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Operator System Description

The controls for the labeler consist of the following major components: main enclosure, operator box, servo motor and label tape supply and take-up motor On/Off switch. All items except the last one are new as part of the labeler retrofit.

Electrical Enclosure

The door of the electrical enclosure contains all the controls for editing a program and monitoring status. On the door is the Red Lion Operator Panel (HMI), CONTREX M-Rotary motor speed control, an On pushbutton, a Off/Stop pushbutton, a Power On lamp and a Servo Fault lamp.

Figure 1

Electrical Enclosure

Operator Panel (HMI)

The operator panel (Human Machine Interface) is used for label program edit, status display and fault display.

Status Display

The *status* page is the default display. It will display one of three messages; Run Mode, Jog Mode or Stopped.

Run Mode

Run Mode indicates that the control will automatically dispense labels as the web paper passes through the tractor drive on the table. It does *not* indicate if the Tabber is properly programmed or setup.

To enter Run Mode the selector switch on the Operator Box must be in the Run position, the Power On lamp must be on and there must not be any faults. See the Faults & Troubleshooting section of this manual.

Jog Mode

Jog Mode indicates that you may use the *Jog* pushbutton on the Operator Box to advance the next label to the label sensor.

Note: Once the Jog pushbutton has been pressed in this mode, the servo motor will continue to run until the Label Sensor sees a label.

Stopped

Stopped indicates that the servo motor is no longer enabled. You may make label program edits.

Figure 2

Operator Panel (HMI)

Additional information on the Red Lion operator panel can be found at the Red Lion web site, www.redlion-controls.com.

Active Keys

Only the following list of keys are active on this HMI. Below is a list of the active keys and their functions.

Edit

The edit key allows you to edit your label program. If you are at the Status page, it takes you to the Web Page Length display. When you are at the Web Page Length Size display, Tab Size display or Tab Start Position display, the edit key allows you to edit these functions.

Help

The Help key will display one or more help screens for the screen you are at. The >> symbol at the bottom right of a page indicates that there are more pages.

Next

The Next key takes you to the next display screen.

Prev

The Prev (Previous) returns you the previous display screen.

Exit

The Exit key will return you to the Status display.

Enter

The Enter key is used to finish entering a new size on the edit screens. It will also return you to the Status display that you were editing.

Raise

When on the Status display, the Raise key displays the Fault screen.

Menu

When on the Status display, the Menu key displays the Software Version and Manufacturer identification screens.

Display Screens

Status

The Status screen displays the operating mode of the Tabber control. It also branches to the Program Edit screens (Web Page Length Size), Job setup and active keys Help screens, the Fault display and the Software Version and Manufacturer identification screens.

This display returns after 60 seconds from all screens except fault, edit and help screens.

Web Page Length Size

The Web Page Length Size displays the distance from Web Marker to Web Marker in inches (xx.xxx" format).

Press the Edit Key to edit the size.

Set Web Page Length Size

This display allows you to change the Web Page Length Size. To leave without editing, press the Prev key. To edit, press the number keys (no decimal needed) until the size you want is displayed. Then press the Enter key when done. You will be returned to the Web Page Length Size screen. The new size will be displayed.

Examples: 12000 will display as 12.000 inches. 8500 will display as 8.500 inches.

Tab Size

The Tab Size displays the length of the label from leading edge to leading edge, in inches (x.xxx" format).

Press the Edit Key to edit the size.

Set Tab Size

This display allows you to change the label length. To leave without editing, press the Prev key. To edit, press the number keys (no decimal needed) until the size you want is displayed. Then press the Enter key when done. You will be returned to the Tab Size screen. The new size will be displayed and the fine label position adjustments made with the Advance and Retard pushbuttons are cleared out of memory.

Examples: 1000 will display as 1.000 inches. 975 will display as .975 inches.

Note: Editing the Tab Size zeros any fine label position offset data that was input with the Advance and Retard pushbuttons.

