



***OPERATING
MANUAL FOR
CONTROL SYSTEM
OF INJECTION
MOLDING MACHINE***

STREAMLINE

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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PREFACE

INJkon is multi functional controller incorporating micro controller, making it most versatile and cost effective solution optimally designed to best suit the automation needs of injection molding machines.

For better usage and maintenance of control system, detail study of this operating manual will be helpful.

We would be glad to assist your queries.

Specifications are subject to change without prior notice.



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(A) SPECIFICATIONS:

Input

Power:		
Voltage	--	230vac \pm 10%vac
Frequency	--	49-50 Hz
Consumption	--	30VA Max.

Control:		
Thermocouple	--	J / K type - Isolated
Proximity/	--	NPN (NO type)
Limit switches		10-30 Vdc - 50 mA Max.

Output

For Solenoids	--	For 230VAC 2 Amp. Max. - SSR Output
		OR
	--	For 24VDC - 2 Amp. Max. – MOSFET Driver Output

Environment

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

MECHANICAL DIMENSIONS (All are in MM)

Operating Box	--	Depth X Width X Height
		95 mm 133 mm 280 mm

(B) INTRODUCTION

INJkon is a complete proven & reliable control system for Injection Molding Machine. System consists of two units.

- (1) MMI unit
- (2) C.V.T. (Optional)/Transformer

(1) Operating Panel:

This is small lightweight Display unit with soft touch keypad & LCD display, digital input, digital output and temperature section.

This package has some obvious advantages over existing conventional Electrical Systems. This occupies lesser space than conventional system. The simplicity of wiring from solenoids to systems or limit switches to system and from Thermocouples to system makes it easier and less time consuming for commissioning. This system has no moving parts, so periodical maintenance is drastically reduced and there for reliability is definitely improved. Function like suck back ON-OFF, Heating ON-OFF and Cycle Time Interlock makes this system much more superior than the conventional system.

(C) FEATURES

- Inherently reliable high speed Micro controller based technology C8051F120 CPU.
- Offers up to 16 digital inputs, Up to 16digital outputs, 8-zone time Proportional controlled Temperature Controllers, timers, Extensive feather touch membrane keypad for user interface for manual/Semi auto/fully auto functions of the machine.
- Latest E2PROM Technology ensures security of programmed parameters.
- User friendly programming through an extensive membrane keypad for easy operator interface (Details of manual mode operations available is appended on separate sheet)
- Six digits shot counter to count Number of Pieces.
- Facility for counting cycle time helpful in production analysis.
- Three different programs for Ejector operations provide to suit the operational needs with various molds.
- Thermocouple "Open" & "Reverse" conditions are self detected and are displayed as "Opn" and "rev" respectively.
- Programmable High & Low limits for all temperature zones.
- Automatic cold junction compensation for Thermocouple inputs.
- Mold Safety interlock provided in case of abnormal pressure rise while the mold is getting closed (For that pressure switch input has to be provided.)
- Inbuilt interlocks for Low & High temperature, Front and/or Back guards, Maximum Cycle Time, Emergency stop.
- Built in 25 sets of mold memory.
- Operating Input/Output diagnosis.
- Central lubrication control with precisely On/Off timer.

