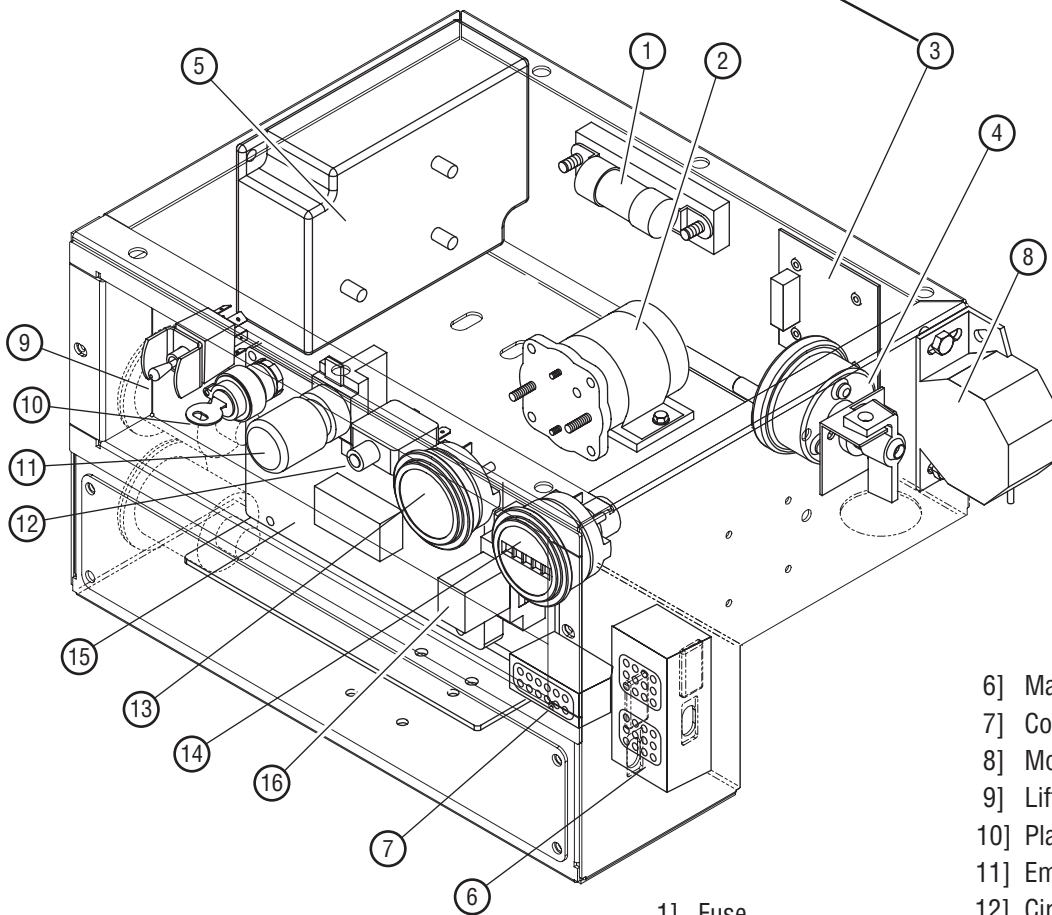


J1 Plug Pin Identification			
PIN #	WIRE #	SIGNAL	FUNCTION
1	10	INPUT	Drive Reverse
2	11	INPUT	Drive Forward
3	19	OUTPUT	Brake, Decel Valve signal
4	8	INPUT	Steer Left
5	18	OUTPUT	Steer signal to Sevcon
6	5	INPUT	Down signal
7	20	OUTPUT	Signal to Motion Alarm(s) (optional)
8	17	OUTPUT	Sevcon & Hour Meter (motor function requested)
9	15	INPUT	Battery Negative
10	7	INPUT	Steer Right
11	4	INPUT	Lift Up
12	2	INPUT	Limit Switch (24V = platform down)
13	3	OUTPUT	Enable, from lower Lift switch
14	21	OUTPUT	To Sevcon (for speed cutback)

MEC  
ILLUSTRATION No.  
ART\_2181



- 1] Fuse
- 2] Contactor
- 3] Circuit (Diode) Board
- 4] Battery Cutoff Switch
- 5] MotorControl Unit
- 6] Main Harness Connection
- 7] Control Cable Connection
- 8] Motion Alarm (option)
- 9] Lift/Lower Switch
- 10] Platform-Base Selector
- 11] Emergency Stop Switch
- 12] Circuit Breaker
- 13] Battery Gauge
- 14] Hour Meter
- 15] GP102 Load Sense Module
- 16] Overload Cutout Relay

MEC  
ILLUSTRATION No.  
ART\_2428



# SEVCON MOTOR SPEED CONTROLLER


The Sevcon Motor Speed Controller (MC-1) is a microprocessor designed with the express purpose of operating the D/C electric motor at varying speeds. The controller uses Pulse-Width Modulation (PWM) technology on the Ground side of the motor to control motor speed. Out of concern for operator safety and to prevent short-circuiting, the Controller monitors certain circuits for potential abnormalities. When the controller senses a problem it errs to the side of safety and stops all motor operation. The green LED will flash a code indicating the reason for the shutdown.

Refer to the *LED Diagnostics Definitions* and *Sevcon Motor Speed Controller - Connections* on the following pages.

The diagram shows the Sevcon Motor Speed Controller (MC-1) with its terminal block and a J5 plug. The terminal block has three terminals labeled B+, B-, and M2. The B+ terminal is connected to the Battery Positive Cable from a 250 AMP Fuse. The B- terminal is connected to the Negative Battery Cable and GROUND wire (15) connection. The M2 terminal is connected to the Motor Ground (Pulse-Width Modulated [PWM] variable speed control). The J5 plug has 12 pins, with the following functions:

Cable Connection Identification		
B+	Battery Positive Cable from 250 AMP Fuse	
B-	Negative Battery Cable and GROUND wire (15) connection	
M2	Motor Ground (Pulse-Width Modulated [PWM] variable speed control)	

J5 Plug Pin Identification		
PIN #	WIRE #	FUNCTION
1	22	B+ power input (power up)
2	17	Lift, Drive or Steer functions input (functions requiring motor)
3	18	Steer Requested (adds additional motor speed for steer)
4	3	Enable Switch signal input
5	21	Speed cut-back (24 Volts = full speed, 0 Volts = creep speed)
6	16	Motor Start Relay signal (GROUND signal to activate Motor Start Relay)
7	41	Lift Valve B- (provides GROUND signal to Lift Valve)
8	none	none
9	14	Accelerator reference signal (3.6 Volts to Potentiometer)
10	none	none
11	none	none
12	none	none

  
 ILLUSTRATION No.  
 ART\_2182

## LED Diagnostics Definitions (Flash Codes)

LED READING	DIAGNOSIS
<b>LED Steady On</b>	Controller is operational and detects no irregularities on monitored circuits.
<b>LED Off</b>	<p><b>No power-up</b></p> <ul style="list-style-type: none"> <li>• No power to pin # 1</li> <li>• No ground to B- post</li> <li>• LED failure or internal controller fault</li> </ul>
<b>2 Flashes</b>	<p><b>Procedure fault.</b></p> <ul style="list-style-type: none"> <li>• Enable depressed at power up</li> <li>• Enable depressed for more then 15 seconds without function request</li> <li>• No signal on wire 17 pin # 2 when function requested</li> <li>• No B- to diode board</li> <li>• Failed diode/s</li> <li>• Damaged wire harness</li> <li>• Internal controller fault</li> </ul>
<b>3 Flashes</b>	<p><b>Motor circuit low.</b></p> <p>Set with unit at rest and is the result of the voltage at M-2 dropping to approximately 4 volts or lower. Possible causes:</p> <ul style="list-style-type: none"> <li>• Short to ground in the motor circuit between the motor contactor and the M-2 terminal</li> </ul>
<b>4 Flashes</b>	<p><b>Motor circuit high.</b></p> <p>Set with the unit at rest and is the result of the voltage at M-2 terminal rising above 21 volts. Possible causes:</p> <ul style="list-style-type: none"> <li>• Motor contactor points are welded shut</li> </ul>
<b>5 Flashes</b>	<p><b>Motor contactor circuit open.</b></p> <p>Set when a function is requested but no current can flow through the motor circuit to the M-2 terminal. Possible causes:</p> <ul style="list-style-type: none"> <li>• Blown 200 amp fuse</li> <li>• Malfunctioning motor contactor</li> <li>• Worn motor brushes</li> <li>• Incomplete circuit to the Sevcon pin #6</li> </ul> <p>If the motor and contactor circuits are diagnosed as working properly:</p> <ul style="list-style-type: none"> <li>• Sevcon internal fault</li> </ul>

continued...

## LED Diagnostics Definitions (continued)

LED READING	DIAGNOSIS
<b>6 Flashes</b>	<p><b>Accelerator fault.</b> Set with unit at rest, a 6 flash will result in an 80% cutback of motor speed. The Accelerator is the proportional control circuitry for the Sevcon. It works in conjunction with the potentiometer located in the upper control box, which is connected to the joystick handle through a gear arrangement.</p> <p><b>Measure voltage at terminals 14 and 15 on the platform terminal strip or at the potentiometer plug connection.</b></p> <ul style="list-style-type: none"><li>• With the joystick handle in neutral, 3.6 volts should be measured on the accelerator circuit (wire #14)</li><li>• Voltage proportionally decreases with the travel of the joystick, with 0 volts at full stroke</li><li>• With the joystick centered, voltages lower than 3.1 or higher than 3.9 will trigger a (6 flash) code</li></ul>
<b>7 Flashes</b>	<p><b>Battery voltage fault.</b></p> <ul style="list-style-type: none"><li>• This includes battery voltage below 12 volts or above 45 volts as measured on pin #1</li><li>• This code will disable all functions</li></ul>
<b>8 Flashes</b>	<p><b>Thermal cutback.</b></p> <ul style="list-style-type: none"><li>• Sevcon internal temperatures above 176 degrees F</li><li>• Will limit motor speed in comparison with over temperature</li><li>• Resets when cooled</li></ul>
<b>9 Flashes</b>	<p><b>Battery voltage at or below 18 volts</b></p> <ul style="list-style-type: none"><li>• As measured on pin #1</li><li>• This code will interrupt or prevent lift function but will allow drive and steer functions</li></ul> <p>When lift is interrupted due to a 9 flash, the electric motor will still run.</p>

## Sevcon Motor Speed Controller - Connections

The following two pages describe the connections to the Sevcon Motor Speed Controller with a brief description of their function and the voltage measurements under normal conditions.

