MP338 Backgauge Controller

MP338 BackGauge

The **MP338** is a computer controller used to run a multibend BACKGAUGE positioner for bending metal for HVAC ductwork. The controller can be used independently to run the BACKGAUGE, or linked to an **XL120** controller via RS485 communications. The data is then automatically down loaded to the **MP338** as to what size part will be coming next.

If the BACKGAUGE SETUP is highlighted and ENTER is selected, the BackGauge setup screen can be seen. There will be a slight delay while this screen is being loaded.

```
 2:30PM    9/05/97      0FPM
0.000"
ORDER
0Ft
MATERIAL                      N/A%
COMP.
Parameters                   Value
Reference Mode
Near
Ref. Pos.                   0.000"
Position Delay
0.0000sec
Multiple Brake
No
OverShoot Dist
10.0000"
Tolerance
1.0000"
Stopping Mode
Auto
Stop Reaction          0.0000sec
Move Delay
0.0000sec
Resolution
0.0117187529"
Correction
100.000%
```

Figure 7b-1. BackGauge Setup Screen
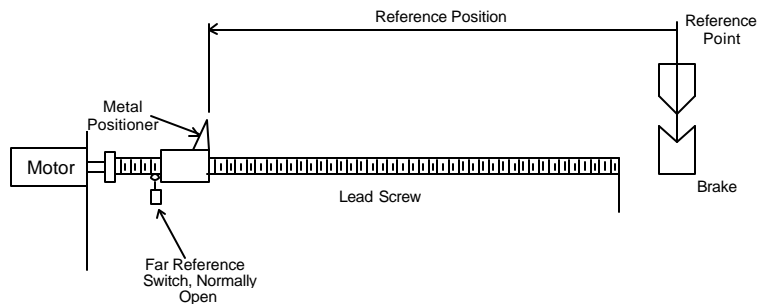
Reference Mode

The REFERENCE MODE parameter tells the **MP338** where the reference switch or physical stop 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 backgauge occur "behind" the switch or physical stop, the REFERENCE MODE is NEAR.   If the switch is behind the backgauge and most of the moves are in "front" of the switch or physical stop, the REFERENCE MODE is FAR.   Use any number key to toggle the choices.

Near Reference Mode

Reference
Position

Reference
Point

Metal
Positioner

Motor

Lead Screw

Brake

Near Reference
Switch, Normally
Closed
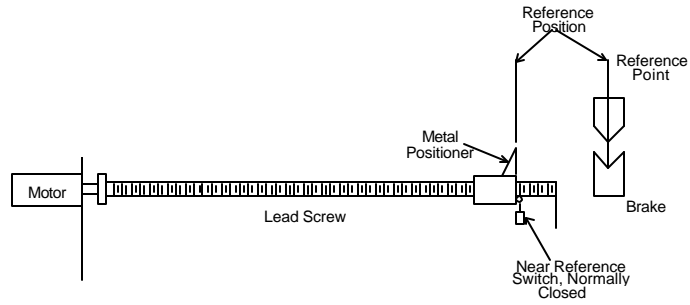
The switch for a NEAR REFERENCE MODE must be normally closed and remain open as long as the backgauge is on the switch or closer to the reference point than the switch. The switch for a FAR REFERENCE MODE must be normally open and remain closed as long as the backgauge is on the switch or farther away from the reference point than the switch.

Far Reference Mode

Reference Position

Reference
Point

Metal
Positioner

Motor

Lead Screw

Brake

Far Reference
Switch, Normally
Open

The controller will automatically reference itself when it is placed in the RUN mode. The reference is always achieved when the controller is moving in the forward direction. If a physical stop with a NEAR REFERENCE is used, the controller will reference itself when the gauge hits the stop going forward. If a physical stop with a FAR REFERENCE is used, the gauge will hit the stop in the reverse direction and then reference when the first forward encoder count is seen.

Ref. Pos.

The REFERENCE POSITION is the distance from the reference point to the metal positioner after it has reached the physical stop or HOME SWITCH.

Position Delay

The POSITION DELAY parameter sets a delay time (in seconds), from when the Brake/Clamp complete input turns on, and the time the outputs turn on to move the backgauge. The limits of this parameter are 0.0000 to 9.9999 seconds

Multiple Brake

With MULTIPLE BRAKE set to NO, the Brake/Clamp Complete input is disabled so that the backgauge can make single bends only. Setting MULTIPLE BRAKE to YES enables the Brake/Clamp Complete input and allows the **MP338** to reposition the backgauge after every bend, if necessary.

