

Model
MP328OL
Gripper & Backgauge Controller
Reference Manual

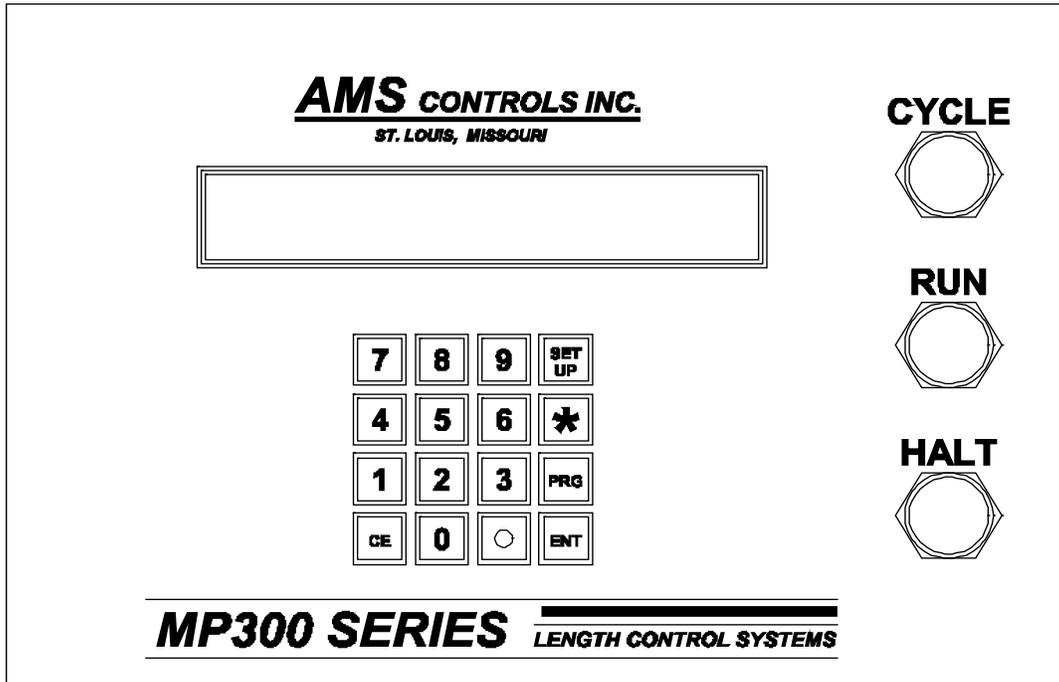
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MP328OL Gripper Controller

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 **MP328** Gripper controller is a cost effective controller designed to perform multiple bends on a sheet of metal and will use a gripping function to hold the metal and to sequence it through each bend..

The **MP328** is housed in a compact 8.00" x 12.50" wide x 2.25" deep enclosure and requires a single 24 VDC power supply for operation.



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MP328 Open Loop Version 13/14 Controller

Operation & Reference Manual

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Front Panel Components and Description

The Model **MP328** front panel has three push button switches, a 16 key keypad, and a two line 48 character liquid crystal display.

The three push buttons provide the following functions:

CYCLE

This push button will open the gripper jaws and will reset the sequence

RUN

Press to initiate an automatic move sequence

HALT

Press to manually stop the guide movement

The keys provide the following functions:

SETUP

Press to enter the setup mode. The setup mode is used to enter specific parameters about the Gripper.

*

Press the asterisk key to exit the setup or programming modes. Also known as the STATUS key to display current position, etc.

PRG

Press to program a new set position. While in the program mode, the new position 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.

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.

The SETUP mode is used when the **MP328** is initially installed to configure it to the particular characteristics of the Gripper. 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.

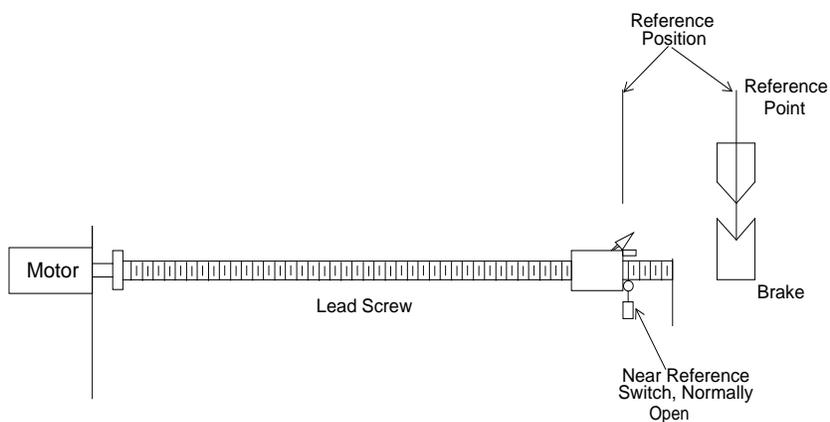
Selecting “1” will allow the operator to adjust the following parameters:

1=Configure	2=In/Out
3=Loc/Remote	4=Reference

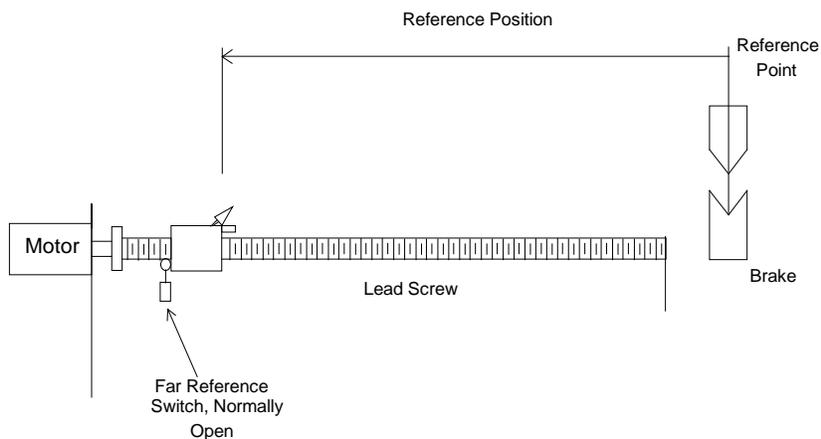
Reference Mode

The REFERENCE MODE parameter tells the **MP328** where the reference switch is located. The reference point is the center of the brake where the bend occurs. If the switch is close to the reference point and most of the moves of the Gripper occur “behind” the switch, the REFERENCE MODE is NEAR. If the switch is behind the Gripper and most of the moves are in “front” of the switch, the REFERENCE MODE is FAR. Use any number key to toggle the choices.

Near Reference Mode



Far Reference Mode



The switch for a NEAR REFERENCE MODE must be normally open and remain closed as long as the Gripper is on the switch or closer to the reference point than the switch. The switch for a FAR REFERENCE MODE must be normally open and remain closed as long as the Gripper is on the switch or farther away from the reference point than the switch.

Ref. Pos.

The REFERENCE POSITION is the distance from the reference point (typically the bend point on the brake) to the inside jaws of the gripper at the point the “home” switch is detected (after being referenced).

Metal Flow

This parameter specifies whether the metal is fed from one side of the brake and the formed parts comes out of the other (NORMAL); or if it is fed through the backside of the brake, (REVERSE). If this parameter is set to NORMAL, the machine should move to the total sheet length plus the CLEARANCE DISTANCE when there is a new program. When REVERSE is selected, it will move to the new CLEARANCE DISTANCE.

Ignore First Bend

When used in conjunction with an MP338 backgauge, the MP328 will need to ignore the first bend of the part. The first bend will be controlled by the MP328 backgauge device (or “backstop”).

If “Yes” is selected, the gripper will position itself the length of the part minus the length of the first leg of the part. The gripper will position itself for brake #2 and brake #3, ignoring the first brake.

If “No” is selected, the gripper will work normally, positioning itself the full distance of the overall part length plus the overshoot distance.

Enable Creep Mode

This defines what type of feedback the MP328 will be looking for when it searches for the part. If the Enable Creep Mode is set to “Yes”, it will look for a detector switch mounted on the gripping device. This detector will signal that controller that it has found the sheet.

If the mode is set to “No”, the controller uses only encoder feedback to locate the sheet. This requires that the sheet be consistently in the same location from one part to the next. This will be determined by the backstop device.

Eject Mode Speed

The MP328 controller can be put into an “Eject” mode that will enable the gripper device to push the part past the brake so that it is easily and safely available to the operator. After the last bend is completed, the gripper device will be sent to position “0.00”, which is directly under the brake. After reaching this point it will return to the home position.

Clearance Dist

This parameter determines the point at which the gripper will move to when a new program is entered or after completion of a sequence. CLEARANCE DIST plus ACTUAL PART LENGTH will determine the position of the guide between sequences.

Brake Dwell Dn

BRAKE DWELL DOWN is the time it takes for the brake to move from the top of the stroke to the bottom of the stroke. The range of time allowed is 0.001 to 9.999 seconds and can be set to the nearest millisecond.

Brake Dwell Up

BRAKE DWELL UP is the time necessary for the brake to return from the bottom to the top of its stroke

Speed Logic

If the controller is set up for two speed logic, the **MP328** 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 4-1 and 4-2. Any number key can be used to toggle 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 to put the line into slow speed (if using two speed logic). 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.

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). The **MP328** 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.

