MCS-131 Series High Speed Overexcitation Controls

Installation & Operating Instructions

P-262
819-0493

Warner Electric

Contents

⚠WARNING Failure to follow these instructions may result in product damage, equipment damage, and serious or fatal injury to personnel.

Basic Function

The simplest clutch-brake control system comprises an on-off switch and the clutch/brake. When extreme accuracy or high duty cycle rates are not required, this is the most desirable control to use.

However, for applications requiring greater accuracy and speed, more sophisticated controls are necessary. Overexcitation is a momentary voltage many times greater than the control's nominal value. Overexcitation builds up a clutch and brake field much faster than ordinary excitation, without damage to the clutch or brake.

The MCS-131, when used with a 6 volt, size 500 clutch/brake, can reduce the response time for rated current buildup or decay to 2 milliseconds. The result is very quick and highly accurate clutch/brake engagement and disengagement.

The steady-state output for each of the control's two channels can be independently adjusted from 0 to 6 volts. To prevent torque overlap when switching from one channel to another, the switching interval time delay can be adjusted from 0.1 to 7 milliseconds. In addition to steady-state level and overlap adjustments, the over-excitation time is adjustable from 2 to 14 milliseconds on each channel.

With these adjustments, the control can be set to precisely match the machine drive to its load. The machine's maximum cycle rate can also be achieved while minimizing machine shock by providing optimum cushioning to start-stop functions.

The basic MCS-131 is identical to the earlier MCS-130 with regard to outside dimensions and mounting, but the terminal strip is slightly different. However, the MCS-131 will directly replace the earlier MCS-130.

Specifications

Input Power:	120VAC ±10%, 50/60 Hz or 240VAC ±10%, 50/60 Hz, Switch Selectable on Board
Load:	Clutch-Brake, 6 volt, 4.4 amps maximum
Output:	Each Channel
Current Rise Time up to Rated Max.:	2 Milliseconds
Current Fall Time:	2 Milliseconds
Overexcitation Time:	Adjustable 2 to 14 milliseconds
Steady-State Output:	Adjustable 0 to 6 volts
Overlap Time Delay:	Adjustable 1.5 to 8.5 milliseconds
Maximum Cycle Rate:	300 CPM on 5” clutch-brake
Auxiliary Output:	12 volts DC @ 100 milliamps, 24 volts DC @ 100 milliamps, 4.8 volts DC @ 1 amp (optional)

Inputs:

BASIC INPUTS: Open collector compatible, device rating: 15 volts DC, 20 ma. minimum, maximum saturation voltage $\leq$ 0.7 VDC.

In basic control mode, only inhibit and input terminals are used for switching. See Figure 2.

EXPANDED INPUTS: Bag Logic Board, part number 6040-448-016 (optional). Open collector compatible, device rating: 15 volts DC, 20 ma. minimum, maximum saturation voltage $\leq$ 0.7 VDC.

Provides for start, stop, scanner and scanner inhibit. See Figures 3, 4, and 5.

Stitch Logic Board, part number 6040-448-017 (optional). Open collector compatible, device rating:

15 volts DC, 20 ma. minimum, maximum saturation voltage $\leq$ 0.7 VDC.

Provides for start, stop, and inhibit functions. See Figures 6 and 7.

OPTIONAL COMPONENTS: 4.8 volt power board, part number 6040-448-014 (optional). Provides for 4.8 volt DC @ 1.0 amp output for operating MCS-624 Register Mark Scanner.

Cover, part number 6040-448-015 (optional). Provides for optional enclosure of basic MCS-131.

Applications

Typical applications for overexcitation include cutting labels after printing, separating bags after manufacture, filling, and other precision applications. System capabilities are expanded by using the optional logic boards with the basic control.

The basic control provides both 12 volts DC for use with the 12 volt DC compact scanners, and 24 volts DC for use with the MCS-638 color Mark Scanner. The MCS-624 Register Mark Scanner may be used also, when the 4.8 volt Power Board is used.

