Calibrations

Calibrations

Calibration must be done to ensure proper and safe operation. Each calibration section explains the nature of the calibration and when it should be performed.

Tilt Sensor Calibration

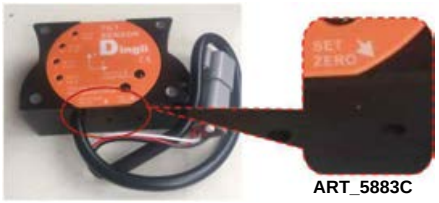
ILLUSTRATION No.
ART_6090A

The Tilt Sensor monitors chassis level. The maximum X-axis tilt angle is 1.5°, the maximum Y-axis direction is 3°.

When the machine is raised, the tilt sensor will monitor the angle value of the chassis in real time. If the tilt angle of the chassis exceeds max tilt angle, the alarm will sound and functions will stop.

Calibration must be performed when the Level Sensor indication is not accurate or after replacing it.

Calibrate Tilt Sensor



ART_5883C

1. Drive the machine onto level ground.
2. Find the reset button on the side of the sensor: “SET ZERO“.
3. Press and the hold the “SET ZERO“button until the indicator light flashes alternatively between red and green.
4. Press the “SET ZERO“button 3 times in a row, then the indicator light will stop flashing and the green light stays on.
5. Calibration is complete.

ILLUSTRATION No.
ART_6090B

Angle Sensor Calibration

The Angle Sensor is located on the linkage beam, it monitors the height of the platform by monitoring the angle of the linkage beam in real time.

Angle Sensor Calibration must be performed in conjunction with Load Calibrations or after sensor replacement.

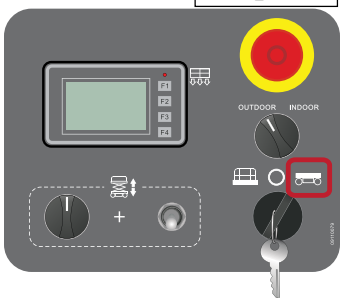
Calibrate Angle Sensor

ILLUSTRATION No.
ART_6090C

1. Refer to the picture to the right and lift the platform halfway. To ensure that the platform is lifted halfway up, lift the platform until the distance between the beams is 12.5 inches or 317mm.
2. Press and the hold the “SET ZERO“button until the indicator light flashes alternatively between red and green.
3. Press the “SET ZERO“button 3 times in a row, then the indicator light will stop flashing and the green light stays on.
4. Calibration is complete.

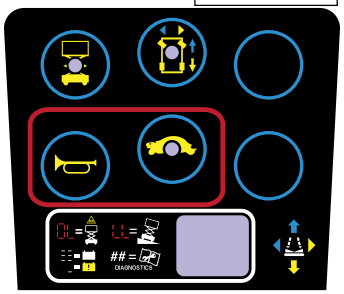
Maximum Height Calibration

ILLUSTRATION No.
ART_6090D



1. Lift up the platform to highest height, then push “red emergency stop button” on PCU.
2. Turn the key switch to ground-control.

ILLUSTRATION No.
ART_6090E



3. On the PCU, press and hold the “horn” and “turtle” buttons, then pull out the “red emergency stop button” . When the PCU displays CL, the machine has entered the calibration mode.
4. Press and hold the “turtle” button, the PCU display will show a flashing “Id”, when the “Id” stops flashing, the calibration is complete. Release the turtle button.

Load Sensor Calibration

ILLUSTRATION No.
ART_6090F

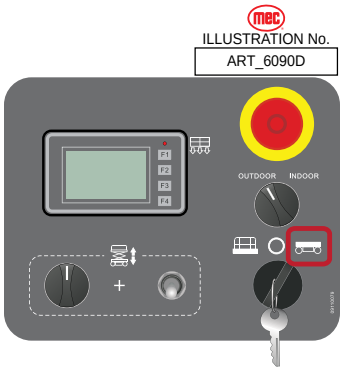
Load Sensor is located in the upper pin of the electric actuator. It can accurately detect the change of the load, thus ensuring the safety of construction. The load signal transmits to lift motor controller “P08” terminal.

Note: During the load calibration processes, the platform will raise and lower 3 times. Therefore, the machine must be placed where overhead obstruction height is 14 feet or higher

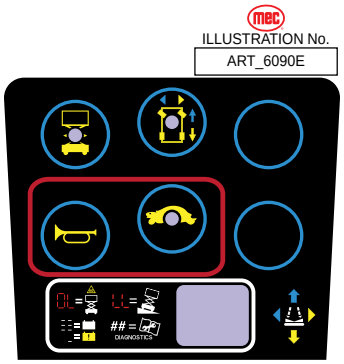
Load Calibration must be performed after the following happens:

- When the overload system is not operating correctly.
- After replacement of the Steering Motor Controller.
- After Steering Calibration.
- After replacement of the Load Sensor.

