

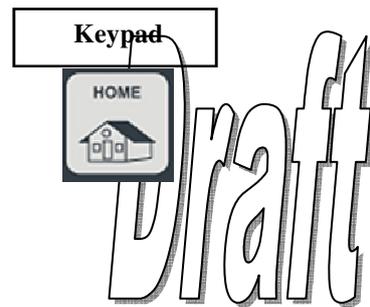
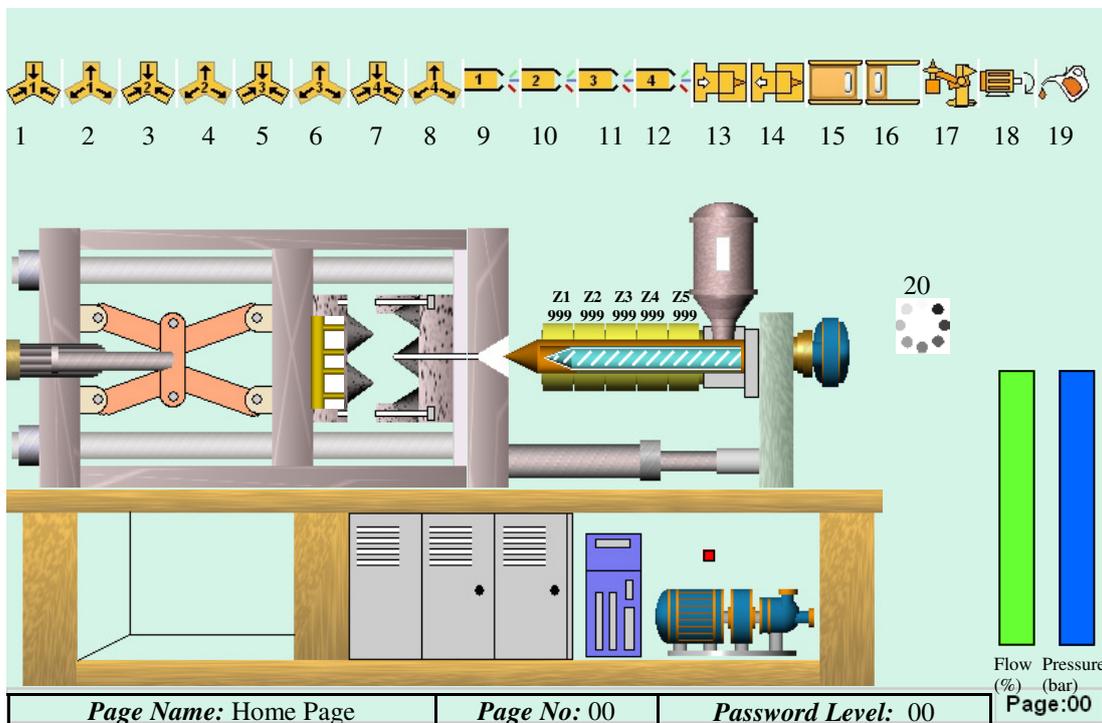



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 Imagine. Inspire. Automate.  
 Phone: +91-22-66935061  
 www.vignanelectronics.com

# Draft

- This is the startup-screen when the PLC is switched ON.
- It shows the status & checkups of various on-board devices.
- No values are settable/configurable on this screen.
- **Screen Related Messages:**
- **“SD Card Initialized Successfully”** message indicates that PLC has detected the SDCARD inserted & is ready for recording/ logging all history parameters.
- **“SD Card Faulty & Not Initialized”** message indicates that PLC has not detected the SDCARD inserted or not properly initialized or damaged and hence is not ready for recording/logging all history parameters.
- **“VIGNAN PLC Reprogrammed Successfully.”** Message indicates that PLC program has been updated successfully through an USB drive.
- **“Er:Battery LOW.Replace with New Battery”** message indicates that the BIOS battery voltage is below critical level. Call VIGNAN service centre & replace the battery at the earliest for proper operation of PLC.
- **“System Fail Detected...Call Service Engg”** message indicates that something abnormal has occurred on PLC. Call nearest VIGNAN service centre at the earliest for proper operation of PLC.

