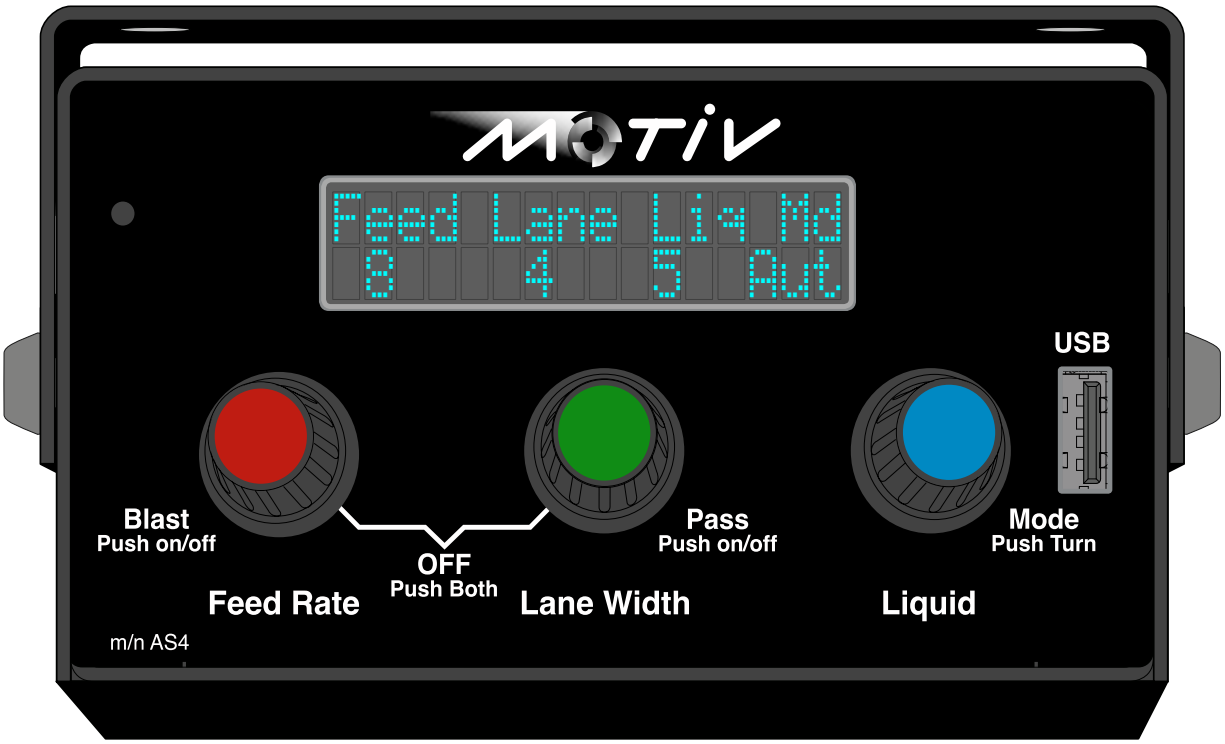
AS400

Installation and Operations Manual

Advanced Spreader Control

with pre-wet liquid control and data logging
Revision -A1A

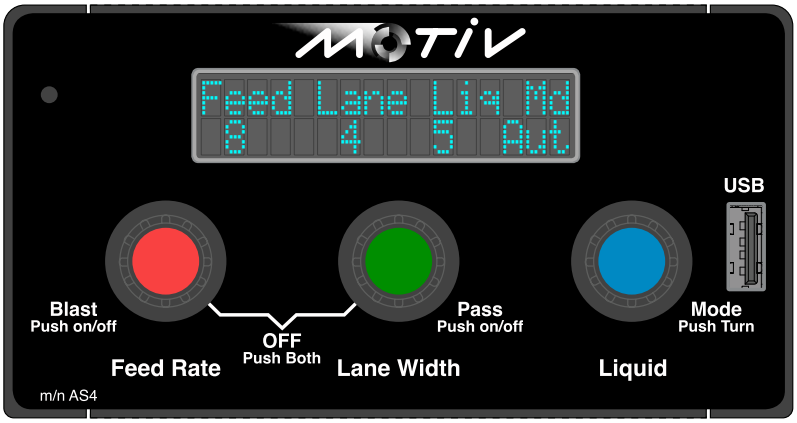


AS4 Operations and Installation Manual

Description

The AS4 spreader controller provides both automatic and manual spreader operation and can control three electro-hydraulic proportional flow control valves; typically for conveyor (auger), spinner (spreader), and a liquid dispensing system. In automatic mode the AS4's feed setting accurately maintains a constant pounds-per-mile output, and the liquid maintains a constant gallons-per-ton (granular) as the vehicle's speed varies. The AS4's proportional valve control is fully adjustable; both the PWM frequency and the minimum and maximum drive voltage limits can be adjusted. The AS4 is capable of running most electro-hydraulic proportional valves.

The AS4 front panel incorporates three knobs for the operator's Feed Rate, Lane Width, and Liquid adjustments. All three settings, along with the spreader mode, are reported to the operator from a digital display located above the knobs. The knobs are detented with bi-directional, endless rotation, and an integral push-button. Changing operation modes is accomplished by push-and-turn operation of the Liquid knob. Pass and/or Blast functions are turned on and off with a push of the knob. The USB port located on the front panel allows easy access to the stored data log of product totals and spreader operation.



AS4 Spreader Features

- Nine programmable levels of Feed Rate for conveyor (auger) control with true lbs/mile calibration
- Nine programmable levels of Lane Width for spinner control, with zero MPH shut off
- Nine programmable levels of Liquid for pre-wet liquid dispensing with gal/ton calibration
- Optional Closed loop operation
- Auto or Manual operation. Six different configurations, including manual or auto lockout
- Blast with adjustable off-delay timer, from the front panel or, remote switch option
- Pass feature with instant push on/off control from the front panel or remote switch option
- Four, operator selectable, granular products
- Internal audible beeper: verifies certain functions for the operator
- MPH ratio change for two speed rear ends

Electrical Specification

- Operating voltage: 11 - 15 vdc, standard 12 volt mobile vehicle electrical system, (neg) ground
- Outputs: (3) current monitored PWM valve drivers, 2.5 amps each, overload sensing/protected
- Inputs: mph input, (4) sensor types: AC (VRM), DC sink, DC source (HALL) and coupled, (2) option inputs for current sinking devices, ie. remote switches
- Front panel: Back lighted, non-glare, encoders w/ knobs, 2x16 OLED display
- Wiring interface: Keyed twist-lock CPC, 9 pin connector
- Enclosure: steel with bracket for various mounting options
- Calibration: all calibrations are set via the front panel, no tools required, pass code protected.

Installation with initial power up and check out

Always install the AS4 inside the vehicle cab. The bracket is designed to offer the installer a selection of mounting positions (see mounting drawing): above, below or panel mount (panel mount option is special order). Ensure the AS4 is mounted in a position that gives the operator easy and clear access to the control knobs. Make a secure mount to avoid vibration. Route the cable harness to the required locations and make the connections as per the wiring diagram (see wiring drawing).

