

***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.

For detailed inquiry and trouble shooting contact:

***STREAMLINE CONTROLS PVT.LTD.
401/402,"meghansh"complex, opp. Oxford tower,
Gurukul road, Memnagar, Ahmedabad-380 052.
Gujrat,India.***

Phone. – (079) 27411463(O)

E-mail –
customercare@Streamlinecontrols.com

Web - www.streamlinecontrols.com

CONTENTS

- (A) **SYSTEM SPECIFICATIONS**
- (B) ***BAGkon* UNIT CONSIST OF FOLLOWING ITEMS**
- (C) **FUNCTIONAL DISCRIPTION**
- (D) **FRONT KEY BOARD OPERATION**
- (E) **HOW TO PROGRAM**
- (F) **LIST OF INPUTS & OUTPUTS**
- (G) **ERROR MESSAGES**
- (H) **COMMISSIONING TIPS**
- (I) **WIRING DIAGRAM**

(A) SYSTEM SPECIFICATIONS :

Input

Power:

Voltage	--	0-24VAC \pm 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 100mA. Max. signal driver
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Environment

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

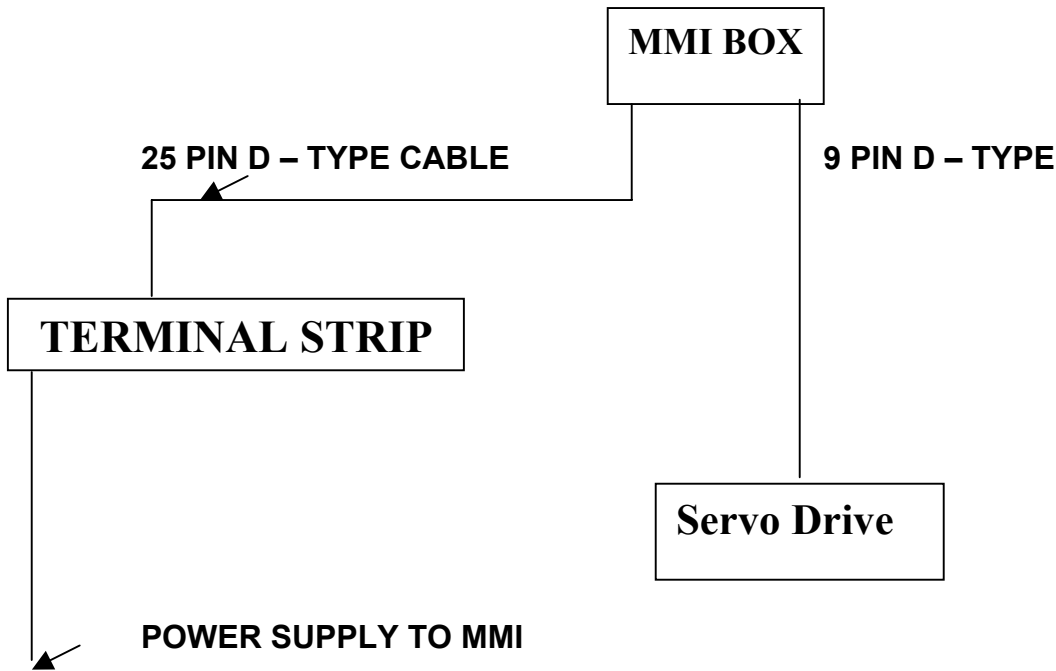
MECHANICAL DIMENSIONS

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

(B) BAGkon UNIT CONSIST OF FOLLOWING ITEMS

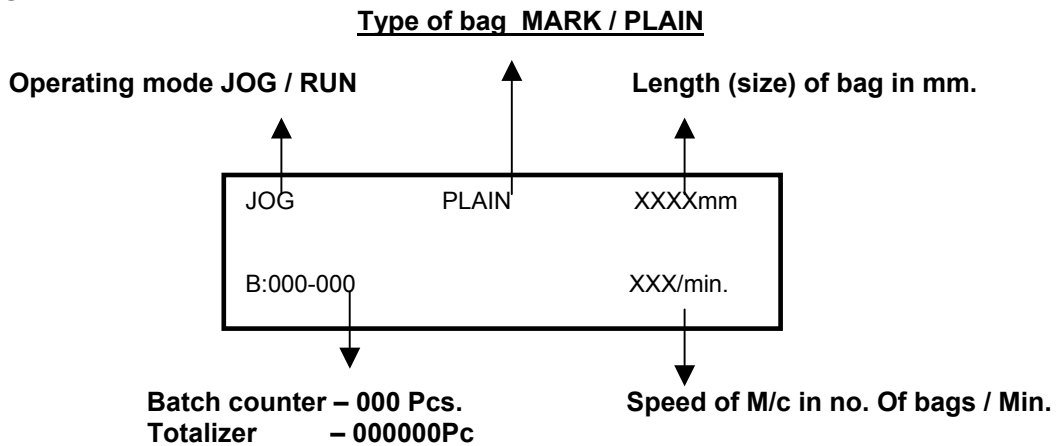
1. Display unit : This is MMI BOX with 16 x 2 LCD & 12 keys keypad on (MMI BOX) front of it.
2. Terminal Strip : This is the terminal strip to connect external solenoids & limit OR Proximity switches to *BAGkon*
3. Cable Set : There are 2 cables to interconnect Display unit, terminal strip & Servo Drive with each other.

BLOCK DIAGRAM



(C) FUNCTIONAL DESCRIPTION

DISPLAY:



-System operates in two modes

1. JOG MODE 2. RUN MODE

IN JOG MODE:

- At the time of power ON (system stays in JOG mode). In JOG mode Upper line in LCD shows 'JOG'.
- In this mode stepper 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 proxi-start input, 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 ENABLED, 'MARK' is displayed and if MARK SENSOR IS DISABLED, 'PLAIN' is displayed.) Stepper 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 stepper motor will stop at set length.
