INSTRUCTION MANUAL FOR CONTROL SYSTEM OF INJECTION MOLDING MACHINE

FIRMWARE VERSION 4.12

NANO

Nano

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 troubleshooting contact:

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

Phone. – 919328808665 (Customer Care)

E-mail –customercare@Streamlinecontrols.com

Website:www.streamlinecontrols.com

PREFACE

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

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

We would be glad to assist your quarries.

Features & Specifications are subject to change without prior notice.

Safety Guidelines

Although utmost care is taken while designing the hardware and the software to ensure the safety during interlock conditions in various operations of the machine, SCPL does not undertake any responsibilities for any damage to the human and or the machine. It is therefore strongly recommended to ensure adherence to all the safety standards while designing and operating the machine.

SCPLstrongly recommends following safety measures to ensure the safety of the human & or machine.

- Whenever the human or human body part is expected to interrupt the moving machine part, cut off all the energy electrical, hydraulic and mechanical.

- The moving parts must be covered with guards.
  SCPL provides continuous monitoring of two guards during the mould close operation – front & back.
  The open guard condition, in addition to the PLC monitoring, must also be linked to disconnection of hydraulic and electrical connection to the mould close operation.

- For the machines designed deliberately with minimum or no safety, are made to operate without safety guards. Although SCPL strongly denies such operation, following recommendations are made to ensure best possible safety from the logic of PLC.
  - SCPL strongly denies use of N/C contact in cycle start input.
  - In Semi mode, N/C contact mal function can initiate a fresh cycle, i.e. mould closing, which in the machines without guards can be prone to fatal accidents.
  - SCPL recommends use of two cycle start push buttons with N/O contact, wired in series in the front guard input of the PLC. This will ensure that the operator presses both the push buttons continuously till full mold close, keeping his both hands busy and thereby avoiding his hands in mold close path, and probable fatal accident.
- Light curtain sensors are advised to use, which can be connected to PLC emergency or auto break input. This prevents mold close operation, as long as operator body part is within the light curtain range, logically.

- Hydraulic dump valve is also recommended in the series of mold close operation. Either open guard or separately provided foot switch in conjunction with dump valve, can prevent mold close operation, ensuring safety.

- Emergency push button must be located at one or multiple locations on & around the machine, in such a way that the operator can immediately reach it to stop machine operation, whenever the need arises. Again SCPL recommends electrical disconnection in addition to logical safety provided by the PLC.

- Only skilled and well trained person must be allowed to operate the machine & PLC, who is well aware of safety requirements and associated risk with the operation of the machine & PLC. For semi auto operation, It is never advisable to allow operator to operate the machine & PLC, continuously beyond average working hours, in odd hours like night shifts, adverse ambient light etc.

<u>સુરક્ષા માર્ગદર્શિકા</u>

ઇન્જેક્શન મોલ્ડિંગ મશીન ના ઘણા ઓપરેશન માં ઇન્ટરલોક પરિસ્થિતિવખતે સુરક્ષા માટે પી.એલ.સી ના હાર્ડવેર તથા સોફ્ટવેર બનાવવામાં ઘણી કાળજી રાખવા છતાં કોઈપણ મશીન પાર્ટ્સ અથવા / અને માણસ ને લગતા નુકશાન ના અમો સ્ટ્રીમ લાઈન કંટ્રોલ્સ પ્રાઇવેટ લિમિટેડ જવાબદાર નથી. તેના માટે અમો મશીનબનાવવા તથા ચલાવવા માટે ના સુરક્ષા નિયમો નો અમલ થાય તેની સખત ભલામણ કરીએ છીએ.
SCPL નીચેના સુરક્ષા નિયમો નો કડક અમલ થાય તેની સખત ભલામણ કરેછે.

૧.જયારે માણસ અથવા તો તેના શરીર નો કોઈ પણ ભાગ ચાલુ ઇન્જેકશન મશીન માં વચ્ચે આવવા જતો હોય ત્યારે બધા જ ઈલેક્ટ્રીકલ , મીકેનીકલ તથા હાઈડ્રોલીક ઉર્જા સ્ત્રોત બંધ થઇ જવા જોઈએ.