The process of setting up and calibrating the AS4 spreader control is made easier by proceeding through the following steps in sequence. These steps are an operational check list for verifying the overall spreader control operation. DO NOT proceed with the calibration settings until the following operational items check out correctly:

1. Hydraulic components are to be fully plumbed and ready to run.
2. Cable harness installed with all devices and terminations completed.
   (mph signal wire can remain unconnected until later in the test)
3. AS4 controller is mounted, cable connected, and 12 volt DC power is ready.
   (note: the AS4 is a negative grounded device)
4. To power up the AS4 press-and-release the FEED knob. When the display comes on, you will also hear a short audible chirp, confirming the power-up is complete.
5. Switch the AS4 to manual mode to check out the feed and spinner operation. To switch to manual mode, push-and-turn the Liquid knob clockwise 1 detent; the display will reflect the manual mode, then release knob. The AS4 will now directly output manual drive signals to the Feed Rate, Lane Width, and Liquid valves.
6. From manual mode, verify the basic hydraulic operation. To check the feed hydraulic circuit, rotate the Feed Rate knob to vary the output speed. To check the spinner operation, rotate the Lane Width knob to vary the spinner speed. To check the liquid operation, rotate the Liquid knob to vary the Pre-Wet spray. Operate knobs throughout all of the settings 0, 1, 2, 3, … 9 and verify proper hydraulic operation. Check for proper rotation, leaks, etc. Note: the minimum and maximum speeds may not be accurate at this point. Fine tuning individual adjustments is made later in the settings section.
7. MPH test. The first step is to determine the type of vehicle speed sensor being used. Most trucks manufactured today use electronic MPH signals generated from the transmission or the ECU (engine control unit). The installer must select the correct MPH signal type in the settings list (see menu 11). Factory default – DC sink. The AS4 offers an input circuit for the four types of sensors:
   - AC zero crossing signal generator with a 300 mV AC, peak-to-peak threshold
   - DC sink current sinking sensor, open collector NPN typ. V in low = 1vdc max, V in high = 6vdc min
   - DC source current sourcing sensor, open emitter PNP typ. V in low = 1vdc max, V in high = 6vdc min
   - Coupled edge sensing, series capacitor coupled, 1uf

   General tips: Vehicles with ECU mph signals are typically DC sinking type. For trucks where the installer is going to tap into the transmission tail shaft sensor, use the AC type. Some small body trucks use the DC sourcing sensors. The option to use Coupled is usually done when the other types won't work.

   Verify the MPH signal is correctly wired. Power up the AS4. After ~ 5 sec. in auto mode, the Feed, Lane, and Liquid switch settings will blink when there is NO signal being generated (normal). Jack up the rear end of the vehicle, using wheel blocks for safety. Put the transmission in gear and let the rear wheels rotate ~ 5mph. If the displays go from blinking, to on-steady, then you have a good MPH signal. If the displays remain blinking, you may need to change the MPH sensor type. (see menu 11)
8. If the hydraulics operate correctly, and the AS4 detects a MPH signal, then you are ready to proceed with the detailed settings setup (see "How to access the settings mode").

Operator Controls: Power on/off

- To turn the **AS4 ON** **Push-and-release** *only* the Feed Rate knob
  … you will hear an audible chirp, confirming the power up

- **To turn the AS4 OFF** **Push-and-HOLD** both the Feed Rate and Lane Width knobs
  … hold for 1 second and release, display goes blank

Spreader Function Navigation

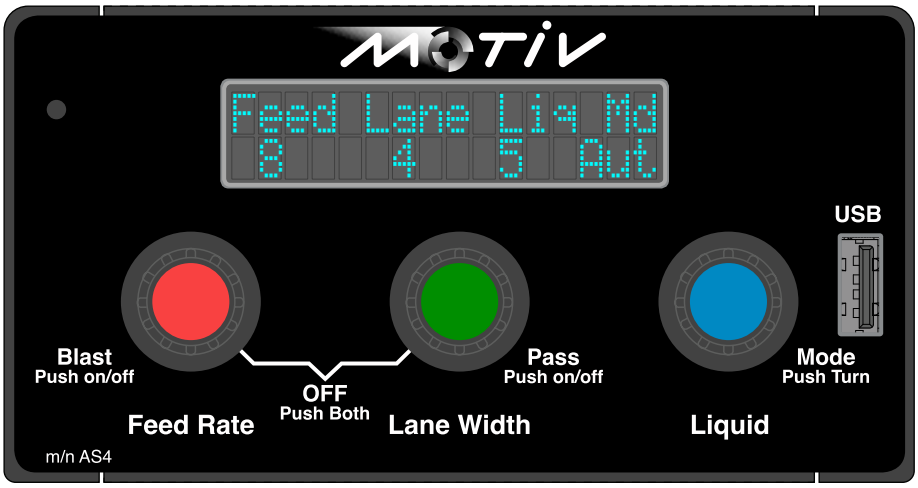
The operator has three control knobs located on the front panel. See sketch below; each knob responds to CW and CCW rotation and acts as a push-button when pressed. The combination of push and/or turn creates different actions for each knob: turn, push-and-release, push-and-turn.

Spreader functions in run mode, assigned to the multiple knob actions, are as follows:

- Feed Rate Turn … selects one of nine Rate settings
- Blast Push-and-release … Feed output = 100% w/ an off-delay timer or power up

- Lane Width Turn … selects one of nine Lane settings
- Pass Push-and-release … instant off for the feed, lane width, and liquid outputs

- Liquid Turn … selects one of nine Pre-wet settings
- Mode Push-and-turn … selects Auto/Manual/Settings modes



Feed Rate Control with Blast

The Feed Rate knob is used by the operator to select a pounds-per-mile application rate. The Feed Rate knob also gives the operator a Blast function.

- At power up, the AS4 starts with the Feed Rate, Lane Output, & Liquid Set point = 0, factory default
  - to setup the overall Feed spreading mode, see menu 03
  - to set the nine individual Feed Rates (table), see menu 40-48

- To change the Feed Rate turn the Feed Rate knob CW to increase and CCW to decrease the rate output. The display transitions to show your switch setting along with the output Lbs/Mile set-point. The standard running display returns 2 seconds after the knob rotation stops.

- Feed Rate Table: The installer is able to set nine different Feed Rates into a table stored in the AS4, (see menus 40-48). This feature allows the operator to easily select a Feed Rate based on viewing an actual lbs./mile number. The full table of Feed Rate choices is displayed one at a time as the operator turns the Feed Rate knob. The standard running display returns 2 seconds after the knob rotation stops. If it is desired to have fewer then 9 feed rates available, setting a feed rate to 'Off' disables that switch position and any positions above it. Example: If switch setting #7 is set to 'Off" then the operator will have switch settings 0-6 available.

- To start **Blast**, push-and-release the Feed Rate knob; the Feed output will = 100% and the display will show the Blast: 5 Sec. Throughout the Blast activity, the display will show **Bla** in the bottom right. Upon releasing the knob the Blast off-delay timer begins counting down. A second push-and-release will end the Blast and timer. The Blast ends automatically at the end of the timer period. The Blast off-delay timer is adjustable, range 0 to 30 seconds (see menu 6)

Lane Width Control with Pass

- After powering up, the AS4 pre-sets the all outputs to 0 (Off)
  - to setup the number of active lanes, see menu 50-58
  - to set the overall lane width operation, see menu 4

- To change the Lane Width, turn the Lane Width knob CW to increase and CCW to decrease the output. The display transitions to show your switch setting along with the output percentage. The standard running display returns 2 seconds after the knob rotation stops.

- Push-and-release the Lane Width knob to enable **Pass**. Push-and-release again to disable Pass. The display will show **Pas** in the bottom right.

Liquid Control, Auto/Manual and Product select

- After powering up, the AS4 pre-sets the all outputs to 0 (Off)
  - to set the nine individual Liquid Rates, see menu 60-68
  - to set the overall lane width operation, see menu 5

- To change the Liquid setting, turn the Liquid knob CW to increase and CCW to decrease the output. The display transitions to show your switch setting along with the gallons/ton set point. The standard running display returns 2 seconds after the knob rotation stops.

- Push-hold-and-turn the Liquid knob to select **Automatic** / **Manual** operation. The display will show Mode: Auto or Mode: Manual. After releasing the knob the standard running display returns with either **Aut**, or **Man** at the bottom right to keep the operator informed.

