Series 1100 Servo Register Manual
Keypad Operation

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1.1 Unpacking and Inspection

Although every precaution is taken to ensure the equipment is delivered in good condition, a careful inspection should be made. EMP makes every effort to individually box and label each component for easy identification of the shipment. Please report damage or shortage immediately.

1.2 Installation

While most EMP Servo Systems come with all installation bracketing, please request the installation manual from EMP for additional assistance.

1.3 Introduction

The Series 1100 Servo Register System is designed to provide a reliable and economical solution to your registration control needs.

Based on information provided, EMP has preprogrammed your equipment for your specific application. The program and equipment have been selected based on your machine and web speed.

The EMP Servo System allows you to customize the program to set tolerances and all alarm settings. To assure proper operation, the initial set up procedure must be done before start up.

1.4 Description of Operation

Once a length is entered and the and the system is placed in "Run" mode, the servo motor is ready to follow the movement of the encoder. As the machine starts, the encoder will begin rotating. The servo motor will follow and will maintain a Relationship with the encoder that guarantees correct cut length.

Before the set button is pressed,

- The Series 1100 will produce cut sheets based on the length entered.
- No Active Area LED - Since no set point has been established, the led will not flash
- Scanner LED - will flash - The scanner LED will flash while sensing any print in its path.

Once the Set button is pressed,

- The Series 1100 is placed in a ready position awaiting the next scanner signal. Once the scanner sees the register mark it records the knife position. The system expects to see a mark every time the knife reaches this position. The active area is the zone around this position where the system is actively seeking a mark.
- The first mark after the Set button is pressed establishes the expected knife position when a mark should occur, and establishes the active area
- The active area LED will start to flash on the arrival of the 2nd register mark and Both the scanner pulse and active area LED's will flash together.
- The Series 1100 will correct the web based on the arrival of the register mark at the scanner and the expected knife position.
- The register mark arriving at the scanner before the expected position will cause the web to move back slightly.
- The register mark arriving at the scanner after the expected position will cause the web to move ahead slightly.
- Based on the trend of corrections, the Series 1100 will adjust the length.
- The direction of corrections and size of corrections (in degrees) can be viewed on the Keypad.

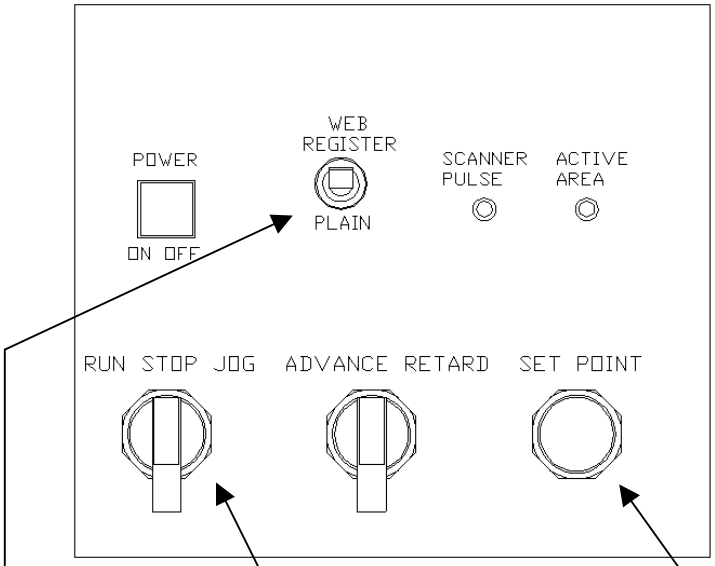
Alarm Conditions

EMP has preprogrammed various alarms that will help in determining particular problems.

