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(1) INTRODUCTION

For your convenience, the Model 2500 Controller's internal adjustments have been factory set to operate with your transmission.

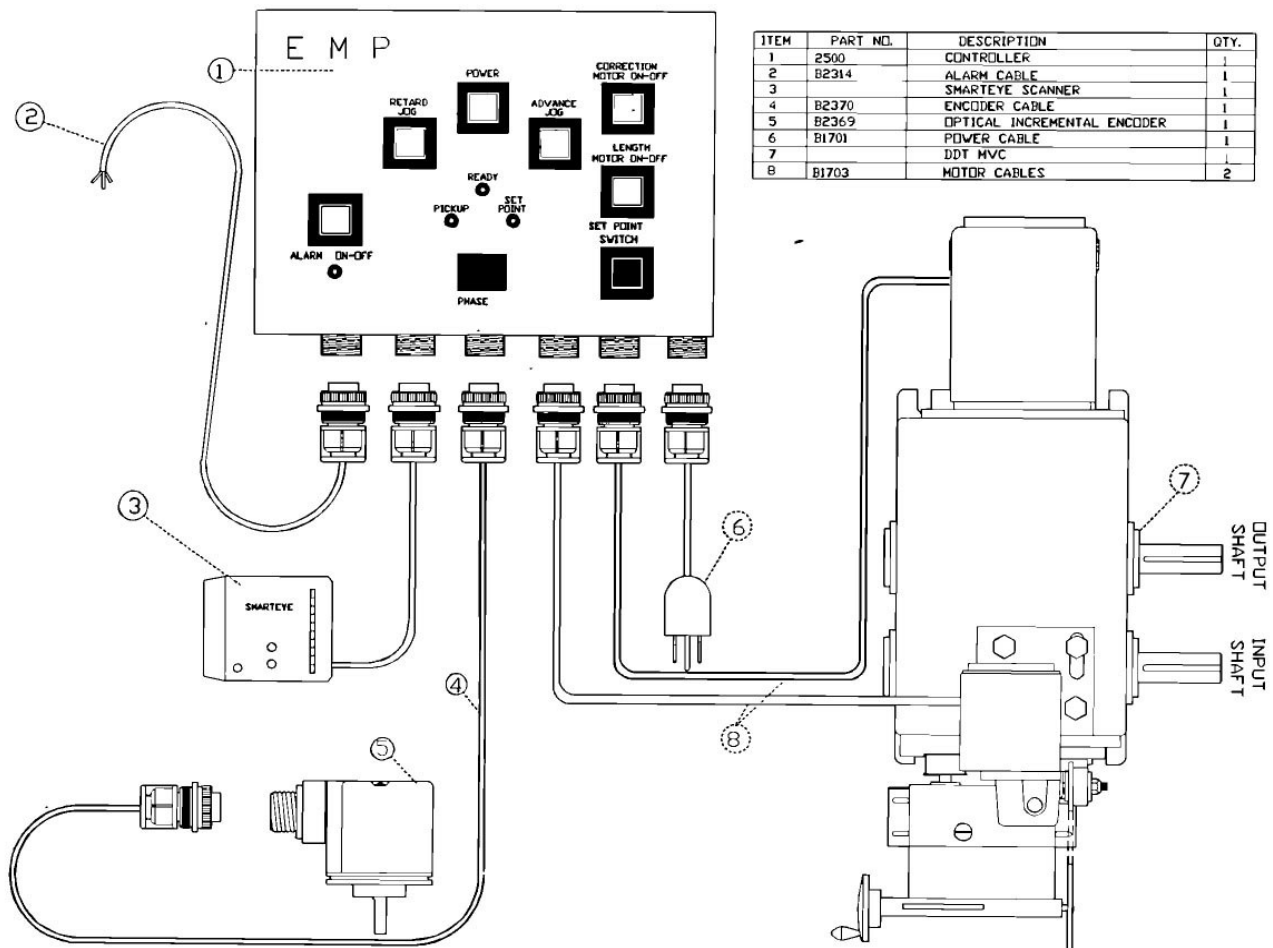
Please read the manual and use the system according to the instructions. If you have any questions, please don't hesitate in contacting EMP' Service Department.

The Model 2500 Dual Motor Register System consists of :

- A) Model 2500 Controller
- B) TL-U Scanner
- C) B2369 Encoder
- D) DDT-2 MVC – Double Differential Transmissions with Motorized Length Control
- E) Cables
 - (1) B1701 6' Power Cable
 - (2) B1703 10' Motor Cable
 - (1) B2370 10' Encoder Cable
 - (1) B2314 10' Alarm Cable

Wiring for Alarm Cable

- A. Black – N.O.
- B. White – Com.
- C. Green – N.C.



INSTALLATION

CONTROLLER

The Model 2500 Controller requires;

- (1) A clean 120 Volt 50-60 HZ Line with;
 - A) Peak Power Requirement 90 VA
 - B) Peak Line Current 8 AMP
 - C) Steady State Line Current 5 AMP (includes Motor Current)
- (2) The Controller should be securely mounted to minimize vibration. It should also be conveniently placed for operator to view all indicator LED's and the front Panel.
- (3) All cables to the Scanner, Motors and Encoder should not be run with any cables from heaters, static eliminators or Main Drive Motors.

SCANNER

The Scanner must be firmly mounted to minimize any machine vibration. Since the LIGHT-DARK and Sensitivity adjustments are on the scanner, it must be accessible to the machine operator. To achieve better registration, the Scanner should be positioned as close to the knife as possible.

ENCODER

The Encoder must be driven in an integral relationship (1:1, 2:1, 3:1, etc.) with the knife at a speed not exceeding 1500RPM. Since there are no adjustments made to the encoder, it may be mounted anywhere on the knife shaft or shaft having an integral relationship with the knife.

