



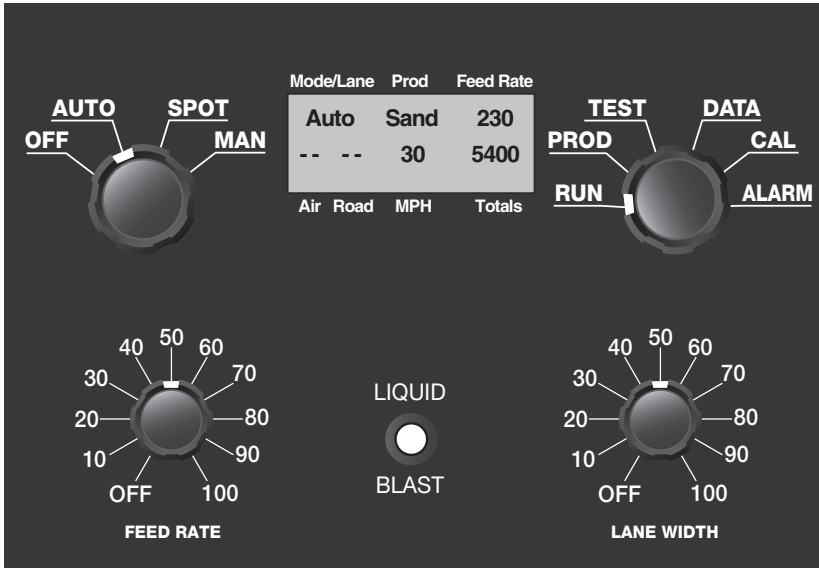
# MESP 402E

## INSTALLATION INSTRUCTIONS AND OPERATOR'S MANUAL

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OPERATION • PROGRAMMING • SERVICE

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# MESP 402-E FEATURES

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- Auto, Spot, or Manual operation including manual lock-out
- Blast with adjustable auto-cancel timer, push on/off control
- Five granular products (plus anti-icing), operator selectable
- Easy-to-read backlit alpha-numeric display
- Data Logging
- GPS Capable
- Air and road temperature sensors compatible with adjustable alarms

The MESP 402-E spreader controller provides manual, automatic, and spot spreading operations. In automatic spreader mode the MESP 402-E accurately maintains constant pounds per mile output as the vehicle's speed varies. The MESP 402-E will control two electro-hydraulic proportional flow control valves; conveyor (auger) and spinner. The MESP 402-E'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 MESP 402-E incorporates data logging to record spreading performance. The data-recording feature stores a log of the spreader operation that can be formatted later into a variety of reports. These reports are useful in areas ranging from service diagnostics to material purchasing.

The MESP 402-E's front panel incorporates four rotary controls and two push buttons: The **Master Control** selects the operating mode, and the **Secondary Control** is used for viewing various information and settings. The **Feed Rate (auger/conveyor) control** and **Lane Width (spinner) control** are both used to set the spinner and auger/conveyor discharge rates. The toggle (Liquid/Blast) switch is used for controlling the blast and the pre-wetting system. Diagnostic, setup and data logging information is displayed on an easy to read backlit alpha-numeric screen.

## MESP 402-E SPECIFICATIONS

Operating Voltage.....	10-16 VDC
Operating Current.....	6.0 Amps ( <i>Typical</i> )
Operating Temperature .....	-20° to 140° F -28° to 60° C
Circuit Protection.....	8 Amps Fused
PWM Controller Outputs	

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

# MESP 402-E

## BASIC OPERATIONS IN RUN MODE

**Power on Controller** - Turn the Master Control to Auto, Spot, or Man. (Before operation, make sure to adjust the gate height to its proper setting established by the supervisor.)

**Product Selection** - Turn the Secondary Control to Prod. Toggle the Liquid/Blast switch down to scroll through the various products available. Once the product has been selected, turn the secondary control back to Run.

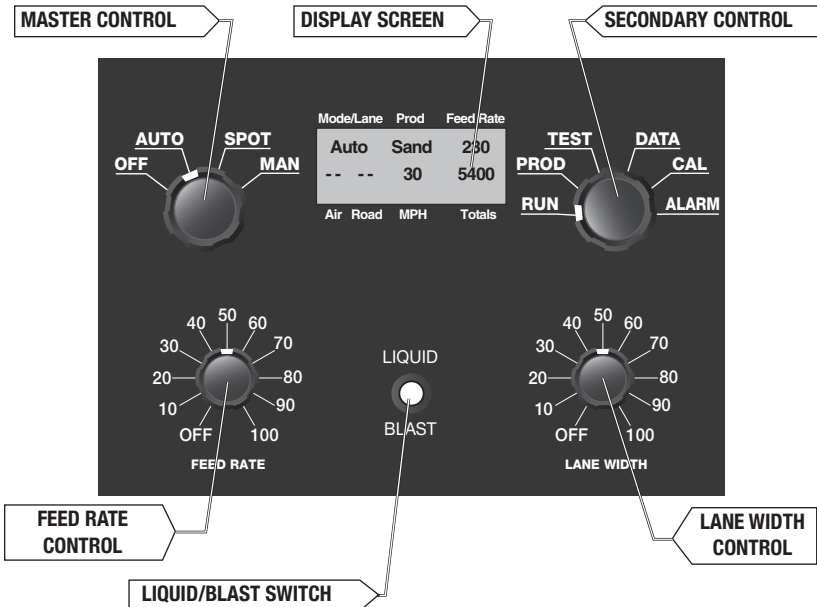
**Master Control** - The Master Control is used to select the desired operating mode. (Auto, Spot or Man)

**Secondary Control** - The Secondary Control allows the operator to view various screens including: spreader information and settings, data logging, test screens for troubleshooting, and calibration settings.

**Liquid/Blast Toggle Switch** - Toggling the Liquid/Blast switch down in either auto or manual mode will momentarily increase the feed rate. After the blast has been engaged, it can be disengaged by toggling the switch down again or waiting until the programmed amount of time is up. If the Liquid/Blast is held down, the blast operation will continue indefinitely until the switch is let up. Toggling the Liquid/Blast switch upward while running the system in auto or manual will activate the pre-wetting system.

**Feed Rate Control** - The Feed Rate Control selects the auger/conveyor 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.