૨. મશીન ના હલન ચલન થતાં પુર્જા જેમ કે મોલ્ડ ક્લોઝ દરવાજા થી ઢાંકેલા હોવા જ જોઈએ.

SCPLની કોઈ પણ પી એલ સી આગળતથા પાછળ ના દરવાજાની સ્થિતિ ને મોલ્ડ ક્લોઝ ઓપરેશન દરમિયાન સતત ચકાસણી કરેછે.

દરવાજા ખુલ્લા હોવા ની સ્થિતિ માં મોલ્ડક્લોઝ દરમિયાન પી.એલ.સી ની ચકાસણી ઉપરાંત ઈલેક્ટ્રીકલ તથા હાઈડ્રોલીક ઉર્જા સ્ત્રોત બંધ થાય તે મુજબ ની વ્યવસ્થા અચૂક કરવી જોઈએ.

૩. જે મશીન (વર્ટીકલ ઇન્જેક્શન મોલ્ડિંગ મશીન) જાણી જોઈ ને જરાપણ અથવા નહીવત સુરક્ષા પ્રમાણે, એટલે કે આગળ/ પાછળ દરવાજા વગર બનાવેલ હોય તેની અમો SCPL હિમાયત કરતા નથી, તેમ છતાં તેવામશીન માટે અમોનીચે દર્શાવેલ સુરક્ષા વિષયક કડક સૂચનો નો અમલ કરવા ની ભલામણ કરીએ છીએ.

- SCPLસાઇકલસ્ટાર્ટઈનપુટતરીકેઇલેક્ટ્રિકલN/Cકોન્ટેક્ટકદીનહિવાપરવાનીસલાહઆપેછે.
- સેમી ઓટો મોડ માં, N/C કોન્ટેક્ટ ના ખામીયુકત કાર્ય થી ફરીથી નવી સાઇકલ શરુ થઇ જવાની સંભાવના રહેલી છે. જેમકે મોલ્ડ ક્લોઝ થવો ., કે જે દરવાજા વગર ના મશીન માં મોટો જીવલેણ અકસ્માત કરાવી શકે છે.
- SCPL બે સાઇકલ સ્ટાર્ટ પુશ બટન કે જેમાં N/O કોન્ટેક્ટ વાપરેલ હોય તથા તે બંનેસીરીઝમાં આગળ ના દરવાજા ના પી.એલ.સી ઈનપુટ માં લગાવેલ હોવા જોઈએ તેવું સુચન કરે છે , જેથી મશીન ઓપરેટર ને બંને સાઇકલ સ્ટાર્ટ પુશ બટન મોલ્ડ ક્લોઝ થાય નહિ ત્યાં સુધી દબાવી રાખવા પડશે જેથી જીવલેણ અકસ્માત થવા ની સંભાવના નિવારી શકાય છે.

૪. SCPLપ્રકાશ ના પડદા વાળા સેન્સર (Light Curtain) વાપરવા ની સલાહ આપે છે, જે પી.એલ.સી ના ઈમરજન્સી કોન્ટેક્ટ અથવા તો ઓટો સાઇકલ બ્રેક ઈનપુટ સાથે કનેકટ કરી શકાય છે. જે મશીન ઓપરેટર ના શરીર ના કોઈપણ અંગપ્રકાશ ના પડદા વાળા સેન્સર (Light Curtain) ના વિસ્તાર માં અવતાજ મોલ્ડ ક્લોઝ ઓપરેશન ને બંધ કરી દે છે.

૫. અમેહાઇડ્રોલિકડમ્પ વાલ્વ કે જે મોલ્ડ ક્લોઝ ના વાલ્વ ની સીરીઝ માં લગાવવા થી મળતી સુરક્ષા ની પણ ભલામણ કરીએ છીએ. ઓપન ગાર્ડ અથવા અલગ થી મુકેલ Foot સ્વીચ(પગ વડે દબાવવા ની સ્વીચ) ને ડમ્પ વાલ્વ સાથે લગાવવા થી સુરક્ષા ની જરૂરીયાત વખતે મોલ્ડ ક્લોઝ રોકી શકાય છે.