Tab Start Position

The Tab Start Position displays the distance from the Web Marker to where the label is to start on the Web Page, in inches (xx.xxx" format).

Press the Edit Key to edit the size.

Set Tab Start Position

This display allows you to change the starting position of the label on the Web Page. To leave without editing, press the Prev key. To edit, press the number keys (no decimal needed) until the size you want is displayed. Then press the Enter key when done. You will be returned to the Web Page Length Size screen. The new size will be displayed.

Examples: 13000 will display as 13.000 inches. 5750 will display as 5.750 inches.

Note: The ending position of the label is automatically calculated based on the Tab Size screen data.

Fault

When on the Status display, the Fault screen will automatically display when a fault occurs and return to the Status display when the fault clears.

See the Faults & Troubleshooting section of this manual for information about the faults and how to clear them.

Help

The Help screens are context sensitive.

Software Version

The Software Version screens are intended for use by the Maintenance Department. The screens display the HMI software revision level and date. The screens are on timers to automatically display for 5 seconds and then cycle through the information, finishing back at the Status display.

HMI Screen Map

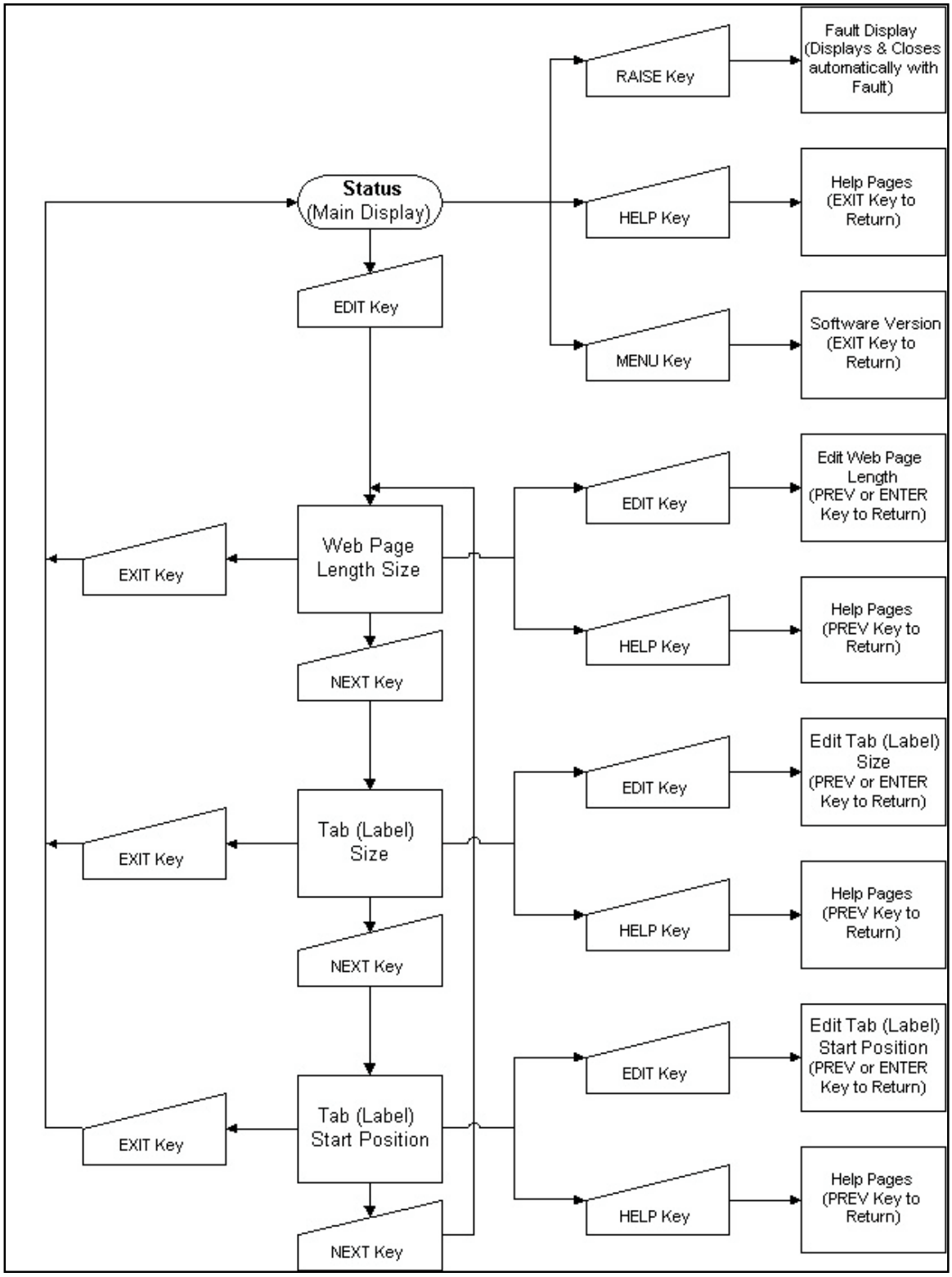

Figure 3

Operator Interface Screen Map

CONTREX M-Rotary