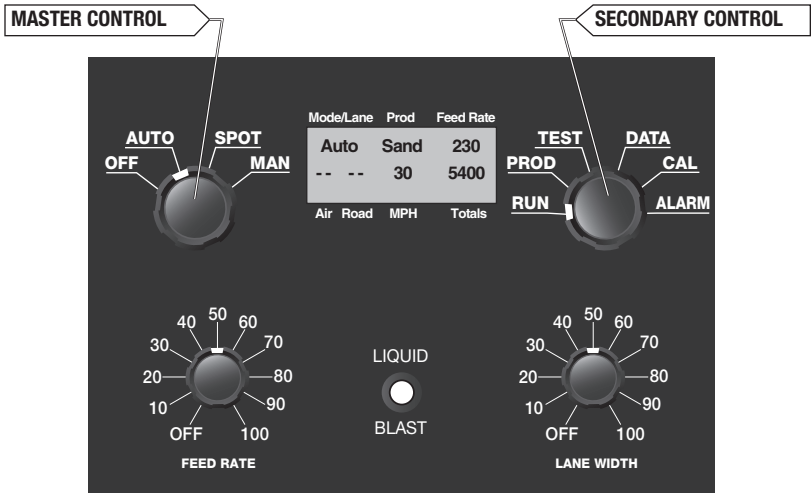
# MESP 402-E

## 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 activated/deactivated by toggling the Liquid/Blast switch down. 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)

**RUN** - The Run screen allows the operator to view important spreader settings and information.

**PROD** - The Product screen allows the operator to change products and establish the pre-wetting set point.

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

**DATA** - The Data screens allow the operator to view recorded data logging information.

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

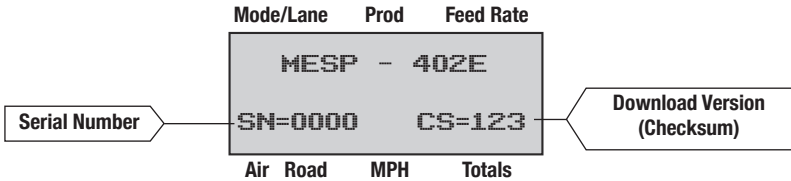
**ALARM** - The Alarm screens allow the operator to access the last 8 alarms that have been activated including the date and time of the alarm.

# MESP 402-E OPERATIONS

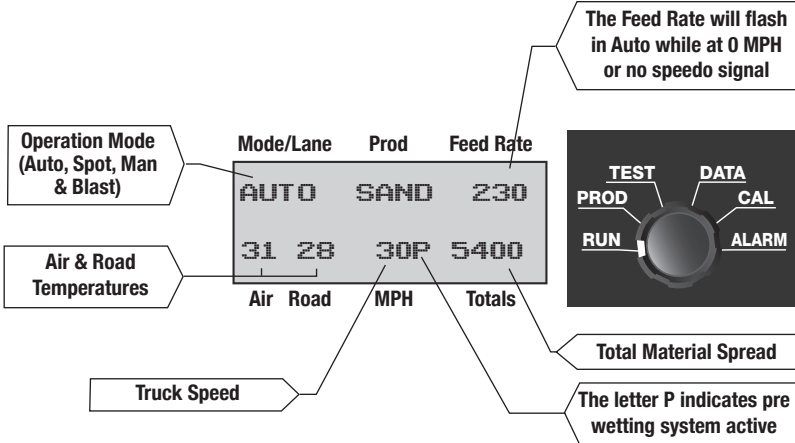
## SECONDARY CONTROL: STARTUP & RUN SCREENS

### STARTUP SCREEN

*This screen is displayed whenever the MESP 402-E controller is powered on.*

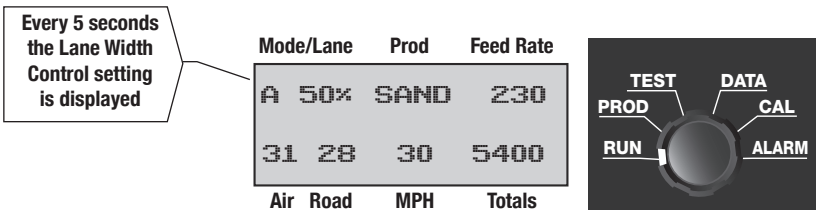


### RUN SCREEN



### ALTERNATE RUN SCREEN

*Screen initially shows "Gate #" under Prod and Feed Rate to remind operator to correctly set the gate height. Toggle the Liquid/Blast to clear this message.*




# MESP 402-E OPERATIONS

## SECONDARY CONTROL: PRODUCT SCREENS

### PRODUCT SCREEN

6 products available including Anti-Icing

Mode/Lane	Prod	Feed Rate
PROD	5	ALT3
ACCUM LBS		340
Air Road	MPH	Totals



Total amount of product spread from the truck


#### PRODUCT SELECTION: *(5 Granular and 1 Anti-Icing)*

1. Turn the Master Control to **AUTO, SPOT OR MAN.**
2. Turn the Secondary Control to **PROD.**
3. Toggle the Liquid/Blast switch down to scroll through the different products available.
4. Once the product has been selected turn the Secondary Control back to Run.

### PRODUCT (PRE-WET)

Pre-Wet Set Point

Mode/Lane	Prod	Feed Rate
PWET SET PT		10.0
ACCUM GAL		0
Air Road	MPH	Totals



Total amount of gallons discharged from truck

#### PRE-WET SET POINT: *(Establishes Pre-Wet setting while activated)*

1. Turn the Master Control to **AUTO, SPOT OR MAN.**
2. Turn the Secondary Control to **PROD.**
3. Toggle the Liquid/Blast switch up to view the pre-wet set point screen.
4. Press and hold the Liquid/Blast switch down and turn the Lane Width control to enter the desired value.
5. Toggle the Liquid/Blast switch upward to save and exit the pre-wet set point screen.

# MESP 402-E OPERATIONS

## SECONDARY CONTROL: TEST SCREENS



*The Test Screens show important spreader diagnostic information. To view the test screens, turn the Secondary Control to "Test". Toggle the Liquid/Blast switch down to scroll through each of the 8 test screens.*