- After stopping of stepper motor 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 set in SET TIMER menu. If input configuration is set to '3' then system waits for start input goes off (proximity switch). For other than '3' & '5' system starts as per explained in programmers guide.

DISPLAY STATUS: IN NORMAL RUNNING MODE DISPLAY SHOWS 'Regular Status'.

1. **XXX** **YYYY** **ZZZZ**
 PPPP **QQQQ**

XXX SHOWS RUN OR JOG MODE

YYYY SHOWS MARK OR PLAIN

ZZZZ SHOWS SET LENGTH

PPPP SHOWS Batch Counter, Total Number of Batches, Totalizer

QQQQ SHOWS SHOTS/ MIN

2. On pressing *ENTER* key display shows 'I/O STATUS' menu in JOG mode or RUN mode.

I/O STATUS view page is useful to monitor input and output signals.

First line shows the status of INPUTS & second line shows the status of OUTPUTS

I
O

INPUT STATUS DESCRIPTION

Press ENTER key once at main view page

First line of LCD shows the status of INPUTS

Before inputs are enabled

I
O

After inputs are enabled

I 123456789ABCDEF
O123456789ABCDEF

1. **1** is displayed in first line of LCD as soon as received START INPUT.
2. **2** is displayed in first line of LCD as soon as received ENABLE INPUT.
3. **3** is displayed in first line of LCD as soon as received BATCH COUNTER RESET INPUT.

4. **4** is displayed in first line of LCD as soon as received STOP PUSH BUTTON INPUT.
5. **3** is displayed in first line of LCD as soon as received BREAK INPUT.
6. LENGTH STOP INPUT: when MARK function is disabled at that time stepper motor stop at its Set Length so stepper stops at Its Length and in `I/O STATUS` view page '**E**' input shows.
7. PHOTOCELL STOP INPUT: when MARK function is enabled at that time stepper motor stops at its photocell stop. This input is **F** in `I/O STATUS MENU`.