(D) SCOPE OF SUPPLY

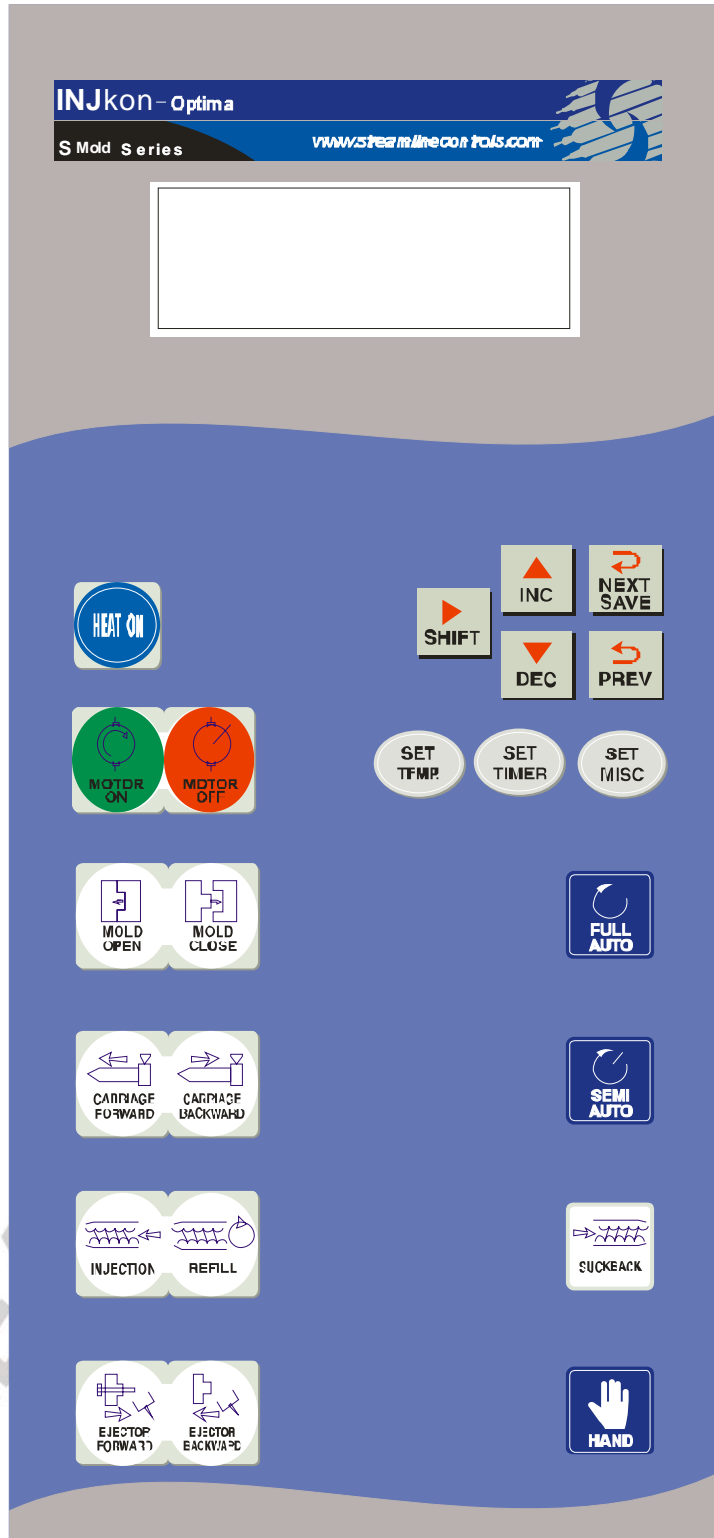
Streamline Controls To provide:
1 Hand Panel.
2. Operating Manual.

(E) PROGRAMMING OF THE SYSTEM

The system will be programmed to suit your application by us.

(F) OPERATING PANEL DESCRIPTION

Front Key Board Sticker








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KEY'S DESCRIPTION

1. CURSOR KEY





-  Push this key to move cursor from left to right direction for parameter setting in any me
With help of this key you should toggle your screen from shot counter to proportional or proportional to shot counter.
-  To increase parameter value in any menu
Also use for function on/Off
Rolls up temperature channel display in temperature channel freeze status.
-  To decrease parameter value in any menu.
Also use for function on/Off.
Push this key to show percentage output in normal temperature display.
-  For Data input confirmation & shift to next parameter.
Toggle the screen from normal display to Digital input or Digital output display.
-  For shift to previous parameter.
Alarm reset for all mode.
Freezes to scroll temperature channel display at current channel.



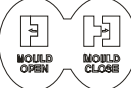
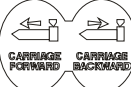
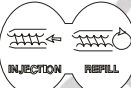


2. MENU SELECTOR

-  Set temperature key for set all zones set point.
-  Set timer key for set all function's timer.
-  Set misc key to do set On/ Off for selectable function.

3. OPERATING MODE SELECTOR

-  Push this key to start or stop the heating.
-  Machine operating at fully automatic production mode.
Restarted by cycle delay timer.
-  Operate machine in semi-auto recycling and
re-started by front safety door open and close again.
-  Operating machine by manual key.

4. Manual Operation Key

-  **Mould Open Key**
Push for activate of mold opening action manually.
Mould Close Key
Push for activate of mold clamping action manually.
-  **Carriage Forward Key**
Push for activate of Carriage Forward action manually.
Carriage Backward Key
Push for activate of Carriage Backward action manually.
-  **Injection Key**
Push for activate of Injection action manually.
(Disable by any zone of barrel temperature is lower than alarm low setting)
Refill Key
Push for activate of Refill action manually.
(Disable by any zone of barrel temperature is lower than alarm low setting)
-  **Ejector Forward Key**
Push for activate of Ejector Forward action manually.
Ejector Backward Key
Push for activate of Ejector Backward action manually.
-  **Suck Back Key**
Push for activate of Suck Back action manually.
(Disable by any zone of barrel temperature is lower than alarm low setting)



(G) MANUAL MODE OF OPERATIONS

- | | |
|---------------------|----------------------|
| 1. Mold Close | 7. Mold Open |
| 2. Carriage forward | 8. Carriage backward |
| 3. Injection | 9. Refill |
| 4. Ejector forward | 10. Ejector backward |
| 5. Suck Back | 11. Motor on |
| 6. Motor off | |

(G) PRECAUTIONS

To prevent damage from human and machine, please obey the following safety caution.