### TEST SCREEN 1 - SPREADER OPERATIONS

Mph	Puls	Aug	Spn
0	12	50%	49%

**Mph**-Truck speed calculated by the controller

**Puls** - Displays the pulse frequency being returned from the feedback sensor

**Aug** - Displays the percentage of valve drive from the auger output

**Spn** - Displays the percentage of valve drive from the spinner output

### TEST SCREEN 2 - MISCELLANEOUS

Ax	Volt	13:40
■	12.5	07/21/05

**Ax** - Displays a block below the label if a 2-speed axle is in use

**Volt** - Displays the incoming voltage from the truck

**Date and Time** - (Military Style)

### TEST SCREEN 3 - ANTI-ICING

Ai	Pul	Out	Mph	B
■	43	68%	30	1

**Mph** - Truck speed calculated by the controller

**Ai** - A block below indicates that the anti-ice system is operating

**Pul** - Displays the pulse frequency being returned from an anti-ice flow turbine sensor

**Out** - Displays the percentage of output drive of the anti-icing system

**B** - Displays (0-3) spray booms in operation



# MESP 402-E OPERATIONS

## SECONDARY CONTROL: TEST SCREENS

### TEST SCREEN 4 - PRE-WETTING

Pw	Puls	Out	Aug
■	33	37%	56%

**Pw** - A block below indicates the pre-wetting system is operating

**Puls** - Displays the pulse frequency of the pre-wet flow turbine sensor

**Out** - Displays the percentage of output drive from the pre-wetting motor

**Aug** - Displays the percentage of valve drive from the auger output

### TEST SCREEN 5 - WIRELESS DOWNLOADING

RF	Test	Xmit	Rcv
		0%	0%

**Xmit** - Displays the strength of signal being transmitted

**Rcv** - Displays the strength of signal being received

### TEST SCREEN 6 - AIR & ROAD TEMPERATURES

Road	Air	Deg F
-----	-----	

**Road** - Displays road temperature in Fahrenheit

**Air** - Displays air temperature in Fahrenheit

### TEST SCREEN 7 - GPS MODE

Lat	No	GPS
Lng	Detected	

**Lat** - Displays latitude if GPS is being used

**Lng** - Displays longitude if GPS is being used

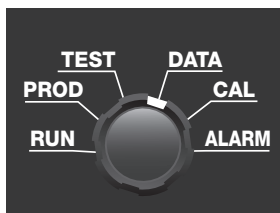
### TEST SCREEN 8 - LIQUID DRIVER TEMPERATURE

Liq	Driver	Temp.
	75.3	Deg F

**Pre-Wet Drive Temp** - This test screen displays the temperature of the pre-wet valve transistor.

# MESP 402-E OPERATIONS

## SECONDARY CONTROL: DATA SCREENS



*The Data Screens are useful for viewing various spreading information including: totals in pounds/gallons, total miles driven, the amount of material distributed and more.*

*To access the data screens, turn the Secondary Control to "DATA." Rotate the Feed Rate control to scroll through the screens.*

### DATA SCREEN 1

Mem.	12.6%	Full
21 Trips		

### DATA LOG MEMORY

Displays the total percent of data log memory used

### DATA SCREEN 2

Auto	Lbs	Miles
	14583	547

### MATERIALS SPREAD IN AUTO MODE

Displays the total weight in pounds of all materials spread in auto mode and over how many miles

### DATA SCREEN 3

Spot	Lbs	Miles
	4567	32

### MATERIALS SPREAD IN SPOT MODE

Displays the total weight in pounds of all materials spread in spot mode and over how many miles

### DATA SCREEN 4

Man	Lbs	Miles
	2339	18

### MATERIALS SPREAD IN MANUAL MODE

Displays the total weight in pounds of all materials spread in manual mode and over how many miles

# MESP 402-E OPERATIONS

## SECONDARY CONTROL: DATA SCREENS

### DATA SCREEN 5

Blast	Lbs	Feet
	3594	2456

#### MATERIALS SPREAD WHILE BLASTING

Displays the total weight in pounds of all materials spread while blasting and over how many feet

### DATA SCREEN 6

PWet	Gal	Mi
	543	34

#### PRE-WETTING LIQUID DISCHARGED

Displays the total gallons of liquid discharged from the pre-wetting system and over how many miles

### DATA SCREEN 7

A-ic Gal	Lane	Mi
3487		78

#### ANTI-ICING LIQUID DISCHARGED

Displays the total gallons of liquid discharged from the anti-icing and over how many lane or boom miles

### DATA SCREEN 8

Last Cleared
14:32 6/12/05

#### DATE OF MEMORY CLEARANCE

Displays the time and date when the data log memory was last cleared

### DATA SCREEN 9

Enter Code to
Clear Totls

#### TO CLEAR DATA LOG MEMORY

Enter the passcode to clear the data log memory. To enter the first two digits, hold down the Liquid/Blast switch while turning the Feed Rate control.

To enter the last two digits, hold down the Liquid/Blast switch while turning the Lane Width control.

### DATA SCREEN 10

Temporary Baud
19,200

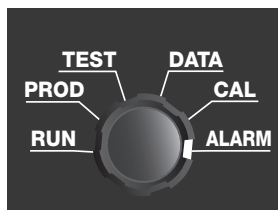
#### SERIAL PORT BAUD RATE

The Serial Port Baud Rate can be set from 19,200 standard to 14,400, 9,600 or 4,800. This number is for wireless downloading purposes only.

# MESP 402-E PROGRAMMING

## SECONDARY CONTROL: ALARM SCREENS

### SECONDARY CONTROL



Various alarms could possibly activate while operating the spreader system. If the alarm is active, it will show on the Run screen. Also, the history of the last eight alarms will be displayed on the Alarm screen.

- To view the Alarm screens, turn the Secondary Control to Alarm and rotate the Feed Rate control to scroll through the various screens.
- To clear the alarms on the Alarm screen, hold down the Liquid/Blast switch and turn the Lane Width control fully CCW.

### 1) Feed Jam

5/20/09 9:42

### JAM ALARM

This alarm occurs on spreaders with feedback sensors. To resume operation, toggle Liquid/Blast switch down while the feed jam message is flashing. The console will display X-Cal and the system will return to normal operation. Report this to your supervisor. Remember that

every time the system is turned off the feed jam alarm will be displayed again when the console is turned on. The process of cross calibrating the system will have to be repeated. The feed jam alarm will also activate when there is a feedback sensor producing pulses, and the system is set for open-loop. If a feedback sensor is connected the system must be set for closed loop. (programming line 25)

### 1) Low Volts

5/20/09 9:42

### LOW VOLTAGE ALARM

This occurs when the voltage of the system drops below 10.5 volts. Continue operation, but report the condition to the supervisor.

### 1) P-Wet Jam

5/20/09 9:42

### PRE-WET JAM ALARM

This occurs when the liquid sensor is no longer functioning. Problems could include: clogged filter, pinched or cut hose, dirt in sensor, loose sensor wire, plugged nozzles, or no liquid.

### 1) Blown Fuse

5/20/09 9:42

### BLOWN FUSE ALARM

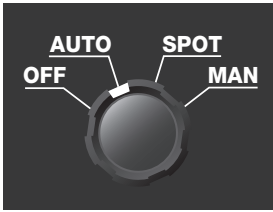
This occurs with a blown fuse inside the console. The console will remain lit, but without any functionality. Contact your supervisor if this alarm is activated.

### OVERRUN ALARM *(This is displayed on the Run screen NOT the Alarm screen.)*

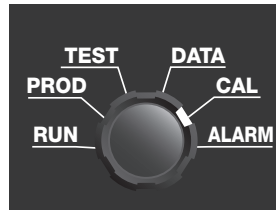
This alarm is displayed only when the truck's speed exceeds the spreader system's ability to produce flow. The operator should reduce truck speed or reduce feed rate. This alarm may also be activated by improper calibration between the speedometer and the MESP 402-E, or improper calibration of the spreader.