NOTE When stepper stops at PHOTOCELL STOP in I/O STATUS MENU inputs EF shows.

To activate any above inputs, an input in terminal is to be connected with GND.

OUTPUT STATUS DESCRIPTION

Press ENTER key at main view page.

Second line of LCD shows the status of OUTPUTS

Before outputs are deactivate.

I
O

After outputs are activate.

I 123456789ABCDEF
O123456789ABCDEF

1. **1** is displayed in second line of LCD as soon as HOLE PUNCH OUTPUT is activated.
2. **2** is displayed in second line of LCD as soon as SERVO ON OUTPUT is activated.
3. **4** is displayed in second line of LCD as soon as WARN OUTPUT is activated.
4. **5** is displayed in second line of LCD as soon as ERROR OUTPUT is activated.
5. **6** is displayed in second line of LCD as soon as COUNT OVER OUTPUT is activated.
6. **7** is displayed in second line of LCD as soon as START DELAY OUTPUT is activated.
7. **8** is displayed in second line of LCD as soon as PUNCH OUTPUT is activated.
8. **9** is displayed in second line of LCD as soon as PARALLEL OUTPUT is activated.
9. **A** is displayed in second line of LCD as soon as SLOW OUTPUT is activated.
10. **B** is displayed in second line of LCD as soon as STOP OUTPUT is activated.

To activate any above outputs, an output at terminal is to be measure with +24V UR.

OUTPUT TEST MODE

Press TEST key.

Before outputs are activated

TEST MODE

0

After outputs are activated

TESTMODE

0123456789ABC

1. On pressing 0 key HOLE PUNCH OUTPUT should be ON and display shows **1**.
2. On pressing 1 key SERVO ON OUTPUT should be ON and display shows **2**.
3. On pressing 3 key WARN OUTPUT should be ON and display shows **4**.
4. On pressing 4 key ERROR OUTPUT should be ON and display shows **5**.
5. On pressing 5 key COUNT OVER OUTPUT should be ON and display shows **6**.
6. On pressing 6 key START DELAY OUTPUT should be ON and display shows **7**.
7. On pressing 7 key PUNCH OUTPUT should be ON and display shows **8**.
8. On pressing 8 key PARALLEL OUTPUT should be ON and display shows **9**.
9. On pressing 9 key SLOW OUTPUT should be ON and display shows **A**.
10. On pressing NEXT key STOP OUTPUT should be ON and display shows **B**.

3. On pressing *ENTER* key again in I/O view page display shows '*SPEED STATUS*' view page.

R>AAAA ms A>BBBBHz

AAAA → shows stepper motor-run time in milli seconds.
BBBB → shows peak speed according to set length

4. On pressing *ENTER* key again in SPEED STATUS view page display shows '*Online Cycle Status*' view page.

JOG Mode..
Nw:XXX Mx:ZZZ/Mn

➤ First line of LCD shows which function is running right now.

XXX → Display set operating stroke of machine.
YYY → Display maximum available stroke of machine at set length

On pressing *ENTER* key again display shows Regular view page.

(D) **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 LENGTH : Push this key for enter in SET *LENGTH* menu.
6. SET SPEED : Push this key for enter in SET *SPEED* menu.
7. SET TIMER : Push this key for enter in SET *TIMER* menu.
8. PASSWORD : Push this key to open password entry menu.