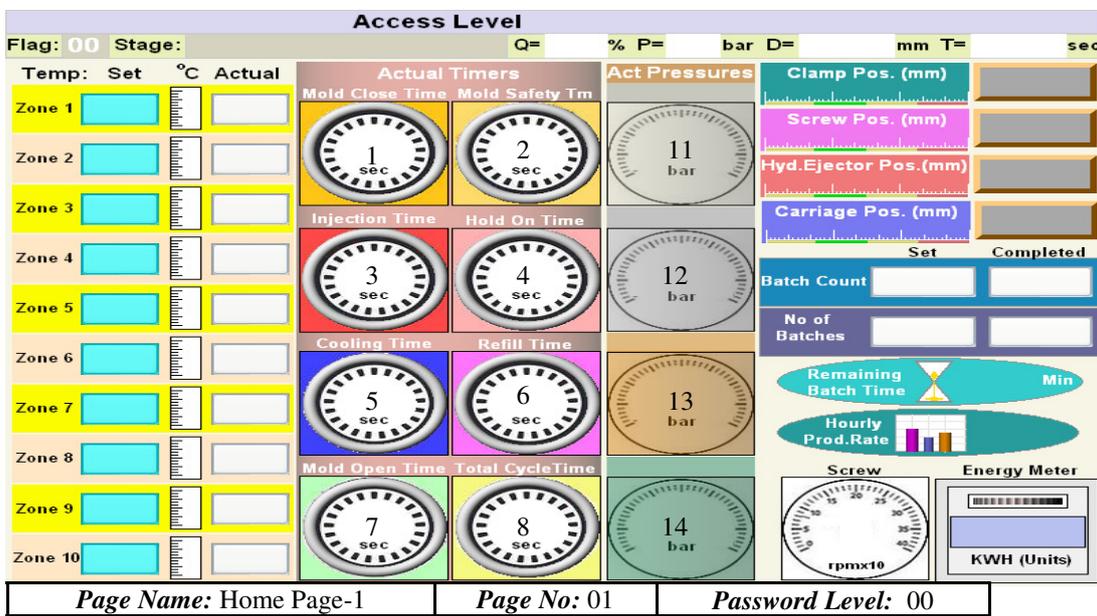
# Draft



- No values are settable/configurable on this screen.
- This is the main graphical screen showing real-time illustrations of the machine operations.
- The vertical bars graph at the right indicates the flow & pressure of the stage in progress.
- Graphic motions reflect the movement of Clamp, Ejector, Screw, Carriage, Injection, Refill & many more.
- Real-time temperatures of the first 5 Zones are indicated over the barrel.
- The motor running status is also indicated with a RED ■ LED- indicating in ON state.
- Other functions in progress during machine cycle are indicated on the top line. The functions are:

| Sr.No | Graphic indicating         |
|-------|----------------------------|
| 1     | Core-1 In                  |
| 2     | Core-1 Out                 |
| 3     | Core-2 In                  |
| 4     | Core-2 Out                 |
| 5     | Core-3 In                  |
| 6     | Core-3 Out                 |
| 7     | Core-4 In                  |
| 8     | Core-4 Out                 |
| 9     | Air Ejector-1 Blow         |
| 10    | Air Ejector-2 Blow         |
| 11    | Air Ejector-3 Blow         |
| 12    | Air Ejector-4 Blow         |
| 13    | Die Height-                |
| 14    | Die Height+                |
| 15    | Safety Gate close          |
| 16    | Safety Gate Open           |
| 17    | Robot in operation         |
| 18    | Unscrew motor in operation |
| 19    | Lubrication ON             |
| 20    | Refill in operation        |





Draft



- No values are settable/configurable on this screen.
- This is a graphical screen representing real-time;
  - ⇒ Zone Temperatures
  - ⇒ Machine stage timers
  - ⇒ Pressures
  - ⇒ Scale Positions
  - ⇒ Production Batch Data
  - ⇒ Screw Speed
  - ⇒ Energy consumption

- **Zone Temperatures:** All 10 Zone real-time temperatures are displayed along with its setpoint. The pointer on scale also indicated the present temperature relative to its limits.
- **Stage Timers:** All vital machine stage timers are shown in digital format at the centre of the page.