**Important: Batteries must be fully charged before troubleshooting!**

**A fully charged battery set on a 24 V DC system will have a nominal voltage of 25.6 V DC**

FUNCTION	VOLTAGE READING
<b>PIN 1 – WIRE 22</b> (WIRE 9 ON EARLY UNITS)	
<b>Battery Positive Input</b>	Switched <b>5% less than battery voltage</b> <ul style="list-style-type: none"> <li>• Controller power-up and reference point for battery state-of-charge</li> <li>• Green LED indicates controller power-up</li> <li>• Power travels through the upper emergency-stop switch with upper controls selected</li> <li>• 7-Flash code and 9-flash code indicate low voltage at this terminal</li> </ul>
<b>Pin 2 Wire 17</b>	
<b>Lift, Drive or Steer functions requested</b>	Motorized function is requested <b>15%-18% less than battery voltage</b> <ul style="list-style-type: none"> <li>• Controller begins the motor run sequence with this signal but still requires a signal on pin 4 and a change on pin 9 before the motor will operate</li> </ul>
<b>Pin 3 Wire 18</b>	
<b>Steer Function Requested</b>	When steering is operated <b>15%-18% less than battery voltage</b> <ul style="list-style-type: none"> <li>• Adds motor speed to compensate for addition of steer requirement during drive operation</li> <li>• Provides a minimum motor speed for steer requirement when only steer is operated</li> </ul>
<b>Pin 4 Wire 3</b>	
<b>Enable signal input</b>	When joystick trigger pulled <b>5% less than battery voltage.</b> <ul style="list-style-type: none"> <li>• Motor will not start without this input</li> <li>• A signal here longer then 15 seconds without a signal on pin-2 or pin-3 will result in a 2-flash code failure</li> </ul>
<b>Pin 5 Wire 21</b>	
<b>Speed cut-back signal from limit switch or Lift circuit</b>	Full speed: <b>24 V DC</b> Creep speed: <b>0 V DC.</b> <ul style="list-style-type: none"> <li>• Speed cut-back is the elevated drive speed</li> </ul>



Sevcon Motor Speed Controller - Connections (continued)

FUNCTION	VOLTAGE READING
<b>PIN 6 – WIRE 16</b>	
<b>Motor Start Relay ground signal</b>	<p>Idle: <b>24 V DC</b></p> <p>When function requested: <b>0 V DC</b></p> <ul style="list-style-type: none"> <li>• This is how the Controller maintains control over the motor circuit</li> <li>• Sevcon controls the Motor Start Relay function ground signal</li> <li>• Will not operate the motor start relay when 2, 3, 4 &amp; 7 flash codes occur</li> </ul>
<b>PIN 7 – WIRE 41</b>	
<b>Ground signal to Lift solenoid valve</b>	<p><b>0 volts</b></p> <p>No ground presence until lift is requested</p> <ul style="list-style-type: none"> <li>• By providing the ground signal, lift function can be prevented anytime battery voltage falls below 18 volts. This will result in a 9 flash code</li> </ul>
<b>PIN 9 – WIRE 14</b>	
<b>Accelerator reference signal to the potentiometer (upper control box)</b>	<p>From <b>3.5 V DC</b> with joystick in the neutral to <b>0 V DC</b> at full stroke</p> <ul style="list-style-type: none"> <li>• Controller uses this circuit to monitor joystick input after pins 2 &amp; 4 energize</li> <li>• Controls motor speed in reference to the voltage on this circuit</li> <li>• Voltages above 4.0 V DC or below 3.0 V DC will result in a 6 flash code</li> </ul>
<b>POST B+</b>	
<b>Battery positive cable from 200 amp fuse</b>	<p>Full battery voltage</p> <ul style="list-style-type: none"> <li>• No real diagnostic value</li> </ul>
<b>POST B–</b>	
<b>Battery positive cable from 200 amp fuse</b>	<p>Battery ground cable connection</p> <p>Ground path for motor operation</p> <ul style="list-style-type: none"> <li>• All system ground wires (wire #s 15 &amp; 15A) terminate here</li> <li>• Best place to connect ground lead from multi-meter while troubleshooting</li> </ul>
<b>POST M-2</b>	
<b>PWM controlled motor ground</b>	<p>Idle: <b>12 V DC – 13 V DC</b></p> <p>During operation, between <b>5 V DC &amp; 24 V DC</b></p> <ul style="list-style-type: none"> <li>• 12 – 13 volts is reference voltage used by the controller to monitor motor circuit irregularities at idle</li> <li>• 0 volts at idle = 3 flash code</li> <li>• Above 20 volts at idle = 4 flash code</li> <li>• No voltage change after Motor Start Relay signal = 5 flash code</li> </ul>



# SECTION 6

## SCHEMATICS

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1532ES, S/N 9002000 - Current	
1932ES, S/N 9105000 - Current .....	6-12

# HYDRAULIC SCHEMATICS

**1532ES - Serial # 9001000 - 9001099**

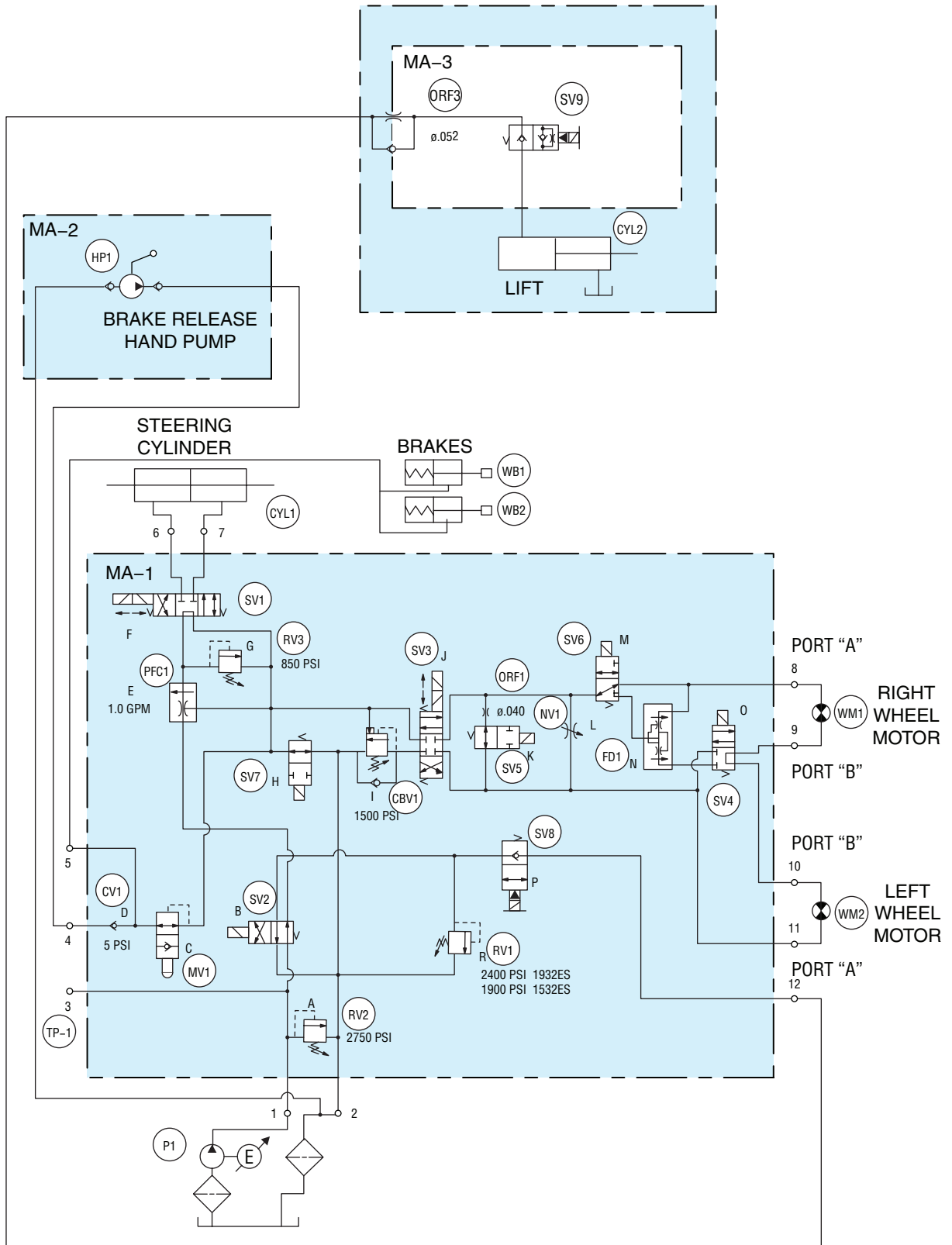
**1932ES - Serial # 9104000 - 9104999**

ITEM	DESCRIPTION	Location
CBV1	Counterbalance Valve	Main Manifold (MA-1)
CV1	Check Valve	Main Manifold (MA-1)
CYL1	Steering Cylinder	Machine Base, Front
CYL2	Lift Cylinder, 2047, 2647	Scissor Assembly
FD1	Flow Divider	Main Manifold (MA-1)
HP1	Hand Pump, Brakes	Brake Release Manifold (MA-2)
MA-1	Main Manifold Assembly	Battery Compartment
MA-2	Brake Release Manifold	Battery Compartment
MA-3	Manifold Assembly	Lift Cylinder
MV1	Manifold Valve	Main Manifold (MA-1)
NV1	Needle Valve	Main Manifold (MA-1)
ORF1	Orifice Plug, Wheel Motors	Main Manifold (MA-1)
ORF3	Orifice, Down Valve	Lift Cylinder Manifold (MA-3)
P1	Pump	Pump Compartment
PCF1	Steering Relief Flow Control	Main Manifold (MA-1)
RV1	Relief Valve, Lift Relief	Main Manifold (MA-1)
RV2	Relief Valve, Main Relief	Main Manifold (MA-1)
RV3	Relief Valve, Steering	Main Manifold (MA-1)
SV1	Spool Valve, Steering	Main Manifold (MA-1)
SV2	Spool Valve, Lift	Main Manifold (MA-1)
SV3	Spool Valve, Drive	Main Manifold (MA-1)
SV4	Spool Valve, Decel	Main Manifold (MA-1)
SV5	Spool Valve, Torque	Main Manifold (MA-1)
SV6	Spool Valve, Torque	Main Manifold (MA-1)
SV7	Spool Valve, Brakes	Main Manifold (MA-1)
SV8	Poppet Valve, Down	Main Manifold (MA-1)
SV9	Spool Valve, Down	Lift Cylinder Manifold (MA-3)
TP1	Test Port	Main Manifold (MA-1)
WB1	Wheel Brake	Drive Wheel
WB2	Wheel Brake	Drive Wheel
WM1	Wheel Motor, Right Side	Machine Base
WM2	Wheel Motor, Left Side	Machine Base



