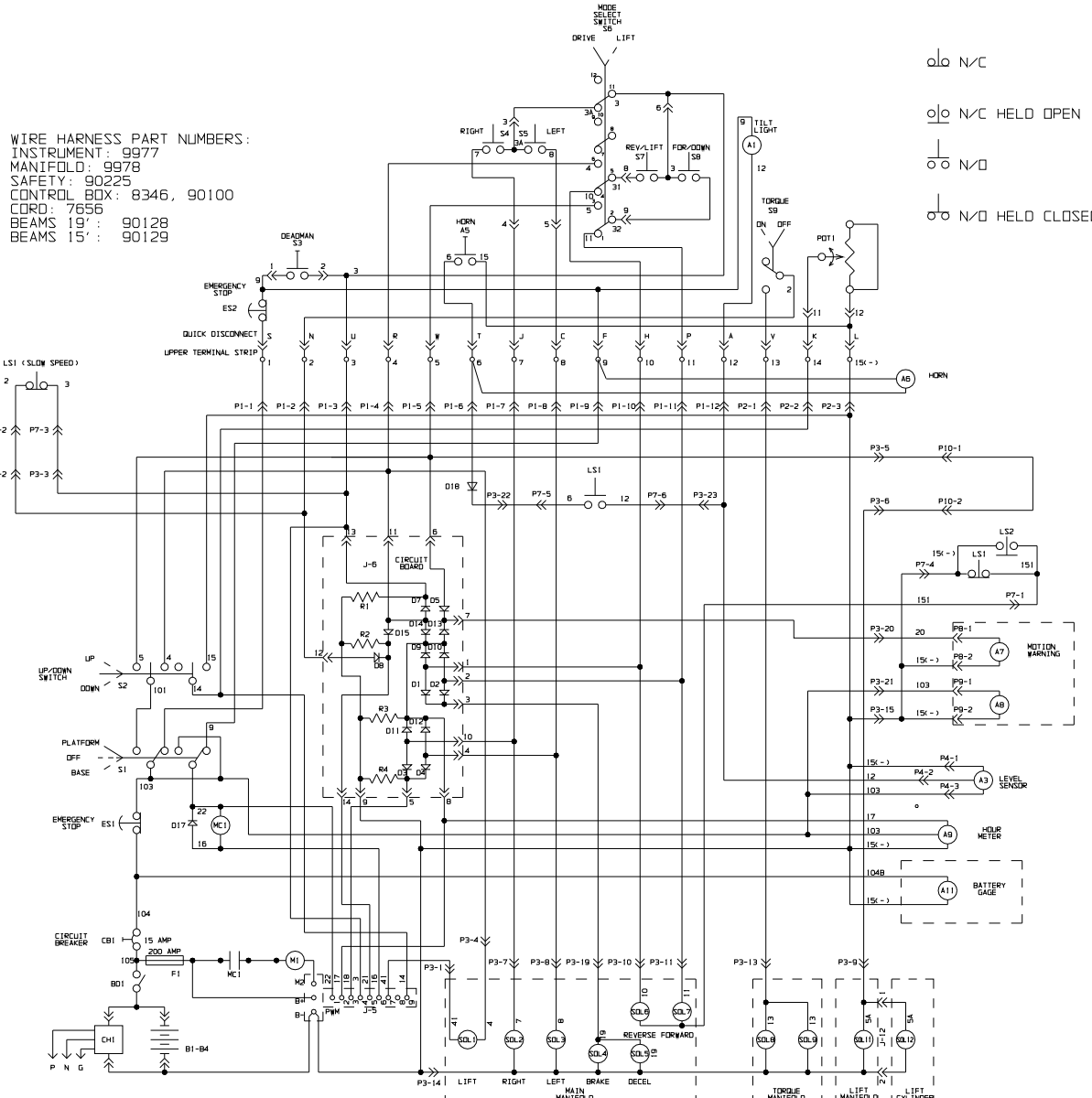


# 1932ES \ 1532ES ELECTRICAL SCHEMATIC

WIRE HARNESS PART NUMBERS:  
 INSTRUMENT: 9977  
 MANIFOLD: 9978  
 SAFETY: 90225  
 CONTROL BOX: 8346, 90100  
 CORD: 7656  
 BEAMS 19': 90128  
 BEAMS 15': 90129



o/o N/C  
 o/o N/C HELD OPEN  
 o/o N/D  
 o/o N/D HELD CLOSED

- NOTES: (UNLESS OTHERWISE SPECIFIED)
- SWITCH S1 "BASE/PLATFORM SWITCH" MAKES CONTACT FROM THE CENTER TO THE LEFT POSITION WHEN PLACED IN BASE.
  - SWITCH S2 "UP/DOWN SWITCH" MAKES CONTACT FROM THE CENTER TO THE LEFT WHEN THE SWITCH IS HELD IN THE DOWN POSITION AND AUTOMATICALLY RETURNS TO THE CENTER POSITION WHEN RELEASED.
  - SWITCH LS1 BREAKS THE N/C SET OF CONTACTS AND MAKES THE N/D SET OF CONTACTS WHEN THE PLATFORM REACHES APPROXIMATELY 7 FEET.
  - SWITCH LS2 MAKES THE N/C SET OF CONTACTS WHEN THE POTHOLE BARS ARE DOWN AND LOCKED IN PLACE.
  - UNIT SHOWN IN STOWED POSITION WITH POTHOLE BAR IN UP POSITION.

ART681 R3  
 CM14602  
 10/12/99

BODY NAME:	REF:	THIRD ANGLE PROJECTION
b xxxxx		
CUSTOMER/CRANKING REVISIONS RECORD/ECN	RELEASED	APPROVED BY/DATE
0	ECN#25800985	BJS/CJB/PWM 10/16/97
0	9100400 TEXT WAS #PRESENT TEXT, 9000126 TEXT WAS #PRESENT TEXT, DELETE A10 TEXT, 1 QTY TEXT WAS 2 QTY TEXT, DELETE FLASHING LIGHT REAR OPTION, DELETE J-13 TEXT ECN #25801233	BJS/CJB/PWM 05/20/98
0	SCHEMATIC UPDATED TO MEET NEW ANS1 AND CE STANDARDS ECN #25801272	CGW/CGW/SLB 08/06/99
0	REVISED HORN CIRCUIT AND REMOVED EUROPEAN SPECIFIC COMPONENTS (SEE ART1801) ECN #25802272	CGW/TLS/AJS 10/12/99
0	ADDED FACTORY MUTUAL STAMP, REVISED HORN CIRCUIT	NJC/TL /TMD 02/07/00