- Equipment must be operating under correct power. (Install a voltage stabilizer while need)
- Earth terminal must be connected to qualified terminal.
- All electrical elements with EARTH terminal, it is necessary for users to connect with the EARTH terminal.
- The high power cables should be separated from the low power cables to avoid interferes.
- To prevent fire or hazard shock, do not expose the unit to rain or moistly place.
- Please understand the operating process before use.
- When system shut down, wait 10seconds for re-start.
- Thermocouples used for this system must be isolated (ungrounded) Fe/k,J, type.
- The wiring of each zone starting from thermocouple of heater must be verified.
For ex: first zone thermocouple must be connected to first channel of the system and heater of first zone must be connected to heater 1of the system.
- The limit switch and solenoids wiring must be done as per given wiring diagram.
- If the proximity switches are used then use only NPN-NO type proximity switches.

(I) SETTING PROCEDURES

(1) TEMPERATURE CONTROLLERS:

Here two different levels of programming is provided

1. **Operator Level.**
2. **Engineers Level.**

In case of operator level only set value of temperature can be changed where as in case of other level all other parameters can be changed.

Set Temperature							
In case of operator level							
Press SET TEMP. key.							
First line of LCD shows TEMPERATURE C							
Second line of LCD shows zone number & set temperature.							
Select require zone using NEXT/ PREV key.							
Set require temperature using INC, DEC and SHIFT key.							
On pressing NEXT key the set value will be saved and display will show the next function.							
List of temperature parameters are given below.							
Zone No.	Message In First Line	First	Message In Second Line	Description	Range	Default Value	Level
1	Temperature C		Zone 1	Zone 1 set temperature	0-500 C	200 C	User
2	Temperature C		Zone 2	Zone 2 set temperature	0-500 C	200 C	User
3	Temperature C		Zone 3	Zone 3 set temperature	0-500 C	200 C	User
4	Temperature C		Zone 4	Zone 4 set temperature	0-500 C	200 C	User
5	Temperature C		Zone 5	Zone 5 set temperature	0-500 C	200 C	User
6	Temperature C		Zone 6	Zone 6 set temperature	0-500 C	200 C	User
7	Temperature C		Zone 7	Zone 7 set temperature	0-500 C	200 C	User
8	Temperature C		Zone 8	Zone 8 set temperature	0-500 C	200 C	User

Set Temperature						
In case of Engineer level						
Press SET TEMP key and keep it pressed for at least ten seconds.						
First line of LCD shows parameter name.						
Second line of LCD shows zone number & parameter value.						
Select require parameter using NEXT/ PREV key.						
Set require value using INC, DEC and SHIFT key.						
On pressing NEXT key the set value will be saved and display will show the next function.						
On pressing set temp key the zone number can be changed. Again pressing the NEXT key the different parameter of the same zone can be checked.						
List of temperature parameters are given below.						

