART NUMBER: 4460899						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	ORN/BLK	CABLE CABLE	18 AWG	TFFN	4460464	SN465 (1)
2	BLK/RED	CABLE CABLE	18 AWG	TFFN	4460464	SN465 (3)
3	BLU/RED	CABLE CABLE	18 AWG	TFFN	4460464	SN465 (2)
4	YEL/BLK	CABLE CABLE	18 AWG	TFFN	4460464	SN466 (1)
5	BRN/BLK	CABLE CABLE	18 AWG	TFFN	4460464	SN466 (3)
6	BLU/BLK	CABLE CABLE	18 AWG	TFFN	4460464	SN466 (2)

CONNECTOR PART NUMBER: 4460336						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	YEL/BLK	CABLE CABLE	18 AWG	TFFN	4460464	X616B (4)
2	BLU/BLK	CABLE CABLE	18 AWG	TFFN	4460464	X616B (6)
3	BRN/BLK	CABLE CABLE	18 AWG	TFFN	4460464	X616B (5)

CONNECTOR PART NUMBER: 4460239						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	ORN/BLK	CABLE CABLE	18 AWG	TFFN	4460465	X616B (1)
2	BLU/RED	CABLE CABLE	18 AWG	TFFN	4460465	X616B (3)
3	BLK/RED	CABLE CABLE	18 AWG	TFFN	4460465	X616B (2)

10017388 C

Figure 7-39. Tele In Proximity Switches Harness

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

CONNECTOR PART NUMBER: 4460530									
CONN POS	WIRE COLOR	WIRE LABEL	GALUGE	JACKET	TERMINAL P/N	TO			
1	ORN/BLK	CABLE	18 AWG	TFN	4460465	SN467 (1)			
2	BLK/RED	CABLE	18 AWG	TFN	4460465	SN467 (3)			
3	BLU/RED	CABLE	18 AWG	TFN	4460465	SN467 (2)			
4	YEL/BLK	CABLE	18 AWG	TFN	4460465	SN571 (1)			
5	BRN/BLK	CABLE	18 AWG	TFN	4460465	SN571 (3)			
6	BLU/BLK	CABLE	18 AWG	TFN	4460465	SN571 (2)			
7					4460466				
8					4460466				

CONNECTOR PART NUMBER: 4460536									
CONN POS	WIRE COLOR	WIRE LABEL	GALUGE	JACKET	TERMINAL P/N	TO			
1	YEL/BLK	CABLE	18 AWG	TFN	4460464	X615B (4)			
2	BLU/BLK	CABLE	18 AWG	TFN	4460464	X615B (6)			
3	BRN/BLK	CABLE	18 AWG	TFN	4460464	X615B (5)			

CONNECTOR PART NUMBER: 4460539									
CONN POS	WIRE COLOR	WIRE LABEL	GALUGE	JACKET	TERMINAL P/N	TO			
1	ORN/BLK	CABLE	18 AWG	TFN	4460465	X615B (1)			
2	BLU/RED	CABLE	18 AWG	TFN	4460465	X615B (3)			
3	BLK/RED	CABLE	18 AWG	TFN	4460465	X615B (2)			



