Model

MP343

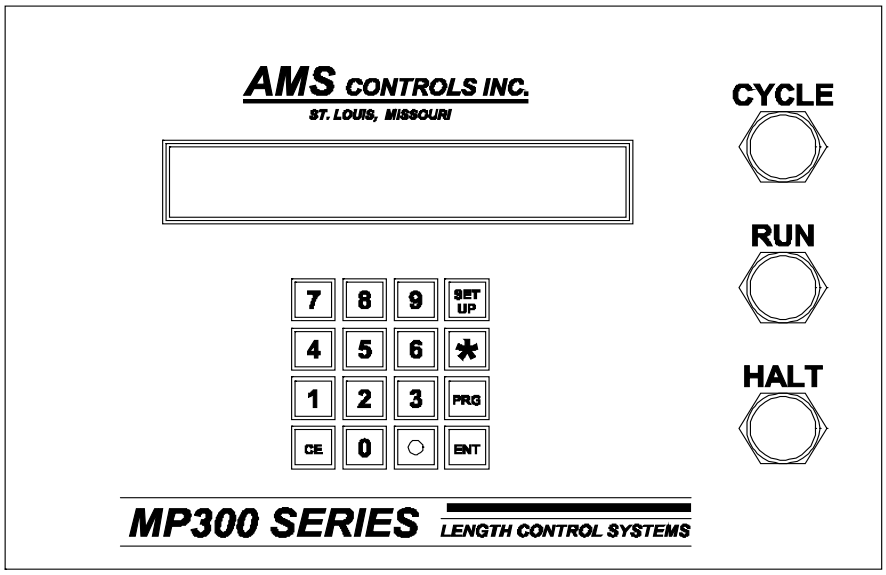
Pin Spotter Controller

Reference Manual

Introduction

AMS Controls has been supplying length control systems to the metal fabricating industry since 1978 and has built a reputation of producing high quality and reliable controllers.

The **MP343** controller is used to run a pinspotting device for pinning insulation to the inside of HVAC ductwork. The controller has the capability to run the conveyor system feeding the material through the PINSPOTTER. Once the **MP343** is placed in RUN, the forward output turns on and stays on. The PINSPOTTER controller can be run at single speed or double speed.



Installation

Refer to pages 4-1 and 4-2 for recommended wiring fo the Emergency Stop and Run circuits for the MP343 controller. Also refer to drawing numbers 4419 and 4447.

Inputs/Outputs

The MP343 controller has eight inputs and eight outputs. The controller also has seven dipswitches on the back of the controller (inside the controller on a consolette model) which are used to configure the controller to a certain machine type.

Inputs

Input 1 – Jog Forward

By pressing the "Jog Forward" button, the forward output (#1) will turn on.

Input 2 – Jog Reverse

By pressing the "Jog Reverse" button, the reverse output (#1) will turn on.

Input 3 – Sheet Detect

This input is a normally open switch that is closed by the presence of metal that is to be processed. The "Sheet Detect Switch" will give the signal to the controller that a part is present and will also reference the controller as to the position of the part. When the trailing edge of the part falls off of the "Sheet Detect Switch", the controller will stop firing pins.

Input 4 – Run Enable

This input can be used two different ways.

1. If the controller does not have a front panel, the "Run Enable" input is used as a run input. In this case, the run output should be used to latch the run button used to engage the run relay. Refer to the figure on page 4-2.
2. If the MP343 does have a front panel, it may be ired the same as mentioned above or the front panel run botton may be used. If the front panel run is used, connect input 4 to DC Common.

Input 5 – Setup Lockout

With this input “ON”, the setups cannot be changed, but may be viewed. The exception to this is the “Units of Measurement” parameter. When the “Setup Lockout” input is “ON” the memory cannot be cleared by pressing the “5” key during power up. This is used to safeguard information within the controller.

Input 6 – Not Used

Input 7 – Not Used

Input 8 – Manual Cycle

This input will fire the pins if the “Run Enable” input is “OFF”. The input functions the same as pressing the blue “Cycle” button on the front panel of the controller.

Outputs

Output 1 – Forward/Fast

Output will vary depending upon what type of speed logic is used. If Forward-Slow speed logic is used, this output will be "ON" for any movement in the forward direction. If Fast-Slow speed logic is used, this output will be "ON" for any fast feeds in the forward direction. See page 4-8 and 4-9 for a complete description of speed logic operation.

Output 2 – Slow

Output will vary depending upon what type of speed logic is used. If Forward-Slow speed logic is used, this output will be "ON" while in slow speed or halted. If Fast-Slow speed logic is used, this output will be "ON" only while in slow speed. See page 4-8 and 4-9 for a complete description of speed logic operation.

Output 3 – Reverse

Turns "ON" whenever the machine is moving in the reverse direction.

Output 4 – Run

Turns on when the MP343 is in the "Run" mode. It is typically used to latch the run push-button when input 4 is used as a run input.

Output 5 – Fire

Used to fire the actual pin valves. It remains on for the programmed "Fire Dwell" time.

Output 6 – Load

Used to load a pin into the pin-spotter. The output remains "ON" for the programmed "Load Dwell" time.

Output 7 – No Liner

Turns "ON" when a part is running with "No Velocity" programmed. In other words, the pin-spotter is to ignore the upcoming parts because no liner is present.

Output 8 – Out of Spec

If a part is running and the MP343 has to leave out at least one row of pins in the part, output #8 will turn "ON". This is to notify the operator that at least one row of pins will have to be put on the part manually to be within SMACNA specifications.

Dip Switch Settings

ON the back of a panel mount style controller or on the circuit board mounted to the lid of a consolette controller, seven small dips switches will be found on a small switch block. These switches are used to setup the proper Unit ID, which is used to define the controller as an MP343 standard backgauge controller and to establish proper communications with an XL120 controller, if applicable. The dipswitches also determine if the machine runs at one or two speeds and determines the encoder direction.

Switches 1, 2, 3, & 7 – Unit ID

Switches 1, 2, 3, and 7 determine the Unit Identification Number (ID) of the controller with the following three options

SW1	SW2	SW3	SW7	Unit ID
OFF	OFF	ON	ON	52 (Used by XL120 only)
ON	OFF	ON	ON	53 (Used by XL120 only)
OFF	ON	ON	ON	C1* (Used by CMP1000 only)

(*) Note: Unit ID C! will communicate with the CMP1000 only. It will <u>not</u> communicate with an XL120.

Switch 4 – Speed Logic

Switch 4 determines if the machine is to operate at a single speed or two speeds (fast and slow).

SW 4 "Off	Single Speed
SW 4 "On"	Two Speed

Switch 5 – Encoder Direction

Determines the polarity of the encoder. If the encoder counts in the wrong direction, change the state of Switch #5.

Switch 6 – Not Used

Must be set to "OFF".

Specification

Parameter	Panel Mount	AC Consolette
Mechanical		
Size	8"X12.5"X2.25"	8"X12.5"X7.5"
Weight	7lbs.	15lbs.
Electrical		
Input Voltage	24VDC ±5%	115VAC ±10%, 50-60Hz
Input Current	.5 Amp.	1 Amp.
Outputs		
Forward/Fast	Std DC	Std DC, AC Relay
Slow	Std DC	Std DC, AC Relay
Reverse	Std DC	Std DC, AC Relay
Run	Std DC	Std DC, AC Relay
Fire	Std DC	Std DC, AC Relay
Load	Std DC	Std DC, AC Relay
No Liner	Std DC	Std DC, AC Relay
Out of Spec.	Std DC	Std DC, AC Relay
Analog	0 to +10VDC	0 to +10VDC
Inputs		
Jog Forward	Yes	Yes
Jog Reverse	Yes	Yes
Sheet Detect	Yes	Yes
Run Enable	Yes	Yes
Security	External	Internal
Not Used		
Not Used		
Manual Cycle	Yes	Yes

(Note: The following parameters apply equally to all versions.)