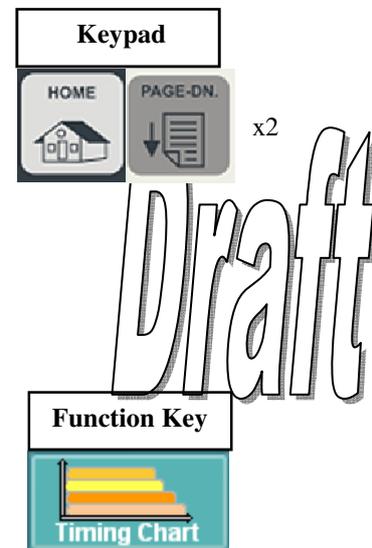
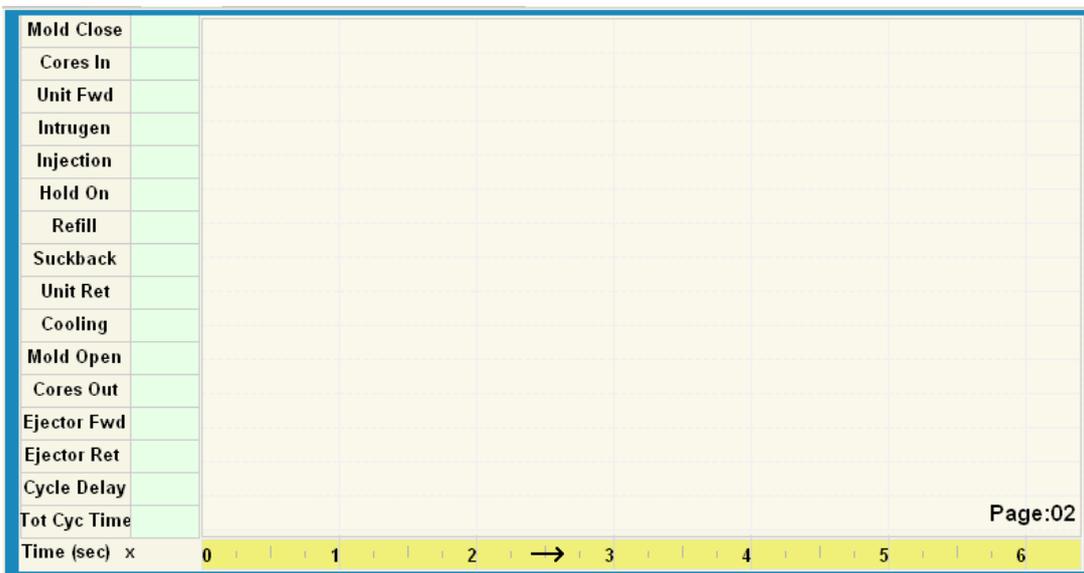
| Sr. No. | Timer       |
|---------|-------------|
| 1       | Mold Close  |
| 2       | Mold Safety |
| 3       | Injection   |
| 4       | HoldON      |
| 5       | Cooling     |
| 6       | Refill      |
| 7       | Mold Open   |
| 8       | Total Cycle |

- **Actual Pressures:** All real-time pressures sensed at the pressure ports are displayed in digital gauges format.

| Sr. No. | Pressure    |
|---------|-------------|
| 11      | System      |
| 12      | Locking     |
| 13      | Injection   |
| 14      | Accumulator |

- **Scale Positions:** All real-time scale positions sensed are displayed in digital scales format. The pointer on scale also indicates the present position relative to its limits.
- **Production Batch Data:** All vital production batch parameters are displayed along with its set-point.
- **Screw Speed:** The real-time screw speed sensed by the speed sensor is displayed at the bottom right.
- **Energy Consumption:** When an energy meter is connected to PLC, real-time consumed is displayed in energy box.

Draft



- No values are settable/configurable on this screen.
- This is a graphical screen showing time bar graphs of different operation during a machine cycle.
- The horizontal bar graph indicates the length of the time in seconds.
- To alter the time scales between 1 second/10 second/100 seconds press <INC> or <DEC> buttons
- Numerical values of operation timing for each stage are also represented along with the total cycle time.

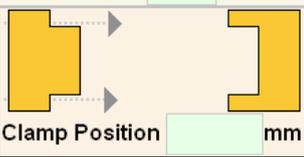
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**MOLD CLOSE DATA - 1**

|                | Slow 1 | Fast | Slow 2 | Safety | Locking |
|----------------|--------|------|--------|--------|---------|
| Flow (%)       |        |      |        |        |         |
| Pressure(bar)  |        |      |        |        |         |
| Position (mm)  |        |      |        |        |         |
| Speeds (mm/s)  |        |      |        |        | ---     |
| Act Stage Time |        |      |        |        |         |