The CONTREX M-Rotary controller regulates the servo motor by reading the inputs from the Web Mark Sensor, Label Sensor and the Encoder that is connected to the tractor drive and using the parameters programmed in by the operator. The M-Rotary outputs a +/- 10 VDC to the Emerson Servo Drive Controller.

There is nothing that the operator needs to do with the M-Rotary, however, the Maintenance Department can use it for troubleshooting faults. The M-Rotary has 99 parameters (CP1 through MV99) which are split up between Control Parameters (CP) and Monitor Values (MV). All of the parameters can be viewed using the M-Rotary front panel, but ***cannot*** be changed except through the HMI.

To view the data in a parameter press Code Select, then enter the parameter number. For a detailed explanation of the parameters see Section C of the CONTREX M-Rotary Manual.

Figure 4

CONTREX M-Rotary Controller

Pushbuttons

On

The On pushbutton enables the servo motor and other control functions.

Off/Stop

The Off/Stop pushbutton disables the servo motor.

Lamps

Power On

The Power On lamp indicates that the 24 VDC is on to enable the servo motor and other control functions.

Servo Fault

The Servo Fault lamp indicates that the Emerson servo motor controller has a fault. See the Emerson Servo Drive Faults section of this manual.

Operator Box

The Operator Box is located on the side of the Tabber where the paper is feed from. The Operator Box has four (4) switches; a Run/Jog selector switch, a Jog pushbutton, an Advance pushbutton and a Retard pushbutton.