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ZoneNo.	Message In First Line	Message In Second Line	Description	Range	Default Value	Level
1	Temperature C	Zone 1	Set temperature	0-500 C	200 C	Engineer
	Prop. Band C	Zone 1	Proportional band	0-100 C	030 C	Engineer
	Integr. Time Sec	Zone 1	Integral time	0-999 Sec	900 Sec	Engineer
	Derivt. Time Sec	Zone 1	Derivative time	0-999 Sec	000 Sec	Engineer
	Cycle Time Sec	Zone 1	Cycle time	0-200 Sec	15 Sec	Engineer
	Alarm Low C	Zone 1	Alarm low	0-200 C	025 C	Engineer
	Alarm High C	Zone 1	Alarm High	0-999 C	025 C	Engineer
	Blower Point C	Zone 1	Blower Operating Point	0-999C	005 C	Engineer
2	Temperature C	Zone 2	Set temperature	0-500 C	200 C	Engineer
	Prop. Band C	Zone 2	Proportional band	0-100 C	030 C	Engineer
	Integr. Time Sec	Zone 2	Integral time	0-999 Sec	900 Sec	Engineer
	Derivt. Time Sec	Zone 2	Derivative time	0-999 Sec	000 Sec	Engineer
	Cycle Time Sec	Zone 2	Cycle time	0-200 Sec	15 Sec	Engineer
	Alarm Low C	Zone 2	Alarm low	0-200 C	025 C	Engineer
	Alarm High C	Zone 2	Alarm High	0-999 C	025 C	Engineer
	Blower Point C	Zone 2	Blower Operating Point	0-999C	005 C	Engineer
3	Temperature C	Zone 3	Set temperature	0-500 C	200 C	Engineer
	Prop. Band C	Zone 3	Proportional band	0-100 C	030 C	Engineer
	Integr. Time Sec	Zone 3	Integral time	0-999 Sec	900 Sec	Engineer
	Derivt. Time Sec	Zone 3	Derivative time	0-999 Sec	000 Sec	Engineer
	Cycle Time Sec	Zone 3	Cycle time	0-200 Sec	15 Sec	Engineer
	Alarm Low C	Zone 3	Alarm low	0-200 C	025 C	Engineer
	Alarm High C	Zone 3	Alarm High	0-999 C	025 C	Engineer
	Blower Point C	Zone 3	Blower Operating Point	0-999C	005C	Engineer
4	Temperature C	Zone 4	Set temperature	0-500 C	200 C	Engineer
	Prop. Band C	Zone 4	Proportional band	0-100 C	030 C	Engineer
	Integr. Time Sec	Zone 4	Integral time	0-999 Sec	900 Sec	Engineer
	Derivt. Time Sec	Zone 4	Derivative time	0-999 Sec	000 Sec	Engineer
	Cycle Time Sec	Zone 4	Cycle time	0-200 Sec	15 Sec	Engineer
	Alarm Low C	Zone 4	Alarm low	0-200 C	025 C	Engineer
	Alarm High C	Zone 4	Alarm High	0-999 C	025 C	Engineer
	Blower Point C	Zone 4	Blower Operating Point	0-999C	005 C	Engineer
5	Temperature C	Zone 5	Set temperature	0-500 C	200 C	Engineer
	Prop. Band C	Zone 5	Proportional band	0-100 C	030 C	Engineer
	Integr. Time Sec	Zone 5	Integral time	0-999 Sec	900 Sec	Engineer
	Derivt. Time Sec	Zone 5	Derivative time	0-999 Sec	000 Sec	Engineer
	Cycle Time Sec	Zone 5	Cycle time	0-200 Sec	15 Sec	Engineer
	Alarm Low C	Zone 5	Alarm low	0-200 C	025 C	Engineer
	Alarm High C	Zone 5	Alarm High	0-999 C	025 C	Engineer
	Blower Point C	Zone 5	Blower Operating Point	0-999C	005 C	Engineer
6	Temperature C	Zone 6	Set temperature	0-500 C	200 C	Engineer
	Prop. Band C	Zone 6	Proportional band	0-100 C	030 C	Engineer
	Integr. Time Sec	Zone 6	Integral time	0-999 Sec	900 Sec	Engineer
	Derivt. Time Sec	Zone 6	Derivative time	0-999 Sec	000 Sec	Engineer
	Cycle Time Sec	Zone 6	Cycle time	0-200 Sec	15 Sec	Engineer
	Alarm Low C	Zone 6	Alarm low	0-200 C	025 C	Engineer
	Alarm High C	Zone 6	Alarm High	0-999 C	025 C	Engineer
	Blower Point C	Zone 6	Blower Operating Point	0-999C	005C	Engineer
7	Temperature C	Zone 7	Set temperature	0-500 C	200 C	Engineer
	Prop. Band C	Zone 7	Proportional band	0-100 C	030 C	Engineer
	Integr. Time Sec	Zone 7	Integral time	0-999 Sec	900 Sec	Engineer
	Derivt. Time Sec	Zone 7	Derivative time	0-999 Sec	000 Sec	Engineer
	Cycle Time Sec	Zone 7	Cycle time	0-200 Sec	15 Sec	Engineer
	Alarm Low C	Zone 7	Alarm low	0-200 C	025 C	Engineer
	Alarm High C	Zone 7	Alarm High	0-999 C	025 C	Engineer
	Blower Point C	Zone 7	Blower Operating Point	0-999C	005 C	Engineer
8	Temperature C	Zone 8	Set temperature	0-500 C	200 C	Engineer
	Prop. Band C	Zone 8	Proportional band	0-100 C	030 C	Engineer
	Integr. Time Sec	Zone 8	Integral time	0-999 Sec	900 Sec	Engineer
	Derivt. Time Sec	Zone 8	Derivative time	0-999 Sec	000 Sec	Engineer

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Cycle Time Sec	Zone 8	Cycle time	0-200 Sec	15 Sec	Engineer
Alarm Low C	Zone 8	Alarm low	0-200 C	025 C	Engineer
Alarm High C	Zone 8	Alarm High	0-999 C	025 C	Engineer
Blower Point C	Zone 8	Blower Operating Point	0-999C	005 C	Engineer

Set Miscellaneous

Press set **MISC** key.

Third line of LCD show function's name and it's value/status.

Select require function using **NEXT/ PREV** key.

Set require value/ status using **INC, DEC** and **SHIFT** key.

On pressing **NEXT** key the set value will be saved and display will show the next function.

List of miscellaneous parameters are given below.