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.

This value should be set long enough that the material fully reaches the slow speed before stopping.

Overshoot Dist

The **MP328** will always move the backgauge toward the target in a forward direction (toward the reference point). When moving away from the reference point to make a bend, or a FAR REFERENCE, the backgauge will overshoot the target by the OVERSHOOT DISTANCE and approach the target in a forward direction. This is done to keep any machine "slop" behind the backgauge.

The allowable range is 0.0 to 50.0 inches. The distance that is entered should be large enough so that the backgauge can get up to full speed before stopping. The default value is 10.0000 inches.

Tolerance

The controller can check for the backgauge to be within a specified TOLERANCE. If the machine has not stopped within this TOLERANCE, the controller will halt and an error will be displayed.

The TOLERANCE should be set small enough to get acceptable parts but wide enough to avoid production interruptions. The controller allows values from 0.0005 inches to 10.0000 inches. The default value for TOLERANCE is 1.0000 inches.

Stopping Mode

The STOP REACTION time represents the time delay from the time that the controller turns off the movement outputs until the backgauge actually stops. The user has a choice of three STOPPING MODES: AUTO, MANUAL, or OFF. Use any number key to toggle through the choices.

AUTO: The controller turns off the movement outputs prior to the actual brake point to allow for the momentum and inertia of the machine. A new STOP REACTION time is calculated after each stop based on the average stopping time for several cycles. This parameter may be overridden, but the value will be modified on the next part that is run. The maximum value is 9.9999 seconds.

MANUAL: The controller turns off the movement outputs prior to the actual brake point as above. However, when in MANUAL, the controller does not recalculate a new STOP REACTION time after each stop. Whatever value is manually entered remains constant. The maximum value is again 9.9999 seconds.

OFF: A STOP REACTION time is not calculated and is not used at all by the controller. The movement outputs are turned off when the backgauge position is equal to the programmed length of the bend. This should cause bends to come out short due to the momentum of the machine and material during

stopping. Also, when the STOP MODE is set to OFF a tolerance test is not performed.

The default mode for STOP REACTION time is AUTO which is the recommended mode of operation.

Stop Reaction

The STOP REACTION is the time it takes (in seconds), for the backgauge to come to a stop after the outputs are turned off. It is adjusted automatically after every stop by the controller if the STOPPING MODE has been set to AUTO.

Decel Factor Mode

On two-speed machines, a DECELERATION (DECEL) FACTOR is used by the **MP328** 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 **MP328** 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 to 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/Sec²) and is used in the Adaptive Slowdown calculation discussed in the DECEL FACTOR MODE above. There 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.

Move Delay

When the RUN input of the **MP328** is enabled, there should be a delay entered before the backgauge starts to move to its new position. This delay is included for safety purposes and allows for notification of personnel of the intended move. The delay can be programmed under the MOVE DELAY parameter. The acceptable range of this parameter is 0.0 to 5.0 seconds.

New Program Delay

Allows the user to set a delay in the MP328 that will allow the gripper to continue running its present program for parts that remain in the machine, even though the XL120 shear controller is starting on a new type of part. The delay should be set to an amount that will allow "in process" parts to be completed, but short enough so that the gripper will start using the new program by the time the newly ran parts arrive to be processed.

Grip Delay

The GRIP DELAY is a value (in seconds), that can be entered into the controller to adjust for the gripper hitting the part, and the part bouncing off of the gripper so that the jaws of the gripper do not grab the part properly. When the part enters the jaws of the gripper, it will

activate the gripper so that the jaws will clamp down on the part. A small delay can be entered, so that the jaws do not close immediately. The acceptable range of values for this parameter is 0.0 to 5.0 seconds. This is only enable when “Enable Creep Mode” is set to yes.

Resolution

The RESOLUTION parameter defines the length of the Gripper movement for each increment of the motor encoder. It is a function of the distance traveled by the gripper during one revolution of the motor encoder, and the number of counts per revolution of the motor encoder. The formula for calculating RESOLUTION is as follows:

$$\text{Resolution} = \frac{\text{Distance of Gripper movement}}{4 \times \text{Encoder Count}}$$

The encoder used will typically be a motor encoder or an encoder mounted in such as way as to simulate the motor movement.

Correction

The CORRECTION FACTOR adjusts for errors in the GRIPPER movement. It is expressed as a percentage, with 100% being no correction. Increasing the CORRECTION FACTOR causes the GRIPPER movement to become longer and decreasing the value shrinks the GRIPPER movement.