Output Characteristics

Standard DC

Type	Open Collector Transistor
Maximum Current	4 ADC
Maximum Applied Voltage	35 VDC

AC Relay

Type	Form A Dry Circuit Relay
Maximum Current	5 Amp.
Maximum Applied Voltage	240VAC

Solenoid Driver

Type	High Voltage Internal Driver
Minimum Load Resistance	12 Ohms
Maximum Voltage Generated	65 VDC
Maximum Actuation Time	0.25 Seconds

Encoder Input

Type	Quadrature with Complements
Voltage	5VDC
Maximum Encoder Load	200 milliamperes
Maximum Pulse Rate	275,000 pulses/second

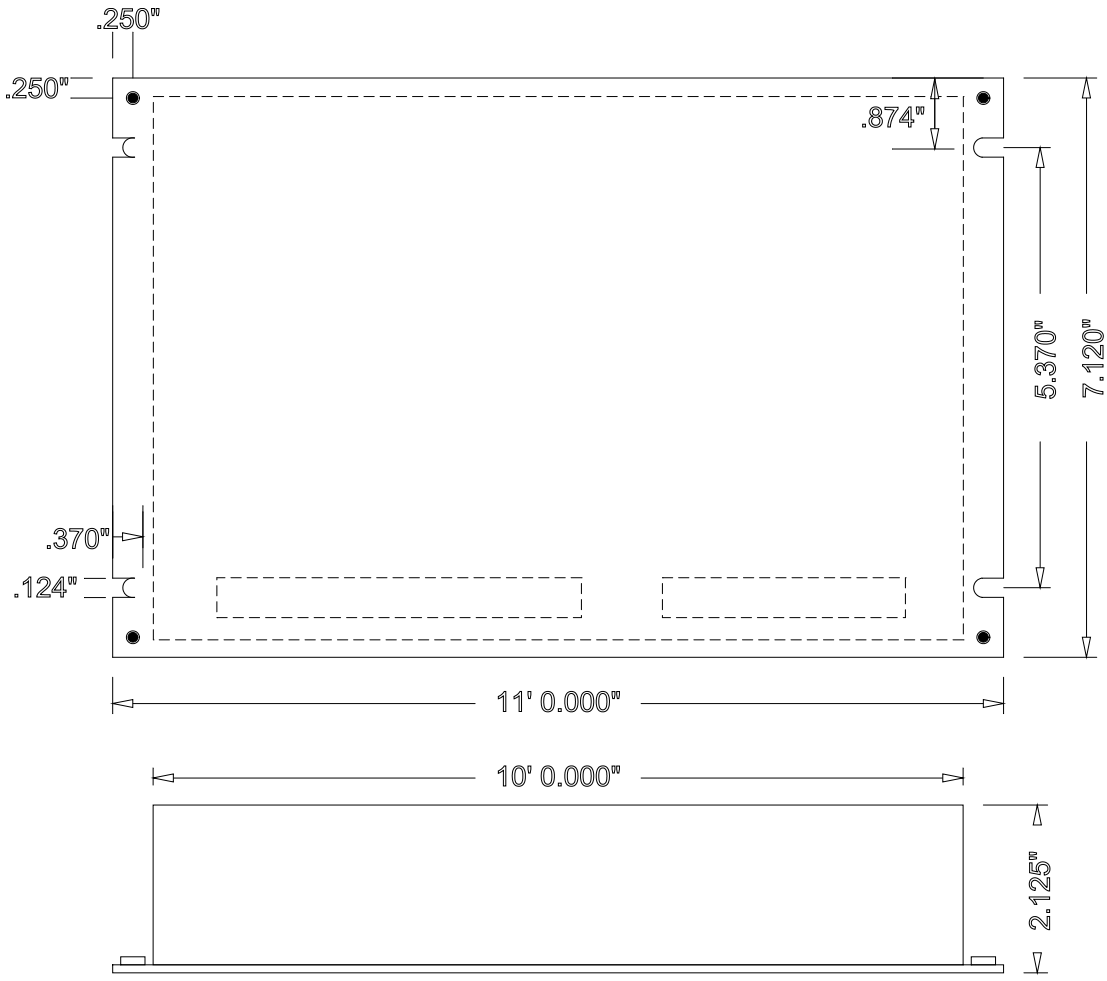
Operation

Maximum Part Length	9999.999 inches 254,000 millimeters
Units of Measurement	inches, centimeters, or millimeters

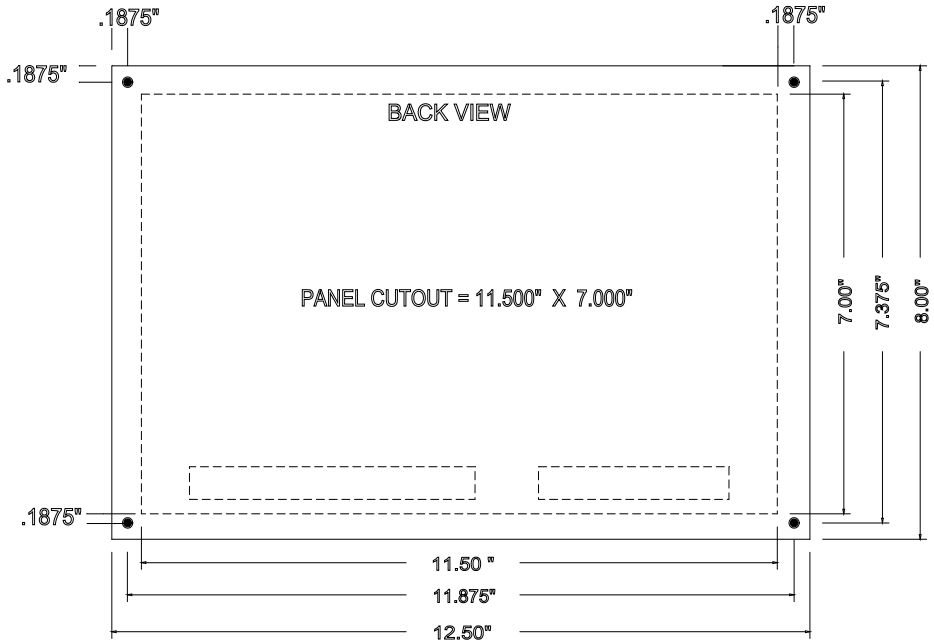
Features

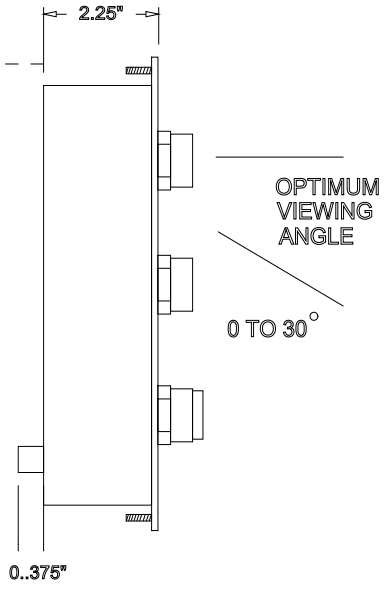
Display	48 characters in 2 rows
Keys	16
Controls	3 (CYCLE, RUN, HALT)

