

**MODEL MP325**

**BACKGAUGE CONTROLLER**

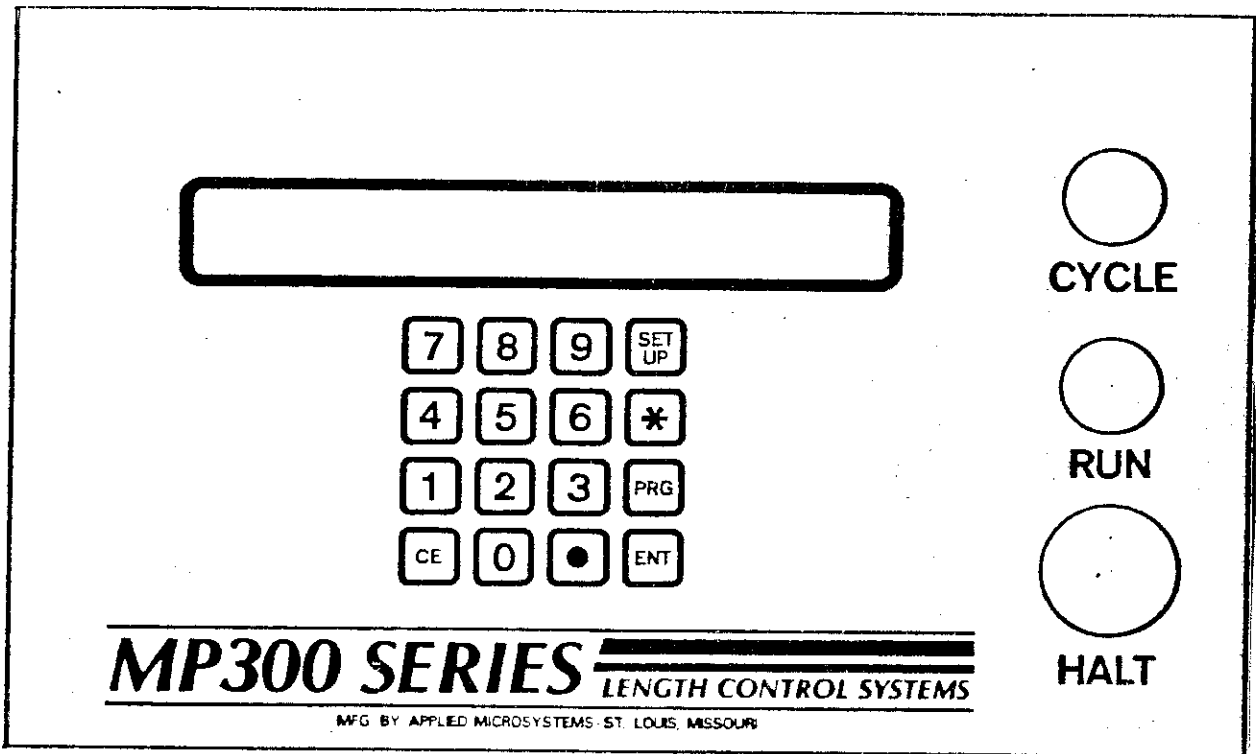
**REFERENCE MANUAL**

MODEL MP325  
BACKGAUGE CONTROLLER

Applied Microsystems 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 MP325 Backgauge controller is a cost-effective controller designed to position a guide or a stop on a press brake. The unit controls a variable speed electric drive or hydraulic system which turns a lead screw. The position of the gauge is sensed by an incremental shaft angle transducer that is coupled to the lead screw. The MP325 controls the drive unit and count the pulses from the transducer until the desired position is reached.

The MP325 is housed in a compact 8.00" high x 12.50" wide x 2.25" deep enclosure and requires only a single 24 VDC power supply for operation.



Front Panel Layout

MODEL MP325  
BACKGAUGE CONTROLLER

FRONT PANEL COMPONENTS AND DESCRIPTION

The Model MP325 front panel has three pushbutton switches, a 16 key keypad, and a two line 48 character liquid crystal display.

The three pushbuttona provide the following functions:

HALT        Press to manually stop guide movement.  
RUN         Press to initiate an automatic move sequence.  
CYCLE       This pushbutton currently has no function.