It should be noted that the maximum rated output for the Clutch-Brake is limited to 4.4 amps. If applications require use of Clutch-Brakes whose ratings exceed this maximum limit, the factory should be consulted.

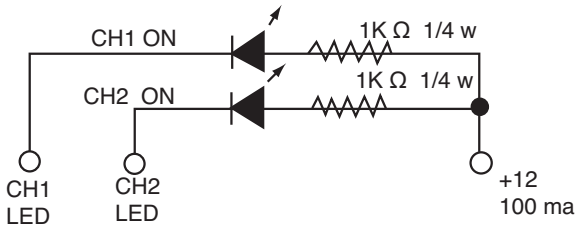
Installation

Mounting

Mount the Control with the terminal strip positioned toward the top. This allows the transformer heat to rise away from the other components.

Wiring

1. Connect clutch and brake to each pair of respective Channel 1 and Channel 2 terminals as required.
2. Connect AC input to the AC input terminals. Set AC selector switch to the desired range 120 VAC or 240 VAC.



3. The earth ground terminal provides for connection of the transformer core to earth ground.

4. Connect input switches per appropriate figure for type switching desired.
   a. For Basic Control Switching, use Figure 2.
   b. For Bag Logic Module, use Figures 3 & 5, or 4 & 5.
   c. For Stitch Logic Module, use Figures 6 & 7.

5. For external LED indicator connection, connect as follows:

Initial Checkout

Basic Control without interface options, per Figure 2.

1. Apply AC power to MCS-131 Control.
2. With inhibit terminal (2) grounded, control should power-up channel 2 on.
3. Ground input terminal (8), control should switch to channel 1 on, and “in” LED should be on.
4. Remove ground from input terminal (8), control should switch back to channel “on” and “in” LED should be off.

Control with optional interface modules, Figures 3 through 7.

1. Check out should be in accordance with the appropriate connection and switching logic diagram.

Control Adjustments

CH 1 Delay, CH 2 Delay:

Potentiometer adjustment which delays the actuation of Channel 1 or Channel 2 to prevent Clutch-Brake overlap.

Range Adjustment: 0.1 to 7 milliseconds

CH 1 Torque, CH 2 Torque:

Potentiometer adjustment for steady-state output voltage of Channel 1 and Channel 2.

Range adjustment; 0 to 6 volts DC

CH 1 Overexcitation, CH 2 Overexcitaiton:

Potentiometer adjustment for adjusting overexcitation time period for Channel 1 and Channel 2.

Range adjustment: 2 to 14 milliseconds.

LED Indicators

CR 102, CR 302:

Indicates when Channel 1 or Channel 2 output is actuated.

CR 205, CR 405:

Indicates operation of overexcitation pulse for Channel 1 or Channel 2 when switched.

CR 12:

Input LED on “in” terminal. On when input terminal is pulled low.

Interface Programming

The two optional logic modules provide for expanded input switching of the basic control. Logic board selection will be dependent primarily upon the input switching requirements. For most applications, the bag logic module will be the more suitable.

Board Set Up and Programming

A. Bag Logic Board, 6040-448-016

Switch No.	Function Affected	Control Operation
SW 1	Stop	Open: Pulse Control on terminal 7. Triggers on negative transition of input pulse.
SW 2	Photo Input	Closed: Dark Operation, switches
SW 3		Open: On negative transition
SW2	Photo Input	Open: light Operation, switches
SW 3		Closed: On positive transition
SW4	Start	Open: Pulse Control on terminal 1. Triggers on negative transition of input pulse. Closed: Level input on terminal 1. Active low, triggers on negative transition of input.

Using the Bag Logic Module, 6040-448-016, control input terminal designations change somewhat as shown in Figures 3 and 4.

Terminal No.	Function	Control Input Logic
1	Start	Selectable on Card for Level or Pulse
2	Photo Inhibit	Level only, Active Low
7	Stop	Selectable on Card for Level or Pulse
8	Photo Input	Level, Light/Dark Card Selectable

For waveform timing diagrams, see Figure 5.

B. Switch Logic Module, 6040-448-017

This module expands the input capabilities of the basic MCS-131 Control. For most application, however, the Bag Logic Module, 6040-448-016, will be used.