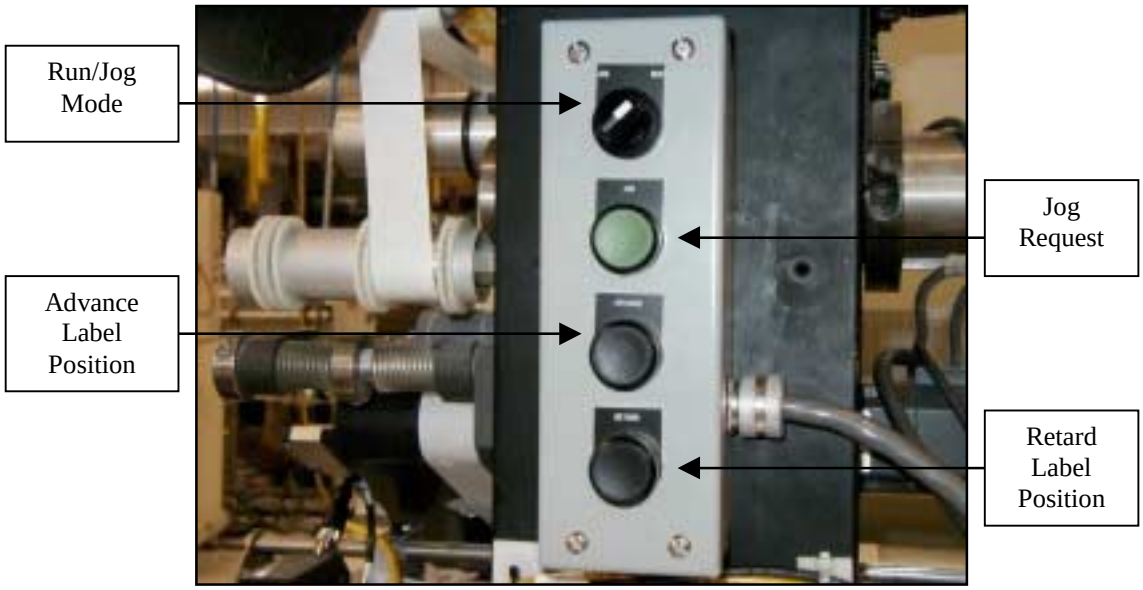

Figure 5

Operator Box

Switches

Run/Jog

The Run/Jog Mode selector switch requests either Run Mode for automatically dispensing labels or the Jog Mode for advancing the label tape.

The control is not the Run Mode or the Jog Mode unless the Power On lamp is on and there are no fatal faults

Jog

When in the Jog Mode, the Jog pushbutton (green) starts the servo motor running to advance the label tape.

The servo motor will continue to run until the label sensor detects a label. Pressing the Off/Stop pushbutton on the electrical enclosure will cancel the Jog request and stop the servo motor.

Advance Label Position

For each time pressed, the Advance Label Position moves the label location on the web paper .032 inch closer to the top of the web sheet marker.

Holding down one of these pushbuttons for more than a second will change the position by .320 inch for every second (course adjustment mode) it is held down.

Note1: This adjustment is held in memory until the next time Tab Size (Label Length) is edited.

Note2: If you have to fine adjust the label position by more than about .500 inch, it is suggested that you edit the Tab Start Position data.

Note3: This function is active *ALL* the time in *ALL* modes (Run, Jog and Stopped) as long as the M-Rotary is on.

Retard Label Position

For each time pressed, the Retard Label Position moves the label location on the web paper .032 inch away from the top of the web sheet marker.

Holding down one of these pushbuttons for more than a second will change the position by .320 inch for every second (course adjustment mode) it is held down.

Note1: This adjustment is held in memory until the next time Tab Size (Label Length) is edited.

Note2: If you have to fine adjust the label position by more than about .500 inch, it is suggested that you edit the Tab Start Position data.

Note3: This function is active *ALL* the time in *ALL* modes (Run, Jog and Stopped) as long as the M-Rotary is on.

Label Tape Supply & Take-up Motor Control

On/Off control of the label tape supply and take-up motors is still done using the original 3M™ switch. The switch is located on the front outfeed side of the Tabber.

The other functions on the box are no longer active.