Pressing “2” while in the second SETUP screen allows the controller to perform a calibration of the machine automatically. See section of manual entitled “Referencing” in the OPERATING PROCEDURE. If you enter a calibration value, the machine will first move to the HOME SWITCH, then it will move to the calibration point, and then prompt the operator for a measured value to that point. The machine will then calculate the correction value and ask the operator if they want this value updated. To calculate the new CORRECTION FACTOR, this formula is used:

$$\text{New CORR. FACTOR} = (\text{Programmed Length Moved} \div \text{Actual Measured Position Movement}) \times \text{Old CORR. FACTOR}$$

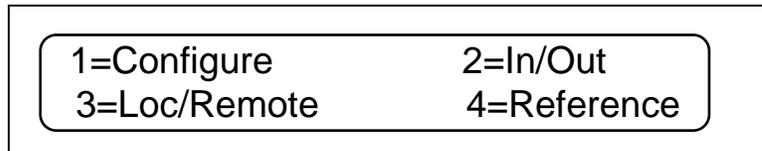
Filter Constant

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

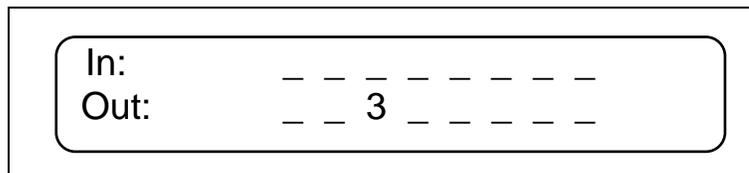
to achieve an accurate value. The default value is 32 Hz, which is considered to be on the high side of the low values. The controller will allow values from 1.0 Hz to 200.0 Hz.

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.



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.

Selecting “4” while viewing the SETUP screen, will cause you to enter the REFERENCE mode. The machine will immediately locate the reference switch and then stop. This is done to set a REFERENCE for the machine. If this is not manually done, it will automatically find the reference switch when RUN is pressed.

Referencing

The controller must be referenced to a known position each time power is removed and restored to the unit. The fixed reference point will be a home switch.

Near referencing with a home switch:

1. The **MP328** determines the state of the Home Switch. If the switch is OPEN, skip to step # 3.
2. The **MP328** moves the gauge in the forward direction until the Home Switch is OPEN. It then skips to step # 5.
3. The controller moves the gauge in the reverse direction until the Home Switch is CLOSED.
4. The **MP328** moves the gauge in the forward direction until the Home Switch is OPEN.
5. At the CLOSED -> OPEN transition of the Home Switch, the encoder interrupt captures the encoder count and sets it equal to the reference position.

Far referencing with a home switch:

1. The **MP328** determines the state of the Home Switch. If the switch is OPEN, the controller moves the gauge in the reverse direction until the Home Switch is CLOSED.
2. The controller moves the gauge in the forward direction until the Home Switch is OPEN.
3. The **MP328** moves the gauge in the reverse direction until the Home Switch is CLOSED.
4. At the OPEN -> CLOSED transition of the Home Switch, the encoder interrupt captures the encoder count and sets it equal to the reference position.

NOTES:

- **If near referencing is used, the home switch must be wired N/C (normally closed). Far referencing requires that normally open contacts be used.**

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.

Pressing "2" while in the second SETUP screen allows the controller to perform a calibration of the machine automatically. If you enter a calibration value, the machine will move to that point and prompt the operator for a measured value to that point. The machine will then calculate the correction value and ask the operator if they want this value updated.

(THIS MAY CHANGE!!)

Program Mode

The program mode is entered by pressing the “PRG” key. The part “type” will start to flash, indicating that the controller is waiting for the entry of the new type of part that is to be made. The operator need only to press any number key to toggle through the choices, and press the “ENT” key to lock the selection in., the choices are:

- Single Piece. Only the lip is bent, if programmed.
- L** L-Shaped. Two bends are made (including the lip).
- U** U-Shaped. Three bends (including the lip).
- 0** Full wrapper. One piece is made that is bent four times (with the lip), to form a complete section of duct.

After the TYPE is selected, the HEIGHT and WIDTH measurements can then be entered. Again use the “ENT” key to lock the selection in. Only height will be used for (-) type parts.

PROGRAM SCREEN

Type	Height	Width
--	0.00”	0.00”

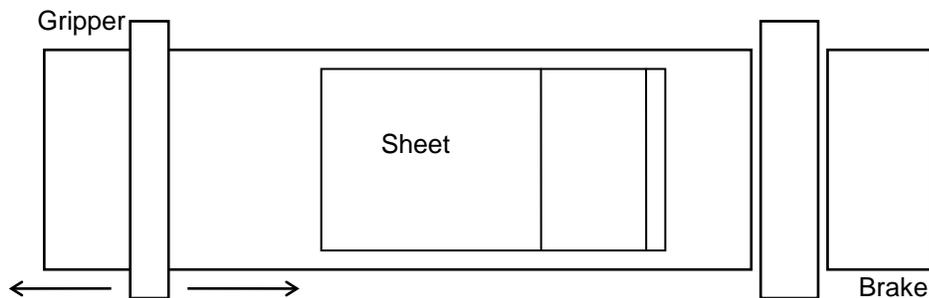
After the part is programmed, the STATUS screen will be shown, listing the line velocity, whether the controller is in the LOCAL or REMOTE mode, the current bend that is being made, the current position, the part TYPE, and the part dimensions.