TRANSMISSION

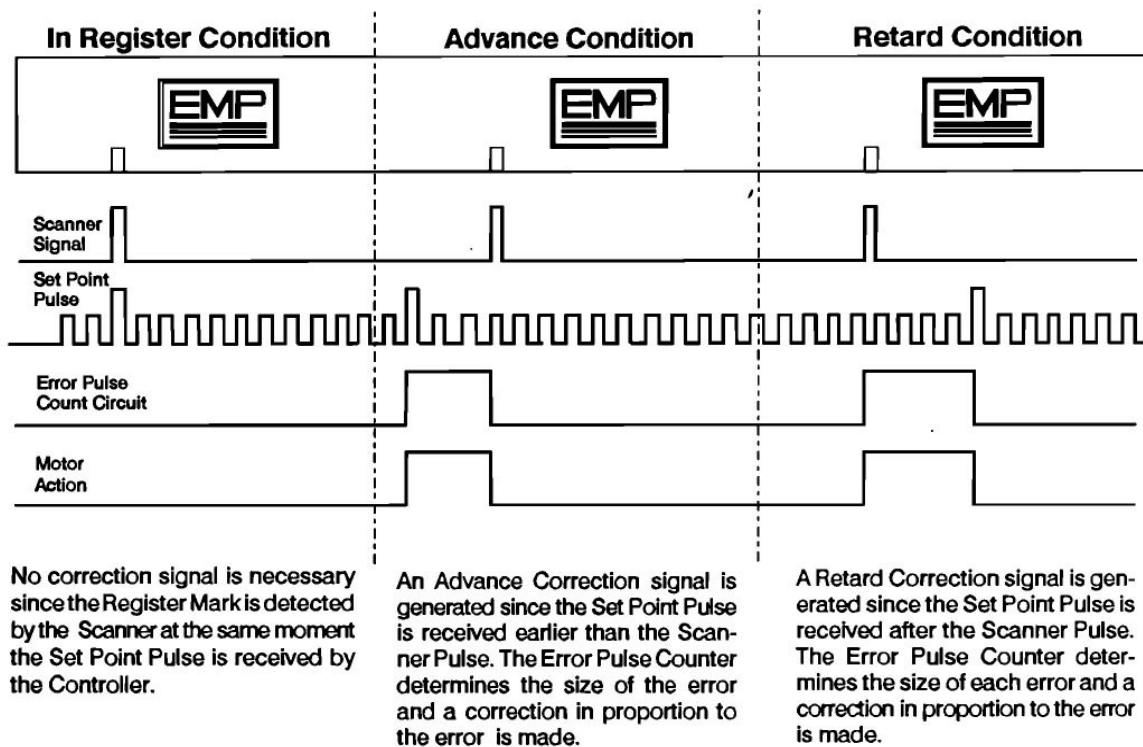
The DDT Transmission must be firmly secured to a flat rigid foundation. The Transmission can be secured with bolts through the slotted mounting holes on the Mount Plate. The Mount Plate must rest firmly on the foundation before bolting down. Align shafts accurately. When using a direct coupling connection, a flexible coupling is recommended. If gearing or timing belts are used, the gears or pulleys should be mounted on the main shafts as close to the housing as possible. This will minimize overhung loads. GUARDS must be used since external moving parts pose as a danger.

LUBRICATION

All EMP Transmissions are **shipped without oil**. Before starting, add the specified quantity of Mobil Gear # 629 Oil. If this oil is not available, the substitute must be a 4EP Grade Oil. After the first 100 hours of operation and every 2000 hours thereafter, change the oil.

OPERATING DESCRIPTION MODEL 2500 CONTROLLER

In an application controlling the cut-off position of a preprinted web, the Controller will receive a series of pulses along with a Set point Pulse from the encoder. The Set Point Pulse represents the proper knife position when the web is properly registered. The Color Scanner is sensing the preprinted web for the register mark. Once detected, a signal from the Scanner is sent to the Controller. The Controller's Error Pulse Count compares the arrival of the Set point Pulse to the Scanner signal and measures the difference. The controller then determines which of the following conditions will exist.



When a correction is necessary, an output signal is sent to the PHASE correction motor on the DDT Transmission. A Proportional phase correction would be made adjusting the speed of the printed web, bringing the "cut" point back in Register. As the web is being monitored, variations in the distance between the register marks may start to occur. The Phase Motor will attempt to correct this length error. The controller will acknowledge the large number of Phase Corrections in one direction and generate a correction signal to the length motor. The Length Motor corrections will make the necessary permanent adjustments to the cut-off position.

MODEL 2500 CONTROLLER

The Model 2500 consists of one main printed circuit board (MOTHER BOARD) that interconnects 5 printed circuit boards. A brief description of each board follows;

Mother Board : Holds receptacles for the other boards in the system. This board also contains the adjustment controls for Active Area width, Motor type, Alarm Settings, Skip Mark Feature and Dead Band. See pages 7 – 10 for internal settings.

Phasing Board : Provides the voltages required by the system.

Phasing Board : Receives signals from both the encoder and the front panel and generates the Set Point Pulse. The active area (area in which no print other than the mark is allowed), is established here.

Timing Board : Uses the Set Point Pulse from the Phasing board and the Scanner pulse to determine the amount and direction of correction. It then sends advance or retard pulses of the appropriate duration to the driving board. The set point LED is also activated by the Timing Board.

Driving board : Uses the advance and retard pulses from the Timing Board to drive the solid state relays. It also generates a mark pulse and pickup pulse from the scanner and activates the alarm relay if an out of tolerance condition exists. The Driving Board determines if a length adjustment is necessary and sends the signal to the SS Relay Board.

SS Relay Board : The Relay board contains the Solid State relays which drive the Correction and Length Motors. The 3 AMP slo-blo fuses which limit motor current are located on this P.C. board.

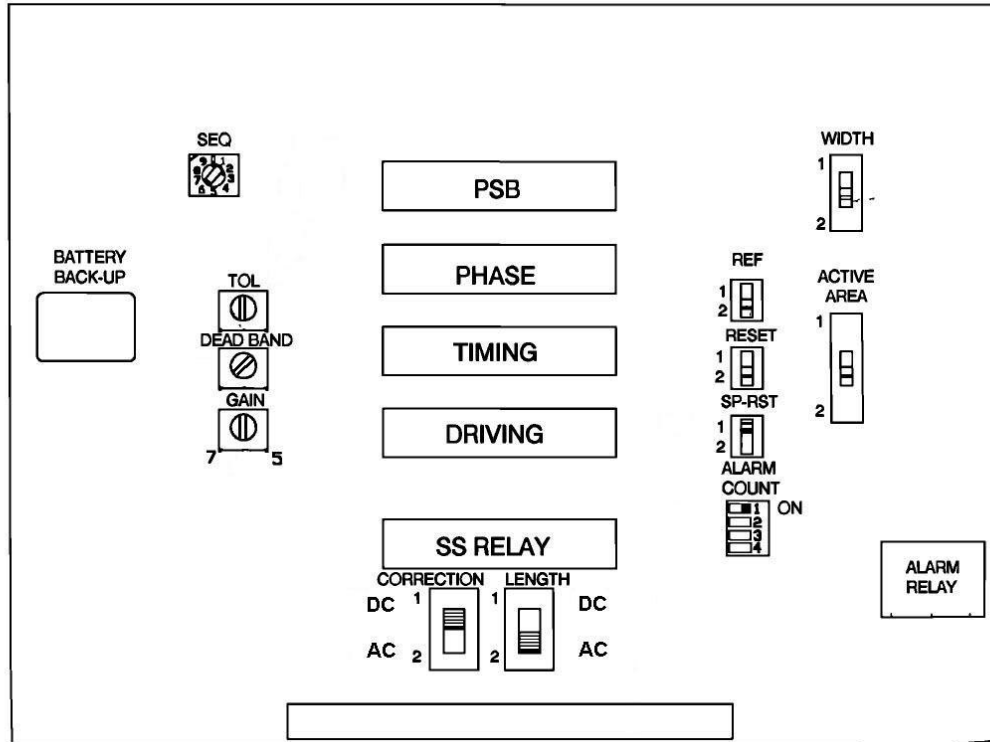
MODEL 2500 CONTROLLER

Front Panel Setting

The Controller's front panel contains all the indicators and switches necessary for proper operation. The function of each of the front panel parts is as follows:

Set Point Switch	Once activated, the encoder's exact position is recorded. This Set Point represents the position the encoder will be at when the system is in register.
Print Adjust	This switch adjusts the position where the web will be cut. After the set-up is complete, minor adjustments to the cut position are achieved by this switch.
Ready LED	This Green LED remains lit, once the Machine is ready for set-up. The LED is activated by the encoder passing its zero point for the first time.
Set Point LED	This amber LED will flash when the encoder passes the set point.
Pick-up	This amber LED will Flash when any printed matter is detected by the scanner, as well as the mark.
Retard Jog	This switch will light each time a retard correction takes place. It is also used to manually jog the printed web into position.
Advance Jog	This switch will light each time an advance correction takes place. It is also used to manually jog the printed web into position.
Motor on/off Correction	This switch when lit, indicated that the correction motor is on and is in the Automatic Mode.
Length Motor On/Off	This switch when lit, indicates that the length motor is on and is in the automatic mode.
Alarm LED	This red LED remains lit when an out of tolerance condition exists.
Alarm On-Off	This switch indicates that the out of tolerance system is activated.

2500 CONTROLLER ADJUSTMENTS MOTHER BOARD LAYOUT



SEQ - Mark - Skip feature – Factory setting is 1.

TOL - Determines Out of Tolerance Zones - Factory setting is 50%

DEAD BAND - Determines size of Dead Band - Factory Setting is 0

GAIN - Determines K Factor - Factory setting is 50%

WIDTH - Determines Active Area - Position 1:24 or 180 Degrees Position 2:12 Degrees

ACTIVE AREA - Determines Active Area Width - Position 1:180 Degrees Position 2:12 or 24 Degrees

REF - Determines Set Point Pulse is from Encoder: (Position 2) or Scanner: (Position 1)

RESET - Reset Signal is done by Scanner #1 or Encoder 2

SP-RST - Determined by Encoder Shaft Rotation - If non-rotating during knife stoppage:
Position 1 If rotating during knife stoppage: Position2

ALARM - Determines number of Out Tolerance events to occur before alarm.

CORRECTION - See Page 14

LENGTH - See page 14

MODEL 2500 CONTROLLER INTERNAL ADJUSTMENTS

OUT OF TOLERANCE ALARM CIRCUIT

1 – This feature was incorporated in the EMP Register System to indicate to the operator or a PC Controller, how accurate the Registration being maintained. The Alarm Circuit recognizes that once a predetermined number of Out of Tolerance events occurred, an alarm signal is generated. Depending on your system settings, the registration system still working to maintain the register while an alarm condition exists.

A) The Out of Tolerance area is established by the TOL Pot located on the Mother Board. The chart below shows the out of tolerance allowable (measure in degrees) before an alarm event is recognized.

	12 Degree Active Area	24 Degree Active Area	180 Degree Active Area
8:00 O'clock	2 Degrees	4 Degrees	30 Degrees
10:00 O'clock	4 Degrees	8 Degrees	60 Degrees
12:00 O'clock	6 Degrees	12 Degrees	90 Degrees
2:00 O'clock	8 Degrees	18 Degrees	120 Degrees
5:00 O'clock	12 Degrees	24 Degrees	180 Degrees

Using a 6" preprinted web with a 12 Degrees Active Area and the TOL Pot set at 12:00 O'clock, an alarm event occurs when the web is out of register by:

$$6/360 \text{ Repeat} * 6 \text{ Degrees} = .100 \text{ inches}$$

B) The alarm count switch on the Mother Board is used to determine the number of out of tolerance events which are allowed to occur before the alarm is activated.

Switch Position	Number of events before the alarm is activated
1 ON	4
2 ON	8
3 ON	16
4 ON	32

2 – Some machines have encoders which rotate while waiting for product. These machines requires a special pulse to prevent the alarm triggering while this is in mode. This is provided by placing the switch marked SP-RST (special alarm) in position 2.

MODEL 2500 CONTROLLER ADJUSTMENTS

OUT OF TOLERANCE ALARM CIRCUIT

3 – The alarm circuit consists of an S.P.D.T. relay rated at 2 amps 115V A.C. or 29V D.C. These ratings are for resistive loads only. Inductive loads should be properly suppressed to avoid arcing. Incandescent lamps should not exceed 12 watts @ 120V A.C. The inrush of current should not exceed 2 amps. Please note THIS OUTPUT IS NOT FUSED. The alarm condition will cause relay operation once the preset count is exceeded. The N.O. contacts will then close and remain closed until the alarm condition is cleared, or until the alarm output is turned off.

4 – Alarm Cable Green = Normally Closed
Wiring White = Common
 Black = Normally Open

ACTIVE AREA SETTING

The following 3 active area modes are available by using the switches located on the Mother Board marked ACTIVE AREA, and WIDTH.

1. 180 Degree Active Area. This setting is used ONLY when there is No PRINT between the register marks.
2. 24 Degree Active Area. In this setting 24 degrees of clear unprinted space must be allowed before the register mark.
3. 12 Degree Active Area. In this mode 12 degrees of clear space must be allowed before the register mark.

SWITCH SETTING

ACTIVE AREA (IN DEGREES)	WIDTH SWITCH	ACTIVE AREA SWITCH
180	1	1
24	1	2
12	2	2

MARK SKIP FEATURE

Sometime it is desirable not to read every Register Mark. When 2 or more print impressions are mounted on the print cylinder or when the repeat length is small, the mark may be skipped. The SEQ Switch will obtain the following settings.

SEQ	180 Active Area	vs	12 or 24 degree Active Area
0	Inactive		Inactive
1	Sees every mark		Uses every active area
2	Sees every 2 nd mark		Uses every 2 nd active area
3	Sees every 3 rd mark		Uses every 3 rd active area
4	Sees every 4 th mark		Uses every 4 th active area
5	Sees every 5 th mark		Uses every 5 th active area
6	Sees every 6 th mark		Uses every 6 th active area
7	Sees every 7 th mark		Uses every 7 th active area
8	Sees every 8 th mark		Uses every 8 th active area
9	Sees every 9 th mark		Uses every 9 th active area

MODEL 2500 CONTROLLER ADJUSTMENTS

GAIN K

The J Factor adjusts the longest correction time allowed. If you experience an overcorrecting situation, the K factor should be reduced. (POT turned counter clockwise). The K Factor is adjusted using the GAIN-K Pot located on the Mother Board. The Gain has been factory set for a correction time normally needed for your application.

DEAD BAND SETTING

A dead band is the in-register area where no correction takes place. It was set using the pot marked Dead Band on the Mother Board. The dead band is increased by turning the pot clockwise.

180 DEGREE ACTIVE AREA : THE DEAD BAND IS ADJUSTABLE FROM 0-8 DEGREEES.

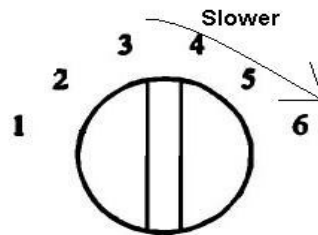
24 DEGREE ACTIVE AREA : THE DEAD BAND IS ADJUSTABLE FROM 0-8 DEGREEES.

