CNC
2 Axis
Control System

Revision 1.01

Vision

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Contents

1. Overview *4*

2. Setting Into Operation *5*

2.1 Special Keys **5**

2.2 Status Display **5**

2.3 Entering Dimensions **6**

2.4 Menu **6**

2.5 Using the Jog Menu **7**

2.6 Programs **8**

2.7 Setting the Reference **9**

3. Parameters & I/O Detail *10*

3.1 Inputs **10**

3.2 Outputs **11**

3.3 Parameters **12**

3.4 Description of Parameters **13**

3.5 General Parameters **14**

3.6 Parameter Record **15**

X Axis **15**

Y Axis **16**

General **16**

1. Overview

The control system is a CNC Controller for providing 2 axis control for two speed motors.

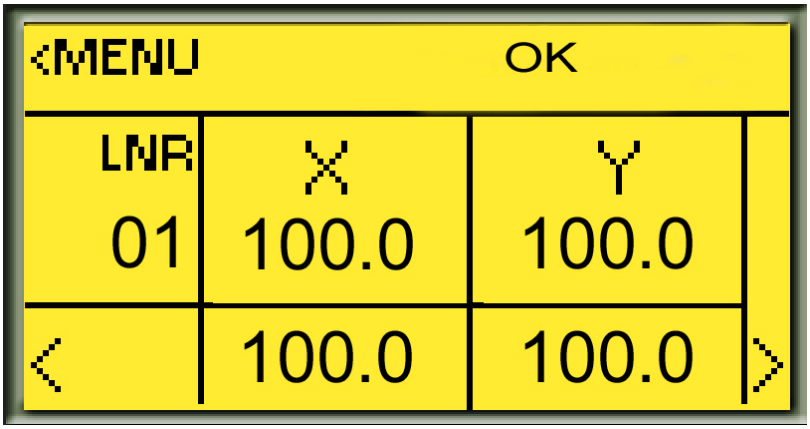
The controllers actual position is constantly monitored against the software limits. The system cannot be driven past these limits in either manual jog mode or normal running mode. This software monitoring also slows the motor down as the limits are approached.

There are 200 programs arranged as program numbers 1 – 200. each program can consist of a maximum of 20 lines of both X and Y positions.

2. Setting Into Operation

When the machine is switched on and the initialisation process completed the controller will be in the program/run screen.

No axis movement can take place until the system status reads "OK" i.e. the "STOP" input must not be activated.



2.1 Special Keys

Enter Key - Used to accept the data entry

ESC - Reset the system to data entry mode. Any partially completed input will be ignored. If held down for 1 second will revert the program to line number 1.

F3 - Moves the program to the previous line

F6 - Moves the program to the next line

2.2 Status Display

System Status displays the following Messages

OK - The Stop input is in active, which usually indicates that the safety circuit is on.

STOP! - The stop input has been activated

MOVING - An axis is currently moving

S.LIMIT - Software Limit has been activated whilst trying to move

X – H.LIMIT - The X axis "Hard limit" has been activated

Y – H.LIMIT - The Y axis "Hard limit" has been activated

ENTRY ERROR - The data entered is beyond the programmed software limits

2.3 Entering Dimensions

1. Press the ESC key
2. The cursor in front of the demand X value will flash
3. Type in the required dimension and press ENTER
4. The cursor moves to the Y demand
5. Enter the required demand and press ENTER
6. The cursor will be switched off indicating that data entry is complete

F2 can be used to toggle the program end.

At any point data entry can be abandoned by pressing the ESC key.

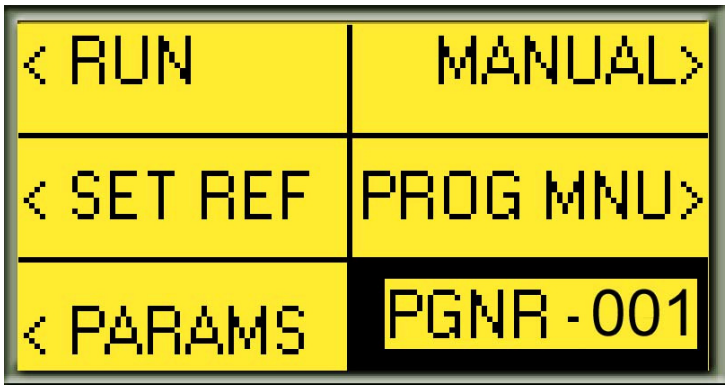
The system will check the dimensions against software limits and should a value be entered that is erroneous a message will be displayed.

Whilst any of the axes are moving the Machine Blocked Output is de-energises. This can be used to prevented unwanted machine operation

2.4 Menu

There is a System Menu which allows the user access to further operations of the system

From the Operating Screen press the F1 key

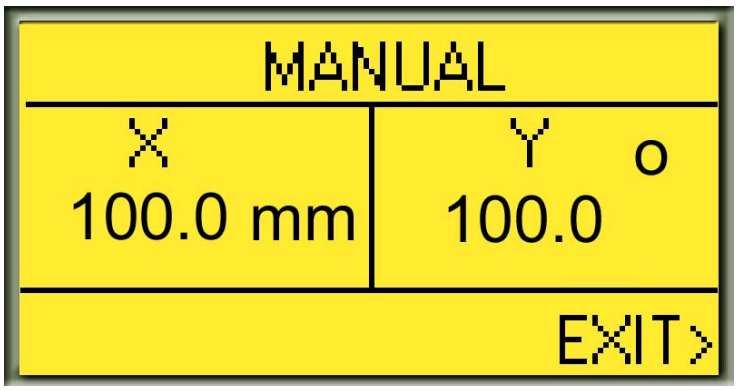


The System Menu will be displayed

F1 - Back to the Program/Run Screen
F2. - Recalibrate the actual positions
F3 - Access the configuration parameters
F4 - Jog the axis using keyboard buttons
F5 - Select and manage programs
F6 - Return to Run/Prog screen
ESC - Return to the Operating Screen

