MP450 Controller

for Cut-to-Length Machines

Technical Reference & Installation Guide

The most current version of this manual is always available at:
www.amscontrols.com/files/manuals/default.asp

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Chapter 1: Introduction

Overview

The AMS Controls MP450 is an industrial controller used to control cut-to-length machinery. Figure 1 shows the front panel of the MP450.

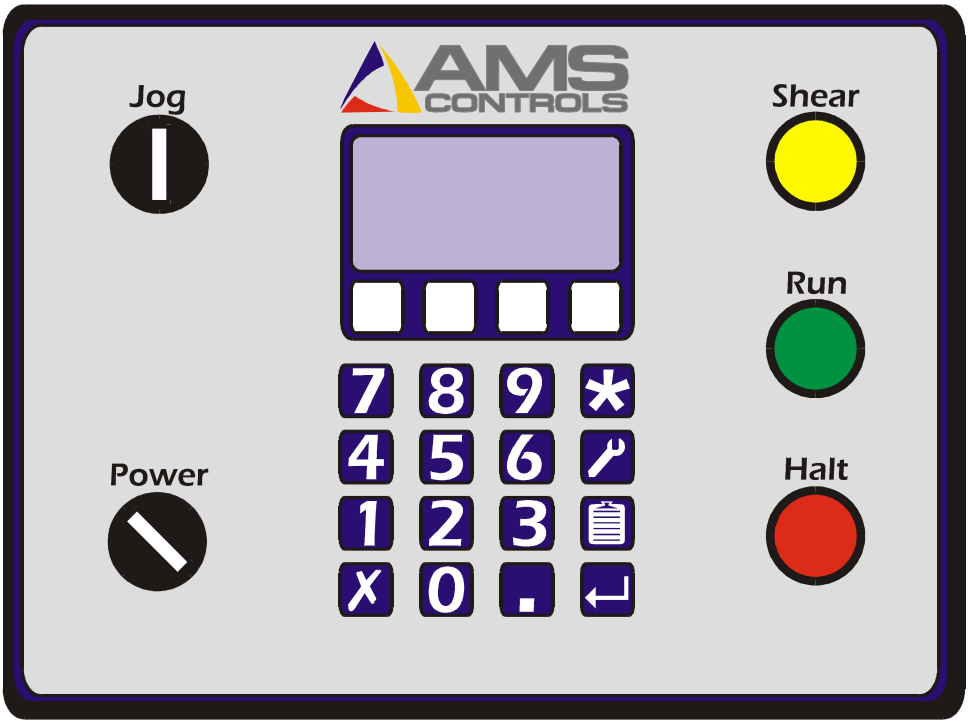

Figure 1: AMS Controls MP450 Controller

Features

The MP450 controller's features include:

- Accurate length control
- Simple programming
- Easy calibration

Chapter 2: Installation Specifics

Mechanical Details

Dimensional Drawing

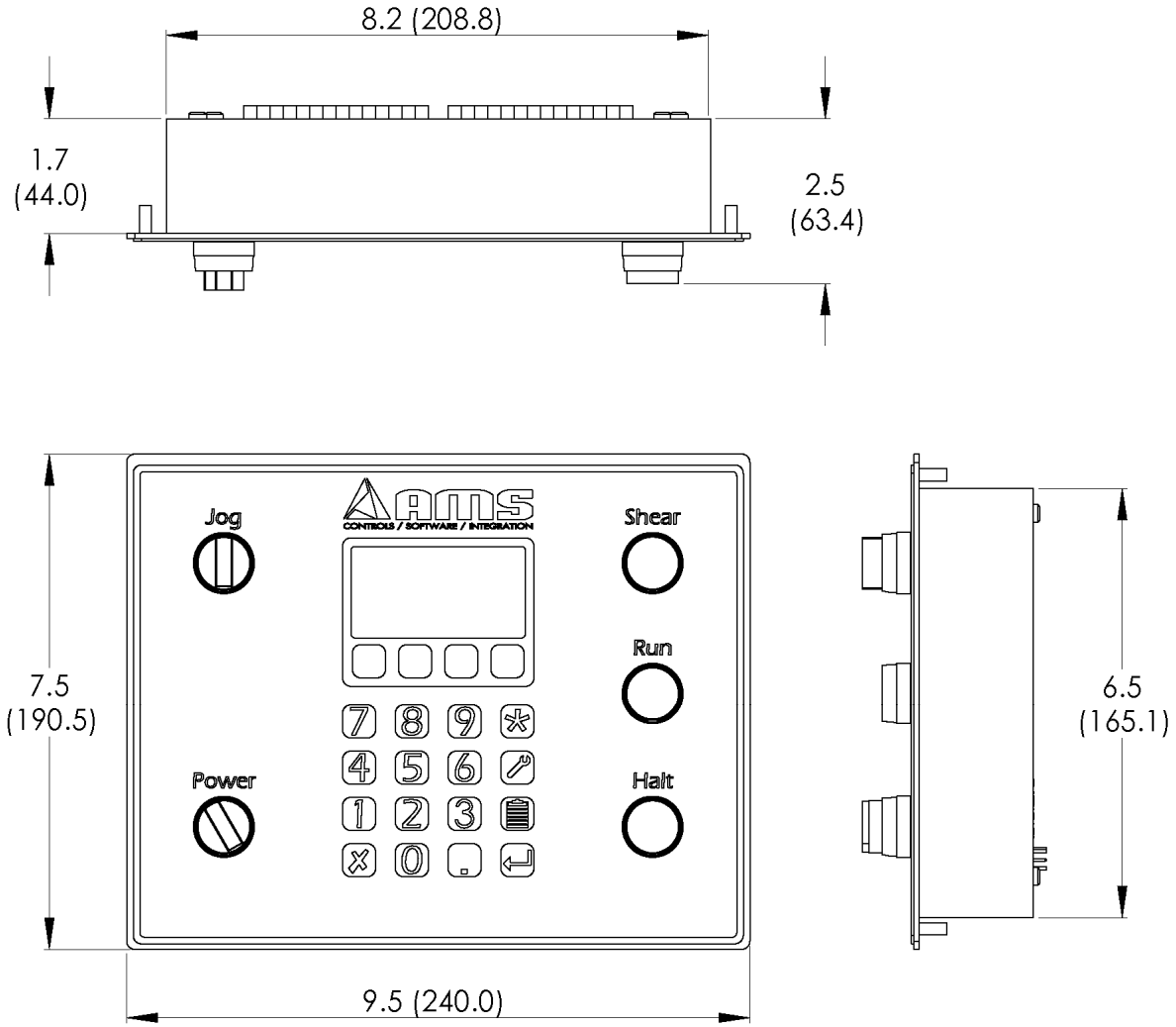

Figure 2: MP450 Dimensional Drawing

Cutout Drawing

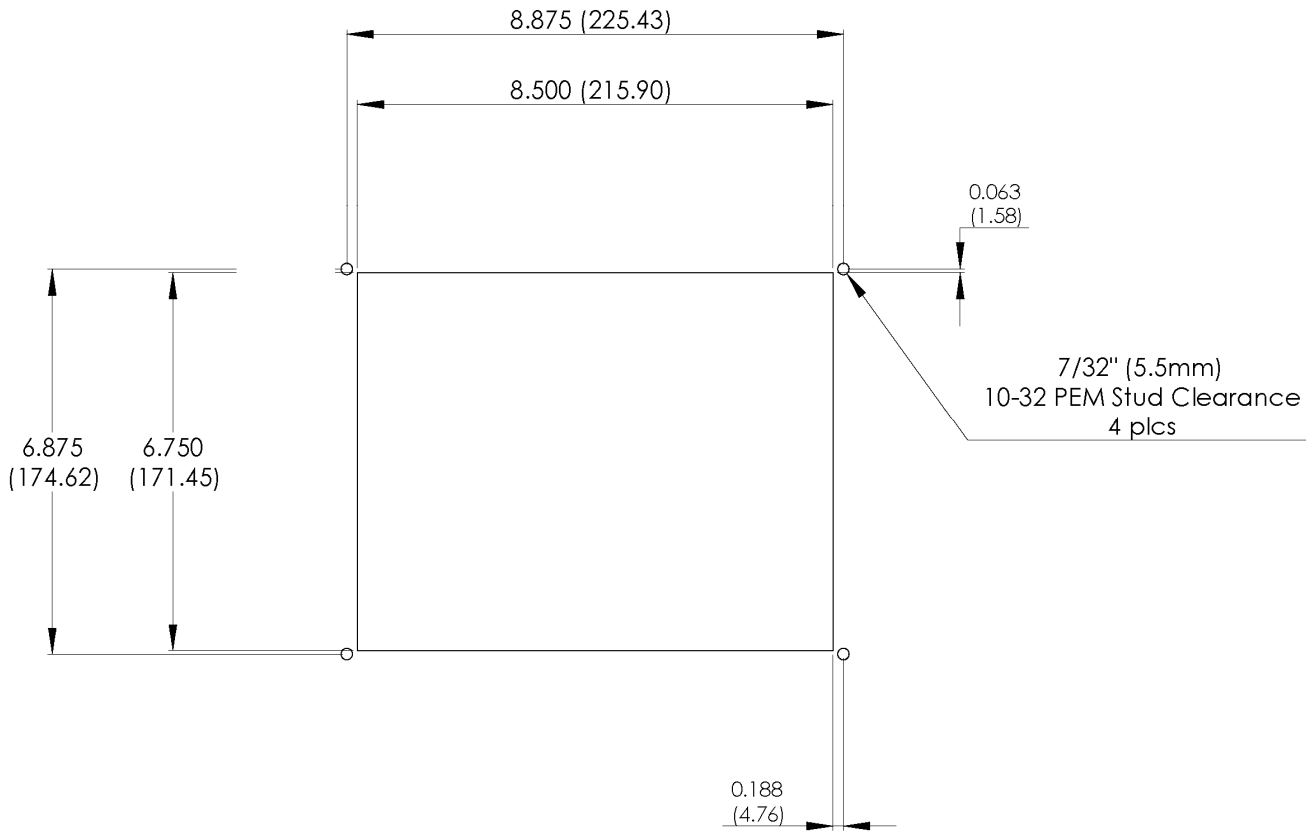

Figure 3: MP450 Cutout Drawing

Electrical Details

Specifications

Power

Supply voltage	24VDC (+/- 20%)
Supply current	400mA + Outputs
Max. inrush current	2A

Inputs

Type	Sourcing
Voltage	24VDC
Input resistance	1.8 KΩ
"ON" voltage	13.4 VDC
Optical Isolation	2500V

Outputs

Type	Sourcing
Voltage	24 VDC
Continuous Current	3A
Optical Isolation	2500V

Encoder

Supply voltage	5 VDC
Supply current	100mA
Type	Quadrature, differential (RS485)
Max. frequency	50 KHz
Optical Isolation	2500V

Environmental

Min. operating temp. (ambient)	-20C (-4F)
Max. operating temp. (ambient)	65C (150F)
Min. storage temp.	-30C (-22F)
Max storage temp.	85C (185F)

Pin Assignments and Descriptions

J301

Pin	Function	Assignment/Notes
1	I/O Ground	6A maximum
2	Output 1	Fast
3	Output 2	Shear Down
4	Output 3	Reverse
5	Output 4	Shear Up
6	Output 5	Slow
7	I/O Ground	6A maximum
8	I/O V (+24V)	
9	Input 1	Shear Up
10	Input 2	Not Used
11	Input 3	Shear Down
12	Input 4	Remote Run
13	Input 5	Not Used
14	I/O V (+24V)	

J401

Pin	Function	Notes
1	RS485 2B+	Unused
2	RS485 2A-	
3	RS485 1A+	For firmware updates
4	RS485 1B-	
5	Encoder A+	
6	Encoder A-	
7	Encoder B+	
8	Encoder B-	
9	Encoder +5V	
10	Encoder Ground	
11	Power +VDC	
12	Power Ground	
13	Power switch contact A Panel Switch	20A maximum
14	Power switch contact B Panel Switch	20A maximum