3. NUMERICAL KEYS

9. 1 : PRG Mode: Push this key to set digit value 1
RUN Mode: Not in use.
10. 2 : PRG Mode: Push this key to set digit value 2
RUN Mode: Push this key for increments length.
11. 3 : PRG Mode: Push this key to set digit value 3
RUN Mode: Not in use.
12. 4 / TOTAL : PRG Mode: Push this key for set digit value 4
RUN Mode: Push this key for display totalizer counter.
Keep press this key for acknowledge Totalizer counter till to reset counter on display
13. 5 : PRG Mode: Push this key to set digit value 5
RUN Mode: Not in use.
14. 6 / BATCH : PRG Mode: Push this key for set digit value 6
RUN Mode: Push this key for display batch counter.
Keep press this key for acknowledge Total Batches Over message till to reset message on display
15. 7 : PRG Mode: Push this key to set digit value 7
RUN Mode: Not in use.
16. 8 : PRG Mode: Push this key to set digit value 8
RUN Mode: Push this key for decrements length.
17. 9 : PRG Mode: Push this key to set digit value 9
RUN Mode: Push this key for decrements length.
18. 0 : PRG Mode: Push this key to set digit value 0
RUN Mode: Push this key for decrements length.
19. NEXT/STATUS : PRG Mode: Push this key for Saves current parameter & switches to next parameter
RUN Mode: Switches menus (i) Regular menu (ii) Input / Output menu (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/ERRST : PRG Mode: Push this key for clearing input data zero
RUN Mode: Push this key for reset errors.

4. FUNCTIONAL KEYS

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

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11	Cutter Count (Not In Use)	Output for the cutter operates after no. of jobs equal to Cutter Count. On setting of Value 0 disables the counter & output.	0000-9999 Auto Reset on overflow.	Number	0001	User Level Supervisor Level
12	Missing Mark	When Mark Sensor is On, the system waits Missing Mark no of missing marks before generating Mark Sense Error. The counter resets on receipt of mark or on error generation.	00-99	Number	03	User Level Supervisor Level
13	Speed Err Count	When system is running on input configuration 1 to 4 at that time if system receives start input during run time the high-speed error generated. The error is reset by error-reset input.	00-99	Number	03	User Level Supervisor Level
14	Ratio PPR	PPR (Pulse Per Revolution) for the motor.	0000-9999	Pulses / Revolution	0400	Supervisor Level
15	Ratio MM	Total linear travel in ten revolutions of the motor.	0000-9999	mm	2000	Supervisor Level
16	Max M/C Strok/Min	Set maximum operating stroke of machine	0000-0150	Stroke/Min	0150	Supervisor Level
17	Cam Ratio %	Set cam ratio of machine in percentage	000-100	Percentage	060	Supervisor Level
18	Remot Start	If set to On, the RUN signal is activated through remote input (Enable Input). In that case RUN key is disable.	On / Off		Off	Supervisor Level
19	Default Loading	If set to On, Factory set values of all the parameters get loaded.	On / Off		Off	Supervisor Level
20	Auto Speed	If it is ON then servomotor's speed is set automatically according to set length.	On / Off		On	Supervisor Level
21	Auto Stroke	If it is ON then machine's stroke is set automatically according to set length.	On / Off		On	Supervisor Level
22	Backward Travel	Length to run in millimeters in backward direction.	0000-9999	mm	0000	Supervisor Level
23	Dly afrtr Bak-msec	Delay time between backward direction & forward direction	00.00	Second	00.00	Supervisor Level
24	Batch Reverse-mm	Length to run in millimeter in backward direction before run set length on completion of missing strokes.	0000-0050	mm	0000	Supervisor Level
25	Input Config	Decides different configuration for the start / error conditions of the system. Description of each configuration is given below.	0000-0005	Number	0003	Supervisor Level
26	Password Level 1	Set user level password	0000-9999	Number	0000	Supervisor Level
27	Password Level 2	Set supervisor level password	0000-9999	Number	9999	Supervisor Level
28	StopOn Tot Batch	If set to OFF system continues stays in RUN mode. Not come into JOG mode on completion of Total Batches Over.	On / Off	Function	Off	Supervisor Level

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29	StopOn Batch Ovr	If set to OFF system continues stays in RUN mode. Not stop for Batch over time on completion of Batch Count Over.	On / Off	Function	Off	Supervisor Level
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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 Programmable Parameter:

NO.	Message On LCD	Description	Parameter Description			Operating Password Level
			Range	Unit	Default	
1	Cycle Delay Sec	With Input configuration option 5, time between two consecutive Cycles.	00.00 to 10.00	Second	00.00	User Level Supervisor Level
2	Dpunch Time Sec	On completion of motor run, the output for the punch operates for DPunch Time.	00.00 to 10.00	Second	01.00	User Level Supervisor Level
3	Start Delay Sec	Before start of motor run, the output for the start delay operates for Start delay Time.	00.00 to 10.00	Second	00.00	Operator Level User Level Supervisor Level
4	BtchOvr Tim Sec	After completion of batch count, the CNOVR O/P operates for the Batch over Time	00.00 to 10.00	Second	01.00	User Level Supervisor Level

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BAGkon 12/3.0/ Manual

5	ErrOut Time Sec	The Alarm output turn on with the occurrence of error & it operates for the Error Time. Value 0 turns the error O/P permanently on until manual reset of the error	00.00 to 10.00	Second	01.00	User Level Supervisor Level
6	HolPunch Tim Sec	On completion of motor run, the output for the Hole punch operates for HolPunch Time.	00.00 to 10.00	Second	01.00	User Level Supervisor Level
7	DlyOn BatOvr Sec	After completion of batch count, start delay on batch over time parallel to next cycle. On completion of this delay CNT OVR O/P turns on for batch over time.	00.00 to 10.00	Second	00.00	User Level Supervisor Level

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 Programmable Parameter:

NO.	Message On LCD	Description	Parameter Description			Operating Password Level
			Range	Unit	Default	
1	M/C Speed	Set operating stroke of M/C for set length	0000-0150	Stroke/Min	0050	Operator Level User Level Supervisor Level
1	Run Speed (kHz)	Maximum speed of the motor.	00.00-12.99	Kilo Hertz	10.00	User Level Supervisor Level
2	Inch Speed (kHz)	Maximum speed of the motor during Inching.	00.00-05.00	Kilo Hertz	01.00	User Level Supervisor Level
3	Start Speed (kHz)	Starting speed of the motor.	00.00-05.00	Kilo Hertz	01.00	Supervisor Level
4	Accel. Time Sec	Time to accelerate the motor from the Start Speed to the Run Speed.	00.00-99.99	Second	00.20	Supervisor Level
5	End Speed (kHz)	End speed of the motor.	00.00-05.00	Kilo Hertz	01.00	Supervisor Level
6	Dccel. Time Sec	Time to decelerate the motor from the run speed to end Speed.	00.00-99.99	Second	00.20	Supervisor Level
7	Run Direction	Decides the direction of motor. On-Forward Off-Reverse	On / Off		Off	Supervisor Level
8	Photo Speed (kHz)	Speed of the motor during Mark Window.	00.00-05.00	Kilo Hertz	01.00	Supervisor Level

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 need not to change those speed & ratio parameter 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 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 be increased above your set run speed.

So, from the use of auto speed you can get desired speed at any job length with out changing of any parameter.

(F) LIST OF INPUTS & OUTPUTS

- OUTPUTS : All outputs are 24V DC type and capable of driving 100mA signal only.
1. PUNCH: This is the output which can be used to operate punch after servo motor completes its travel. The duration for which the output remains ON is adjustable by DPunch time in timer menu.
 2. WARN : This o/p turns on, giving warning that now batch counter will over after batch over count (set in length menu). This remains on till the batch count reaches. I.e. If batch count is set to 200 and batch over warn is set to 10 . Output will turn ON as soon as counter crosses 190 & remains ON till 200.
 3. ERROR: This o/p turns ON when any type of error either photocell error or high speed error occurs.
This o/p goes OFF after set delay error time if error time is set to zero then o/p remains ON till error resets. Error can be reseted by pressing AUTO / MAN key or power ON / OFF.
 4. CNOVR: This O/P turns on after completion the batch counter. This O/P is used to indicate the Batch over function is complete.
 5. HOLE PUNCH: This is the output, which can be used to operate HOLE PUNCH after stepper motor completes its travel. The duration for which the output remains ON is adjustable by HOLE PUNCH time in timer menu.