# MESP 402-E PROGRAMMING

**MASTER CONTROL**



**SECONDARY CONTROL**



The password-protected Programming mode allows changes to be made to the programming. Use the following steps to enter the program/calibration mode.

1. Turn the controller's Master Control on to any position.
2. Turn the Secondary Control to the "CAL" position.
3. The Pass Code is initially set at **5555**. To enter the first two digits of the pass code, press and hold the Liquid/Blast switch and turn the Feed Rate Control. To enter the second two digits press down and hold the Liquid/Blast switch and turn the Lane Width control.
4. Release the Liquid/Blast switch, and you will now be in the programming mode.
  - Turn the Feed Rate control to scroll through the (51) menu lines.
  - Toggle the Liquid/Blast switch down to highlight the various settings per screen.
  - To change a setting, highlight the desired variable, press and hold the Liquid/Blast switch down and rotate the Lane Width control.

## PROGRAMMING MENU LINES

LINE	CATEGORY
1	Spinner Max / Min
2	Spreader Max / Min
3	Blast Timer
4	Blast Max %
5	Pre-Wet Max/Min %
6	Pre-Wet Max/Min (Gal/Ton)
7	Spreader PWM Adj.
8	Pre-Wet PWM Adj.
9	Calibration Units
10-14	Product Selection
15	Spreader Dump Calibration
16	Pre-wet Calibration
17	Max Spreader Frequency
18	Max Pre-wet Frequency
19	Speedometer Calibration
20	Air/Road Temperature Sensor
21	Road Temperature Calibration
22	Air Temperature Calibration
23	AVL / GPS Data Acquisition
24	AVL / GPS Data Transmit Time
25	Spreader Type (Open / Closed)
26	Lane Width Shutdown (On / Off)
27	Manual Mode Lockout
28	Intersection Timer

LINE	CATEGORY
29	Pre-Wet Type (Open / Closed)
30	Speedometer Sensor
31	Log Distance
32	GPS Mode
33	Pre-Wet Drive Transistor Max Temp
34	Spreader Temperature Alarm
35	Watch Temperature Alarm
36	A-Ice Temperature Alarm
37	Alarm Timer
38	Alarm Volume
39	A-Ice Min/Max
40	A-Ice Min/ Max (Setpt)
41	A-Ice High Flow
42	Max A-Ice Frequency
43	A-Ice Calibration
44	Programming pass Code
45	Programmer I.D.
46	Vehicle I.D.
47	Vehicle Location
48	Spreader I.D.
49	Console Run Time
50	Clock
51	Calibrated At

# MESP 402-E PROGRAMMING

MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
LINE 1	<div style="border: 1px solid black; padding: 5px; text-align: center;">                     1 Width Max 65%                      Width Min 12%                 </div>	Max 0-99% Min 0-99%	65% 12%

The 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 1,800 RPM.

**WARNING: Spinner becomes active whenever these changes are made.**

LINE 2	<div style="border: 1px solid black; padding: 5px; text-align: center;">                     2 Feed Max 65%                      Feed Min 12%                 </div>	Max 0-99% Min 0-99%	65% 12%
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The 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 1,800 RPM.

**WARNING: Auger becomes active whenever these changes are made.**

LINE 3	<div style="border: 1px solid black; padding: 5px; text-align: center;">                     3 Blast Timer                      5 Sec.                 </div>	0-30 Sec.	5 Sec.
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The blast timer sets the duration of the blast operation ranging from 0 – 30 seconds. The system will remain in the blast mode continuously while the Liquid/Blast switch is held down. Pressing the Liquid/Blast switch down a second time while blasting will cancel the operation. Setting the time to 0 seconds will cause the blast mode to stop immediately upon release of the Liquid/Blast switch.

LINE 4	<div style="border: 1px solid black; padding: 5px; text-align: center;">                     4 Blast Max                      Limit 99%                 </div>	0-99%	99%
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This line is used to set the max from 0 to 99% of the maximum allowable distribution when the (Liquid/Blast) switch is engaged in normal operating mode.

# MESP 402-E PROGRAMMING

MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
LINE 5	<pre> 5 Pwet Max 99%    Pwet Min 15%                     </pre>	Max 0-99% Min 0-99%	99% 15%

The pre-wet min/max establishes the operating range of the electric motor used for the pre-wetting system. The min setting takes the slip or dead band out of the pre-wet motor. The max setting limits the pre-wet motor's max speed. Adjust the min setting so that the pre-wetting motor is just beginning to dispense liquid.

**Warning: Pre-wet motor active whenever these changes are made.**

LINE 6	<pre> 6 Pwet Max/Min   Gal/Ton 10 / 1                     </pre>	Max 0-99% Min 0-99%	10 1
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The purpose of these two variables is to establish the pre-wetting application rates the operator can control. The max setting is the upper limit and the min setting is the lower. The operator can adjust within these set points through the product screen. If one application rate is desired set both values to the same set point.

LINE 7	<pre> 7 Sprdr PWM Adj           100 Hz.                     </pre>	30-200Hz	100Hz
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The MESP 402-E 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 8	<pre> 8 PWet PWM Adj           30 Hz.                     </pre>	30-200Hz	30Hz
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This line sets the Pulse Width Modulation (PWM) required for the 12 VDC pre-wet pumps to perform optimally.

# MESP 402-E PROGRAMMING

MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
LINE 9	<div style="border: 1px solid black; padding: 5px; text-align: center;">           9 Cal. Units            Metric English         </div>	(English/Metric)	English

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

LINE 10-14 1.00:1	<div style="border: 1px solid black; padding: 5px; text-align: center;">           10 Sand 1.00:1            Max 500 Gate 2         </div>	Off/ (0.5-2.5):1.00 / Prim	
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**Product Ratio-** The MESP 402-E can be programmed for a total of five different granular products that can be selected by the operator. By default, salt is the primary material. There can only be one selected primary material for any of the 10-14 programming lines.

**To designate a material as Primary:** toggle the (Liquid/Blast) switch down until the cursor highlights the Product Ratio, push and hold the (Liquid/Blast) switch down, and turn the Lane Width Control fully CW.

**To make a product unavailable:** toggle the (Liquid/Blast) switch down until the cursor highlights the Product Ratio, push and hold the (Liquid/Blast) switch down, and turn the Lane Width Control fully CCW.

**To calculate Product Ratio:** take a 5 gallon bucket and fill with the primary material (salt) and weigh it. Refill the bucket with one of the alternate products. In order to find the product ratio, divide the weight of the alternate product by the weight of primary material (salt).

**Product Ratio = Weight of Alternate Product / Weight of Primary Product (Salt)**

**To Enter the ratio:** toggle the (Liquid/Blast) switch down until the product ratio is highlighted, push and hold the (Liquid/Blast) switch down 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 on the Sand Product Screen as 1.50:1


**Max** – This establishes the maximum auto-mode application rate available to the operator in terms of pounds per mile. It has no limiting effect in manual mode.