12 DEGREE ACTIVE AREA : THE DEAD BAND IS ADJUSTABLE FROM 0-8 DEGREEES.

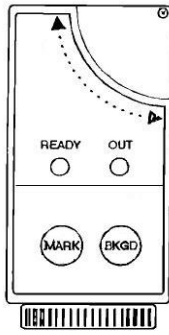
FRONT PANEL PRINT ADJUST

Once operating speed are achieved, minor adjustments to the cut position of the web may be required. Older systems required an adjustment to the Selector Switch. The Model 2500 allows the Print Adjust to be done using the Front Panel Print Adjust Switch. The print adjustment is actually moving the set point position. The speed of the Print Adjust is adjustable to meet your specific applications. The Position Switch located on the Phase Board controls the speed. A clockwise adjustment will decrease the adjustment speed. The Factory Setting is at 3. If your set-up is performed on the "Fly", Position 1 or 2 may be preferred.

	<u>Web movement per second</u>
Position 1	10 Degrees
Position 2	5 Degrees
Position 3	2.5 Degrees
Position 4	1.25 Degrees
Position 5	.625 Degrees
Position 6	.313 Degrees



TL-U SCANNER



- (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 indicated 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 light function was selected on the basis of the reading of a darker or lighter mark with respect to the background

REGISTRATION MARKS

The Registration Mark is the reference that tells the Model 2500 Controller the printed web's exact position. It is important that the Registration Mark have the following characteristics:

1 - Color - Since the Scanner "sees" the mark by sensing the change in colors, contrast is the key. High contrast (Dark color on light or vice versa) provides the best signal ratio and control reliability. Therefore, if possible, plan early to use bright, well defined, contrasting colors in your operation.

2 - Size - EMP recommends the mark to be a minimum of 3/8" in length and 1/8" wide. This size is recommended because the 3/8" length allows for slight side to side web drift while still remaining in the path of the Scanner. The width of 1/8" provides the scanner enough contrast.

3 - Minimum Clear Space - To maintain proper registration, only the Register Mark should give the signal to the Controller. To help the System recognize only the Register Mark, a clear unprinted area BEFORE the Registration Mark is required. Other systems will require a clear area before and after the mark.

4 - The system can be set in any of the 3 modes of encoder operation, which may be set internally. See page 9 for details.

1. 180 Degree Active Area. This mode is used if there is no print between the marks. The machine will now automatically come to register even after a bad splice. If there is any printing between the marks, operation will be erratic.
2. An active area width of 24 degrees. 24 degrees of clear space is required before the mark.
3. An active area width of 12 degrees. 12 degrees of clear space must be allowed before the mark.

5 - To calculate, the minimum clear area required, please use this formula.

$$(\text{Active Area}/360 \text{ degrees}) \times \text{Repeat length} = \text{Clear area Requirement}$$

For example Repeat length = 12 inches
 Active Area Width = 24 degrees

$$\text{Clear area required} = (24 / 360) \times 12 = 0.8 \text{ inches.}$$

Should you have any question regarding the Registration Mark, please send sample to EMP for testing.

ENCODER

The encoder used by the Model 2500 is an incremental type, with a two channel quadrature output, and a zero reference. Each channel delivers 1204 pulses per revolution, and these are decoded by the electronics to give a resolution of 1 part in 4096 or .088 degrees.

Internally, a glass disk is mounted on the shaft. The disk is ruled with 1024 fine dark lines. Mounted on either side of the disk are 2 photoelectric emitters and receivers. As the disk spins the light from the emitter is interrupted to form a train of pulses. A Set Point pulse (which occurs once per revolution) is placed on a third channel. By counting from this pulse the electronics know the exact position of the knife.

MECHANICAL DATA

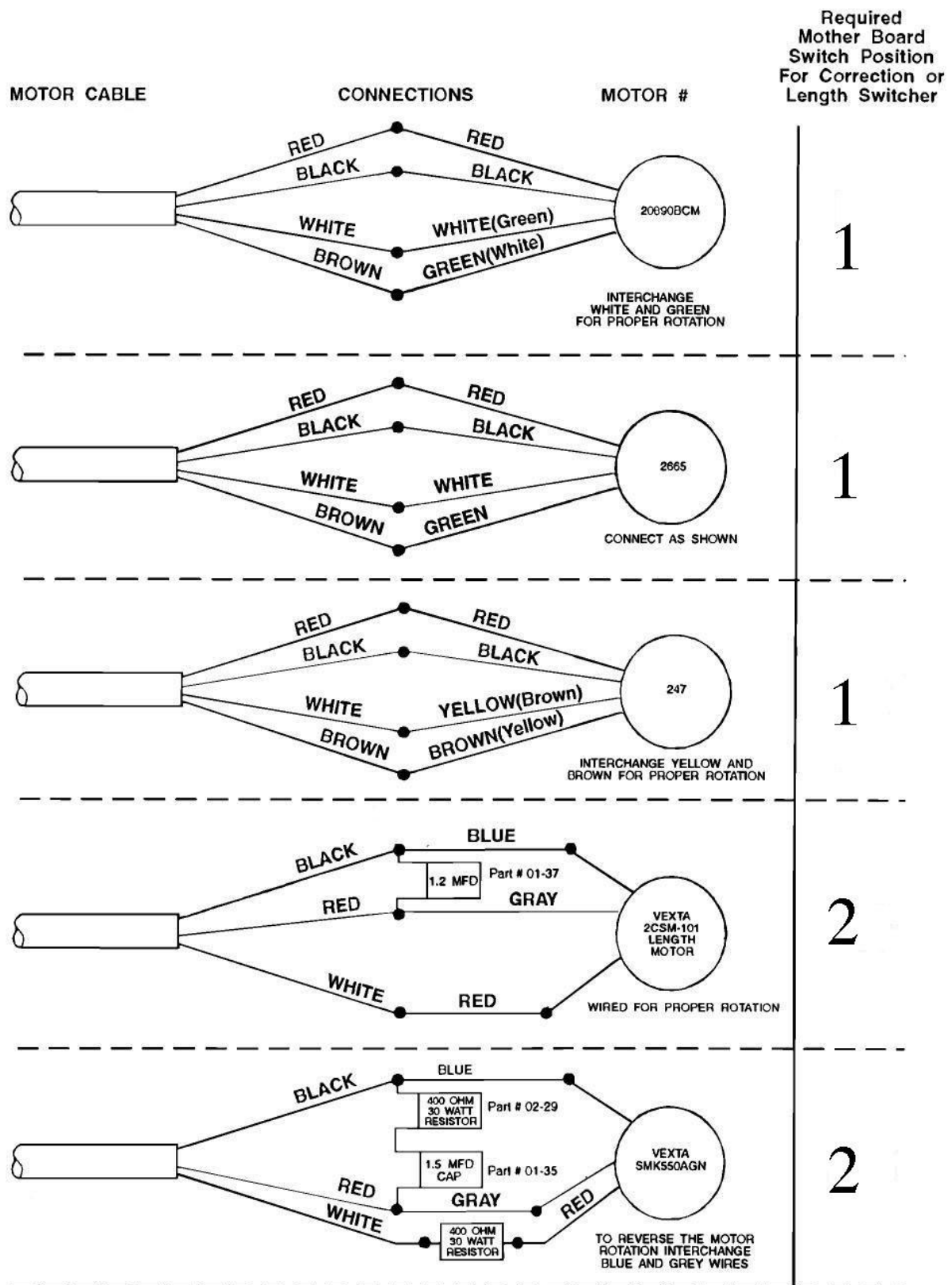
SHAFT LOADING	: 40lbs. (axial or radial)	STARTING
TORQUE	: 1.0 oz-in max.	2
MOMENT OF INERTIA	: 0.00037 oz-in sec max.	
SPEED	: 1500 rpm max.	