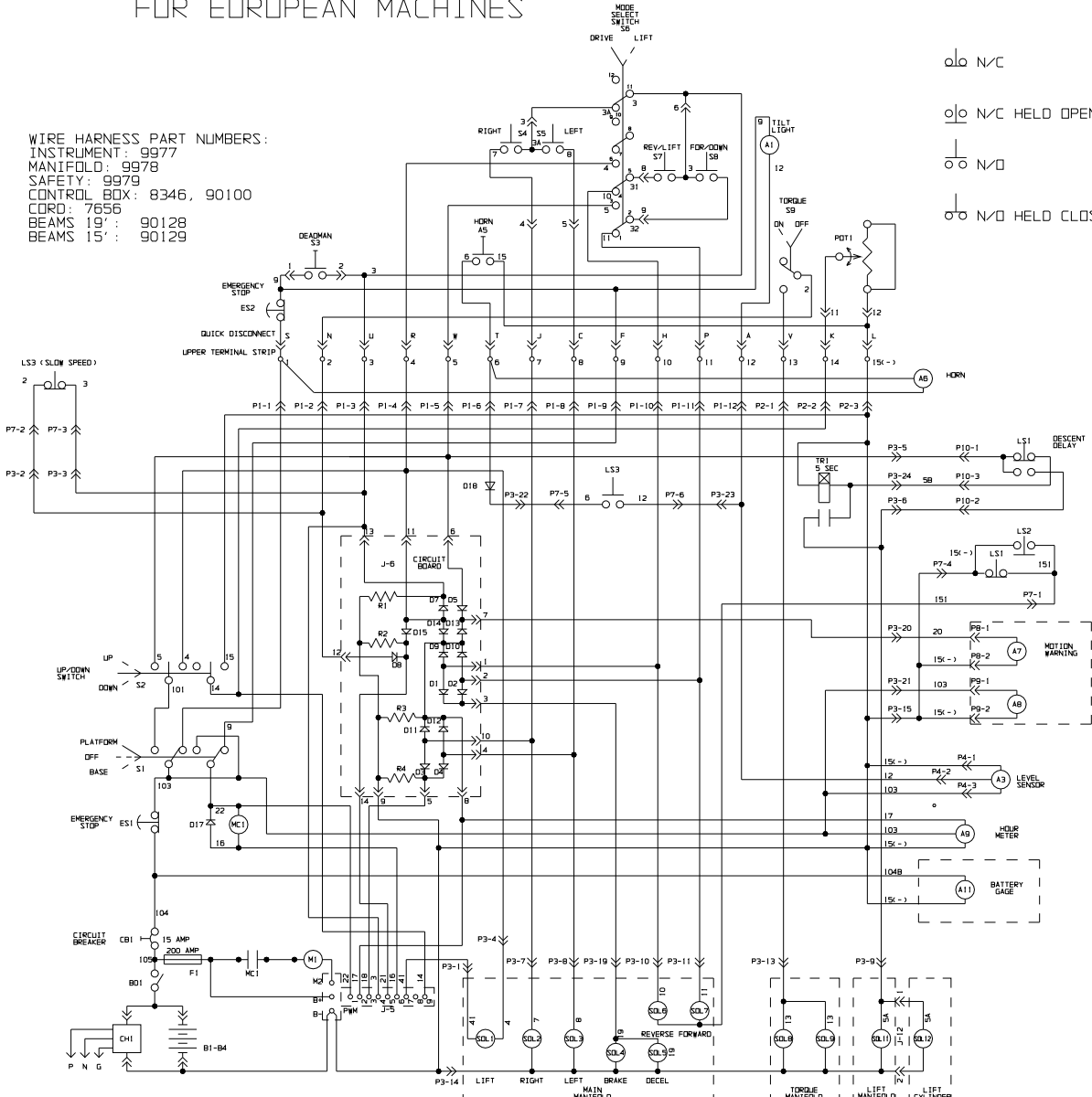
ITEM	PART NO.	QTY.	DESCRIPTION	FUNCTION	LOCATION
A1	9182	1	LIGHT, 2B VOLT	WARN WHEN MACHINE IS APPROACHING UNSAFE ANGLE	IN CONTROL BOX
A3	90217	1	TILT SENSOR	ACTIVATES TILT LIGHT AND HORN	INSIDE LOWER CONTROL CABINET
A5	9044	1	PROHIBITION SWITCH	ACTIVATES HORN	IN CONTROL BOX
A6	9716	1	12V-48V HORN	ACTIVATED BY OPERATOR AND TILT SENSOR	UNDER PLATFORM
A7	30675	1	MOTION ALARM PACKAGE	WARN OF A MOVEMENT	FRONT LEFT CORNER OF MACHINE
A8	30574	1	MOTION LIGHT PACKAGE	WARN OF A MOVEMENT	FRONT LEFT CORNER OF MACHINE
A9	7909	1	HOUR METER	RECORD TIME THAT IS MACHINE IS BEING USED	LOWER CONTROL PANEL
A11	7099	1	BATTERY INDICATOR	SHOW BATTERY STATUS	LOWER CONTROL PANEL
B01	8841	1	SWITCH BATTERY DISCONNECT	DISCONNECT ALL ELECTRICAL POWER	LOWER CONTROL CABINET
CB1	7235	1	CIRCUIT BREAKER - 15 AMP MANUAL	CONTROL CIRCUIT PROTECTION	LOWER CONTROL PANEL
MC1	5967	1	24 VOLT CONTACTOR	ALLOW MOTOR TO TURN ON	INSIDE LOWER CONTROL CABINET
D1-D15	9607	1	CIRCUIT BOARD FOR UNITS W/ SEVCON	DIRECT SIGNALS TO THE PROPER LOCATION	INSIDE LOWER CONTROL CABINET
R1-R4	8366	1	DIODE W/ RING TERMINALS	SUPPRESSION DIODE	ACROSS CONTACTOR COIL
D17	8366	1	DIODE W/ RING TERMINALS	SUPPRESSION DIODE	IN INSTRUMENT HARNESS
D18	8070	1	INSHORE DIODE W/ SPARE TERMINALS	SUPPRESSION DIODE	IN INSTRUMENT HARNESS
ES1	7800	1	SWITCH, EMERGENCY STOP	SHUTDOWN ALL MOVING FUNCTIONS	LOWER CONTROL PANEL
ES2	7800	1	SWITCH, EMERGENCY STOP	SHUTDOWN ALL PLATFORM MOVING FUNCTIONS	UPPER CONTROL BOX
F1	8344	1	FUSE, 200 AMP	MAIN LINE FUSE	INSIDE LOWER CONTROL CABINET
LS1	8932	1	SWITCH, LIMIT: DOUBLE POLE	ENABLES DRIVE AND HIGH SPEED	RIGHT REAR CORNER OF MACHINE
LS2	8776	1	SWITCH, LIMIT: SINGLE POLE	ENABLE DRIVE IF POTHOLE SYSTEM IS DEPLOYED	CENTER FRONT OF MACHINE
M1	9544	1	MOTOR, 24 VOLT, 2 HP	TURN THE HYDRAULIC PUMP	MOTOR CABINET
PMM	9539	1	POTENTIOMETER, DC 250 AMP	CHANGES THE MOTOR SPEED	INSIDE LOWER CONTROL CABINET
POT1	13527	1	POTENTIOMETER, 20K OHMS	SENSES THE OPERATOR INPUT	UPPER CONTROL BOX
S1	9590	1	SWITCH, LEVER	ALLOWS BASE OR PLATFORM CONTROLS TO BE USED	LOWER CONTROL PANEL
BOB2	8062	4	NORMALLY OPEN CONTACT BLOCK	ALLOWS BASE OR PLATFORM CONTROLS TO BE USED	LOWER CONTROL PANEL
S2	9590	1	SWITCH, TOGGLE 2 POLE 3 PDS	ALLOWS BASE OR PLATFORM CONTROLS TO BE USED	LOWER CONTROL PANEL
S3	8753	1	SWITCH, PUSH-BUTTON	ENABLES OTHER FUNCTION TO BE USED AT PLATFORM	UPPER CONTROL BOX, HANDLE
S4	8448	1	SWITCH, LIMIT V2	RIGHT TURN SWITCH	UPPER CONTROL BOX, HANDLE
S5	8448	1	SWITCH, LIMIT V3	LEFT TURN SWITCH	UPPER CONTROL BOX, HANDLE
S6	8638	1	SWITCH, TOGGLE 4 POLE 2 PDS	ALLOW EITHER LEFT OR DRIVE FUNCTIONS	UPPER CONTROL BOX
S7	8696	1	SWITCH, LIMIT V2	REVERSE OR LEFT SWITCH	UPPER CONTROL BOX
S8	8696	1	SWITCH, LIMIT V7	FORWARD OR DOWN SWITCH	UPPER CONTROL BOX
S9	9530	1	SWITCH, TOGGLE 1 POLE 2 PDS	TORQUE SWITCH	UPPER CONTROL BOX
SOL1	9914	1	COIL, 24 VOLT 2 SPADE	ACTIVATES LIFT VALVE	MAIN MANIFOLD
SOL2	9914	1	COIL, 24 VOLT 2 SPADE	ACTIVATES RIGHT TURN VALVE	MAIN MANIFOLD
SOL3	9914	1	COIL, 24 VOLT 2 SPADE	ACTIVATES LEFT TURN VALVE	MAIN MANIFOLD
SOL4	9914	1	COIL, 24 VOLT 2 SPADE	ACTIVATES BRAKE VALVE	MAIN MANIFOLD
SOL5	9914	1	COIL, 24 VOLT 2 SPADE	DECAL VALVE	MAIN MANIFOLD
SOL6	9914	1	COIL, 24 VOLT 2 SPADE	ACTIVATES REVERSE	MAIN MANIFOLD
SOL7	9914	1	COIL, 24 VOLT 2 SPADE	ACTIVATES FORWARD	MAIN MANIFOLD
SOL8	9914	3	COIL, 24 VOLT 2 SPADE	ACTIVATES TORQUE VALVES	TORQUE MANIFOLD
SOL9	9914	1	COIL, 24 VOLT 2 SPADE	ACTIVATES DOWN VALVE	LIFT MANIFOLD
SOL10	9914	1	COIL, 24 VOLT 2 SPADE	ACTIVATES UP VALVE	LIFT MANIFOLD
SOL12	9914	1	COIL, 24 VOLT 2 SPADE	ACTIVATES DOWN VALVE	LIFT CYLINDER