૬. ઈમરજન્સી પુશ બટન ને મશીન માં એક અથવા એક કરતા વધારે જગ્યા એ લગાવવા થી ઓપરેટર તેની અકસ્માત સમય ની સ્થિતિ માં જલ્દી થી તેને દબાવી ને મશીન રોકી શકે છે.ફરી વખત SCPL પી.એલ.સી દ્વારા મળતી સુરક્ષા ઉપરાંત ઈલેક્ટ્રીકલ જોડાણ કાપવા ની ભલામણ કરે છે.

૭. ફક્ત કુશળ તથા તાલીમબદ્ધ માણસો નેજમશીન તથા પી.એલ.સી ને ઓપરેટ કરવા દેવા કે જેઓ મશીન તથા પી.એલ.સી ના સંચાલન ને લગતા જોખમ તથા તેને લગતી સુરક્ષા જરૂરીયાત થી વાકેફ હોય.

સેમી ઓટો મોડની કામગીરી વખતે ઓપરેટરે ક્યારેપણ સરેરાશ કામ ના કલાકો ઉપરાંત રાતપાળી તથા ખરાબ પ્રકાશ ની સ્થિતિ માં સતત કામ કરવા નું સલાહ ભર્યું નથી.

CONTENTS

(A) SYSTEM SPECIFICATIONS

(B) INTRODUCTION

(C) FEATURES

(D) SCOPE OF SUPPLY

(E) PROGRAMMING OF THE SYSTEM

(F) OPERATING PANEL DESCRIPTION

(G) MANUAL MODE OF OPERATION

(H) PRECAUTIONS

(I) SETTING PROCEDURES FOR:

- **(1) TEMPERATURE CONTROLLER**
- **(2) TIMERS**
- **(3) MISC.FUNCTIONS**
- **(4) Pressure**

(J) DESCRIPTION OF TEST MODES:

- **(1) OUTPUT**
- **(2) TEMPERATURE**

(K) FUNCTIONAL DESCRIPTION OF:

- **(1) HEAT OFF FUNCTION**
- **(2) HAND**
- **(3) SEMI AUTO**
- **(4) FULLY AUTO**

(L) INTERLOCKS

(M) LIST OF I/P AND O/P

(A) SPECIFICATIONS:

Input

Power:

Voltage	--	24VDC ± 1%VDC

Control:

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

Output

For Solenoids	--	For 24VDC - 2 Amp. Max. – MOSFET Driver Output

Environment

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

(B) INTRODUCTION

INJkon is a complete proven & reliable control system for Injection Molding Machine.
System consists of two units.
(1) MMI unit
(2) SMPS

(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 then the conventional system.

(C) FEATURES

- Inherently reliable high speed Micro controller based technology C8051F120 CPU.
- Offers up to 4 digital inputs, 12 digital outputs, 4-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 etc.
- Operating Input/output diagnosis.

(D) SCOPE OF SUPPLY

Streamline Controls to provide:

1. Hand Panel.
2. Operating Manual.

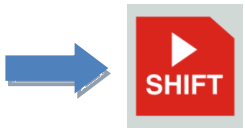
(E) PROGRAMMING OF THE SYSTEM

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

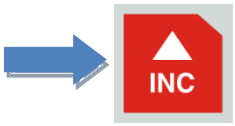
(F) OPERATING PANEL DESCRIPTION

Key's Description

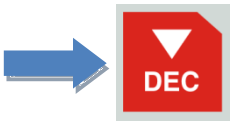
1. Cursor Key



Press this key to move cursor from left to right direction for parameter setting in any menu.
With help of this key you should toggle your screen from shot counter to proportional to RPM counter 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.

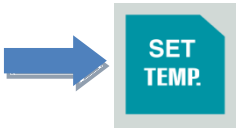


To decrease parameter value in any menu.
Also use for function on/Off.
Press this key to show percentage output in normal temperature display.