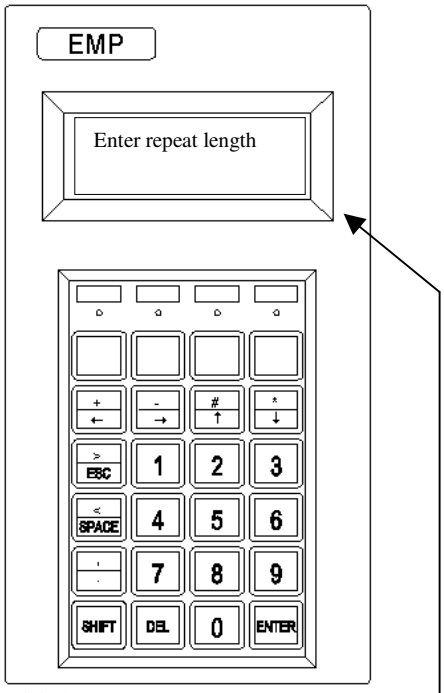
- **No Register Marks** - The scanner is not seeing a register mark within the active area. The number of missed register marks that will counted before an alarm condition is established in the initial setup.
- **Out of Tolerance** - The Series 1100 is not maintaining the desired tolerance. There are a number of reasons for this error.
- **Following Error -** The Series 1100 system will shut down when a following error exists. When the relationship between the Motor's Resolver and the Knife's Encoder has been changed. To avoid an unexpected Motor movement, a Following Error stops the machine. he Machine must be set up again.

Section 2 Initial Setup

2.1 Accessing the Initial Set-Up Screen

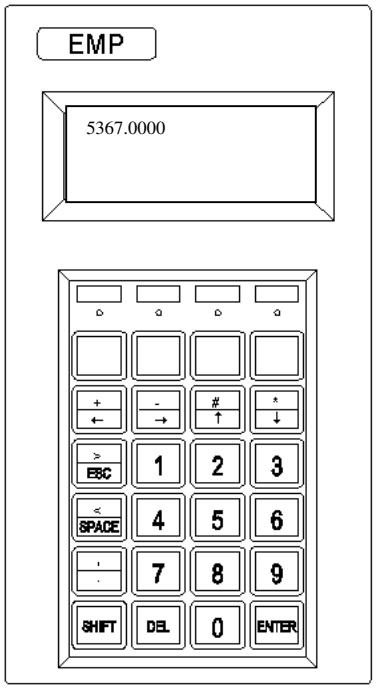


Put the "RUN STOP JOG" switch in STOP.
Put the REGUSTER /PLAIN switch in REGISTER.
Push "SET POINT" to access the Set-Up Screen on the Keypad.



Initial Setup Screen

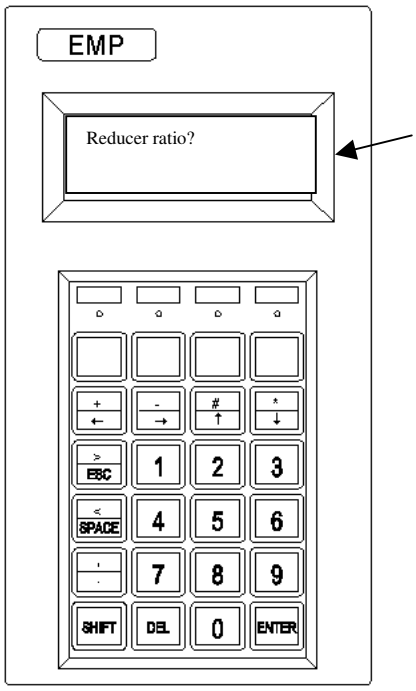
2.2 Encoder Position Screen



- Access the Initial Setup Screen (see section 2.1) as described above.
- Type 5000 at the Keypad and then Press ENTER
- The Keypad now displays the position of the encoder.
- The Encoder Position should be **POSITIVE** and should **INCREASE** as the Machine rotates.
- Press the reset button to return to Set-Up Screen.

- Should the encoder position DECREASE when the machine rotates exchange the blue and brown wires on the encoder and scanner connector and recheck.