ART681 R3  
 CM14602  
 10/12/99

TOLERANCE	CADKEY	ITEM	A/R	N/A	PART NUMBER	PART/MATERIAL DESCRIPTION
(UNLESS OTHERWISE SPECIFIED) REF. WORK INSTRUCTION ENG-56-022 3rd PLACE (.XXX) ± .015 2nd PLACE (.XX) ± .030 RADIUS DIM. ± .030 PUNCHED HOLE ANGLE ± .005 ANGLE ± 1°	CUSTOMER NUMBER 258/ART AND PROJECT NAME <b>ART681</b> PART NUMBER					ELECTRICAL SCHEMATIC 1932ES/1532ES
PROPRIETARY DOCUMENT - THE INFORMATION CONTAINED IN THIS DOCUMENT IS THE CONFIDENTIAL PROPERTY OF MAYVILLE ENGINEERING COMPANY. DO NOT DISCLOSE, COPY, OR REPRODUCE WITHOUT AUTHORIZATION FROM MAYVILLE ENGINEERING COMPANY.	VOLUME XX XX CU IN PAINT SURFACE AREA XX XX SQ FT					MAYVILLE ENGINEERING CO. INC.  AERIAL WORK PLATFORM DIVISION 210 CORPORATE DR. P.O. BOX 900 / PHONE: 920-887-2518 / 1-800-887-6575 BEAVER DAM, WISCONSIN 53616-0000 / FAX: 920-887-2480
			SCALE 1.000	SHEET 1 OF 1	DRAWING NUMBER	CM14602

# 1932ES \ 1532ES ELECTRICAL SCHEMATIC FOR EUROPEAN MACHINES

WIRE HARNESS PART NUMBERS:  
 INSTRUMENT : 9977  
 MANIFOLD : 9978  
 SAFETY : 9979  
 CONTROL BOX : 8346, 90100  
 CORD : 7656  
 BEAMS 19' : 90128  
 BEAMS 15' : 90129



o/o N/C  
 o/o N/C HELD OPEN  
 o/o N/O  
 o/o N/O HELD CLOSED

BODY NAME: d xxxxx		REF:	THIRD ANGLE PROJECTION
CUST REV	OR REV	CUSTOMER/DRAWING REVISIONS RECORD/ECN	APPROVED OR/DATE/INITIALS
0		RELEASED ECN#2580227	CGW/CGW 9/07/99
0		REVISED SCHEMATIC TO REFLECT REDESIGNED 1932 AND PREN280 STANDARD ECN #25802272	CGW/TLS/AJS 10/12/99