6. STOP OUT This output is use to stop A.C. drive. Normally stop output is on.
7. SLOW OUT This output is use to slow A.C. drive. Slow output goes on as soon as stop proxy input is received.
8. Start Delay This output turns on before the start of every cycle. The duration for which the output remains on is adjustable by start delay timer in timer menu.
9. On with Stepper Motor This output turns on with the start of cycle and **ON** till to completion of motor traveling. No timer is required for this selection

INPUTS :

1. PROXI-IN This is the start input. Servomotor starts running as soon as start Input is received. This is N-P-N NO type input. For this input 10 – 30 VDC N-P-N NO type switch can be used.
2. PH IN NPN This is the mark sensor input. Servomotor stops as per this input. For this NPN type photocell (Mark Sensor) can be used.
3. CRST IN This input is used to reset the batch counter.
4. INCHF On applying this input motor jogs in forward direction.
5. INCHR On applying this input motor jogs in reverse direction.
6. ENABLE IN On applying this input motor runs in auto mode. If remove this input at motor running time motor will stop after completion of length & O/P should be on to respect its Timer setting. Then system comes in to MANUAL mode.
7. BREAK IN This input is used to stop AC drive.
8. ST PB Stop push button input for AC drive.

To activate any above inputs, input terminal is to be connected with GND.

(G) 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.