100113807 C

Figure 7-40. Capacity Proximity Switches Harness

XCO69-J4					
CONN. POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	5-23 CRIBBING ENABLED	18 AWG	GXL	GD486-J3 (1)
2	WHT	5-35 SYSTEM FAULT	18 AWG	GXL	GD486-J4 (5)
3	WHT	5-24 SLOW PLUG	18 AWG	GXL	GD486-J2 (3)
4	WHT	5-9 IGNITION START	18 AWG	GXL	SW143 (1)
5	WHT	5-8 LEVEL DOWN	18 AWG	GXL	SW142 (3)
6	WHT	5-4 ROTATE LEFT	18 AWG	GXL	SW146 (3)
7	WHT	5-1 TELE IN	18 AWG	GXL	SW141 (3)
8	WHT	5-11 JIB DOWN	18 AWG	GXL	SW144 (3)
9					
10					
11					
12					
13	WHT	5-36 LO LIVL FUEL	18 AWG	GXL	GD486-J1 (5)
14	WHT	5-26 PLATFORM OVERLOAD	18 AWG	GXL	GD486-J3 (6)
15					
16	WHT	5-8 AUX POWER	18 AWG	GXL	SW143 (3)
17	WHT	5-5 LEVEL UP	18 AWG	GXL	SW142 (1)
18	WHT	5-3 ROTATE RIGHT	18 AWG	GXL	SW140 (1)
19	WHT	5-10 JIB UP	18 AWG	GXL	SW144 (1)
20					
21					
22					
23	WHT	5-12 MAIN LIFT UP	18 AWG	GXL	SW145 (1)
24					
25	WHT	5-26 SWITCH POWER	18 AWG	GXL	SW141 (2)
26	WHT	5-22 NO CHARGE	18 AWG	GXL	GD486-J4 (1)
27					
28	WHT	5-21 ENGINE HIGH TEMP	18 AWG	GXL	GD486-J4 (3)
29	WHT	5-20 ENGINE LOW OIL PRES	18 AWG	GXL	GD486-J4 (2)
30	WHT	5-2 TELE OUT	18 AWG	GXL	SW141 (1)
31	BLK	000-50-1 GND	18 AWG	GXL	GD486-J2 (6)
32	BLK	000-50-2 GND	18 AWG	GXL	GD486-J1 (4)
33	WHT	5-13 MAIN LIFT DOWN	18 AWG	GXL	SW145 (3)
34	WHT	5-15 SWING LEFT	18 AWG	GXL	SW146 (3)
35	WHT	5-14 SWING RIGHT	18 AWG	GXL	SW146 (1)

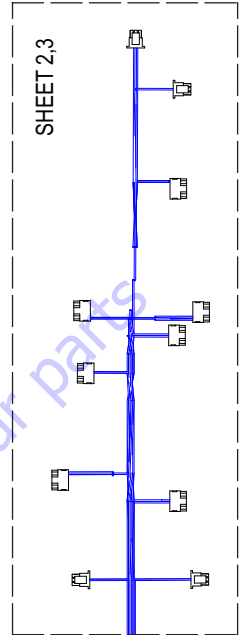


Figure 7-41. Ground Control Panel Harness - Sheet 1 of 5

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

SW140					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	5-3 ROTATE RIGHT	18 AWG	GXL	XCO69-J4 (18)
2	WHT	5-27	18 AWG	GXL	SW141 (2)
2	WHT	5-28	18 AWG	GXL	SW142 (2)
3	WHT	5-4 ROTATE LEFT	18 AWG	GXL	XCO69-J4 (6)
4					
5					
6					

SW141					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	5-2 TELE OUT	18 AWG	GXL	XCO69-J4 (30)
2	WHT	5-26 SWITCH POWER	18 AWG	GXL	XCO69-J4 (25)
2	WHT	5-27	18 AWG	GXL	SW140 (2)
3	WHT	5-1 TELE IN	18 AWG	GXL	XCO69-J4 (7)
4					
5					
6					

SW144					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	5-10 JIB UP	18 AWG	GXL	XCO69-J4 (19)
2	WHT	5-30	18 AWG	GXL	SW143 (2)
2	WHT	5-31	18 AWG	GXL	SW145 (2)
3	WHT	5-11 JIB DOWN	18 AWG	GXL	XCO69-J4 (8)
4					
5					
6					

SW145					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	5-12 MAIN LIFT UP	18 AWG	GXL	XCO69-J4 (23)
2	WHT	5-31	18 AWG	GXL	SW144 (2)
2	WHT	5-32	18 AWG	GXL	SW146 (2)
3	WHT	5-13 MAIN LIFT DOWN	18 AWG	GXL	XCO69-J4 (33)
4					
5					
6					

SW142					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	5-5 LEVEL UP	18 AWG	GXL	XCO69-J4 (17)
2	WHT	5-28	18 AWG	GXL	SW140 (2)
2	WHT	5-29	18 AWG	GXL	SW143 (2)
3	WHT	5-6 LEVEL DOWN	18 AWG	GXL	XCO69-J4 (5)
4					
5					
6					

SW143					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	5-9 IGNITION START	18 AWG	GXL	XCO69-J4 (4)
2	WHT	5-29	18 AWG	GXL	SW142 (2)
2	WHT	5-30	18 AWG	GXL	SW144 (2)
3	WHT	5-8 AUX POWER	18 AWG	GXL	XCO69-J4 (16)
4					
5					
6					

SW146					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	5-14 SWING RIGHT	18 AWG	GXL	XCO69-J4 (35)
2	WHT	5-32	18 AWG	GXL	SW145 (2)
3	WHT	5-15 SWING LEFT	18 AWG	GXL	XCO69-J4 (34)
4					
5					
6					

