OPERATING MANUAL FOR CONTROL SYSTEM OF BAG MAKING MACHINE

Business Mission

Streamline Controls Pvt. Ltd. (SCPL) is in the business of providing electronic & computerized automation solution for different industries so as to enhance the quality and productivity. Our motto is to provide indigenous, reliable and proven products & hence to ensure consistent performance. Our concept of value to the customers is to supply indigenous control systems designed with latest technology, developed through extensive R & D, incorporating state of art technology (world technology trend), manufactured under strictest quality control system and duly tested, at competitive prices, delivered in time and supported by service teams.

We feel it to be our responsibility to ensure that our business operates at a reasonable profit, as profit provides opportunity for R&D, growth and job security. Therefore we are dedicated to profitable growth - growth as a company and growth as an individual.

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(A) SYSTEM SPECIFICATIONS:

Input

Power:

Voltage	--	0-24VAC ± 2%
Frequency	--	49-50 Hz
Consumption	--	10VA Max.

Control:

1. Proximity	--	NPN (NO type) 10-30 Vdc-50Ma Max
2. Limit switches	--	NO TYPE

Output

Output Signal	--	24VDC 25mA. Max. Signal driver

Environment

Temperature	--	0ºC to 55ºC
Humidity	--	5 to 95% RH non-condensing

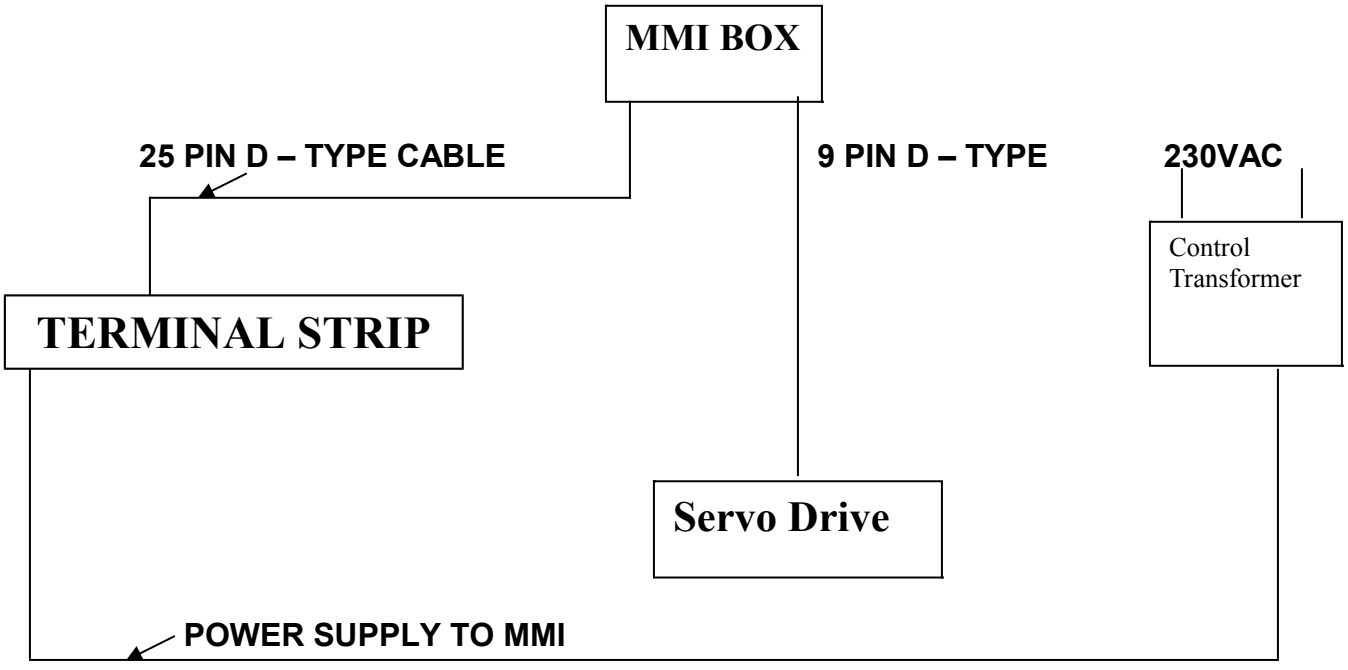
MECHANICAL DIMENSIONS

OVERALL DIMENSION	--	Depth X Width X Height 65 mm 146 mm 146 mm
PANEL CUTOUT SIZE	--	**140mmX140mm**