Actual Force  tonnes



|  | Set     | Actual | Last |     |
|--|---------|--------|------|-----|
| Mold Close Time                        |         |        |      | sec |
| Mold Safety Time                       |         |        |      | sec |
| Clamp Position <input type="text"/> mm | Locking | Time   |      |     |

Page Name: Mold Close-1    Page No: 03    Password Level: 01    Page:03

Keypad



Draft

Function Key



- All Mold Close settings are settable/configurable on this screen.
- On this screen flow, pressure, position & times profiles are configurable for each stage of mold close operation for hand & auto modes.
- The type of Clamp Sensor=Linear Potentiometer. Locking can be confirmed by either Pressure Transducer/Limit Switch/Timers, selectable from **Page:58**.
- **Mold Close Time**= Total time limit for the entire mold closing operation. It is equal to Mold Closing+Safety+Locking.
- **Mold Safety Time**= Time limit for the mold safety operation to complete.
- **Locking Time**= Time limit for mold locking operation to complete.
- **Interlock:** Position of Slow1>Fast>Slow2>Safety>Locking
- The maximum value of clamp scale position can be adjusted from **Page:55**.
- The maximum values for flow & pressure can be settable from **Page:33**.
- The maximum Close times value can be ceiled on **Page:54**.
- Actual Real-time Speeds for all stages of Mold closing operation are indicated in terms of mm/s.
- Actual times of Mold Close, Safety & Locking are indicated. Last cycle times of Mold Close, Safety & Locking are also indicated.
- Actual Locking force of toggle is displayed. Displays the actual tonnage of the locking toggle. A Pressure transducer needs to be connected to the locking pressure port to display this value. Calibrate the Pressure transducer on **Page:44**. with the main pressure gauge on the machine. Adjust the 'Clamp Pressure to Tonnes C.F' on **Page: 04** accordingly to display the actual tonnage.
- Actual Real-time Clamp Position is also indicated.

| # | RELATED ERRORS   |
|---|--|
| 1 | <p><b>MOULD CLOSE TIME OVER, MOULD OPENING</b></p> <p>Mould close time entered might be too small to complete the mold closing stage<br/>                     Increase the mould close time on Pg 03.<br/>                     Check the flow/pressure in all stages of the mould closing. It may be not sufficient to close the mould. Change the settings</p>  |
| 2 | <p><b>MOULD SAFETY TIME OVER</b></p> <p>Check the mould safety time on Pg 03.<br/>                     If the safety time is too less to achieve the set position then increase the safety time.<br/>                     If the time is sufficient then increase slow-2 stage flow/pressure.<br/>                     Check the safety position reading/Limit switch(LSW03) (on 40 output card) .</p> |

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| MOLD CLOSE DATA - 2           |                             |   |   |
|-------------------------------|-----------------------------|---|---|
| Mold Locking Selection        | <input type="text"/>        | In Hand Mode                            | D.I. LS02 <input type="checkbox"/>          |
| Mold Closing Retries          | <input type="text"/>        |   |   |
| Mold Close Boost Sel          | <input type="text"/>        | Solenoid No.                            | <input type="text"/>                        |
| Mold Close Regeneration Sel   | <input type="text"/>        | Solenoid No.                            | <input type="text"/>                        |
| Pre Mold Lock Delay           | <input type="text"/> Sec    | Post Mold Lock Delay                    | <input type="text"/> Sec                    |
| Mold Locking Tonnage          | <input type="text"/> Tonnes | Mold Locking Time Out                   | <input type="text"/> Sec                    |
| Core & Hyd. Ejector Operation | <input type="text"/>        | When Safety Time Elapses                |   |
| Toggle Locking Hold Function  | <input type="text"/>        | Hold Solenoids                          | <input type="text"/> + <input type="text"/> |
| Clamp Press to Tonnes C.F.    | <input type="text"/>        |   |   |
|                               |                             | <b>Note</b>                             |   |
|                               |                             | Mold Clamping Force (Kgf) = 0.6 x A     |   |
|                               |                             | Where A = Molded Product Projected Area |   |
| Page Name: Mold Close-2       |                             | Page No: 04                             | Password Level: 01                          |
|                               |                             | Page:04                                 |   |