- For **Product Selection**, Push-and-turn the Liquid knob CW 2 clicks (1 past the Manual selection) and release when the display reads Mode: Setup. Select the product with the Liquid knob. To return to the run mode Push-and-turn the Liquid knob to CCW releasing it in the desired Auto or Manual mode.

Feed Reversing Switch

Sometimes there is a need to momentarily reverse the Feed (either Auger, or Conveyer) to clear a blockage. The AS4 can accommodate this with the **AS400C6A** wiring harness and its included momentary switch (see Diagram). The hydraulic system needs to have a reversing circuit with a control coil (either solenoid, or proportional) and installer sets Option Input #2 to Pass. Pressing the reversing switch will put the AS4 into Pass mode, and apply vehicle 12 volts to the reverse control coil. As the switch is released the AS4 returns to normal operation.

Program Updating

When a USB flash drive is plugged into the front panel, the controller reads the directory and looks for an update file. If one is found it is checked for integrity and read to see if there are any differences with the resident program. If the file on the drive has changes the operator is presented with:

Pressing the Lane knob and holding for 5 sec starts the update. It is important that power not be interrupted during the update. The process can take as long as 1 minute. After the update is completed, the operator will hear the startup beep, and the flash disk can be removed.
If the file does not have changes the operator is presented with:

Removing the flash disk causes the controller to switch to the normal run screen.

Data-Logging

The AS4 comes equipped with a non-volatile memory where it stores distance based data-logging information. When the controller sees the truck passing the first distance threshold it stores a start-record, and a data-record. Each time, after the start, a distance threshold is passed another data record is stored. Plugging a USB flash drive into the front panel starts the controller looking for a software update; if none are found it then gets ready to store the data-log file to the drive. The operator is presented with:

Pressing the Lane knob and holding for 5 sec starts the transfer. After the transfer is complete the controller will reset the data-log memory to avoid overlapping data. The data file stored on the flash drive will be titled ‘log01234.csv’, except the ‘01234’ in the name is the serial number of the controller. If the flash drive has been used before, the controller will open the log file and add the new information to it. The information stored in the file is in a simple comma separated file format. It can be read with a spreadsheet program, or text editor.

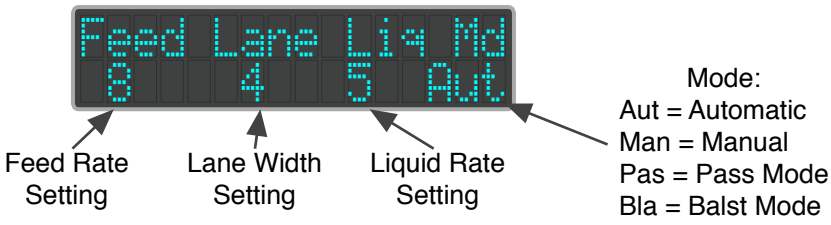
Valve trims (Menus 23-26)

Valves have a minimum current to achieve hydraulic flow, and a maximum current above which is not providing any flow. Properly setting the minimum and maximum for valve gives the control system a ‘good’ working zone to without stalling, or wasting power. Setting the valve drive to **Current** mode helps the controller compensate for variations in battery voltage, and coil resistance, giving consistent performance. If there are difficulties with a particular valve coil **Voltage** mode can be selected.

Displays

The AS4 has a 2 by 16 organic LED display. With an operational range of -40 to 85 °C it will be viewable even at the most extreme conditions.

Main Run Display



AS4 Error codes if the AS4 detects an error, the outputs will shut down and display an error message:

Display	Description
Error:Feed Valve Short Circuit	Feed Valve is < 2 Ohms or over 3 amps
Error:Feed Valve Open Circuit	Feed Valve is > 40 Ohms (can be disabled, see menu 26)
Error:Lane Valve Short Circuit	Lane Valve is < 2 Ohms or over 3 amps
Error:Lane Valve Open Circuit	Lane Valve is > 40 Ohms (can be disabled, see menu 26)
Error:Liq. Valve Short Circuit	Liquid Valve is < 2 Ohms or over 3 amps
Error:Liq. Valve Open Circuit	Liquid Valve is > 40 Ohms (can be disabled, see menu 26)
Error: Internal Fuse Blown	Valve supply internal fuse blown
Error: Supply Voltage Too Low	Vehicle battery supply < 10.5 volts DC
Error:Feed Stall PSI Input	High pressure stall switch active (one of the option inputs is set to 'Over PSI Sw', see menus 20, 21)
Error:Feed Stall Lost Pulses	Closed loop sensor failure

Clearing Error Code

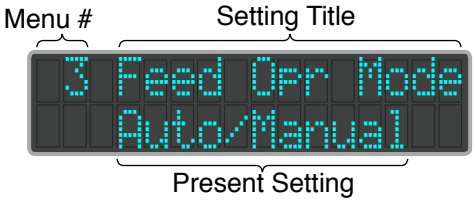
Error codes on the AS4 are cleared by pressing either the Feed, or Lane knob.

How to access the settings mode

Push-and-turn the Liquid knob 2 clicks CW (1 past the Manual selection) and release when the display reads Mode: Setup. From here press and hold the Feed Rate knob and rotate the Liquid knob to move through the menus. As the feed rate knob is pressed the display will show menu number and “Select Menu” in the 1st line, and a short descriptor of the menu. Release the Feed knob to see the settings display. A Pass Code is required for most Menus. The default pass code in on the last page of this manual. The AS4 allows the installer the change this pass code. If it is changed make sure it is stored in a safe place that can be accessed for future changes.

How to make changes to the internal memory settings

Once in Settings mode rotate the Liquid knob to make adjustments. Some settings, because of their range, need the upper/lower digits to be set separately. In these cases push the Lane Width knob to transition between the digits.



Note: some menu items are view only.

Program List

The AS4 uses a list of menu numbers to assign each adjustment, mode, or feature selection. The settings list has been organized into logical groupings and presented in a sequence that aids the installer.

Display	Description
1 Sel. Material Primary	Allows the operator to change the Product. No pass code required.
2 Enter Pass Code xxxx	Entering the correct pass code allows changes to the settings. Use the Lane Knob push button to transition between upper and lower pairs of digits. Once the pass code is entered hold the Lane Knob push button for **3 Sec**. If the pass code is correct the display will show GOOD.
3 Feed Opr Mode Auto/Manual	Controls the operational mode for the Feed output. Manual-Only - Auto Lock out Auto/Manual - Both Auto, and Manual mode allowed Auto-Only - Manual Lock out
4 Lane Opr Mode Auto/Manual	Controls the operational mode for the Lane Width output. Locked-Out - Shut off Lane completely Manual-Only - Auto Lock out Auto/Manual - Both Auto, and Manual mode allowed
5 Laid Opr Mode Variable	Controls the operational mode for the Feed output. Disabled - Shut off Liquid completely On/Off - Turns on with the Feed to 100% Variable - Adjusts the output to achieve a set Gal/Ton of granular
6 Blast Timer 5 Sec.	Blast off-delay timer (0-30 Sec.)