**Gate** – Gate height setting




# MESP 402-E PROGRAMMING

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MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
LINE 15			100.0

See spreader calibration instructions on page 27.

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LINE 16			8.30
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8.30 is the recommended setting for MPP pre-wetting pumps.

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LINE 17		0-3599 Hz	60-0Hz
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This line is used on systems with a feed back sensor (closed-loop) on the auger/conveyor. The value entered here is used to cross-calibrate to an open-loop system should the feedback sensor fail.

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LINE 18		0-2099 Hz	350-0Hz
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This line is used on systems with a flow turbine (closed-loop) for the pre-wetting system. This value is used to cross-calibrate to an open-loop system should the flow turbine fail.

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# MESP 402-E PROGRAMMING

MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
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LINE 19	<pre> 19 Cts/Mi  Cts 46 29500      0           </pre>	14000-320000	29500
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For proper operation, the console must be connected and calibrated to the vehicle speedometer. Sometimes this data is available from the chassis manufacturer or through the truck dealer. Tire sizes, rear axle ratios, and transmission drive ratios affect this value. If the pulse counts per mile is not available from one of these sources this value can be determined by running a measured mile. In programming line 19, advance the cursor to the top line and:

1. Toggle the (Liquid/Blast) down at the beginning of the measured mile. The set numbers on the far right will start scrolling upwards.
2. Toggle the (Liquid/Blast) down again at the end of the measured mile. The value shown is the number of pulse counts in that mile.
3. Advance the cursor to the lower line. Input the pulse counts per mile that was observed during the measured mile by holding the (Liquid/Blast) switch down and turning the Lane Width Control.

LINE 20	<pre> 20 IR1 Version   A          B           </pre>	A / B	B
---------	--	-------	---

This line is used to distinguish between the older style infrared temperature sensors and the new style. The new style (B) will have 3 wires; the old style (A) will have 4 wires.

LINE 21	<pre> 21 Road Temp Cal 0.0      -----           </pre>	±10	0.0
---------	--	-----	-----

The road temperature calibration allows the operator to fine tune the console to the infrared temperature sensors plus or minus 10 degrees.

LINE 22	<pre> 22 Air Temp  Cal 0.0      -----           </pre>	±10	0.0
---------	--	-----	-----

The air temperature calibration allows the operator to fine tune the console unit to the infrared temperature sensor plus or minus 10 degrees.

# MESP 402-E PROGRAMMING

MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
-----------	----------------	--------------	--------------

LINE 23	<pre> 23 In 654321 Boom           </pre>	Non-Adjustable	
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This line is for systems that use the GPS or AVL outputs. This is an encoded number for data acquisition.

LINE 24	<pre> 24 Data Xmit Timer OffSec           </pre>	Off - 300 Sec	Off
---------	--	---------------	-----

This line is for systems that use the GPS or AVL outputs. This line controls how often data will be transmitted from the AVL and GPS outputs.

LINE 25	<pre> 25 Sprdr Type Open Closed           </pre>	Open / Closed	Closed
---------	--	---------------	--------

A closed loop system uses a feedback sensor on the auger/conveyor shaft to feed pulses back to the console, which would equate to the shaft RPM. Choose open loop if no feedback sensor is used or the sensor fails.

LINE 26	<pre> 26 Lane Width Shutdown On Off           </pre>	ON / OFF	OFF
---------	--	----------	-----

While operating in auto-mode, this line allows the spinner to either run continuously when the vehicle comes to a complete stop (choose Off), or discontinues the spinner operation once the vehicle comes to a stop (select On). If On is selected, the spinner will resume operation once the vehicle begins to move again.

# MESP 402-E PROGRAMMING

MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
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LINE 27	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>27 Mode Options Auto-Man Auto</p> </div>	Auto or (Auto-Man)	(Auto-Man)
---------	--	--------------------	------------

Selecting Auto-Man allows the operator to use either auto or manual mode. Selecting Auto locks the operator out of manual mode when the truck is driving faster than 6-7 MPH. If Auto is selected here, the operator can still unload the vehicle in manual mode if the truck is stationary and the controller is powered off and then back on.

LINE 28	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>28 Intersection Timer 5 Sec</p> </div>	0-30 Seconds	5 Seconds
---------	--	--------------	-----------

This line only applies to auto mode. This setting activates the blast mode for a certain amount of time after the truck accelerates from a stop. Setting the intersection timer to 0 will cancel this feature and the spreader will not blast material after the truck accelerates from a stop.

LINE 29	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>29 P-Wet Type Open Closed</p> </div>	Open/Closed	Closed
---------	--	-------------	--------

A closed loop pre-wet system uses a flow turbine to feed pulses back to the console. Choose (open) if no sensor is used or the sensor fails.

LINE 30	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>30 MPH Type Hall VRM</p> </div>	Hall or VRM	Hall
---------	---	-------------	------

This line is used to indicate what type of speedometer sensor is used on the truck. This 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 World transmission uses a Hall effects sensor.

# MESP 402-E PROGRAMMING

MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
LINE 31	31 Log Distance 2 Mile	.10, .25, .50, 1, 2, 5, 10	2 Mile

This 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 4,000 records can be stored or 4,000 miles if using 1 mile increments. A full memory is written over on a first in –first out basis.

LINE 32	32 GPS Mode Off Active Passive	OFF, Active, or Passive	OFF
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The MESP 402-E is GPS Capable.

LINE 33	33 Liq Dr Max Temp 265 Deg F	OFF - (184-301)	265
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The purpose of this line is to limit the temperature of the pre-wet drive transistor. If the temperature of the transistor exceeds this setting, the pre-wet system will temporarily shut off until the temperature drops below the max temperature set.

LINE 34	34 Spdr Hi-- Temp Alm Lo--	0-40 0-40	Hi-- Lo--
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The Spdr Temperature Alarm establishes a temperature range that the spreader should operate within. If the temperature exceeds or falls below the set range, the spreader temperature alarm will sound. Setting the Hi or Lo to - - will prevent the alarm from activating.

# MESP 402-E PROGRAMMING

MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
LINE 35	<div style="border: 1px solid black; padding: 5px; display: inline-block;">           35 Watch      Hi--            Temp Alm     Lo--         </div>	0-40 0-40	Hi-- Lo--

The Watch Temperature Alarm establishes a temperature range that the spreader function should operate within. If the temperature exceeds or falls below the set range, the watch temperature alarm will sound. Setting the Hi or Lo to - - will prevent the alarm from activating.