**HYDRAULIC SCHEMATIC**

Model: / Serial #	
1532ES	9001000 - 9001099
1932ES	9104000 - 9104999
2033ES	8804000 - 8804099
2633ES	11100000 - 11100599
Reference Art #: 915	Publication Art #: ART_2194



**1532ES - Serial # 9001100 - Current**

**1932ES - Serial # 9105000 - Current**

ITEM	DESCRIPTION	Location
CBV1	Counterbalance Valve	Main manifold (MA-1)
CYL1	Steering Cylinder	Machine Base, Front
CYL2	Lift Cylinder	Scissor Assembly
FD1	Flow Divider	Main manifold (MA-1)
FRR1	Steering Relief Flow Control	Main manifold (MA-1)
HP1	Hand Pump, Brakes	Brake Release Manifold (MA-2)
MA-1	Main Manifold Assembly	Machine Base, Battery Compartment
MA-2	Manifold Assembly	Lift Cylinder
MV1	Manifold Valve	Main manifold (MA-1)
NV1	Needle Valve	Main manifold (MA-1)
ORF1	Orifice Plug, Wheel Motors	Main manifold (MA-1)
ORF2	Orifice Disc, Brake Release	Main manifold (MA-1)
ORF3	Orifice, Down Valve	Lift Cylinder Manifold (MA-3)
P1	Pump	Pump Compartment
RV1	Relief Valve, Lift Relief	Main manifold (MA-1)
RV2	Relief Valve, Main Relief	Main manifold (MA-1)
SV1	Spool Valve, Steering	Main manifold (MA-1)
SV2	Spool Valve, Lift	Main manifold (MA-1)
SV3	Spool Valve, Drive	Main manifold (MA-1)
SV4	Spool Valve, Brake/Decel	Main manifold (MA-1)
SV5	Spool Valve, Torque	Main manifold (MA-1)
SV6	Spool Valve, Torque	Main manifold (MA-1)
SV9	Spool Valve, Down	Lift Cylinder Manifold (MA-2)
WB1	Wheel Brake	Drive Wheel
WB2	Wheel Brake	Drive Wheel
WM1	Wheel Motor, Right Side	Machine Base
WM2	Wheel Motor, Left Side	Machine Base

**HYDRAULIC SCHEMATIC**

Model: / Serial #

1532ES | 9001100 -

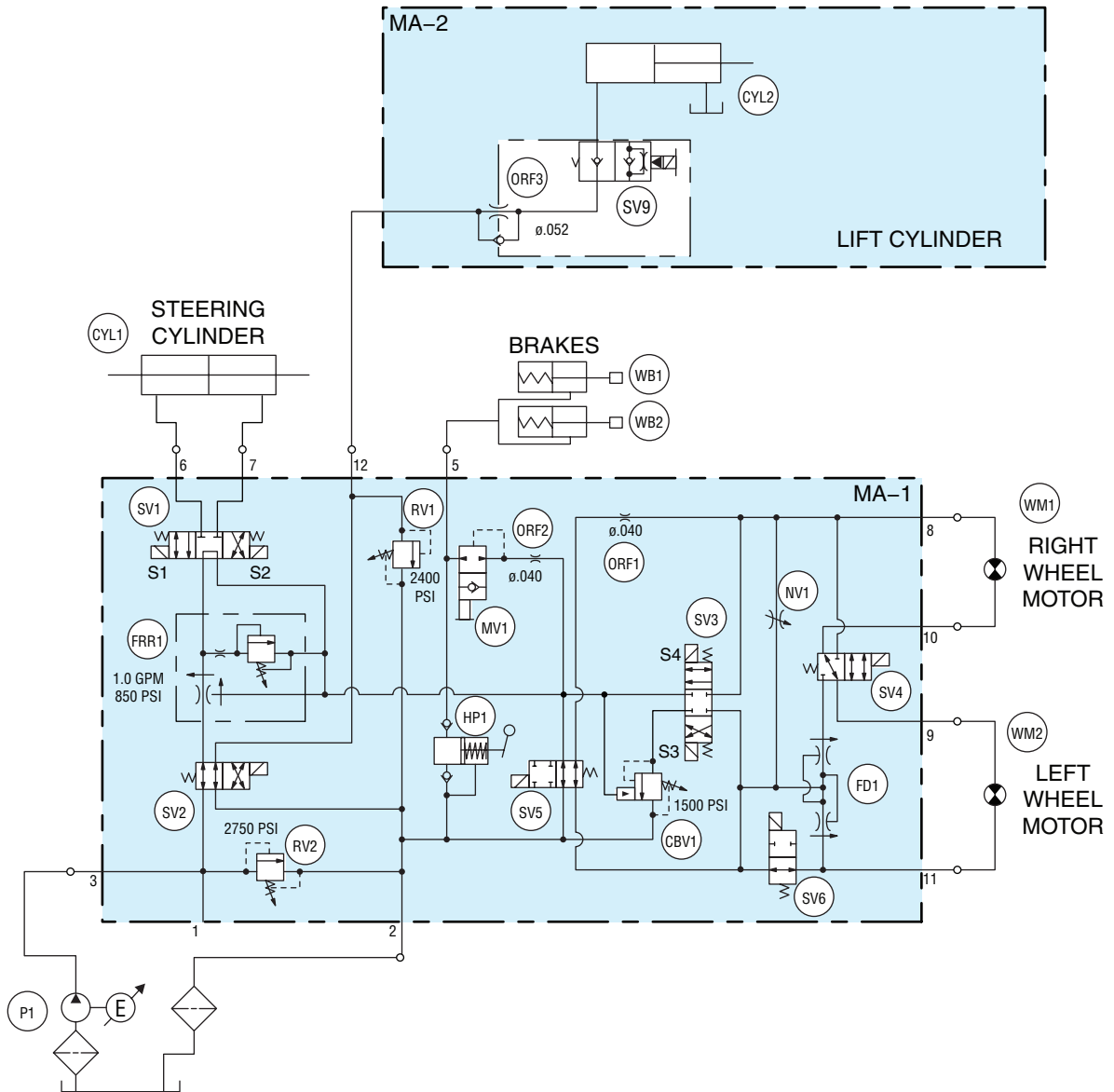
1932ES | 9105000 -

2033ES | 8804100 -

2633ES | 1101000 -

Reference Art #: 965

Publication Art #: ART\_2195



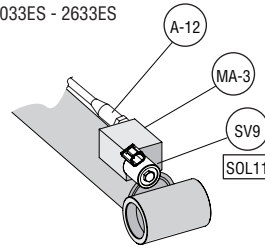
**MEC** Hydraulic Manifold - early style

Model: / Serial #  
 1532ES CE | 1932ES  
 2033ES CE | 2633ES

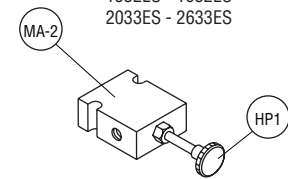
Reference Art #: none | Publication Art #: ART\_2460

NOTE: Early style manifold. Refer to Hydraulic Schematic for serial # break

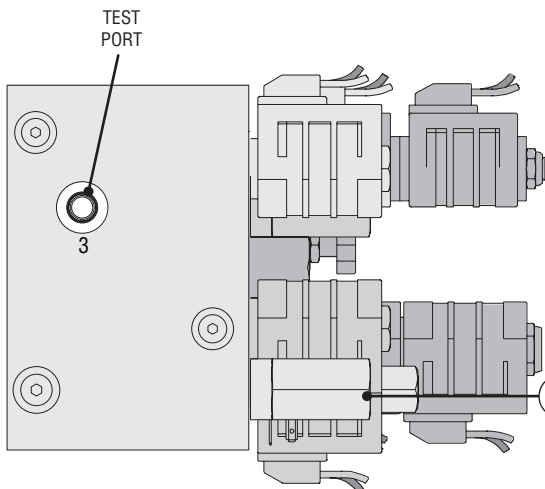
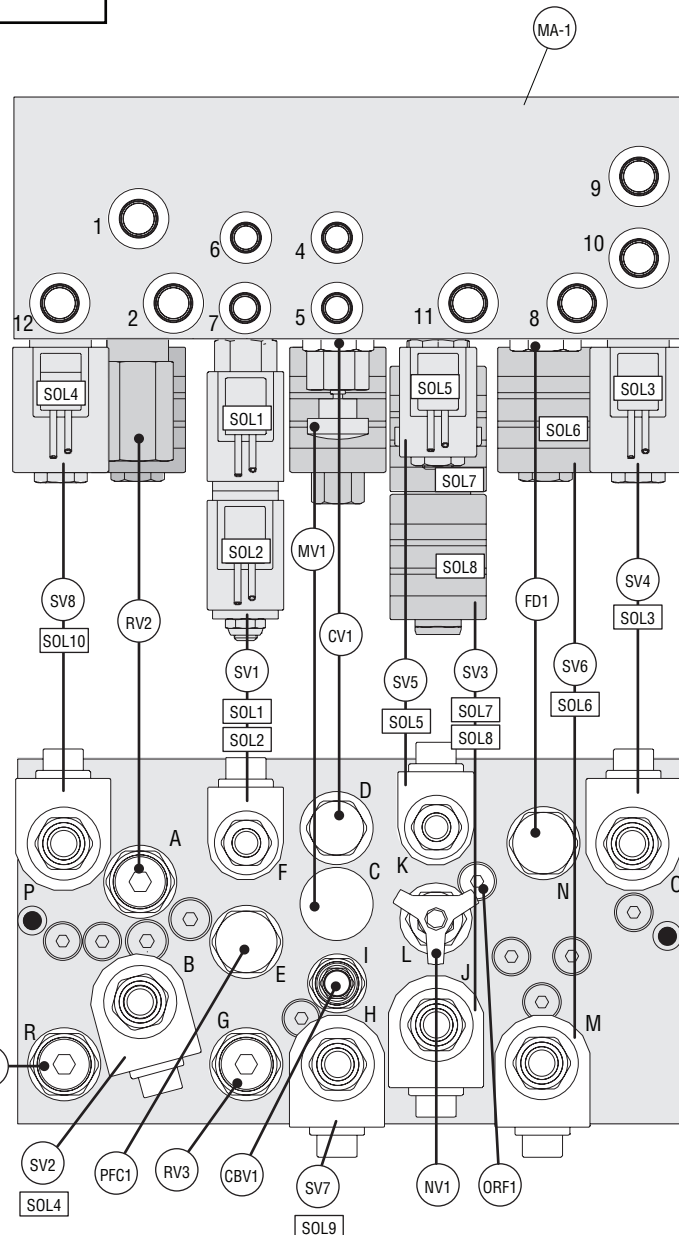
**LIFT CYLINDER**  
 1532ES - 1932ES  
 2033ES - 2633ES