- NOTES: (UNLESS OTHERWISE SPECIFIED)
- SWITCH S1 "BASE-PLATFORM SWITCH" MAKES CONTACT FROM THE CENTER TO THE LEFT POSITION WHEN PLACED IN BASE.
  - SWITCH S2 "UP/DOWN SWITCH" MAKES CONTACT FROM THE CENTER TO THE LEFT WHEN THE SWITCH IS HELD IN THE DOWN POSITION AND AUTOMATICALLY RETURNS TO THE CENTER POSITION WHEN RELEASED.
  - SWITCH LS1 BREAKS THE N/C SET OF CONTACTS AND MAKES THE N/O SET OF CONTACTS WHEN THE PLATFORM REACHES APPROXIMATELY 7 FEET.
  - SWITCH LS2 MAKES THE N/C SET OF CONTACTS WHEN THE POTHOLES ARE DOWN AND LOCKED IN PLACE.
  - SWITCH LS3 BREAKS THE N/C SET OF CONTACTS WHEN THE PLATFORM REACHES APPROXIMATELY 5 FEET.
  - UNIT SHOWN IN STOWED POSITION WITH POTHOLES BAR IN UP POSITION.

ART901 R1  
 CM20882  
 10/12/99

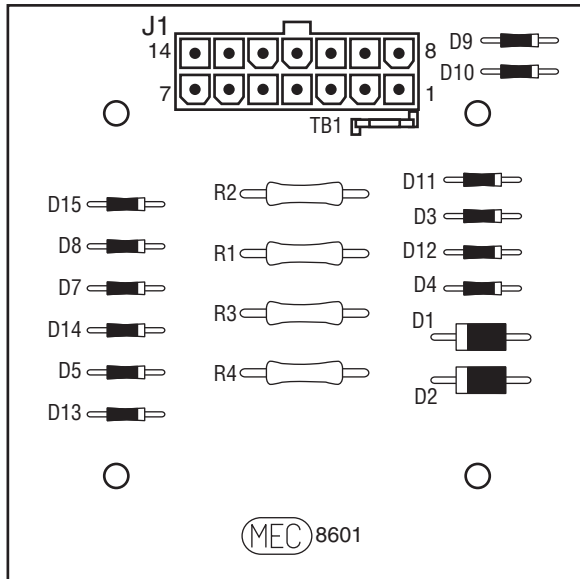
ITEM	PART NO.	QTY.	DESCRIPTION	FUNCTION	LOCATION
A1	9182	1	LIGHT, 28 VOLT	WARN WHEN MACHINE IS APPROACHING UNSAFE ANGLE	IN CONTROL BOX
A3	90217	1	TILT SENSOR	ACTIVATES TILT LIGHT AND HORN	INSIDE LOWER CONTROL CABINET
A5	9044	1	PUSHBUTTON SWITCH	ACTIVATES HORN	IN CONTROL BOX
A6	9716	1	12V-48V HORN	ACTIVATED BY OPERATOR AND TILT SENSOR	UNDER PLATFORM
A7	30675	1	MOTION ALARM PACKAGE	WARN OF A MOVEMENT	FRONT LEFT CORNER OF MACHINE
A8	30674	1	MOTION LIGHT PACKAGE	WARN OF A MOVEMENT	FRONT LEFT CORNER OF MACHINE
A9	7909	1	HOUR METER	RECORD TIME THAT IS MACHINE IS BEING USED	LOWER CONTROL PANEL
A11	7099	1	BATTERY INDICATOR	SHOW BATTERY STATUS	LOWER CONTROL PANEL
B1-B4	XXXX	4	16 VOLT DEEP CYCLE BATTERY	POWER FOR THE MOTOR AND CONTROL CIRCUIT	INSIDE BATTERY COMPARTMENT
B01	8841	1	SWITCH BATTERY DISCONNECT	DISCONNECT ALL ELECTRICAL POWER	LOWER CONTROL CABINET
C01	7235	1	CIRCUIT BREAKER - 15 AMP MANUAL	CONTROL CIRCUIT PROTECTION	LOWER CONTROL PANEL
KC1	5967	1	24 VOLT CONTACTOR	ALLOW MOTOR TO TURN ON	INSIDE LOWER CONTROL CABINET
D1-D15	8001	1	CIRCUIT BOARD FOR UNITS W/ SEVEN	DIRECT SIGNALS TO THE PROPER LOCATION	INSIDE LOWER CONTROL CABINET
R1-R4					
D17	9368	1	DIODE W/ RING TERMINALS	SUPPRESSION DIODE	ACROSS CONTACTOR COIL
D18	9070	1	1N5400 DIODE W/ SPARE TERMINALS	SUPPRESSION DIODE	IN INSTRUMENT HARNESS
ES1	7800	1	SWITCH, EMERGENCY STOP	SHUTDOWN ALL MOVING FUNCTIONS	LOWER CONTROL PANEL
ES2	7800	1	SWITCH, EMERGENCY STOP	SHUTDOWN ALL PLATFORM MOVING FUNCTIONS	UPPER CONTROL BOX
F1	9344	1	FUSE, 200 AMP	MAIN LINE FUSE	INSIDE LOWER CONTROL CABINET
LS1	8932	1	SWITCH, LIMIT, DOUBLE POLE	ENABLES DRIVE AND DELAYED DESCENT	RIGHT REAR CORNER OF MACHINE
LS2	8776	1	SWITCH, LIMIT, SINGLE POLE	ENABLE DRIVE IF POTHOLES SYSTEM IS DEPLOYED	CENTER FRONT OF MACHINE
LS3	8776	1	SWITCH, LIMIT, SINGLE POLE	ENABLES HIGH SPEED MOTOR	RIGHT REAR CORNER OF MACHINE
M1	9544	1	MOTOR, 24 VOLT, 2 HP	TURN THE HYDRAULIC PUMP	MOTOR CABINET
PM	9539	1	CONTROLLER, DC 250 AMP	CHANGES THE MOTOR SPEED	INSIDE LOWER CONTROL CABINET
PT01	13927	1	POTENTIOMETER, 20K OHMS	SENSES THE OPERATOR INPUT	UPPER CONTROL BOX
S1	9549	1	SWITCH, KEY	ALLOWS BASE OR PLATFORM CONTROLS TO BE USED	LOWER CONTROL PANEL
S0B2	8082	2	NORMALLY OPEN CONTACT BLOCK	ALLOWS BASE OR PLATFORM CONTROLS TO BE USED	LOWER CONTROL PANEL
S0B0	9950	1	KEY SWITCH MOUNTING BASE	ALLOWS BASE OR PLATFORM CONTROLS TO BE USED	LOWER CONTROL PANEL
S2	5664	1	SWITCH, TOGGLE 2 POLE 3 POS	ALLOWS LIFT/LOWER FUNCTIONS AT BASE CONTROLS	LOWER CONTROL PANEL
S3	8793	1	SWITCH, LIMIT, PUSH-BUTTON	ENABLES OTHER FUNCTION TO BE USED AT PLATFORM	UPPER CONTROL BOX, HANDLE
S4	8448	1	SWITCH, LIMIT V3	RIGHT TURN SWITCH	UPPER CONTROL BOX, HANDLE
S5	8448	1	SWITCH, LIMIT V3	LEFT TURN SWITCH	UPPER CONTROL BOX, HANDLE
S6	8838	1	SWITCH, TOGGLE 4 POLE 2 POS	ALLOW EITHER LEFT OR DRIVE FUNCTIONS	UPPER CONTROL BOX
S7	8698	1	SWITCH, LIMIT V7	REVERSE OR LIFT SWITCH	UPPER CONTROL BOX
S8	8698	1	SWITCH, LIMIT V7	FORWARD OR DOWN SWITCH	UPPER CONTROL BOX
S9	5630	1	SWITCH, TOGGLE 1 POLE 2 POS	TORQUE SWITCH	UPPER CONTROL BOX
SOL1	9914	1	COIL, 24 VOLT 2 SPARE	ACTIVATES LEFT VALVE	MAIN MANIFOLD
SOL2	9914	1	COIL, 24 VOLT 2 SPARE	ACTIVATES RIGHT TURN VALVE	MAIN MANIFOLD
SOL3	9914	1	COIL, 24 VOLT 2 SPARE	ACTIVATES LEFT TURN VALVE	MAIN MANIFOLD
SOL4	9914	1	COIL, 24 VOLT 2 SPARE	ACTIVATES BRAKE VALVE	MAIN MANIFOLD
SOL5	9914	1	COIL, 24 VOLT 2 SPARE	DECAL VALVE	MAIN MANIFOLD
SOL6	9914	1	COIL, 24 VOLT 2 SPARE	ACTIVATES REVERSE	MAIN MANIFOLD
SOL7	9914	1	COIL, 24 VOLT 2 SPARE	ACTIVATES FORWARD	MAIN MANIFOLD
SOL8,9	9914	3	COIL, 24 VOLT 2 SPARE	ACTIVATES TORQUE VALVES	TORQUE MANIFOLD
SOL11	9914	1	COIL, 24 VOLT 2 SPARE	ACTIVATES DOWN VALVE	LIFT MANIFOLD
SOL12	9914	1	COIL, 24 VOLT 2 SPARE	ACTIVATES UP VALVE	LIFT CYLINDER
TR1	9672	1	RELAY, 24 VOLT 1 TIME DELAY	PROVIDES 5 SECOND DELAY WHEN LOWERING	INSIDE LOWER CONTROL CABINET