LINE 36	<div style="border: 1px solid black; padding: 5px; display: inline-block;">           36 A-Ice      Hi--            Temp Alm     Lo--         </div>	0-40 0-40	Hi-- Lo--
---------	--	--------------	--------------

The Anti-Ice Temperature Alarm establishes a temperature range that the anti-ice function should operate within. If the temperature exceeds or falls below the set range, the anti-ice temperature alarm will sound. Setting the Hi or Lo to - - will prevent the alarm from activating.

LINE 37	<div style="border: 1px solid black; padding: 5px; display: inline-block;">           37 Alarm Timer                  0 Sec         </div>	0-60	0 Sec
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This number sets the duration of time that the alarm will sound.

LINE 38	<div style="border: 1px solid black; padding: 5px; display: inline-block;">           38 Temp Alarm                  Volume 0         </div>	0-10	0
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This line allows the user to select the volume of the temperature alarms.

# MESP 402-E PROGRAMMING

MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
LINE 39	<pre> 39 A-Ice Max 65%     A-Ice Min 12%           </pre>	<b>Max 0-99%</b> <b>Min 0-99%</b>	<b>65%</b> <b>12%</b>

The purpose of these two variables is to establish the range of operational speed of the hydraulic motor used for anti-icing. The min setting takes the slip or dead band out of the hydraulic motor and valve. The min setting should be set so that the hydraulic motors are just beginning to produce flow.

LINE 40	<pre> 40 A-Ice Max 200     Setpt Min 10           </pre>	<b>Max 0-200</b> <b>Min 0-200</b>	<b>200%</b> <b>10%</b>
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The purpose of these two variables is to establish the anti-icing application rates the operator can control. The max setting is the upper limit and the min setting is the lower limit. The operator can adjust within these set points through the product screen. If one application rate is desired set both values to the same set point.

LINE 41	<pre> 41 A-Ic High Flw     On Off           </pre>	<b>ON / OFF</b>	<b>ON</b>
---------	--	-----------------	-----------


Select **ON** if the anti-ice is setup with the spinner flow teed or connected in parallel with the auger's flow.

Select **OFF** if the anti-ice is setup only using the flow of the Auger and dumping the spinner flow directly back to tank.

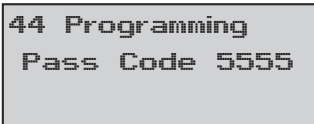
LINE 42	<pre> 42 Max A-Ic Freq     300 Hz  0 Hz           </pre>	<b>3500-0 Hz</b>	<b>300 Hz</b>
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This line is for use on closed loop systems using the flow turbine on the anti-ice pump. This value is used to cross calibrate to the open loop mode should the sensor fail and the operator switches to open-loop for continued running.

# MESP 402-E PROGRAMMING

MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
LINE 43			3.00 0.00

3.00 is the recommended anti-icing setting.

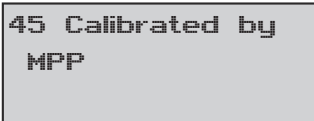
LINE 44			5555
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This line is used to set the Programming pass code.

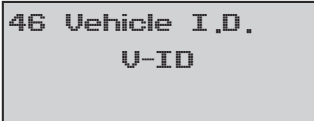
#### To change the pass code:

1. Hold the (Liquid/Blast) switch down and rotate the Feed Rate Control.
2. To enter the second two digits hold the (Liquid/Blast) switch down 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 45		Up to 16 Alpha-Numeric	MPP
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This line allows the individual that has done the calibration or most recent change to enter their name for future reference. Push and hold the (Liquid/Blast) switch down 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 (Liquid / Blast) switch down to move to the next character position.


LINE 46		Up to 16 Alpha-Numeric	Blank
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This line allows the vehicle number to be entered. This is useful in large fleets or for contract work when used with the support software. Character entry is the same as described in line 45.




# MESP 402-E PROGRAMMING

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MENU LINE	SCREEN DISPLAY	ADJUST RANGE	PRESET POINT
LINE 47		Up to 16 Alpha-Numeric	Blank

This line allows the vehicle location to be entered. Character entry is the same as described in line 45.

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LINE 48		Up to 16 Alpha-Numeric	Blank
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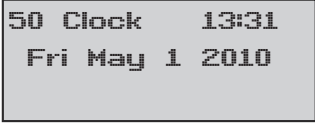
This line allows the user to set an identification number for the spreader. Character entry is the same as described in line 45.

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LINE 49		Non-Adjustable	Continuous
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This line records the total control console operation time. This line is non-adjustable.

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LINE 50		Time, Day, Month Year	
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This line is used to set the Time and Date. This line is important for data logging.

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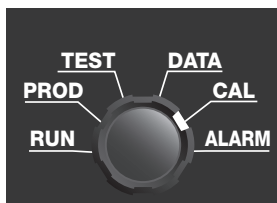
LINE 51			Non-Adjustable
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This value is non-adjustable and automatically updated any time one of the menu lines is adjusted.

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# MESP 402-E PROGRAMMING

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**SECONDARY CONTROL:  
CAL (PROGRAMMING)**

## PROGRAMMING LINES (VIEW ONLY)

To change any of the programming lines, the user must enter the pass code. The programming lines can still be viewed without a pass code; however the lines cannot be changed (view only). Press and hold the (Liquid / Blast) switch upward while turning the lane width to select a particular category of programming. Each category consists of screens that are related.

Program Group  
All Settings

**All Settings** — All 51 Programming Lines

Program Group  
Valve Parameters

**Valve Parameters** — Valve Min/Max Settings, Pulse Width Modulation Adjustments, Blast Max, Blast Timer, and Pre-Wet Min/Max

Program Group  
Products and Cal

**Products and Calibration** — Units, Product Ratios, Calibration Settings, Temperature Sensor Type, and Data Acquisition

Program Group  
Operational Set.

**Operational Settings** — Feedback Sensor Options, Spinner 0 MPH Shutdown, Auto-Man Lockout, Intersection Blast Time, Speedo Sensors, Log Distance, GPS Mode, Max Liquid Driver Temperature

Program Group  
Temp Alarms

**Temperature Alarms** — Temperature Alarm Settings, Alarm Timer, and Alarm Volume

Program Group  
A-Ice Settings

**A-Ice Settings** — Anti-Ice Min/Max Settings, Anti-Ice Hi Flow, and Anti-Ice Calibration

Program Group  
User/Truck Ident

**User/Truck Identification** — Pass Code, Clock, Run Time, Calibration I.D., and Vehicle I.D

# MESP 402-E

## Spreader/Dump Calibration

In the course of this procedure, the MESP 402-E controller uses either an internal pulse counter (closed-loop) or an internal clock (open-loop), to calculate a weight-to-pulse or weight-to-minute ratio. This number is stored in the memory and is used to determine the hydraulic output required to meet feed rates in everyday operation and to record the material weights over distance.