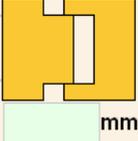
- All Mold Close special settings are settable/configurable on this screen.
- **Mold Locking Selection:** Enable/Disable- Mold Locking after safety stage when Mold Close is pressed in Hand mode.
- **Mold Closing Retries:** 0-9- Number of Closing retries when safety not reached during Mold Closing.
- **Mold Close Boost Selection:** Enable/Disable- for using a boost circuit output during mold close fast stage. Enter the digital output number for this purpose besides in the Solenoid No.
- **Mold Close Regeneration Selection:** Enable/Disable- for using a regeneration circuit output during mold close stages. Enter the digital output number for this purpose besides in the Solenoid No.
- **Pre Mold Lock Delay:** Delay in seconds before the actual mold locking starts.
- **Post Mold Lock Delay:** Delay in seconds after the actual mold locking finishes.
- **Mold Locking Tonnage:** Maximum Locking Tonnage to reach after which locking stage ends. A pressure transducer is needed for this function.
- **Mold Locking Time Out:** Timeout in seconds after which the mold locking operation aborts. Delay maximum value can be ceiled on Page:54.
- **Core & Hyd. Ejector Operation=** Enable/Disable- for operating the Core/Ejector if the Mold safety time is elapsed.
- **Toggle Locking Hold Function:** Enable/Disable- Certain machines require certain outputs to be ON to prevent Mold open during closed situation. When Enabled these outputs will be ON from Locking-Cooling stages of the cycle in Auto mode. Enter the digital outputs number for this purpose besides in the Hold Solenoid No.
- **Clamp Press to Tonnes C.F:** Multiplying factor based on the area of the locking clamp to compute the tonnage along with the pressure. A pressure transducer is needed for this function.
- On this screen flow, pressure are configurable for each stage of mold close operation in set mode.
- Actual Real-time status of mold close related digital inputs & outputs are indicated on the right side.

Draft

**MOLD OPEN DATA - 1**

|                | Slow 3 | Slow 2 | Fast | Slow 1 | Decomp |
|----------------|--------|--------|------|--------|--------|
| Flow (%)       |        |        |      |        |        |
| Pressure(bar)  |        |        |      |        |        |
| Position (mm)  |        |        |      |        | ---    |
| Speeds (mm/s)  |        |        |      |        | ---    |
| Act Stage Time |        |        |      |        |        |

|   |                        |        |     |
|---|------------------------|--------|-----|
|  | Set                    | Actual |     |
|   | Decompression Time     |        | Sec |
| Clamp Position  |                        |        | mm  |
|   | Slow 2 Stage Hold Time |        | Sec |

**Page Name:** Mold Open-1    **Page No:** 05    **Password Level:** 01    **Page:**05

Keypad



Draft

Function Key



- All Mold Open settings are settable/configurable on this screen.
- On this screen flow, pressure, position & times profiles are configurable for each stage of mold open operation for hand & auto modes.
- The type of Clamp Sensor=Linear Potentiometer. Full Mold Open can be confirmed by Limit Switch on Page:06
- **Decompression Time**= Time required by the locked clamp to decompress.
- **Slow2 Stage Hold Time**=Time the mold opening stops in Slow2 stage & let other operations like hydraulic ejector & core to operate if enabled.
- **Interlock:** Position of Slow1<Fast<Slow2<Slow3
- **Interlock:** Position of Slow3>Core x Position(Page:09) & Air Ejector/Unscrew motor Position(Page:14).
- The maximum value of clamp scale position can be adjusted from **PG:55**.
- The maximum values for flow & pressure can be settable from **PG:33**.
- Actual Real-time Speeds for all stages of Mold opening operation are indicated in terms of mm/s.
- Actual times of decompression & Slow2 Hold are indicated.
- Actual Real-time Clamp Position is also indicated.
- Actual Real-time status of mold open related digital inputs & outputs are indicated on the right side.

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| MOLD OPEN DATA - 2                         |                               |                   |                      |
|--|-------------------------------|-------------------|----------------------|
| Mold Open Confirm LSW Check                | <input type="checkbox"/>      | Digital Input No. | <input type="text"/> |
| Mold Open Boost Selection                  | <input type="checkbox"/>      | Solenoid No.      | <input type="text"/> |
| Mold Open Regeneration Selection           | <input type="checkbox"/>      | Solenoid No.      | <input type="text"/> |
| Mold Open Back (Counter) Pressure Sel      | <input type="checkbox"/>      | Solenoid No.      | <input type="text"/> |
| Auto Mold Open Adaptive Distance Selection | <input type="checkbox"/>      |                   |                      |
| Auto Mold Open Adaptive Distance Value     | <input type="text" value=""/> |                   | mm                   |