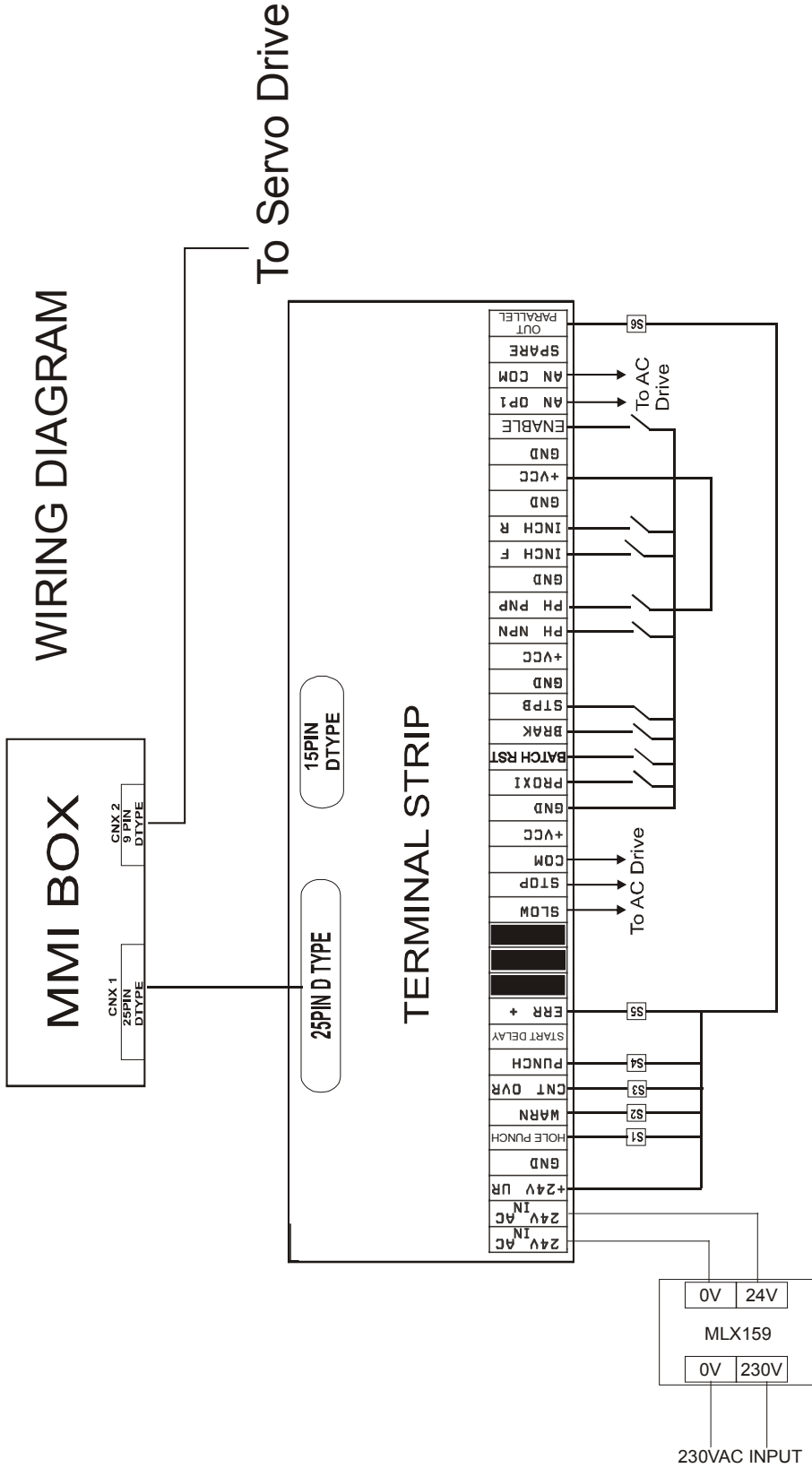
(H) COMMISSIONING TIPS

- 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

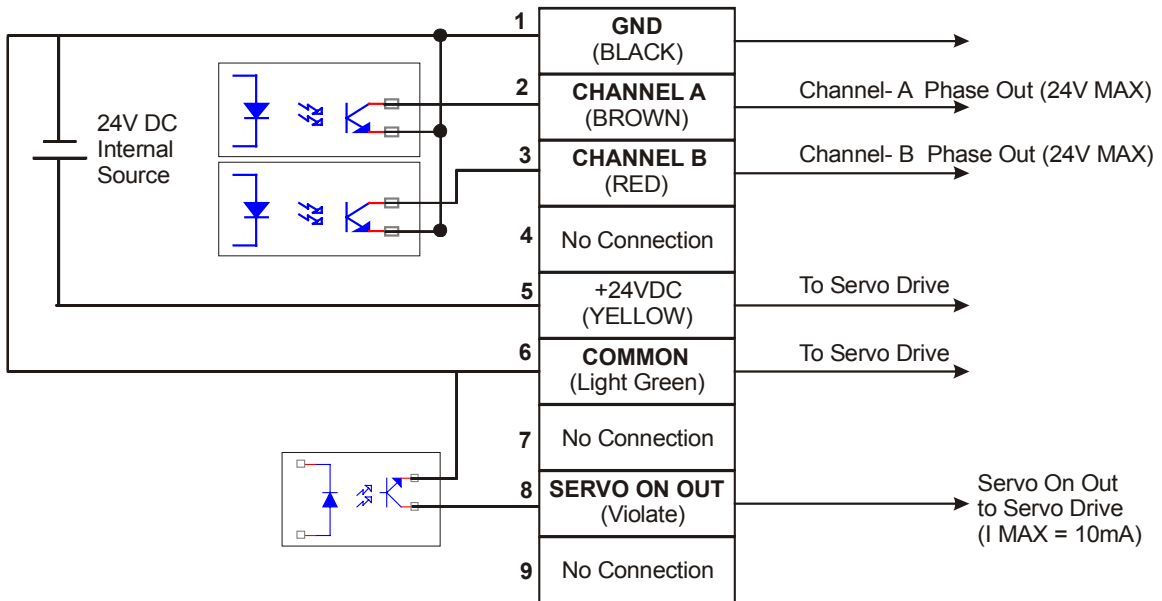
$$\text{No of output pulses} = \frac{\text{Set Length}}{\text{Ratio mm/10}} \times \text{PPR}$$

- At the time of commissioning set acceleration, deceleration, start speed, end speed properly for maximum length & then switch to 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.