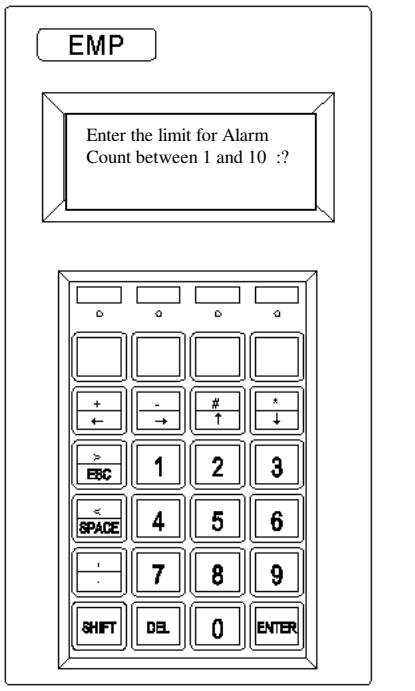
2.3 Entering the Reducer Ratio and Draw Roll diameter



Reducer Ratio Screen

- Access the Initial Setup Screen (see section 2.1) as described above.
- Type 5001 at the Keypad and then Press Enter.
- The system now asks for a Reducer Ratio.
- Enter the Reduction between the Draw Roll and the Servo Motor and then Press Enter.
- The system asks for the Draw Roll Diameter.
- Enter the Diameter of the Draw Roll in inches and then Press Enter.
- The System now returns to the initial setup Screen.

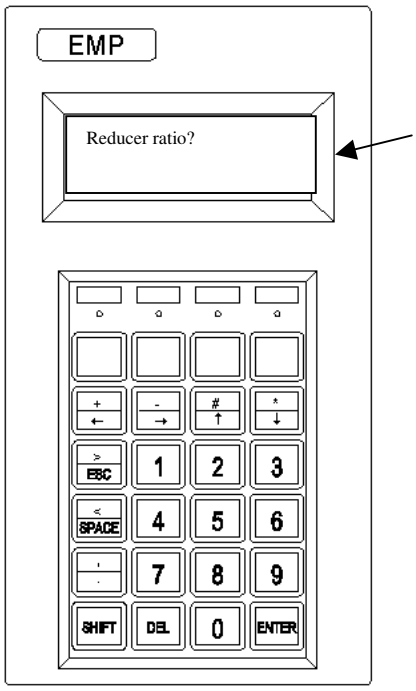
2.4 Entering the Alarm Count and Sequence



Alarm Screen

- Access the Initial Setup Screen (see section 2.1) as described above.
- Type 5001 at the Keypad and then Press Enter.
- The system asks for a number between 1 and 10, as an alarm limit. This is the number of alarm events (in a row) that the system will count before turning on the alarm. For example with an alarm count of 5 the system will count 5 out of register labels before turning on the alarm. Any in register label resets the count to 0.
- Input the desired number and then Press Enter.
- The system will respond "Enter #Labels / Scan Between 1 and 4.
- Depending on the number entered the system will look at every mark,(1) every second mark,(2) every third mark,(3) or every fourth mark.(4) This is useful if the web is printed with a 2 UP, 3 UP or 4 UP print cylinder and the spacing between the marks is uneven.
- Input the desired number and then Press Enter.
- The System returns to the Initial Setup Screen.

2.5 To find existing parameter settings



Reducer Ratio Screen

To find the Program version Number

- Access the Initial Setup Screen (see section 2.1) as described above.
- Type 5004 at the Keypad and then Press Enter.
- The system now responds with a Program version number, and then returns to the initial setup screen.

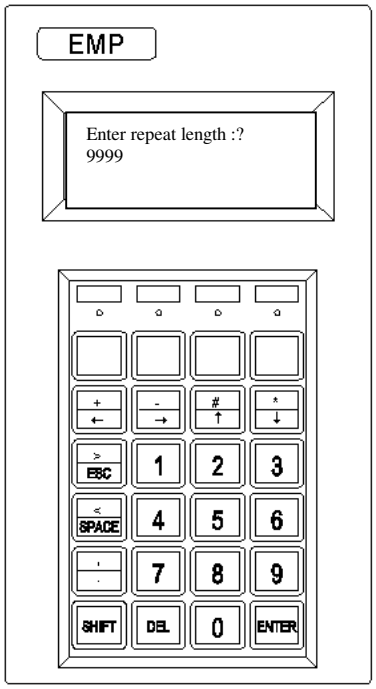
To find the Repeat Length and Alarm Count

- Access the Initial Setup Screen (see section 2.1) as described above.
- Type 9000 at the Keypad and then Press Enter.
- The system now responds with the length and alarm count, and then returns to the Stop Mode.