ART901 R1  
 CM20882  
 10/12/99

TOLERANCE (UNLESS OTHERWISE SPECIFIED) REF WORK INSTRUCTION ENG-56-022 3+ PLACE (.XXX) ± .015 2 PLACE (.XX) ± .030 RADIUS DIM. ± .030 PLUNGED HOLE ± .005 ANGLE ± 1°	CADKEY ITEM 1 A/R N/A QTY. PART NUMBER <b>ART901</b> PART NUMBER VOL/ME XX.XX CU IN PAINT SURFACE AREA XX.XX SQ FT	1 A/R N/A QTY. PART NUMBER <b>ELECTRICAL SCHEMATIC</b> 1932ES/1532ES EUROPEAN TITLE SCALE 1:000 SHEET 1 OF 1	PART/MATERIAL-DESCRIPTION <b>MAYVILLE ENGINEERING CO. INC.</b>  AERIAL WORK PLATFORM DIVISION 210 CORPORATE DR. P.O. BOX 990 (PHONE: 800-987-2518) (800-987-4575) BEAVER DAM, WISCONSIN 53616-0990 (FAX: 920-887-2480)

# DIODE BOARD

The diode board is located inside the lower control box.



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)

 ILLUSTRATION No.  
ART\_2181

# 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 terminal connections labeled B+, B-, and M2. A green LED is located between the B+ and B- terminals. Below the main unit, a J5 plug is shown with pins 1, 6, 7, and 12 labeled. Lines connect the B+, B-, and M2 terminals to the 'Cable Connection Identification' table, and the J5 plug to the 'J5 Plug Pin Identification' table.

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>	<b>No power-up</b> <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>	<b>Procedure fault.</b> <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>	<b>Motor circuit low.</b> Set with unit at rest and is the result of the voltage at M-2 dropping to approximately 4 volts or lower. Possible causes: <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>	<b>Motor circuit high.</b> Set with the unit at rest and is the result of the voltage at M-2 terminal rising above 21 volts. Possible causes: <ul style="list-style-type: none"> <li>• Motor contactor points are welded shut</li> </ul>
<b>5 Flashes</b>	<b>Motor contactor circuit open.</b> Set when a function is requested but no current can flow through the motor circuit to the M-2 terminal. Possible causes: <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> If the motor and contactor circuits are diagnosed as working properly: <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>