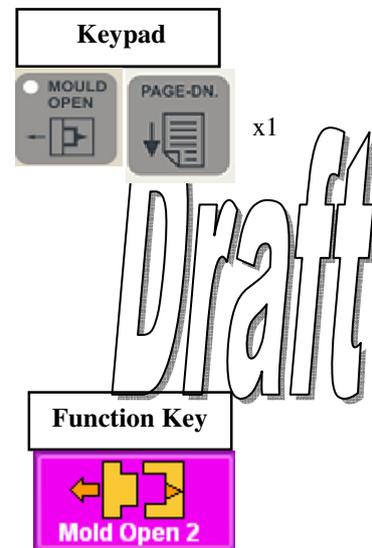
|      |                          |
|------|--------------------------|
| D.O. | <input type="checkbox"/> |
| V02  | <input type="checkbox"/> |

| Set Mode                          |
|-----------------------------------|
| Flow                              |
| <input type="text" value=""/> %   |
| Pressure                          |
| <input type="text" value=""/> bar |

|                        |             |                    |         |
|------------------------|-------------|--------------------|---------|
| Page Name: Mold Open-2 | Page No: 06 | Password Level: 01 | Page:06 |
|------------------------|-------------|--------------------|---------|

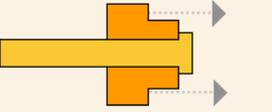


- All Mold Open special settings are settable/configurable on this screen.
- **Mold Open Confirm LSW Check:** Enable/Disable– for using a limit switch to confirm the complete mold open. Enter the digital input number for this purpose besides in the Digital Input No.
- **Mold Open Boost Selection:** Enable/Disable– for using a boost circuit output during mold open fast stage. Enter the digital output number for this purpose besides in the Solenoid No.
- **Mold Open Regeneration Selection:** Enable/Disable– for using a regeneration circuit output during mold open stages. Enter the digital output number for this purpose besides in the Solenoid No.
- **Mold Open Back(Counter) Pressure Sel:** Enable/Disable– for using a counter back pressure output during mold open stage. Enter the digital output number for this purpose besides in the Solenoid No.
- **Auto Mold Open Adaptive Distance Selection:** Enable/Disable– Mold Open Correction done automatically by the PLC over 10 continuous auto cycle shots/upto 25.0mm. The mould open correction is done to prevent moving Mould slip beyond the final opening position.
- The actual mould opening correction is expressed in millimetres is indicated at the end of the screen.
- On this screen flow, pressure are configurable for each stage of mold open operation for set mode.
- Actual Real-time status of mold open related digital outputs are indicated on the right side.

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**HYDRAULIC EJECTOR** Selection  No. of Repeats Set  Executed  Present Stage

|                | INITIAL FORWARD |       | FINAL RETRACT |       | REPEATS DATA |       | Time |
|----------------|-----------------|-------|---------------|-------|--------------|-------|------|
|                | Fwd 1           | Fwd 2 | Ret 2         | Ret 1 | Back         | Front |      |
| Flow (%)       |                 |       |               |       |              |       |      |
| Pressure(bar)  |                 |       |               |       |              |       |      |
| Position (mm)  |                 |       |               |       |              |       |      |
| Time (sec)     |                 |       |               |       |              |       |      |
| Off Delay(sec) |                 |       |               |       |              |       |      |
| Speeds (mm/s)  |                 |       |               |       |              |       |      |



Hyd. Eject Pos.  mm

Ejector Start Position(mm)  (Clamp Position)

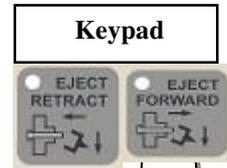
Ejector Start Delay (sec)

Ejector Retract Solenoids  (For Timer mode)

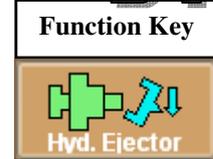
D.I. LS03  LS04

D.O. V09  V10

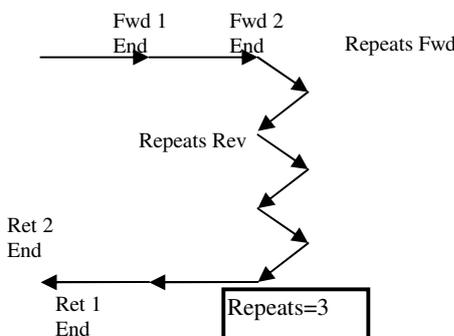
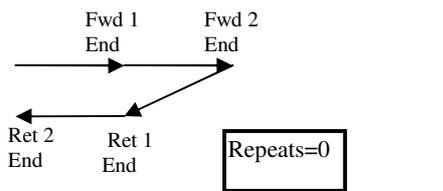
Page Name: Hydraulic Ejector
Page No: 07
Password Level: 01
Page:07