Mph and Data-Log setup

	Mph Pulses per mile calibration. This can be done as the truck is moving. The number in the upper right of the display shows a live MPH for matching to the truck speedometer.
	Set MPH sensor type. If the truck is moving while the sensor type is being selected, the MPH should show up in the lower right of the display. It may not match the truck speedometer until the properly calibrated (see above) VRM - AC sensor VRM-Dif. - AC sensor w/ differential coupling DC-Sink - DC current sinking type sensors DC-Source - DC current sourcing type sensors
	Enter the ratio of the 2-speed rear-end, (range 0.2 to 5.0) factory 1.00 Note: The AS4 creates a calculated MPH to be used for Feed Rate control. Using a 2 speed rear-end requires a switch or relay to pull down an input (either Pin #1, or Pin #5). First, calibrate the MPH with the input inactive, then when the pin is grounded the AS4 will calculate (MPH = calib MPH / ratio) The lower left of the display will show 'A' when an input, programmed as 2-speed rear end, is active, and the lower right will show a live MPH to test gear ratio.
	Set Clock time. Move through the fields with the Lane push button. If there is a 'L' in the upper right of the display it means the time is live. While setting the clock the 'L' disappears, and the internal clock stops advancing. This keeps the setting from being disrupted.
	Set Clock Date. Move through the fields with the Lane push button.
	Set data-logging event distance (1/4, 1/2, 1, 2 Miles). The AS4 data-logging system can store more then 1000 distance based events. Setting the log distance adjusts the granularity of this data.
	View/clear data-logging memory. The data-log memory usage can be viewed here. After a download to a USB stick this should read 0%. If there is a need to clear the memory hold the Lane Width knob for 5 sec.
	Adjust the back lighting for the front panel (5-100%)

Option inputs actions, Valve drive setup

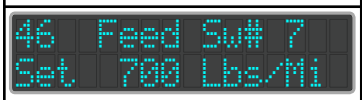
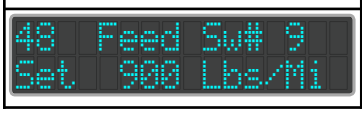
	Controls the function of input #1 (pin 1) Not Used - No function associated with this input Over PSI Sw - PSI sw to sense a feed stall Remote Pass - External switch control for Pass function Remote Blast - External switch control for Blast function Gearbox - Enable for 2-speed rear end (menu #12) Closed Loop - If Feed Type is set to Closed Loop (menu #30), this field will not be adjustable.
	Controls the function of input #2 (pin 5) Not Used - No function associated with this input Over PSI Sw - PSI sw to sense a feed stall Remote Pass - External switch control for Pass function Remote Blast - External switch control for Blast function Gearbox - Enable for 2-speed rear end (menu #12)
	Set PWM frequency to match the customer valve specification (30-300 Hz).

	Feed Valve setup. Set the minimum trim so the hydraulic motor shaft just starts turning. Set the maximum trim for the max desired speed. Set Current, or Voltage mode (see Valve trims). **NOTE: Pressing the Lane Knob while adjusting the Max/Min makes the hydraulic valves LIVE. Release the Lane knob to stop the output.**
	Lane Valve Setup. Set the minimum trim so the hydraulic motor minimum desired speed. Set the maximum trim for the max desired speed. Set Current, or Voltage mode (see Valve trims). **NOTE: Pressing the Lane Knob while adjusting the Max/Min makes the hydraulic valves LIVE. Release the Lane knob to stop the output.**
	Liquid Valve setup. Set the minimum trim to get the desired Pre-Wet spray. Set the maximum trim for the max desired spray. Set Current, or Voltage mode (see Valve trims). **NOTE: Pressing the Lane Knob while adjusting the Max/Min makes the hydraulic valves LIVE. Release the Lane knob to stop the output.**
	Allows the installer to disable the open circuit alarm. This allows compatibility with valves that are very low current.

Feed & Liquid Calibration

	Controls the Feed control system type. Open Loop - No sensor for the Feed function Closed Loop - Speed sensor to accurately control the Feed output
	Calibration for the feed function. Procedure for either open loop or closed loop calibration below.
	Used in the open, and closed loop the calibration procedures.
	Sets the minimum Pre-Wet spray. Because the liquid function needs to be a spray, its minimum output in typically not zero GPM.
	Calibrates the Pre-Wet spray when the valve is at maximum
	Weight ratio of product #2. The calculation Ratio = $\frac{Product\ 2}{Pimary\ Prod.}$ Range is 0.10 - 5.00
	Weight ratio of product #3. Range is 0.10 - 5.00
	Weight ratio of product #4. Range is 0.10 - 5.00

Feed Switch Settings

	Controls automatic mode Feed switch setting #1. Range is 50 - 1500 Lbs/ Mile
	Controls automatic mode Feed switch setting #2. Range is Off- 50 - 1500 Lbs/Mile. If set to Off the Feed knob will be limited to settings below 2
	Controls automatic mode Feed switch setting #3. Range is Off- 50 - 1500 Lbs/Mile. If set to Off the Feed knob will be limited to settings below 3.
	Controls automatic mode Feed switch setting #4. Range is Off- 50 - 1500 Lbs/Mile. If set to Off the Feed knob will be limited to settings below 4
	Controls automatic mode Feed switch setting #5. Range is Off- 50 - 1500 Lbs/Mile. If set to Off the Feed knob will be limited to settings below 5
	Controls automatic mode Feed switch setting #6. Range is Off- 50 - 1500 Lbs/Mile. If set to Off the Feed knob will be limited to settings below 6
	Controls automatic mode Feed switch setting #7. Range is Off- 50 - 1500 Lbs/Mile. If set to Off the Feed knob will be limited to settings below 7
	Controls automatic mode Feed switch setting #8. Range is Off- 50 - 1500 Lbs/Mile. If set to Off the Feed knob will be limited to settings below 8
	Controls automatic mode Feed switch setting #9. Range is Off- 50 - 1500 Lbs/Mile. If set to Off the Feed knob will be limited to settings below 9

Lane Switch Settings

	Controls Lane switch setting #1. Range is 1 - 100%
	Controls Lane switch setting #2. Range is Off - 1 - 100% If set to Off the Lane knob will be limited to settings below 2
	Controls Lane switch setting #3. Range is Off - 1 - 100% If set to Off the Lane knob will be limited to settings below 3
	Controls Lane switch setting #4. Range is Off - 1 - 100% If set to Off the Lane knob will be limited to settings below 4
	Controls Lane switch setting #5. Range is Off - 1 - 100% If set to Off the Lane knob will be limited to settings below 5
	Controls Lane switch setting #6. Range is Off - 1 - 100% If set to Off the Lane knob will be limited to settings below 6
	Controls Lane switch setting #7. Range is Off - 1 - 100% If set to Off the Lane knob will be limited to settings below 7
	Controls Lane switch setting #8. Range is Off - 1 - 100% If set to Off the Lane knob will be limited to settings below 8
	Controls Lane switch setting #9. Range is Off - 1 - 100% If set to Off the Lane knob will be limited to settings below 9

Liquid Switch Settings

	Controls Liquid switch setting #1. Range is 3.0 - 20.0 Gal/Ton
	Controls Liquid switch setting #2. Range is Off - 3.0 - 20.0 Gal/Ton. If set to Off the Liquid knob will be limited to settings below 2
	Controls Liquid switch setting #3. Range is Off - 3.0 - 20.0 Gal/Ton. If set to Off the Liquid knob will be limited to settings below 3
	Controls Liquid switch setting #4. Range is Off - 3.0 - 20.0 Gal/Ton. If set to Off the Liquid knob will be limited to settings below 4
	Controls Liquid switch setting #5. Range is Off - 3.0 - 20.0 Gal/Ton. If set to Off the Liquid knob will be limited to settings below 5
	Controls Liquid switch setting #6. Range is Off - 3.0 - 20.0 Gal/Ton. If set to Off the Liquid knob will be limited to settings below 6
	Controls Liquid switch setting #7. Range is Off - 3.0 - 20.0 Gal/Ton. If set to Off the Liquid knob will be limited to settings below 7
	Controls Liquid switch setting #8. Range is Off - 3.0 - 20.0 Gal/Ton. If set to Off the Liquid knob will be limited to settings below 8
	Controls Liquid switch setting #9. Range is Off - 3.0 - 20.0 Gal/Ton. If set to Off the Liquid knob will be limited to settings below 9

Input Test, Pass Code & Software ID

	Display current status of Option input #1, and #2. The letter 'A' appears below label if the input is active.
	Allows the customer to have a custom pass code. Make sure to keep good notes if this is used. The only way into the settings without the pass code requires submitting the checksum and serial number to the factory for the bypass code.
	Product and software identification. SN = Serial number CS = Software checksum

Changes to the factory settings are expected since every vehicle, its hydraulic components, and individual spreading policies are different.