The keys provide the following functions :

SET UP      Press to enter the setup mode. The setup mode is used to enter specific paramaters about the backgauge.  
\*            Press the asterisk key to exit the setup or programing modes before reaching the end of the entry list.  
PRG         Press to program a new target length. While in the program mode, the word "TARGET" will flash.  
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.

MODEL MP325  
BACKGAUGE CONTROLLER

PROGRAM MODE

The program mode is entered by pressing the "PRG" key. The word "TARGET" will start to flash, indicating that the controller is waiting for the entry of the new target length. The operator need only key in the desired position, press the "ENT" key and the backgauge is now ready to position to the new target value. The maximum target value that may be keyed in is 999.999 inches or 9999.99 millimeters.

The following example is provided to explain how a target position is programmed. In this example, a target position of 57.5 inches will be programmed.

Press the "PRG" key to enter the program mode. The display will now show:

TARGET	CURRENT
0.000in	24.378in

The word "TARGET" should be flashing steadily. This is the controllers way of informing the operator that it is waiting for a new target position. The 24.378 inches under the word "CURRENT" is the current position of the guides when the "PRG" key was pressed. This position is automatically updated when the controller is not in the setup or program modes.

Since we want to program a new target position of 57.5 inches, the following keys would be pressed:

5  
7  
.  
5  
ENT

The display should now show:

TARGET	CURRENT
57.500in	24.378in

Notice that it was not required to enter the zeroes to the right of the decimal point. The MP325 automatically inserts any needed zeroes after the decimal point. At this point, the controller is ready to move to the length programmed.

To start the controller moving, the operator simply presses the RUN button.

MODEL MP325  
BACKGAUGE CONTROLLER

SETUP MODE

The Setup Mode is used when the MP325 is initially installed to configure it to the particular characteristics of the backgauge. The Setup Mode is entered by pressing the "SET UP" key and can be exited by pressing the "\*" or "PRG" key. When power is applied to the controller, 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. An explanation of each parameter is given followed by the default display reading. 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.

ENCODER SYNC LENGTH - This is the length that the controller sets it's internal length counter to when a calibrate sequence is done. It is approximately the distance from the zero point of the brake to the reference switch.

```
*** SETUP MODE ***  
SYNC LENGTH      0.000in
```

UNIT OF MEASUREMENT - This parameter allows the controller to be programed in English (inches) or Metric (millimeters) units. Pressing any numerical key will toggle the display between "ENGLISH" and "METRIC".

```
*** SETUP MODE ***  
UNIT OF MEASURE  ENGLISH
```

COUNTS PER REVOLUTION - This value corresponds to the number of pulses (or counts) that are generated by one revolution of the encoder shaft.

```
*** SETUP MODE ***  
COUNTS/REVOLUTION  256
```

DISTANCE PER REVOLUTION - This value corresponds to the distance traveled with one revolution of the encoder shaft. In other words, this is the pitch of the lead screw.

```
*** SETUP MODE ***  
DISTANCE/REV      0.250in
```

MODEL MP325  
BACKGAUGE CONTROLLER

CORRECTION FACTOR - The correction factor adjusts for any error between the target programmed and the target actually measured.

```
*** SETUP MODE ***  
CORRECTION      100.000%
```

MOVEMENT TOLERANCE - This is the maximum error, plus or minus, that the backgauge controller will allow on any move. If a move is made with the final guide position outside of this tolerance, the MP325 will proceed to move the guides again until within the tolerance programmed.

```
*** SETUP MODE ***  
MOVE TOLERANCE  0.000in
```

ACCELERATION LENGTH - The MP325 uses an analog signal to drive a variable speed drive control. This parameter is the length to be used to accelerate the guide up to full speed on any move.

```
*** SETUP MODE ***  
ACCEL LENGTH    0.250in
```

DECELERATION LENGTH - This parameter is used to specify the length used to decelerate the guide from full speed down to a stop on any move.

```
*** SETUP MODE ***  
DECEL LENGTH    1.750in
```