STATUS SCREEN

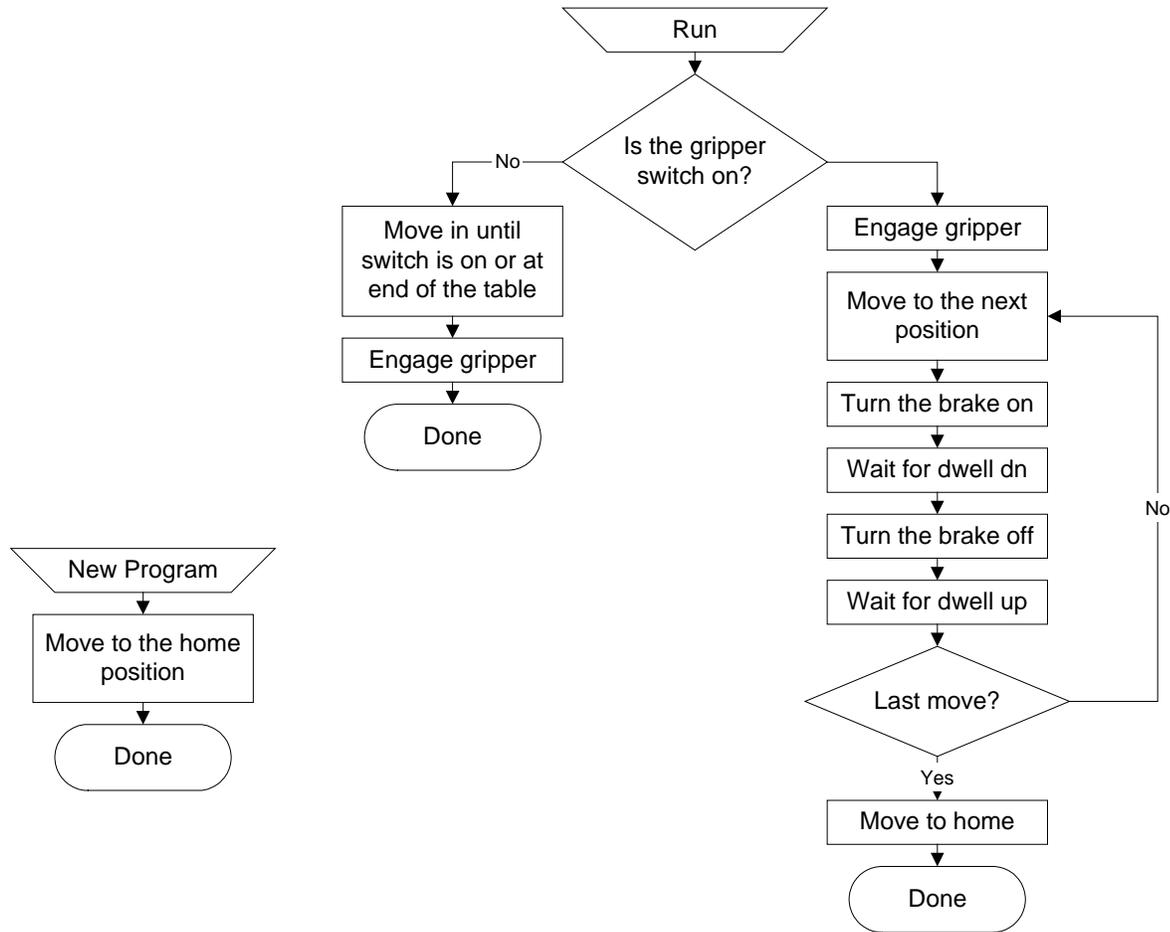
S 0	Loc	Bnd 0/3	0.00”
Type : 0	50.00”	x	35.00”

Run Operation

With this style of machine, the gripper has a sheet detect switch. When the run button is first pressed, and there is no sheet in the gripper, the controller should move the gripper in until the sheet is found, and engage the gripper. When the run button is pressed and a sheet is detected by the gripper, the controller should grip the metal, if it has not already, position to the first bend, engage the brake (wait for the dwell time), then move to the next position. When all bends are made, it should return to the clearance position (as programmed in the configuration).



