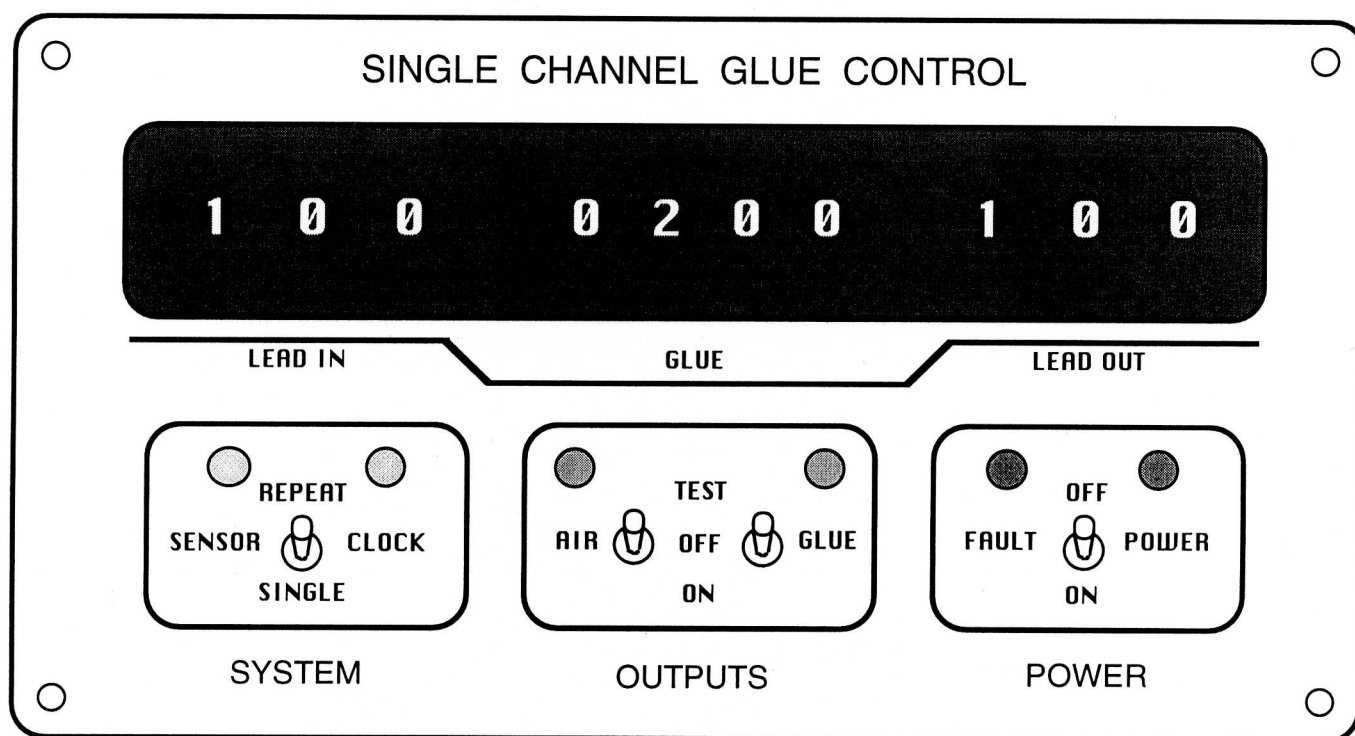


MAC 100 Adhesive Application System

MAC 100 Control Module



General Information:

This is a single channel output controller that has been designed to operate either with extrusion or spray valves on a wide range of packaging machinery. It is driven by either an encoder running at board speed or a pulse generator programmed at the appropriate speed and so can be used either on fixed or variable speed lines. The REPEAT function means that it can also be used to drive two glue heads for four point gluing applications such as tray erecting, case sealing and anti-slip pallet stabilisation. The control pcb is mounted behind the control panel making this module suitable for installation in either existing switchgear cabinets or as a separate unit in its own enclosure.

Outline Specification:

Minimum & Maximum settings: Lead In 0-999 mm, Glue Line 0-9999 mm, Lead Out 0-999 mm. With REPEAT function maximum gap between two patterns 999 mm.