For Data input confirmation, save parameter & 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

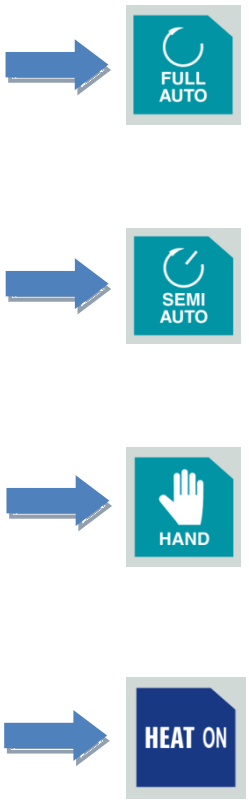


Set temperature key for set all zones set point.

Set timer key for set all function's timer.

Set misc key to do set on / off for selectable function.

3. Operating Mode Selector



Machine operating at fully automatic production mode.
Re-started 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.

Press this key to start or stop the heating.

4. Manual Operation Key

Mold Open Key
Press for activate of mold opening action manually.
Mold Close Key
Press for activate of mold clamping action manually.

Carriage Forward Key
Press for activate of Carriage Forward action manually.
Carriage Backward Key
Press for activate of Carriage Backward action manually.

Injection Key
Press for activate of Injection action manually.
(Disable by any zone of barrel temperature is lower than alarm low setting).
Refill Key
Press for activate of Refill action manually.
(Disable by any zone of barrel temperature is lower than alarm low setting).

Ejector Forward Key
Press for activate of Ejector Forward action manually.
Ejector Backward Key
Press for activate of Ejector Backward action manually.

Suck Back Key
Press for activate of Suck Back action manually.
(Disable by any zone of barrel temperature is lower than alarm low setting)
F1 Key
Spare Key.

F2 Key
Spare Key.
F3 Key
Spare Key.

(G) MANUAL MODE OF OPERATIONS

1. Mold Open	6.Mold Close
2. Carriage Forward	7.Carriage backward
3. Ejector Forward	8.Ejector Backward
4. Injection	9.Refill
5. Suck Back	10.Spare key

(H) 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 10 seconds 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.

1. Operator Level.

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	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

2. Engineers Level.

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 zone 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.

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
	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

Set Miscellaneous

Press set **MISC** key.
Third line of LCD show function's name and its value/status.
Select require zone 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	Mold Safty	Mold Safety Operation On/Off	On / Off	Off	Supervisor
2	MCls Bost	Mold Close Boost Option	0000-0003	0000	Supervisor
3	Lock Ton2	Locking Tonnage 2 On/Off	On / Off	Off	User
4	Auto Carrg	Auto Carriage On/Off	On / Off	Off	Supervisor
5	Carr W Inj	Carriage With Injection Function	On / Off	On	Supervisor
6	Flow Inj	Flow Injection Option On/Off	On / Off	Off	Supervisor
7	Inj. Boost	Injection Boost Option	0000-0002	0000	Supervisor
8	Refil Boost	Refill Boost On/Off	0000-0002	0000	Supervisor
9	RPM Intlk	RPM Interlock On/Off	On / Off	Off	Supervisor
10	LoRPM Scrw	Minimum RPM limit to operate screw	0-20	0000	Supervisor
11	PPR Screw	Screw pulse per revolution	0-4	0001	Supervisor
12	Suckback	Suck Back On/Off	On / Off	On	Supervisor
13	Decomp On	Decompression On/Off	On / Off	Off	Supervisor
14	Ejct Prog	Ejector Operating Program	0-2	0002	Supervisor
15	Ejct Shot	Ejector Shot	0-5	0001	User
16	EjBak I/L	Ejector backward interlock On/Off	On / Off	Off	Supervisor
17	Clamp Advnc	Clamp advance On/Off	On / Off	Off	Supervisor
18	% Heat Zn1	Set Temperature of % Heating Zone 1	0-100%	0000	User
19	% Zn1 CyTm	Cycle time of % Heating Zone 1	0-100Sec	0000	User
20	% Heat Zn2	Set Temperature of % Heating Zone 2	0-100%	0000	User
21	% Zn2 CyTm	Cycle time of % Heating Zone 2	0-100Sec	0000	User
22	Purge Mode	Purge Mode On/Off	On / Off	Off	Supervisor
23	TestIn/Out	Test Mode On/Off	On / Off	Off	Supervisor
24	Test Temp	Test Temperature Mode On/Off	On / Off	Off	Supervisor
25	Count Rst	Reset the Shot Counter	On / Off	Off	User
26	Maxm Pres	Maximum Pressure Setting	0-100bar	100 bar	Supervisor
27	Mold Memry	Mold Memory Selection	0-25	0000	Supervisor
28	Fast Appro	Fast Approach	On/Off	On	Supervisor
29	Ej.Plate	Ejector Plate back interlock On/Off	On/Off	Off	Supervisor
30	MopnIL WEj	Mold Open Interlock for Ejector Function	On/Off	On	Supervisor
31	Ejct Boost	Ejector Boost Option	0000-0003	0000	Supervisor
32	MOpn Boost	Mold Open Boost Option	0000-0002	0000	Supervisor
33	Zon 8: Oil	Temperature zone 8 select as oil temperature	On/Off	On	Supervisor
34	Oil Temp.	Set oil temperature	0000-0060	0060	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.