Mounting Dimensions

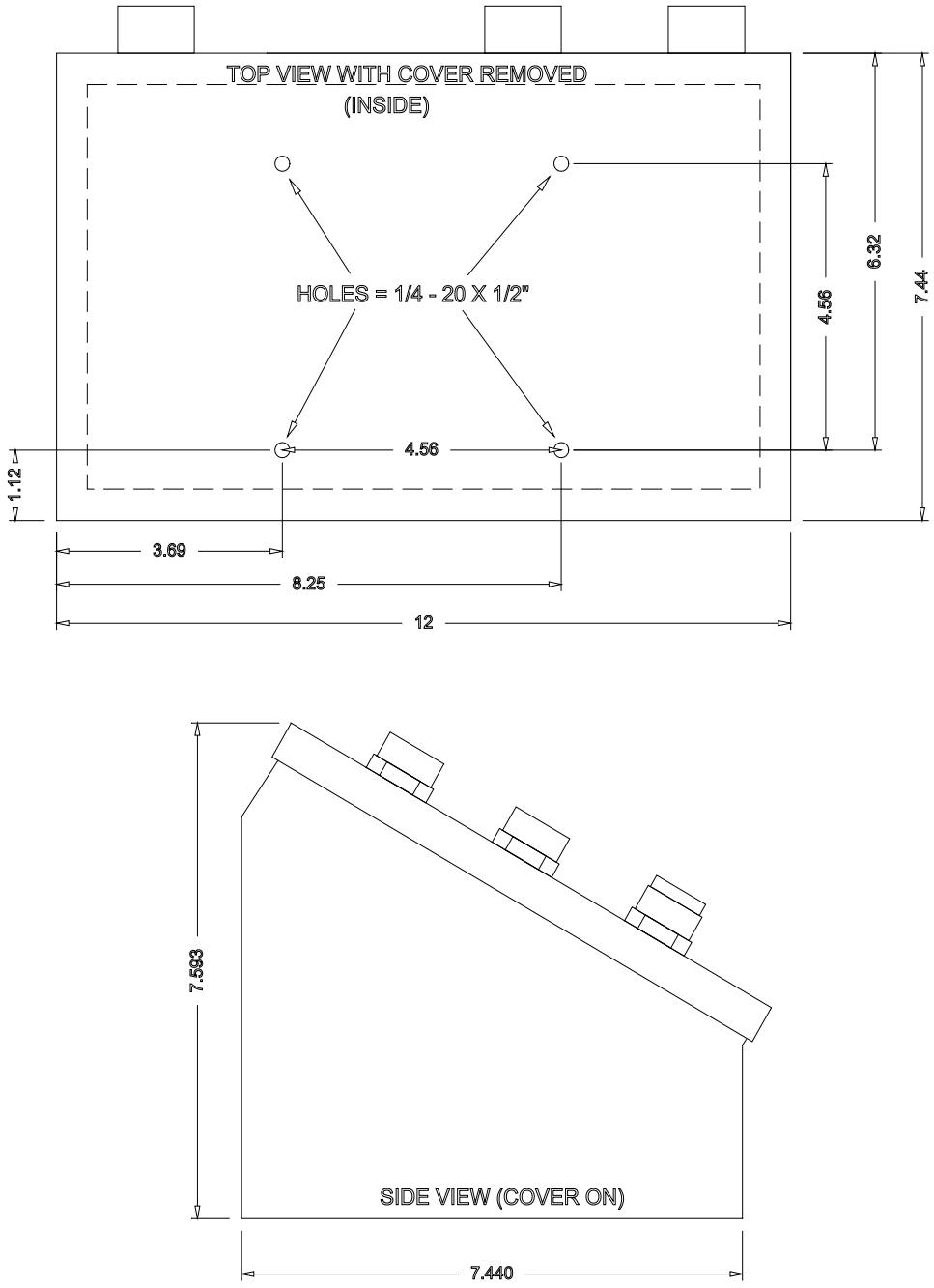


Auxiliary Controller Mounting Specifications





Panel-Mount Mounting Specifications

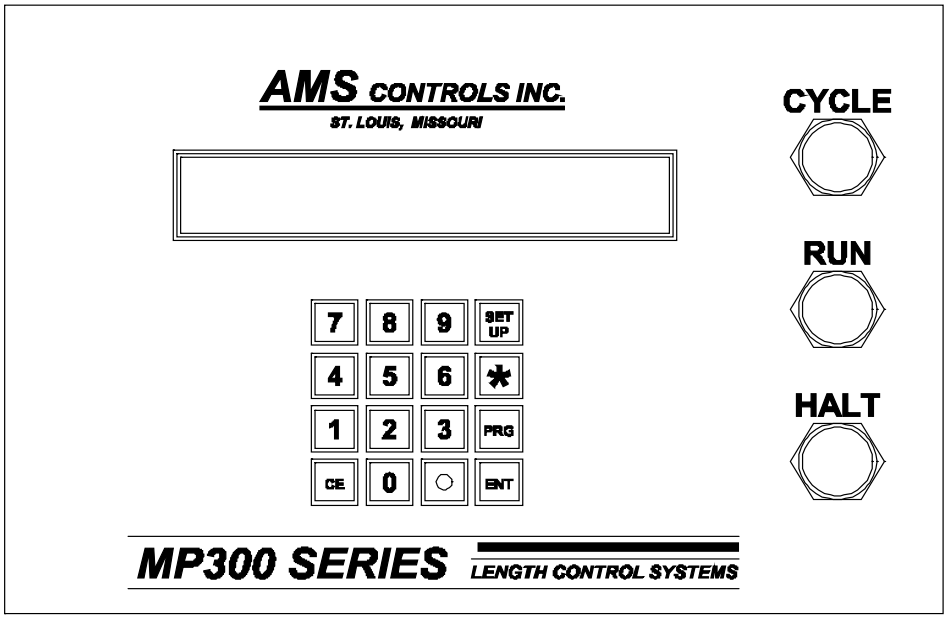


Consolette Mounting Dimension

Product Description

Front Panel Components and Description

The Model **MP343** front panel has three push button switches, a 16 key keypad, and a two line 48 character liquid crystal display.



Push Buttons

- CYCLE Press to fire the pins when NOT in the RUN mode
- RUN Press to initiate an automatic move sequence
- HALT Press to manually stop the guide movement

Key Inputs

- SETUP — Press to enter the setup mode. The setup mode is used to enter specific parameters about the Pinspotter.
- * — Press the asterisk key to exit the setup or programming modes.
- PRG — Press to program a new pin placement .
- ENT — Press to store the values entered in the setup and program modes.
- CE — Press to clear an incorrect entry value before the “ENT” key is pressed. Also used to clear any errors reported by the controller.

Chapter 1: Installation

Controller Power

The AMS controller requires a 24VDC supply for operating power. It is preferable to have two 24VDC supplies. One for the inputs and outputs and the other for the controller CPU power. Separate power supplies will isolate the input/output circuits from the Processor, reducing noise interference. The common of the supplies used must be connected to the common of the control, this circuit being grounded. The common of the supply will be switched into the inputs of the controller and the 24 VDC will be used in conjunction with the outputs to pull-in control relaying. All input power should be within the specification limits.

