MODEL MP44

PINSPOTTER CONTROLLER

REFERENCE MANUAL

AMS APPLIED MICROSYSTEMS
ST. LOUIS, MISSOURI

MP44 CONTROLLER MANUAL

INTRODUCTION

The Model MP44 Controller is a special purpose computer designed to control an industrial pinspotting machine in the manufacturing of metal duct work. The pinspotting machine places fastening pins in sheet metal according to a specific set of spacing rules and specifications.

The spacing rules for the MP44 pinspotter are designed around the programable parameters of minimum spacing and specification spacing and the duct velocity type selected. Using these parameters, the MP44 Controller follows a strict set of spacing rules to determine where the rows of pins should be loacated. The spacing rules are:

1. Always put a row of pins 3 inches from the leading edge of the sheet of metal.
2. Always put a row of pins 3 inches from the trailing edge of the sheet of metal.
3. Never space rows less than the minimum spacing.
4. Never put a row closer than 3 inches from a brake line.
5. Never put rows spaced greater than the specification spacing unless rules 1 thru 4 would be violated.
6. Never put a row greater than 6 inches from a brake line unless it conflicts with rules 1 thru 5.
7. Always try to put a row 3 inches from a brake line unless a row of pins could be saved by putting the last row from 3 to 6 inches from the brake line.
8. If rules 1 thru 5 result in the specification spacing not being met, then make only one row out of specification so that an extra row can be put in by hand.

The MP44 is programed using a display and keyboard similar to an electronic calculator. The display acts as a prompt for the operator by indicating what data is to be entered. The procedure for entering data is discussed in detail in a later section of this manual called ENTERING A NUMBER.

The operation of the machine itself is straight forward. The position of the strip of metal is sensed by an incremental shaft angle transducer which generates an exact number of pulses to the computer for an exact amount of material movement. The computer then counts the pulses and activates the fire outputs when the programed movement has occured.

FRONT PANEL CONTROLS

On the front panel of the MP44 there are 6 lighted pushbutton switches and a 16 key keypad. The functions of these keys are as follows:

HALT

The HALT key is used to stop the machine from running material. The red lamp indicates that the FIRE or LOAD outputs are not on.

RUN

The RUN key is used to allow the pinspotter to run. The green lamp indicates that the controller is in the run mode.

METRIC WHEN LIT

The METRIC WHEN LIT key is used to toggle between inch units and centimeter units. When the lamp is lit, all lengths are displayed in centimeters and all lengths entered are interpreted by the computer as being centimeters. When the lamp is off, lengths are displayed in inches and all lengths enered are interpreted by the computer as being inches. The actual measurements of the computer are in inches with resolution to the nearest 0.01 inches. When metric units are used, the metric units are converted to the nearest inch equivalent. If a roundoff does occur, the amount of the roundoff can be seen by checking the number a second time. The computer takes lengths stored in inches and converts to the nearest 0.01 cm. The values displayed may be different from what was programed by 0.01 cm but it will reflect the actual length that will be used. The difference will be less than the resolution of the system.

MANUAL CYCLE

The MANUAL CYCLE key is used to cycle the fire outputs when the unit is in the halt mode. After pressing the MANUAL CYCLE key,

the fire outputs will cycle for their pre-determined time and then the load outputs will cycle.

LOW VEL

The LOW VEL key has no function but the lamp indicates that the MP44 is running low velocity parts.

HIGH VEL

The HIGH VEL key has no function but the lamp indicates that the MP44 is running high velocity parts.

SET UP

The SET UP key is used to enter the SET UP mode which allows the entry of the machine parameters.

END

The END key is used to exit the PROGRAM or SET UP modes.

PRG

The PRG key is use to enter the PROGRAM mode where data concerning the velocity and type of part are entered.

ENT

The ENT key is the ENTER key and it is used to terminate an entry of an item of data.

CLR

The CLR key is used to clear out a partial entry in a data item and revert back to the previous value.

The number keys and decimal point are used in entering a numerical value into the computer.

SET UP MODE

The SET UP mode is used to enter information about the machine that the computer needs to know in order to complete its function. This data may vary slightly from machine to machine and cannot be permanently set into the computer. However, the computer has rechargeable batteries that maintain power to memory circuits so that this data can be retained when power is off. The batteries are automatically charged whenever the unit is on. If the batteries should discharge, then the SET UP mode will automatically be entered to force the operator to re-enter the data. The data required in the SET UP mode is as follows:

FIRE TIME

The FIRE TIME is the time required for the FIRE output to be on to complete the fire operation. The range of values is 0.001 to 99.99 seconds.

LOAD TIME

The LOAD TIME is the time required for the LOAD output to be on to complete the load operation. The range of values is 0.01 to 99.99 seconds.

DELAY TIME

The DELAY TIME is the time delay after the FIRE output is turned on, until the LOAD output is turned on. The range of values is 0.01 to 99.99 seconds.