Core Position Set Misc:

Core IN Position:

1. Set 00: Before Mold Close
2. Set 01: In between Mold Close
3. Set 02:After Mold Close

Core OUT Position:

1. Set 00: Before Mold Open
2. Set 01: In between Mold Open
3. Set 02:After Mold Open

Set Timer

Set Timer

Press set **TIMER** key.
Third line of LCD show function's name and it's set value.
Select require zone 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	Mold Close	Mold slow close time	0-999.9 Sec	001.0	User
2	Mold Safty	Mold safety time	0-999.9 Sec	002.0	User
3	Carr.Forwd	Carriage Forward time	0-999.9 Sec	003.0	User
4	Pre-Inject	Pre Injection time	0-999.9 Sec	001.0	User
5	Flow Inj	Flow Injection time	0-999.9 Sec	001.0	User
6	Injct Dely	Injection delay	0-999.9 Sec	001.0	User
7	Inject 1	Injection 1 time	0-999.9 Sec	001.0	User
8	Inject 2	Injection 2 time	0-999.9 Sec	001.0	User
9	Inject 3	Injection 3 time	0-999.9 Sec	001.0	User
10	Inject 4	Injection 4 time	0-999.9 Sec	001.0	User
11	Inject Hld	Injection Hold time	0-999.9 Sec	001.0	User
12	Sukbk1 Dly	Suck back 1 Delay	0-999.9 Sec	001.0	User
13	Sukbk1 Tim	Suck back 1 Time	0-999.9 Sec	001.0	User
14	CarrBk Dly	Carriage backward delay	0-999.9 Sec	003.0	User
15	Intens Dly	Intensifier delay	0-999.9 Sec	001.0	User
16	Intens Tim	Intensifier time	0-999.9 Sec	001.0	User
17	Air Cavity	Air Cavity time	0-999.9 Sec	001.0	User
18	Refil Dely	Refill delay	0-999.9 Sec	001.0	User
19	Refil Time	Refill time	0-999.9 Sec	001.0	User
20	Sukbk2 Dly	Suck back 2 Delay	0-999.9 Sec	001.0	User
21	Sukbk Time	Suck back time	0-999.9 Sec	001.0	User
22	Cool Time	Cool time	0-999.9 Sec	005.0	User
23	Carr.Bakwd	Carriage backward time	0-999.9 Sec	001.0	User
24	Mold Open	Mold open slow time	0-999.9 Sec	001.0	User
25	Ejct Dely	Ejector delay	0-999.9 Sec	000.5	User
26	Ejct Forwd	Ejector Forward time	0-999.9 Sec	002.0	User
27	Ejct Hold	Ejector Hold time	0-999.9 Sec	000.5	user
28	Ejct Bakwd	Ejector Backward time	0-999.9 Sec	002.0	User
29	Air Punch	Air Punch time	0-999.9 Sec	001.0	User
30	Cycle Dely	Cycle delay	0-999.9 Sec	005.0	User
31	Cycle Time	Cycle time	0-999.9 Sec	999.9	Supervisor
32	Lub. On	Lubrication On time	0-999.9 Sec	001.0	User
33	Lub. Delay	Lubrication delay	0-999.9 Min	001.0	User
34	To Heat On	To Heat On delay	0-999.9 Sec	010.0	Supervisor
35	Prop On Dly	Delay between direction valve & prop. On time	0-999.9 Sec	000.1	Supervisor
36	Unscr Dely	Unscrew Delay Time	0-999.9 Sec	001.0	User
37	Unscr Time	Unscrew Time	0-999.9 Sec	001.0	User