DDT Differential Transmission

The fourth component of the registration system is the Double Differential Transmission (DDT MVC). This transmission maintains the registration by regulating the speed of the output shaft which in most print to cut applications controls the machines draw rollers. Mounted on the DDT MVC are two motors which are controlled by the Model 2500 Controller.

The Correction motor momentarily corrects for random phase error. The speed of the output shaft is increased or decreased depending on the direction of rotation of the motor. This correction will increase or decrease the speed of the web thereby moving the cut point to its correct position. When the motor stops rotating the output shaft returns to its original speed.

The Length motor corrects for length errors. These are the errors caused by tension changes during printing. The Length motor adjusts position of a variator, which in turn permanently increases or decreases the output shaft speed. When the motor stops rotating the output shaft retains its new speed, which compensated for the constant length change.



STEP 1

Establish the proper Cut-Off length

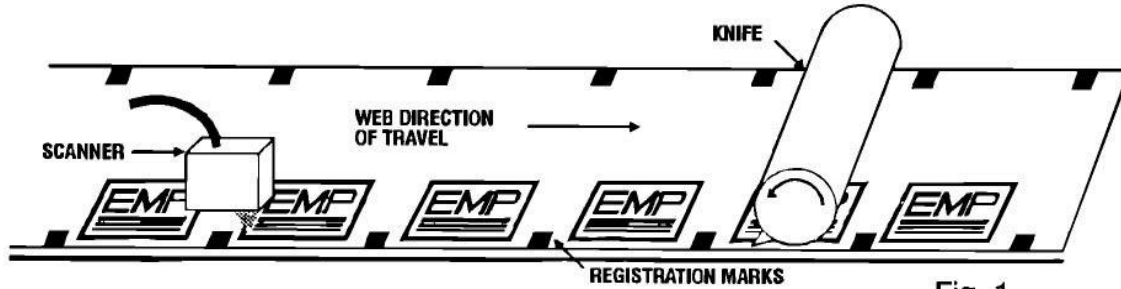


Fig. 1

STEP 2

Using machine jog bring knife into position, just prior to knife cutting web.

STEP 3

Using Model 2500 jog switch, move the Web so the Cut Point is under the knife

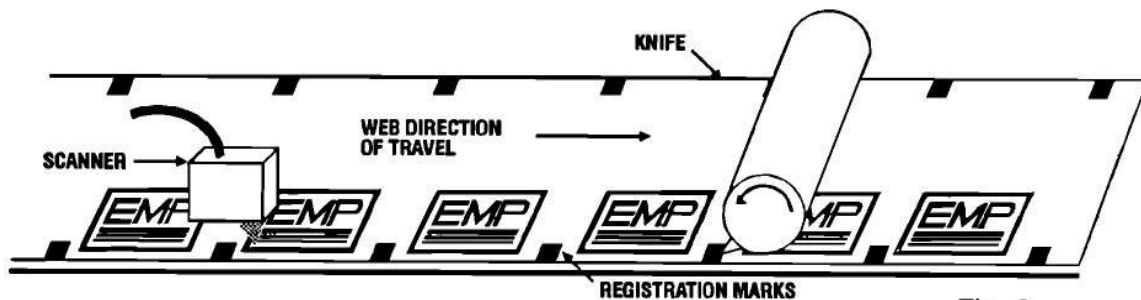


Fig. 2

STEP 4

Using the machine jog, complete the cut
And bring the Mark up to the Scanner.
The Ready LED will be on.

STEP 5

Press Set Point Switch on Model 2500
Front Panel.

STEP 6

Set up is complete.

SETUP & OPERATING PROCEDURE

1. Turn the Power ON, the Correction Motor On/Off to Off, the Length Motor On-Off to ON. The LENGTH MOTOR CAN ONLY BE JOGGED WHILE THE CORRECTION MOTOR IS TURNED OFF.
2. Test run the machine to obtain the correct cut-off length. You should be able to make 10 consecutive cuts with the cut position at the same point on the print. On model 2500 Controllers the length may be adjusted using the ADVANCE or RETARD JOG BUTTONS. Pushing the advance jog button increases the length, while pushing the retard decreases it. Turn the CORRECTION MOTOR to "ON."
3. Check that the scanner beam is properly aligned and focused along the registration mark path.
4. Set the light/dark switch to the proper mode on the SCANNER.
5. To check that the scanner is operating properly, pass some printed material beneath it, the pickup LED on the front panel will flash indicating proper operation.
6. Using the existing MACHINE'S JOG button, rotate the knife, stopping at a point just prior to the knife cutting the web.
7. Jog the web using the Jog Switch on the Model 2500 Front Panel until the desired cut position has been reached.
8. Using the MACHINE JOG, jog the machine feed. Move the web until the ready LED illuminates (if it is not already on) and the leading edge of the next register mark is under the scanner.
9. Press the SET POINT Switch on the Model 2500
10. You have now completed the static set-up of the machine. Now run the machine as normal and do the following:
11. When the machine is running but not at the desired cut off position, the Phase switch must be adjusted. Pushing the phase switch will reposition the cut-off point to any position on the web. The Phase switch allows for adjustment in either direction. Adjustments should be made slowly, to ensure that the mark stays within the active area. If the desired cut point is moved too quickly the mark may not keep up and control may be lost. If you establish Register on the "Fly", the length Motor should be shut off while using the Print Adjust feature.

CIRCUIT DESCRIPTION

ENCODER SIGNALS: Channel A, and Channel B are encoder signal lines. Electronic pulses are received on each of these lines 1024 times per revolution of the encoder. These signals are 90 Degrees out of phase. An index mark is received once per revolution.

DECODER: The encoder signals are decoded to produce 4096 pulses per revolution of the encoder. The number of pulses since the last index pulses are counted. This number (12 bit binary word) represents the absolute position of the encoder with the respect to the index pulse. Since the encoder is usually geared directly to a knife or some other actuating mechanism, each of these number represent a unique position in the cycle of the machine.

OFFSET GENERATOR: The mark is expected to arrive at the scanner at a given point in the machine's cycle. Electronically it is expected at a given offset by pushing the set button. This is compared with the absolute position to generate a setpoint pulse. The operator can increase or decrease this offset using the phase button.