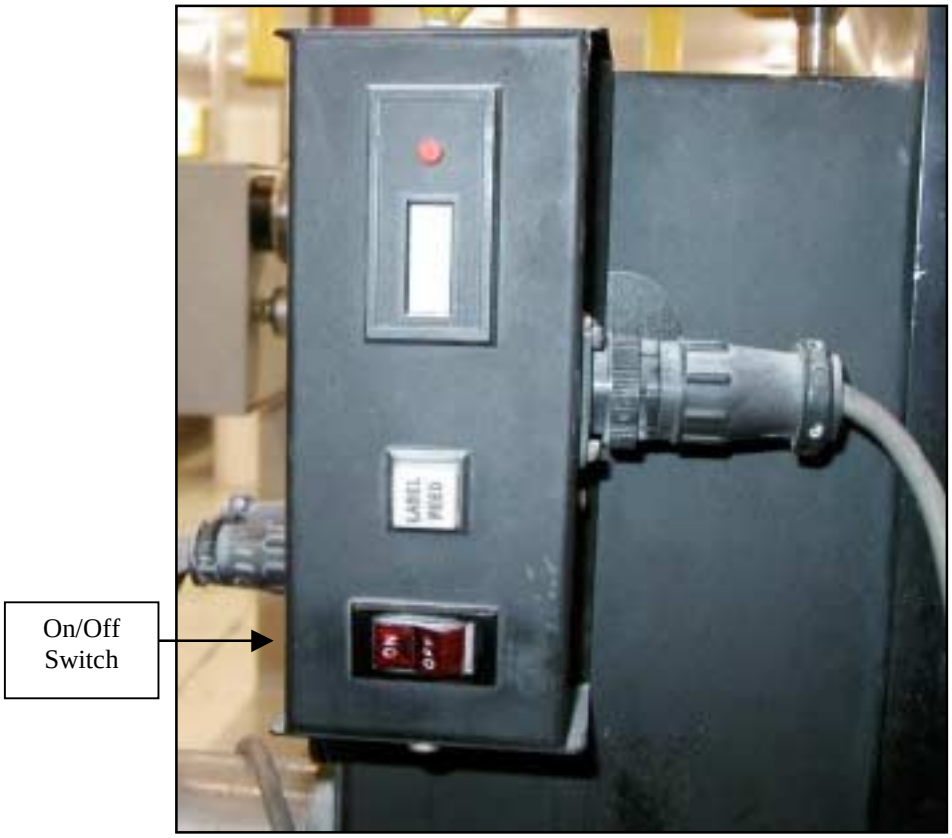

Figure 6

Label Tape Supply and Take-up Motors On/Off Switch

Sensors

There are three (3) sensors critical to the successful application of the labels, the Web Marker sensor, the Label sensor and the Encoder.

Web Marker Sensor

Function

The function of the Web Marker sensor is to detect the web marker at the start of each web sheet. Seeing the marker at the beginning of each sheet begins the measurement for the placement of the label. Based on the data programmed by the operator for the Web Page Length Size, the M-Rotary controller "expects" to see the next web marker again at a certain distance. If it does not see the expected Web Marker it will trigger an Overdue Lead Sync fault until the Web marker is seen again.

Adjustments
The sensor must be adjusted for each new web paper run through the Tabber. See the sensor instruction sheet for details.

False Signals
After the sensor has been setup for an application, some conditions can lead to false or extra marker signals being sent by the Web Marker sensor even after successfully teaching the sensor. Some of the conditions are reflection from the Tabber Table through the tractor feed holes, the web paper not running flat and the sensor set too far (high) above the and/or to the side of the web paper.

Label Sensor

Function
The function of the Label sensor is to detect the leading edge (start) of each label. Based on the data programmed by the operator for the Tab Length, the M-Rotary controller "expects" to see the next label again at a certain distance. If it does not see the expected Label it will trigger an Overdue Follower Sync fault until the Label is seen again.

Adjustments & Setup
The sensor must be adjusted for each new label type setup on the Tabber. See the sensor instruction sheet for details.

The leading edge of the labels need to stop at the front edge of the Platen in Run Mode. To make this adjustment, slide the Label Sensor up or down the Label Sensor Adjustment Slide and run several web sheets through the Tabber (you can pull the web paper by hand). Check to see where the labels line up and adjust again if necessary.

Note: The labels may stop anywhere in the Label Sensor. The important issue is that they stop at the front end of the platen.

False Signals
Multiple color labels and labels with light colors inside can cause false signals from the Label sensor. Re-teach the sensor if this occurs.