**BRAKE RELEASE HAND PUMP**  
 1532ES - 1932ES  
 2033ES - 2633ES



COMPONENTS	FUNCTION	PORTS	
CBV1 Relief Valve	Counter Balance	1	PUMP
CV1 Check Valve	Flow Control, Brakes	2	TANK
SOL1 Coil (SV1)	Steer Right	3	TEST PORT
SOL2 Coil (SV1)	Steer Left	4	BRAKE RELEASE
SOL3 Coil (SV5)	Drive/Decel	5	BRAKE
SOL4 Coil (SV2)	Lift	6	STEER
SOL5 Coil (SV4)	Torque	7	STEER
SOL6 Coil (SV6)	Torque	8	RIGHT A
SOL7 Coil (SV3)	Drive Forward	9	RIGHT B
SOL8 Coil (SV3)	Drive Reverse	10	LEFT B
SOL9 Coil (SV7)	Brakes	11	LEFT A
SOL10 Coil (SV8)	Down	12	LIFT
FD1 Flow Divider			
MV1 Manual Valve	Brake Release		
NV1 Needle Valve	Freewheel		
ORF1 Orifice Plug			
PFC1 Flow Control	Steer Relief		
RV1 Relief Valve	Lift Relief		
RV2 Relief Valve	Main Relief		
RV3 Relief Valve	Steering Relief		
SV1 Spool Valve	Steering Control		
SV2 Spool Valve	Lift Control		
SV3 Spool Valve	Direction Control		
SV4 Spool Valve	Torque		
SV5 Spool Valve	Drive Dump/Decel		
SV6 Spool Valve	Torque		
SV7 Spool Valve	Brakes		
SV8 Poppet Valve	Down		
MA2 HP1 Hand Pump	Brake Release		
MA3 SOL11 Coil (SV9)	Down, Lift Cylinder		
	SV9 Spool Valve	Emergency Lowering	
	A12 Pressure Sensor	Overload	



**mec** Hydraulic Manifold - current style

Model: / Serial #

1532ES CE | 1932ES CE

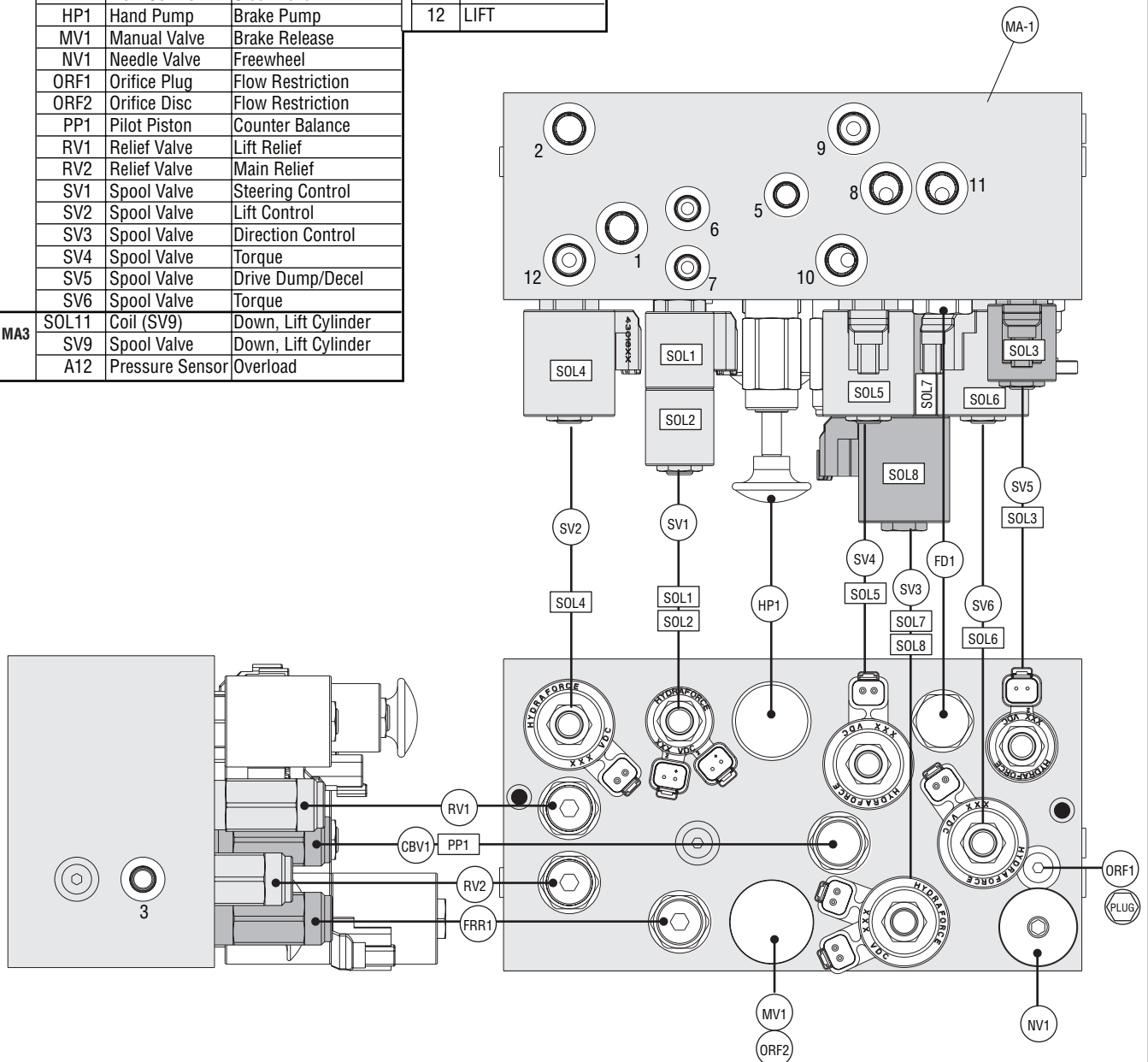
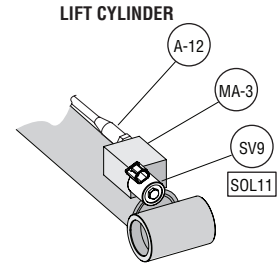
2033ES CE | 2633ES CE

Reference Art #: none

Publication Art #: ART\_2459

NOTE: Current style manifold. Refer to Hydraulic Schematic for serial # break

	COMPONENTS		FUNCTION	PORTS		
	Code	Description		Port #	Function	
MA1	CBV1	Relief Valve	Counter Balance	1	PUMP	
	SOL1	Coil (SV1)	Steer Right	2	TANK	
	SOL2	Coil (SV1)	Steer Left	3	TEST PORT	
	SOL3	Coil (SV5)	Brake/Decel	4	N/A	
	SOL4	Coil (SV2)	Lift	5	BRAKE	
	SOL5	Coil (SV4)	Torque	6	STEER	
	SOL6	Coil (SV6)	Torque	7	STEER	
	SOL7	Coil (SV3)	Drive Forward	8	RIGHT B	
	SOL8	Coil (SV3)	Drive Reverse	9	LEFT A	
	FD1	Flow Divider		10	RIGHT A	
	FRR1	Flow Control	Steer Relief	11	LEFT B	
	HP1	Hand Pump	Brake Pump	12	LIFT	
	MV1	Manual Valve	Brake Release			
	NV1	Needle Valve	Freewheel			
	MA3	ORF1	Orifice Plug	Flow Restriction		
		ORF2	Orifice Disc	Flow Restriction		
PP1		Pilot Piston	Counter Balance			
RV1		Relief Valve	Lift Relief			
RV2		Relief Valve	Main Relief			
SV1		Spool Valve	Steering Control			
SV2		Spool Valve	Lift Control			
SV3		Spool Valve	Direction Control			
SV4		Spool Valve	Torque			
SV5		Spool Valve	Drive Dump/Decel			
SV6		Spool Valve	Torque			
SOL11		Coil (SV9)	Down, Lift Cylinder			
SV9		Spool Valve	Down, Lift Cylinder			
A12		Pressure Sensor	Overload			



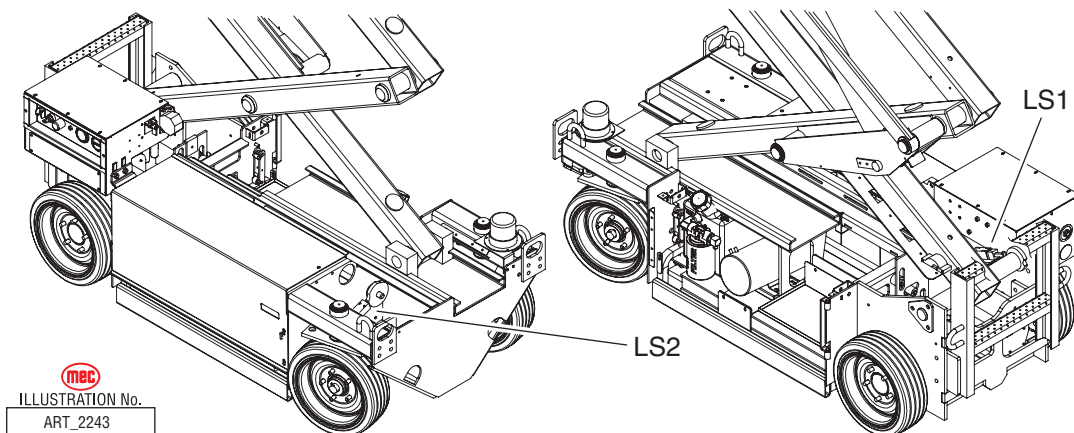
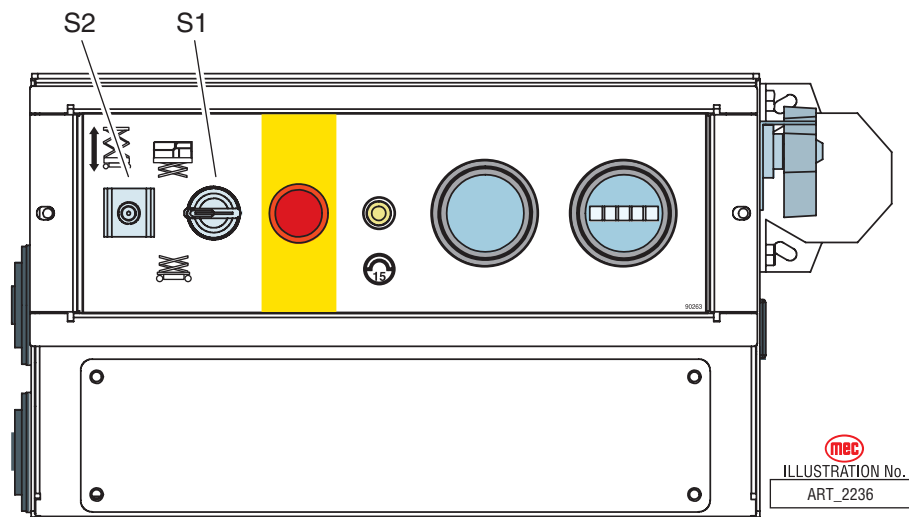
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# ELECTRIC SCHEMATICS

**NOTES:** (Unless otherwise specified)

1. Switch **S1 BASE/PLATFORM** makes contact from the CENTER to the LEFT position when placed in **BASE**.
2. Switch **S2 UP/DOWN** makes contact from the CENTER to the LEFT position when the switch is held in the CONTACT position and automatically returns to the CENTER position when released.
3. Switch **LS1** opens the N/C set of contacts and closes the N/O set of contacts when the platform reaches approximately 2 meters.
4. Switch **LS2** closes the N/C set of contacts when the Pothole Bars are down and locked in place.