Power to the controller should be switched independent of other devices through it's own circuitry. The emergency stop circuit should not interrupt power to the controller. In an emergency-stop condition, the controller will track any movement of the material with controller power still applied. This allows continued production to resume after the emergency stop condition, without loss in accuracy. See Figure 4-1.

Emergency Stop Circuit

An emergency stop circuit is required for each machine, giving operator safety and protection of system equipment. A typical emergency stop circuit is shown in Figure 4-1. Pressing the guarded push-button RESET switch arms this circuit. The relay remains energized after the RESET switch opens because of the hold-in contacts of the relay. The relay condition depends on current flow through the normally closed emergency stop switches and any other emergency stop contacts in series with the switches. A momentary opening of either switch or contact will cause the relay to de-energize which cuts off power to all load devices. Adding devices in series with the emergency stop contacts or switches easily expands the circuit.

A higher degree of safety is achieved by placing switches behind safety guards and in doors of electric panels. These are wired in the Emergency Stop Circuit, so when opened, the machine is shut down.

The emergency stop circuit should not interrupt power to the AMS controller, however the AMS controller must know when an emergency stop has occurred in order to drop the line out of the RUN mode. This can be accomplished by breaking the run circuit or by opening the safely interlock input to the control. If an emergency stop condition occurs, power should be isolated from all output devices. This would include all 24VDC devices as well as all 115VAC devices. Please refer again to Figure 4-1.

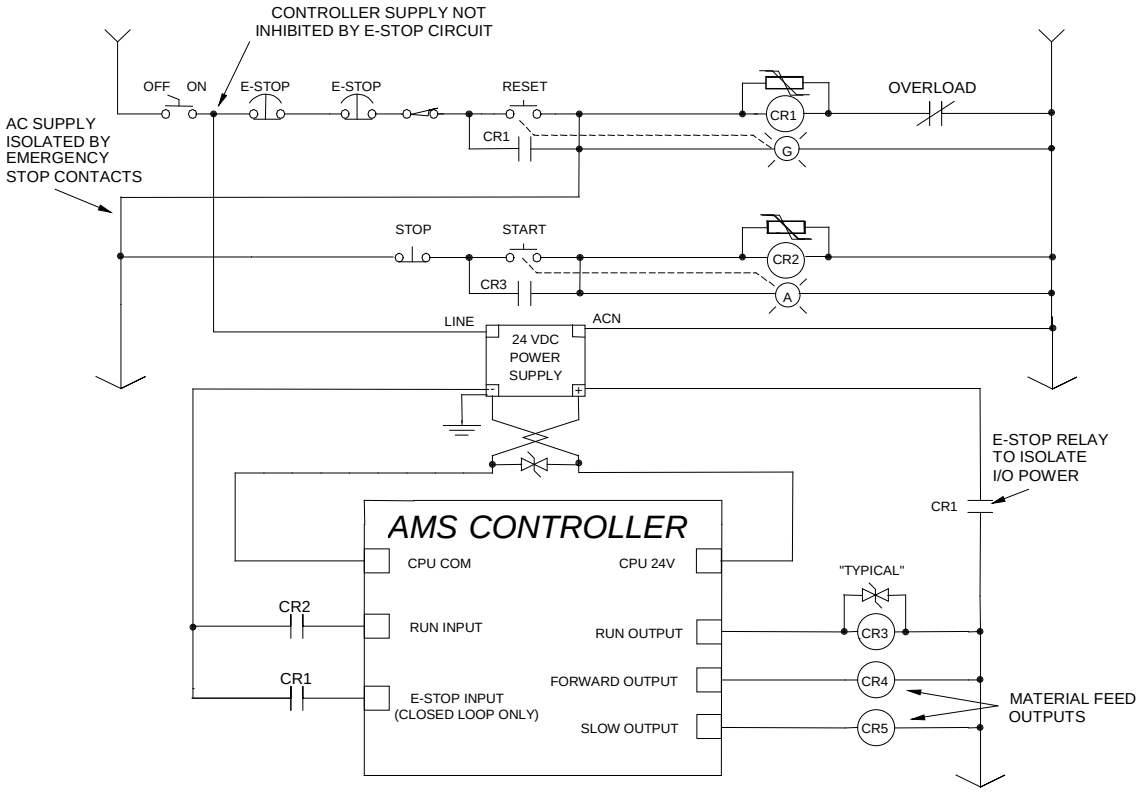


Figure 4-1 Circuit Example for Run and Estop

Pin Fire Circuit

Optimal performance of the pin fire can be met by customizing the AMS controller to a particular type of press and feed control. This is accomplished by changing the customer available switch settings. The switches are in a single package located on the back of the controller. The controller can be configured to work with single speed or two speed non-stop pin placement applications. Outputs are available for “Pin Fire” and “Pin Load”.
AMS controllers are designed to connect directly to 24VDC solenoids for optimal performance. A solenoid driving device, such as the AMS 3840 power module, can provide more accurate firing of the press.

If the solenoid for the pin-fire valve output is not 24VDC, then an attempt should be made to replace the solenoid with a compatible 24VDC type. If this is not possible, then a 24VDC relay will have to be installed between the AMS output and the solenoid.

AMS controllers have a timed “Pin Fire” output. The duration of the **PIN FIRE DWELL** or **PIN LOAD DWELL** output is programmable from 0.000 to 9.999 seconds. Please refer to timing diagram - Figure 4-2.

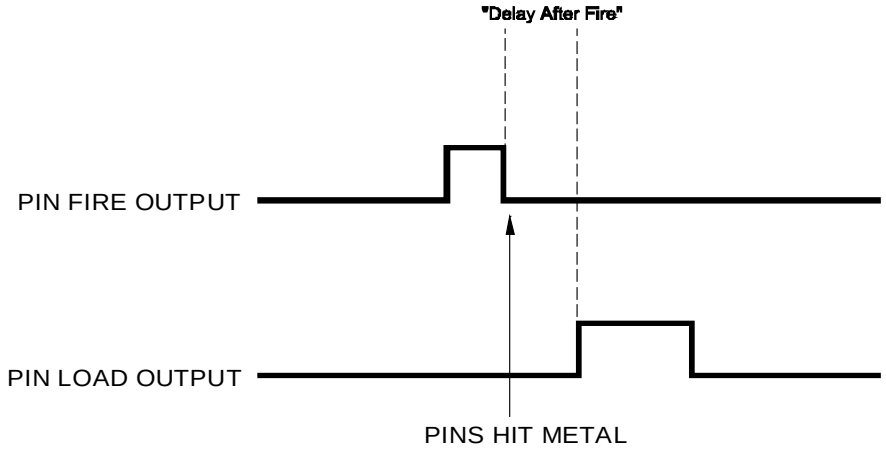


Figure 4-2 “Pin Fire” and “Pin Load” Timing

Setup Mode

Note: The following descriptions include all possible SETUP PARAMETERS and there are some parameters that are not used for every application. Only use the ones that apply for your particular machine. Make sure that the proper "dip switches" are set prior to entering setups. Refer to page A-1 for the proper dip switch settings.

