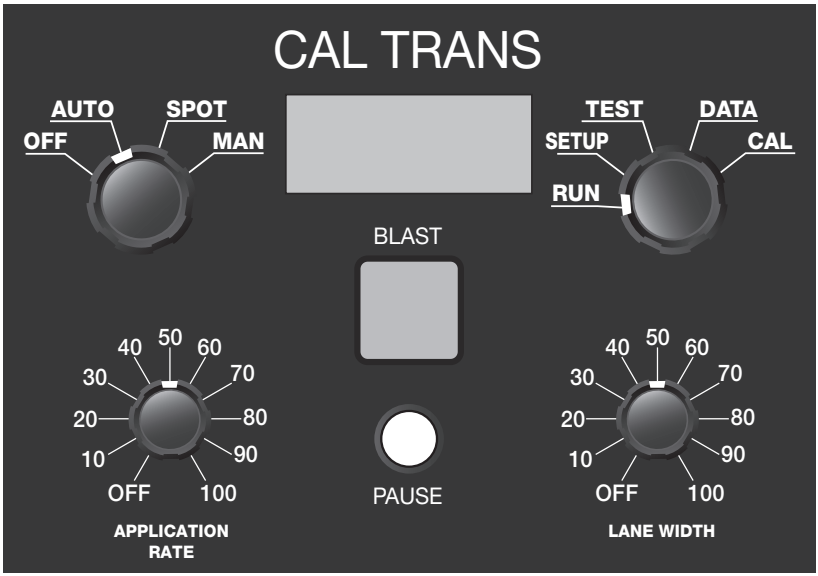
M.E.S.P. 402E-CAL

INSTALLATION INSTRUCTIONS AND OWNER'S MANUAL

OPERATION • PROGRAMMING • SERVICE



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M.E.S.P. 402E-CAL FEATURES

- Auto, Spot, or Manual operation including manual lock-out.
- Blast with adjustable auto-cancel timer, push on/off control, Remote Switch Option.
- Pause feature with instant push on/off control.
- Five granular products, operator selectable.
- Easy-to-read backlit alphanumeric display.
- MPH ratio change for two-speed axle.

The M.E.S.P. 402E-CAL spreader controller provides manual, automatic, and spot spreading operations. In automatic spreader mode the M.E.S.P. 402E-CAL accurately maintains constant pounds per mile output as the vehicle's speed varies. The M.E.S.P. 402E-CAL will control two electro-hydraulic proportional flow control valves; conveyor (auger) and spinner. The M.E.S.P. 402E-CAL's proportional valve control is fully adjustable with both minimum and maximum trim settings and adjustable PWM frequency for compatibility with virtually any valve design.

The M.E.S.P. 402E-CAL's front panel incorporates four rotary controls and two push buttons: The Master Control selects the operating mode, a Secondary Control is used for viewing various information and settings, the Application Rate (auger/conveyor) Control and the Lane Width (spinner) Control are both used to set the spinner and auger discharge rates. One push button is used for a Blast operation, and one push button is used to Pause the Auger operation. Setup, diagnostic, and basic spreading information is displayed upon an easy to read backlit alphanumeric screen.

M.E.S.P. 402E-CAL SPECIFICATIONS

Operating Voltage.....10-16 VDC

Operating Current..... 6.0 Amps *(Typical)*

Operating Temperature ..... -20º to 140º F
-28º to 60º C

Circuit Protection.....8 Amps Fused

PWM Controller Outputs

Easy to Calibrate: *All calibrations are set through the front panel. No tools are required.*

BASIC OPERATIONS IN RUN MODE

Power on Controller - Turn the Master Control to Auto, Spot, or Man.

Master Control - The Master Control is used to select the desired operating mode.

Secondary Control - The Secondary Control allows the operator to view various screens and change certain settings including: spreading, diagnostic, and calibration settings.