No.	Message	Description	Range	Default Value	Level
1	Suckback	Suck Back On/Off	On / Off	On	Supervisor
2	Ejct Prog	Ejector Operating Program	0-2	0002	Supervisor
3	Ejct Shot	Ejector Shot	0-5	0001	User
4	% Heat Zn1	Set Temperature of % Heating Zone 1	0-100%	0050	User
5	% Zn1 CyTm	Cycle time of % Heating Zone 1	0-100Sec	0010	User
6	TestIn/Out	Test Mode On/Off	On / Off	Off	Supervisor
7	Count Rst	Reset the Shot Counter	On / Off	Off	User
8	Mold Memry	Mold Memory Selection	0-25	0000	Supervisor
9	Fast Appro	Fast Approach	On/Off	On	Supervisor

STANDARD EJECTOR PROGRAM :

1. Program 00: Ejector disable.
2. Program 01: Ejector Forward only after mold gets fully open.
3. Program 02: Ejector Forward/Hold/Backward
i.e. Full Shot after mold gets fully open.
No of shots is programmable.

Set Timer

Press set **TIMER** key.

Third line of LCD show function's name and it's set value.

Select require function using **NEXT/ PREV** key.

Set require time using **INC, DEC** and **SHIFT** key.

On pressing **NEXT** key the set value will be saved and display will show the next function.

List of timer parameters are given below.

No.	Message	Description	Range	Default Value	Level
1	Injct Dely	Injection delay	0-999.9 Sec	000.2	User
2	Inject 1	Injection 1 time	0-999.9 Sec	003.0	User
3	Inject Hld	Injection Hold time	0-999.9 Sec	000.1	User
4	Refil Dely	Refill delay	0-999.9 Sec	000.1	User
5	Sukbk2 Dly	Suck back 2 Delay	0-999.9 Sec	000.1	User
6	Sukbk Time	Suck back time	0-999.9 Sec	010.0	User
7	Cool Time	Cool time	0-999.9 Sec	004.0	User
8	Ejct Dely	Ejector delay	0-999.9 Sec	000.1	User
9	Ejct Forwd	Ejector Forward time	0-999.9 Sec	000.5	User
10	Ejct Hold	Ejector Hold time	0-999.9 Sec	000.0	user
11	Ejct Bakwd	Ejector Backward time	0-999.9 Sec	000.5	User
12	Cycle Dely	Cycle delay	0-999.9 Sec	001.0	User
13	Cycle Time	Cycle time	0-999.9 Sec	999.9	Supervisor
14	Tot Inj Tim	Total Injection time	0-999.9 Sec	010.0	User
15	EjBak@MCIs	Set Ejector Backward time before mold close function	0-999.9 Sec	000.2	User

(J) DESCRIPTION OF TEST MODES

1. INPUT TEST MODE:

- This mode is useful for testing of each input. (Limit switch Or proximity switch or push button)
 - This mode is enabled when **Test In/Out** is ON .(GO to SET MISC and then on the test in/out mode)
 - First two line of LCD display shows the input, which is being tested.
 - When Input is sensed LCD display shows its particular count on LCD.
- For Ex: When we apply first input on input card LCD display will show 0(Zero). i.e. every input has it's own count. Please refer list of inputs & outputs for more information. Every input is provided with particular count.
- Changes in the input status as per sensing of input indicates that the wiring and electronic path of that input is functioning correctly.
 - During this mode no other cycle function can operate.
 - To disable the test mode made off the **test In/Out** in **set misc menu**.

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(2) OUTPUT TEST MODE:

- This mode is useful for testing each output of the system.
- This mode is enabled when **Test In/Out** is ON (GO TO SET MISC menu and then ON the test in/out mode.) first line of LCD shows output being checked. When any output is activated, its particular count is shown on LCD. Please refer list of inputs & outputs for more information. Every output is provided with particular count.
- The output can be made **ON** or **OFF** using **SHIFT** key.
- The O/P under test can be changed using **INC/DEC** key.
- If the O/P goes **ON** and **OFF** as per the status show on the display, we can say that the wiring & electronic path of the system for that O/P is correct.
- During this mode all other functions are disabled.
- To disable the test mode made off the **test In/Out** in **set misc menu**.

(K) FUNCTIONAL DESCRIPTIONS

(1) MOLD SAFETY:

This feature is enabled when **Mold Safety** in **set misc. menu** is switched **ON**
At the time of mold closing if the delay between mold safety start switch & mold safety end switch is more then the set value of mould safety timer the cycle brakes here mold gets opened and machine comes into hand mode.

(2) Heat off function:

Heating off function can be enabled or disabled using **HEAT OFF**, key. When heating off is active **HOFF** indicate in second line of display. And all output of heater goes OFF. When heating is **ON PV** indicate in second line of display. And all heater outputs operate as per control action of temp. Controller.

(4) HAND:

System (after power on) starts in HAND MODE. In this mode all the functions (like mold open, mold close, unit forward etc) can be done using different function keys.
For ex. : Mold can be opened using mold open key. When any interlock appears during cycle the machine transferred in to hand mode.

(5) SEMI AUTO:

On pressing **SEMI AUTO** key cycle starts.
Cycle stops after completion of one cycle. Here cycle can be restarted by opening and closing of front guard.