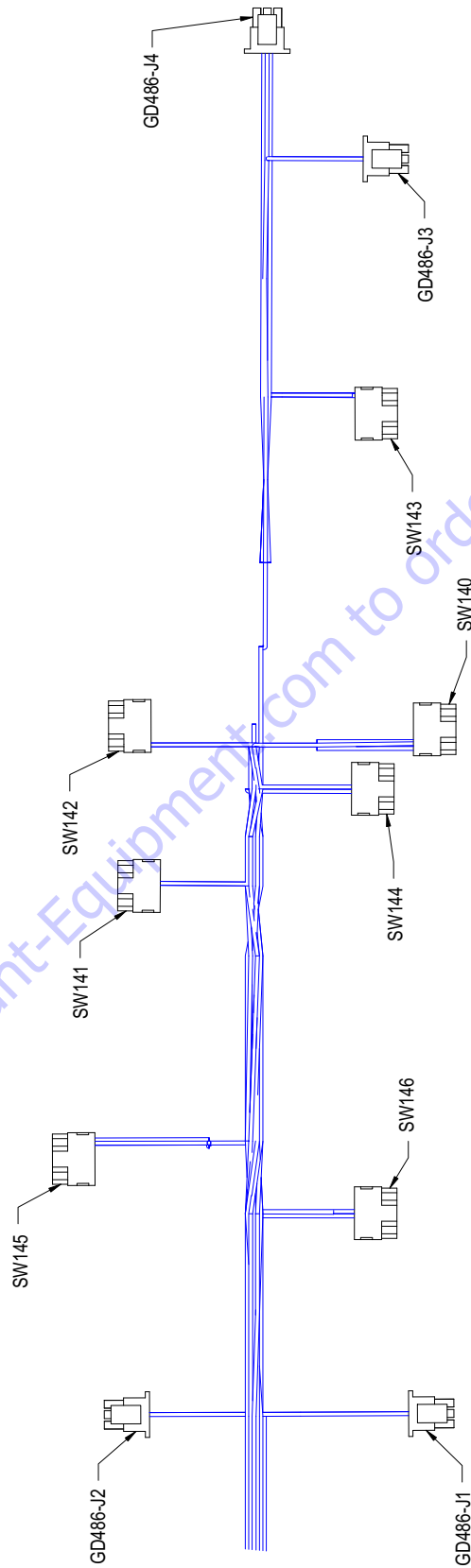
GD486-J1					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2					
3					
4	BLK	000-50-2 GND	18 AWG	GXL	XCO69-J4 (32)
5	WHT	5-36 LO LVL FUEL	18 AWG	GXL	XCO69-J4 (13)
6					

GD486-J2					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2					
3	WHT	5-24 GLOW PLUG	18 AWG	GXL	XCO69-J4 (3)
4					
5					
6	BLK	000-50-1 GND	18 AWG	GXL	XCO69-J4 (31)

GD486-J3					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	5-23 CRIBBING ENABLED	18 AWG	GXL	XCO69-J4 (1)
2					
3					
4					
5					
6	WHT	5-25 PLATFORM OVERLOAD	18 AWG	GXL	XCO69-J4 (14)

GD486-J4					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	5-22 NO CHARGE	18 AWG	GXL	XCO69-J4 (26)
2	WHT	5-20 ENGINE LOW OIL PRES	18 AWG	GXL	XCO69-J4 (29)
3	WHT	5-21 ENGINE HIGH TEMP	18 AWG	GXL	XCO69-J4 (28)
4					
5	WHT	5-35 SYSTEM FAULT	18 AWG	GXL	XCO69-J4 (2)
6					