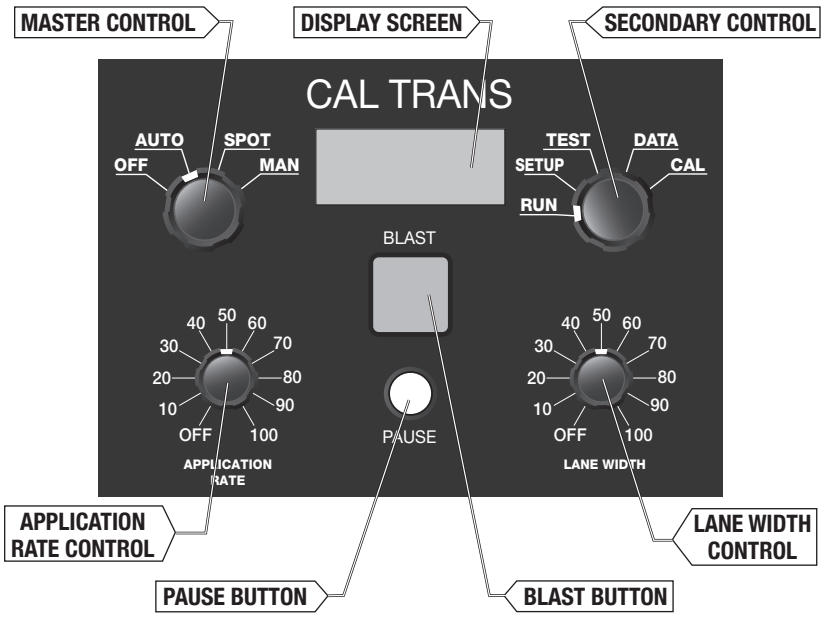
Blast Button - Pushing the Blast Button causes the auger to come to full speed regardless of the operating mode or other control settings. The duration of the blast operation is indefinite if the push button is held down. It will time out automatically at a pre-set interval after release. This operation has no effect upon the spinner speed.

Pause Button - Pushing the Pause Button will momentarily stop the auger while in any mode of operation. Pushing again reactivates the auger at the previous setting.

Application Rate - The Application Rate Control selects the auger motor speed and thereby the material discharge rate. The effect of this control is displayed in the top right corner of the run screen.

Lane Width Control - The Lane Width Control selects the spinner motor speed which determines the width of the material discharge pattern. This control is never adjusted by the microprocessor and is therefore always a manual setting.

Product Selection - Turn the Secondary Control to Setup. Toggle the Pause Button to highlight the product selection. Press and hold the Pause Button while turning the Lane Width Control to select a different product.

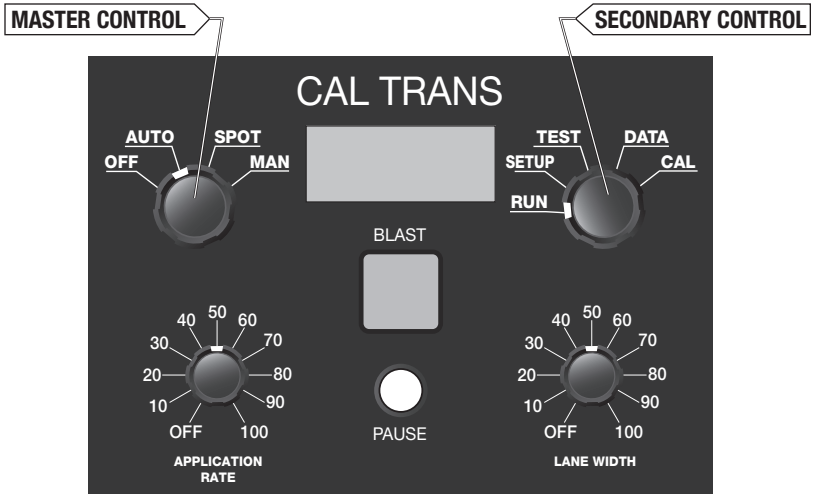


MASTER CONTROL (OPERATING MODES)

AUTO - *(Ground Speed Orientation)* Auto mode uses a speedometer input to spread material in proportion with the speed of the vehicle. This mode discharges a fixed amount of material per distance traveled. (Lbs./Mi.)

SPOT - Spot mode works like Auto, however it is toggled on or off by pressing the Pause Button. Spot mode also distributes material in proportion to the speed of the vehicle. (Lbs./Mi.)

MAN - Manual mode allows the operator to spread a certain amount of material per time (Lbs./Min) independent of vehicle speed. For example, if the vehicle is going 10 MPH or 40 MPH the distribution of material is constant at a particular setting.



SECONDARY CONTROL (SCREEN SELECTOR)

RUN - *(Normal Operating Screen)* The Run screen allows the operator to view current settings and information such as: Operating Mode, Application Rate, Truck MPH, Product Selection, and Total Weight of discharged material.