(6) FULLY AUTO:

On pressing **AUTO** key the auto cycle starts.
Here after completion of one cycle, cycle delay timer starts after completion of **cycle delay** cycle restarts.

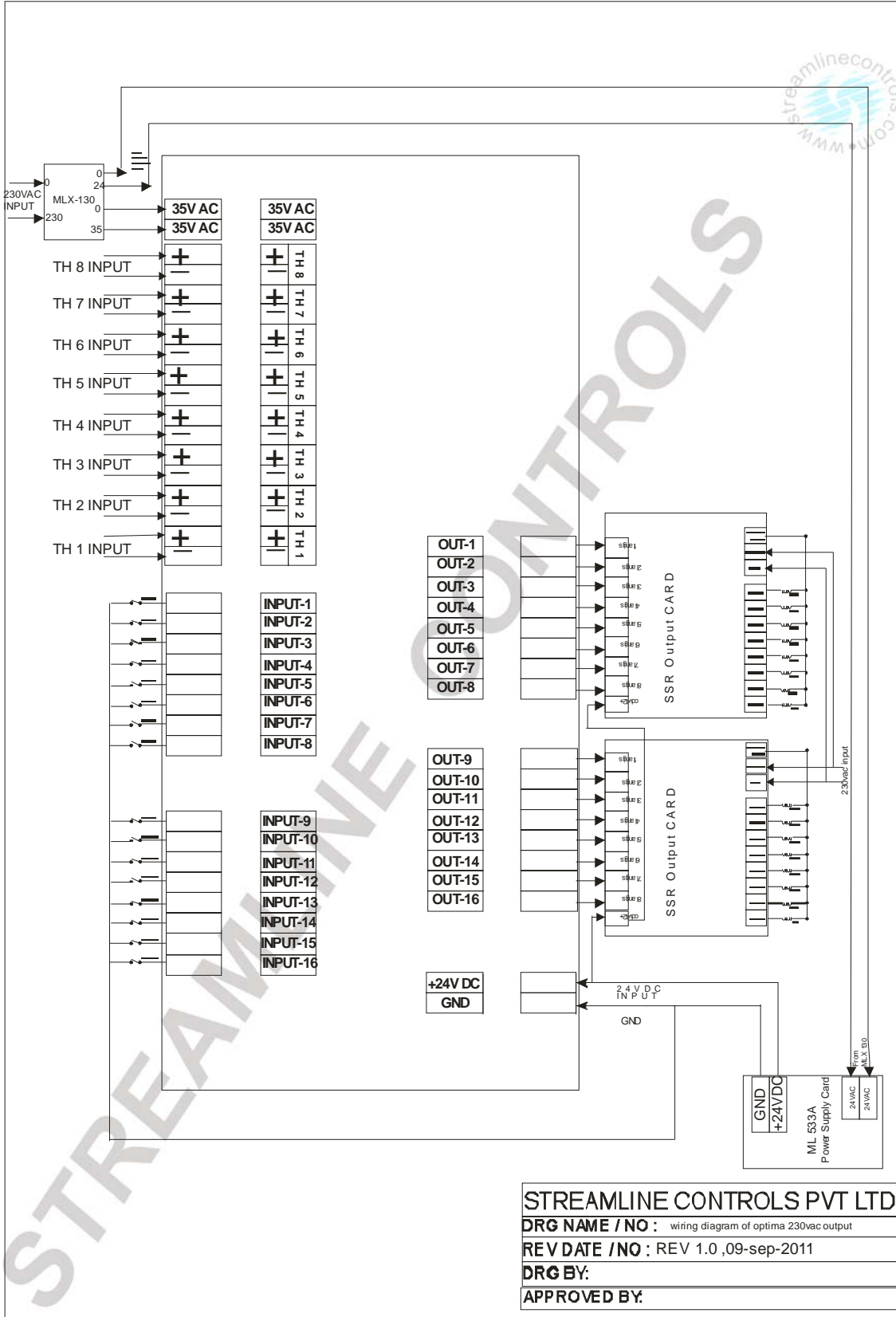
(L) INTERLOCKS

It is a one type of alarm system which activate when cycle or any other function does not operate properly because of those abnormal condition it indicate INTERLOCK
Following are the different interlock messages.