No-load Calibration

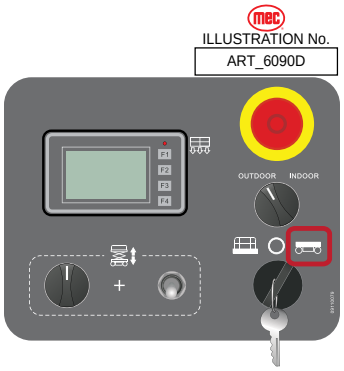


1. The platform must be completely empty before proceeding with No-Load Calibration.
2. Turn the key switch to ground-control, and pull out the “red emergency stop button” on ground control panel.
3. Bring the PCU to the side of the machine where it can be operated outside the platform.

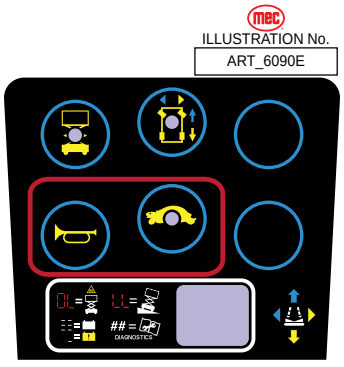


4. On the PCU, press and hold the “horn” and “turtle” buttons, then pull out the “red emergency stop button”. When the PCU displays L or CL, the machine has entered the load calibration mode.
5. Press and hold the “lift” button, the PCU display will show a flashing “nL”. The machine will lift and lower 3 times. When the “nL” stops flashing, it means the calibration is complete.

Full-load Calibration



1. Put a rated load on the platform.
2. Turn the key switch to ground-control, and pull out the “red emergency stop button” of ground control panel.
3. Bring the PCU to the side of the machine where it can be operated outside the platform.



4. Press and hold the “horn” and “turtle” buttons, then pull out the “red emergency stop button” of PCU. When the PCU display shows L or CL, it means that the machine has entered the calibration mode.
5. Press and hold the “drive” button, the PCU display will show a flashing “FL”. The machine will lift and lower 3 times. When the “FL” stops flashing, it means the calibration is complete.

Steer Sensor Calibration

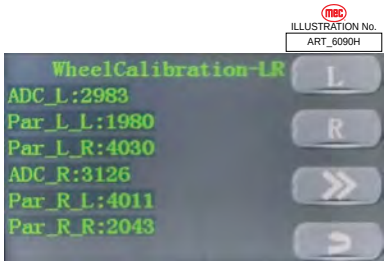
The Steer Sensors are located inside each of the steering Actuators. They ensure accurate wheel position while steering.

Steer Sensor Calibration must be performed when the front wheels do not align or after the replacement of any steering component or Steering Motor Controller.

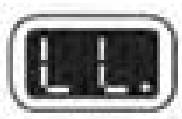
Access the Display Module located on the right side of the chassis. Turn Key to Platform position.

1. Press F2 button to access pass code screen. Enter 3211. The display will show “Wheel Calibration-LR”.
2. Steer fully to the Left using the steer button on the joystick, both wheels must reach full left steer. Press the L (F1) button to calibrate the Left position.

3. Steer fully to the Right using the steer button on the joystick, both wheels must reach full right steer. Press the R (F2) button to calibrate the right position.



Fault Codes



Art_5533

The LED readout screen displays fault codes that provide information about the machine operating status and about malfunctions. The fault codes listed in the following charts describe malfunctions and can aid in troubleshooting the machine by pinpointing the area or component affected.

List of Fault Codes		
Display	**Description**	**Lift Reaction**
01 System Initialization Fault	System Initialization Fault	Disables All Motion
02 System Communication Fault	System Communication Fault	Disables All Motion
03 Invalid Option Setting Fault	Invalid Option Setting Fault	Disables All Motion
04 Calibration Incomplete	Calibration Incomplete	Warning Only
05 Left MC Fault	Left MC Fault	Disables All Motion
06 Right MC Fault	Right MC Fault	Disables All Motion
07 Lift MC Fault	Lift MC Fault	Disables All Motion
08 Steer MC Fault	Steer MC Fault	Disables All Motion
09 Left MC Communication Fault	Left MC Communication Fault	Disables All Motion
10 Right MC Communication Fault	Right MC Communication Fault	Disables All Motion
11 Pump MC Communication Fault	Pump MC Communication Fault	Disables All Motion
12 Steer MC Communication Fault	Steer MC Communication Fault	Disables All Motion
13 Chassis Up or Down Switch ON	Chassis Up or Down Switch ON	Disables All Motion
14 Load Sensor Communication Fault	Load Sensor Communication Fault	Disables All Motion
18 Pothole Guard Fault	Pothole Guard Fault	Disable Lifting and Driving
31 Load Sensor Fault	Load Sensor Fault	Disables All Motion
32 Angle Sensor Fault	Angle Sensor Fault	Disables All Motion
36 Low Battery Limp	Low Battery Limp	Drive speed limit
37 Battery Sleep	Battery Sleep	Warning Only
42 Platform Left Button ON	Platform Left Button ON	Warning Only
43 Platform Right Button ON	Platform Right Button ON	Warning Only
46 Platform Enable Button ON	Platform Enable Button ON	Disable Platform Control