Closed loop spreader Calibration procedure

Calibrating the Feed circuit improves the accuracy of the entire system. With an accurate system, supervisory policy can be correctly implemented to apply the Pounds/Mile to deal with various storm situations. Calibrating closed loop systems is preformed so the AS4 controller can relate the pulse feedback from the sensor to a real weight of material delivered.

1. Load and weigh the truck with the designated “primary material”
2. Position the truck to off-load material and adjust the gate to its designated height.
3. Go to the Feed Cal. Run Menu (#32).
4. Hold the Lane Pb through the count down (5 sec.). The display will switch to "Ready for Cal. Dump"
5. Advance the engine to 1,800 R.P.M.
6. As the liquid knob is rotated CW the output will increase(CCW to decrease). Press either the Feed, or Lane Pb to stop the output instantly.
7. Reweigh the truck and find the difference between the second weight and the first weight.
8. Read the total pulses from the display and follow the equation below to determine what to enter into Menu #31

W1 = Original truck+material weight
W2 = After Dump truck+material weight
Pul = Pulses recorded in AS4 Display

Calibration value for Menu #31 $\frac{(W1 - W2) \times 1000}{Pul}$ = Lbs/K-Pul

Open loop spreader Calibration procedure

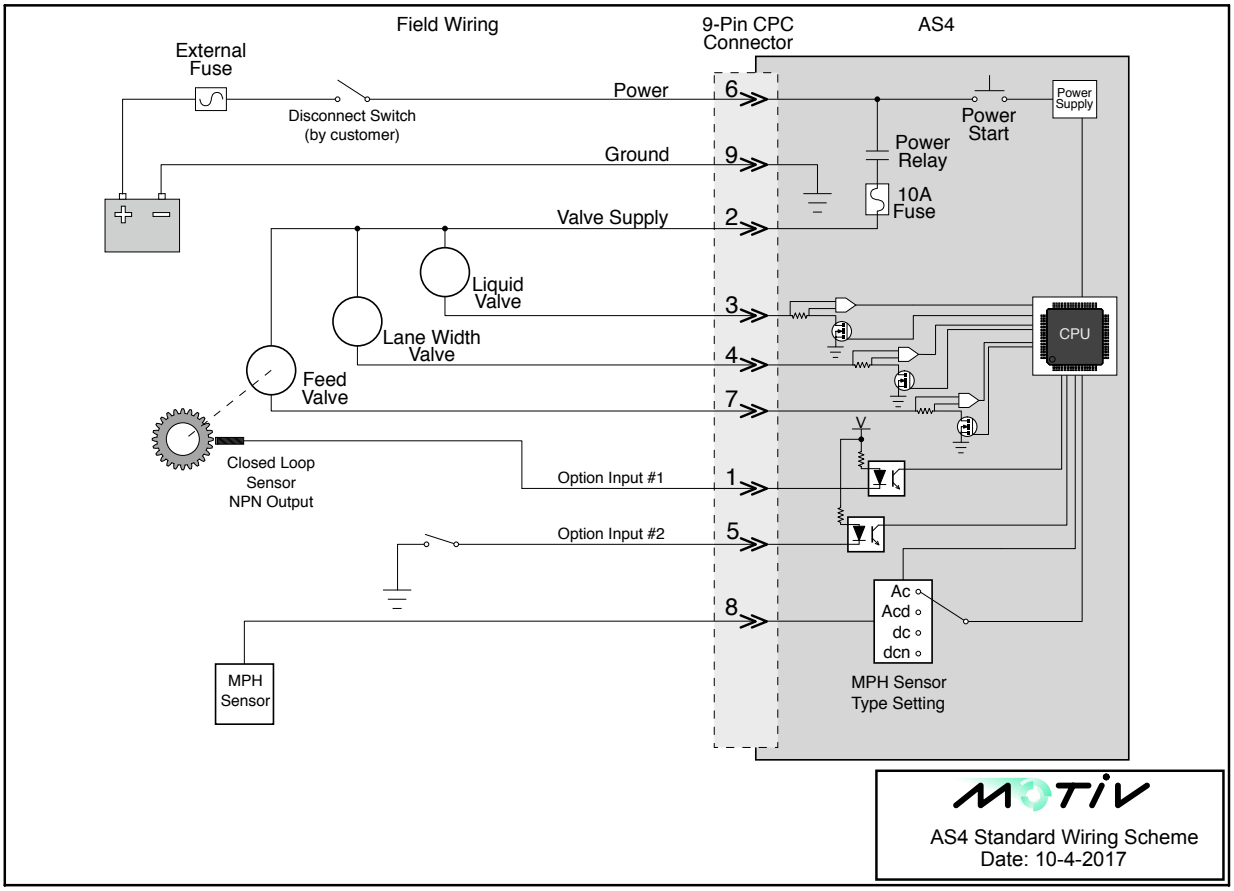
Calibrating the Feed circuit improves the accuracy of the entire system. With an accurate system, supervisory policy can be correctly implemented to apply the Pounds/Mile to deal with various storm situations. Calibrating open loop systems is preformed so the AS4 controller can relate the output powering the hydraulic valve to a real weight of material delivered.

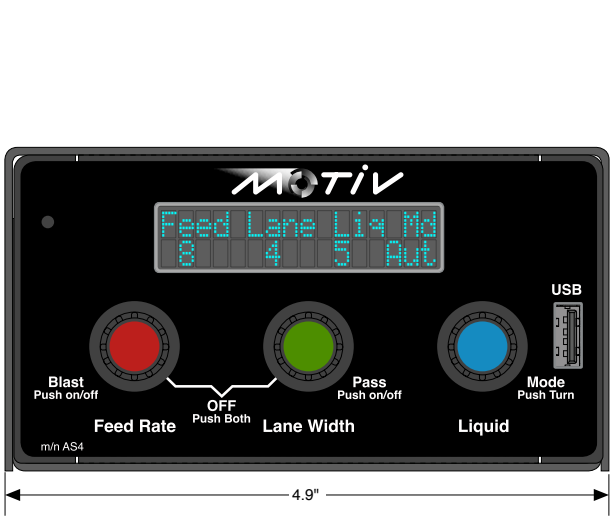
1. Load and weigh the truck with the designated “primary material”
2. Position the truck to off-load material and adjust the gate to its designated height.
3. Go to the "Feed Cal. Run" Menu (#32).
4. Hold the Lane Pb through the count down (5 sec.). The display will switch to "Ready for Cal. Dump"
5. Advance the engine to 1,800 R.P.M.
6. As the liquid knob is rotated CW the output will jump to 100%, CCW jumps to 0%. Press either the Feed, or Lane Pb to end the test. The test must be more than 60 Sec. for the time to be recorded for calculation
7. Reweigh the truck and find the difference between the second weight and the first weight.
8. Read the total pulses from the display and follow the equation below to determine what to enter into Menu #31

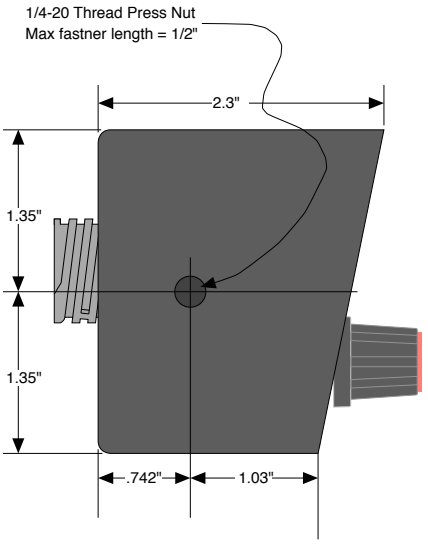
W1 = Original truck+material weight
W2 = After Dump truck+material weight
T = Seconds recorded in AS4 Display