The SETUP mode is used when the **MP343** is initially installed to configure it to the particular characteristics of the Pinspotter. The SETUP mode is entered by pressing the "Set Up" key and the mode can be exited by pressing the "∗" key. When power is applied to the controller, the built-in diagnostics check the memory for data retention.

If an error is detected, the memory is automatically cleared and the SETUP mode is entered to indicate that this data should be reentered. The setup values are entered in the order shown below and an explanation of each parameter is given. A form is provided in the back of this manual for recording the setup parameters of your machine. This form should be completed after your machine has been installed and properly adjusted.

To enter the SETUP mode, press the "Set Up" key. The following display will appear.

Selecting "1" will allow the operator to adjust the following parameters:

Detect-Fire

The DETECT-FIRE is the distance from the sheet-detect switch to the center of the pin fire mechanism. This distance should be as accurate as possible. The DETECT switch must be a normally open switch.

Fire Reaction

The FIRE REACTION time is the time delay between the time that the fire signal occurs, and the time that the pins enter the

material. To calculate the FIRE REACTION time, use the following steps:

1) Set the FIRE REACTION time to zero. 2) Run a sheet of material through the Pinspotter. 3) Measure the distance from the leading edge of the part to the first row of pins minus any programmed offset distance. 4) Calculate the FIRE REACTION using the actual leading edge to pins distance and the programmed leading edge to pins distance as follows:

$$\text{Fire Reaction Time} = \left[\frac{\text{Actual Distance - Prog. Distance}}{\text{Line Speed (in FPM)}}\right] \times 5$$

Fire Dwell

The FIRE DWELL parameter sets the time duration of the PIN FIRE cycle, in seconds. The range of time allowed is 0.001 to 9.999 seconds and is set to the nearest millisecond.

Delay After Fire

The DELAY AFTER FIRE is the amount of time between the PIN FIRE output turning off, and the PIN LOAD output turning on. The range of time allowed is 0.00 to 9.99 seconds.

Load Dwell

The LOAD DWELL parameter sets the time duration of the PIN LOADING device to be activated. The range of time allowed is 0.001 to 9.999 seconds.

Hi Vel Distance

The HIGH VELOCITY DISTANCE parameter sets the maximum spacing between the pins when making High Velocity Ductwork. The **MP343** will place the pins between the MINIMUM SPACING DISTANCE and the HIGH VELOCITY DISTANCE. The default distance is 6.000 inches.

Lo Vel Distance

The LOW VELOCITY DISTANCE parameter sets the maximum spacing between the pins when making Low Air Velocity Ductwork. The **MP343** will place the pins between the MINIMUM SPACING DISTANCE and the LOW VELOCITY DISTANCE. The default distance is 12.000 inches.

Sp Vel Distance

The SPECIAL VELOCITY DISTANCE parameter sets the maximum spacing between the pins when making Special Air Velocity Ductwork. The **MP343** will place the pins between the

MINIMUM SPACING DISTANCE and the SPECIAL VELOCITY DISTANCE. The default distance is 6.000 inches.

Hi MaxEdge Dist

When making ductwork for High Velocity Airflow, the HIGH MAXEDGE DISTANCE is the farthest location away from an edge that the PINSPOTTER will place pins. The **MP343** will place the pins between the HIGH MAXEDGE DISTANCE and the HIGH MINEDGE DISTANCE. The default distance is 4.000 inches.

Hi MinEdge Dist

When making ductwork for High Velocity Airflow, the HIGH MINEDGE DISTANCE is the closest that the PINSPOTTER will place pins to an edge. The **MP343** will place the pins between the HIGH MAXEDGE DISTANCE and the HIGH MINEDGE DISTANCE. The default distance is 4.000 inches.

Hi Max Brk Dist

When making ductwork for High Velocity Airflow, the HIGH MAX BRK DISTANCE is the farthest location away from a bend that the PINSPOTTER will place pins. The **MP343** will place the pins between the HIGH MAX BRK DISTANCE and the HIGH MIN BRK DISTANCE. The default distance is 4.000 inches.

Hi Min Brk Dist

When making ductwork for High Velocity Airflow, the HIGH MIN BRK DISTANCE is the closest to a bend that the PINSPOTTER will place the pins. The **MP343** will place the pins between the HIGH MAX BRK DISTANCE and the HIGH MIN BRK DISTANCE. The default distance is 4.000 inches.

Lo MaxEdge Dist

When making ductwork for Low Velocity Airflow, the LOW MAXEDGE DISTANCE is the farthest location away from an edge that the PINSPOTTER will place pins. The **MP343** will place the pins between the LOW MAXEDGE DISTANCE and the LOW MINEDGE DISTANCE. The default distance is 4.000 inches.

Lo MinEdge Dist

When making ductwork for Low Velocity Airflow, the LOW MINEDGE DISTANCE is the closest that the PINSPOTTER will place pins to an edge. The **MP343** will place the pins between the LOW MAXEDGE DISTANCE and the LOW MINEDGE DISTANCE. The default distance is 4.000 inches.

Lo Max Brk Dist

When making ductwork for Low Velocity Airflow, the LOW MAX BRK DISTANCE is the farthest location away from a bend that the PINSPOTTER will place pins. The **MP343** will place the pins between the LOW MAX BRK DISTANCE and the LOW MIN BRK DISTANCE. The default distance is 4.000 inches.

Lo Min Brk Dist

When making ductwork for Low Velocity Airflow, the LOW MIN BRK DISTANCE is the closest to a bend that the PINSPOTTER will place the pins. The **MP343** will place the pins between the LOW MAX BRK DISTANCE and the LOW MIN BRK DISTANCE. The default distance is 4.000 inches.

Sp MaxEdge Dist

When making ductwork for Special Velocity Airflow, the SPECIAL MAXEDGE DISTANCE is the farthest location away from an edge that the PINSPOTTER will place pins. The **MP343** will place the pins between the SPECIAL MAXEDGE DISTANCE and the SPECIAL MINEDGE DISTANCE. The default distance is 4.000 inches.

Sp MinEdge Dist

When making ductwork for Special Velocity Airflow, the SPECIAL MINEDGE DISTANCE is the closest that the PINSPOTTER will place pins to an edge. The **MP343** will place the pins between the SPECIAL MAXEDGE DISTANCE and the SPECIAL MINEDGE DISTANCE. The default distance is 4.000 inches.

Sp Max Brk Dist

When making ductwork for Special Velocity Airflow, the SP MAX BRK DISTANCE is the farthest location away from a bend that the PINSPOTTER will place pins. The **MP343** will place the pins between the SP MAX BRK DISTANCE and the SP MIN BRK DISTANCE. The default distance is 4.000 inches.

Sp Min Brk Dist

When making ductwork for Special Velocity Airflow, the SP MIN BRK DISTANCE is the closest to a bend that the PINSPOTTER will place the pins. The **MP343** will place the pins between the SP MAX BRK DISTANCE and the SP MIN BRK DISTANCE. The default distance is 4.000 inches.

Minimum Spacing

The MINIMUM SPACING parameter is the minimum amount of space that will be between the rows of pins. This is a physical characteristic of the machine and is dependent upon how fast the Pinspotter can reload, and how fast the line speed is. The **MP343** will place the pins between the MINIMUM SPACING distance and the HI, LO, or SP VEL DIST. The default distance is 3.000 inches.