Speed Range: Minimum speed 32 mm/sec, Maximum speed 4.0 m/sec.

Voltage Ranges: Input 9-25 Volts AC and 10-30 Volts DC. Output 10-30 Volts DC.

Advance range: (distance between sensor and glue head, set by dip-switch) 2-510 mm.

Compensation range: (response delay for glue head, set by dip-switches) 1-255 m/secs.

Lockout: Once glue cycle has begun cpu is barred from receiving further signals until complete.

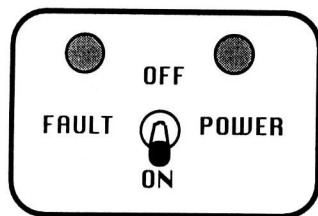
Sensor type: NPN or PNP, Diffuse scan or Retro-reflective types, 10-30 Volts DC

Encoder type: NPN or PNP, 10-30 Volts DC

Time base: On board pulse generator / percentage correction feature set by dipswitch. 10-2560mm / sec fixed speed application and 1 - 256 % correction for encoder input signal

Power Supply: Outside power source of either 12 or 24 V DC

CONTROL PANEL FUNCTIONS



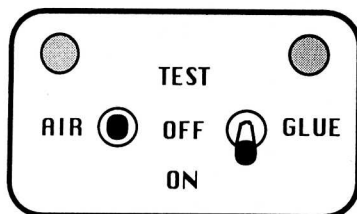
POWER

SWITCH ON

ON/OFF switch controls low voltage power to processor board only.

POWER I e d indicates power is on.

FAULT I e d indicates either low speed or calculation error.



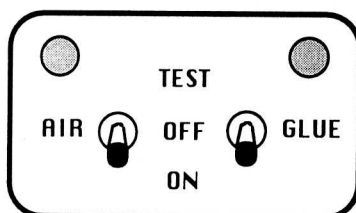
OUTPUTS

EXTRUSION SETTING

AIR switch is off as spray air solenoid is not required.

GLUE switch is in ON position ready for signal from processor.

GLUE I e d will indicate when solenoid is switched by the processor.

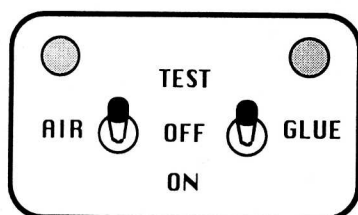


OUTPUTS

SPRAY SETTING

AIR and GLUE switches are in ON position ready for processor signals.

AIR and GLUE I e d s will indicate when solenoids are switched by the processor. Sequence is AIR ON; GLUE ON; GLUE OFF; AIR OFF.

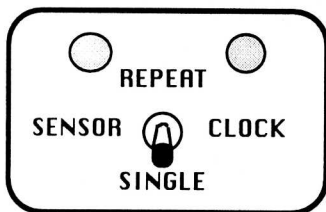


OUTPUTS

TEST FUNCTIONS

AIR TEST assists in the adjustment of the spray head air flow regulators.

GLUE TEST will be required for purging air from glue lines and assist when the Glue lines need to be periodically flushed out.



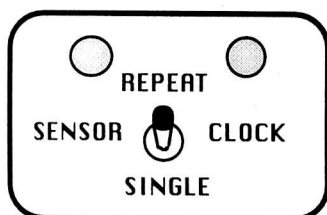
SYSTEM

SINGLE

When SINGLE is selected only one shot of glue will be applied per cycle

SENSOR I e d indicates that the sensor is triggered ON.

CLOCK I e d shows pulses from either an encoder or pulse generator .