Calibration value for Menu #31 $\frac{(W1 - W2) \times 60}{T}$ = Lbs/Min

AS4 Wiring diagram

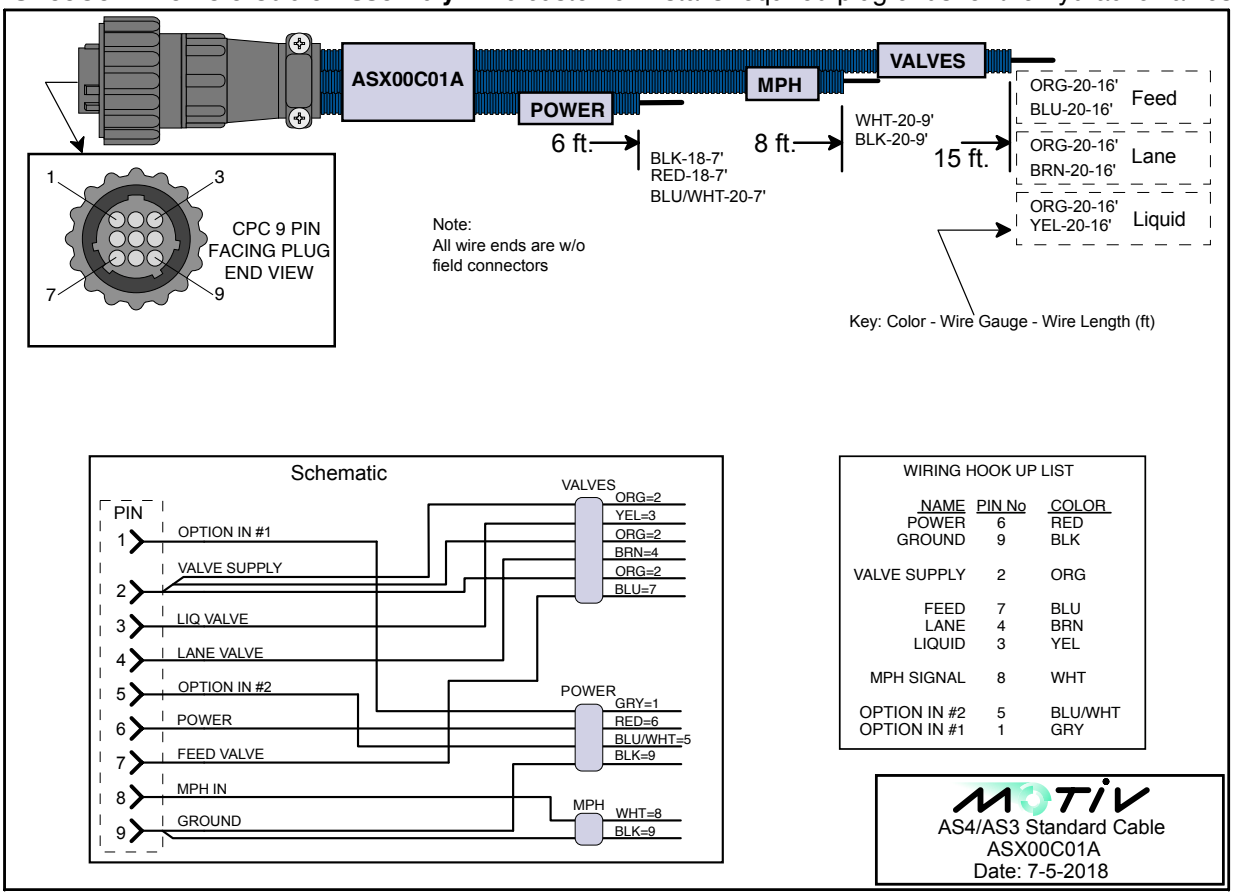




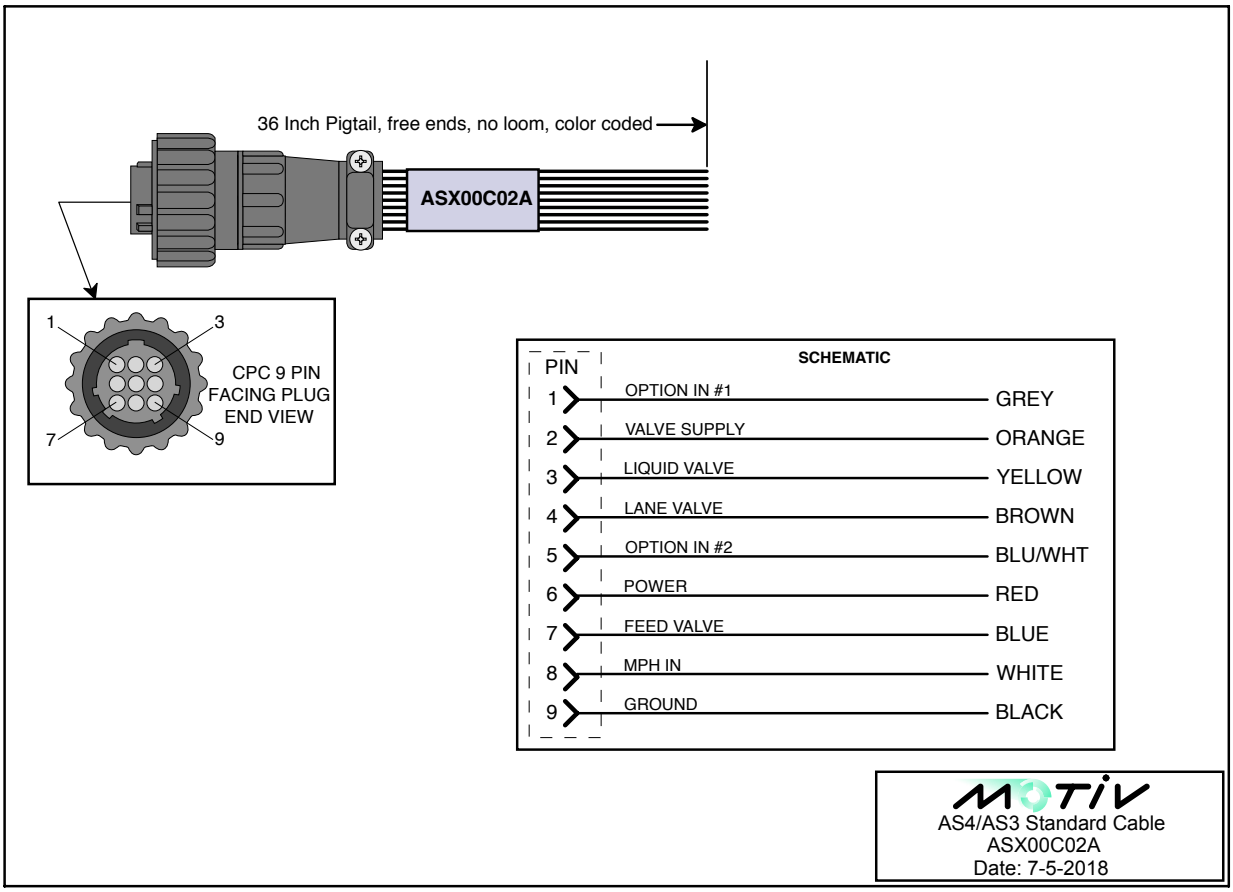


AS400 Mechanical No-Bracket
Date: 3-28-2018

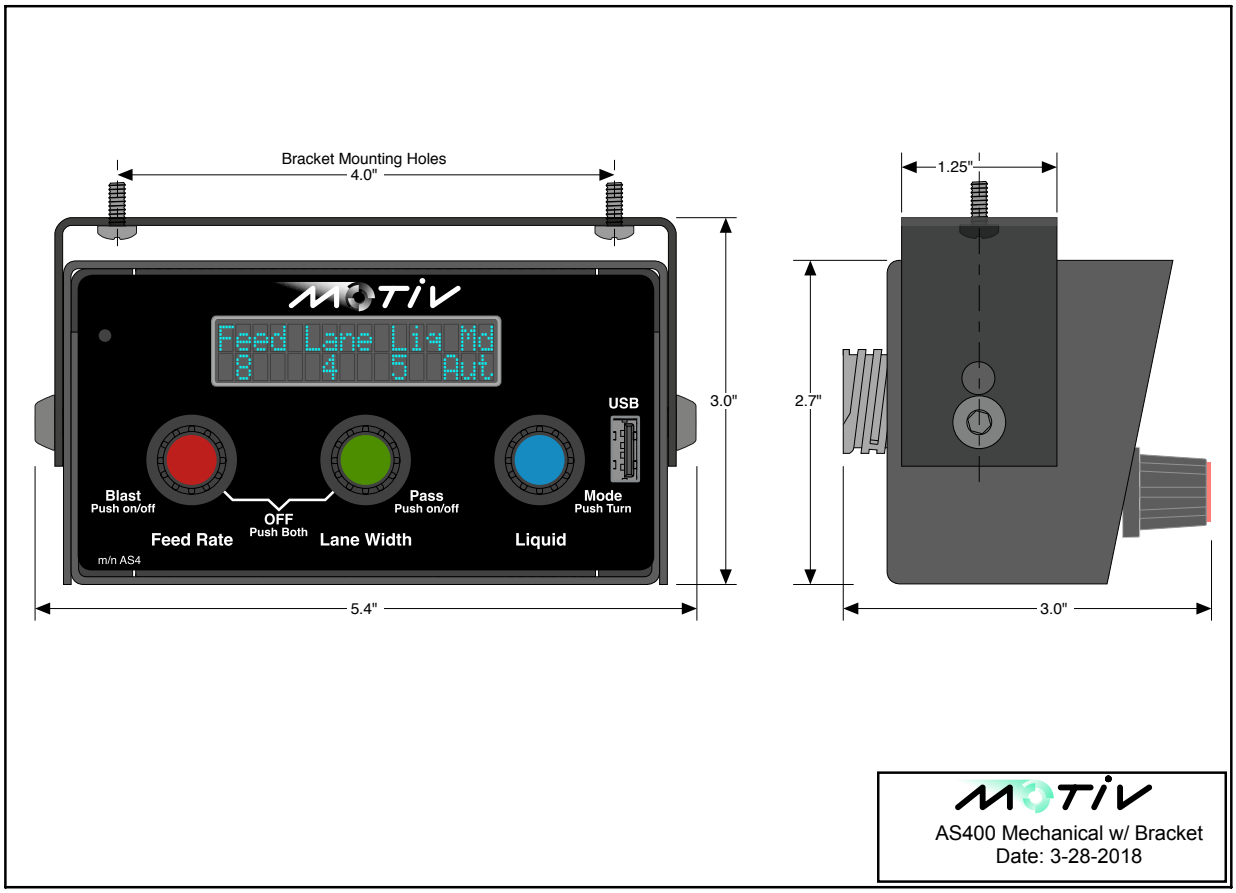