If calibrating the system for closed-loop control, be sure to verify the system is receiving pulses from the motor or shaft feedback sensor. Use MAN and TEST selection to verify that a pulse counter is working properly. The PULS label on the first Test Screen will display a number with the conveyor turning if the system is receiving pulses.

1. Load and weigh the truck with the designated "primary material" (salt)
2. Position the truck to off-load material and adjust the gate to its designated height.
3. Enter the "CAL" Menu and go to **Line 15**.
4. Toggle the (Liquid / Blast) switch down until the word "Total" is highlighted.
5. Advance the engine to 1,800 R.P.M.
6. Press and hold the (Liquid/Blast) switch down, and turn the Lane Width Control to off and then back to 50. This will start the material off-loading.
7. Toggle the (Liquid/Blast) switch down to end the off-load process.
8. Reweigh the truck and find the difference between the second weight and the first weight.
9. Toggle the (Liquid/Blast) switch down until the left digits of the top number are highlighted.
10. Hold the (Liquid/Blast) down while turning the Lane Width Control to adjust the total number as close as possible to the difference weight found above.

Mode/Lane	Prod	Feed Rate
15	lb/min	1138.0
Salt	Total	474
Air Road	MPH	Totals

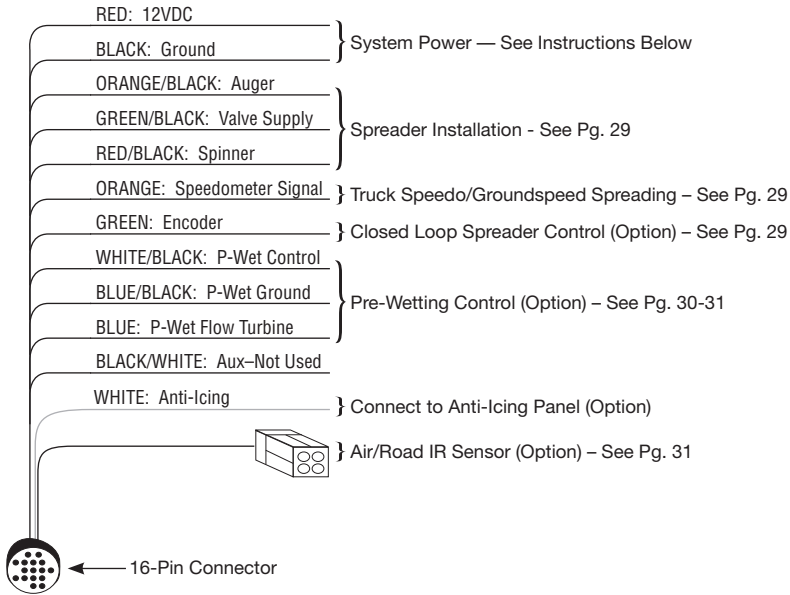
Lb/Kpl – Closed Loop  
Lb/Min – Open Loop

Adjust top number to get the bottom number as close as possible to the weight of material discharged.

11. Toggle the (Liquid/Blast) switch down until the right digits of the top number are highlighted.
12. Hold the (Liquid/Blast) down while turning the Lane Width Control to adjust the total number as close as possible to the difference weight found above.
13. Turn the system off or continue programming other lines as required.

# MESP 402-E INSTALLATION

## MESP 403EP1 WIRE HARNESS INSTALLATION



**1. Screw the 16 pin connector of the MESP 403EP1 harness into the back of the MESP 402E controller.**

### 2. System Power

- Connect the red wire of the MESP 403EP1 harness to 12VDC (20 Amp) ignition supply.
- Connect the black wire from the MESP 403EP1 harness to ground.

# MESP 402-E INSTALLATION

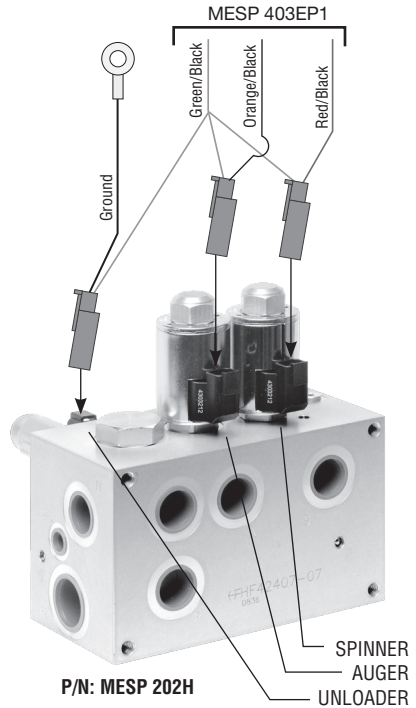
## MESP 403EP1 WIRE HARNESS INSTALLATION

### 3. Spreader Valve Installation (MESP 202H)

- Split the (green/black) wire of the MESP 403EP1 harness and connect to all 3 coils of the MESP 202H.
- Connect the (red/black) wire of the MESP 403EP1 harness to the spinner coil.
- Connect the (orange/black) wire of the MESP 403EP1 harness to the auger coil.
- Connect a ground wire to the unloader coil.

### 4. Groundspeed Spreading Installation (Optional)

- Connect the orange wire of the MESP 403EP1 harness to speedometer signal. (Contact dealership to locate speedometer signal output.)
- Typically wire 157 on Allison TCM or tail shaft sensor on standard shift transmissions.



### 5. Encoder Installation (Optional)

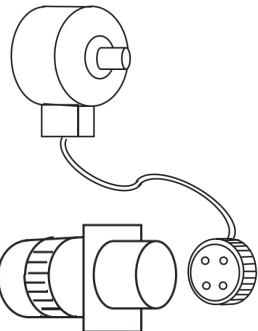
- Screw the encoder (P/N: 38M36663) to the encoder cable (P/N: 96009H)
- From the encoder cable (P/N: 96009H) connect the black wire to ground, connect the red wire to ignition 12VDC, and connect the green wire (96009H) to the green wire of the MESP 403EP1 harness.

RED: Connect to 12VDC (Ignition)

GREEN: Connect to Green wire of MESP 403EP1

BLACK: Ground

Encoder/Feedback Sensor  
P/N: 38M36663



Encoder Cable  
P/N: 96009H

# MESP 402-E INSTALLATION

## MESP 403EP1 WIRE HARNESS INSTALLATION

### 6. Connecting the Liquid Wetting Pump

Muncie recommends using a terminal block to connect the MESP 403EP1 harness to the liquid wetting pump. Reference the drawing to the right as an example.