The following codes are retrieved from the ECU Display only.		
Display	**Description**	**Lift Reaction**
47 Joystick Not In Neutral	Joystick Not In Neutral	Drive speed limit
68 Battery Low Voltage Fault	Battery Low Voltage Fault	Disables All Motion
80 Platform Load is over 80%	Platform Load is over 80%	Warning Only
90 Platform Load is over 90%	Platform Load is over 90%	Warning Only
99 Platform Load is over 99%	Platform Load is over 99%	Warning Only
100 Machine Inclined	Machine Inclined	Disable Lifting and Driving
100 Platform Overloaded	Platform Overloaded	Disable All Motion
101 Restore Parameters to Default	Restore Parameters to Default	Warning Only
102 Battery is draining	Battery is draining	Battery is draining

List of Fault Codes (Motor Controller)	
Display	**Description**
1037	Contactor Closed
1038	Contactor Open
1060	Capacitor Charge
1062	TH. Protection
1065	Motor Temperat.
1066	Battery Low
1080	Forward and backward
1153	Encoder Error
1175	Speed FB. Error
1177	EB. Coil Short
1178	Motor Temp. Stop
1180	Overload
1196	Motor Phase Short
1200	Vdc Off Shorted
1202	Vdc Link Overv.
1207	Motor Phase Open
1211	Stall Rotor
1212	Parameter Error
1216	EB. Coil Open
1218	Sens Mot Temp KO
1220	Vkey Off Shorted
1223	Contactor Coil Short
1227	Current Sensor Fault
1229	Hard Fault
1230	Contactor Coil Open
1248	No CAN Msg.
2037	Contactor Closed
2038	Contactor Open
2060	Capacitor Charge
2062	TH. Protection
2065	Motor Temperat.
2066	Battery Low
2080	Forward and backward
2153	Encoder Error
2175	Speed FB. Error
2177	EB. Coil Short
2178	Motor Temp. Stop
2180	Overload
2196	Motor Phase Short
2200	Vdc Off Shorted
2202	Vdc Link Overv.
2207	Motor Phase Open
2211	Stall Rotor
2212	Parameter Error

List of Fault Codes (Motor Controller)	
Display	**Description**
2216	EB. Coil Open
2218	Sens Mot Temp KO
2220	Vkey Off Shorted
2223	Contactor Coil Short
2227	Current Sensor Fault
2229	Hard Fault
2230	Contactor Coil Open
2248	No CAN Msg.
3037	Contactor Closed
3038	Contactor Open
3060	Capacitor Charge
3062	TH. Protection
3065	Motor Temperat.
3066	Battery Low
3080	Forward and backward
3153	Encoder Error
3175	Speed FB. Error
3177	EB. Coil Short
3178	Motor Temp. Stop
3180	Overload
3196	Motor Phase Short
3200	Vdc Off Shorted
3202	Vdc Link Overv.
3207	Motor Phase Open
3211	Stall Rotor
3212	Parameter Error
3216	EB. Coil Open
3218	Sens Mot Temp KO
3220	Vkey Off Shorted
3223	Contactor Coil Short
3227	Current Sensor Fault
3229	Hard Fault
3230	Contactor Coil Open
3248	No CAN Msg.
4038	Main Contactor Open
4062	TH. Protection
4180	Overload
4202	Over Voltage Fault
4211	Stall Rotor
4220	Low Voltage Fault
4229	Hard Fault
5180	Overload
5211	Stall Rotor

Charger Fault code list		
Fault code	**Fault Cause**	**Remark (Internal personnel analysis)**
E01 bAt	The battery is not well connected or battery reversely connected or battery damage	The battery pack voltage is less than 3V
E02 AC	Abnormal AC Power Input (Voltage)	< 85 VAC or > 270 VAC
E03 Hot	Charger High Temperature Protection	> 95°C
E04 bAt	Battery High Temperature Protection	> 65°C
E05 Err	Output Current is too large	> (Rated current + 3) A
E06 bAt	Battery Voltage is too high	3V/Cell
E07	CAN_ID conflict	
E08	The software runs incorrectly and the pointer overflows	The curve parameter is wrong
E10	Relay closure timeout	20 minutes timeout
E11	Single battery failure	Charge for 2 hours, voltage < 2V/Cell
E91	TmainI timeout	Hoppecke battery Specific Code (Battery factory requirements)
E92	Capacity overflow error	
E93	Charging timeout	
E94	Low battery voltage	
E96	Pre-charge error	
U01	Failed to open directory	
U02	File calibration error	
U03	File does not match the machine	
U04	Comprehensive error	
U05	Need to re-flash	
U06	Indicates that the USB is locked	