When part information is programmed, and the RUN button is pressed the gripper will try to find the part in the forward direction. As long as the programmed part is shorter than the clearance position, the part will be processed. If the part is physically longer than the clearance position, the gripper must be jogged back to allow the part to be accepted. This must be done on the first part of that length, and the machine will readjust itself for the remaining parts.



If “metal flow” is set to NORMAL, the home position will be at the total sheet size plus the clearance distance. If it is REVERSE, then the home position is at the clearance distance only. In the first case, the operator will be placing a sheet on a transfer table in front of the brake. The clearance position of the gripper should be far enough away so that it will not interfere with the operator putting the sheet on the table. In the second case, the sheet is fed from the other side of the brake into the gripper. As soon as the gripper “sees” the metal, it clamps. Because of this arrangement, it is necessary to feed the metal only a short distance.

MP328 Switch Settings

Switch	Description
1	Unit ID must be OFF
2	Unit ID must be ON
3	Unit ID must be ON
4	Single Speed = OFF / Dual Speed = ON
5	Encoder Direction: CW = OFF / CCW = ON
6	Not Used: Must be OFF
7	Unit ID must be OFF

The proper Unit ID switch setting for the **MP328** is: Switches 2 & 3 ON, Switches 1 & 7 OFF.

MP328 Inputs/Outputs

Inputs	Description
1	Jog Forward
2	Jog Reverse
3	Home
4	Run Enable
5	Setup/Lockout
6	External Cycle / Manual Reset
7	Sheet Detect
8	Sequence Initiate

Outputs	Description
1	Fast/Forward
2	Slow
3	Reverse
4	Run
5	Leaf Up
6	Short Sheet
7	Gripper
8	Brake Down

Specification

Parameter	Panel Mount	AC Console
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Mechanical

Size	8"X12.5"X2.25"	8"X12.5"X7.5"
Weight	7lbs.	15lbs.

Electrical

Input Voltage	24VDC \pm 5%	115VAC \pm 10%, 50-60Hz
Input Current	.5 Amp.	1 Amp.

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

Output Characteristics

Std 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	6,500 pulses/second

Operation

Number of Batches	1 or 999, depending on model
Maximum Part Length	9999.999 inches 25,400 centimeters 254,000 millimeters
Maximum Parts/Batch	9999
Units of Measurement	inches, centimeters, or millimeters
Footage Totalizers	3
Maximum Footage/Totalizer	1,000,000 feet 1,000,000 meters