**1532ES, S/N 9000500 - 9001099****1932ES, S/N 9104000 - 9104999**

ITEM	DESCRIPTION	FUNCTION	LOCATION
A1	Overload Light, 28V	Warn when Machine is Overloaded	Upper Control Box
A5	Push-Button Switch	Activates Horn	On Upper Control Box
A6	Horn, 12V - 48V (option)	Activated by Operator	Under Platform
A7	Overload/Motion Alarm (option)	Warn of Movement	Outside Lower Control Box
A8	Motion Light (option)	Warn of Movement	Front Left Corner of Machine
A9	Hour Meter	Record Machine Usage Time	Lower Control Panel
A10	Platform Alarm	Warn of Platform Overload and Tilt	Upper Control Box
A11	Battery Indicator	Show Battery Status	Lower Control Panel
A12	Pressure Transducer	Measure Lift Cyl Pressure for Load Sense	Lift Cylinder Manifold
A13	Angle Transducer (Height Sensor)	Measure Scissor Angle for Load Sense	Lowest Scissor Beam
B1-4	6-V Deep Cycle Battery	Power for Motor And Control Circuit	Inside Battery Compartment
BD1	Battery Disconnect Switch	Disconnect All Electrical Power	Lower Control Box
CB1	Circuit Breaker, 15AMP Manual	Control Circuit Protection	Lower Control Panel
CH1	Battery Charger	Recharges 24-VDC Battery Pack	Machine Base, Rear
CHRL1	Charger Relay	Disconnect Electric when Charger ON	Inside Charger
D1 - D15	Circuit Board Diodes	Directs Signal to Proper Location	Inside Lower Control Box
D17	Diode w/Ring Terminals	Suppression Diode	Across Contactor Coil
D18	Diode	Control Reverse Drive Speed – Elevated	Main Manifold
ES1	Switch, Emergency Stop	Shutdown All Moving Functions	Lower Control Panel
ES2	Switch, Emergency Stop	Shutdown All Platform Functions	Upper Control Box
F1	Fuse, 200AMP	Main Line Fuse	Inside Lower Control Box
LS1	Limit Switch, Double Pole	Enable Drive and High Speed	Right Rear Corner of Machine
LS2	Limit Switch, Single Pole	Drive Enable if Pothole Deployed	On pothole Linkage
M1	Motor, 24V, 2HP	Turn the Hydraulic Pump	Inside Pump Compartment
MC1	24-V Contactor	Connects Battery (+) to Motor	Inside Lower Control Box
PWM	Controller, DC 250AMP	Changes the Motor Speed	Inside Lower Control Box
POT1	Potentiometer, 20K Ohms	Senses Operator Input	Upper Control Box
R1 - R4	Circuit Board Resistors	Circuit Board Functions	Inside Lower Control Box
RL1	Load Sense Relay	Disable Functions if Platform Overloaded	Lower Control Box
S1	Key Switch, N/O Contact Block	Select Base or Platform Controls	Lower Control Panel
S2	Switch, Toggle	Lift/Lower at Lower Controls	Lower Control Panel
S3	Switch, Push Button	Enable Other Functions at Platform	Upper Control Box Handle
S4	Switch, Micro	Right Turn Switch	Upper Control Box Handle
S5	Switch, Micro	Left Turn Switch	Upper Control Box Handle
S6	Switch, Toggle	Select LIFT or DRIVE	Upper Control Box
S7	Switch, Micro	Reverse or Lift Switch	Upper Control Box
S8	Switch, Micro	Forward or Down Switch	Upper Control Box
S9	Switch, Toggle	Torque Switch	Upper Control Box
SOL1	Coil, Turn Right Solenoid	Activate Turn Right Valve (SV1)	Main Manifold
SOL2	Coil, Turn Left Solenoid	Activate Turn Left Valve (SV1)	Main Manifold
SOL3	Coil, Decel Solenoid	Activate Decel Valve (SV5)	Main Manifold
SOL4	Coil, Lift Solenoid	Activate Lift Valve (SV2)	Main Manifold
SOL5	Coil, Torque Solenoid	Activate Torque Valve (SV4)	Main Manifold
SOL6	Coil, Torque Solenoid	Activate Torque Valve (SV6)	Main Manifold
SOL7	Coil, Reverse Solenoid	Activate Reverse Valve (SV3)	Main Manifold
SOL8	Coil, Forward Solenoid	Activate Forward Valve (SV3)	Main Manifold
SOL9	Coil, Brake Solenoid	Activate Brake Valve (SV7)	Main Manifold
SOL10	Coil, Down Solenoid	Activate Down Valve (SV8)	Main Manifold
SOL11	Coil, Down Solenoid	Activate Down Valve (SV9)	Lift Cylinder Manifold

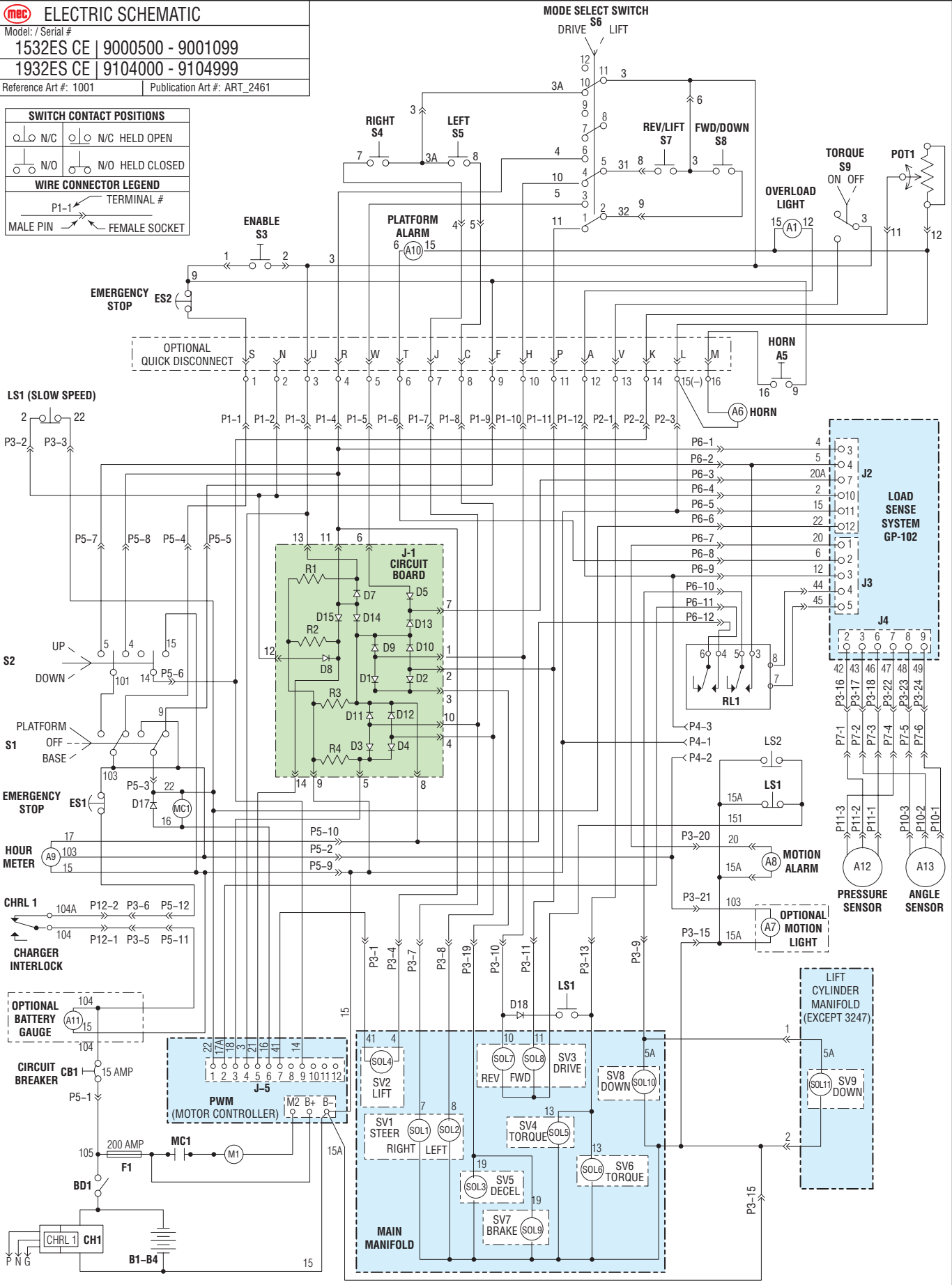




**MEC** ELECTRIC SCHEMATIC

Model / Serial #  
 1532ES CE | 9000500 - 9001099  
 1932ES CE | 9104000 - 9104999  
 Reference Art #: 1001 | Publication Art #: ART\_2461

SWITCH CONTACT POSITIONS	
	N/C N/C HELD OPEN
	N/O N/O HELD CLOSED
WIRE CONNECTOR LEGEND	
	TERMINAL #
	MALE PIN
	FEMALE SOCKET