Sample Interface Drawing

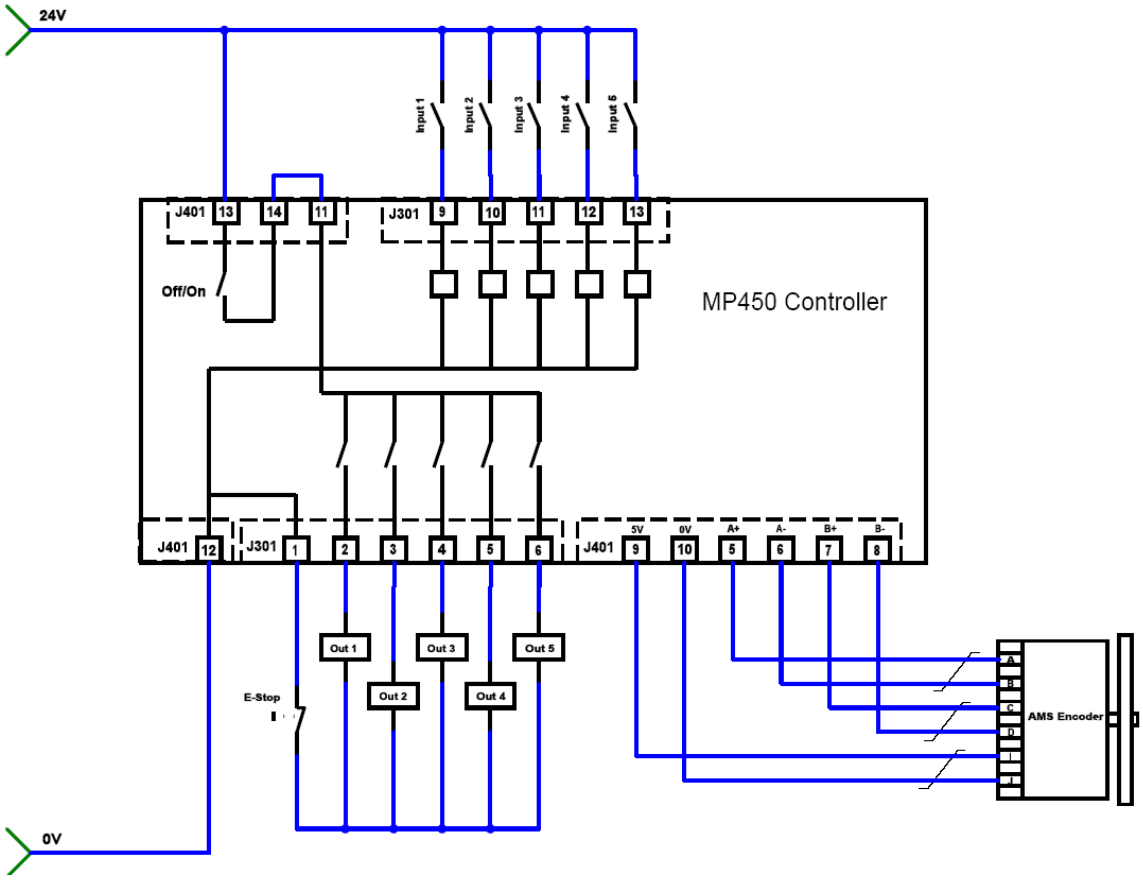

Figure 4: MP450 Sample Interface Drawing

Software Configuration

Setup Screen

Use the Setup screen to change the display units, encoder direction and slow distance.

To enter the setup screen,

1. Power up the system.
2. While the startup screen displays, press **[9]**. The Setup screen displays.

Navigate the Setup Screen

- Use the Up and Down soft keys (white keys just below the display, see Figure 5) to navigate from item to item.