Speed Logic

The **MP338** 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 (if set up as a two speed controller): 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 7b-1 and 7b-2. Any number key or the blue PICK 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 7b-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 7b-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 **MP338** 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 **MP338** 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 time it takes 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 **MP338** 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 **MP338** 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/Sec^2) 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 **MP338** 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.

Resolution

The RESOLUTION parameter defines the length of the backgauge movement for each increment of the encoder. It is a function of the lead screw lead (the distance the metal positioner travels for one revolution of the screw), and the number of counts per revolution of the encoder. For a directly coupled encoder/lead screw installation, the formula for calculating RESOLUTION is as follows:

$$\text{Resolution} = \frac{\text{Lead Screw Lead (in inches)}}{4 \ \text{x} \ \text{Encoder Count}}$$

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.

Common lead screws have a ¼" lead, so for this lead screw, the RESOLUTION would be as follows:

Model	Resolution
256	0.00024414
256Z	0.00024414
500	0.000125
500Z	0.000125
1000Z	0.0000625

It is not necessary to precisely measure the lead 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.

Slow Volts

This parameter allows the operator to control the speed of the movement of the backgauge in the SLOW SPEED mode if analog outputs are being used. Increasing this value will cause a faster movement and decreasing this value slows the movement.

The controller provides an analog voltage signal that varies between 0 V and + 10 VDC. This output can drive a 1000 ohm load. The voltage is proportional to the speed of the movement.

Fast Volts

This parameter allows the operator to control the speed of the movement of the backgauge in the FAST SPEED mode if analog outputs are being used. Increasing this value will cause a faster movement and decreasing this value slows the movement.

The controller provides an analog voltage signal that varies between 0 V and + 10 VDC. This output can drive a 1000 ohm load. The voltage is proportional to the speed of the movement.

Correction

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

Calculate the CORRECTION FACTOR using the following steps: 1) Force the Backgauge to perform a reference.   2) Program the Backgauge to move to a position at the opposite end of the table. 3) Measure the distance that the Backgauge moved. 4) Use the following formula for the new CORRECTION FACTOR.

$$\text{New CF} = \frac{\text{Programmed movement of the Backgauge}}{\text{Actual Measured movement of the Backgauge}} \times \text{Old CF}$$

CF = Correction Factor

Filter Constant

The FILTER CONSTANT can be adjusted in order to improve the line speed display. If the line speed on the display fluctuates, a lower FILTER CONSTANT value will stabilize the display.   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 English inches, Metric millimeters, or Metric centimeters. Press any number key or the PICK key to toggle through the choices.

To exit the BACKGAUGE SETUP screen push the SETUP key.

BackGauge Status

To view the BACKGAUGE STATUS you must first be in the DOWN STREAM MACHINES CONFIGURATION SCREEN, figure 7-3. Highlight the DOWN STEAM MACHINES line and hit ENTER. Highlight the BACKGAUGE STATUS line and hit ENTER to view the status screen.

```
 2:59PM    9/05/97      0FPM
0.000"
ORDER
0Ft
MATERIAL                        N/A%
COMP.
MP338    Version:14.01  Unit:44  Type:
2
Position:  0.000"   Status: Stopped
Inputs:--------        Outputs:-2----
--
Device: Offline

Type  Height     Width    Offset
BendAllow
      0.00      0.00      0.00
0.00




       Press Enter for Program Page
```

Figure 7b-2. BackGauge Status Screen

If no parts are programmed, the screen will have the information shown above. When parts are programmed, this screen will show the characteristics of the programmed part.

The information shown on the Status Screen includes the current **MP338** version, unit and type number, the part position, the controller status, input and output status, on line and off line status, as well as the current part information.

The controller status options are Stopped, Moving, Jog Fwd, Jog Rev, and Enabled.

```
 3:03PM    9/05/97      0FPM                    ⛶
0.000"
ORDER
0Ft
MATERIAL                          N/A%
COMP.
MP338  Version:14.01  Unit:44   Type: 1
Device                              Off
Line
Part Type
Part Height
0.00"
Part Width
0.00"
Offset
0.00"
Bend Allowance                    0.00"
Command                    Send
Program
```

Pressing the Enter key will take you to the Program page as shown in figure 7b-3.

Figure 7b-3 Backgauge Program Screen

The first function of this screen is to set the downstream machine into the "Local" or "Remote" mode. This is done with the "Device" parameter. Pressing the "Pick" key will toggle between the choices of ON LINE and OFF LINE. After the proper mode is selected, use the "Enter" key to lock the choice into the controller.