Figure 7-42. Ground Control Panel Harness - Sheet 2 of 5



100166864-D

Figure 7-43. Ground Control Panel Harness - Sheet 3 of 5

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

WIRE NO	COLOR	WIRE GAUGE	JACKET	LENGTH (mm)	FROM		TO	
					REFERENCE	PIN	REFERENCE	PIN
000-50-1 GND	BLK	18	GXL	1730	XCO69-J4	31	GD486-J2	6
000-50-2 GND	BLK	18	GXL	1751	XCO69-J4	32	GD486-J1	4
5-10 JIB UP	WHT	18	GXL	2121	XCO69-J4	19	SW144	1
5-11 JIB DOWN	WHT	18	GXL	2101	XCO69-J4	8	SW144	3
5-12 MAIN LIFT UP	WHT	18	GXL	1906	XCO69-J4	23	SW145	1
5-13 MAIN LIFT DOWN	WHT	18	GXL	1904	XCO69-J4	33	SW145	3
5-14 SWING RIGHT	WHT	18	GXL	1835	XCO69-J4	35	SW146	1
5-15 SWING LEFT	WHT	18	GXL	1850	XCO69-J4	34	SW146	3
5-1 TELE IN	WHT	18	GXL	2057	XCO69-J4	7		
5-20 ENGINE LOW OIL PRES	WHT	18	GXL	2424	XCO69-J4	29	GD486-J4	2
5-21 ENGINE HIGH TEMP	WHT	18	GXL	2445	XCO69-J4	28	GD486-J4	3
5-22 NO CHARGE	WHT	18	GXL	2445	XCO69-J4	26	GD486-J4	1
5-23 CRIBBING ENABLED	WHT	18	GXL	2434	XCO69-J4	1	GD486-J3	1
5-24 GLOW PLUG	WHT	18	GXL	1720	XCO69-J4	3	GD486-J2	3
5-25 PLATFORM OVERLOAD	WHT	18	GXL	2440	XCO69-J4	14	GD486-J3	6
5-26 SWITCH POWER	WHT	18	GXL	2053	XCO69-J4	25	SW141	2
5-27	WHT	18	GXL	407	SW141	2	SW140	2
5-28	WHT	18	GXL	159	SW140	2	SW142	2
5-29	WHT	18	GXL	210	SW142	2	SW143	2
5-2 TELE OUT	WHT	18	GXL	2000	XCO69-J4	30		
5-30	WHT	18	GXL	288	SW143	2	SW144	2
5-31	WHT	18	GXL	342	SW144	2	SW145	2
5-32	WHT	18	GXL	178	SW145	2	SW146	2
5-35 SYSTEM FAULT	WHT	18	GXL	2435	XCO69-J4	2	GD486-J4	5
5-36 LO LVL FUEL	WHT	18	GXL	1754	XCO69-J4	13	GD486-J1	5
5-3 ROTATE RIGHT	WHT	18	GXL	2146	XCO69-J4	18	SW140	1
5-4 ROTATE LEFT	WHT	18	GXL	2126	XCO69-J4	6	SW140	3
5-5 LEVEL UP	WHT	18	GXL	2140	XCO69-J4	17	SW142	1
5-6 LEVEL DOWN	WHT	18	GXL	2142	XCO69-J4	5	SW142	3
5-8 AUX POWER	WHT	18	GXL	2278	XCO69-J4	16	SW143	3
5-9 IGNITION START	WHT	18	GXL	2271	XCO69-J4	4	SW143	1