SETUP - The Setup screen allows the operator to input the driver number, route number, product selection, and is used for clearing totals.

TEST - The Test screens contain useful diagnostic information for troubleshooting.

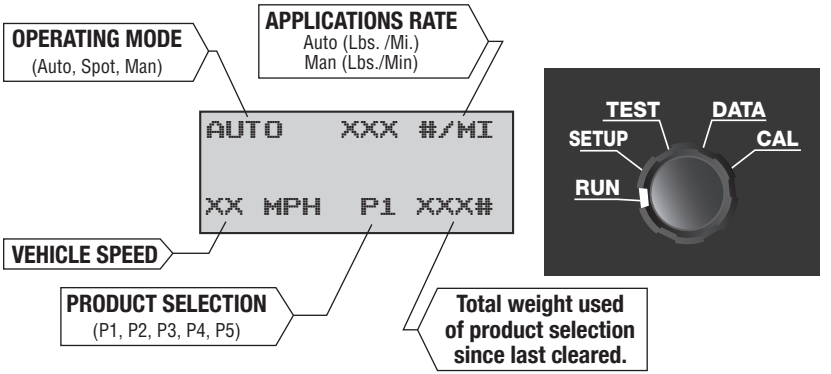
DATA - The Data screens contain data logging information.

CAL - The Calibration screens allow the operator to fine-tune the controller's settings for the most accurate spreading controls.

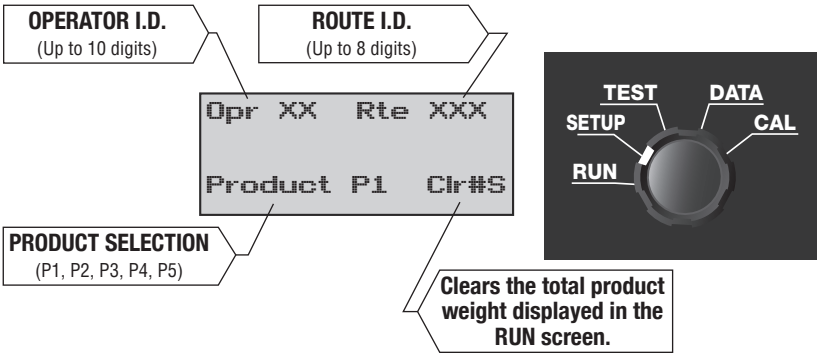
M.E.S.P. 402E-CAL OPERATIONS

SECONDARY CONTROL (RUN & SETUP SCREEN)

RUN SCREEN



SETUP SCREEN



Making Changes to Variables on Setup Screen

1. Select the desired variable by toggling the PAUSE button.
2. Push and hold the PAUSE button while turning the LANE WIDTH control to adjust the setting.
3. Release the PAUSE button to lock in the setting.

NOTE: To clear the total weight discharged for the displayed product:

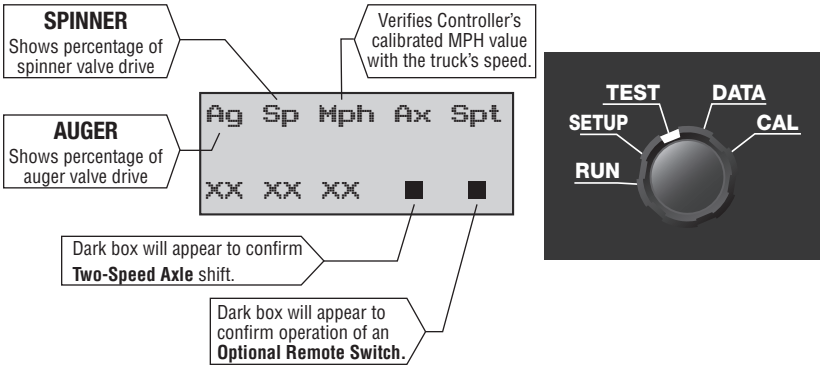
1. Toggle the PAUSE button to select **Clr#S.**
2. Press and hold the PAUSE button, while turning the LANE WIDTH control fully **CCW.**