Switch No.	Function Affected	Control Operation
1	Always Closed	----------
2	Input Signals	Open: Pulse Control Closed: Level Control
3	Not Used	
4	Always Closed	----------

Using the Stitch Logic Board, 6040-448-017, switching inputs change somewhat from the basic MCS-131 Control. Input switching configurations are shown in Figure 6.

Terminal No.	Function	Control Input Logic
1	Start	Pulse or Level
2	Inhibit	Level only, Active Low
7	Stop	Pulse or Level

For waveform timing diagram, see Figure 7.

Cautions

Fusing: For 120 VAC operation a 1.6A slo-blo fuse should be used.
for 240 VAC operation a 1.0A slo-blo fuse should be used.

Note: When replacing a fuse, the same type and size as specified should be used to prevent control damage.

AC: Ac line voltages are present at the terminal strip.

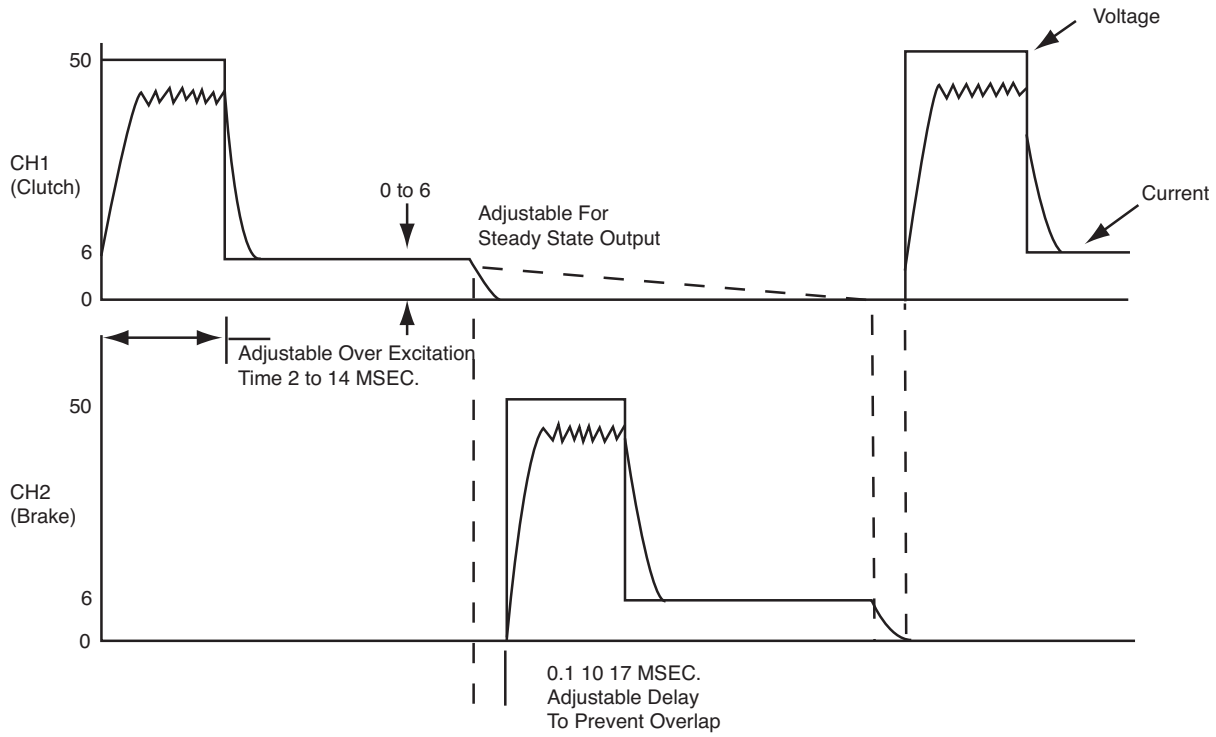


Figure 1 - Voltage and Current Waveforms

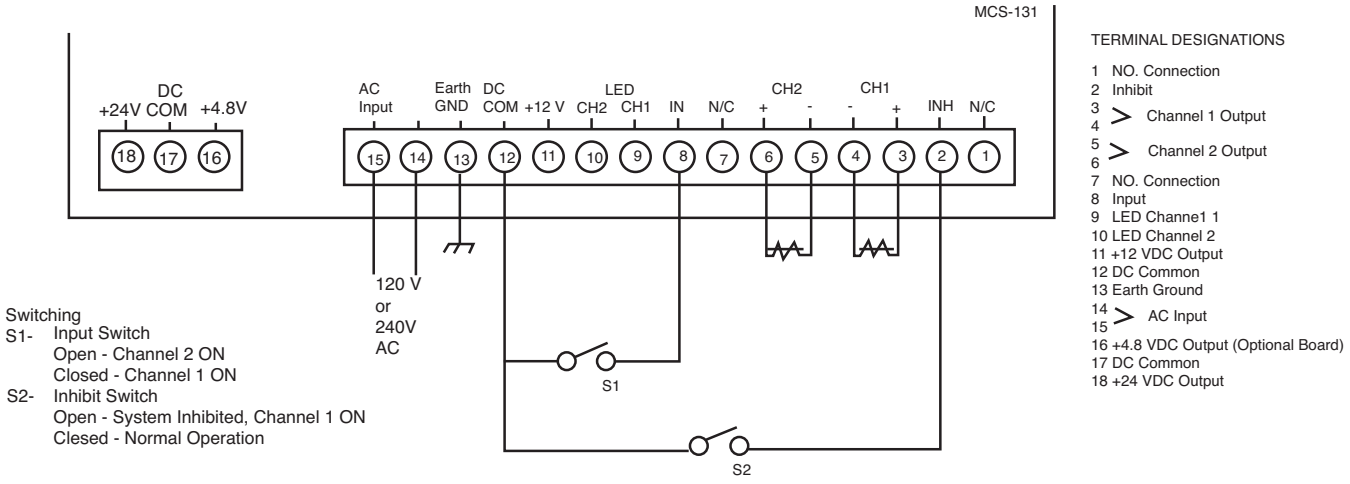


Figure 2 - Basic Control with Switch Inputs

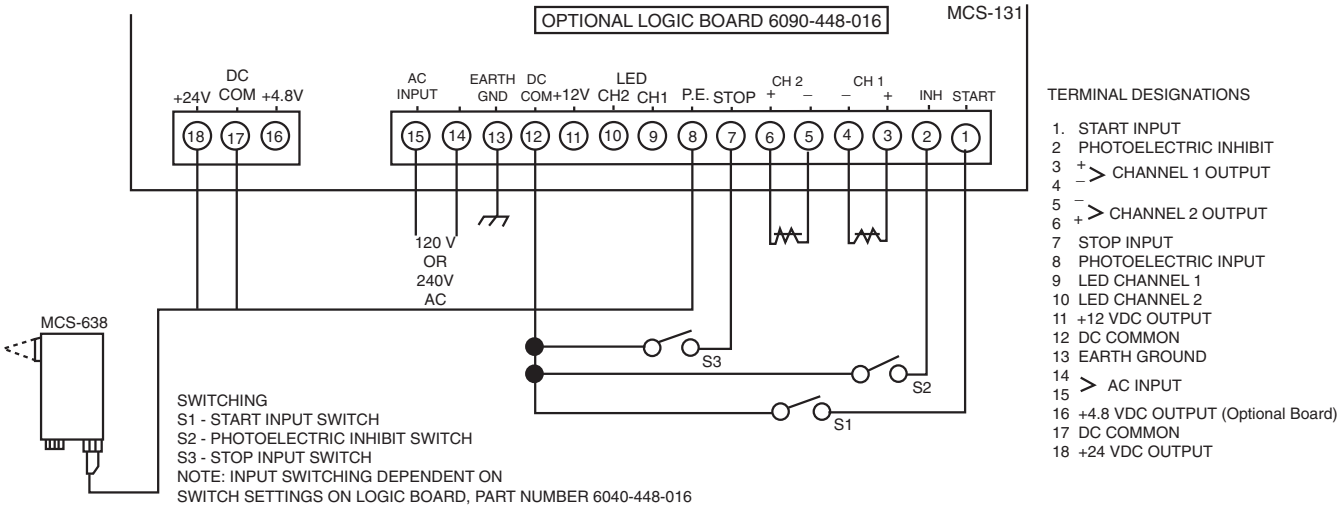


Figure 3 - Expanded Input Switching with Logic Board, 6090-448-016 and MCS-638 Color Mark Scanner