To find the Draw Roll Diameter and Alarm Count

- Access the Initial Setup Screen (see section 2.1) as described above.
- Type 9001 at the Keypad and then Press Enter.
- The system now responds with the Draw Roll Diameter and Reducer Ratio, and then returns to the Stop Mode.

2.6 Changing the Direction of Rotation of the Servo Motor (if necessary)



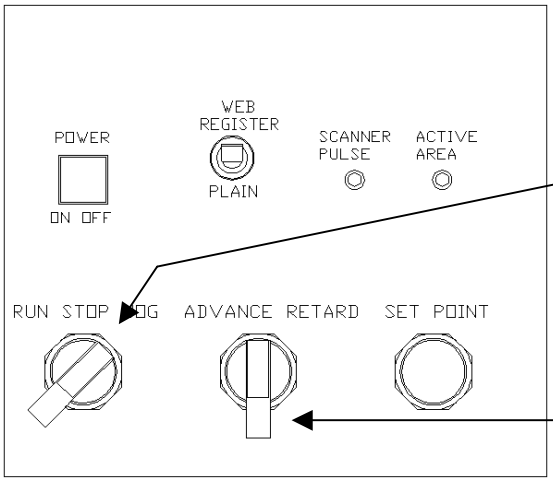
Alarm Screen

If the Servo motor rotates in the wrong direction when it is following the encoder the following steps will reverse its direction of rotation.

- Access the Initial Setup Screen (see section 2.1) as described above.
- Type 9999 at the Keypad and then Press Enter.
- The direction or rotation of the motor reverses.
- The system returns to the initial setup screen.

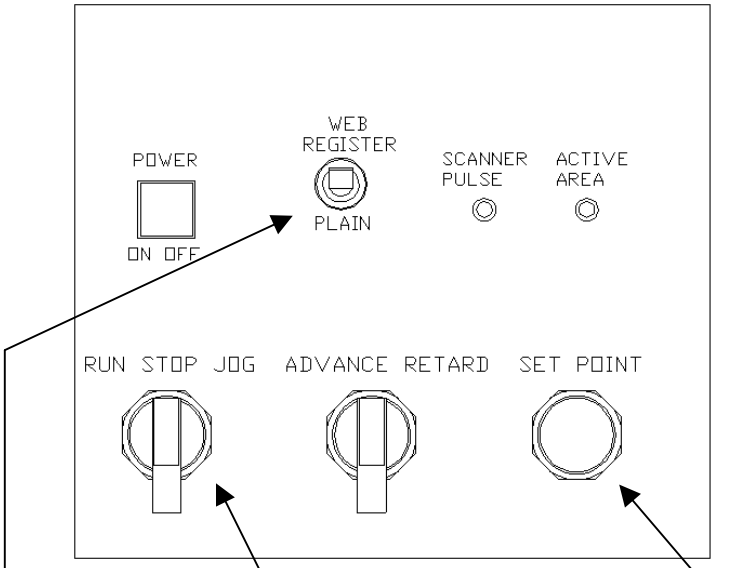
Section 2 Operating Procedure

3.1 Jogging the Servo Motor

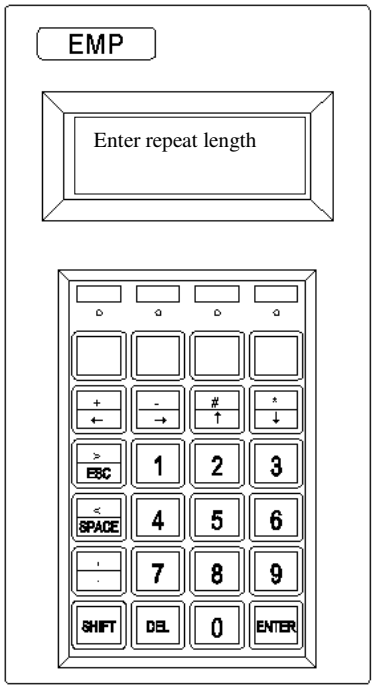


- Place the RUN STOP JOG switch in Jog Mode.
- The Servo motor will not follow the encoder in this mode.
- The keypad will display Jog mode.
- Use the ADVANCE RETARD switch to Jog the Servo Motor as required.