(B) BAGkon UNIT CONSIST OF FOLLOWING ITEMS

1.	Display unit	:	This is MMI BOX with 16 x 2 Big LCD & 24 keys keypad on (MMI BOX) front of it.
2.	Terminal Strip	:	This is the terminal strip to connect external solenoids & limit OR Proximity switches to *BAGkon*
3.	Cable Set	:	There are 2 cables to interconnect Display unit, terminal strip & Servo Drive with each other.
5.	Control Transformer:		*BAGkon* is provided with Control Transformer with 230VAC Input and 24VAC output.

BLOCK DIAGRAM



(C) FRONT KEY BOARD OPERATION

1. OPERATING MODE SELECTOR

1. RUN : Push this key for toggle between RUN and JOG (inching) mode
2. DRIVE ON : Push this key for Enable or Disable servo drive.
3. MARK : Push this key for enabled or disabled the MARK *function.*
4. TEST : Push this key for enabled or disabled the TEST *function.*

2. PROGRAM MODE SELECTOR

5. SET LENTH : Push this key to open SET *LENGTH* menu.
6. SERVO SPEED : Push this key to open SERVO *SPEED* menu.
7. SET DELAY : Push this key to open SET DELAY menu.
8. PASSWORD : Push this key to open password entry menu.

3. NUMERICAL KEYS

9. 1 : PRG Mode: Push this key for set digit value1.

10. 2/INC : PRG Mode: Push this key for set digit value 2.
RUN Mode: Push this key for increments length.

11. 3 : PRG Mode: Push this key for set digit value 3.
RUN/JOG Mode: not use.

12. 4 / TOTAL : PRG Mode: Push this key for set digit value 4.
RUN/JOG Mode: Push this key for display totalizer counter.

13. 5 : PRG Mode: Push this key for set digit value 5.
RUN Mode: Not Use.

14. 6 / BATCH : PRG Mode: Push this key for set digit value 6.
RUN Mode: Push this key for display batch counter.
Push this key for acknowledge Total Batches Over message till to reset message on display

15. 7 : PRG Mode: Push this key for set digit value 7.
RUN /JOG mode : Push this key for decrement seal strength .

16. 8/DEC : PRG Mode: Push this key for set digit value 8.
RUN/JOG Mode: Push this key for decrements length.

17. 9 : PRG Mode: Push this key for set digit value 9.
RUN /JOG mode: Push this key for decrement MSPD .

18. 0 : PRG Mode: Push this key for set digit value 0
RUN /JOG Mode: Not in use.

19. NEXT/ STATUS : PRG Mode: Push this key for Saves current parameter & Switches to next parameter
RUN Mode: Switches menus (i) Regular menu (ii) I/O Status (iii) Speed menu (iv) Online Cycle Status menu

20. PREV / VIEW : PRG Mode: Push this key for switch to previous parameter
RUN Mode: Push this key to view all parameter & it's set value