Figure 7-44. Ground Control Panel Harness - Sheet 4 of 5

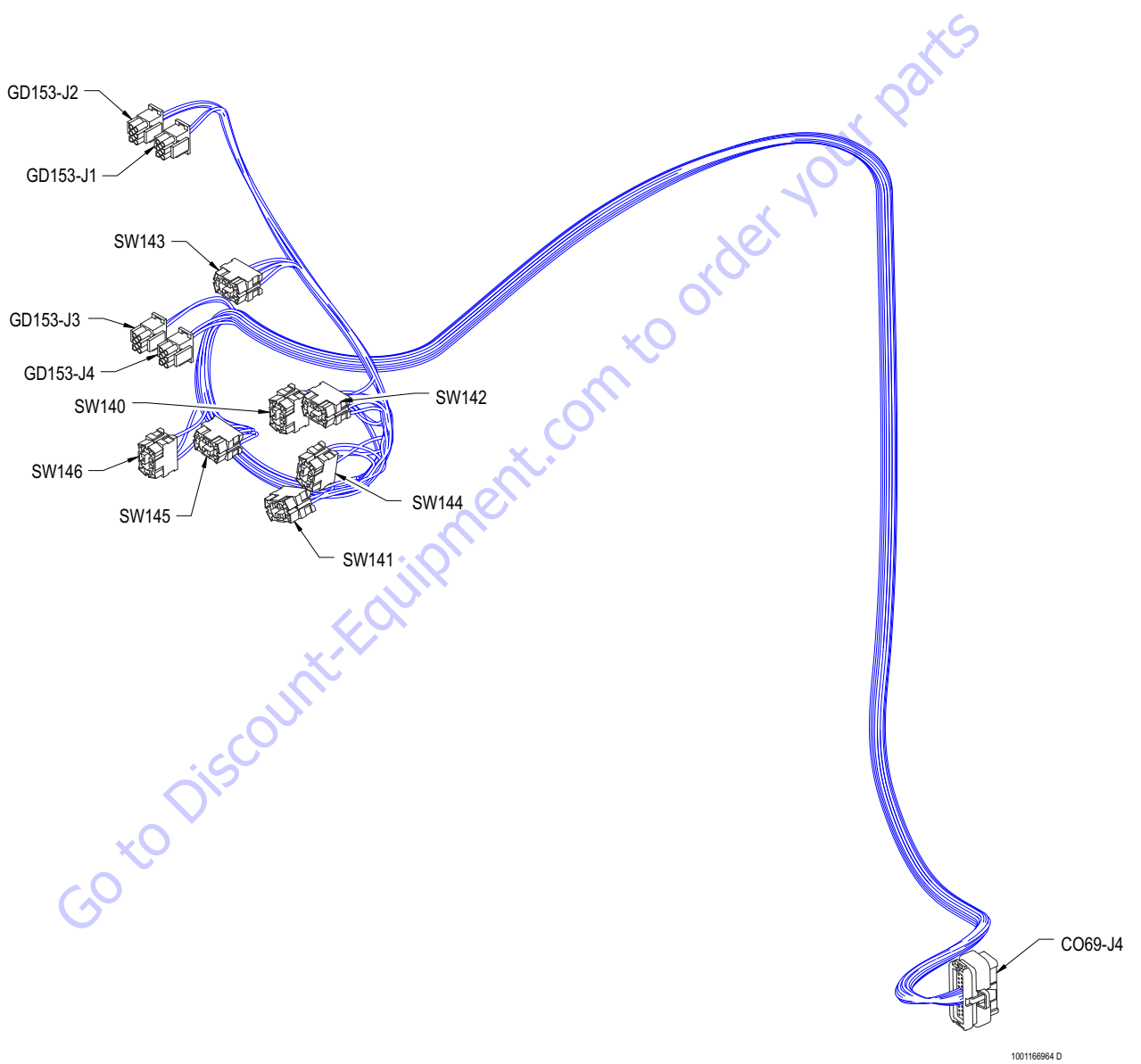


Figure 7-45. Ground Control Panel Harness - Sheet 5 of 5

SECTION 7 - BASIC ELECTRICAL INFORMATION & ELECTRICAL SCHEMATICS

X206					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	BLK	000-6-1 GROUND	16 AWG	TFFN	X238 (2)
2	BLK	000-6-3	18 AWG	GXL	X239 (B)
3					
4					
5					
6					
7					
8					
9					
10	WHT	6-23	18 AWG	GXL	X239 (L)
11	WHT	6-23	18 AWG	GXL	X239 (K)
12	RED	CABLE	18 AWG	CABLE	S484 (2)
13	BLK	CABLE CAN LO	18 AWG	CABLE	S483 (2)
14	WHT	6-15 DIAGNOSTIC	18 AWG	GXL	S240 (2)
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

X238					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2	BLK	000-6-1 GROUND	16 AWG	TFFN	X206 (1)
3					
4	WHT	6-18 GLOW	18 AWG	GXL	RL234-86 (1)
5					
6					
7					
8					

X481					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
A	RED	CABLE	18 AWG	CABLE	S484 (1)
B	BLK	CABLE	18 AWG	CABLE	S483 (2)
C	SHIELD	6-50	18 AWG	SHLD	X237 (6)

S484					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	RED	CABLE CAN HI	18 AWG	CABLE	X237 (3)
1	RED	CABLE	18 AWG	CABLE	X481 (A)
2	RED	CABLE	18 AWG	CABLE	X206 (12)

X239					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
A	WHT	6-17 DIAGNOSTIC	18 AWG	GXL	S240 (2)
B	BLK	000-6-3	18 AWG	GXL	X206 (2)
K	WHT	6-23	18 AWG	GXL	X206 (11)
L	WHT	6-23	18 AWG	GXL	X206 (10)