If ON LINE is chosen, the downstream device will be in the "Remote" mode and controlled by the **XL120**. When the Device is "ON LINE" the part information is sent to the downstream controller. This information will include the Part Type, Part Height, Part Width, Offset, and Bend Allowance parameters.

If OFF LINE is chosen, the downstream device will be in the "Local" mode and is designed to operate independently, without using the **XL120** as a controlling device. In this mode parts can be programmed with the downstream controller.

The Command line allows the operator to send a new set of dimensions to the **MP338** controller for bending sheets not made by the **XL120** controller. The Command line may also be used to clear the **MP338's** memory, if necessary. By highlighting the Command line and pressing the PICK key, the Clear Memory or Reference command will be shown on the display. Pressing ENTER will send the specified command to the **MP338**. The command options are "Send Program", "Reference", and "Clear Memory".

To exit this screen hit the SETUP button.

Operating Procedure

Referencing

The controller must be referenced to a known position each time power is removed and restored to the unit. The fixed reference position may be one of two items: 1) A home (reference) switch, or 2) A positive stop. Each type of referencing sequence is described below.

Near Referencing With A Home Switch:

NOTE: **Referencing is performed at fast speed.**

1. The **MP338** determines the state of the Home Switch. If the switch is CLOSED, the **MP338** moves the gauge in the forward direction until the Home Switch is OPEN. It then skips to step # 6.
2. If the Home Switch is OPEN, the **MP338** moves the gauge in the reverse direction until the Home Switch is CLOSED.
3. It continues the reverse move for the Overshoot Distance.
4. Wait for the gauge to stop.
5. The **MP338** moves the gauge in the forward direction until the Home Switch is OPEN.
6. At the CLOSED -> OPEN transition of the Home Switch, the encoder interrupt captures the encoder count and sets it equal to the reference position.

Near Referencing With A Positive Stop:

NOTE: **Referencing is performed at fast speed.**

1. The **MP338** moves the gauge in the forward direction until it hits the positive stop (Velocity < 1 count/sec).
2. The encoder interrupt captures the encoder count and sets it equal to the reference position.

Far Referencing With A Home Switch:

NOTE: Referencing is performed at fast speed.

1. The **MP338** determines the state of the Home Switch. If the switch is OPEN, skip to step # 3.
2. If the switch is closed, the controller moves the gauge in the forward direction until the Home Switch is OPEN, and waits for the gauge to stop.
3. The **MP338** moves the gauge in the reverse direction until the Home Switch is CLOSED.
4. The controller continues the reverse move for the Overshoot Distance.
5. It waits for the gauge to stop (Velocity < 1 count/sec).
6. The **MP338** moves the gauge in the forward direction until the Home Switch is OPEN.
7. 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 Positive Stop:

NOTE: Referencing is performed at fast speed.

1. The **MP338** moves the gauge in the reverse direction until it hits the positive stop (Velocity < 1 count/sec).
2. It then moves the gauge in the forward direction until 1 encoder count is generated.
3. The encoder position is then set to the reference position distance.

NOTES:

- **All referencing moves are made in fast speed.**
- **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 operator changes from near to far (or back), he or she must toggle the home switch input before the change takes effect.**

<u>Programming</u>

The programming of parts is done with the **XL120** controller. Refer to the Parts Programming section of the manual for the proper procedure.

A second method of programming the parts for the **MP338** is by using the Backgauge Status Screen, figure 7b-2 on page 7b-11.

Type   Part Type - One of four options:

⬓   Single sheets that will not cause the Backgauge to move

L   "L" shaped, single bend duct

U   "U" shaped, double bend duct

0   Wraparound, triple bend duct

I   Shear only sheets which will not cause the Backgauge to move

Height The height of the duct .

Width The width of the duct.

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.
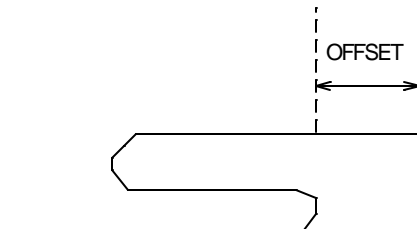
Run Operation

Once a new set position is programmed in, the controller moves to the target while following the rules below.

1. If Current Position > (Set Position + Overshoot Distance), it will move in the forward direction to the target.
2. If Current Position < Set Position, it will move in the reverse direction until condition # 1 is true, then move in the forward direction to the target.

All targets must be approached from the forward direction so that any backlash in the system can be minimized.