3.2 Setting the Length

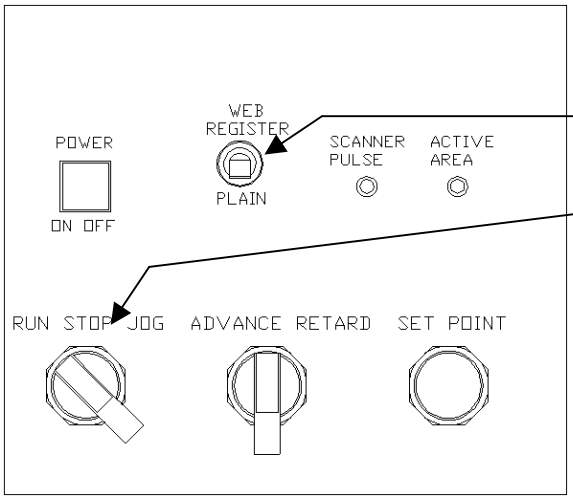


1. Put the "RUN STOP JOG" switch in STOP.
2. Put the REGUSTER /PLAIN switch in REGISTER.
3. Push "SET POINT" to access the Set-Up Screen on the Keypad.
4. Enter the desired repeat length between 2 and 36 inches then press enter.



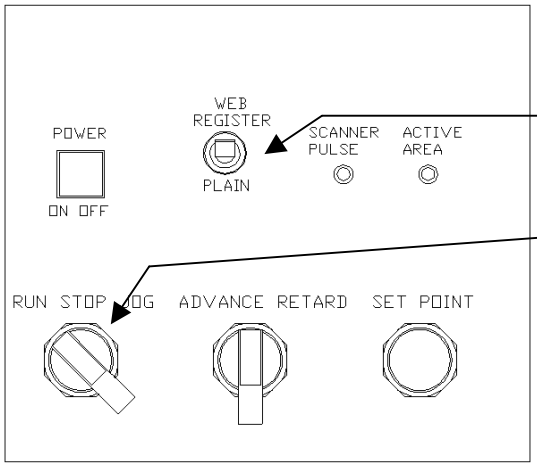
Initial Setup Screen

3.3 Running a plain Job



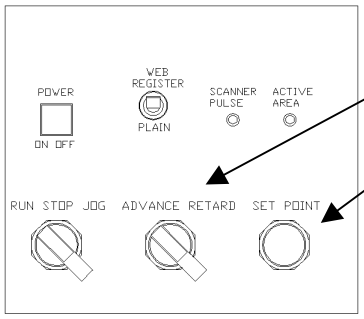
- Set the desired length as described in section 3.2 above.
- Put the REGUSTER /PLAIN switch in PLAIN.
- Put the RUN STOP JOG switch in RUN.
- The Servo Motor will follow the encoder at the preprogrammed length.

3.4 Running a Register Job



- Set the desired length as described in section 3.2 above.
- Put the REGUSTER /PLAIN switch in REGISTER.
- Put the RUN STOP JOG switch in RUN.
- The Servo Motor will follow the encoder at the preprogrammed length.

3.5 Setting Register .

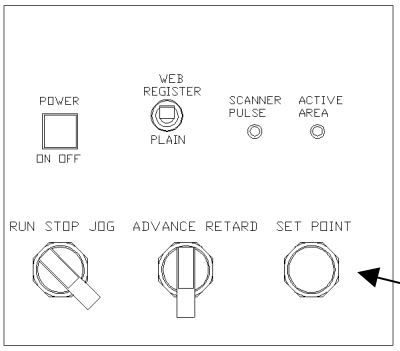


- Run the machine slowly.
- Use the ADVANCE RETARD switch to adjust the Position of the cut. Move the cut to the desired position.
- Once the cut is at the desired position press the SET POINT button. (see note below)
- The Scanner Pulse LED and the Active Area LED will flash together indicating that the mark is arriving at the expected time.
- Run the machine at normal speed.