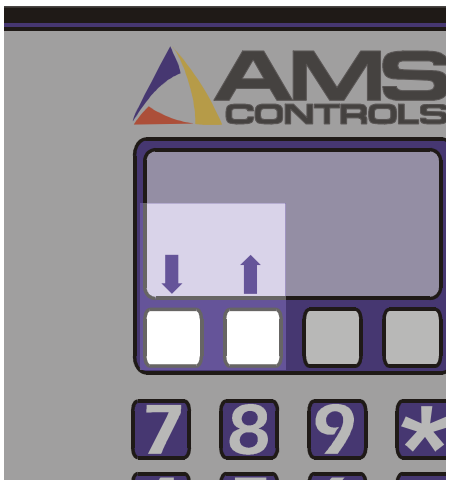

Figure 5: AMS Controls MP450 Controller front panel (Up and Down Soft Keys highlighted)

- Press a number key to change a selected setting temporarily, causing the field to blink.
- Press **[Enter]** to save the new setting and move to the next setup item, or **[Clear]** to restore the value to its original value.
- Press the Up (**[↑]**) or Down (**[↓]**) arrow keys while a field is blinking to restore its original value and move to the next item.

Setup Parameters

Note: These parameters retain their value while the machine is powered off.

Display Units

The display unit setting enables the operator to choose between viewing the part length in either feet and inches or metric millimeters.

Encoder Direction

The encoder direction allows the operator to change the direction of the encoder without modifying the machine wiring.

Changing this setting is necessary, for example, if the material position is shown to be moving backwards on the controller while the material is actually moving forwards. You would use this parameter, then, to reverse the encoder direction for the controller so it can register forward and backward movement correctly.

Slow Distance

The distance that the controller feeds in slow speed before stopping for the cut operation.

The accuracy of a two-speed stopping control system depends on a stable slow speed. Through experimentation, it is possible to find a value that provides a good balance between accuracy and productivity.

If this parameter is set to zero, the controller operates in single speed mode, where it decelerates from fast speed to zero velocity. While this may increase the production of the machine, typically it is difficult to achieve good part length accuracy in this mode.

Chapter 3: Operational Reference

Note: For details on operating a machine with the MP450 Controller, see the **MP450 Operator Manual.**

Positioning Control

Speed Logic Table

Function		Output			
		Slow	***Fast***	***Reverse***	
Jog Forward		Off	On	Off	**Manual**
Jog Reverse		On	Off	On	
2-Speed Mode	*Run Fast*	Off	On	Off	**Automatic**
	Run Slow	On	Off	Off	
Single Speed Mode	*Run*	Off	On	Off	

Speed Diagram for Two-Speed Positioning

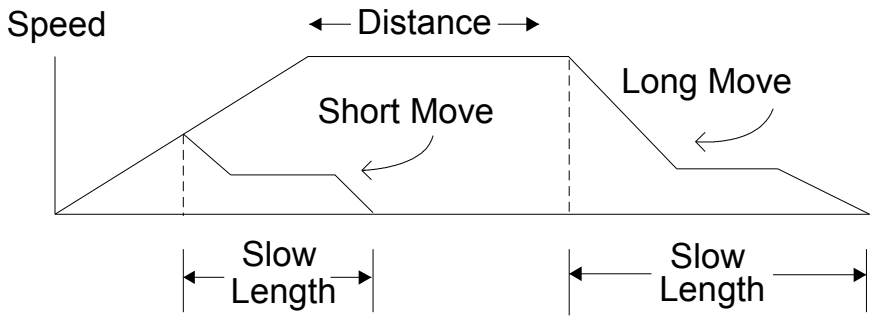

Figure 6: Speed Profile with Adaptive Stopping

Adaptive Stopping Compensation

Adaptive stopping compensation is a feature that enables the controller to account for changes in the amount of time required to bring moving material to a stop.

With a stopping control system, the controller must turn off the motion output before the desired target position is reached. The material then decelerates to a stop and is hopefully within the desired tolerance.

The MP450 constantly monitors the deceleration rate of the machine and makes slight adjustments to the time at which the motion output is turned off. This constant monitoring and adjustment is an important feature for machines that have stopping dynamics that change over time. This is especially an issue with hydraulics-based motion control where the temperature of the oil can affect the stopping behavior of the machine.