M.E.S.P. 402E-CAL OPERATIONS

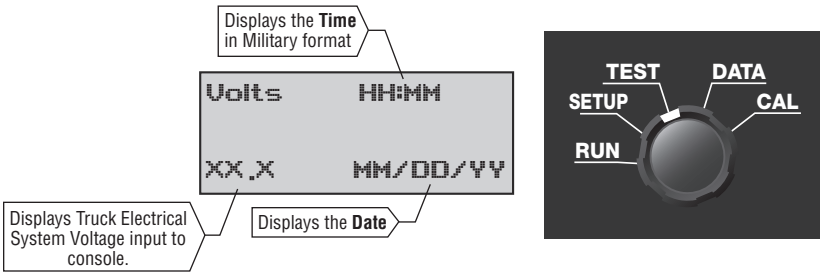
SECONDARY CONTROL (TEST SCREENS)

The test screens are an important diagnostic tool when troubleshooting the spreader system. ***(Push the PAUSE button to switch between screens.)***

TEST SCREEN 1

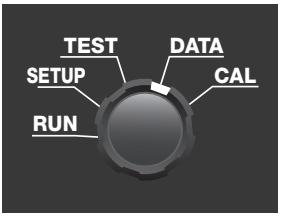


TEST SCREEN 2



M.E.S.P. 402E-CAL OPERATIONS

SECONDARY CONTROL (DATA SCREENS)



To Scroll through the DATA screens, turn the APPLICATION RATE control.

```
Mem   XX.X%  Full

      XX Trips
```

DATA SCREEN 1

This screen displays the amount of memory used and a stored element for factory software only.

```
Auto  Lbs   Miles

      XXXX  XX
```

DATA SCREEN 2

This screen displays the total Auto Mode usage in Lbs. and Miles.

```
Man   Lbs   Miles

      XXXX  XX
```

DATA SCREEN 3

This screen displays the total Manual Mode usage in Lbs. and Miles.

```
Blast Lbs   Feet

      XXXX  XX
```

DATA SCREEN 4

This screen displays the total Blast operation usage in Lbs. and Feet.

```
   Last Cleared

HH:MM    MM/DD/YY
```

DATA SCREEN 5

This screen displays the time and date of the last time the data log memory was cleared.

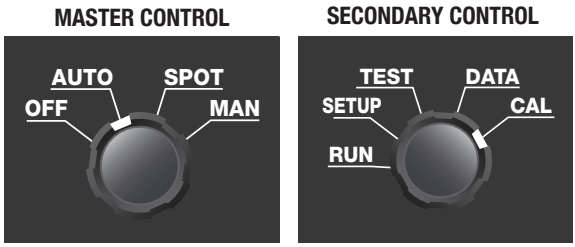
```
Enter Code To

Clear  Totls  XXX
```

DATA SCREEN 6

Enter the passcode on this screen to clear the data log memory. To enter the first two digits of the passcode, press and hold the PAUSE button and turn the APPLICATION RATE control. To enter the second two digits, press and hold the PAUSE button and turn the LANE WIDTH control.

M.E.S.P. 402E-CAL PROGRAMMING

SECONDARY CONTROL: Accessing the Program Mode.



1. Turn the Master Control to **AUTO, SPOT OR MAN.**
2. Turn the Secondary Control to **CAL.**
3. To enter the first two digits of the passcode, press and hold the PAUSE button and turn the APPLICATION RATE control. To enter the second two digits, press and hold the PAUSE button and turn the LANE WIDTH control.
4. Release the PAUSE button to enter the programming mode.
   - Turn the APPLICATION RATE control to scroll through the 28 menu lines.
   - Toggle the PAUSE button to cycle through the various settings per screen.
   - To change a setting, press and hold the PAUSE button and rotate the LANE WIDTH control.

PROGRAMMING MENU LINES

MENU LINE	DESCRIPTION	PG. NO.
1	Spinner Max/Min	10
2	Auger Max/Min	10
3	Blast Delay	10
4	Application Rate Resolution	10
5	Product - P1	11
6-9	Products P2-P5	11
10	Spreader Calibration	12
11	Spot Timer	12
12	Spinner Shutdown	12
13	Manual Mode Lockout	13
14	Speedometer Calibration	13
15	Two-Speed Axle	13
16	Valve PWM	14
17	Setting the Clock	14
18	Last Calibration Date	14
19	Calibration Units	14
20	Changing the Passcode	15
21	Programmer's I.D.	15
22	Vehicle Identification	15
23	Vehicle Location	15
24	Console Run Time	16
25	Data Logging Intervals	16
26	Speedometer Input	16
27	Operator Identification	16
28	Route Identification	16

M.E.S.P.-402E-CAL PROGRAMMING

MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
LINE 1	1 Width Max 75% Width Min 40%	Max 0-99% Min 0-99%	75% 40%

The (Lane) Width Rate Min/Max establishes the operating range of the hydraulic motor used on the Spinner. The Min setting takes the slip or dead band out of the spinner motor. Adjust the Min setting so the spinner motor is turning about 6 RPM. The Max setting limits the spinner motor's max speed. When making these adjustments have the engine speed set at approximately 1800 RPM.