**1532ES, S/N 9002000 - Current**  
**1932ES, S/N 9105000 - Current**

ITEM	DESCRIPTION	FUNCTION	LOCATION
A1	Overload Light, 28V	Warn when Machine is Overloaded	Upper Control Box
A5	Push-Button Switch	Activates Horn	On Upper Control Box
A6	Horn, 12V - 48V (option)	Activated by Operator	Under Platform
A7	Overload/Motion Alarm (option)	Warn of Movement	Outside Lower Control Box
A8	Motion Light (option)	Warn of Movement	Front Left Corner of Machine
A9	Hour Meter	Record Machine Usage Time	Lower Control Panel
A10	Platform Alarm	Warn of Platform Overload and Tilt	Upper Control Box
A11	Battery Indicator	Show Battery Status	Lower Control Panel
A12	Pressure Transducer	Measure Lift Cyl Pressure for Load Sense	Lift Cylinder Manifold
A13	Angle Transducer (Height Sensor)	Measure Scissor Angle for Load Sense	Lowest Scissor Beam
B1-4	6-V Deep Cycle Battery	Power for Motor And Control Circuit	Inside Battery Compartment
BD1	Battery Disconnect Switch	Disconnect All Electrical Power	Lower Control Box
CB1	Circuit Breaker, 15AMP Manual	Control Circuit Protection	Lower Control Panel
CH1	Battery Charger	Recharges 24-VDC Battery Pack	Machine Base, Rear
CHRL1	Charger Relay	Disconnect Electric when Charger ON	Inside Charger
D1 - D15	Circuit Board Diodes	Directs Signal to Proper Location	Inside Lower Control Box
D17	Diode w/Ring Terminals	Suppression Diode	Across Contactor Coil
ES1	Switch, Emergency Stop	Shutdown All Moving Functions	Lower Control Panel
ES2	Switch, Emergency Stop	Shutdown All Platform Functions	Upper Control Box
F1	Fuse, 200AMP	Main Line Fuse	Inside Lower Control Box
LS1	Limit Switch, Double Pole	Enable Drive and High Speed	Right Rear Corner of Machine
LS2	Limit Switch, Single Pole	Drive Enable if Pothole Deployed	On pothole Linkage
M1	Motor, 24V, 2HP	Turn the Hydraulic Pump	Inside Pump Compartment
MC1	24-V Contactor	Connects Battery (+) to Motor	Inside Lower Control Box
PWM	Controller, DC 250AMP	Changes the Motor Speed	Inside Lower Control Box
POT1	Potentiometer, 20K Ohms	Senses Operator Input	Upper Control Box
R1 - R4	Circuit Board Resistors	Circuit Board Functions	Inside Lower Control Box
RL1	Load Sense Relay	Disable Functions if Platform Overloaded	Lower Control Box
S1	Key Switch, N/O Contact Block	Select Base or Platform Controls	Lower Control Panel
S2	Switch, Toggle	Lift/Lower at Lower Controls	Lower Control Panel
S3	Switch, Push Button	Enable Other Functions at Platform	Upper Control Box Handle
S4	Switch, Micro	Right Turn Switch	Upper Control Box Handle
S5	Switch, Micro	Left Turn Switch	Upper Control Box Handle
S6	Switch, Toggle	Select LIFT or DRIVE	Upper Control Box
S7	Switch, Micro	Reverse or Lift Switch	Upper Control Box
S8	Switch, Micro	Forward or Down Switch	Upper Control Box
S9	Switch, Toggle	Torque Switch	Upper Control Box
SOL1	Coil, Turn Right Solenoid	Activate Turn Right Valve (SV1)	Main Manifold
SOL2	Coil, Turn Left Solenoid	Activate Turn Left Valve (SV1)	Main Manifold
SOL3	Coil, Decel Solenoid	Activate Decel Valve (SV5)	Main Manifold
SOL4	Coil, Lift Solenoid	Activate Lift Valve (SV2)	Main Manifold
SOL5	Coil, Torque Solenoid	Activate Torque Valve (SV4)	Main Manifold
SOL6	Coil, Torque Solenoid	Activate Torque Valve (SV6)	Main Manifold
SOL7	Coil, Reverse Solenoid	Activate Reverse Valve (SV3)	Main Manifold
SOL8	Coil, Forward Solenoid	Activate Forward Valve (SV3)	Main Manifold
SOL11	Coil, Down Solenoid	Activate Down Valve (SV9)	Lift Cylinder Manifold

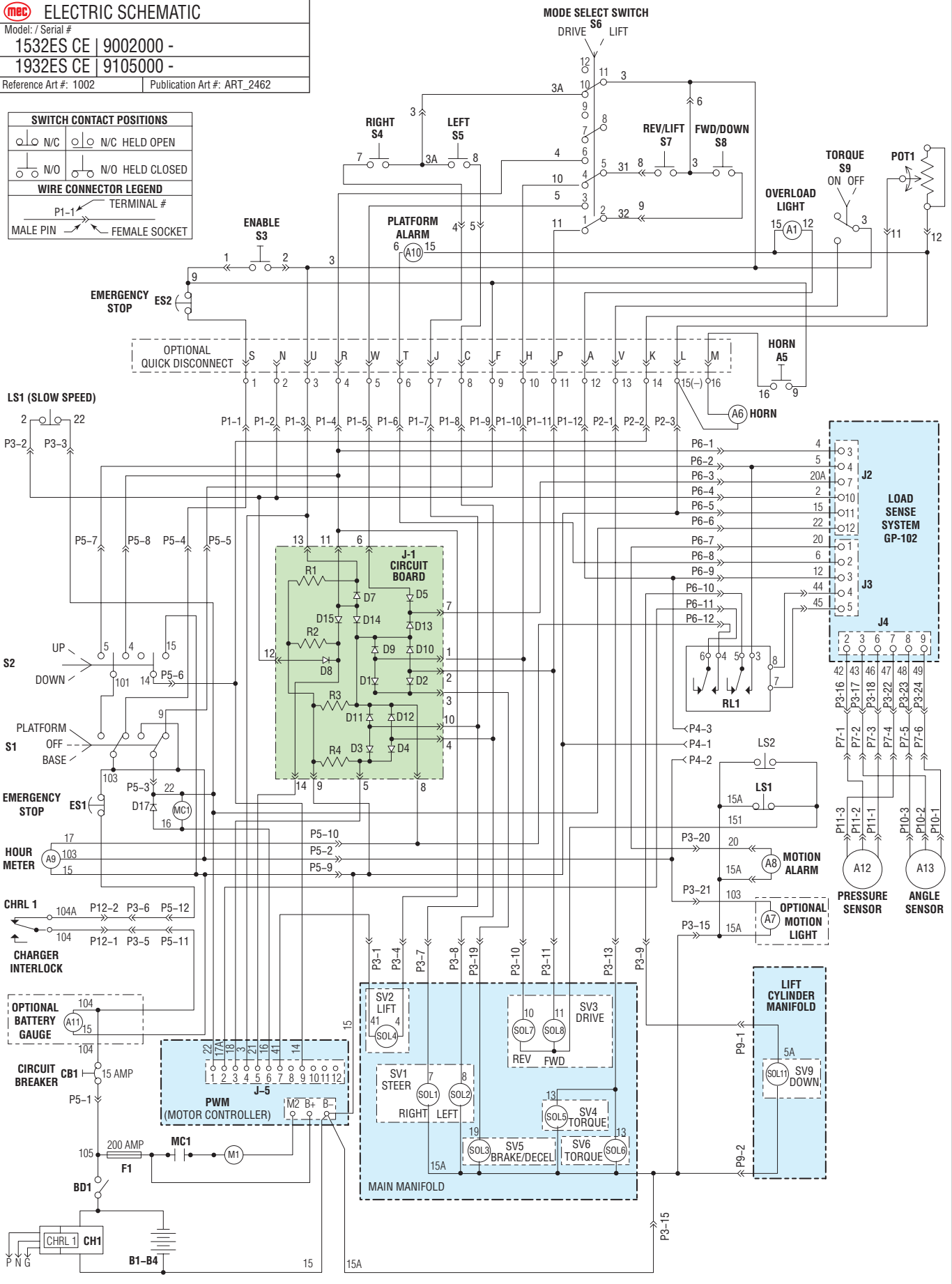
**MEC** ELECTRIC SCHEMATIC

Model: / Serial #  
 1532ES CE | 9002000 -  
 1932ES CE | 9105000 -  
 Reference Art #: 1002 | Publication Art #: ART\_2462

SWITCH CONTACT POSITIONS	
	N/C
	N/C HELD OPEN
	N/O
	N/O HELD CLOSED

WIRE CONNECTOR LEGEND	
	TERMINAL #
	MALE PIN
	FEMALE SOCKET

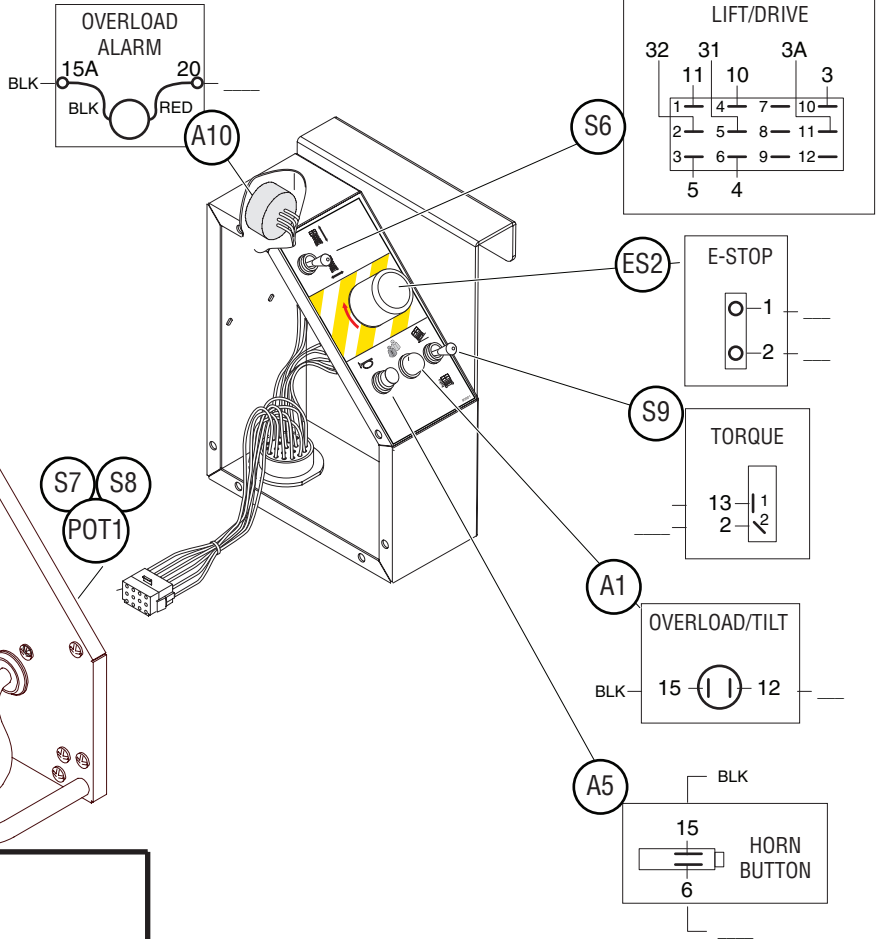


**mec** Component Locations

Model: / Serial #  
**ES Models: all CE**

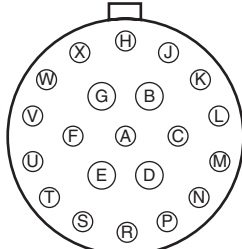
Reference Art #: none | Publication Art #: 2445