Missed Pin Mode

When a row of pins are fired and there is not enough time to load the Pinspotter before the next row of pins needs to be fired, the **MP343** will display a MISSED PUNCH error and stop the line (if the MISSED PIN MODE is set to NORMAL). With the MISSED PIN MODE set to IGNORE, the row of pins will be skipped and no error will be displayed.

With the MISSED PIN MODE set to FIRE, the **MP343** will fire a row of pins as soon as the FIRE DWELL TIME, DELAY AFTER FIRE, and LOAD DWELL TIME have elapsed

NOTE:

With this mode set to FIRE, the Max Edge, Min Edge, and Brake Distance are ignored, so the pins may be fired closer to bends and edges than preferred.

Speed Logic

The **MP343** controller has four outputs which control the speed and direction of the machine. To accommodate more than one wiring possibility, the controller may be run with one of two different SPEED LOGIC settings: FORWARD/SLOW or FAST/SLOW. The controller outputs are defined differently for each logic setting. The outputs, their definitions, and their states in various conditions are shown in tables 1 and 2. Any number key toggles between FORWARD/SLOW and FAST/SLOW. Select the appropriate SPEED LOGIC to match your machine wiring configuration.

Machine State					
	Run Fast	**Run Slow**	**Jog Fwd**	**Halt**	**Jog Rev**
Output 1 (FOR)	**ON**	**ON**	**ON**	**OFF**	**OFF**
Output 2 (SLOW)	**OFF**	**ON**	**OFF**	**ON**	**OFF**
Output 3 (REV)	**OFF**	**OFF**	**OFF**	**OFF**	**ON**
Output 5 (RUN)	**ON**	**ON**	**OFF**	**OFF**	**OFF**

Table 4-1. Status of Outputs in Forward-Slow

Note: All Jogging and Referencing is performed at fast speed

Machine State					
	Run Fast	**Run Slow**	**Jog Fwd**	**Halt**	**Jog Rev**
Output 1 (FOR)	**ON**	**OFF**	**ON**	**OFF**	**OFF**
Output 2 (SLOW)	**OFF**	**ON**	**OFF**	**OFF**	**OFF**
Output 3 (REV)	**OFF**	**OFF**	**OFF**	**OFF**	**ON**
Output 5 (RUN)	**ON**	**ON**	**OFF**	**OFF**	**OFF**

Table 4-2. Status of Outputs in Fast-Slow

Note: All Jogging and Referencing is performed at fast speed

Min Slow Distance

This parameter is used on two speed lines and determines when to put the line into slow speed. The controller will automatically calculate when to start slowing down, and then this distance is added to it (if the DECEL MODE is set to AUTO). Increase this value for a longer slow distance. Decrease this value for a shorter slow distance.

A longer slow distance can improve part accuracy but too long a value can slow production. The distance should be set long enough that the material fully reaches the slow speed before stopping.

The **MP343** controller calculates the distance from the programmed position that the machine should shift into slow speed. This is based on the speed of the material and the deceleration characteristics of the machine.

A minimum amount of slow distance can be manually set by this parameter. It is added to the calculated slow distance to extend the time spent in slow speed (if the DECEL FACTOR is set to AUTO).

When the DECEL FACTOR AUTO setting is used, it is best to set this parameter to a few inches initially until the system has been calibrated and the controller has had a chance to get accustomed to the behavior of the machine. When the machine is running good parts repeatedly, reduce the MINIMUM SLOW DISTANCE as much as possible to increase the production rate, making sure that the material is at a constant velocity (slow speed) before stopping.

Decel Factor Mode

On two-speed machines, a DECELERATION (DECEL) FACTOR is used by the **MP343** controller when changing from fast to slow speeds. The user has the option to select from three DECEL FACTOR MODES: AUTO, MANUAL, or OFF.

AUTO: A DECEL FACTOR is automatically maintained by the controller. It is expressed in inches-per-second-per-second (In/Sec^2) and is used in the Adaptive Slowdown calculation. The parameter can be overridden but will change on the next movement.

MANUAL: A DECEL FACTOR may be manually entered into the **MP343** controller. The value is used in the Adaptive Slowdown calculation. Some trial and error may be necessary when in the MANUAL mode to find a DECEL FACTOR which works properly. Ideally, the machine should shift from fast to slow at some distance prior to the target long enough so that it reaches a constant slow velocity before the movement outputs are turned off.

If the machine tends to shift into slow too soon, increase the DECEL FACTOR. If the machine tends too shift into slow too late, decrease the DECEL FACTOR. The DECEL FACTOR should be used in conjunction with the MINIMUM SLOW DISTANCE to determine the ideal time to change from fast to slow.

While in the MANUAL mode, the AMS controller will not calculate a new value for the DECEL FACTOR after each stop.

OFF: No DECEL FACTOR is used and the controller will not make an Adaptive Slowdown calculation. The machine will shift from fast to slow when the backgauge has reached the MINIMUM SLOW DISTANCE before the target. For example, if the MINIMUM SLOW DISTANCE has been set to four inches, the machine will shift from fast to slow 4 inches before the programmed position. This may or may not be enough distance for the machine to decelerate properly.

The DECEL FACTOR mode defaults to OFF but may be used in MANUAL or AUTO to increase productivity.

Decel Factor

This parameter is expressed in inches-per-second-per-second (In/Sec^2) and is used in the Adaptive Slowdown calculation discussed in the DECEL FACTOR MODE above. The is no exact formula for this value so experimentation is necessary. Ideally the machine should shift from fast to slow at some distance prior to the target so that it reaches a constant slow velocity before the movement outputs are turned off. This value is automatically calculated by the controller if the DECEL FACTOR MODE is set to AUTO.

Resolution

The RESOLUTION parameter defines the length of material movement for each increment of the encoder. It is a function of the circumference of the measuring wheel and the number of counts per revolution of the encoder. The formula for calculating RESOLUTION is as follows:

$$\text{Resolution} = \frac{\text{Circumference}}{4 \text{ x Encoder Count}}$$

For an AMS encoder, the encoder count is the model number of the encoder. A Model 256 is a 256 count encoder. A Model 1000Z is a 1000 count encoder.

The most common wheel used has a circumference of 12 inches. For this size wheel, RESOLUTION would be as follows:

Model	Resolution
256	0.01171875
256Z	0.01171875
500	0.006
500Z	0.006
1000Z	0.003

It is not necessary to precisely measure the circumference or calculate the formula to any great precision. Nominal values can be used with precise results achieved during calibration.

Values between 0.00004000 inches and 0.04000000 inches are acceptable.

Correction

The CORRECTION FACTOR adjusts for errors in the size and tracking of the measuring wheel. It is expressed as a percentage, with 100% being no correction. Increasing the CORRECTION FACTOR causes the pins to be placed further apart and decreasing the value brings the pins closer together.

Filter Constant

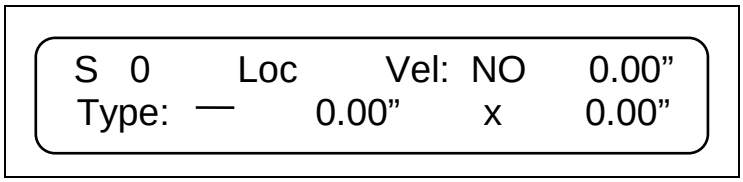
The FILTER CONSTANT can be adjusted in order to improve accuracy. A low value should be used on machines with very stable line speeds. A high value (greater than 50 Hz) should be used when rapid fluctuations in line speeds occur. Some trial may be necessary to achieve an accurate value. The default value is 32 Hz, which is considered to be on the high side of the low values. The controller will allow values from 1.0 Hz to 200.0 Hz.