LINE 2	2 Feed Max 80% Feed Min 40%	Max 0-99% Min 0-99%	80% 40%

The (Application) Feed Rate Min/Max establishes the operating range of the hydraulic motor used on the Auger. The Min setting takes the slip or dead band out of the auger motor. The Max setting limits the auger motor's max speed. Adjust the Min setting so that the auger motor is turning about 1 RPM. When making these adjustments have the engine speed set at approximately 1800 RPM.

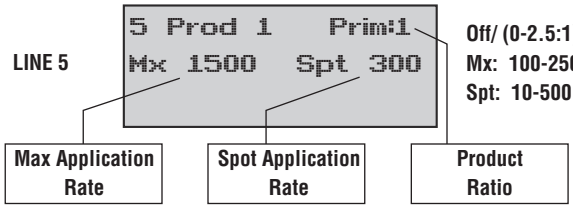
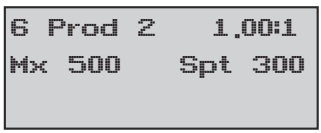
LINE 3	3 Blast Delay 10 Sec.	0-30 Sec.	10 Sec.

This sets the duration of the blast ranging from 0 to 30 Seconds. The system will remain in the blast mode continuously while the button is held down. By pressing the BLAST button a second time while the blast is operating will cancel the operation. Setting the time to 0 seconds will cause the blast mode to stop immediately upon release of the button.

LINE 4	4 Appl. Resol. 50 Lbs.	10, 25, 50, 100	50

The Application Resolution establishes the increments of change from rotating the Application Rate Control.

M.E.S.P. 402E-CAL PROGRAMMING

MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
LINE 5		Off/ (0-2.5:1)/Prim Mx: 100-2500 Spt: 10-500	Prim 1500 300
LINE 6-9		Off/ (0-2.5:1)/Prim Mx: 100-2500 Spt: 10-500	1.00:1 500 300

Product Ratio- The M.E.S.P. 402E-CAL can be programmed for a total of five different granular products that can be selected by the operator (Product NO's 1-5). By default, Product No. 1 is the Primary Material. There can only be one selected primary material for any of the 5-9 programming lines.

To designate a material as Primary, toggle the PAUSE button until the cursor highlights the Product Ratio. Push and hold the PAUSE button and turn the LANE WIDTH control fully **CW**. To make a product unavailable to the operator, place the cursor on the product ratio, push and hold the PAUSE Button, and turn the LANE WIDTH control fully **CCW.**

To calibrate Products (2-5) take a 5 gallon bucket and fill with the primary material (Product No. 1) and weigh it. Refill the bucket with Product NO. (either 2-5). In order to find the product ratio divide the weight of the secondary product (2,3,4, or 5) by the weight of primary material (product 1).

$$\textbf{Product Ratio} = \frac{\text{Weight of Product (2, 3, 4, or 5)}}{\text{Weight of Primary material Product (1)}}$$

TO ENTER THE RATIO: Toggle the PAUSE button until the product ratio is highlighted, push and hold the PAUSE button while turning the LANE WIDTH control to enter the Product Ratio.

Example 1: The material chosen as the Primary is salt. A filled container weighs 50 Lbs. The second material is sand and the same filled container weighs 75 Lbs. The ratio shows that 75/50=1.5 The 1.5 should be entered as **1.50:1**

Max Application Rate – This establishes the maximum Auto mode application rate available to the operator in terms of pounds per mile. It has no limiting effect to manual mode operation.

Spot Application Rate – This establishes an alternative preset application rate that will become the system input whenever the Spot Mode is selected for this product. The rate cannot be higher than the Max Application Rate in the previous step.

M.E.S.P. 402E-CAL PROGRAMMING

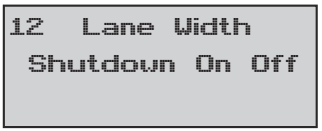
MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
LINE 10		Lbs./Min: 1-1499.9 (Adj. to weight of material dump)	60

This line is critical to the accuracy of all material totals stored in the microprocessor since product ratios work around the value entered from the timed dump.