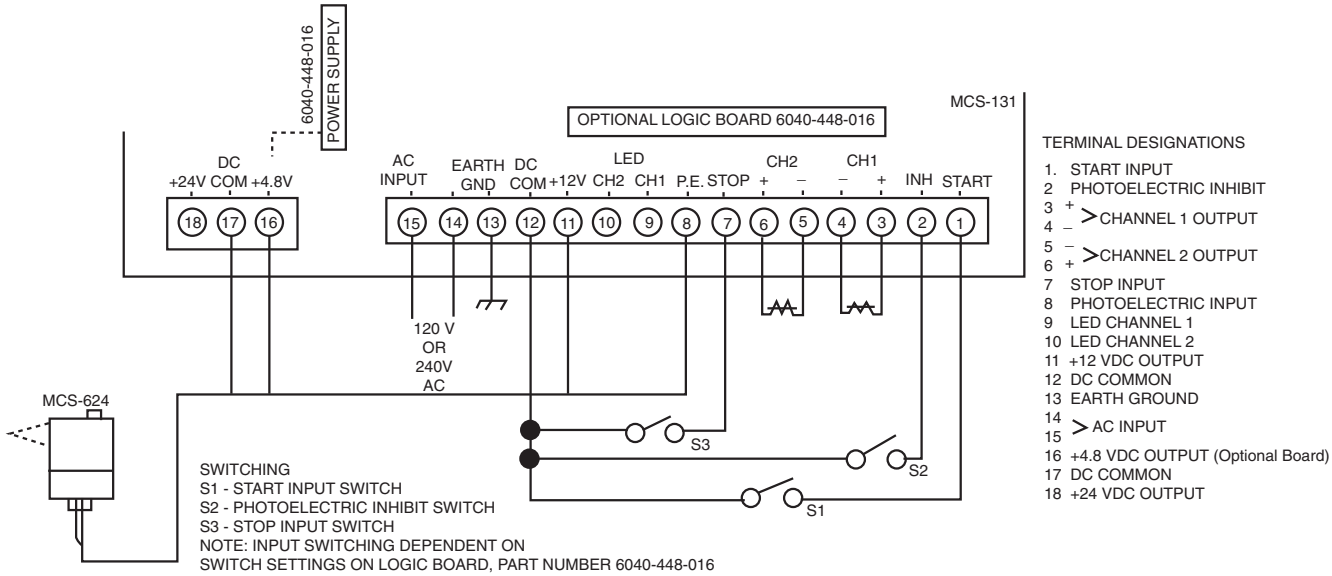
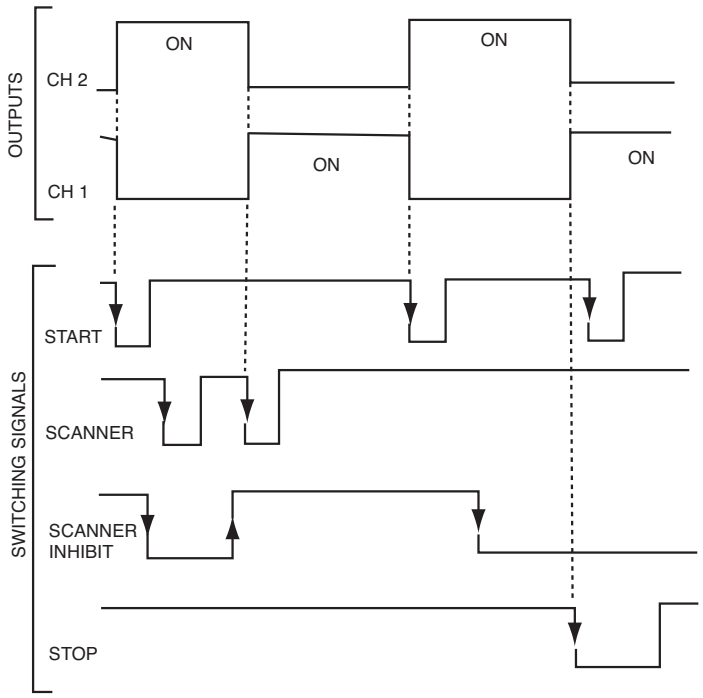