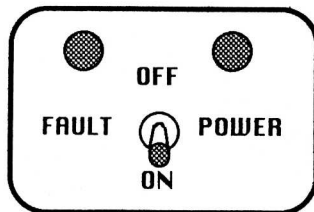


SYSTEM

REPEAT

The REPEAT feature allows the system to repeat the first glue line. The distance between the two is set using the LEAD OUT setting. This means the system can be used for case sealing, tray erecting and anti-slip gluing

How to use the MAC 100 Controller

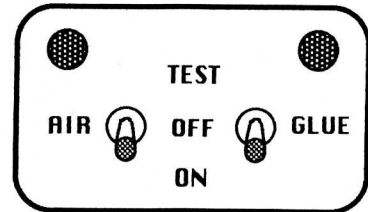


POWER

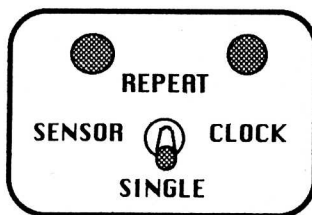
Put the POWER switch in the ON position. The POWER light should be on. If not check that the main supply is on.

Test the outputs by switching each of the OUTPUT switches to the TEST position in turn. If the compressed air supply is on then the solenoids will operate. Place a container under the glue head to catch the adhesive while doing this.

When ready to run switch the required OUTPUTS to ON.



OUTPUTS

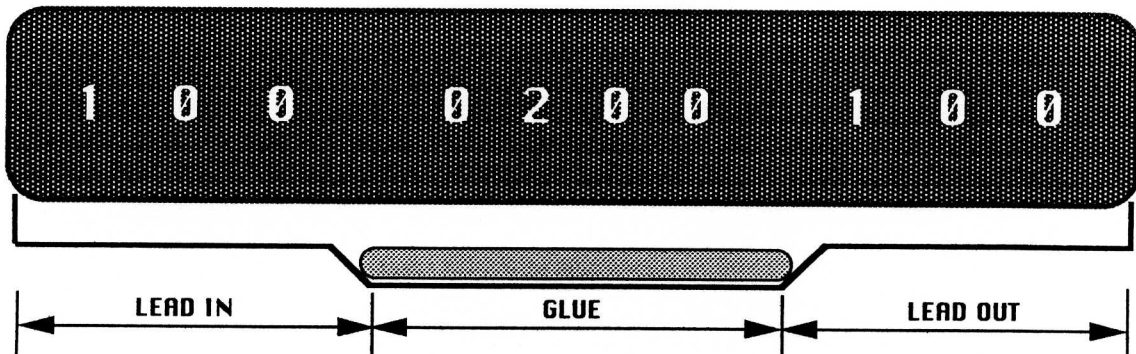


SYSTEM

The SYSTEM switch allows you to select either a single or a double glue application. (See the two diagrams below) SINGLE is selected for standard straight line gluing work and REPEAT can be used for case sealing and palletising applications where other gluing patterns are needed.

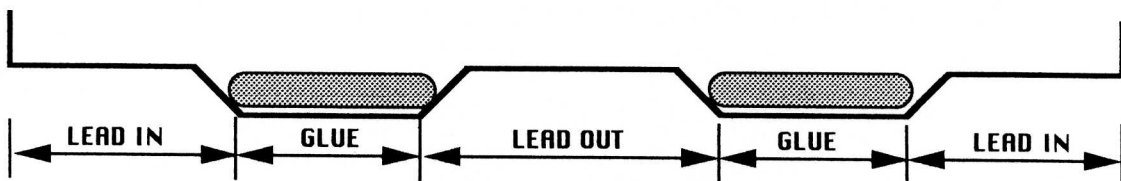
The CLOCK light will be on if a clock/generator card is used or, if an encoder is used, when the machine is running. SENSOR light indicates that an object has switched the photo-cell ON.

To input the dimensions of the case measure in millimetres to the point where you want the glue to start and enter that as the LEAD IN. From **that** point measure to where you want the glue to stop and enter that as the GLUE line. From **that** point measure to the back of the case and enter that as LEAD OUT. In spray applications remember to allow for the radius of the glue pattern at each end of the glue line. (This will be between 5 & 10mm at each end)



'A' Single line gluing with SYSTEM switch set to SINGLE

If using REPEAT measure LEAD IN and the first GLUE line as above. The LEAD OUT then becomes the distance between the two GLUE lines. The controller assumes that the actual LEAD OUT will be the same as the LEAD IN so there is no need to measure that part.