- Set the machine up as described in section 3.4 above.

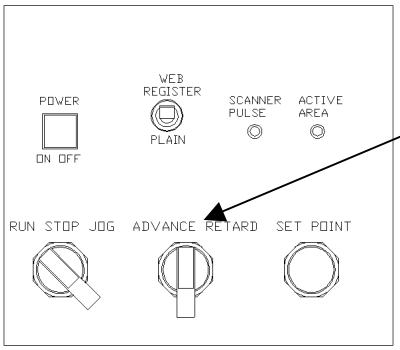
Note) If there is print between the register marks then the SET POINT should be pressed when the next print the scanner sees is the register mark.

3.6 Setting Register.
(method 2)



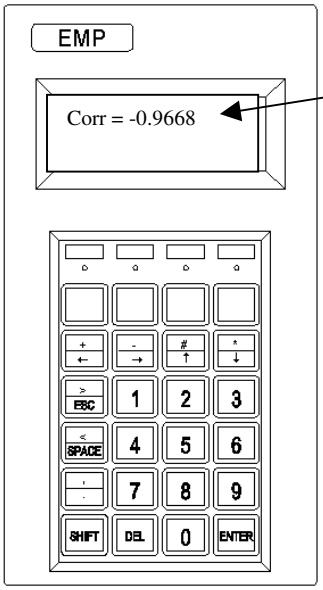
- Set the machine up as described in section 3.4 above.
- Rotate the machine until the knife is about to make a cut.
- Put the controller in jog mode (section 3.1) and use the ADVANCE RETARD switch to jog the web until the cut point is under the knife.
- Put the Controller in Run mode.
- Use the **Machine Jog** to rotate the machine until the scanner sees the clear area before the register mark .
- Push the SET POINT Button.
- Run the machine at normal speed. The Scanner Pulse LED and the Active Area LED will flash together indicating that the mark is arriving at the expected time.

3.7 Adjusting the cut position on a moving machine.



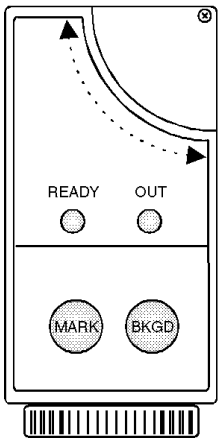
The position of the Cut can be adjusted on an operating machine using the ADVANCE RETARD switch.

3.8 Correction Display.



- While the machine is running in register mode the keypad will display the amount and direction of correction being made to the web.
- The amount of correction is displayed in degrees 1 degree = 1/360 Repeat Length.
- A negative number indicates a correction in the retard direction, a positive number indicates a correction in the advance direction.

3.9 TL-U Scanner Operation



(Ready) Green LED – Always "ON" when set-up is done properly.

(Output) Red LED – Flashes when scanner has sensed print.

(Mark) Learns the color of the register mark.

(Bkgd) Learns the color of the web's background. The background is the clear area directly in front of the register mark.

Proper Position of Scanner

1. The Scanner should be 3/8" (9mm) from the preprinted web.

2. The connector can be rotated in three positions by loosening the locking screw. Tighten the locking screw when finished.

3. The beam direction may be changed by swapping the cap and lens.

Scanner Set-Up

1. Position the register mark under the light spot of the scanner. Press and hold the MARK key until the GREEN LED turns off.

2. Position the label's background under the light spot of the scanner. Press and hold the BKGD key. The GREEN LED will blink briefly.

3. The GREEN LED stays on continuously. This indicates the register mark and background acquisition was correct and the TL-U is ready.