1. Load the truck with the Primary material and record the vehicle weight.
2. Set the Lbs./Min. variable to 60. This will cause the total number on the bottom line to count in seconds during the dump cycle. (Toggle the PAUSE button to switch between the first-two and last-two digits)
3. Advance the blinking cursor to the word Total. The Primary material is shown in front of the word Total.
4. Press and hold the PAUSE button and rotate the Lane Width Control fully CCW, and then back CW to 50.
5. The material should start to discharge. Discharge for at least 3-5 minutes. You can interrupt the discharge by turning the LANE WIDTH control to zero, restart by turning back to 50. Proper calculations will still be made within the console.
6. Toggle the PAUSE button to stop the process. Re-weigh the truck.
7. Subtract the two weights. Enter the difference of the weights into the control console by:
   a. Toggle the PAUSE button to advance the cursor to the left most characters of the Lbs/Min variable.
   b. Press and hold the PAUSE button, turn the LANE WIDTH control until the Total number is as close to the difference weight as possible.
   c. Release the PAUSE button and advance the cursor to the right most characters of the Lbs./Min. variable.
   d. Hold the PAUSE button down, turn the LANE WIDTH control until the Total number exactly matches the difference in weights.

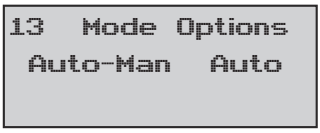
LINE 11		On / (0-60) / Off	On

The Spot Timer determines how long the Spot mode will continue once the PAUSE button is released. If the Spot Timer setting is adjusted to OFF, this will cancel the Spot operation entirely. Choosing ON deletes the timer and allows the PAUSE button to activate and deactivate alternately.

LINE 12		On / Off	On

Selecting On for this setting will cause the spinner to shutdown with the auger in the Auto mode when the truck comes to a stop. Choosing Off allows the spinner to continue turning while the truck is in Auto and stationary.

M.E.S.P. 402E-CAL PROGRAMMING

MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
LINE 13		(Auto/Man) or Auto	(Auto/Man)

Selecting **Auto-Man** allows the operator to use either Auto or Manual Operation. Selecting Auto locks the operator out of manual mode and only allows the use of Manual mode when the truck is moving less than 6-7 MPH. If the operator only has the Auto mode option, he or she can still unload the vehicle in Manual mode if the truck is stationary and the controller is powered off and then back on.

LINE 14		7000-160,000	31,600

For proper Auto-Mode operation, the console must be connected and calibrated to the vehicle's speedometer. The pulse cts/mile should be available through the chassis manufacturer or through the truck dealer. If the pulse counts per mile are not available, the pulses per mile can be determined by running a measured mile.

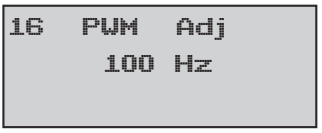
1. While in Programming mode turn to line 14.
2. Push and release the PAUSE button at the beginning of the measured mile. The set of numbers on the far right will start scrolling upwards.
3. Push the PAUSE button again at the end of the measured mile. The value shown is the number of pulse counts in that mile.
4. Advance the cursor to the lower line by toggling the PAUSE and input the value by pressing and holding the Pause Button while turning the Lane Width Control.

The calculated MPH of the M.E.S.P. controller is displayed in the top right corner of lines 14, 26, and in the TEST screen selection.

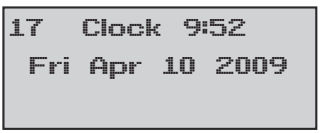
LINE 15		0.00:1 to 5.00:1	2.00:1

This line is used on vehicles equipped with two speed axles. The M.E.S.P. 402E-CAL will use this ratio to recalculate the speedometer speed when the axle is shifted.

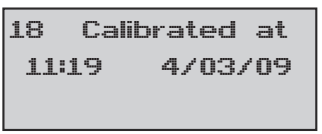
M.E.S.P. 402E-CAL PROGRAMMING

MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
LINE 16		030-200 Hz.	100

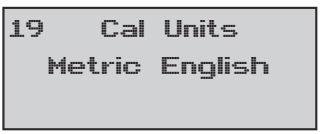
The M.E.S.P. 402E-CAL uses voltage pulses to control the current flow in the spreader valves. It varies the “on” and “off” time division of each pulse to change the current and thereby the valve’s hydraulic flow. The pulses are sent at a frequency that can be set on this menu line from 30 to 200 pulses-per-second. This pulse frequency helps to “vibrate” the valve and keep it responsive to quick changes of position requirements. Valve manufacturers have different recommendations for the optimum frequency. Muncie’s valves operate best from 80-120 pulses-per-second (Hz). This technique of current control is called Pulse-Width-Modulation (PWM).