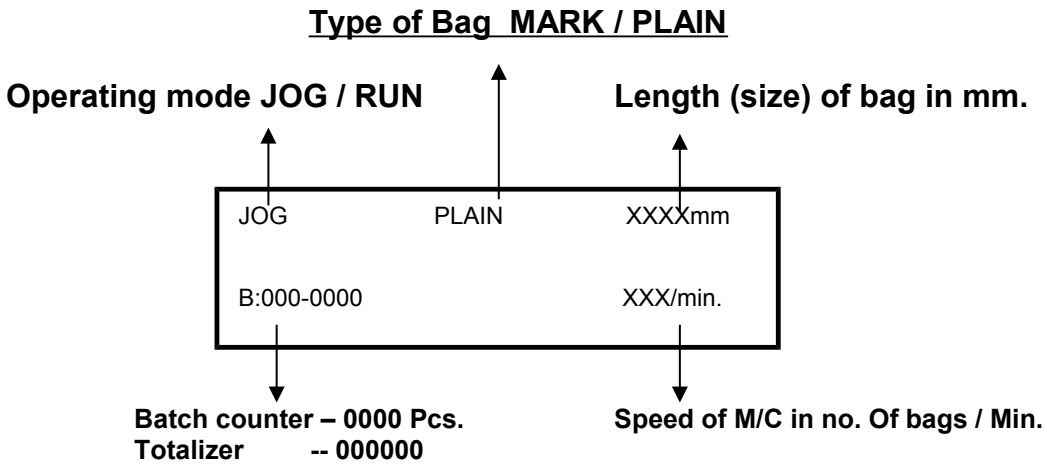
21. CLEAR /ER RST : PRG Mode: Push this key for clearing input data zero
RUN /JOG Mode: Push this key for reset errors

4. FUNCTIONAL KEYS

22. CNTR PAUSE : Push this key for stop batch counter in run mode.
23. SINGLE STROKE : Push this key for run motor as per set length & set speed
24. F1 : Spare Key. Not in use.

(D) FUNCTIONAL DESCRIPTION

DISPLAY:



-System operates in two modes

1. MANUAL MODE 2. AUTO MODE

IN MANUAL MODE:

- At the time of power ON (system stays in MANUAL mode). In MANUAL mode Upper line in LCD shows **'*JOG*'**.
- In this mode servo motor can be moved either in forward direction or in reverse direction as per input applied at the terminal strip (i.e. at INCH FOR or INCH REV)

IN RUN MODE

- In RUN MODE system operates in two functional modes
  1. PLAIN MODE
  2. MARK MODE
- Upper line of display shows '*RUN*'
- On applying start signal to START INPUT terminal, stepper motor starts running. Motor moves for set length at set speed.
- If mark sensor input is enabled "MARK" is displayed in upper line of display. (If mark sensor is ENEBLED,'MARK' is displayed and if MARK SENSOR IS DISABLED, 'PLAIN' is displayed.) Servo motor stops as soon as MARK SENSOR input is received. If MARK SENSOR input is not received then motor will stop at set length.
- If mark sensor is disabled then servo motor will stop at set length.
- After stopping of servo motor CUT, SEAL, HOLE PUNCH*, D-PUNCH* etc output operates for their corresponding set time in SET TIMER menu.
- After all the output goes off system waits for next start.

Now if input configuration is set to *'5*' then motor restarts after cycle delay value in SET TIMER menu. If input configuration is set to '3' then system waits for start input goes off (proximity switch). For other then '3' & '5' system starts as per explained in programmers guide.

(E) HOW TO PROGRAM

Parameter SET 1:

To enter, press **SET LENGTH**.
The upper line of LCD shows parameter name in the upper line, parameter value in the Lower line.
The cursor blinks on last significant digit.
Use **CLEAR** key to clear entered data.
Set required value using 0-9 numerical keys.
Use **NEXT** to save the current parameter & to switch to the next parameter.
Use **PREV** to switch to the previous parameter.
Use **SET LENGTH** key again to exit.

List of Length Parameters is as per mentioned in "List of Programmable Parameters" Table.

Input Configuration: Decides different configuration for the start / error conditions as follows.

0 : The system awaits transition of *START* Signal from OFF to ON to start the motor. Speed Error is disabled.

1 : The system awaits transition of *START* Signal from OFF to ON to start the motor. If the *START* Signal transition from OFF to ON takes place during the motor run, *SPEED ERROR* is generated & the system is halted.

2 : The system awaits transition of *START* Signal from OFF to ON to start the motor. If the *START* Signal turns OFF during the motor run, *SPEED ERROR* is generated & the system is halted.