OUTSIDE APPROACH LENGTH - This parameter allows for the elimination of gear lash encountered when the guide is moved from an inside position to an outside position. When a move of this nature is made, the controller will move to a point equal to the target position plus the approach length. After reaching this point, the controller will then move in to the desired target position. This method insures that all positions in the system are made from the same direction, consequently eliminating any effect of gear backlash.

```
*** SETUP MODE ***  
APPROACH LENGTH 0.125in
```

MODEL MP325  
BACKGAUGE CONTROLLER

MANUAL CALIBRATION COMMAND - During normal operation, the MP325 will automatically calibrate itself on the first move after it has lost calibration. The manual calibration command allows the operator to manually calibrate the guides in case the guides were moved while the controller was turned off. Pressing any numerical key will toggle the display between "YES" and "NO".

```
*** SETUP MODE ***  
CALIBRATE SYSTEM?      NO
```

RESET CONTROLLER MEMORY - To reset the controller memory to it's default values, enter the reset code of 1984. Note that after this code is entered, the setup parameters for your particular backgauge must be reentered. All other codes are ignored.

```
*** SETUP MODE ***  
MEMORY RESET CODE      0
```



MODEL MP325  
BACKGAUGE CONTROLLER

EXTERNAL INPUTS

The MP325 uses two external inputs. Their functions are:

REFERENCE - This input is used during the calibration procedure to ensure that the controller references itself to the exact same location consistently.

INHIBIT MOVEMENT - This input can be used as a safety precaution to provide a cutoff switch to all movement functions. When this input is brought to ground, the controller will disable all movement outputs until the input is remove from ground.

MODEL MP325  
BACKGAUGE CONTROLLER

EXTERNAL OUTPUTS

The three outputs used by the MP325 and their functions are:

GUIDES IN MOVEMENT - This output will remain on while the MP325 is in a movement mode.

FORWARD and REVERSE - These outputs are connected to a variable speed drive controller along with the analog output signal to provide direction and speed controls for the controller.

MODEL MP325  
BACKGAUGE CONTROLLER

CALIBRATION PROCEDURE

To determine the value for the "SYNC LENGTH" parameter, the following procedure should be followed:

1. Measure the distance from the zero point of the machine to the center of the reference switch.
2. Enter this number as the "SYNC LENGTH" in the setup mode.
3. Respond with a "YES" to the manual calibrate command to start the calibration procedure.
4. Measure the position of the gauge after the calibration procedure has been completed.
5. Subtract this value from the value under "CURRENT" on the display.
6. Add this result to the current value in the "SYNC LENGTH" parameter to form a new "SYNC LENGTH" parameter.
7. Enter this new number in the setup mode.
8. Continue steps 3 thru 7 until the position measured is within tolerance of the position under "CURRENT".

MODEL MP325  
BACKGAUGE CONTROLLER

DETERMINING THE PROPER CORRECTION FACTOR

If the number of pulses per revolution of the encoder and the distance traveled per revolution of the encoder wheel are entered accurately in the setup mode, the guides should position precisely to the target position. If there is a slight difference between the length programed and the actual position length, the following steps should be taken to correct this error.

1. Manually move the guides in to the farthest point they can be moved.
2. Measure the distance from the guide to the zero point on the machine.
3. Write down the distance displayed under "CURRENT".
4. Manually move the guides out to the farthest point they can be moved.
5. Measure the distance from the guide to the zero point on the machine.
6. Write down the distance displayed under "CURRENT".
7. Calculate the correction factor using as follows:

$$NCF = OCF * (LDI - LDO) / (LMI - LMO)$$

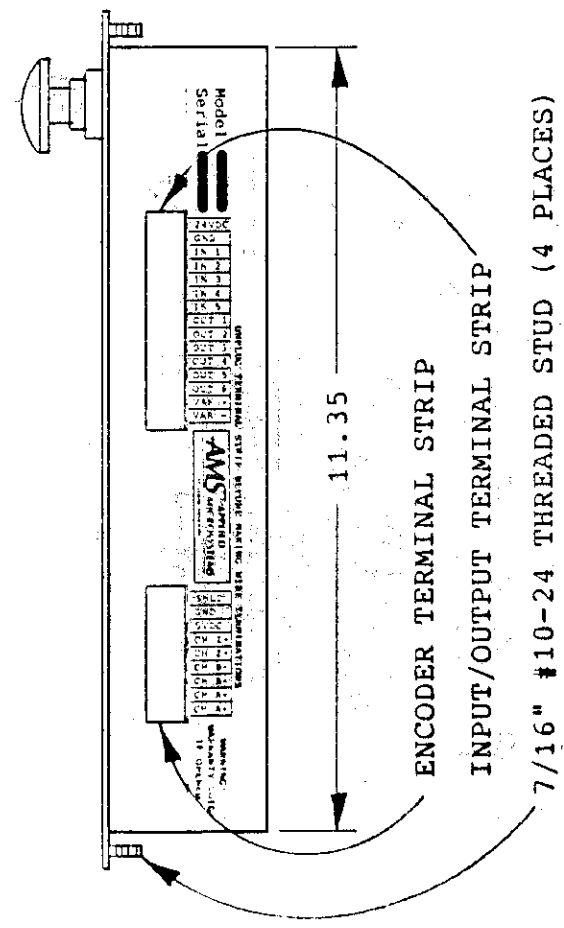
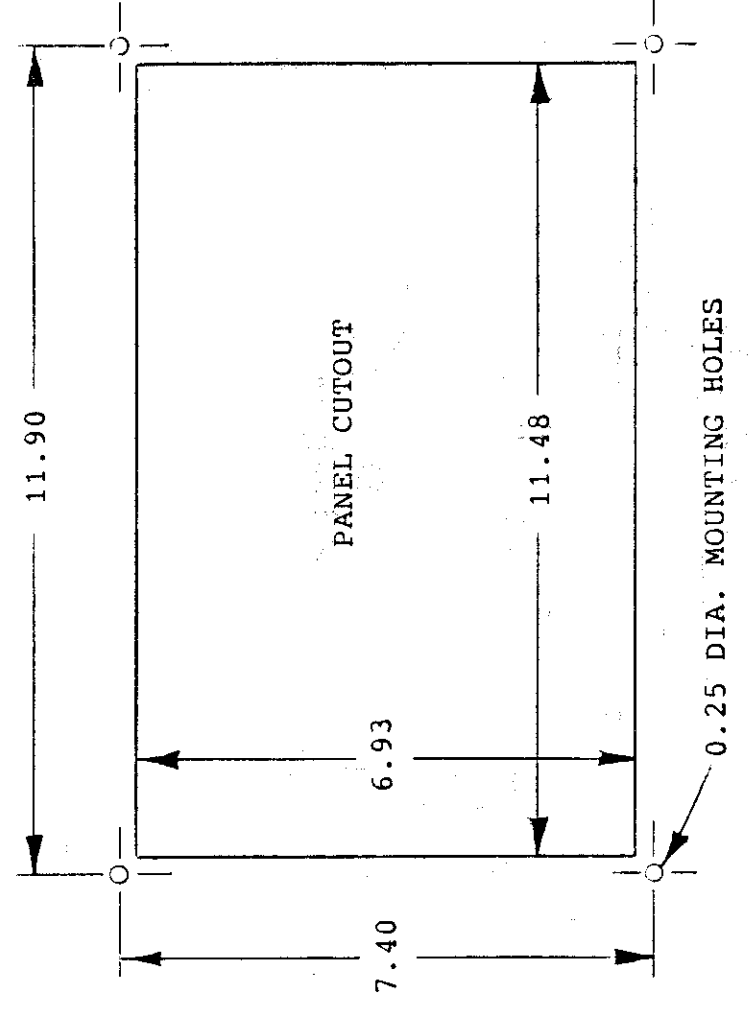
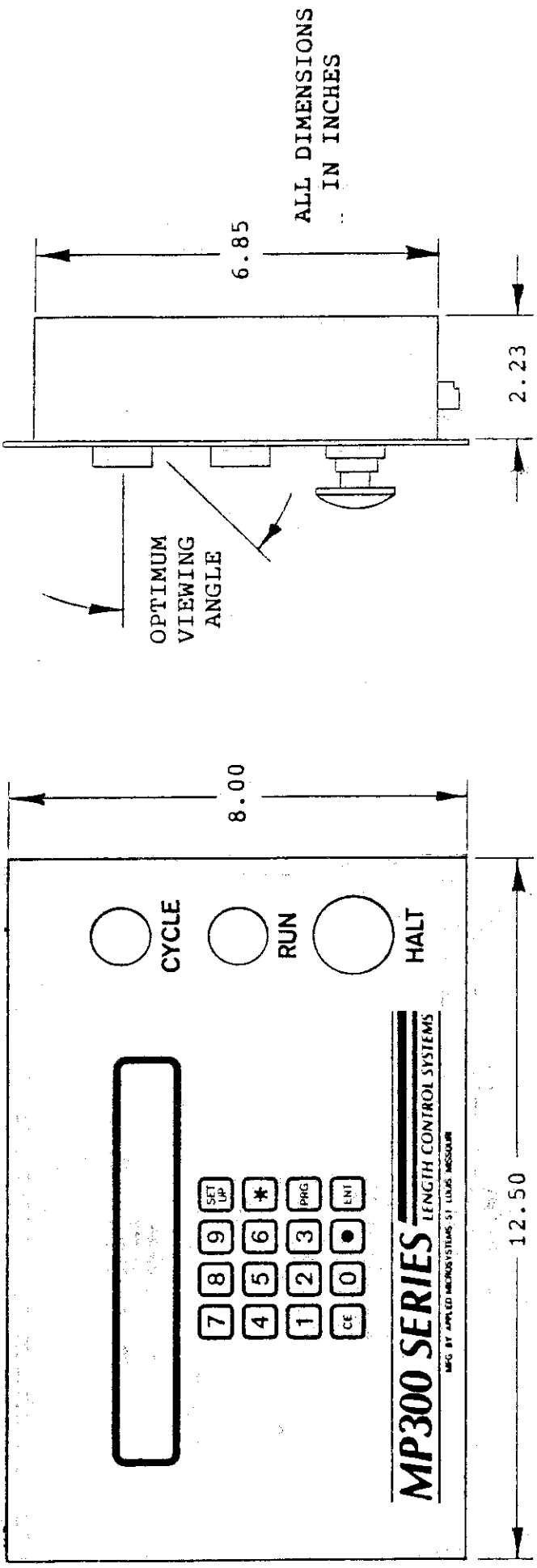
Where: NCF is the new correction factor  
OCF is the old correction factor  
LDI is the length displayed on inside move  
LDO is the length displayed on outside move  
LMI is the length measured on inside move  
LMO is the length measured on outside move