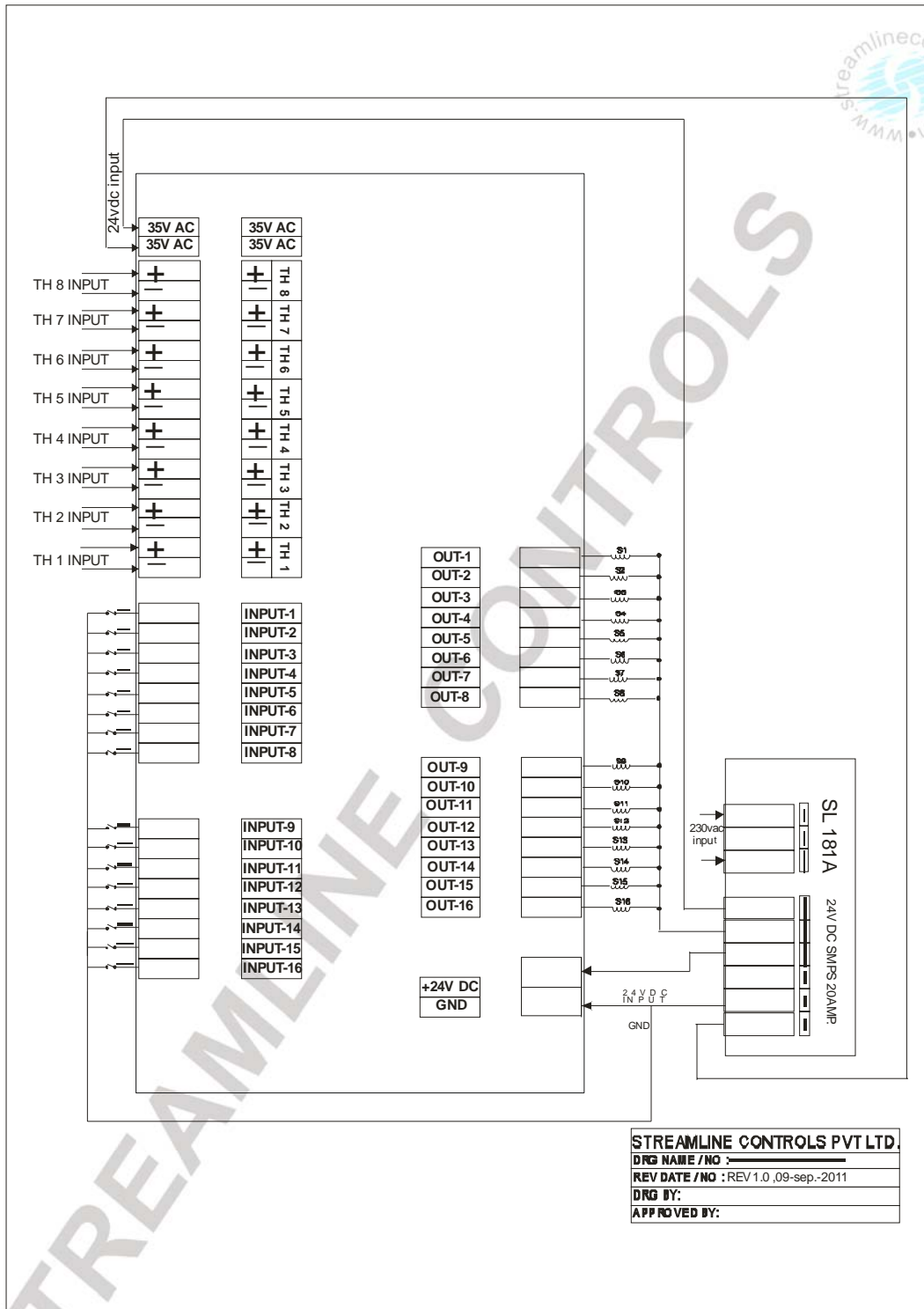
Sr.No.	Operation	Interlocks Messages On Screen	Description Of Messages	Type Of Mode		
				Hand	Semi Auto	Fully Auto
1	Mold Open	IL Mold Open End	Mold fully open end		y	y
		IL Mold Open/Clos On	Mold open close limits on	y	y	y
2	Mold Close	IL Mold Close End	Mold fully Close end		y	y
		IL Mold Safty Tm Ovr	Mold Safety time over	y	y	y
		IL Mold Open/Clos On	Mold open close limits on	y	y	y
3	Carriage Forward	IL Carriage For End	Carriage Forward End	y	y	y
4	Carriage Backward	IL Carriage Back End	Carriage Backward End	y	y	y
5	Injection	IL Temperature Low	Temperature is low	y	y	y
		IL Temperature High	Temperature is High	y	y	y
6	Refill	IL Refill End	Refill End	y	y	y
		IL Temperature Low	Temperature is low	y	y	y
		IL Temperature High	Temperature is High	y	y	y
		IL RPM too Low.	Screw RPM is low	y	y	y
7	Suck Back	IL Temperature Low	Temperature is low	y	y	y
		IL Temperature High	Temperature is High	y	y	y
		IL Suckback End	Suck back End	y	y	y
8	Ejector Forward	IL Eje Forward End	Ejector Forward end	y	y	y
9	Ejector Backward	IL Eje Backward End	Ejector Backward end	y	y	y
		IL Ejector Not Back	Ejector not back	y	y	y
10	Temperature	IL Temperature Low	Temperature is low	y	y	y
		IL Temperature High	Temperature is High	y	y	y
		IL Oil Temp. High	Oil temperature is high	y	y	y
11	Common	IL Front Guard Open	Front door open	y	y	y
		IL Back Guard Open	Rear door open	y	y	y
		IL Cycle Time Over	Cycle time over	y	y	y
		IL Emergency Press	Emergency press	y	y	y
		IL Motr not on Delta	Hydraulic motor not on Delta	y	y	y