Units

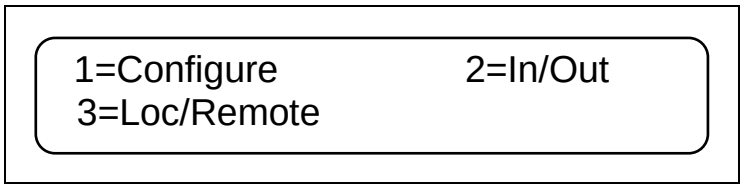
Length measurements can be programmed and displayed as either English inches, Metric millimeters, or Metric Centimeters. Press any number key to toggle through the choices.

Status Screen

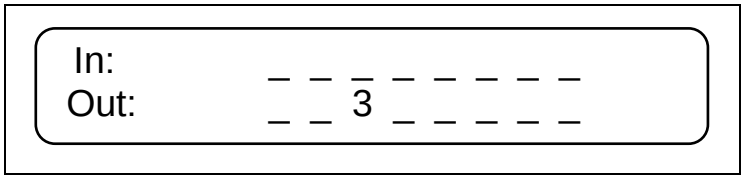
Pressing the "∗" key will show the current velocity, Local / Remote mode, velocity type, current position, type of part, part width and part height.



If the "Set Up" key is pressed again other options are available.



If “2” is pressed, the INPUT/OUTPUT screen can be viewed. This can be helpful as a troubleshooting aid if the machine is not working properly.



Pressing the “Set Up” key will allow you to exit this screen.

Pressing 3 while viewing the SETUP screen enters the LOCAL/REMOTE function. If the programming for the machine is to be done with this controller, select the LOCAL mode. If another controller will program the machine, select REMOTE.

Operating Procedure

Pin Placement

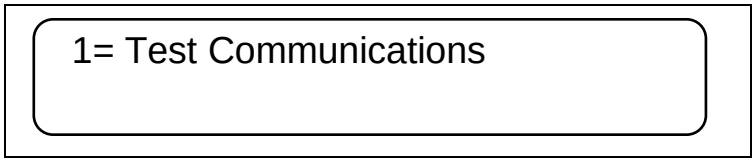
The following are the rules that the **MP343** follows to determine where the rows of pins must be located based on the size and velocity of the duct.

1. Always put a row of pins between the min and max edge distance from the leading and trailing edges of the sheet of metal. Unless there is a conflict, put holes in the middle of these limits.
2. Never space rows of pins less than the minimum spacing (this is a machine limitation).
3. Never put a row of pins closer than the min edge distance from a brake line.
4. Never put rows of pins spaced greater than the specification spacing (i.e. High Velocity Distance) unless rules 1 through 3 would be violated.
5. Never put a row of pins greater than the max edge distance from a brake line unless it conflicts with rules 1 through 4.
6. Always try to put a row of pins the median edge distance from a brake line unless a row of pins could be saved by putting the last row within the max edge distance from the brake line.
7. If rules 1 through 4 result in the specification spacing not being met, then make only one row of pins out of specification so that an extra row of pins can be put in by hand. If this happens, the “out of spec” output will turn on. If the pin locations can be programmed entirely within specification, the “out of spec” output will be off.

NOTE:

If the velocity is “none”, the Pinspotter is disabled and the “No Line” output will turn on.

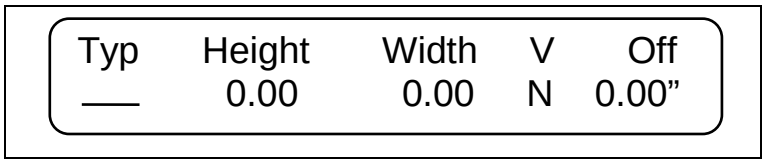
If the “Set Up” key is pressed twice, the following screen appears:



While in the second SETUP screen, pressing 1 will test the communications with another controller if they are interfaced together. If there is no communications, the messages “No Data Received” and “No Data Sent” will be seen.

Program Mode

The program mode is entered by pressing the “PRG” key.



The Type Part should be flashing steadily. This is the controller’s way of informing the operator that it is waiting for the operator to enter information.

TYP (T) Part Type - One of four options:

- **Four piece**
  One piece is pinned from either the height or width dimension. If both are programmed, the height dimension is used.

L **- “L” shaped**
One piece is pinned that will be bent once to form an “L” shaped section of duct.

U **- “U” shaped**
One piece is pinned that will be bent two times to form a “U” section.

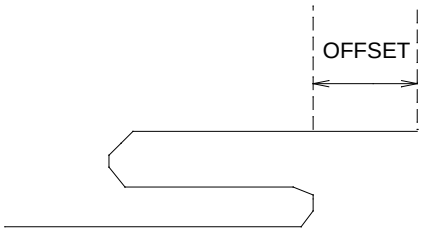
0 **- Full wrapper**
One piece is pinned that will be bent three times to form a complete section of duct.

Height The height of the duct .

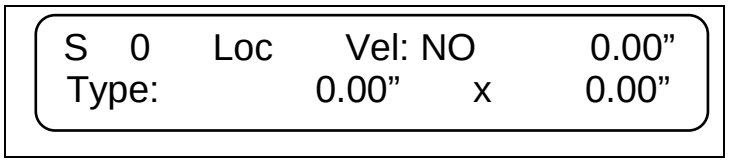
Width The width of the duct.

V Velocity - Different velocities require different pin spacing for the insulation. Valid options: H (high), L (low), S (special), and N (none).

Off Offset- The lip that is added to some sheets’ length when the lock is formed and is not counted toward the length of the part.



When the part programming has been completed, press the "ENT" key to accept the new program and to enter the STATUS screen.

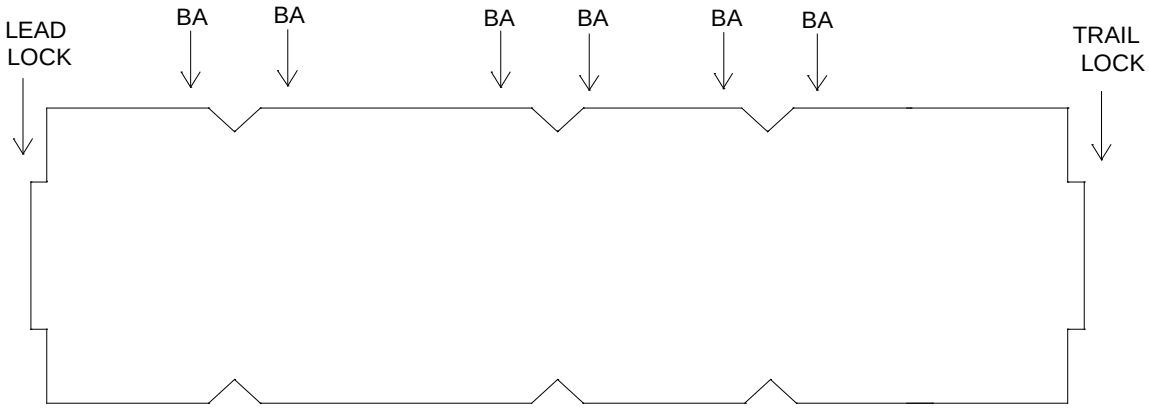


The status screen will show the line speed, the LOCAL / REMOTE mode, the Velocity type, current position, Type of part, part Width, and part Height.

