CNC Backgauge Control System

Revision 1.01

Vision

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Contents

1. Overview

The control system is a CNC Controller for providing both backgauge and machine logic. The required dimensions can be entered in millimetres. In order to provide optimum speed, movement of the backgauge is performed using three pre-programmed speeds.

A quantity counter is inbuilt which can be used to count down i.e. displaying the number of pieces left to be done.

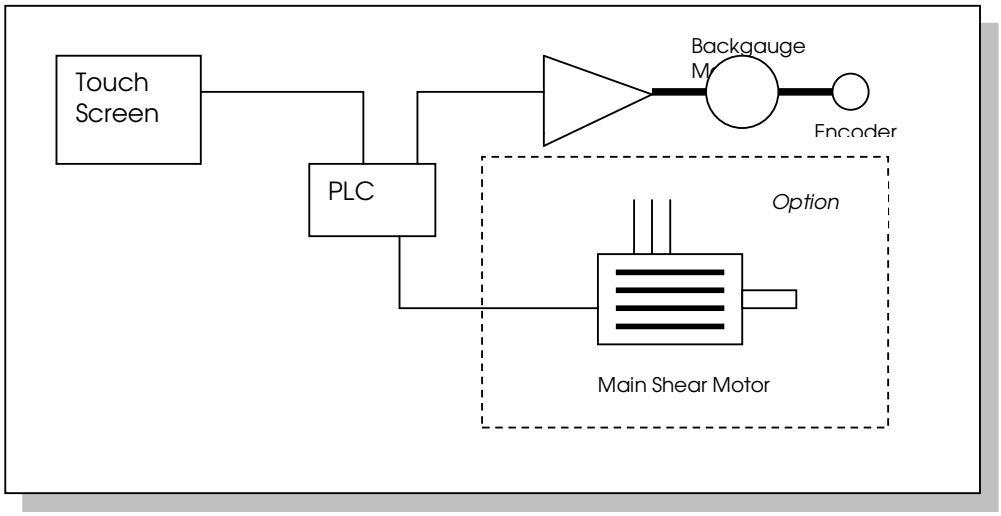

Fig 1. Overview

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.

2. Setting Into Operation

After the machine has been switched on and the initialisation process completed a welcome screen will be displayed. After 5 seconds the system will revert to the Operating Screen.

No backgauge movement can take place until the system status reads "Ready". Therefore the following situation must exist

1. The "Stop" input must not be activated

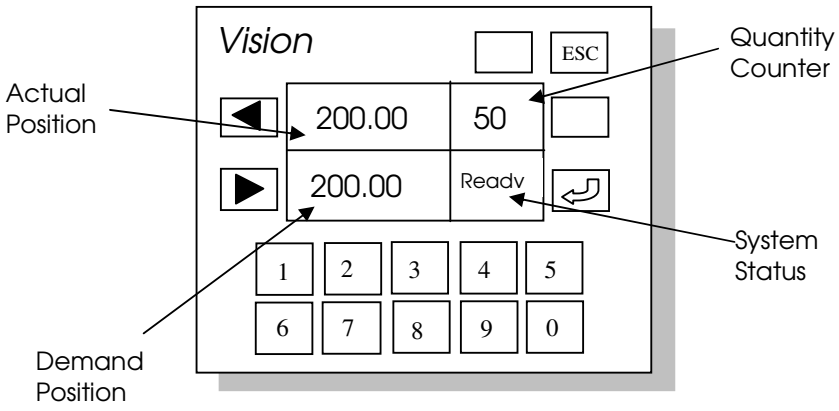

Fig 2. Operating Screen

2.1 Definitions of the Pushbuttons

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 give access to the system Menu

2.2 Status Display

System Status displays the following Messages

Ready	-	The Stop input is in active, which usually indicates that the safety circuit is on.
Fwd/Rev	-	The backgauge is currently moving

2.3 Entering a Backguage Dimension

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

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.

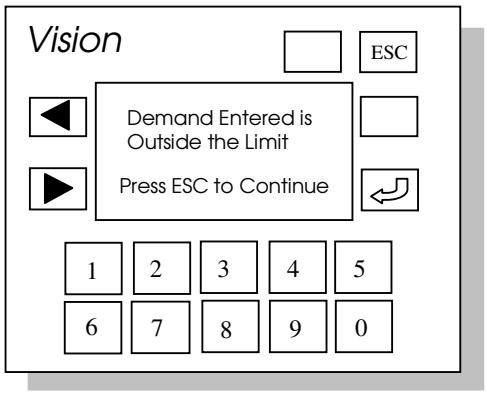

Fig 3. Limit Error

Whilst the backgauge is moving the shear is prevented from operating with the Machine Blocked output.

Pressing the ESC key during a move will stop the controller.