ASX00C01A Vehicle Cable Assembly- The customer installs required plug ends for the hydraulic valves.

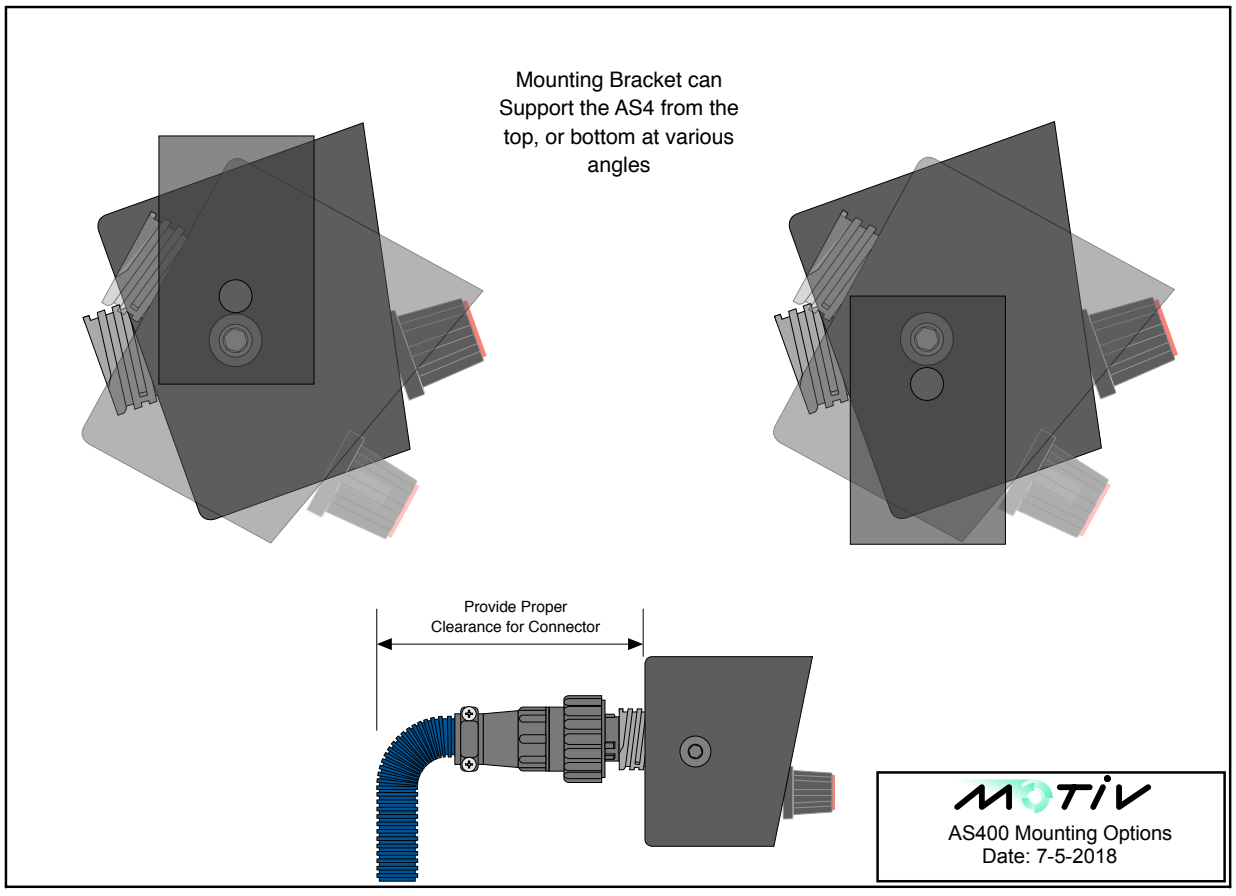


ASX00C02A Pigtail Cable Assembly-The customer completes the cable assembly by adding the required wire lengths, connections and terminations to all of the required vehicle components.