'B' Two line gluing with SYSTEM switch set to REPEAT

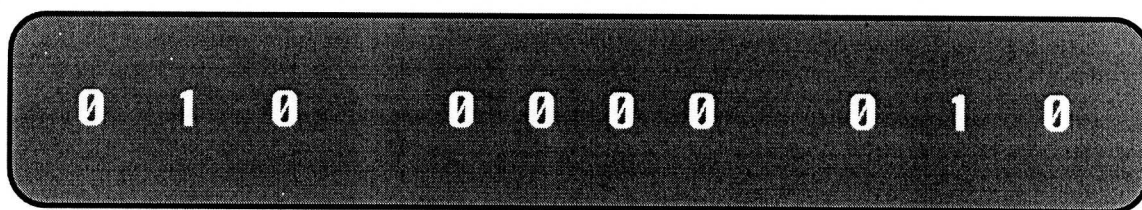
Automatic Glue Application

If the machine design allows the photo-sensor to be installed in line with the glue tab, or if continuous sleeves are being glued, you can select **automatic** gluing.

To switch to AUTOMATIC, select 0000 on the GLUE switches. The LEAD IN and LEAD OUT switches now set the point from each end where glue will be applied. The example shown is set at 10mm and this will allow the glue to start and stop 10mm in from each end of the glue tab. If you are using a spray head, please remember to allow for the radius at each end of the spray pattern.

NOTE: In this mode glue will be applied while the machine is running, whenever the sensor is triggered, so it is essential to position the sensor so that only the glue tab is seen.

Example of Switch Settings

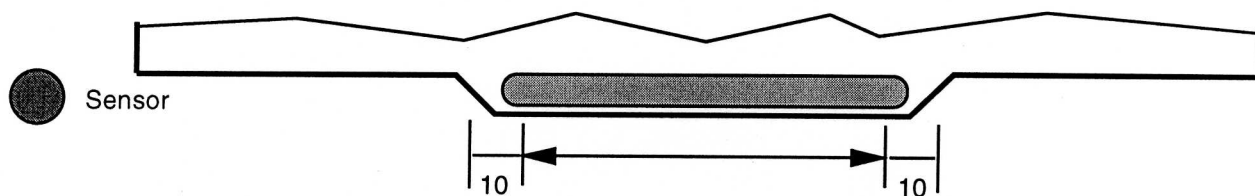


LEAD IN

GLUE

LEAD OUT

Single line gluing with SYSTEM in AUTOMATIC mode



MAC 100 Calibration

There are four sets of switches on the back of the main printed circuit board which are used to pre-program the sensor to glue head off-set and the glue head on and off response times.

These sets of switches are ON in the up position and OFF in the down position. To set a switch add up the numbers shown in the diagram below until the required value has been achieved. (Start with the larger numbers)

The sensor to head offset is best measured by sliding a piece of board in the direction of travel until the sensor led is lit. From that point measure, in millimetres, to the application point of the glue head. (For a spray head this is the point of the needle/nozzle).

Examples as shown:

Glue Head to sensor offset of 100mm set by $64 + 32 + 4 = 100$

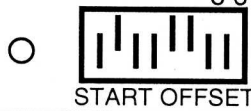
Timebase switched off ie. default setting of 100%

On Compensation of 35 msec set by $32 + 2 + 1 = 35$

Off Compensation of 10 msec set by $8 + 2 = 10$

Sensor to head offset
in millimetres

2 4 8 1 3 6 1 2
6 2 4 2 5
8 6



START OFFSET

Timebase in %

1 2 4 8 1 3 6 1
6 2 4 2
8



TIMEBASE

Comp On in
milliseconds

1 2 4 8 1 3 6
6 2 4



COMP ON

Comp Off in
milliseconds

1 2 4 8 1 3 6
6 2 4



COMP OFF

Compensation times are measured in milliseconds and are the time taken for an electronic signal to operate a pneumatic valve and transfer adhesive to the board.

In the case of a non-contact system such as a spray valve we would expect a response time of 35 milliseconds for ON & OFF.

A contact gluing system will probably have a time of around 10 - 12 milliseconds for ON & OFF.