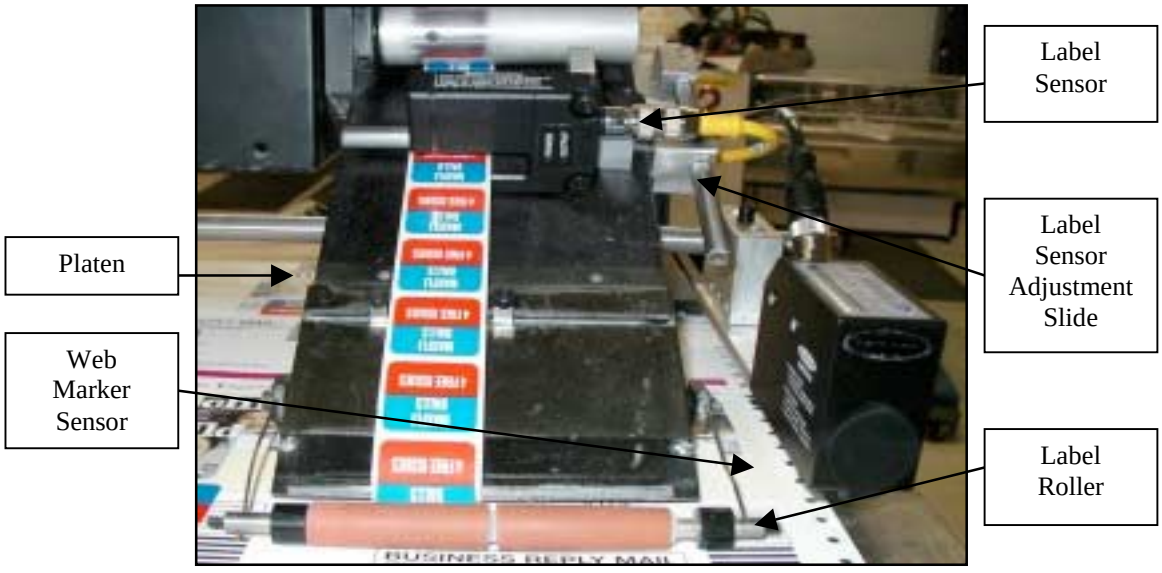

Figure 7

Platen, Label Sensor & Web Marker Sensor

Platen

The platen is a black metal plate that the Label Sensor is attached to and the Label Tape rides down, around the and up the back side. The platen should be adjusted down as close as possible to the web paper. If it is too far above the web paper the labels will not go on repeatably. If it is too close and the label roller is out of adjustment the long labels will tend to wrinkle.

Emerson Servo Motor Controller Diagnostic Display

The Emerson Servo Motor Controller contains a diagnostic/fault display. The Emerson controller is located inside the electrical enclosure in the bottom right corner. The diagnostic/fault display is located on the bottom left corner of the controller.

Note1: For additional information about the controller, see the Emerson manual "EN Series Installation.PDF" in the Emerson Drive Files folder on the CD-ROM provided by Automation & Controls Engineering, Ltd.

Note2: For additional information about the servo motor, see the Emerson manual "NT Motor Installation.PDF" in the Emerson Drive Files folder on the CD-ROM provided by Automation & Controls Engineering, Ltd.

Viewing Display

The diagnostic/fault display will hold its information for five (5) to seven (7) seconds after the main disconnect is turned off.

Display Contents

See the Emerson Servo Drive Faults section of this manual for information and descriptions of the contents displayed by the diagnostic/fault display.

Figure 8

Emerson Servo Motor Controller

Technical Information

This section contains technical information intended for experienced and knowledgeable Maintenance Technicians.

Red Lion Operator Panel

The Red Lion Operator Panel fills two major function. The first is converting the label program data back and forth from an inch format to encoder and servo motor encoder counts for the M-Rotary controller.

The second major function is to automatically download the critical M-Rotary controller parameters to the M-Rotary controller every time the main disconnect of the electrical enclosure is turned on.

A backup copy of the source files (© 2001 Automation & Controls Engineering, Ltd.) for the Operator Panel can be found in the Red Lion Files folder of the CD-ROM provided by Automation & Controls Engineering, Ltd.