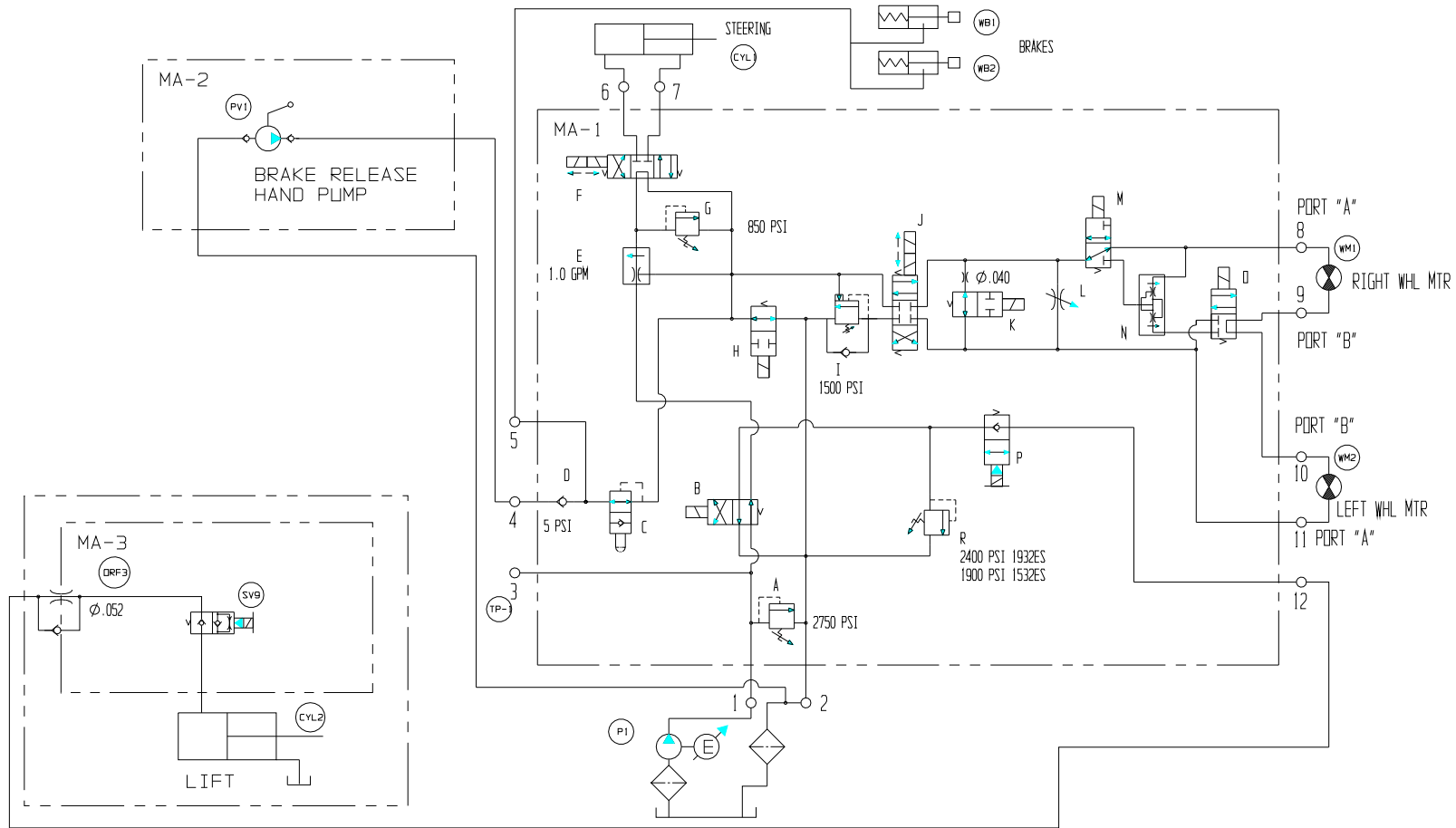


Sevcon Motor Speed Controller - Connections (continued)

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>



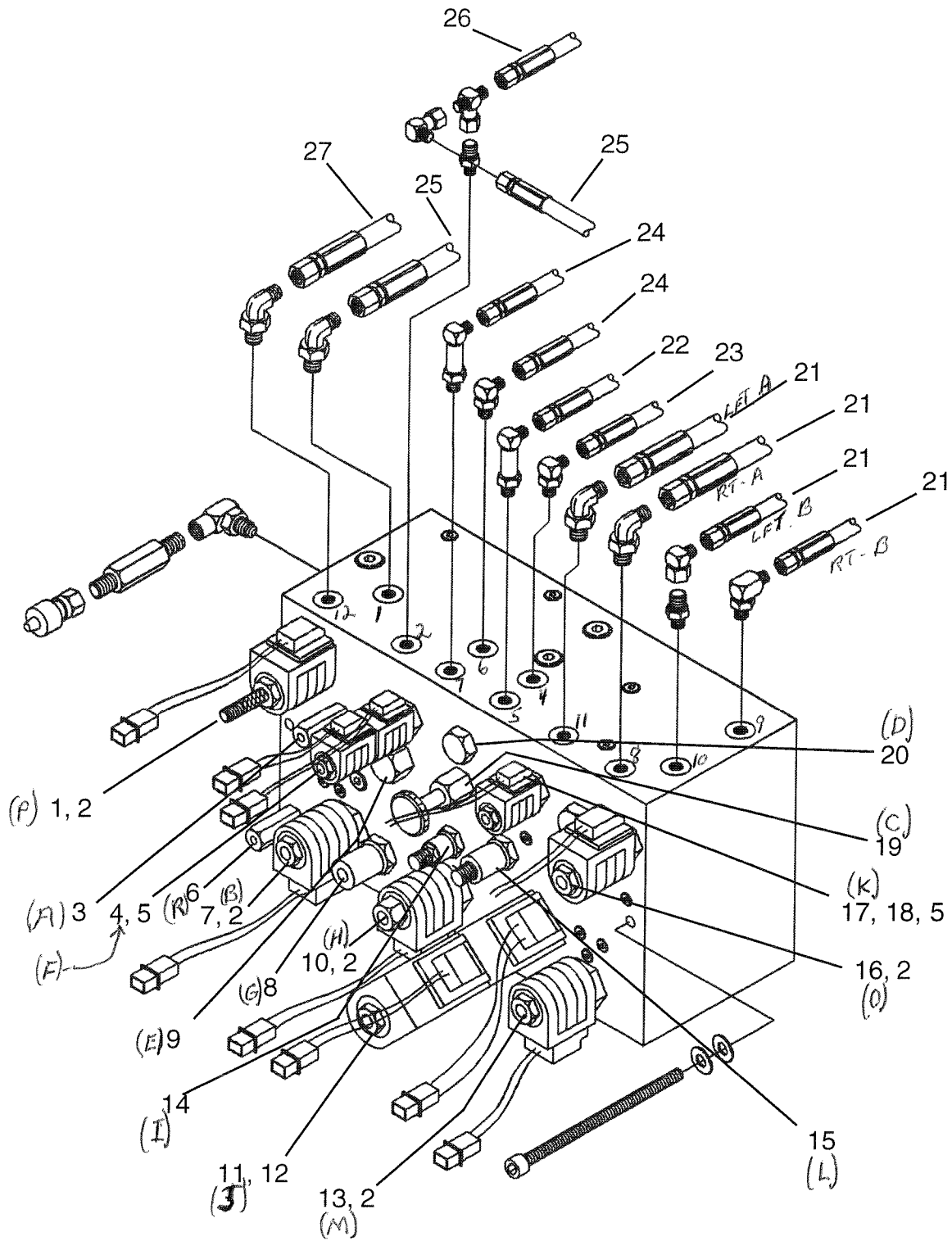
BODY NAME: b_XXXXX		REF:	THIRD ANGLE PROJECTION	
CUST REV	DR REV	CUSTOMER/DRAWING REVISIONS RECORD/ECN#		APPROVED DR/ISSN/MFG
0		RELEASED ECN# 25802415		DATE
			NJC/NJC/TMD	02/07/00