If a new set position is programmed in before the controller has been referenced, the reference sequence will be performed before the controller moves to the target.

Note: In order for the MP338 to automatically receive parts data from the XL120, it must be put "on line". To do this, go to the Backgauge Status Screen by highlighting "Downstream Machines" in the Setup Menu and pressing "Enter". Highlight "Backgauge Status" and press "Enter". Press "Enter" again to go to the Backgauge Program Screen. Highlight the top row labeled "Device" and press the "Pick" key to toggle the option to "On Line". It can also be done at the MP338 controller, if it has a front display panel. Press the "Setup" key and press the number "3 = Loc / Remote". Local or Remote mode is indicated on the Status Screen, top row, next to the line speed indicator.

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 as well as the Auto Calibrate function.

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 (if available), will still halt the operation.

Part Reset Operation

Circumstances may arise when you may need to start the Part Bend process over, i.e. if a part gets damaged and the remaining bends cannot be completed.

In order to reset the position of the Backgauge back to the first bend in the part, simply close the Part Reset input (#8). If the Backgauge is moving to a new position when the input is initiated, the Backgauge will finish the move before returning to the first bend position. To stop the Backgauge from moving, and to immediately go to the first bend position, halt the motor by removing the Run Enable input. This will result in an "Out of Tolerance" error due to the fact that the motor did not reach the programmed target. Clear the error and momentarily close the Part Reset input (#8) and then close the Run Enable input. The Backgauge will now move to the first bend position.

<u>Specification</u>

Parameter	Panel Mount	AC Consolette

<u>Mechanical</u>

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

<u>Electrical</u>

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

<u>Outputs</u>

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
Part Complete	Std DC	Std DC, AC Relay
Part Type Low Bit	Std DC	Std DC, AC Relay
Part Type High Bit	Std DC	Std DC, AC Relay
Not Used		
Analog (Optional)	0 to +10VDC	0 to +10VDC

<u>Inputs</u>

Jog Forward	Yes	Yes
Jog Reverse	Yes	Yes
Home	Yes	Yes
Run Enable	Yes	Yes
Setup/Lockout	External	Internal
Not Used		
Brake/Clamp Complete	Yes	Yes
Part Reset	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	999.99 inches
	9999.9 millimeters
Units of Measurement	inches, or millimeters

MP338 Switch Settings and I/O

MP338 Switch Settings

Switch	Description
1	Unit ID, see switch settings below
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 OFF

The proper Unit ID switch setting for the **MP338** is: switch 3 ON. Switches 1 and 3 ON is also a valid Unit ID number for the **MP338**.

SW1	SW2	SW3	SW7	Unit ID
OFF	OFF	ON	OFF	44/81
ON	OFF	ON	OFF	45/82

MP338 Inputs

Inputs	Description
1	Jog Forward
2	Jog Reverse
3	Home
4	Run Enable
5	Setup/Lockout
6	Not Used
7	Clamp Detect
8	Part Reset

MP338 Outputs

Outputs	Description
1	Forward/Fast
2	Slow
3	Reverse
4	Run
5	Part Complete
6	Part Type Low Bit
7	Part Type High Bit
8	Not Used
Pin 14	Analog + (Optional)
Pin 15	Analog - (Optional)

To exit the Backgauge Status screen hit the SETUP button

SETUP DATA SHEET

MODEL MP338 CONTROLLER

## _BackGauge Configuration Data_

Reference Mode   _____
Ref. Pos.   _____
Position Delay   _____
Multiple Brake   _____
Speed Logic   _____
Min Slow Dist   _____
OverShoot Dist   _____
Tolerance   _____
Stopping Mode   _____
Stop Reaction   _____
Decel Factor Mode   _____
Decel Factor   _____
Move Delay   _____
Resolution   _____
Slow Volts   _____
Fast Volts   _____
Correction   _____
Filter Const   _____
Units   _____

AMS CONTROLS

For problems call 1-800-334-5213 and ask for customer service

Note: Use this sheet to fill in the machine setup values. This list includes all possible parameters and not all controllers have every parameter. Only fill in the values for your machine. Use the switch drawing below to show your switch setting.

TYPE

→ ON

1
2
3
4
5
6
7
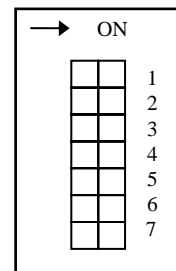
Serial Number _____
Version Number _____

-
-
-

Appendix A

Setup Data Sheet

Setup Data Sheet