Features

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

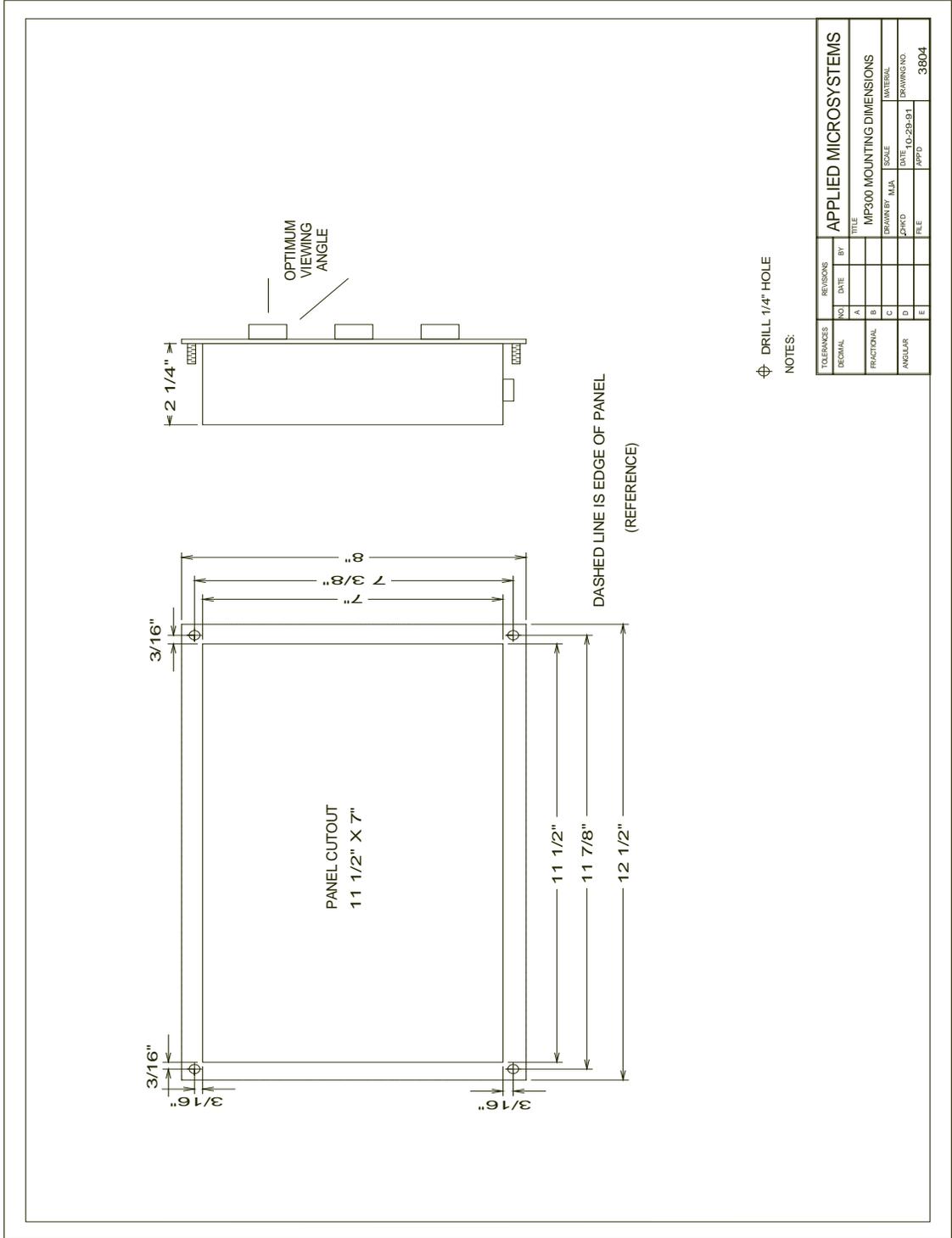


Figure B-1. Panel Mount Mounting Dimensions

Troubleshooting Guide

When did the Problem Start?

Did the machine work properly at one time? If not, have you done the Calibration procedure?

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, or 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.

The encoder **wheel** must be at right angles to the material. The wheel must rotate exactly parallel to the direction of material movement.

The wheel must be in firm contact with the material. **No slippage** is allowed!

Re-run the length **Calibration** procedure after any changes to the encoder mounting.

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.

Check the **shear** (or punch) press to make sure that it returns fully to its home position after each cycle. The press will make accurate cuts **only** if it starts from a known position for each cycle.

Re-run the length **Calibration** procedure after any changes to either press.

Visually check **other** parts of the machine for loose fasteners, excessive wear, proper lubrication, proper material feed, and roll former adjustment.

Re-run the length **Calibration** procedure after any changes to the machine.

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. Also take note of the order in which the shear cut the parts.

Write down these measurements for possible later reference.

If length and punch 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, run the **Calibration** procedure.

Re-check Setups

Re-check Setup values with originally recorded values. When you installed the **MP300 SERIES** 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.

Run the Calibration mode

When you do the Calibration, take great care to make accurate measurements. Be sure that you know how to reduce measuring error as much as possible with the scale or steel tape you use. A loose tip on your steel tape can add a large error into your measurements.

Use Built-in Diagnostic features

The **MP300 SERIES** has a display mode Press SETUP until the screen shown below appears.



Figure 5-1. Input Output, Memory Test Screen.

Press the number for Input/Output and the screen that is shown in figure 5-2 will appear.

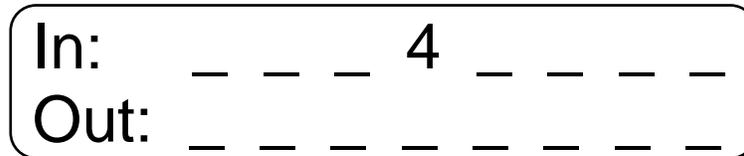


Figure 5-2. In / Out Screen.

This screen will allow you to monitor the controller's inputs and outputs. Watch this display while the machine is running to check for slowdown, stopping, die accelerator, and press actuation points.

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

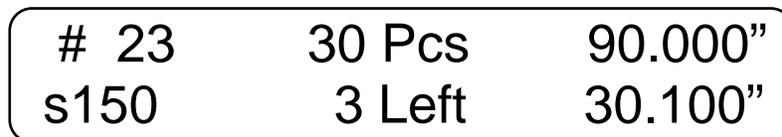


Figure 5-3. MP350 and MP350P Status Screen

Check incoming Power

Check incoming power for proper voltage. If you suspect fluctuations, watch the needle indication with an analog meter to see if they show up.

More advanced line monitors are available for stubborn cases that you can't see with 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 **MP300 Series'** memory.

Clear Memory

Clearing memory will erase all Setup, Pattern, and Order information in the **MP300 Series'** memory.

Do not clear the memory unless you have written down all Setup, Pattern, and Order information for re-entry, and you have tried everything else above.