ACTIVE AREA AND RESET GENERATOR: This circuit generates both a wide and a narrow active area around the setpoint. This is done by counting the LEAST SIGNIFICANT BIT (LSB) pulses of the absolute position. The side active area is 22.5 degrees on each side of the setpoint. Either wide, narrow or 180 degree active areas may be chosen by setting the appropriate switches on the mother board. This circuit also generated a reset pulse to help with the subsequent timing.

SEQUENCER: The sequencer circuit allows the user to prevent the system from attempting to measure and correct the error on every active area. The user may set-up the sequence which the machine will use. That is, use set-up the sequence which the machine will use. That is, use every active area, every second active area, or every third active area and so on. If the active area is set to 180 degrees the sequencer will skip marks rather than active areas.

EXTERNAL SCANNER: A second scanner may be used to generate the setpoint rather than the circuits described above. This is useful for 'mark to mark' operation. The set button now sets only the position of the active area and reset pulses. Registration is adjusted by moving the location of the scanner.

EXTERNAL RESET: The reset pulse is used to initiate a timing cycle. This pulse is normally generated 180 degrees distant from the setpoint. For some special applications it is generated by the trailing edge of the scanner pulse. This can be achieved by setting the appropriate switch on the Mother Board. Note this is used in special applications only.

AMOUNT AND DIRECTION OF ERROR CIRCUIT: The setpoint and mark are expected to occur simultaneously. The magnitude of the registration error is equal to the number of LSB pulses which occur between the Setpoint and the Mark. The direction in which a correction is made depends on whether a setpoint pulse or a mark pulse occurs first after the rest.

TIMING GENERATOR: First the timing generator compares the magnitude of the error against a user adjustable dead band. If a correction is to be made it is proportional to the magnitude of the error. The proportional constant or gain is user adjustable. The maximum proportional band is 22.5 degrees. For a 180 degree active area errors greater than 22.5 degrees produce the same correction time as a 22.5 degree error.

SPECIAL RESET GENERATOR: On some machines the encoder will continue to rotate when the product is not being fed into the machine. This would normally cause an alarm. To prevent this a special reset pulse is generated. This option may be turned on and off by means of a switch. If selected the unit will not give alarms for broken web conditions.

SCANNER PROCESOR: This circuit converts the scanner pulse to a +5V DC pulse usable by digital logic circuits.

TOLERANCE ADJUST: This sets a tolerance for the alarm circuit. If the registration error exceeds this tolerance, out of tolerance event pulses are generated.

COUNT EVENTS: The number of out of tolerance events is counted and compared to a user selectable allowed number. The first in register event will clear this count. This counter is also cleared by a special reset pulse or by turning the alarm off.

ALARM DIVER: Switches the alarm LED and relay on and off. The alarm is turned on when the number of out of tolerance events exceeds a user selected max.

ACCUMULATE CORRECTION TIME AND ALLOW LENGTH CORRECTIONS IF SUFFICIENT: Length corrections are only necessary if an excessive number of corrections are being made in one direction. This circuit keeps track of the number and duration of corrections in one direction, and if excessive corrections are being made allows length correction.

SOLID STATE RELAY DRIVERS: These circuits turn the length and correction motor relays on and off. They accept signals from both the jog buttons and length and phase correction timing circuits. The jog buttons take precedence over the automatic corrections. The length motor cannot be jogged while the correction motor is turned on.

MOTOR RELAYS: These solid state relays turn the motors on and off. The motors are turned on at a zero voltage crossing, and turned off when the current through the motor is zero. AC motors, Universal motors and permanent magnet motors can be accommodated.

MODEL 2500 TROUBLESHOOTING GUIDE

1. NO POWER OR LIGHT.

- A – Check the Safety Cut-Off Switch is properly engaged when Front Panel is closed.
- B – Check 1 AMP Fuse on Front Panel.
- C – Replace Power Supply Board.

2. NO SCANNER PICK-UP.

- A – If the scanner is not showing pick-up replace the scanner.
- B – If the scanner is showing a pick-up signal
 - a) Replace driving board.

3. RANDOM CORRECTION AND PICK-UP SIGNAL

- A – Check all AC ground. Light dark settings on the scanner.
- B – Observe the web, look for excessive web flutter which may produce a False signal to the scanner.
- C – Use a separate Power Line clear of electronic noise producing equipment such as static eliminators, DC Motors and Solenoids. If necessary use an Isolation Transformer.
- D – Replace Scanner.
- E – Replace Timing Board.

4. NO SET POINT LED

- A – Push Set Point Button, the Set Point LED should flash.
- B – If there is no indication perform 5V DC Check – See System Checkout Step #4
- C – If 5 Volts is present - replace Timing Board.
- D – If 5 Volts is not present - Replace Power Supply Board.

5. NO SET POINT MEMORY

The Model2500 Controller has a Battery Back-up for the Set Point Memory. If power to the controller is OFF for more than 2 weeks, the Battery may require charging. The controller should be left on for a 24 Hour period to fully charge the batteries.

6. LIMITED OR NO MOTOR ACTION

- 1 – Check 3 AMP Slo-Blo fuses on relay board described in #2
- 2 – Are Correction and Length Motor switches on Mother Board in desired position. Check hat SEQ setting
- 3 - If mother action is limited replace the relay.
 - ACR = ADVANCE CORRECTION RELAY
 - ALR = ADVANCE LENGTH RELAY
 - RCR = RETARD CORRECTION RELAY
 - RLR = RETARD LENGTH RELAY
- 3 – Replace the Relay Board.
- 4 -

7.

SYSTEM CHECKOUT

EMP recommends the following check be performed any time a Registration problem is experienced. Once completed, review the Trouble Shooting Guide or contact EMP.

1. MOTOR TEST

- A) Push the Retard Jog Switch. The Retard Lamp will light. The Machine's Draw will retard the web. If you are Controlling the knife rather than the Draw Roller-Request Manual Insert #104
- B) Push the Advance Jog Switch. The Advance Lamp will light. The Machine's Draw Roller will advance the web.

2. PRINT ADJUST STATIC TEST

- A) Press Set Point Switch – Set Point LED will light.
- B) Press Print Adjust Switch – forward for 1 Second.
- C) Print-Adjust Switch – Back for 2 Seconds – The Set Point LED flashes.
- D) By the Set Point LED flashing, we have checked the Print Adjust feature **is working**.

3. SYSTEM CHECK

- A) Using the Machine Jog – Jog the web until the READY LED is on.
- B) Press the Set Point Switch.
- C) Using the Machine Jog – Jog the web solely until the Set Point LED is on.
- D) Pass a Printed Mark under the Scanner;
An Advance Correction should take place.