3 : The system awaits transition of *START* Signal from ON to OFF to start the motor. If the *START* Signal turns ON during the motor run, *SPEED ERROR* is generated & the system is halted.

4 : The system awaits transition of *START* Signal from OFF to ON to start the motor. If the *STOP* Signal turns ON during the motor run, *SPEED ERROR* is generated & the system is halted.

5 : The system awaits for the *CYCLE DELAY time* to start the motor. Speed Error is not generated.

Parameter SET 2 :

To enter, press **SET TIMER**.
The upper line of LCD shows parameter name in the upper line, parameter value in the lower line.
The cursor blinks on least significant digit.
Use **CLEAR** key to clear entered data.
Set required value using 0-9 numerical keys.
Use **PREV** to switch to the previous parameter.
Use **SET TIMER** key again to exit.

List of Timer Parameters are as per mentioned in "List of Programmable Parameters" Table.

Parameter SET 3:

To enter, Press **SET SPEED**.
The upper line of LCD shows parameter name in the upper line, parameter value in the Lower line.
The cursor blinks on least significant digit.
Use **CLEAR** key to clear entered data.
Set required value using 0-9 numerical keys.
Use **NEXT** to save the current parameter & to switch to the next parameter.
Use **PREV** to switch to the previous parameter.
Use **SET SPEED** key again to exit.

List of Speed Parameters is as per mentioned in "List of Programmable Parameters" Table.

Note:

WHAT IS AUTO SPEED FUNCTION & HOW TO SELECT IT?

Auto speed is the run speed, which is automatically selected by microprocessor with respect to job length. I.e., you want to change your job length thereafter you need not to change any speed parameter. For that you have to select auto speed parameter ON in the Engineer level menu.

Auto speed is depending also on other parameters which are used only at the time of commissioning because torque, roller diameter, pulley ratio etc. are changing with deferent m/c. once you set all speed parameter & ratio parameter with respect to m/c at load (with photocell), there after you don't need to change those speed & ratio parameters for any length.

Auto speed will be changed with respect to start speed, end speed, acc.time, dec. time, photo speed, and mark window.

If you increased start speed, end speed & photo speed from the default value then auto speed will be decreased.

If you increased acc.time, dec.time & mark window then auto speed will be increased.

If you want to run motor faster then set run speed is equal to 5000 PPS (max) so auto speed which is selected by the microprocessor with respect to length & other parameters is set at its pick speed. If you want to run slower then you have to set required run speed. So auto speed will not increase above your set run speed.

So, from the use of auto speed you can get desired speed at any job length without changing any parameter.

(F) CONFIGURABLE INPUT & OUTPUT

- BAGKon provides configurable inputs and outputs i.e. user can configure any input/output for any purpose.

  e.g. If currently cutter output is on output no.1 and D-punch output is on output no. 3 but user wants cutter output at output no. 3 and D-punch on output no.1 then he has to set 0(hex code) in config output 3 and 2(hex code) in config output 1.
  Input can be config for any purpose.

The list of configurable inputs and outputs are as per listed in **"CONFIGURABLE INPUT and OUTPUT TABLE".**

(G) LIST OF NON-CONFIGURABLE INPUTS

INPUT NAME	DESCRIPTION
PH IN NPN	This is the mark sensor input. Servo motor stops as per this input. For this NPN type Photocell (Mark sensor) can be used.
PH IN PNP	This is the mark sensor input. Servo motor stops as per this input. For this PNP type Photocell (Mark sensor) can be used.
INCH F	On applying this input motor jogs in forward direction.
INCH R	On applying this input motor jogs in reverse direction.

(H) ERROR MESSAGES

There are two types of error messages

1. **MARK SENSOR ERROR**
   When the MARK SENSOR is enabled and MARK SENSOR input is not received for more then set *MISSING MARK* count continuously then MARK SENSOR error occurs.