If, while the machine is running, the glue pattern moves back as speed is increased then it will probably mean that the ON compensation is set too low.

If, on the other hand, the glue pattern moves forward as speed is increased then the ON compensation is set too high.

Once the ON compensation is set correctly follow the same procedure for adjustment of the OFF compensation. Please note that the system will not accept compensation values greater than 99 milliseconds.

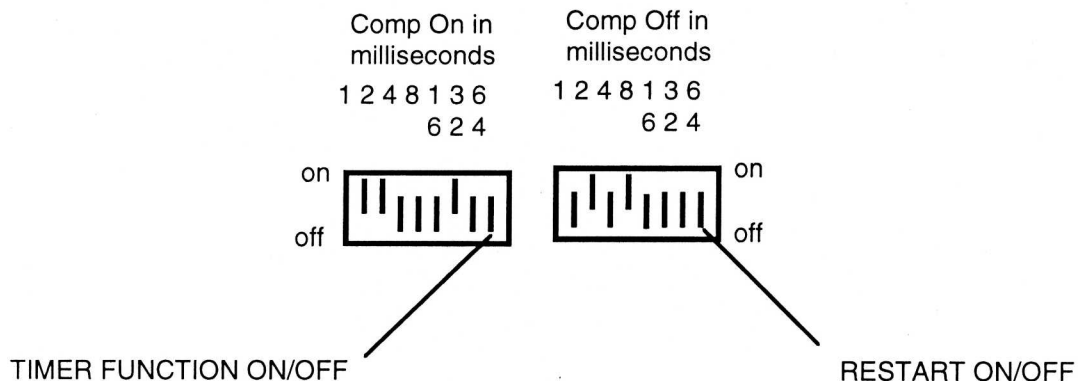
MAC 100-D New features

Compensation switch changes

The eighth switch in ON & OFF Compensation is no longer used for this purpose as it is extremely unlikely that compensation in excess of 99 milliseconds will ever be required. These switches now have new functions:

Switch 8 (ON Comp) - This now activates a built in pulse generator circuit set at 1000 mm/sec. When activated this effectively turns the front panel switches into timers with each digit representing 1 millisecond. This means that the system can be used in timer mode on fixed speed machines and as an emergency, in the event of encoder failure, will enable the system to be used while a replacement is found.

Switch 8 (OFF Comp) - This now de-activates the glue RESTART Function. In the OFF position the glue application stops automatically if the encoder pulses stop and restarts as soon as they return. ie. emergency stops. It may not always be desirable for this feature to be present so switching this to the ON position will have the effect of turning the Restart OFF.



Time base switches

There is now a built in dual function 'clock generator' that is programmable to suit a variety of applications.

Note! In conventional applications with encoders running at belt speed you do not need to use this feature and may leave all time base switches OFF. If, however, your application falls into either of these categories calibration is carried out as follows:

Fixed speed machines without an encoder - switch timebase ON using switch 8 'COMP ON' enter machine/board speed as percentage eg. 960mm/sec is entered as 96% (switches 6&7 ON). Note that all switches OFF will give the default time base of 1000mm/sec.