You can clear all storage in the **MP300 SERIES** (including Setup and Order data) by following the sequence below.

- 1) Make sure that the Security switch is unlocked.
- 2) Turn off power to the controller.
- 3) Wait five seconds.
- 4) press the '5' key while you
- 5) turn the controller's power back on.
- 6) Hold down the '5' key for at least two seconds after you turn the power on.

Electrical Noise

The **MP300 SERIES** 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 suppressor 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.

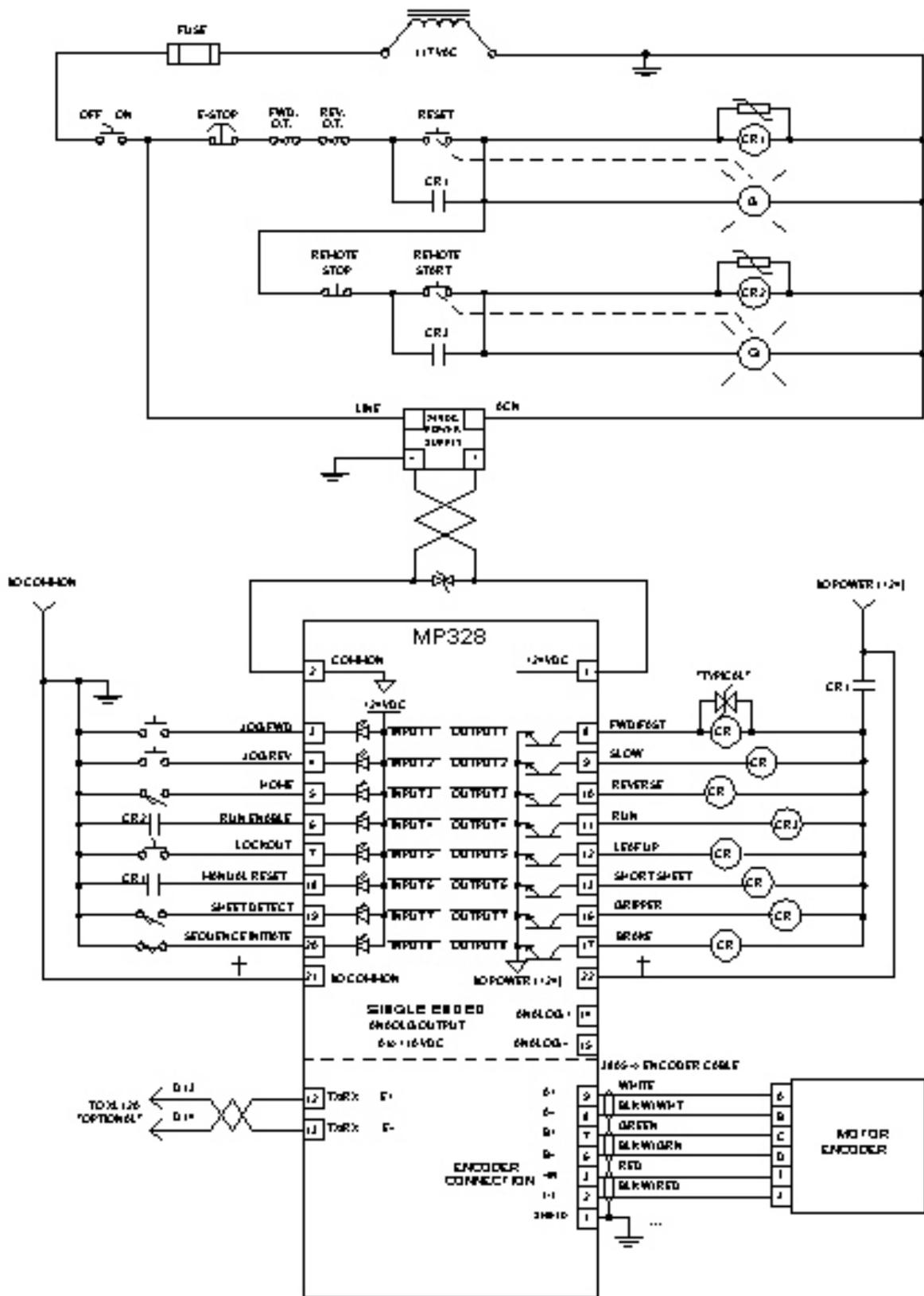
Include the Model, Serial, and Software Version numbers.

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.



Contact AMS

If assistance is needed, AMS expert technicians will be glad to help. Please have the controller Model Number, Serial Number, and software version ready when calling. It will be asked for.

Telephone: 1-800-334-5213

Fax: 1-314-344-9996

AMS can also be contacted through our web site at www.amscontrols.com or email us at Support@amscontrols.com.

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