At the end of the above operations the following settings are made:

- The light emission was set for red or green to maximize the contrast between the mark and the background reading.
- The dark or light function was selected on the basis of the reading of a darker or lighter mark with respect to the background.

4. Trouble Shooting

4.1 No Power to controller :

a) Check the AC wiring to the controller. Ensure that the correct Voltage and Grounding is in place.
b) Check the contactor fuse in the controller.
c) Check and if necessary replace the Power Supply.

4.2 No Scanner Pickup on Front Panel :

a) Check that the output LED on the scanner is flashing. If it is not, follow the steps outlined in 3.8 above. (Scanner Setup)
b) Inspect the Scanner cable for Physical damage.
c) Check if the scanner is emitting light on the web. If it is not check for +12V DC between the red and black conductors on the scanner cable. Replace Power Supply of necessary.
d) Check Scanner diagnostic, (see section 6.1).

4.3 No Active Area Indication :

a) Check that the encoder is functional and correctly phased. (see section 2.2)
b) Check the front panel switches, see diagnostics (section 6.1).
c) Check that the scanner tracks properly over the mark.
d) Check Scanner output, and diagnostics (section 6.1).

4.4 Motor not Rotating :

a) Check the cabling to the motor for physical damage.
b) Check if the amplifier is turned on, if it is not check the voltage to the amplifier.
c) Check the fault indicators on the amplifier.
d) Replace the Galil board.

4.5 Varying Cut Off Position :

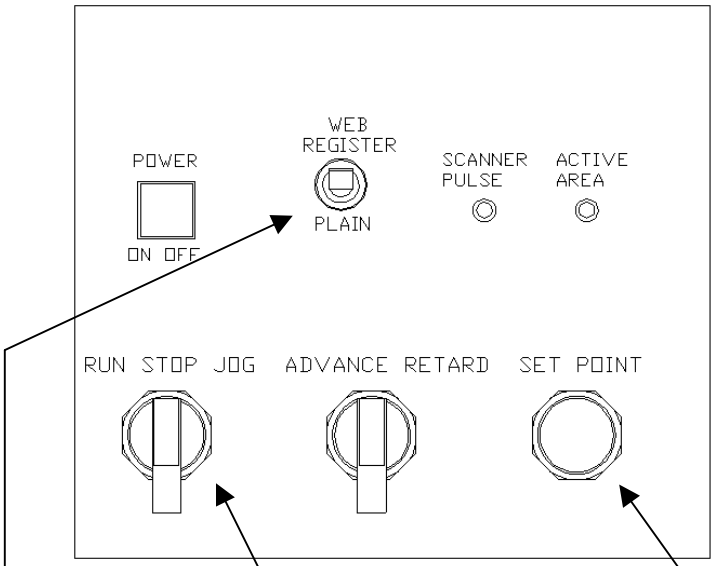
a) Put the Controller in the stop Mode, and reenter the Length (see section 3.2). Run the machine in Plain Mode. (see section 3.3). If the Length tend to vary check the adjustment and mechanical condition of the machine. Check for worn gears, pulleys, or sprockets. Check that any chains are not stretched or loose. Ensure that the web is in good contact with the draw roller.(no slippage)
b) Roll out two lengths of web side by side and check the accuracy if the repeat length.
c) If the web is imprinted check the registration between the mark and the rest of the web.
d) Check the accuracy of the servo motor (see section 6.2)

4.6 Errors due to Electronic Noise

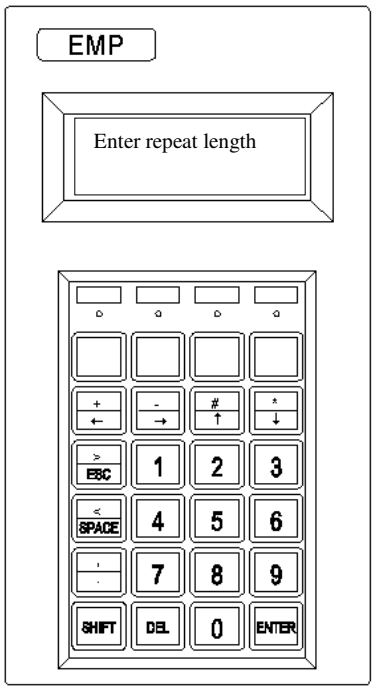
a) Check the AC grounding. An isolation transformer may be necessary, if so contact EMP for correct rating.
b) Ensure that the signal wires going to the controller are not bundled with and other conductors.
c) It may be necessary to suppress any solenoids on the machine by placing capacitors across their terminals.
d) If there are any static eliminators on the machine it may be necessary to shield and/or relocate their leads.