Figure 4 - Expanded Input Switching with Logic Board 6040-448-016 and MCS-624 Mark Reader



6040-448-016 SWITCH PROGRAMMING

SW 1	Open:	The output f.f. goes low, ligic “0” at the negative transition of the “stop” inut. It may be immediately retriggered.
	Closed:	The output f.f. goes low, ligic “0” at the negative transiotion of the “stop” input and remains low as long as this input is low.
SW 2* SW 3*	Open: Closed:	The scanner input must be low, logic “0”, and go hight, logic “1” when a mark is detected.
SW 2* SW 3*	Closed: Open:	the scanner input must be high, logic “1”, and go low, logic “0” when a mark is detected.
SW 4	Open:	The output f.f. trips high, logic “1” at the negative transition of the “start” input.
	Closed:	The information in the output f.f. remains latched after the negative going transition of the “start” input.

* Only one of the two switches may be closed.

Figure 5 - Input - Output Switching Relationships with Logic Board 6040-448-018

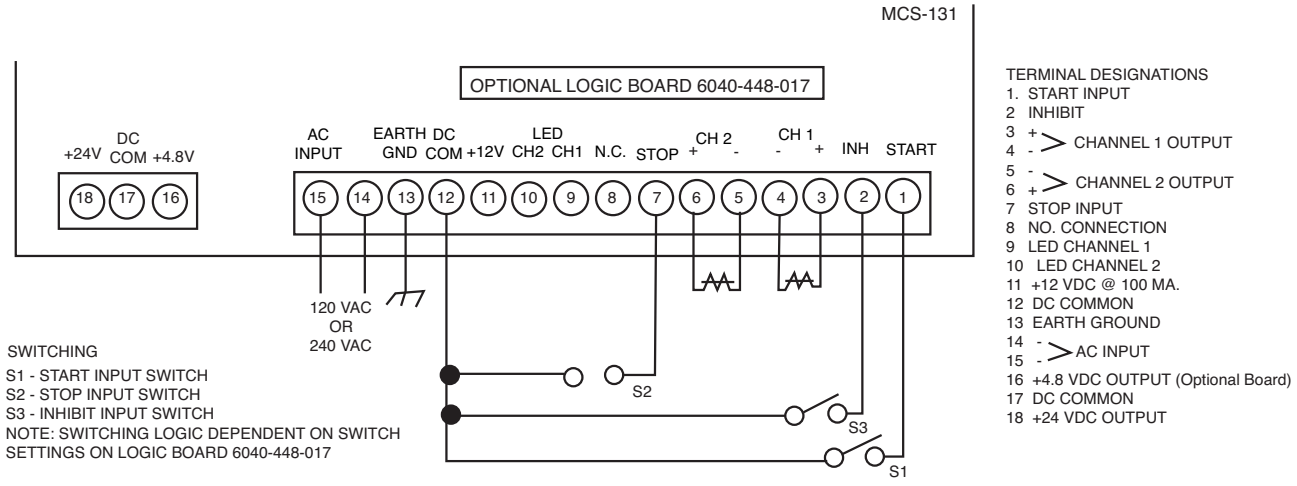


Figure 6 - Extended Input Switching With Logic Board 6040-448-017

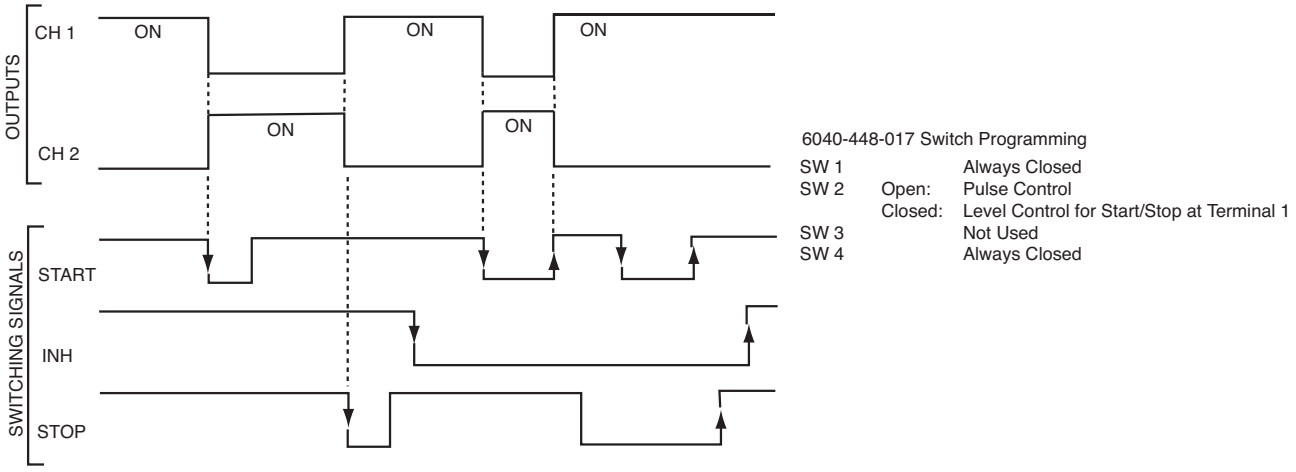


Figure 7 - Input - Output Switching Relationships With Logic Board 6040-448-017

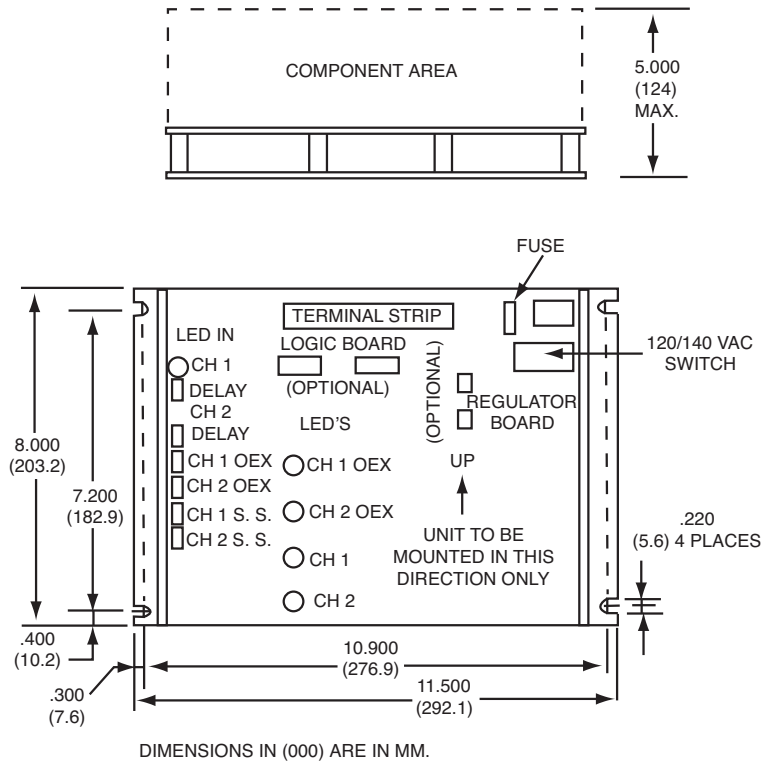


Figure 8 - Dimensional Outline and Adjustment Location

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