**REFER TO  
 ELECTRIC SCHEMATIC**

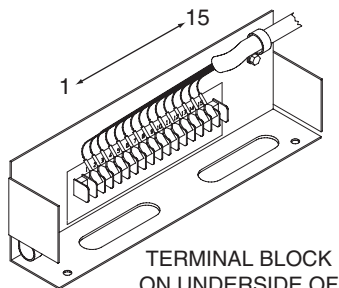


**REMOVABLE  
 CONTROL  
 HARNESS**

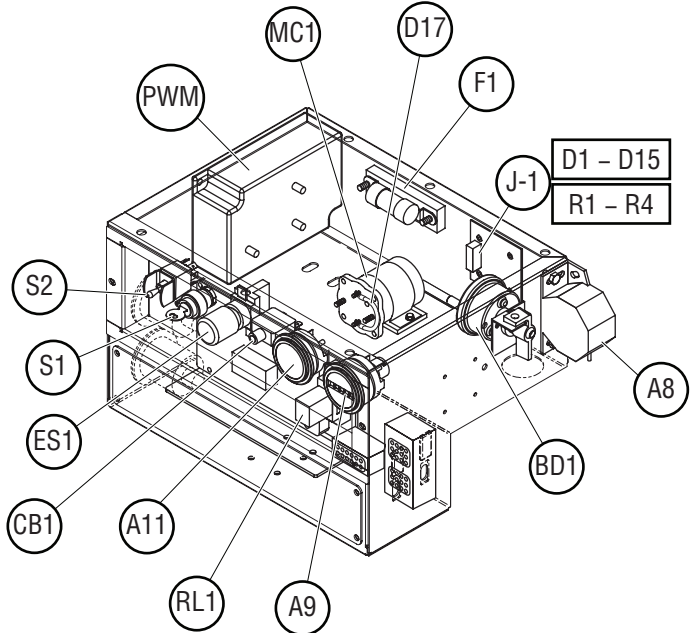
PIN #	WIRE #
S	1
F	9
W	5
R	4
V	13
A	12
H	10
P	11
U	3
T	6
J	7
N	2
C	8
K	14
M	16 (GND)
L	15



END VIEW OF  
 REMOVABLE  
 CONTROL HARNESS  
 (OPTIONAL  
 QUICK  
 DISCONNECT)



TERMINAL BLOCK  
 ON UNDERSIDE OF  
 PLATFORM DECK



**mecc** Component Locations

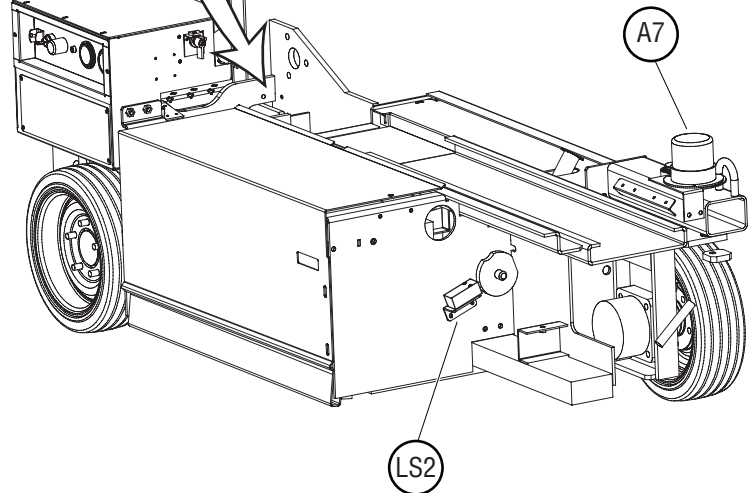
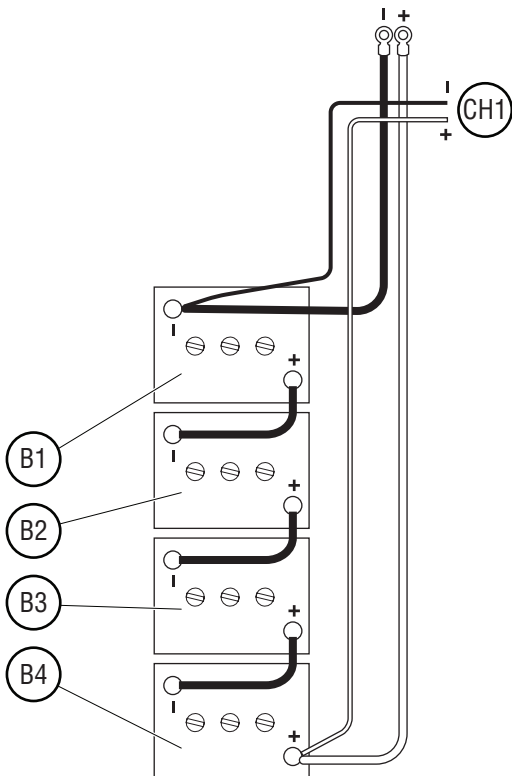
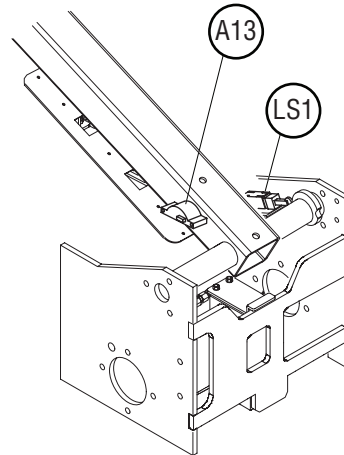
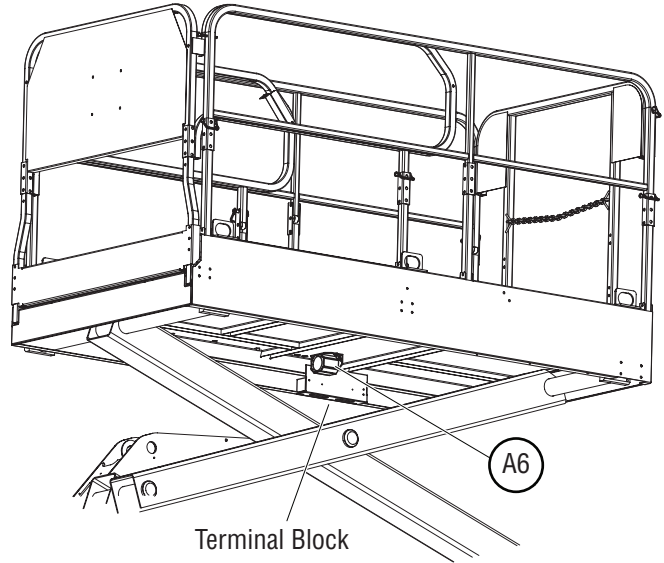
Model: / Serial #

1532ES - 1932ES: all CE

Reference Art #: none

Publication Art #: ART\_2446

**REFER TO  
ELECTRIC SCHEMATIC**



**MEC** Component Locations

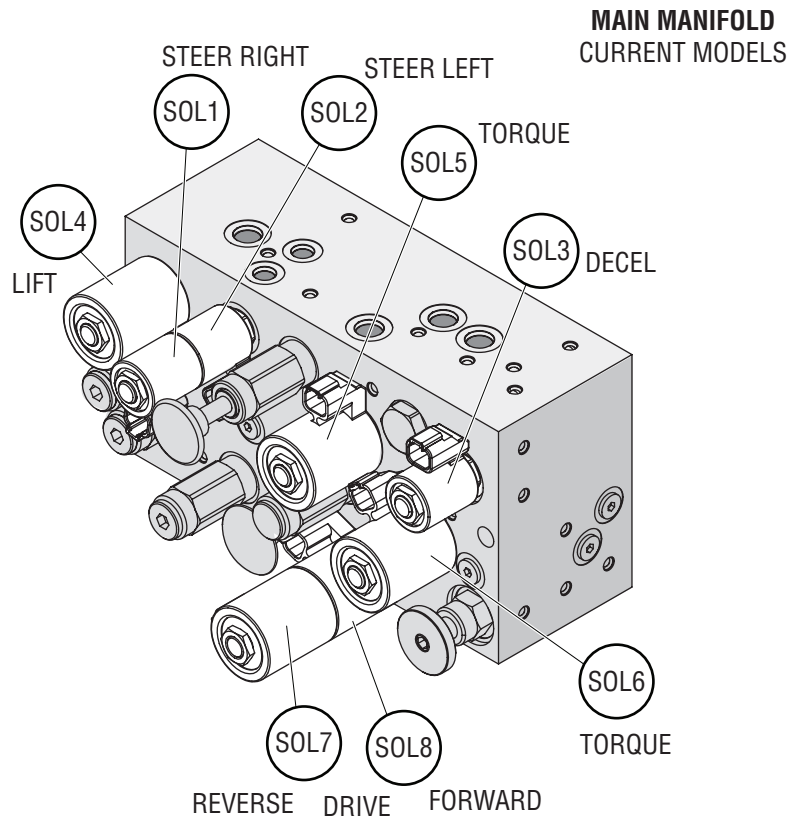
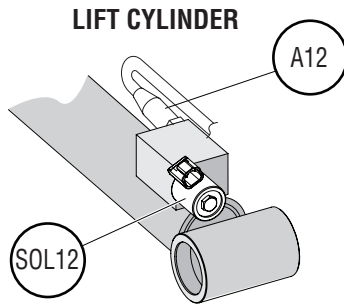
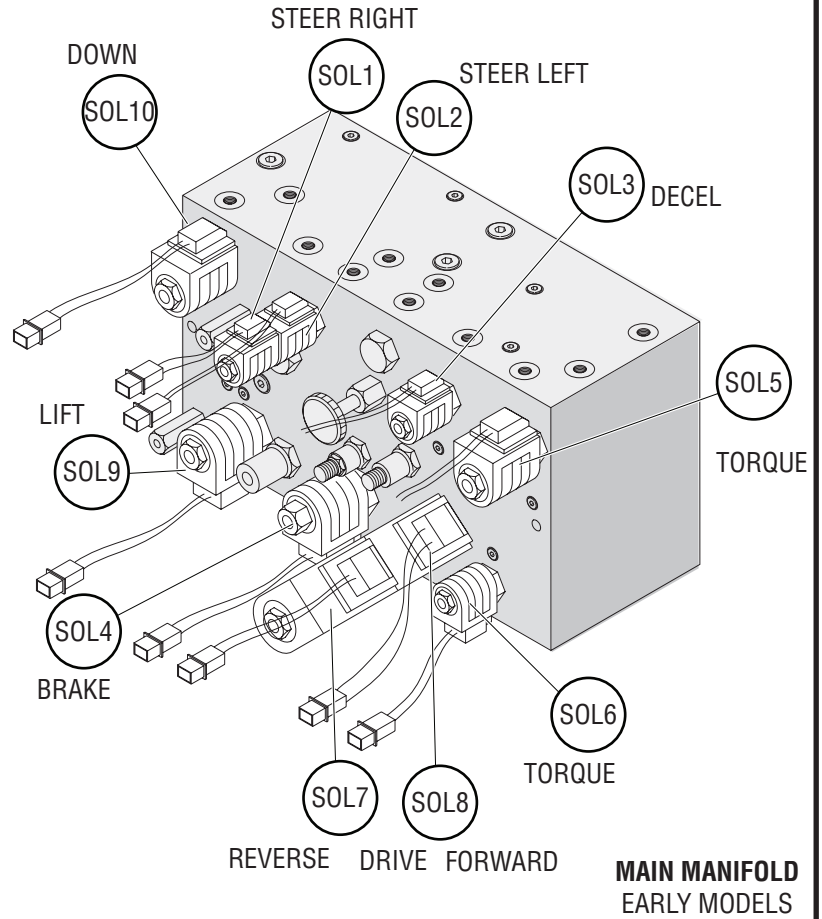
Model: / Serial #