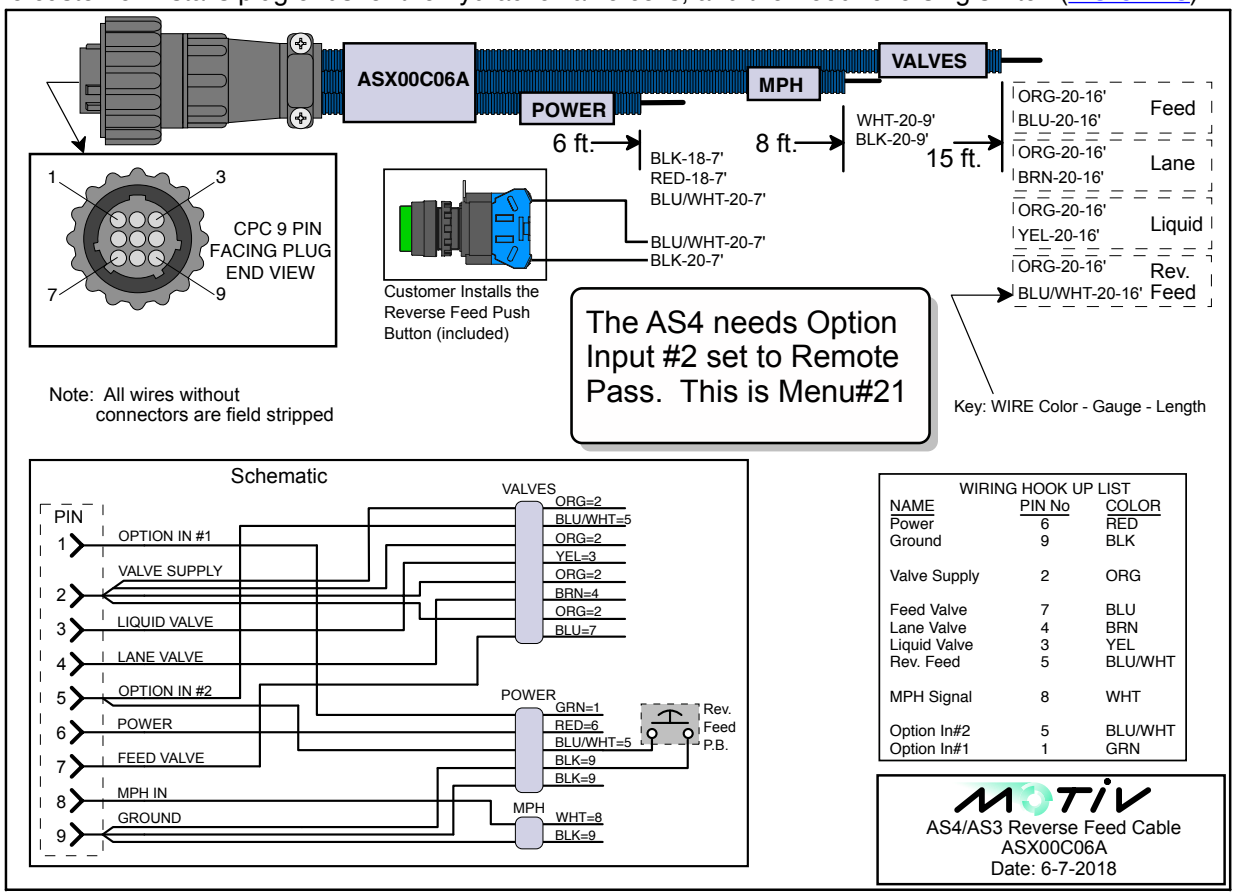
AS4 Mounting





ASX00C06A Vehicle Cable Assembly w/ Reverse Feed Switch

The customer installs plug ends for the hydraulic valve coils, and the Feed reversing switch (**more info**)

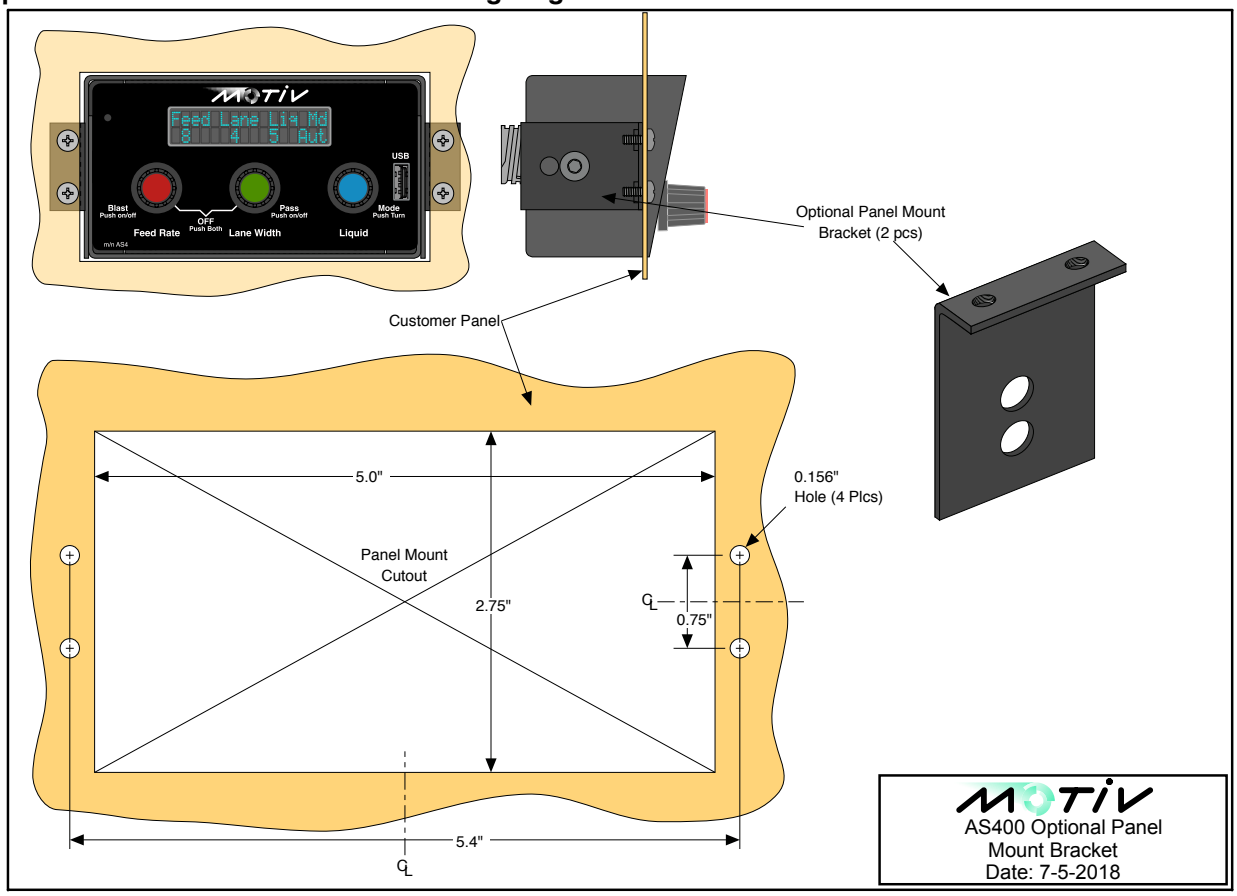


WIRING HOOK UP LIST

NAME	PIN No	COLOR
Power	6	RED
Ground	9	BLK
Valve Supply	2	ORG
Feed Valve	7	BLU
Lane Valve	4	BRN
Liquid Valve	3	YEL
Rev. Feed	5	BLU/WHT
MPH Signal	8	WHT
Option In#2	5	BLU/WHT
Option In#1	1	GRN

AS4/AS3 Reverse Feed Cable
ASX00C06A
Date: 6-7-2018

Optional Panel Mount BracketAS4 Wiring diagram



AS400 Optional Panel
Mount Bracket
Date: 7-5-2018

Program version log (valid as of the date of this publication)

The software version code for an individual AS4 can be viewed at menu 99

---------- *Begin design s/n 0 - 150* ----------

Date	Checksum	description
9-27-18	5D47	Initial Release.
11-1-18	A2DA	Fix lane output bug

- cut here -

Program Access Pass Code

The AS4 requires the installer to enter an access pass code in order to make changes to any internal settings. If the installer or supervisor wishes to keep this code secret, remove this portion from the printed manual. The AS4 pass code is **5428**