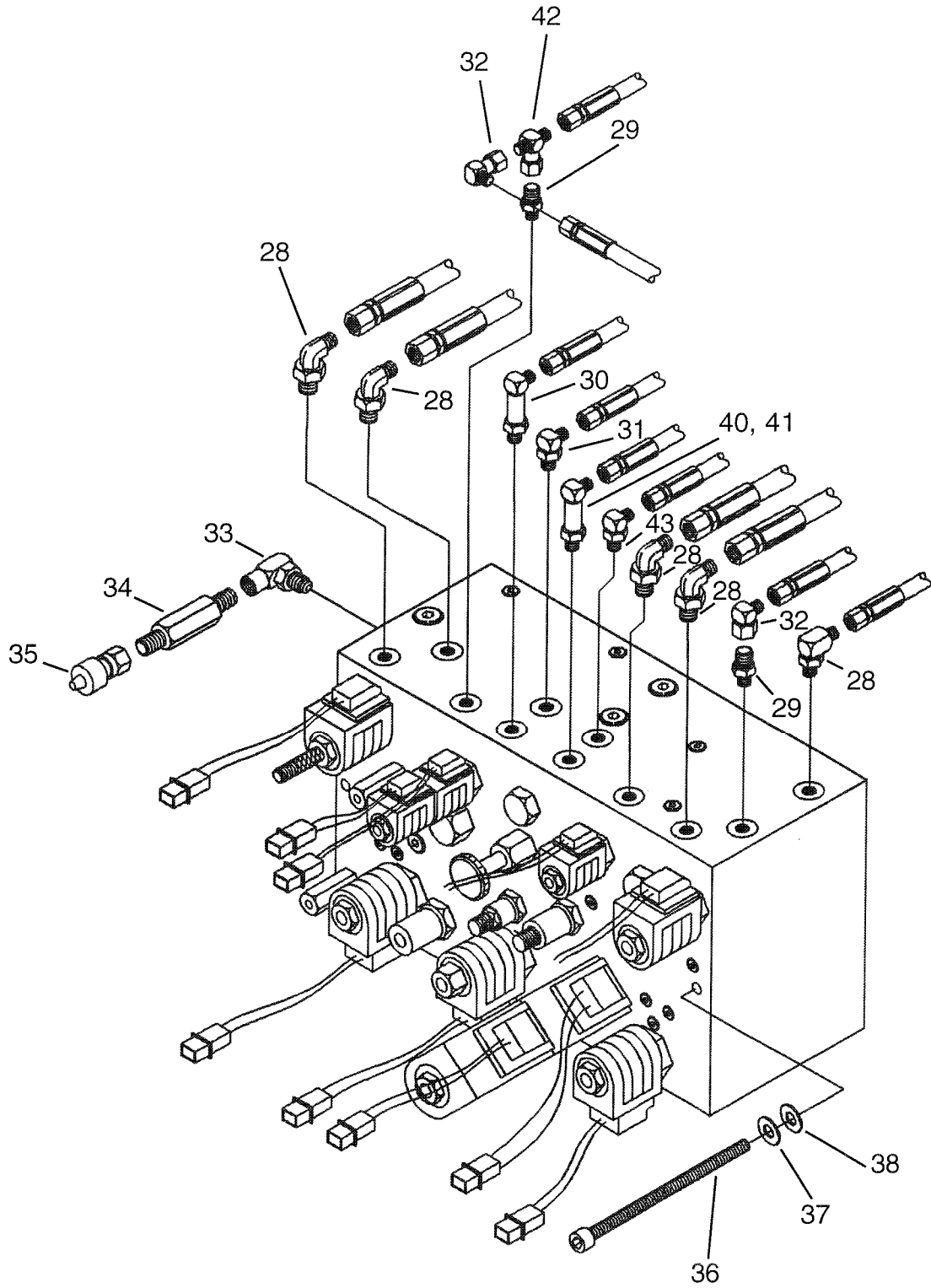
NOTES: (UNLESS OTHERWISE SPECIFIED)

TOLERANCE (UNLESS OTHERWISE SPECIFIED) REF. WORK INSTRUCTION ENG-56-022		CADKEY		1	A/R	N/A	
3+ PLACE (.XXX)	± .015	CUSTOMER NUMBER 258/ARTWORK AND PROJECT NAME		ITEM	QTY.	PART NUMBER	PART/MATERIAL-DESCRIPTION
2 PLACE (.XX)	± .030	ART915		SCHEMATIC HYD. 1932ES			MAYVILLE ENGINEERING CO. INC. 
RADIUS DIM.	± .030						
PUNCHED HOLE	± .005	PART NUMBER		TITLE			AERIAL WORK PLATFORM DIVISION 210 CORPORATE DR P.O. BOX 990 (PHONE: 920-887-2518) (800-387-4575) BEAVER DAM, WISCONSIN 53816-0990 (FAX: 920-887-2480)
ANGLE	± 1°	VOLINE XX.XX CU IN		SCALE N/A			
PROPRIETARY DOCUMENT: THE INFORMATION CONTAINED ON THIS DOCUMENT IS THE CONFIDENTIAL PROPERTY OF MAYVILLE ENGINEERING COMPANY. DO NOT DISCLOSE, COPY, OR REPRODUCE WITHOUT AUTHORIZATION FROM MAYVILLE ENGINEERING COMPANY.		PAINT SURFACE AREA XX.XX SQ FT		SHEET 1 OF 2			DRAWING NUMBER
							BM21396