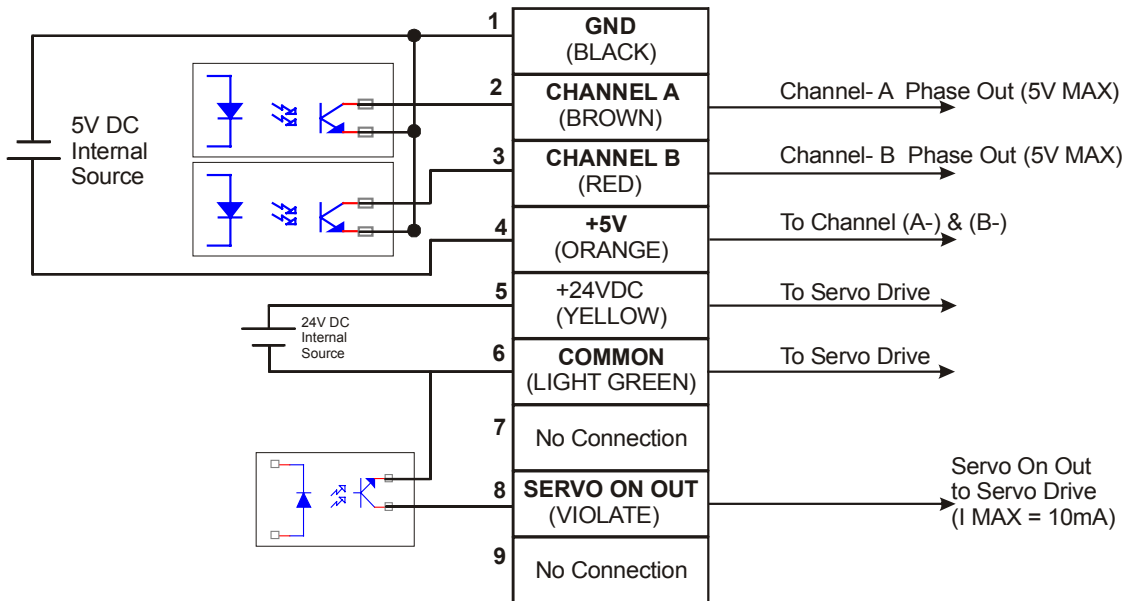
(I) Wiring Diagram



CNX 2 Connector Detail For 24V Signal Output



CNX 2 Connector Detail For 5V Signal Output



Color Code For CNX 2 (Servo Connector)
(9 pin connector with loose wires):

PIN NO	Description	COLOUR CODE
1	GND for Pulse output.	Black
2	CH A	Brown
3	CH B	Red
4	+5VDC	Orange
5	24VR	Yellow
6	Common	Light Green
7	No connection	Blue
8	Servo enable out to servo drive.	Violate
9	No Connection	Grey

OUR PRODUCT RANGE

- ***Dedicated Controller for Plastic Injection/Blow molding Machines***
- ***DC Servo Drives***
- ***PID Temperature Controllers - 6 CH/1CH***
- ***Profile Generator***
- ***Pre Programmable Logic Controllers - PPLCs***
- ***Digital Timers & Counters***
- ***Dedicated Controller for Plastic Bag /Pouch Making Machines***
- ***Dedicated Controller for Food / Pharma labeling Machines***
- ***Dedicated Controller for Grinding Machines***
- ***2/3/4 Axes Motion Controller (Using DC Servo / AC Servo Drives)***

AUTOMATION... PRODUCTIVITY THROUGH TECHNOLOGY.