38	Tot Inj Tim	Total Injection time	0-999.9 Sec	001.0	User
39	AirCav Dly	Air Cavity 1 delay	0-999.9 Sec	001.0	User
40	AirCav2 Dl	Air Cavity 2 delay	0-999.9 Sec	001.0	User
41	AirCav2 Tm	Air Cavity 2 time	0-999.9 Sec	001.0	User
42	InjBost Dl	Injection Boost delay time	0-999.9 Sec	001.0	User
43	InjBost Tm	Injection Boost On time	0-999.9 Sec	001.0	User

(J) DESCRIPTION OF TEST MODES.

1. 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**.

2. TEMPERATURE TEST MODE

This mode is useful for testing individual temp loop

This mode can be enabled by making **Test Temp.** in **set misc. menu ON.**

During this mode only one channel is displayed.

The zone under testing can be changed using **INC or DEC** key.

To disable the test TEMP. mode made off the **Test TEMP.** in **set misc menu**.

During this test mode all other functions are disabled.

Calibration Method For Temperature

Procedure	
Step 1	Press Set temp Key & Power ON the PLC
Step 2	Insert mili volt generator in zone 1 or link in zone 1(+ and -)of " Temperature card " and set 0 mV in it and verify the actual room temp. in " CH 0 ACT Temp " if not achieved Set " Offset by INC/DEC key & Press " Next" to Save.
Step 3	Set 10 mV thru mili volt generator Verify " CH 0 ACT Temp "
Step 4	If not achieved the said value (it should be 185*m.v + Room Temperature value) in " CH 0 ACT Temp " , set it in " Gain " Value [To toggle Gain / Offset by Set Temp. Key & Set Value by INC/DEC Key & Press Next to Save.
Step 5	Then Power OFF PLC & ON the PLC.

(K) FUNCTIONAL DESCRIPTIONS

(1) HEAT ON / OFF:

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.

(2) 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.

(3) 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.