To start the controller moving, the operator simply presses the "RUN" button. If the controller is already in the RUN mode, the Pinspotter will move to the new position as soon as you press the "ENT" key.

Bend Allowance

"Bend Allowance" is the length that is subtracted from each side of the part. This is used to compensate for gain due to each bend and the difference between real and nominal measures. For example, when making an ▭ shaped part (wrap-around type), there will be three corner notches for the three bends. At each bend the **MP343** controller will subtract the BEND ALLOWANCE from both the height section and the width section. So on a part with three bends, the controller subtracts a total of 6 BEND ALLOWANCES from the overall part length. This is shown in figure below.



Velocity Different velocities require different pin spacing for the insulation. Valid options: H (high), L (low), S (special), and N (none).

Run Operation

Once the RUN ENABLE input (#4) is closed, the **MP343** will turn on the RUN and FORWARD outputs until the RUN ENABLE input opens, or the front panel HALT button is pressed. The **MP343** will only fire pins in the RUN mode when the sheet detect switch is closed.

Front Panel Run/ Remote Run Mode

If using the FRONT PANEL RUN button, jumper input 4 (Run/Enable) to DC common. Doing this will disable the Jog Forward and Jog Reverse inputs.

If using a REMOTE RUN/ HALT circuit, Input 4 is the Run input. The Run output (#4), should be used to latch the input, refer to the enclosed Electrical Interface Diagram for wiring. When using a REMOTE RUN, the HALT button on the front panel will still halt the operation.

Appendix

MP343 Switch Settings

Switch	Description
1	Unit ID, must be OFF
2	Unit ID, must be OFF
3	Unit ID, must be ON
4	OFF = One Speed/ ON = Two Speed
5	Encoder Direction
6	Not Used, must be OFF
7	Unit ID, must be ON

The proper Unit ID switch setting for the **MP343** is: switch 3 and 7 ON. Some systems have the capability of having 2 **MP343s**, and the Unit ID switch setting for the second controller is: switches 1, 3, and 7 ON.

SW1	SW2	SW3	SW7	Unit ID
OFF	**OFF**	**ON**	**ON**	**52**
ON	**OFF**	**ON**	**ON**	**53**

MP343 Inputs

Inputs	Description
1	Jog Forward
2	Jog Reverse
3	Sheet Detect
4	Run Enable
5	Setup/Lockout
6	Not Used
7	Not Used
8	Manual Cycle

MP343 Outputs

Outputs	Description
1	Forward/Fast
2	Slow
3	Reverse
4	Run
5	Fire
6	Load
7	No Liner
8	Out of Spec.
Pin 14	Analog +
Pin 15	Analog -

Pin 14 is labeled VAR + on the back of the controller
Pin 15 is labeled VAR - on the back of the controller

In Case of a Problem

The **MP343** is a very reliable product, but things can go wrong.

The user can clear most problems, but AMS experts are always ready to help if needed.

We have many years of experience with all types of length controls and coil processing equipment. Our experience shows that problems are grouped into:

- **Machine problems** (most common)
- **Operator mistakes**
- **Incorrect Setup data**
- **Corrupted controller memory**
- **Cable damage**
- **Controller fault** (least common)

Troubleshooting is just a logical series of steps which leads to the likely cause of a problem. The only tools you need are an accurate scale or steel tape, and perhaps a multimeter.

This guide helps the user to help himself. Follow these suggestions in the order listed.

Troubleshooting Guide

When did the Problem Start?

Did the machine work properly at one time?

If the machine **did** work properly at one time, what has changed since then?

Did the problem start after routine maintenance? After electrical panel work? After a material change? After an operator change? Trace backwards in time to find out what's different.

Check the Machine

Check the **Encoder** to make sure it tracks the material perfectly.

Check the encoder **cable** connections. They may have worked loose from material movement or vibration. Make sure there are no nicks or cuts in the cable.

Visually check **other** parts of the machine for loose fasteners, excessive wear, proper lubrication, proper material placement, and proper operation of the Guide.

Collect Data

Often the problem is that the machine is making out-of-tolerance parts. To deal with this type of problem, carefully measure the parts made and compare these numbers with those that were programmed.

Write down these measurements for possible later reference.

If pin placement seem to vary at random, check the encoder mounting very carefully. The encoder must move with the material, and cannot be allowed to slip. If dimensions are off in a consistent pattern, adjust the correction factor.

Re-check Setups

Re-check Setup values with originally recorded values. When you installed the **MP343** controller, you should have recorded the Setup values on the form provided in the manual for your machine TYPE. Make sure that none of these values has changed.

Use Built-in Diagnostic features

The **MP343** has a display mode (press SETUP, then press 2 for the Input/Output Status) that allows you to monitor the controller's inputs and outputs. Watch this display while the machine is running to check for enables and brake actuation points.

On the main Status display, you can watch line speed and Guide position. Compare what you see here to what should be happening as the machine runs.

Check incoming Power

Check incoming power for proper voltage. If you suspect fluctuations, watch the indicator on an old-fashioned analog meter to see if they show up.

Fancier line monitors are available for stubborn cases that you can't see on ordinary meters. Use a recording line monitor to find problems that seldom show up. Your local power company may be able to help with this.

Cycle Power

Cycle power off and on. Try this if the controller "locks up" (won't respond to the keyboard). This **may** restore normal operation after an electrical surge. If not, clear the **MP343**'s memory.

Clear Memory

Clearing memory will erase all Setups and Order information in the **MP343**'s memory.

Don't try clearing memory unless you have written down all Setups and Order information for re-entry.

Don't try clearing memory unless you have tried everything else above.

You can clear all storage in the controller (including Setup and Order data) by following this sequence: **(1)** Make sure that the Security switch is unlocked; **(2)** Turn off power to the controller; **(3)** Wait five seconds; **(4)** Turn the controller back on; **(5)** Wait until the AMS Controls Inc. screen has disappeared and the words **" EPROM TEST"** appears on the screen, and a bar at the bottom of the screen starts moving from left to right; **(6)** Hold down the "5" key for at least two seconds and release the "5" key when you see the unit reset (the AMS Controls Inc. will reappear on the screen).

NOTE:

If the bar at the bottom of the screen makes it all the way across the screen, it may be too late to hit the "5" key. If this happens the memory was NOT cleared and you must return to step one of the clearing sequence.

Electrical Noise

The **MP343** should **not** lock up frequently. If it does, you should suspect that electrical noise is present.

Noise problems can be very hard to locate. The best way to avoid noise is by using good cable layout and wiring methods. Also, noise suppresser devices such as **varistors** are needed in some cases.

Refer to the AMS Application **Note "Noise Suppression Methods"** for details.

FAX Setup and Parts data to AMS

FAX Setup and Parts data to AMS with a full description of the problem. Unless you think your problem is very simple, you might as well FAX this information to us before you call. We'll probably ask you for it anyway.

Include the Model, Serial, and Software Version numbers.

Be sure to send a copy of the Setup Data Sheet, and all information about the problem. **FAX** us at **1-314-344-9996**.

Don't forget to include your name and phone number so we can call you back.

Call AMS

If you can't fix the problem without our help, call AMS and speak with our experts. Call us toll-free at **1-800-334-5213**. Have your Model, Serial, and Software Version numbers ready when you call.