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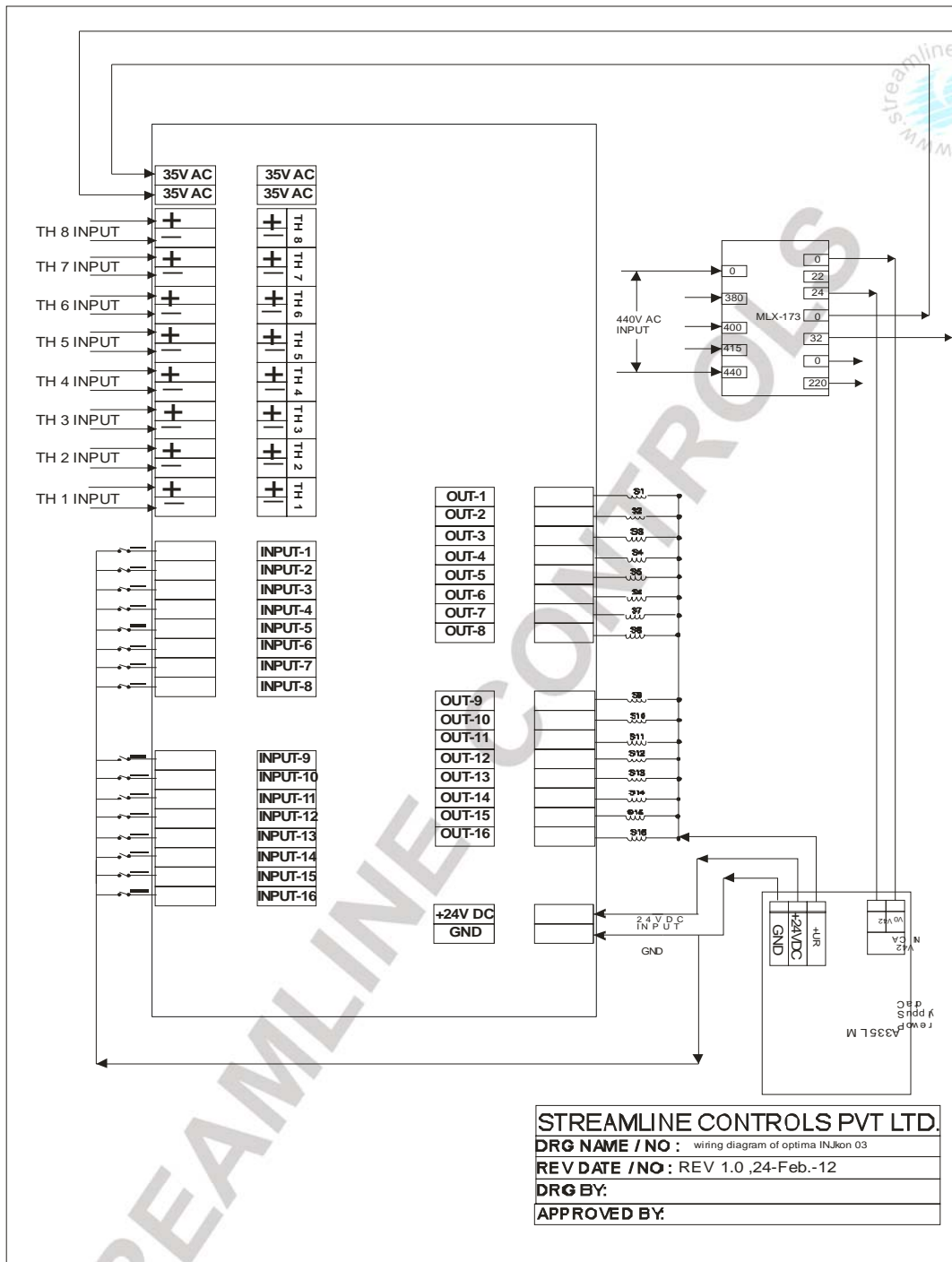
N) Wiring Diagram (IN case of 230vac out put)



IN case of 24vdc output



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DRG NAME / NO : wiring diagram of optima INJkon 03
REV DATE / NO : REV 1.0 ,24-Feb.-12
DRG BY:
APPROVED BY:



OUR PRODUCT RANGE

- Dedicated Controller for Plastic Injection/Blow molding Machines
- DC Stepper 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 Stepper / AC Servo Drives)

AUTOMATION... PRODUCTIVITY THROUGH TECHNOLOGY.