Charger Warning Code List		
Warning Code	**Fault Cause**	**Remark**
INI	HP battery low voltage wait 10 minutes	Not Used
bns	BMS Control mode Battery Management Control for Lithium-ion Batteries	Check battery temperature, connections.
Het	BMS Request heating of the Lithium-ion battery	Heat Batteries before charging

Electrical Schematic

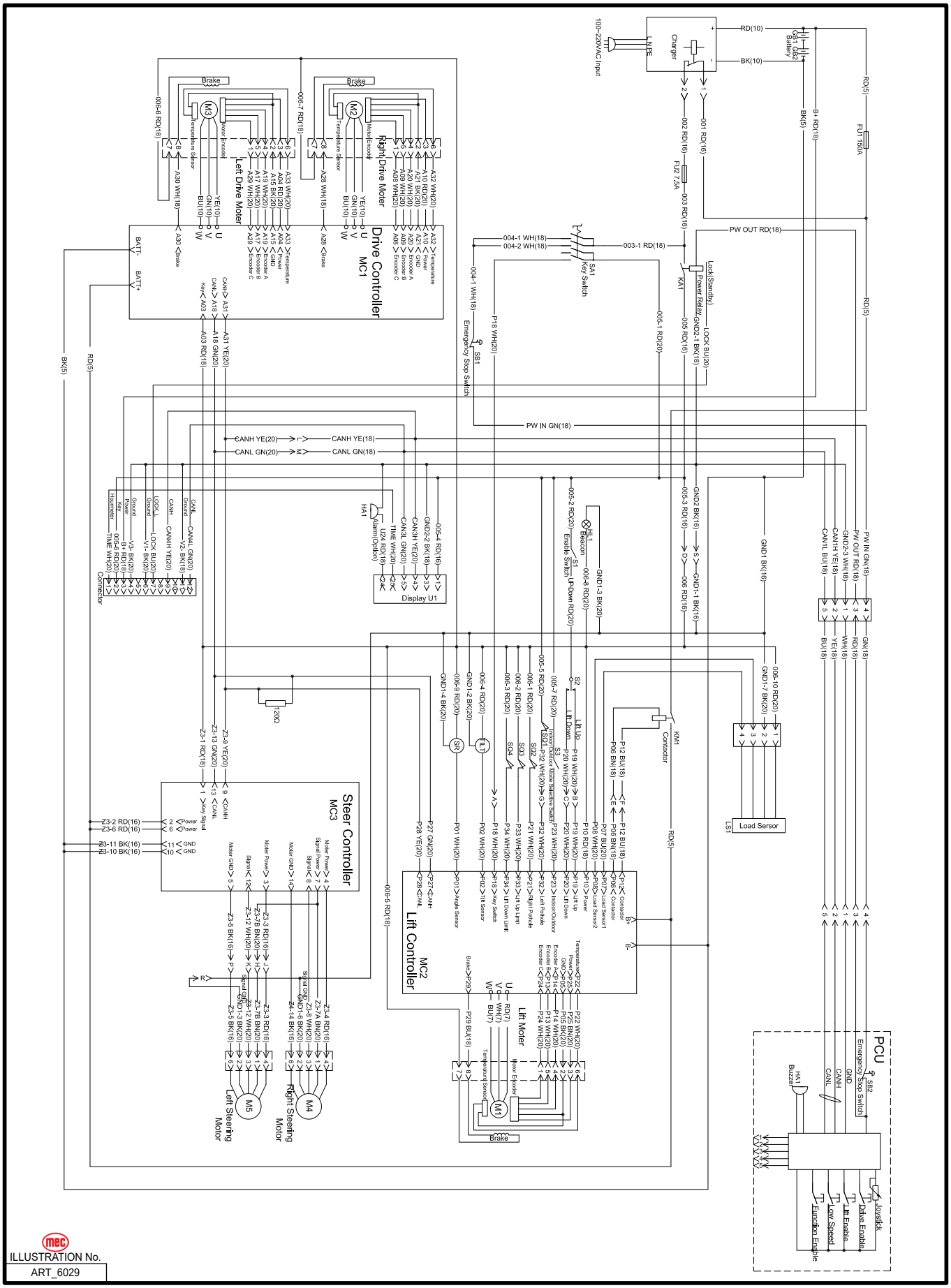


ILLUSTRATION No.
ART_6029