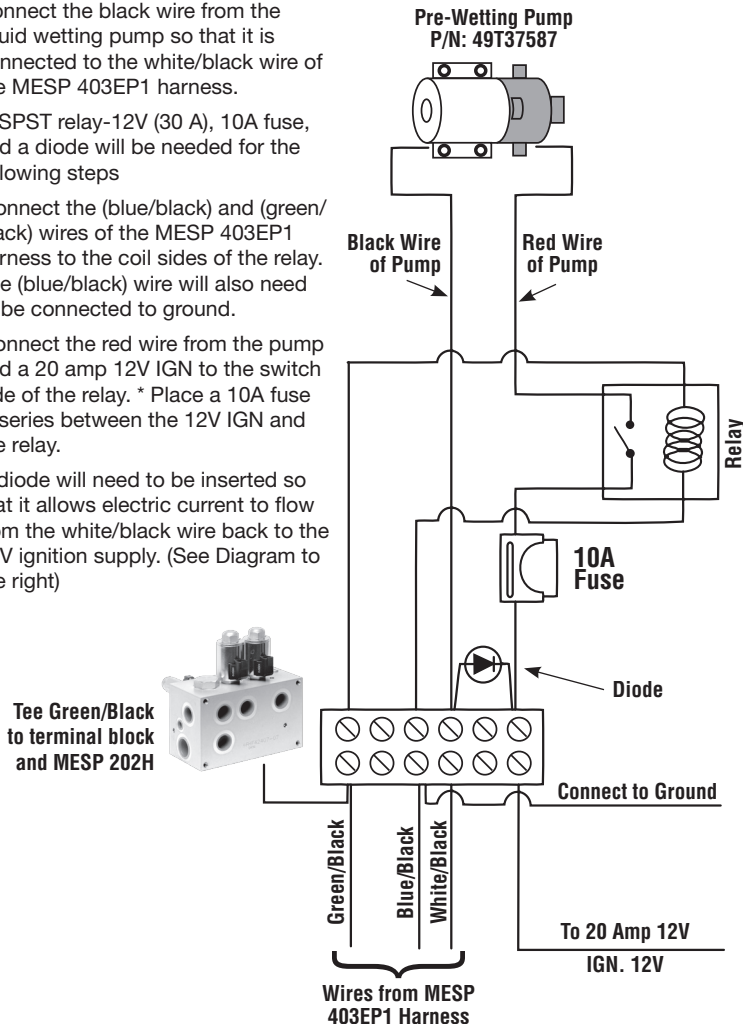
A. Connect the black wire from the liquid wetting pump so that it is connected to the white/black wire of the MESP 403EP1 harness.

B. A SPST relay-12V (30 A), 10A fuse, and a diode will be needed for the following steps

C. Connect the (blue/black) and (green/black) wires of the MESP 403EP1 harness to the coil sides of the relay. The (blue/black) wire will also need to be connected to ground.

D. Connect the red wire from the pump and a 20 amp 12V IGN to the switch side of the relay. \* Place a 10A fuse in series between the 12V IGN and the relay.

E. A diode will need to be inserted so that it allows electric current to flow from the white/black wire back to the 12V ignition supply. (See Diagram to the right)

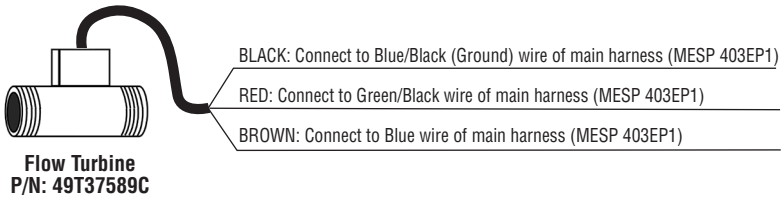


# MESP 402-E INSTALLATION

## MESP 403EP1 WIRE HARNESS INSTALLATION

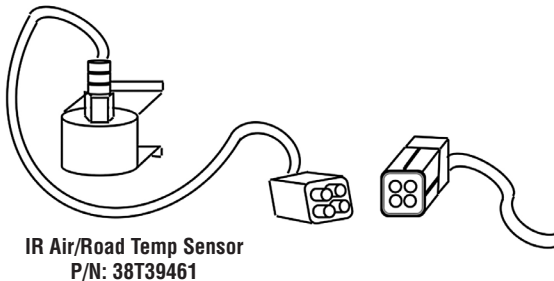
### 7. Connecting the Flow Turbine (P/N 96009H)

- A. Connect the black wire of the flow turbine to ground.
- B. Connect the brown wire of the flow turbine to the blue wire of the MESP 403EP1 harness.
- C. The red wire of the flow turbine needs to be teed into the green/black wire of the MESP 403EP1 harness.



### 8. Connecting the IR Sensor (Air and Road Temperature)

- Connect the male 4 pin connector of the IR sensor to the female 4-pin connector pigtailed from the MESP 403EP1 harness.



*(Reference the IR Sensor instructions for connecting the male 4-pin connector to the IR sensor.)*

# MESP 402-E TROUBLESHOOTING

PROBLEM	CAUSES	SOLUTIONS
No Spreader Output in AUTO or Spreader does not start until vehicle reaches a certain speed	<ul style="list-style-type: none"> <li>• No speedo signal</li> <li>• Weak speedo signal</li> <li>• Failed speedo sensor</li> <li>• Speedometer is not properly calibrated (Menu Line 19)</li> </ul>	<ul style="list-style-type: none"> <li>• Check for proper speedo signal connection</li> <li>• Reference Line 19 in programming to enter correct cts/mile for speedo sensor</li> </ul>
Console displays "Feed jam"	<ul style="list-style-type: none"> <li>• Console not receiving feedback sensor signal</li> <li>• Spreader not turning</li> <li>• Feedback sensor not connected</li> <li>• Feedback sensor not functioning</li> </ul>	<ul style="list-style-type: none"> <li>• Check all connections from sensor to console</li> <li>• Check hydraulic systems</li> <li>• Install sensor</li> <li>• Replace sensor</li> </ul>
<p><i>NOTE: System can continue to operate by toggling the (Liquid/Blast) switch down while in run mode. This will put the controller in "X-Cal" mode which does not use the feedback sensor.</i></p> <p><i>NOTE: The Feed Jam alarm will also activate when there is a feedback sensor producing pulses connected and the system is set for <b>Open-Loop</b>. If Feedback sensor is used Reference Programming line 25 to change to "CLOSED LOOP" if needed.</i></p>		
Console will not hold various settings (Clock, Date, etc.)	<ul style="list-style-type: none"> <li>• Internal battery failure</li> </ul>	<ul style="list-style-type: none"> <li>• Return console to Muncie for battery replacement</li> </ul>
Spreader continues to run with console turned OFF	<ul style="list-style-type: none"> <li>• Valve spool still activated manually</li> <li>• Valve spool stuck</li> <li>• Valve spool still activated electrically</li> </ul>	<ul style="list-style-type: none"> <li>• Back out manual override screw</li> <li>• Remove override screw and use small screwdriver to move spool several times until free</li> <li>• Test by removing valve connector. Console needs to be serviced</li> </ul>