(4) 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

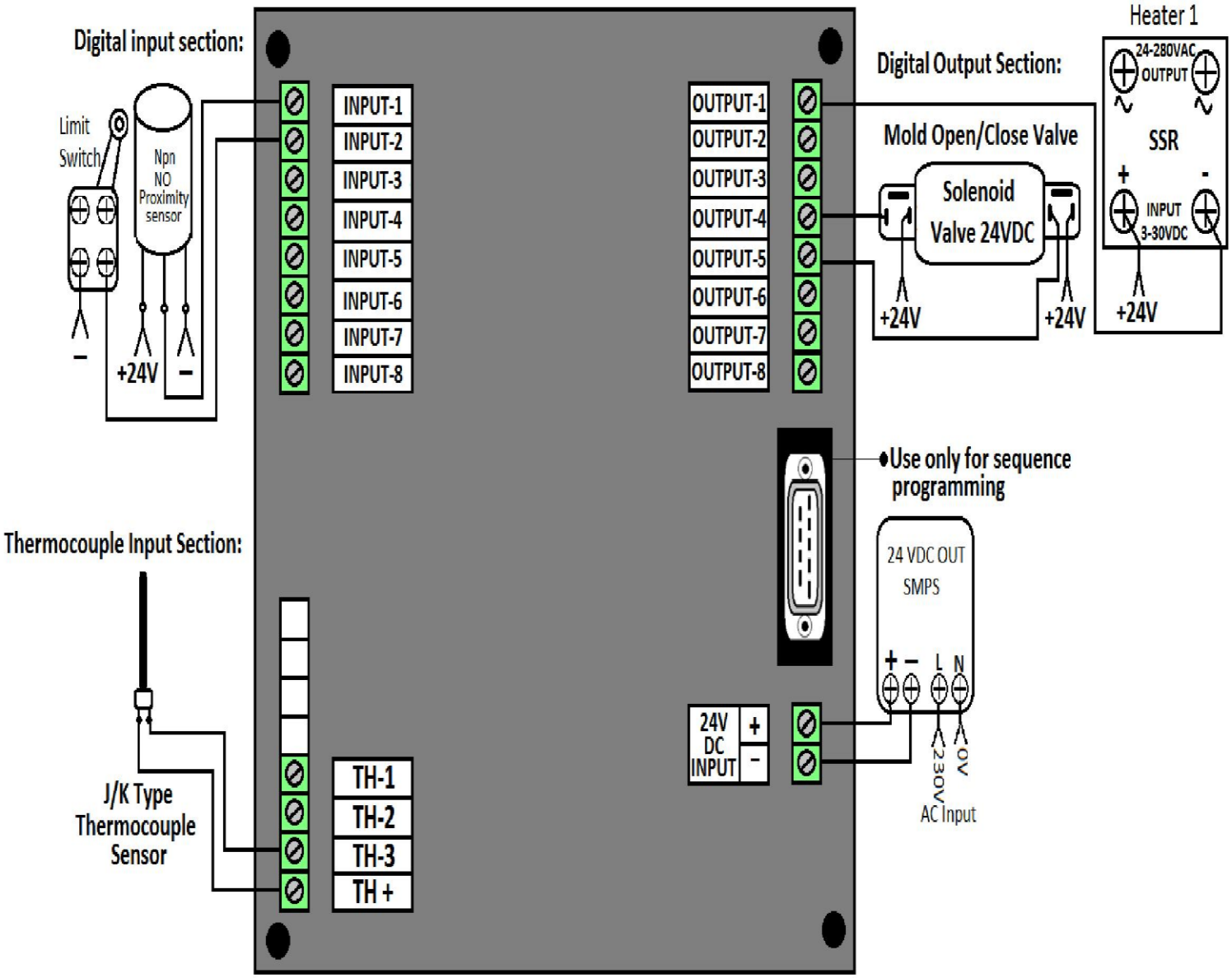
It is a one type of alarm system which activate when cycle or any other function does not operate properly because of those abnormal condition it indicate INTERLOCK

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	Unit Forward	IL Carriage For End	Carriage Forward End	y	y	y
4	Unit 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

Wiring Diagram

Wiring Diagaram: Below is an example of how to do wiring.
(View Digital output name, digital input name
and thermocouple input name according to programming sequence code.)



OUR PRODUCT RANGE

- Dedicated Controller for Plastic Injection molding Machines
- Dedicated Controller For Blow Molding Machine
- Dedicated Controller For Pet Stretch Molding Machine

- Dedicated Controller For Hopper Loader
- AC Servo Motor Drive
- DC Stepper Drive
- Dedicated Controller For Bag Making Machine
- Dedicated Controller For Sticker Labeling Machine
- Dedicated Controller For Grinding Machine
- Dedicated Controller For Dozing Application
- Dedicated Controller For Pad Printing Machine
- Dedicated Controller For Jet Dyeing Machine
- Application Specific Packages
- All Servo Pick & Place Robot For IMM
- Time/Temperature Based Profile Generator
- Multi Channel Temperature Controller
- 2/3/4 Axes Motion Controllers (Using DC stepper / AC Servo Drives).

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