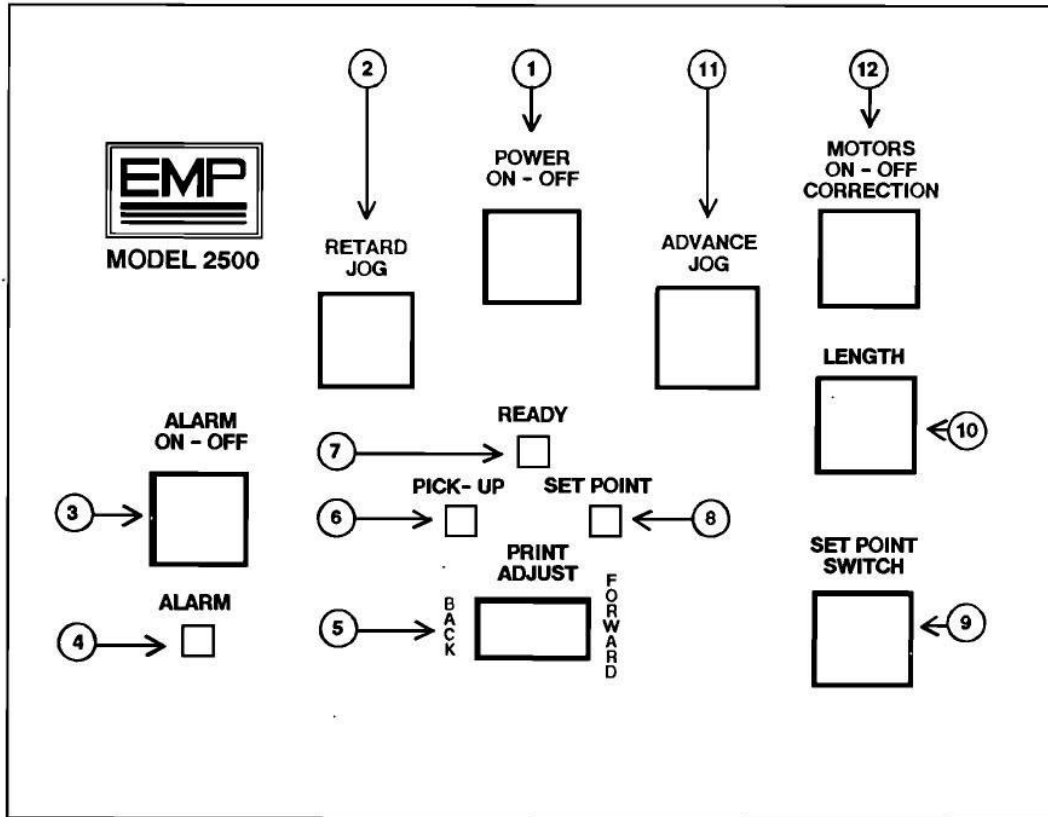
4. POWER SUPPLY

- Using a DMM Meter, measure;
- A) 15 Volts DC between Pins A & D on the Scanner Connector located on the Controller.
 - B) 5 Volts DC between Pins C & E on the Encoder Connector located on the Controller.
 - C) If 15 Volts or 5 Volts measurement is not obtained replace the PSB – Power Supply board.

5. SET POINT ON ALL THE TIME

- A) Replace cable
- B) Replace encoder

MODEL 2500 FRONT PANEL PARTS



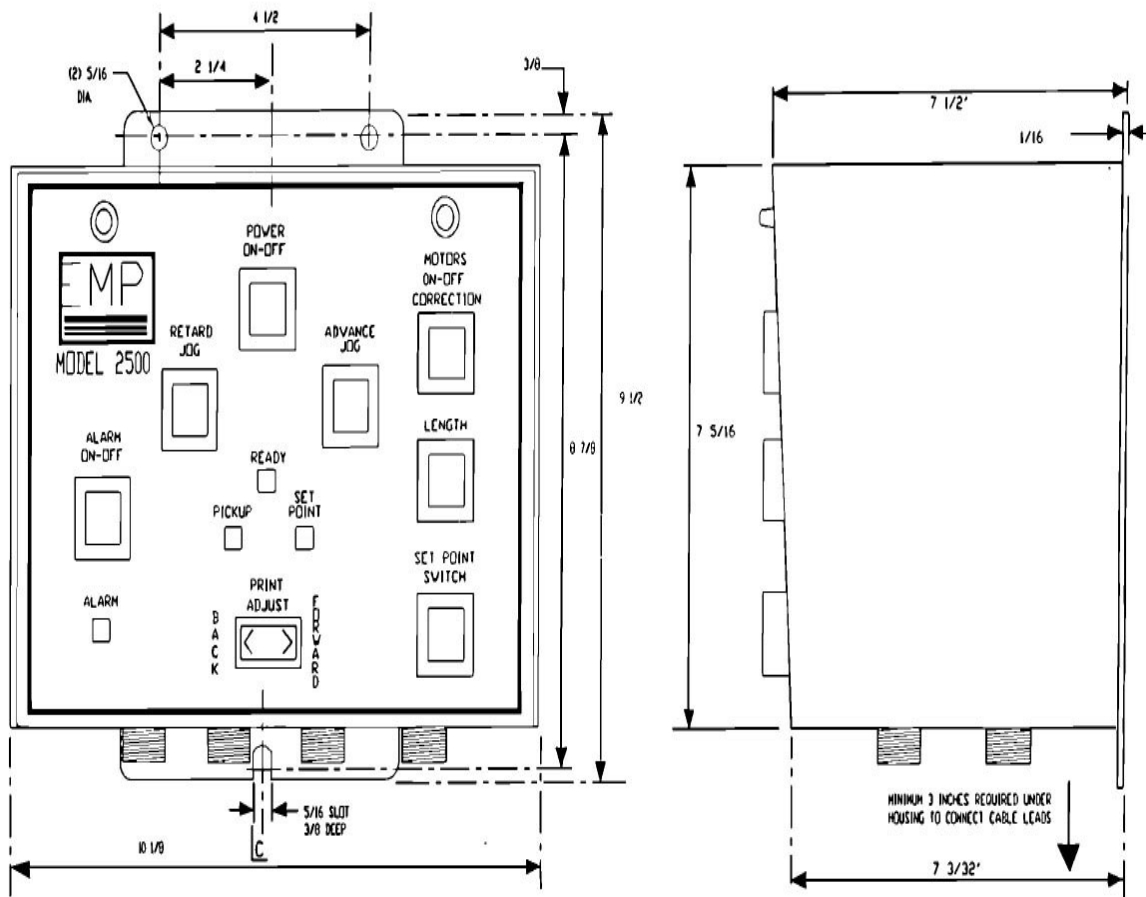
ITEM	PART No.	DESCRIPTION
1	11-39	POWER ON - OFF SWITCH
2	11-40	RETARD JOG
3	11-42	ALARM ON - OFF
4	11-44	ALARM LED
5	11-38	PRINT ADJUST SWITCH
6	11-46	PICK-UP LED
7	11-45	READY LED
8	11-46	SET POINT LED
9	11-43	SET POINT SWITCH
10	11-39	LENGTH MOTOR ON - OFF SWITCH
11	11-41	ADVANCE JOG
12	11-39	CORRECTION MOTOR ON-OFF SWITCH
13	11-50	BULB FOR ALL SWITCHES # 18