LINE 17		Time, Day, Month, Year	As Needed

This line is used to set the Time and Date. This line is important for data logging.

LINE 18		Non-Adj.	Non-Adj.

This value is non-adjustable and is automatically updated when any of the menu lines are changed.

LINE 19		Metric-English	English

This line allows the programmer to select either English Units or Metric Units.

M.E.S.P. 402E-CAL PROGRAMMING

MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
LINE 20		0-9999	Call MPP

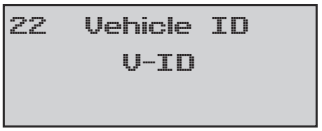
This line is used to set the Programming Pass Code.

1. To enter the first two digits: Push and hold the PAUSE button, and rotate the Application Rate control.
2. To enter the second two digits: Push and hold the PAUSE button, and rotate the Lane Width control.

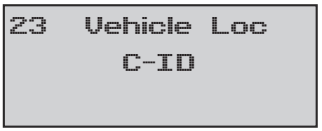
Setting the Program Pass code to 0000 will be the same as having no pass code, and the Calibration menu will be accessible anytime the console is turned on. This is helpful during troubleshooting or some calibration procedures.

LINE 21		Up to 16 Alpha-Numeric	MPP

This line allows the individual that has done the calibration or most recent change to enter their name for future reference. Toggle the PAUSE button to latch the cursor and character to be changed. Rotate the Lane Width control to the desired letter, character, or number. Both upper and lower case letters are available. Toggle the PAUSE button to move to the next character position.

LINE 22		Up to 16 Alpha-Numeric	Blank

This line allows the vehicle number to be entered. This is useful in large fleets or for contract work. Character entry is the same as described in line 21.

LINE 23		Up to 16 Alpha-Numeric	Blank

This line allows the vehicle location to be entered. Character entry is the same as described in line 21.

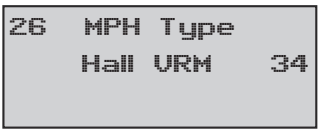
M.E.S.P. 402E-CAL PROGRAMMING

MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
LINE 24		Non-Adj.	Continuous

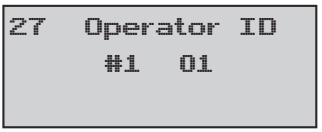
This line records the total control console operation time. This is non-adjustable.

LINE 25		1/4, 1/2, 1	1 Mile

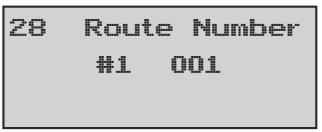
This Line establishes the measured increment to record information into the control console. Data will continuously be monitored within the designated increment. At the end of the increment the data will be stored. Approximately 4000 records can be stored or 4000 miles if using 1 mile increments. A full memory is written over on a first in – first out basis.

LINE 26		Hall/VRM	VRM

This line allows the console input to adapt to either a Hall Effect style sensor or a Variable Reluctance Magnetic sensor. The latter, (VRM), is most widely used. The Allison transmission uses a Hall Effects sensor.

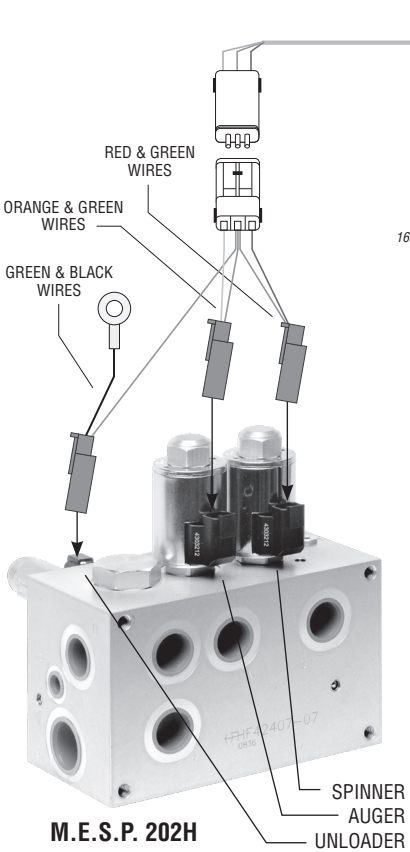
LINE 27		1,2,3…10

Ten Operator identity numbers can be assigned for reference in the data log. The numbers can be one or two digits. The assigned numbers become available for selection in the operator's setup menu.