DIRECTION

The length transducer provides direction of flow information to the computer controller but it can be mounted on the machine so that for forward movement of the material, either clockwise or counter clockwise rotation of the transducer will occur. The DIRECTION parameter allows the operator to change the counting direction by pressing either the 0 or 1 key to change the

direction setting. One of these settings will be correct for your installation.

CORRECTION FACTOR

The CORRECTION FACTOR is a number that is used to compensate for slight errors in the diameter of the measuring wheel. The range for this parameter is .50000 to 1.50000. With no correction required, the value would be 1.00000. A larger number would result in larger pars and a smaller number would result in smaller parts. Refer to the section called LENGTH CALIBRATION for further details on calculating the correction factor.

MINIMUM ALLOWABLE SPACING

This parameter is the minimum allowable distance between any two rows of pins. The range for this parameter is 3.00 to 999.99 inches. If an attempt is made to program a value out of this range, an error message will occur.

OFFSET LENGTH

The MP44 uses a detector switch which enables it to sense the leading edge of the sheet metal. There are, however, situations in which the user may want to define the actual beginning of the part some distance in from the leading edge. The OFFSET LENGTH parameter allows the user to offset the actual start of the part a set number of inches from the leading edge. The range of this parameter is 0 to 99.99 inches.

OUTSIDE HIGH VELOCITY LENGTH

This parameter is the maximum distance that the MP44 will leave between any two outside rows of pins when manufacturing high velocity ducts. This distance must be equal to or greater than the minimum allowable distance or an error message will be displayed.

INSIDE HIGH VELOCITY LENGTH

This parameter is the maximum distance that the MP44 will leave between any two inside rows of pins when manufacturing high velocity ducts. This distance must be equal to or greater than the minimum allowable distance or an error message will be displayed.

OUTSIDE LOW VELOCITY LENGTH

This parameter is the maximum distance that the MP44 will leave between any two outside rows of pins when manufacturing low velocity ducts. This distance must be equal to or greater than the minimum allowable distance or an error message will be displayed.

INSIDE LOW VELOCITY LENGTH

This parameter is the maximum distance that the MP44 will leave between any two inside rows of pins when manufacturing low velocity ducts. This distance must be equal to or greater than the minimum allowable distance or an error message will be displayed.

OUTSIDE SPECIAL VELOCITY LENGTH

This parameter is the maximum distance that the MP44 will leave between any two outside rows of pins when manufacturing special velocity ducts. This distance must be equal to or greater than the minimum allowable distance or an error message will be displayed.

INSIDE SPECIAL VELOCITY LENGTH

This parameter is the maximum distance that the MP44 will leave between any two inside rows of pins when manufacturing special velocity ducts. This distance must be equal to or greater than the minimum allowable distance or an error message will be displayed.

MEMORY RESET OPTION

There are times when the operator may wish to clear all of the computers memory and program the computer from a reset condition. The FRESH start option allows the operator to reset the computer by entering the code 1984. Any other code will be ignored and data will be retained.

PROGRAM MODE

The PROGRAM mode is used to enter data about the parts to be run. Information required is the type, velocity specification, length of the part, and the width of the part in some instances.

The PROGRAM mode is entered by pressing the PRG key and is exited by pressing the END key. The first entry required is the type of part to be made which can be from 1 to 4. After entering the type, the velocity specification of HI, LO, or SP is entered. The next two entries specify the length and, for all but type 1 parts, the width. The range for these two values is 0.01 to 999.99 inches.

RUN MODE

When the data has been programed, the parts can be fabricated by entering the RUN mode. This is done by pressing the RUN key. The RUN mode is exited by pressing the HALT key.

ERROR MESSAGES

The following error numbers may appear if the operator makes a mistake. Press the CLR key to remove the error.

Error 0 Error in range of Correction Factor (.50000-1.50000)