2. **HIGH SPPED ERROR**
   When input configuration is set other then 0 or 5 and start command is received before servo motor stops for more then high-speed error count continuously then high-speed error occurs.

3. **EMERGENCY ERROR**
   If any configurable input's value is set to 3(hex code) then error will generate whenever input is received on that input terminal.

4. **SERVO TRIP ERROR**
   Servo trip error will generate whenever servo drive get tripped.

(I) COMMISSIONING TIPS

- Tuning of servo drive with machine must be done before commissioning of controller.
- Set servo command pulse input as in **Quadrature Pulse** mode.
- Match set length & actual length by setting **PPR & RATIO MM** parameters in controller and **Gear RATIO** parameter in servo drive. (It is advisable to set **PPR** parameter not more than **800** pulse)
- Understand the following formula clearly

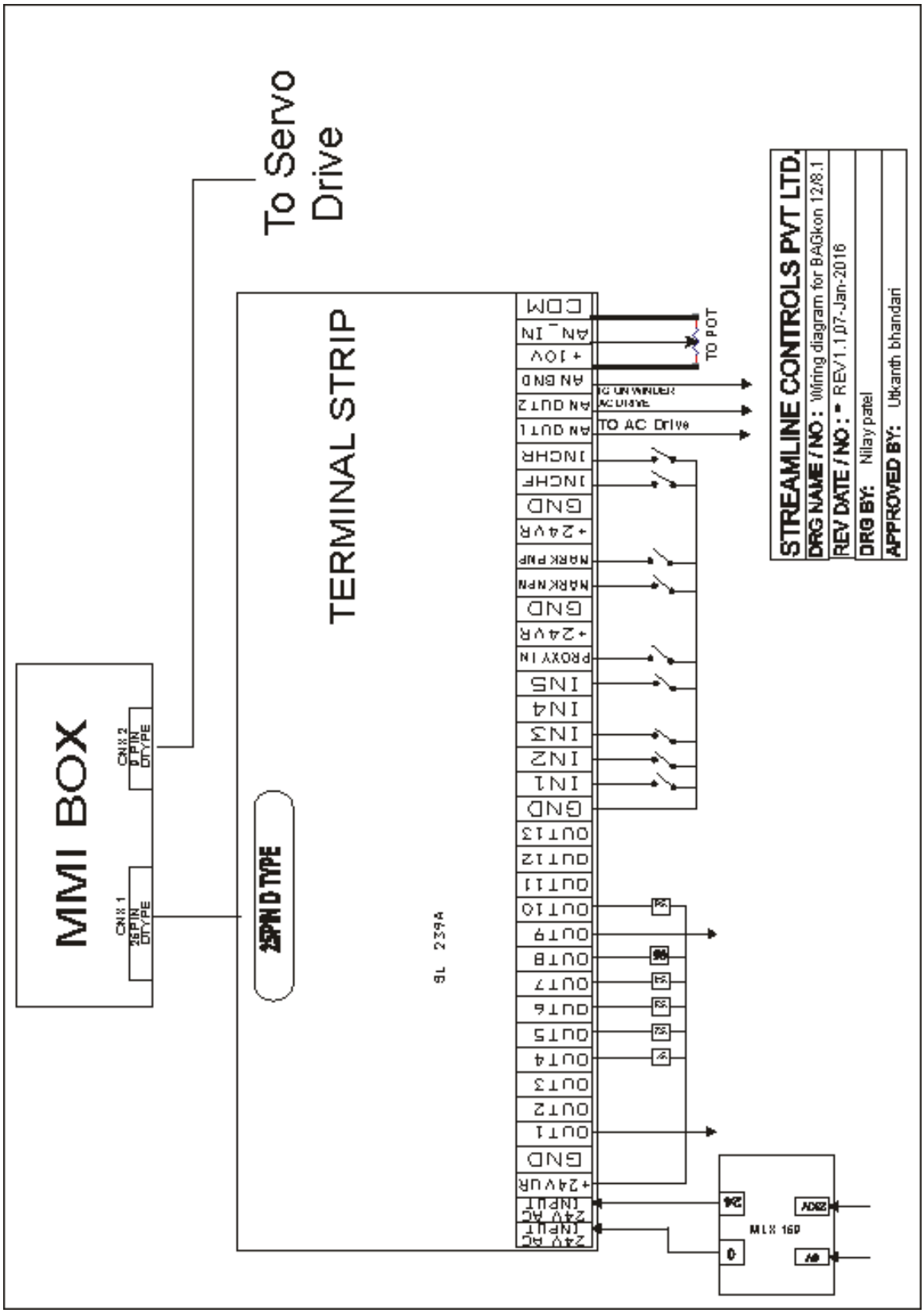
$$\text{No of output pulses} = \frac{\text{Set Length}}{\text{Ratio mm/10}} \times \text{PPR}$$