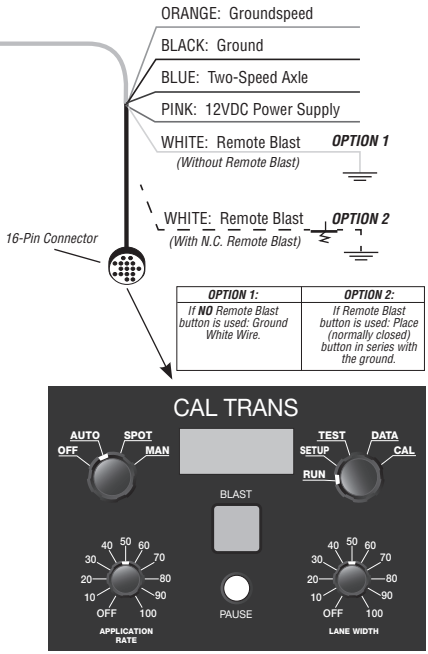
LINE 28		1,2,3…10

(8) Route identity numbers can be assigned for data log reference. One to three digits can be assigned for each individual route number. The numbers assigned become available to the operator for selection in the setup menu.

M.E.S.P. 402E-CAL INSTALLATION



M.E.S.P. 202H



M.E.S.P. 402E-CAL

INSTALLATION INSTRUCTIONS:

1. Screw the 16 pin connector into the back of the M.E.S.P. 402E-CAL.
2. Plug the Male 3 pin Connector into the Female 3 pin connector.
3. Plug the three valve connectors into their designated locations shown above.
4. Ground the ring terminal of the unloader connector.
5. Connect the 5 remaining colored wires to their designated locations shown above.

M.E.S.P. 402E-CAL PINOUTS

PIN #	FUNCTION	COLOR
1	Auger Return	Orange
2		
3	Ground	Black
4		
5		
6	12VDC Power	Pink
7	Spinner Return	Red
8		
9	Remote Blast	White
10		
11	Two-Speed Axle	Blue
12		
13	Ground Speed	Orange
14	Valve Supply (Green)	Green
15		
16		

ALARM SCREENS

These warning messages may appear at the bottom of the RUN screen, during the course of operation. An explanation of each is given below.

ALARM	CAUSE	SOLUTION
Console Displays **"BLOWN FUSE"**	• Blown fuse from short in wiring.	• Inspect complete wiring harness and connections for shorts. Replace fuse only after ensuring wiring short has been eliminated.
Console Displays **"LOW VOLTAGE"**	• Low supply voltage being supplied to the system. • Bad connection at wiring harness voltage supply wire.	• Vehicle electrical system problem. Make necessary corrections. • Inspect and make necessary connections.
Console Displays **"OVERRUN"**	• Vehicle speed exceeding hydraulic system capability. • MPH system improperly calibrated.	• Reduce speed or lower application rate. • Recalibrate

TROUBLESHOOTING

PROBLEM	CAUSES	SOLUTIONS
No Spreader Output in AUTO. ***OR*** Spreader does not start until vehicle reaches a certain speed.	• No Speedo signal • Weak Speedo signal • Failed Speedo Sensor • Speedometer is not properly calibrated. (Menu Line 14)	• Check for proper Speedo signal connection. • Reference Line 14 in programming to enter correct **cts/mile** for speedo sensor.
Spreader continues to run with console turned OFF	• Valve spool still activated manually. • Valve spool stuck. • Valve spool still activated electrically.	• Back out manual override screw. • Remove override screw and use small screwdriver to move spool several times until free. • Test by removing valve connector. Console needs to be serviced.
During weight calibration, spreader dumps out more material than can be entered on TOTAL line.	• Small Conveyor / Auger motor.	• Reduce application rate to maximum % of calibration then rerun the weight calibration procedure.
Console will not hold various settings. (Clock, Date, etc.)	• Internal battery failure	• Return console to Muncie for battery replacement.

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