Error 1 Length not allowed to be zero

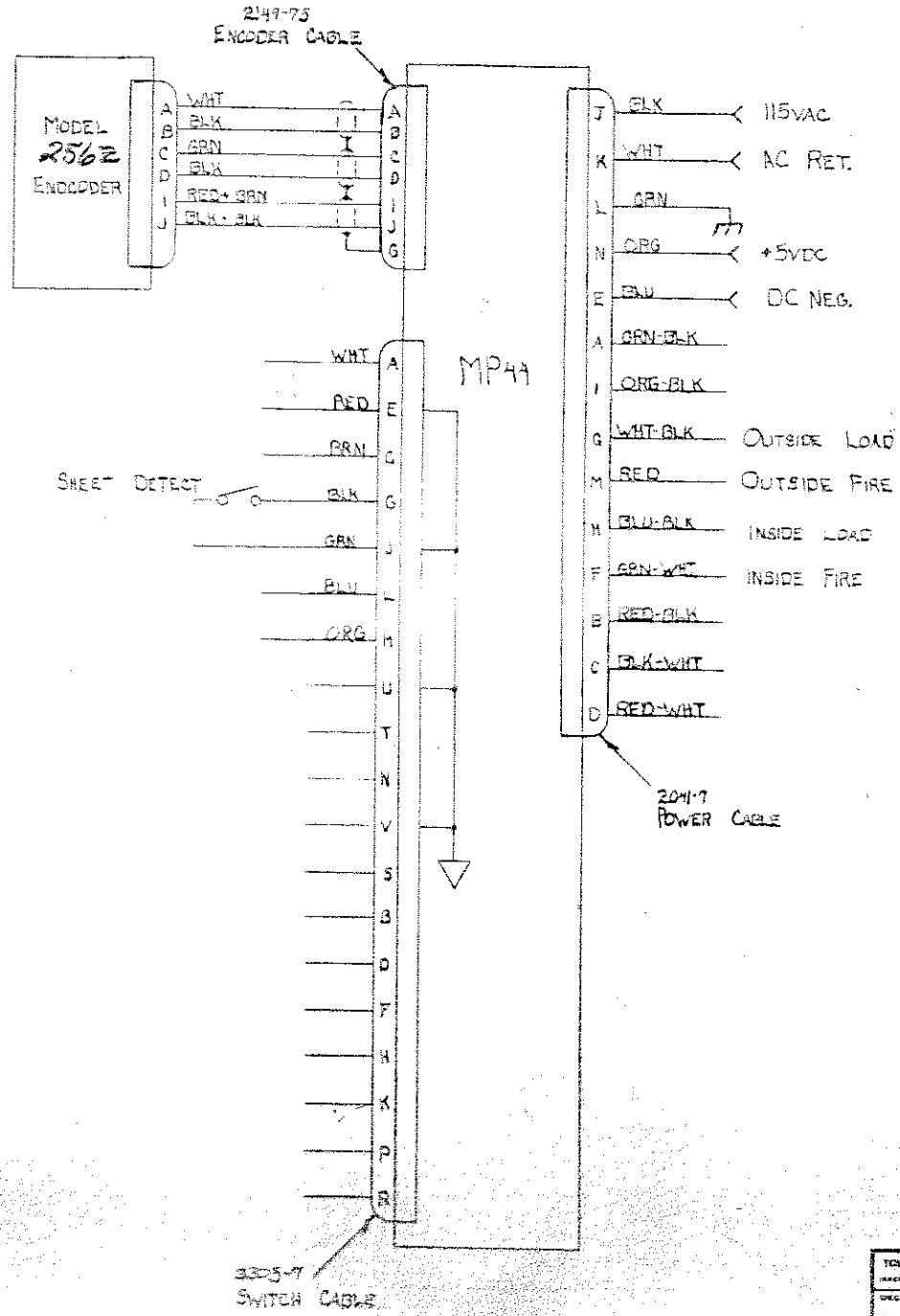
Error 2 Length not allowed less than 3 inches

Error 4 Error in setup parameters

Error 5 Internal error.

MP44 SET UP REFERENCE CHART

PARAMETER	PROMPT	VALUE	UNITS	FORMAT	RANGE
FIRE CYCLE TIME	FIrE	__.__	SECONDS	XX.XX	.01-99.99
DELAY CYCLE TIME	dELAY	__.__	SECONDS	XX.XX	.01-99.99
LOAD CYCLE TIME	LOAd	__.__	SECONDS	XX.XX	.01-99.99
DIRECTION	dirEction		NONE		0 OR 1
CORRECTION FACTOR	Corr.	_._____	NONE	X.XXXXX	.5 - 1.5
MINIMUM SPACE	SPACE	__.__	IN/CM	XX.XX	3 -99.99
OFFSET LENGTH	OFFSEt	__.__	IN/CM	XX.XX	3 -99.99
OUTSIDE HI LEN	OUt HI	__.__	IN/CM	XX.XX	3 -99.99
INSIDE HI LEN	In HI	__.__	IN/CM	XX.XX	3 -99.99
OUTSIDE LO LEN	OUt LO	__.__	IN/CM	XX.XX	3 -99.99
INSIDE LO LEN	In LO	__.__	IN/CM	XX.XX	3 -99.99
OUTSIDE SP LEN	OUt SP	__.__	IN/CM	XX.XX	3 -99.99
INSIDE SP LEN	In SP	__.__	IN/CM	XX.XX	3 -99.99
MEMORY RESET	FrESH		NONE	XXXX	NONE



ENGEL PINSPOTTER

TOLERANCES	REVISIONS			APPLIED MICROSYSTEMS INC.
	NO.	DATE	BY	
ORIGINAL	1	9-27-84		MACHINE INTERFACE
	2	9-15-84		
FRACTIONAL	4			SCALE / MATERIAL
				DATE / DRAWING NO.