2.4 Menu

There is a menu system available to allow the user access to further operations of the system

From the Operating Screen press the ESC key and hold it down for 1 second

The Main Menu will be displayed

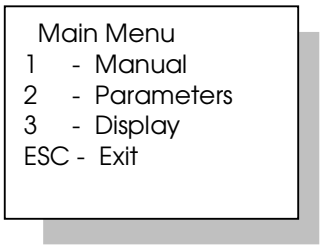

Fig 4. Main Menu

1 - Allows the Backgauge to be jogged using the keyboard
2. - Accesses the parameters via a passcode
3 - Adjust the contrast
ESC - Return to the Operating Screen

2.5 Jogging the backgauge

In some instances it may be necessary to jog the backgauge. This can be done by selecting option 1 from the Main Menu.

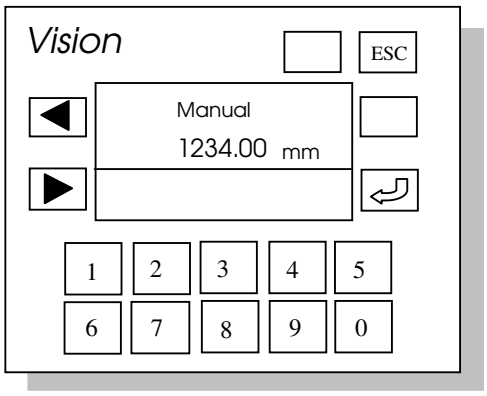

Fig 5. Manual Operation

The backgauge can be jogged using the following buttons

6 - Slow Reverese
7 - Fast Reverse
0 - Slow Forward
9 - Fast Forward

To return to the Operating Screen press ESC.

2.6 Quantity Counting

The counter works on the down counting principle

Enter a quantity value, each time the shear fires the quantity will be decremented. When it reaches zero counting will stop and the Quantity Complete output will energise. This will be reset when a new quantity value is entered.

2.7 Setting the Reference

Should the actual position no longer represent the real positions of the backgauge it will be necessary to recalibrate the controller. This situation can arise if the backgauge is moved with the power to the controller switched off, for example during maintenance. This is achieved following the instructions below

1. Jog the backgauge to a measured position, for example 50.00 mm
2. Return to the Operating Screen
3. Cut a piece of material
4. Accurately measure it
5. Enter this value in the demand position
6. Turn the reference key switch

2.8 Contrast

In the event that the operator cannot see the screen clearly the contrast can be adjusted. From the Main Menu select option 3.

Use the 5 and 0 buttons respectively to adjust the contrast.

Press ESC to return to the Operating Screen

3. Parameters, Input Output and Connections

3.1 Inputs

Input No	Designation	Description
I0.0	Encoder A Channel	Channel A of the quadrature Encoder
I0.1	Encoder B Channel	Channel B of the quadrature Encoder
I0.2	Unused	
I0.3	Unused	
I0.4	Unused	
I0.5	Unused	
I0.6	Start	External Start input. Starts the move to the demand position
I0.7	Stop	Cancels all positioning. Must be active for positioning to take place
I0.8	Decrement Quantity	Decrements the quantity counter by 1
I0.9	Datum	Sets the demand position to the actual position for referencing purposes

3.2 Outputs

Output No	Designation	Description
Q0.0	Forward Output	On when driving to a lower position, I.e. backgauge towards operator
Q0.1	Reverse Output	On when driving to a higher position, I.e. backgauge away from operator
Q0.3	Creep	Energised when (Demand – Actual Position) > Creep
Q0.2	Fast	Energised when (Demand – Actual Position) >Slow
Q0.4	Machine Blocked	A move is in operation
Q0.5	Qty Complete	Pulses for 0.5 seconds when quantity count reaches zero.

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 option 2 from the Main Menu and operator is prompted for access code.

The access code is _____

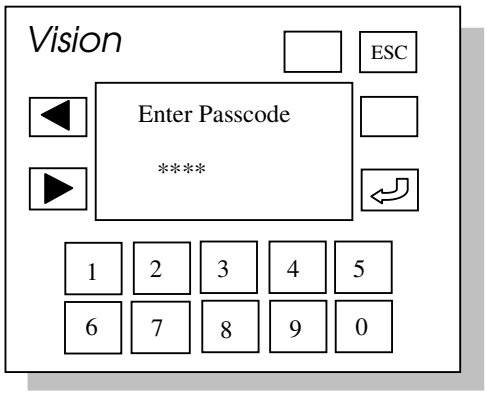

Fig 6. Entering the passcode

Touch the passcode display and enter the code 6809. Press Enter then when returned to the Access Code screen press OK.

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.

Holding the ESC down for 1 second will return the user to the Operation Screen.

3.4 Description of Parameters

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

Creep - The distance the motor will run in creep speed for

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

Backlash - The amount of backlash compensation required when the backgauge is moving away from the shear. This will allow the gauge to approach from one direction only. Setting to zero switches backlash compensation off.

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 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.

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