CONTREX M-Rotary Controller

The CONTREX M-Rotary controller regulates the servo motor by reading the inputs from the Web Mark Sensor, Label Sensor and the Encoder that is connected to the tractor drive and using the parameters programmed in by the operator. The M-Rotary outputs a $^{+}$/- 10 VDC to the Emerson Servo Drive Controller.

The M-Rotary has 99 parameters (CP1 through MV99) which are split up between Control Parameters (CP) and Monitor Values (MV). All of the parameters can be viewed using the M-Rotary front panel, but ***cannot*** be changed because as a safety, a panel lockout was installed by Automation & Controls Engineering, Ltd. If you feel that a parameter needs to be changed through the front panel, call Automation & Controls Engineering, Ltd. for the panel lockout location and to verify the parameter change.

CAUTION: Any parameter changes except as provided through the HMI will have negative effects on the system performance and can **DAMAGE** system components.

To view the data in a parameter press Code Select, then enter the parameter number.

For a detailed explanation of the parameters see Section C of the CONTREX M-Rotary Manual.

Parameter Setting List

CP #	Description	Value
CP 01	Setpoint 1	Set By HMI
CP 02	Setpoint 2	0
CP 03	Setpoint 3	0
CP 04	Setpoint 4	0
CP 05	Setpoint 5	0
CP 06	Setpoint 6	0
CP 07	Setpoint 7	0
CP 08	Setpoint 8	0
CP 10	Master Setpoint	0
CP 11	Jog Speed	200
CP 14	Control Mode	3
CP 15	Engineering Units	1.000 (decimal point and trailing zeros required)
CP 16	Lead Encoder Lines / Inch	500
CP 17	Label Length (Encoder Lines)	Set By HMI
CP 18	Label Encoder Lines / Motor Rev	2048
CP 19	Label Motor Max. Speed	2700
CP 20	Lead Min. Speed	0
CP 21	Lead Max. Speed	5000
CP 22	Low Speed Alarm	0

CP #	Description	Value
CP 23	High Speed Alarm	6000
CP 24	Out of Position	1000
CP 25	Lag Pulse Limit	2000
CP 26	Lead Pulse Limit	2000
CP 28	Alarm Format	3
CP 29	Output Format	1
CP 30	Sync. Trend Enable	0
CP 32	Sync. Phase Inc.	55
CP 33	Sync. Lead Auto Enable	0
CP 35	Sync. Flag Polarity	2
CP 36	Sync. Lead Divide	1
CP 37	Sync. Label Divide	1
CP 60	Acceleration Time	.1 (decimal point required)
CP 61	Deceleration Time	.1 (decimal point required)
CP 62	Gross Error Overspeed	10
CP 63	Gross Error Reset	10000
CP 64	Gross Error Boundary	999999
CP 65	Gain (Kp)	30000
CP 66	Integral (Ki)	3000
CP 67	Derivative (Kd)	0
CP 70	Device Address	1
CP 71	Baud Rate	6
CP 72	Character Format	1
CP 90	Speed Match Ratio	3.432 (decimal point required)
CP 91	Minimum Profile Ratio	0
CP 92	Maximum Profile Ratio	10. (decimal point required)
CP 93	Label Start (Encoder Lines)	Set By HMI
CP 94	Label End (Encoder Lines)	Set By HMI

Emerson Servo Drive Controller

A backup copy of the source files for the Emerson Servo Drive Controller can be found in the Emerson Drive Files folder of the CD-ROM provided by Automation & Controls Engineering, Ltd. The file names (Nahan_1481.EN & Nahan_1482.EN) match the Control Enclosure serial number.

Note1: For additional information about the controller, see the Emerson manual "EN Series Installation.PDF" in the Emerson Drive Files folder on the CD-ROM provided by Automation & Controls Engineering, Ltd.

Note2: For additional information about the servo motor, see the Emerson manual "NT Motor Installation.PDF" in the Emerson Drive Files folder on the CD-ROM provided by Automation & Controls Engineering, Ltd.