8. Enter this value as the new "CORRECTION" parameter in the setup mode.
9. Continue steps 1 thru 8 until the position is within the "MOVE TOLERANCE" range.

MODEL MP325  
BACKGAUGE CONTROLLER

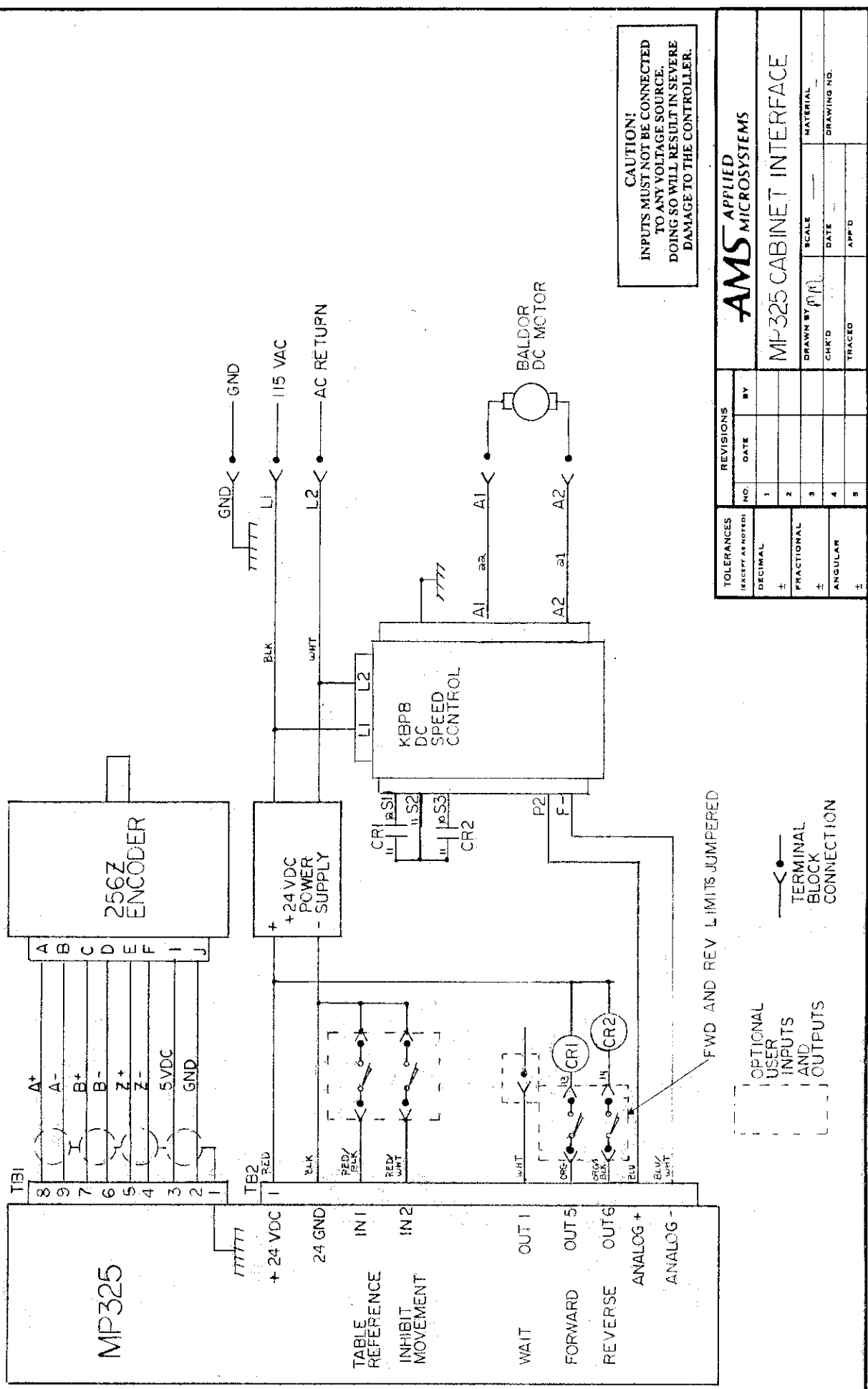
SETUP RECORD SHEET

SYNC LENGTH	0.000 - 99.999 in	-----
UNIT OF MEASURE	ENGLISH or METRIC	-----
COUNTS/REVOLUTION	100 to 1000	-----
DISTANCE/REV	0.250 to 25.000 in	-----
CORRECTION	90.000 to 110.000 %	-----
MOVE TOLERANCE	0.000 to 9.999 in	-----
ACCEL LENGTH	0.000 to 99.999 in	-----
DECEL LENGTH	0.000 to 99.999in	-----
APPROACH LENGTH	0.000 to 99.999 in	-----
CALIBRATE SYSTEM?	YES or NO	
MEMORY RESET CODE	1984	



**AMS** APPLIED MICROSYSTEMS

MP300 SERIES INSTALLATION DRAWING



TOLERANCES (EXCEPT AS NOTED)		REVISIONS	
DECIMAL	FRACTIONAL	NO.	DATE
±		1	
±		2	
±		3	
±		4	
±		5	

<b>AMS APPLIED MICROSYSTEMS</b>	
<b>MP325 CABINET INTERFACE</b>	
SCALE	MATERIAL
DRAWN BY <i>PM</i>	DATE
CHK'D	DRAWING NO.
TRACED	APP'D

OPTIONAL USER INPUTS AND OUTPUTS

FWD AND REV LIMITS JUMPED

TERMINAL BLOCK CONNECTION