ES Models: all CE

Reference Art #: none

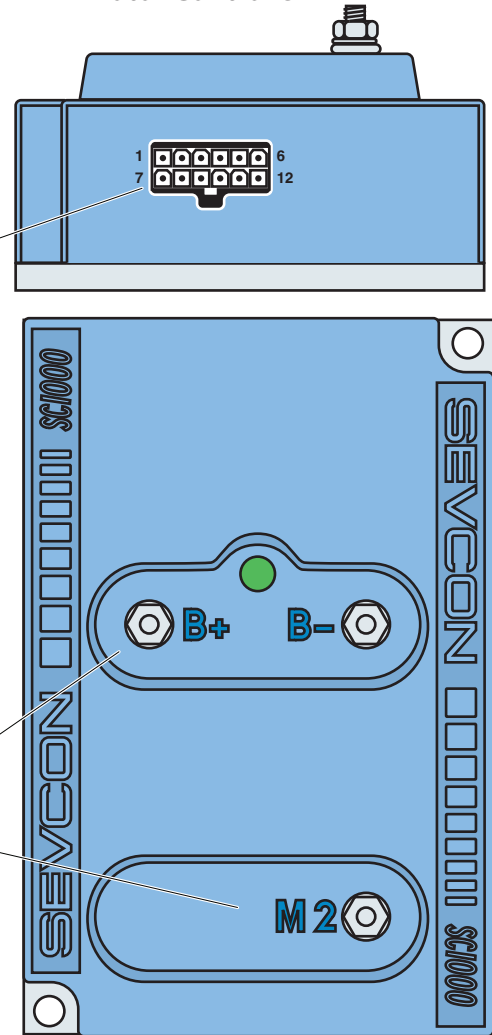
Publication Art #: ART\_2447

**REFER TO  
ELECTRIC SCHEMATIC**



**REFER TO  
ELECTRIC SCHEMATIC**

**PWM  
Motor Controller**

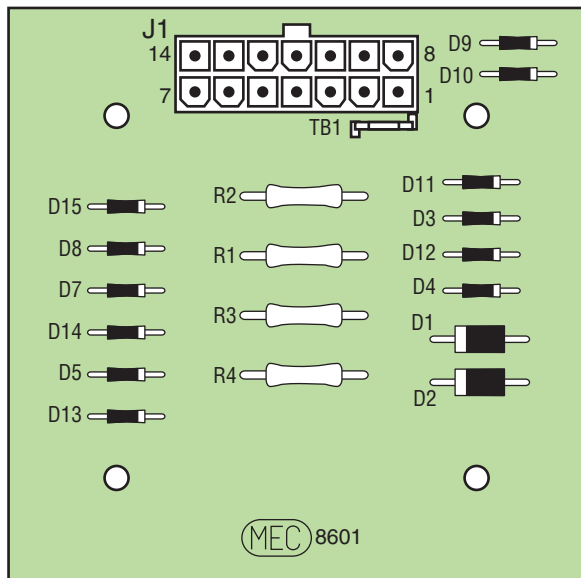


J5 Pin Identification		
PIN #	WIRE #	FUNCTION
1	22	B+ power input (power up)
2	17	Lift, Drive or Steer functions requested (functions requiring motor)
3	18	Steer Requested (adds additional motor speed for steer)
4	3	Enable signal input
5	21	Speed cut-back (24 Volts = full speed, 0 Volts = creep speed)
6	16	Motor Start Relay signal (GROUND signal to activate Motor Start Relay)
7	41	Lift Valve B- (provides GROUND signal to Lift Valve)
8	none	none
9	14	Accelerator reference signal (3.6 Volts to Potentiometer)
10	none	none
11	none	none
12	none	none

Terminal Identification	
POST	FUNCTION
B+	Battery Positive Cable from 200 AMP Fuse
B-	Negative Battery Cable and GROUND wire (15) connection
M2	Motor Ground (Pulse-Width Modulated [PWM] variable speed control)

**Circuit Board**



**J1 Plug Pin Identification**

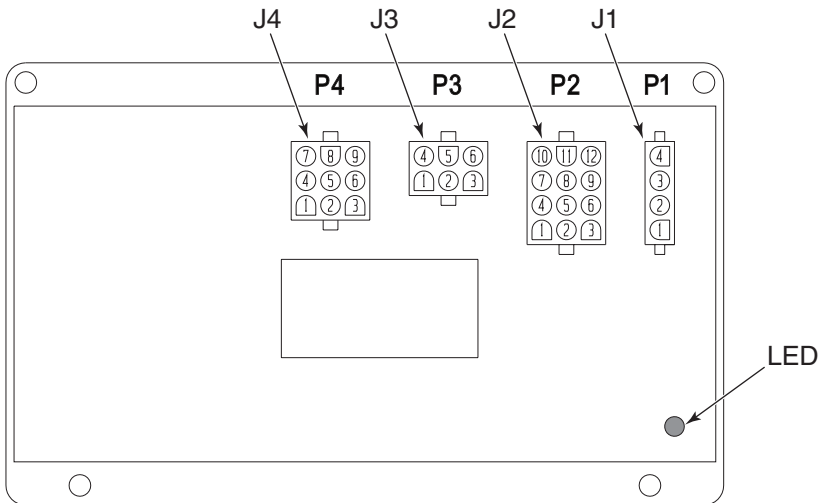
PIN #	WIRE #	SIGNAL	FUNCTION
1	10	INPUT	Drive Reverse
2	11	INPUT	Drive Forward
3	19	OUTPUT	Brake, Decel Valve signal
4	8	INPUT	Steer Left
5	18	OUTPUT	Steer signal to Sevcon
6	5	INPUT	Down signal
7	20	OUTPUT	Signal to Motion Alarm(s) (optional)
8	17	OUTPUT	Sevcon & Hour Meter (motor function requested)
9	15	INPUT	Battery Negative
10	7	INPUT	Steer Right
11	4	INPUT	Lift Up
12	2	INPUT	Limit Switch (24V = platform down)
13	3	OUTPUT	Enable, from lower Lift switch
14	21	OUTPUT	To Sevcon (for speed cutback)

<b>mec</b> Load Sense Plug Pin Identification	
Model: / Serial #	
ES Models: all	
Reference Art #: none	Publication Art #: 2473

### GP-102 Load Sense Control Module Connections

J1 (P1)			J2 (P2)			J3 (P3)			J4 (P4)		
PIN #	WIRE #	CONNECTION	PIN #	WIRE #	CONNECTION	PIN #	WIRE #	CONNECTION	PIN #	WIRE #	CONNECTION
1	EZ-Cal	DIAGNOSTIC	1	-	No Connection	1	20	Motion Alarm (A8)	1	-	No Connection
2	EZ-Cal	AND	2	-	No Connection	2	6	Alarm (A10)	2	42	Overload Sensor
3	EZ-Cal	PROGRAMMING	3	4	P6-1	3	12	Overload Light (A1)	3	43	Height sensor
4	EZ-Cal		4	5	P6-2	4	44	Overload Relay (8)	4	-	No Connection
			5	-	No Connection	5	45	Overload Relay (7)	6	46	Overload Sensor
			6	-	No Connection	6	-		7	47	Overload Sensor
			7	20A	P6-3				8	48	Height Sensor
			8	-	No Connection				9	49	Height Sensor
			9	-	No Connection						
			10	2	P6-4						
			11	15	P6-5						
			12	22	P6-6						

#### GP-102 Load Sense Control Module

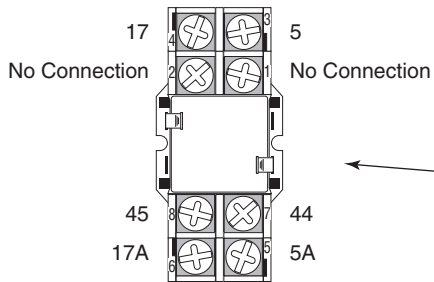


Inside Lower Control Box

#### Overload Cutout Relay Connections

RL1		
PIN #	WIRE #	CONNECTION
1	-	No Connection
2	-	No Connection
3	5	GP-102 (J2 - Pin 4)
4	17	P6-12
5	5A	P6-10
6	17A	P6-12
7	44	GP-102 (J3 - Pin 4)
8	45	GP-102 (J3 - Pin 5)

#### RL1 Overload Cutout Relay



Overload Cutout Relay