2.5 Using the Jog Menu

In some instances it may be necessary to jog either the X or Y axis. This can be done by selecting Manual Option from the System Menu



The X axis can be jogged using the following buttons

1 - Slow Forward
2 - Fast Forward
+/- - Slow Reverse
3 - Fast Reverse

The Y axis can be jogged using the following buttons

7 - Slow Forward
8 - Fast Forward
0 - Slow Reverse
9 - Fast Reverse

To return to the Operating Screen press F6

2.6 Programs

There are 200 programs available fro the user. These are numbed 1 – 200. From the System Menu using F5

The menu allows the user to

1. Select the program number to use. Select F5 . Enter the program number to use then press enter.

2. Erase the data in the currently selected program. Press F3. The user will be asked to confirm this by pressing F3

3. Erase all the data in the controller memory. Press F3. The user will be asked to confirm this.

When options 2 and 3 are complete the user is automatically returned to the program menu.,

2.7 Setting the Reference

Should the actual position no longer represent the real positions of the axes it will be necessary to recalibrate the controller. This situation can arise if any of the axes are moved with the power to the controller switched off, for example during maintenance.

Resetting the reference is achieved as follows

1. Jog the X to an accurately measured position.
2. From the System Menu select "SET REF"
3. press F1 or F2 to select the axis to reference
4. Enter the measured value
5. Select F3to reference X axis
6. Select F6 to return

3. Parameters & I/O Detail

3.1 Inputs

Input No	Designation	Description
I0.0	Encoder X A Channel	
I0.1	Encoder X B Channel	
I0.2	Encoder Y A Channel	
I0.3	Encoder Y B Channel	
I0.4	Stop	Cancels all moves
I0.5	Start X	Start X axis. If Start X & Y is set then this input will start both axis simultaneously
I0.6	Increment Program	Increment the program to the next line
I0.7	Start X	Start Y
I0.8	Limit X Positive	Hard Limits
I0.9	Limit X Negative	
I1.0	Limit Y Positive	
I1.1	Limit Y Negative	
I1.2	Unused	
I1.3	Unused	
I1.4	Unused	
I1.5	Simulation Mode	Simulates movement of the axis.

3.2 Outputs

Output No	Designation	Description
Q0.0	Machine Blocked	A move is in operation
Q0.1	Forward Output	On when driving to a lower position than the demand,
Q0.2	Reverse Output	On when driving to a higher position than the demand
Q0.3	Fast	Energised when (Demand – Actual Position) >Slow
Q0.4		
Q0.5	Forward Output	On when driving to a higher position than the demand
Q0.6	Reverse Output	On when driving to a higher position than the demand
Q0.7	Fast	Energised when (Demand – Actual Position) >Slow
Q0.8		
Q0.9	Program End	The program is complete

3.3 Parameters

The parameters define how the control system should operate and should only be changed by trained personnel or under the supervision of one. To prevent accidental overwriting of the data the parameter screen is passcode protected.

Select "PARAMS" from the System Menu and operator is prompted for access code.

The access code is 6809

The parameter screen will now be displayed. There are three screens which can be accessed by pressing the left or right arrow keys. If a mistake is made the ESC key will abandon all data entry.

F6 will return the user to the Operation Screen.

3.4 Description of Parameters

This set of parameters exist for both X and Y axis

Stop Offset - The overrun distance to be compensated for when the motor stops

Slow - The distance the motor will run in slow speed for

Tolerance - The acceptable difference between the actual and demand positions where the motor is deemed to be in position. This will also manipulate the display so that the actual position and the demand position are identical. This is aesthetic only and the real position is not lost

Multiplier - The scaling factor to allow the encoder and mechanics to read in mm.

Displayed Position = Actual Count X Multiplier

Limit Min - Minimum demand dimension that is allowed.

Limit Max - Maximum demand dimension that is allowed.

3.5 General Parameters

Stop	Configure the stop input to be open or closed. Toggle using F2
X & y Start Together	Toggle to decide if X and Y start at the same time
X Hard Limits Disabled	Disable/Enable Hard Limits. Toggle using F2
Y Hard Limits Disabled	Disable/Enable Hard Limits. Toggle using F3
Program End	The time the program end relay pulses for.
Line Advance	The time at the end of the positioning of the Y axis that the program line will auto advance.

3.6 Parameter Record

Once the system has been commissioned we advise that all parameter settings are noted so that in the event of a failure data can easily be re-entered.

X Axis

Parameter	*Value*
Stop offset	
Creep	
Slow	
Tolerance	
Backlash	
Multiplier	
Limit Min	
Limit Max	

Y Axis

Parameter	*Value*
Stop offset	
Creep	
Slow	
Tolerance	
Backlash	
Multiplier	
Limit Min	
Limit Max	

General

Parameter	*Value*
Stop Active	
X & Y Start Together	
X Hard Limits Disabled	
Y Hard Limits Disabled	

Notes