CALLOUT	PART NO.	DESCRIPTION	SETTING
MA-1	9999	MANIFOLD ASSEMBLY	N/A
D	9990	VALVE, CHECK	N/A
N	8538	FLOW DIVIDER/COMBINER	N/A
L	90378	VALVE, NEEDLE	N/A
C	9665	VALVE, MANUAL	N/A
A	9992	RELIEF VALVE, POPPET	2750 PSI.
R	9993	RELIEF VALVE 1932ES 2400 PSI/1532ES 1900 PSI	
G	9984	RELIEF VALVE, POPPET	850 PSI.
B	9982	VALVE, SPOOL, 4-WAY 2 POS	N/A
P	8343	VALVE, POP, 2-WAY, N.C.	N/A
K	9985	VALVE, SPOOL, 2-WAY, N.O.	N/A
K	9998	ORIFICE, PLUG $\phi$ .040	N/A
J	9995	VALVE, SPOOL, 4-WAY 3 POS	N/A
F	9986	VALVE, SPOOL, 4-WAY 3 POS	N/A
D	8373	VALVE, SPOOL, 4-WAY 2 POS	N/A
M	6976	VALVE, SPOOL, 3-WAY	N/A
H	6975	VALVE, SPOOL, 2-WAY, N.O.	N/A
I	9669	VALVE, COUNTERBALANCE	1500 PSI
F,K	9988	COIL, 24VDC	N/A
B,H,M,P,D	9996	COIL, 24VDC	N/A
J	9997	COIL, 24VDC	N/A
N/A	90382	PLUG, #4 SAE ZL	N/A
N/A	90383	PLUG, #6 SAE ZL	N/A
N/A	90251	PLUG, EXPANDER 7mm	N/A
N/A	90309	TAG, MANIFOLD	N/A
1,8,9,11,12	8081	FITTING, #8-#6 90°	N/A
2,10	7389	FITTING, #8-#6	N/A
2,10	90299	FITTING, #6-#6 90° SHORT	N/A
4	90329	FITTING, #6-#4 90°	N/A
6	7601	FITTING, #6-#6 90°	N/A
7	9157	FITTING, #6-#6 90° LONG	N/A
2	90285	FITTING, TEE #6	N/A
3	9980	FITTING, #6-1/4 NPT 90°	N/A
3	90301	UNION, 1/4 NPT 3" LONG	N/A
3	7971	FITTING, QUICK DISCONNECT	N/A
5	90327	FITTING, #6-#6 90° TAP 1/8 NPT	N/A
5	2974	ORIFICE, PLUG $\phi$ .040	N/A
MA-2	90234	PUMP ASSY MNFLD BRAKE RLSE	N/A
PV1	90326	VALVE, HYD HAND PUMP	N/A
N/A	90325	MANIFOLD, BRAKE RELEASE	N/A
N/A	7438	FITTING, #6-#6 STRGHT	N/A
N/A	90329	FITTING, #6-#4 90°	N/A
MA-3	13551	MANIFOLD, LIFT CYLINDER	N/A
SV9	8595	VALVE, 2-WAY N.C. W/MAN LOCK	N/A
N/A	8914	COIL, 24VDC	N/A
N/A	7438	FITTING, #6-#6 STRGHT	N/A
DRF3	90297	ORIFICE, UNI-DIRECTION $\phi$ .052	N/A
TP-1	N/A	MAIN PRESSURE TEST POINT #1	N/A
WB1,WB2	9544	BRAKE, WHEEL	N/A
WM1,WM2	90231	MOTOR, WHEEL	N/A
P1	8546	PUMP, 3 GPM. NO LOAD	N/A
CYL1	25085	CYLINDER, STEERING	N/A
CYL2	25237	CYLINDER, LIFT	N/A



	ITEM	PART NO.	QTY	DESCRIPTION
		9999	-	MAIN MANIFOLD ASSEMBLY
P	1	8343	1	VALVE, SPOOL, POP, 2 WAY, N.C. W/MAN OVERRIDE
	2	9996	5	COIL, 24 VOLT 10 SERIES
A	3	9992	1	VALVE, RELIEF
F	4	9986	1	VALVE, SPOOL, 4 WAY, 3 POSITION (STEERING)
	5	9988	3	COIL, 24 VOLT 8 SERIES
R	6	9993	1	VALVE, RELIEF
B	7	9982	1	VALVE, SPOOL, 4 WAY
G	8	9984	1	VALVE, RELIEF
E	9	5954	1	VALVE, PRIORITY FLOW CONTROL
H	10	6975	1	VALVE, SPOOL, N.O.
J	11	9995	1	VALVE, SPOOL, 4 WAY, 3 POSITION (DRIVE)
	12	9997	2	COIL, 24 VOLT
M	13	6976	1	VALVE, SPOOL, 3 WAY
I	14	9669	1	VALVE, COUNTER BALANCE
L	15	90378	1	VALVE NEEDLE (TOW VALVE)
O	16	8373	1	VALVE, SPOOL, 4 WAY
K	17	9985	1	VALVE, SPOOL, N.O.
	18	9998	1	ORIFICE 0.040 DIA.
C	19	9665	1	VALVE, MANUAL (BRAKE RELEASE)
D	20	9990	1	VALVE, CHECK
	21	90286	4	HOSE ASSY, STRGHT FML, 3/8"- 67" LG
	22	90276	1	HOSE ASSY, STRGHT FML, STRGHT FML, 1/4"- 24" LG
	23	90274	1	HOSE ASSY, STRGHT FML, STRGHT FML, 1/4"- 31" LG
	24	9404	2	HOSE ASSY, STRGHT FML, STRGHT FML, 1/4"- 63" LG
	25	7598	2	HOSE ASSY, STRGHT FML, STRGHT FML, 3/8"- 28" LG
	26	9038	1	HOSE ASSY, STRGHT FML, STRGHT FML, 3/8"- 46" LG
	27	9245	1	HOSE ASSY, STRGHT FML, ELBW FML, 3/8"- 110" LG
				CONTINUED ON NEXT PAGE



<b>ITEM</b>	<b>PART NO.</b>	<b>QTY</b>	<b>DESCRIPTION</b>
	9999	-	MAIN MANIFOLD ASSY (CONTINUED)
28	HDW8081	5	FITTING, 90° ELBW, MALE 3/8", MALE 1/2" O-RING
29	HDW7389	2	ADAPTER, MALE 3/8", MALE 3/8" O-RING
30	HDW9157	1	FITTING, 90° ELBW, MALE 3/8", MALE 3/8" O-RING
31	HDW7601	1	FITTING, 90° ELBW, MALE 3/8", MALE 3/8" O-RING
32	HDW90299	2	FITTING, 90° ELBW, MALE 3/8", FML 3/8", MALE 3/8"
33	9980	1	FITTING, 90° ELBW, MALE 3/8" O-RING, FML 1/4" NPT
34	HDW90301	1	UNION, MALE 1/4" NPT, MALE 1/4" NPT, 3" LG
35	HDW7971	1	DISCONNECT, MALE 1/4"
36	HDW90287	2	SCREW, 1/4" - 20, 4.5" LG
37	HDW5277	2	WASHER, LOCK
38	HDW5217	2	WASHER, FLAT
39	25575	-	HOSE KIT - 1532ES/1932ES
40	HDW90327	1	FITTING, 90° ELBW, MALE 3/8", MALE 3/8" O-RING TAPPED
41	2974	1	PLUG, METERING
42	HDW90285	1	FITTING, MALE 3/8" TEE
43	HDW90329	1	FITTING, 90° ELBW, MALE 1/4", MALE 3/8" O-RING