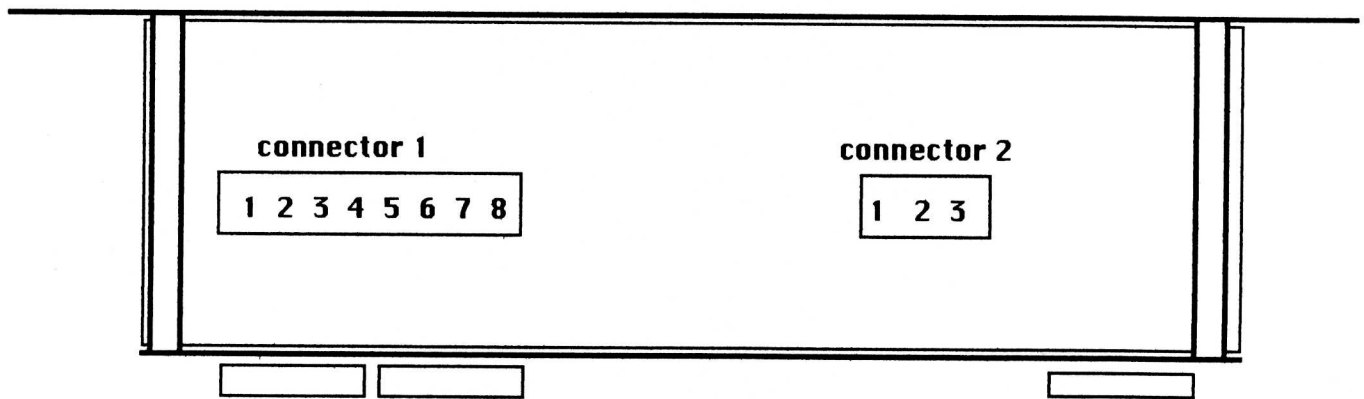
Variable speed machines with an encoder - if it is necessary to drive the encoder at a different speed to the board this can be compensated for by entering a percentage value. To 'correct' the input pulses calibrate as follows: Put down the largest glue line possible upto 1000mm. Divide the switch set length by the actual glue length and multiply by 100.

Examples:

Switch settings: 100 **500** 100 ie 500 mm glue line
Actual glue line: 415mm
Calculation : $500/415 = 1.20 \times 100 = 120$. set switches to 120% (4,5,6 & 7 ON)

Switch settings: 050 **500** 050 ie 500 mm glue line
Actual glue line: 540
Calculation : $500/540 = 0.93 \times 100 = 93$. set switches to 93% (1,3,4,5 & 7 ON)

MAC 100 Connection Details



Connector 1

- | | |
|---|------------------------|
| 1 | Sensor NPN |
| 2 | Sensor PNP |
| 3 | Encoder NPN |
| 4 | Encoder PNP |
| 5 | Glue Solenoid PNP |
| 6 | Glue Solenoid NPN |
| 7 | Spray Air Solenoid PNP |
| 8 | Spray Air Solenoid NPN |

Connector 2

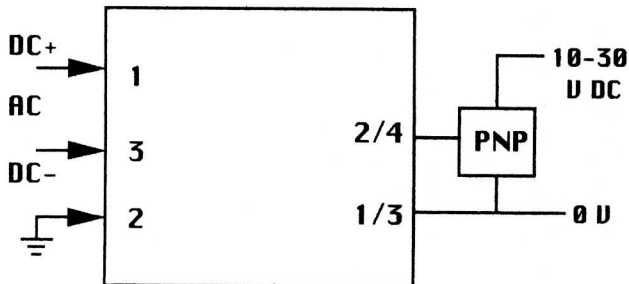
- | | |
|---|--------------|
| 1 | DC +ve or AC |
| 2 | Ground |
| 3 | DC -ve or AC |

Note:

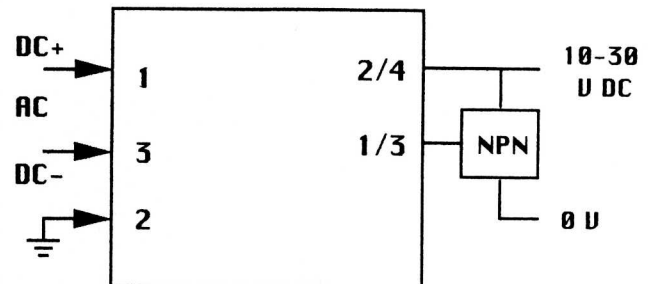
DC Range 10-30 V

AC Range 9-25 V

PNP Inputs

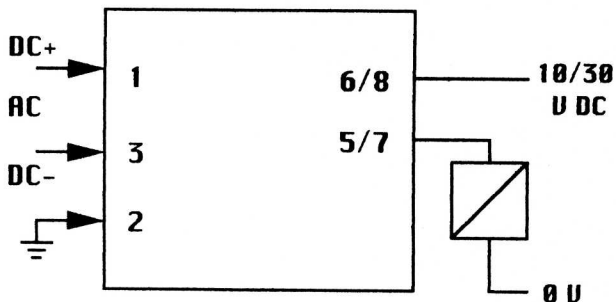


NPN Inputs

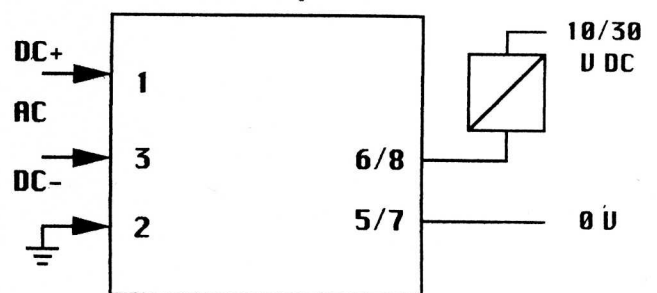


or any mix allowed

PNP Outputs

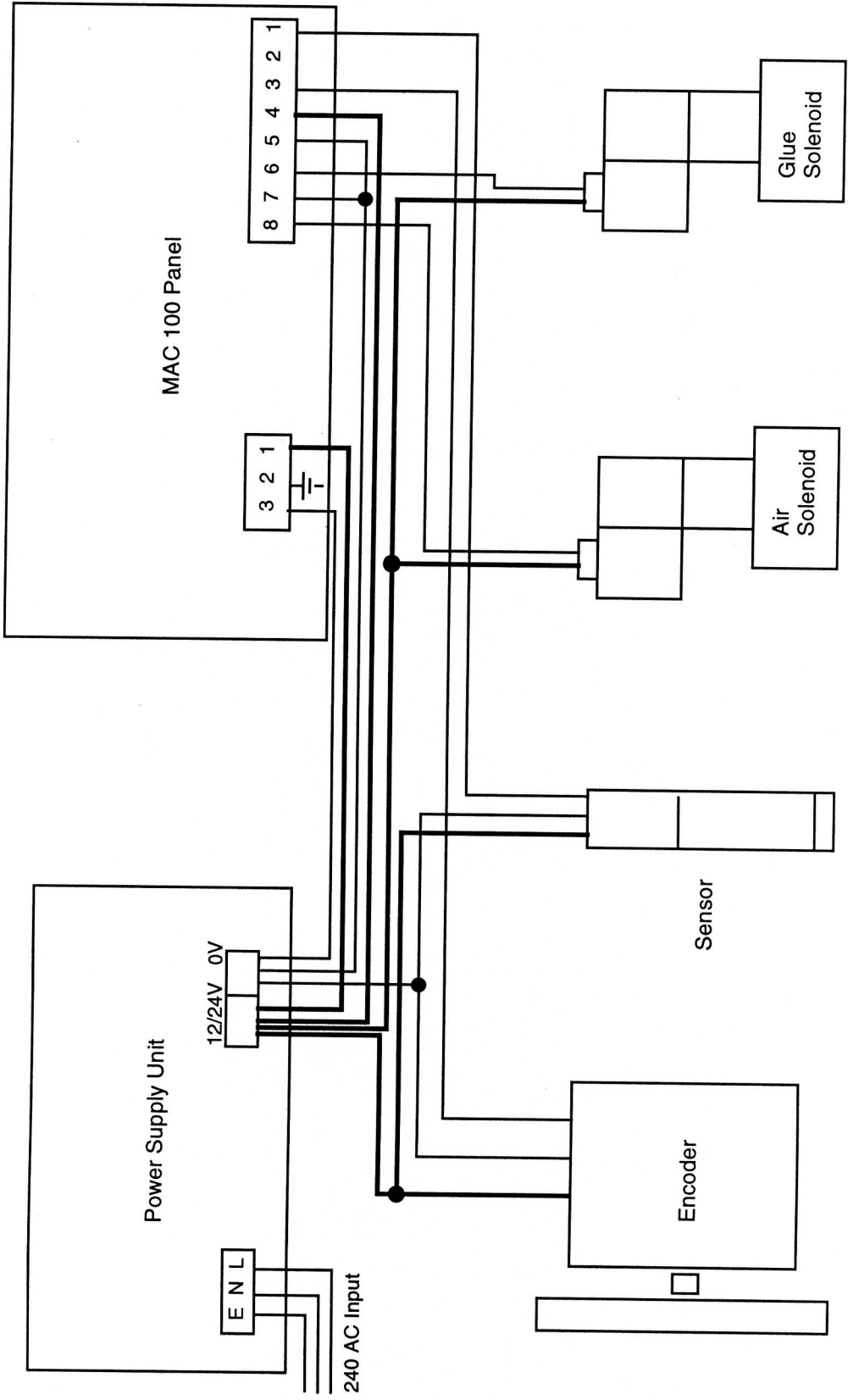


NPN Outputs



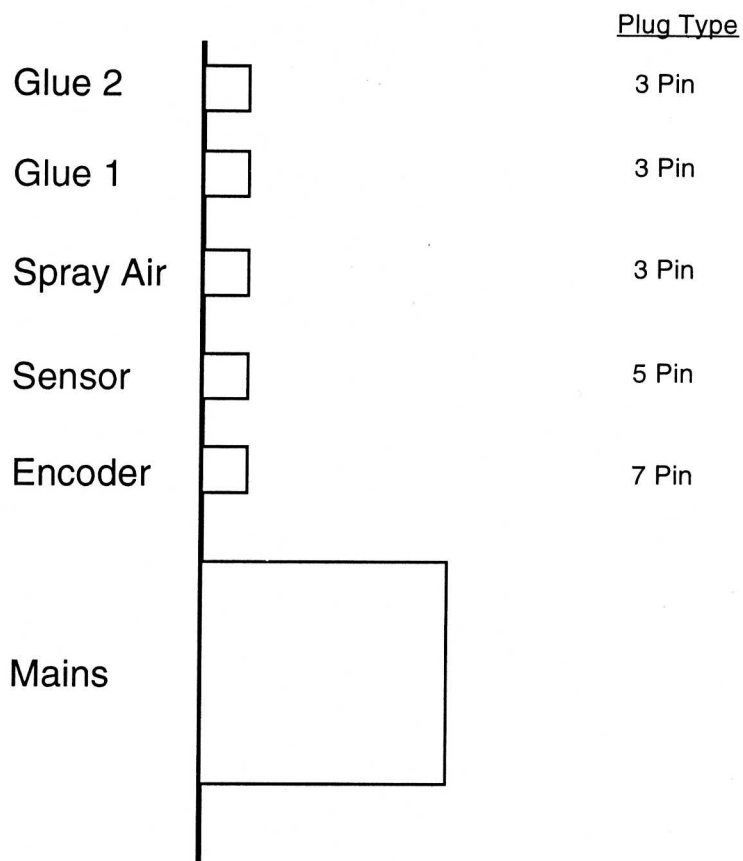
If using solenoids in excess of 10 Watts please connect flywheel diode in parallel with coil.

MAC 100 System Connection example using NPN Encoder & Sensor

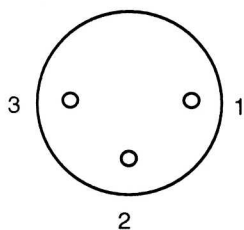


Please note that to avoid interference it is preferable to use separate power lines as shown in the diagram

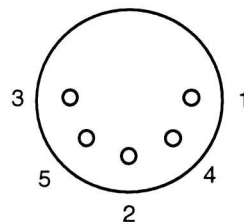
MAC 100 Enclosure Connections



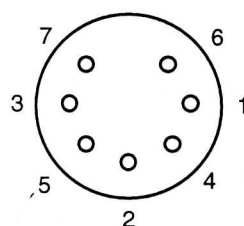
Plug Connections



1 - 12 / 24 Volts DC
2 - Glue / Air Return
3 - 0 Volts



1 - 12 / 24 Volts DC
2 - Sensor Input
3 - 0 Volts
4 - Not used
5 - Not used



1 - 12 V DC (Clock Generator)
2 - PWM Sensor Input
3 - 0 Volts DC
4 - Not used
5 - Not used
6 - Encoder Input
7 - 12 / 24 Volts DC

Socket Connections