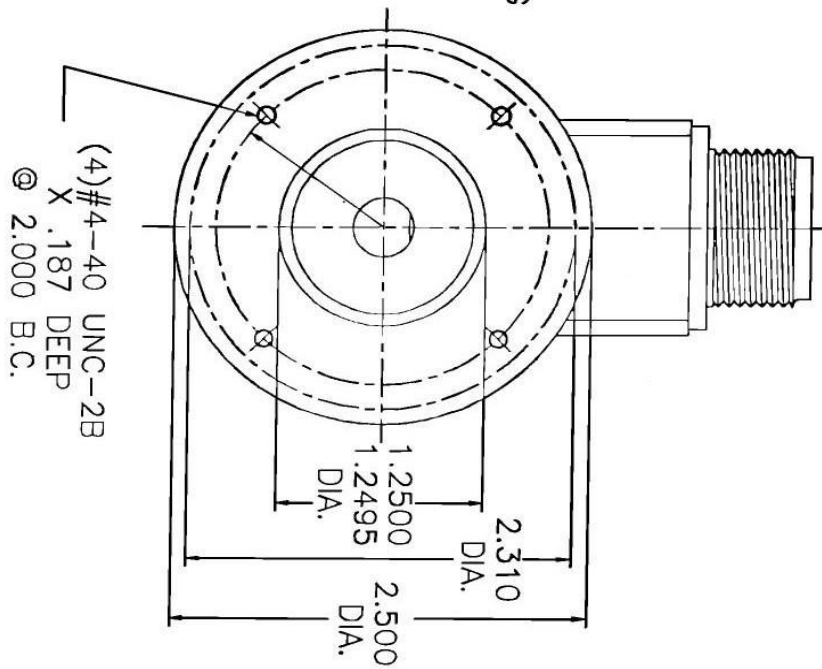
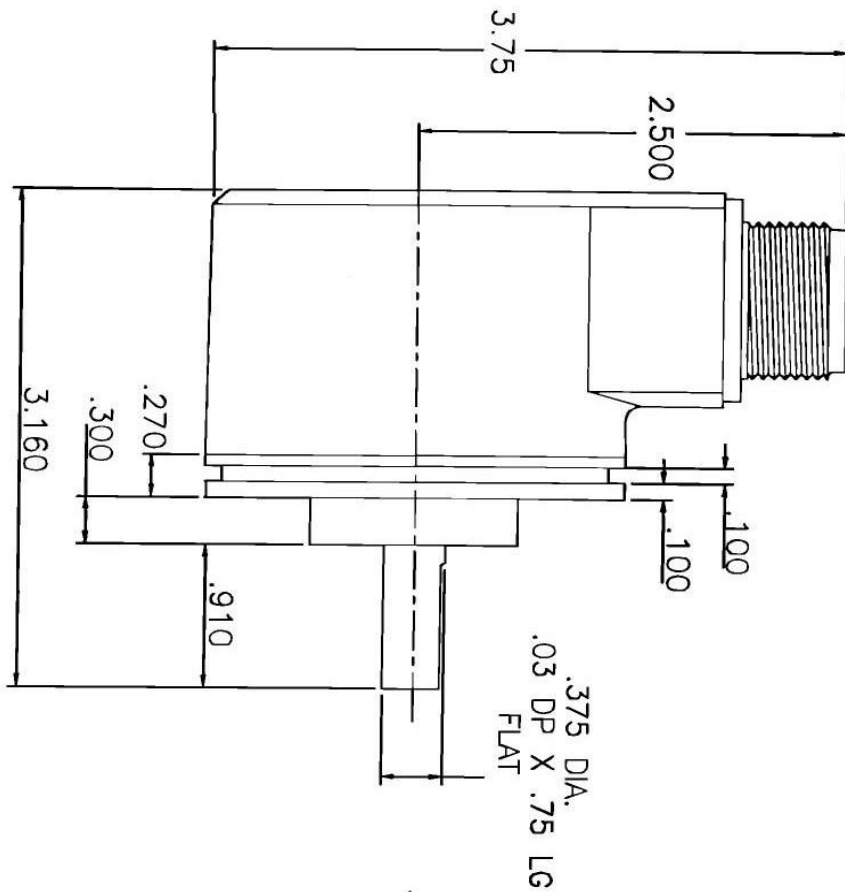
MODEL 2500
RECOMMENDED SPARE PARTS LIST

- 1 - PSB – POWER SUPPLY OARD
- 1 - PHASE BOARD
- 1 - TIMING BOARD
- 1 - DRIVING BOARD
- 1 - SS RELAY BOARD
- 1 - BOX (5) 3 AMP SLO-BLO-MOTOR FUSE
- 1 - BOX (5) 1 AMP FRONT PANEL FUSE
- 1 - BOX (5) # 18 – FRONT PANEL INDICATOR BULBS

WARRANTY

We guarantee to replace, or at our option, repair any products or thereof, which are found to be defective in material or workmanship, within one year from date of shipment, except relays or motors, which are guaranteed for ninety days. Our obligation with respect to such products or parts shall be limited to replacement or repair, F.O.B College Point, New York. In no event shall we be held liable for consequential or special damages o for the transportation, installation, adjustment, or other expenses which may arise in connection with such products or parts.





ELECTRONIC MACHINE PARTS, INC	
P.O. BOX 124, 22-25 119th ST. COLLEGE POINT NY 11356	
PHONE: (718) 461-8850 FAX: (718) 461-2062	
TITLE: ENCODER: DYNAPAR HR62510241101	
7 PIN- ROUND SERVO MOUNT	
PART:	DWG BY: R. LOVE
SECTION:	DATE: 10-19-91
MACHINE:	DWG NO: B2369

This Document outlines how to set the internal proportional controls.

ACTIVE AREA	:	POSITION 1 180 DEGREES POSITION 2 11 OR 22 DEGREES
WIDTH	:	POSITION 1 22 DEGREES POSITION 1 11 DEGREES
REF	:	POSITION 1 EXTERNAL POSITION 2 INTERNAL
RST	:	POSITION 1 SCANNER TRAILING EDGE POSITION 2 ENCODER GENERATED
SP_RST	:	POSITION 1 NORMAL POSITION 2 B&H MODE
CORRECTION	:	POSITION 1 DC MOTORS OR RELAYS. POSITION 2 AC MOTORS, MOTOR STARTERS, OR RELAYS
LENGTH	:	POSITION 1 DC MOTORS OR RELAYS. POSITION 2 AC MOTORS, MOTOR STARTERS,OR RELAYS
SEQ	:	POS 1 LOOKS AT EVERY ACTIVE AREA 2 LOOKS AT EVERY SECOND ACTIVE AREA 3 LOOKS AT EVERY THIRD ACTIVE AREA 4 LOOKS AT EVERY FOURTH ACTIVE AREA 5 LOOKS AT EVERY FIFTH ACTIVE AREA 6 LOOKS AT EVERY SIXTH ACTIVE AREA 7 LOOKS AT EVERY SEVENTH ACTIVE AREA 8 LOOKS AT EVERY EIGHT ACTIVE AREA 9 LOOKS AT EVERY NINTH ACTIVE AREA

IF THE ACTIVE AREA IS SET TO 180 DEGREES, THEN MARKS ARE
SKIPPED.