- At the time of commissioning set acceleration, deceleration, start speed, end speed properly for maximum length & then set auto speed function ON.
- To enable mark function please check

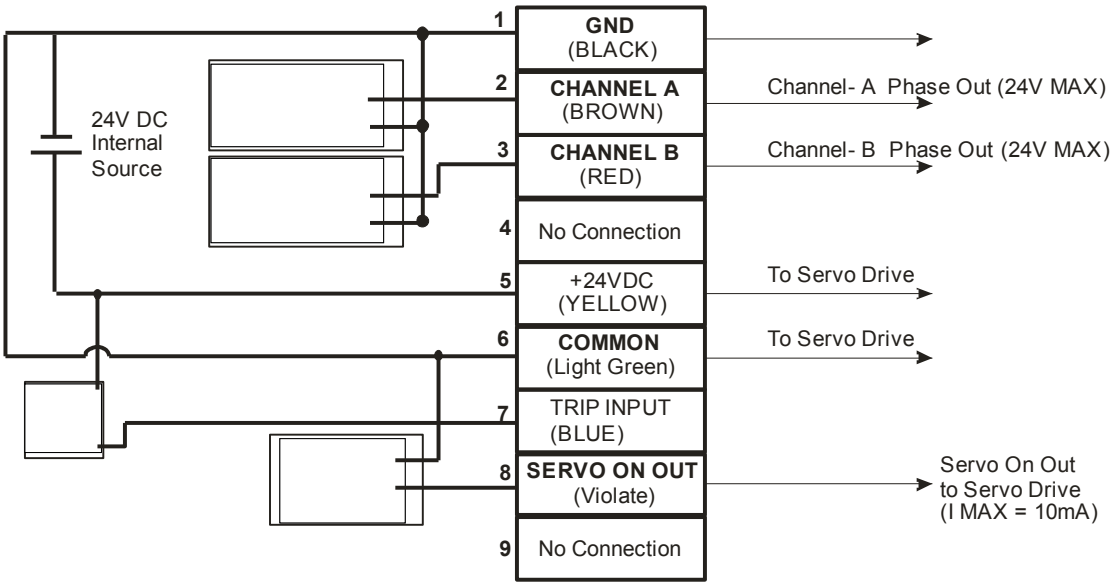
(1) Draw length is equal to set length.
(2) Mark sensor is of **NPN-NO** type.
(3) Output of mark sensor should go low at the instant of sensing spot.
(4) Set length should be 5 to 6 mm higher than the actual job length.
(5) Set mark window to 10 to 15 mm. it can be reduced slowly after satisfactory operation of machine.
(6) ***MARK*** sensor must be set such that when *MARK* appears in front of sensor the *'MARK* led in terminal strip should remain on.

- Value of parameter **R** (In 3rd Status menu) shows the running time of servo motor in milliseconds for set length. Try to reduce this value by speed menu parameters (run speed, acceleration, deceleration, start speed, end speed)
- Start proxy must be set such that when sensed by object on shaft, the '2'' in i/o status menu is seen.

(J) Wiring Diagram



CNX 2 Connector Detail For 24V Signal Output



CNX 2 Connector Detail For 5V Signal Output