5. Diagnostic Procedure

5.1 Accessing the Diagnostic Mode



Put the "RUN STOP JOG" switch in STOP.
Put the REGUSTER /PLAIN switch in REGISTER.
Push "SET POINT" to access the Set-Up Screen on the Keypad.
Enter a length of 5002 and then Press Enter.



Initial Setup Screen

5.2 Switch Diagnostics

1. Put the RUN STOP JOG Switch in STOP. With the Output LED from the scanner on, the Keypad should read "Scanner is on". With the Output LED from the scanner off, the Keypad should read "Nothing Engaged".
2. Put the RUN STOP JOG Switch in RUN. The Keypad should read "Run Engaged".
3. Put the RUN STOP JOG Switch in JOG. The Keypad should read "Jog Mode Engaged".
4. Put the RUN STOP JOG Switch in STOP. Put the ADVANCE RETARD Switch in ADVANCE. The Keypad should read "Advance Engaged".
5. Put the RUN STOP JOG Switch in STOP. Put the ADVANCE RETARD Switch in RETARD. The Keypad should read "Retard Engaged".
6. Put the RUN STOP JOG Switch in STOP. Put the ADVANCE RETARD Switch in ADVANCE. The Keypad should read "Advance Engaged".
7. Put the RUN STOP JOG Switch in STOP. Press the SET POINT Switch. The Keypad should read "Reset Button Pressed.
8. Put the RUN STOP JOG Switch in RUN. Put the ADVANCE RETARD Switch in RETARD. The Keypad should read "Alarm Engaged". An output signal from the Alarm should be present.
9. To Exit the switch diagnostics, Press and hold the SET POINT button.

5.3 Encoder Diagnostics

1. Turn the Encoder slowly (by hand or using the machine jog) until the Index LED illuminates. Stop with the Index LED on.
2. Turn the Controller off then on. (This resets the encoder position to Zero.)
3. Turn the Encoder slowly (by hand or using the machine jog). The Index LED turns off, and then after exactly one revolution turns back on. Stop with the Index LED on.
4. The Keypad should display the Encoder position as 4096 +\-1
5. To Exit the encoder diagnostics, Press the SET POINT button.

5.4 Verify Correct Following.

1. Set the Draw Roll Diameter at 3.183 inches. (See section 2.3)
2. Set the length at 10 inches. (See section 3.2)
3. Put a mark at Top Dead Center of the encoder shaft, and the Draw Roller.
4. Put the Register Plain switch in Plain.
5. Run the machine. The Draw Roller should turn with an exact 1:1 ratio to the encoder. In particular the should always stay in time.

Recommended Spare Parts

EMP maintains a file by serial number of each Servo System sold. The serial number will supply details on the:

1. Servo Program
2. Motor Amplifier
3. Style of Alarm Relay and Components Used
4. Motor Type
5. Reducer Ratio

Before contacting EMP, please obtain the serial number.

The Serial Number can be obtained by:

1. The touch screen upon start up will display the serial number for 5 seconds before defaulting to the main screen.

2. Inside the controller, a label with style of controller and serial number is displayed.

Recommended Spare Parts

SE 141	Power Supply
SE 143	Control Board
B-3149	Encoder - 10 pin
TL U15	Scanner

Emergency Telephone Number

EMP provides service assistance Monday to Friday 8:30 AM (EST) to 6:00 PM (EST).

After normal business hours, an emergency phone number, 917 215 4639 should be called.
The EMP web site www.empregister.com also provides trouble-shooting assistance.