S240					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	6-16	18 AWG	GXL	X237 (1)
2	WHT	6-15 DIAGNOSTIC	18 AWG	GXL	X206 (14)
2	WHT	6-17 DIAGNOSTIC	18 AWG	GXL	X239 (A)

RL267-86					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	6-25	14 AWG	GXL	X237 (2)

S483					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	BLK	CABLE CAN LO	18 AWG	CABLE	X237 (4)
2	BLK	CABLE	18 AWG	CABLE	X481 (B)
2	BLK	CABLE CAN LO	18 AWG	CABLE	X206 (13)

RL234-86					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	6-18 GLOW	18 AWG	GXL	X238 (4)

X237					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	6-16	18 AWG	GXL	S240 (1)
2	WHT	6-25	14 AWG	GXL	RL267-86 (1)
3	RED	CABLE CAN HI	18 AWG	CABLE	S484 (1)
4	BLK	CABLE CAN LO	18 AWG	CABLE	S483 (1)
5	RED	6-51 16AWG	16 AWG	GXL	EC255-D+ (1) ***
6	SHIELD	6-50	18 AWG	SHLD	X481 (C)

EC255-D+					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	RED	6-51 16AWG	16 AWG	GXL	X237 (5)

Figure 7-46. Deutz T4i Harness - Sheet 1 of 4

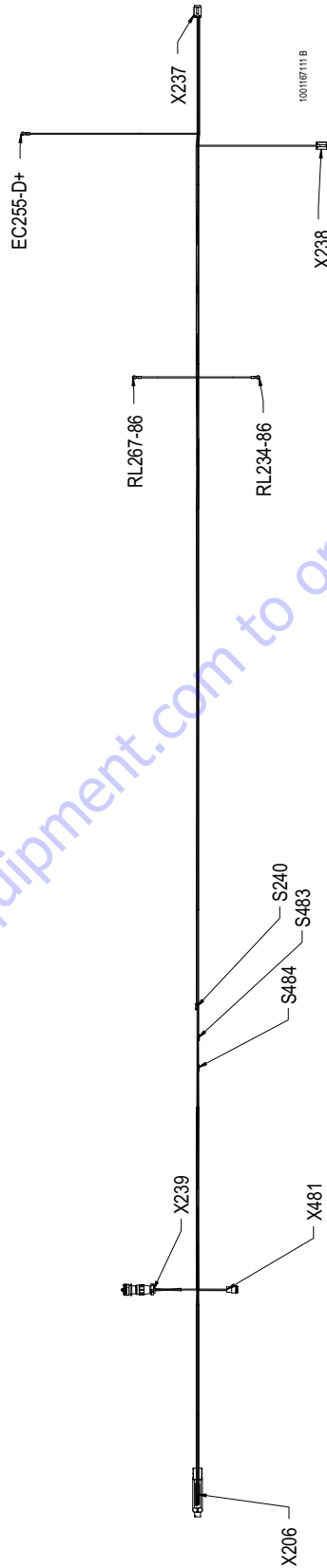


Figure 7-47. Deutz T4i Harness - Sheet 2 of 4

WIRE NO	COLOR	WIRE GAUGE	JACKET	LENGTH (mm)	FROM		TO	
					REFERENCE	PIN	REFERENCE	PIN
000-6-1	GROUND	BLK	16	3809	X238	2	X206	1
000-6-3		BLK	18	582	X239	B	X206	2
6-15	DIAGNOSTIC	WHT	18	1267	X206	14	S240	2
6-16		WHT	18	2574	S240	1	X237	1
6-17	DIAGNOSTIC	WHT	18	846	S240	2	X239	A
6-18	GLOW	WHT	18	1054	X238	4	RL234-86	1
6-23		WHT	18	588	X239	K	X206	11
6-23		WHT	18	584	X239	L	X206	10
6-25		WHT	14	1091	X237	2	RL267-86	1
6-50	SHIELD	SHLD	18	3389	X237	6	X481	C
6-51	16AWG	RED	16	739	X237	5	EC255-D+	1
CABLE	CAN LO	BLK	18	2661	X237	4	S483	1
CABLE	CAN HI	RED	18	2739	X237	3	S484	1
CABLE		RED	18	662	S484	1	X481	A
CABLE		BLK	18	728	X481	B	S483	2
CABLE		RED	18	1110	S484	2	X206	12
CABLE	CAN LO	BLK	18	1189	X206	13	S483	2

Figure 7-48. Deutz T4i Harness - Sheet 3 of 4