Draft

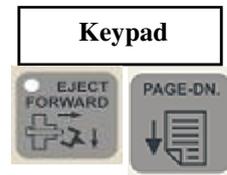


- All Hydraulic Ejector settings are settable/configurable on this screen.
- On this screen flow, pressure, position & times profiles are configurable for each stage of hydraulic ejector operation for hand & auto modes.
- The type of Ejector Sensor (“Linear Potentiometer”/”Limit switch”)or Timer-based function is machine manufacturer settable from **PG: 58**.
- The **Mode of Ejector** Selection is selectable between Inactive/Repeated/Stay Forward.
- **Inactive**=Ejector Movement Disabled; **Repeated**=Multiple Ejector strokes, **Stay Forward**= At the End of ejection, Hydraulic ejector stays forward.
- **No. of Strokes Set** is between 0-9. 0= Repeats Disable , >0=Repeats Enable.
- See above illustration for Repeats=0(Disable) & Repeats=3
- **Position Interlock:**Fwd2>Fwd1,Rev2<Rev1,RepeatsFwd>Fwd2, Repeats Rev>Rev1
- **Ejector Start Position**=The clamp open position where the ejector operation starts when enabled.
- **Ejector Start Delay**= The delay in seconds before which the ejector function executes.
- The **Ejector Retract Solenoid** can be ON/OFF by Enable/Disable when Hydraulic Ejector is functioning on Timers.
- The maximum value of ejector scale position can be adjusted from **PG:55**.
- The maximum values for flow & pressure can be settable from **PG:33**.
- Actual Real-time Speeds for all stages of Hydraulic Ejector operation are indicated in terms of mm/s.
- Actual Strokes executed & Present Stage of Hydraulic Ejector is indicated. Present Stage time is also indicated.
- Actual Real-time Ejector Position are also indicated.
- Actual Real-time status of ejector related digital inputs & outputs are indicated on the right side.



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|   |                          |  |
|---|--------------------------|--|
| Machine Operation Type <input type="text"/> |                          | Mold Open Distance <input type="text"/> mm |
|   |                          | Degas Time <input type="text"/> sec        |
| <b>Standard Sequence</b>                    | <b>Thinwall Sequence</b> | <b>Backelite Sequence</b>                  |
| Gate Close                                  | Gate Close               | Gate Close                                 |
| Mold Close                                  | Mold Close               | Mold Close                                 |
| Mold Lock                                   | Carriage FWD             | Mold Lock                                  |
| Carriage FWD                                | Injection Stage-1        | Carriage FWD                               |
| Injection                                   | Mold Lock                | Injection Stage-1                          |
| Hold On                                     | Refill                   | Decompression                              |
| Refill                                      | Cooling                  | Mold Open                                  |
| Cooling                                     | Mold Open                | Degas Stage                                |
| Mold Open                                   | Ejector Operation        | Mold Close Again                           |
| Ejector Operation                           |                          | Mold Lock Again                            |
|   |                          | Remaining Injection                        |
|   |                          | Hold On                                    |
|   |                          | Refill                                     |
|   |                          | Cooling                                    |
|   |                          | Mold Open                                  |
|   |                          | Ejector Operation                          |
| <i>Page Name:</i> Machine Operation         |                          | <i>Page No:</i> 08                         |
|   |                          | <i>Password Level:</i> 01                  |
|   |                          | Page:08                                    |



Draft



Injection sequence machine. In Auto Mode. Standard, Thin-wall, Bakelite

**Standard:** This is normally the default for standard & regular injection molding machines.

**Thinwall:** Select this option if machine is used for thinwall injection molding

**Bakelite:** Select this option if machine is used for Bakelite injection molding

**Mold Open Distance:** When machine sequence is Bakelite, the required mold open position for degassing should be set here.

**Degas Time:** When machine sequence is Bakelite, Enter the time here required for degassing.

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| CORE DATA     |          | Core 1    |          | Core 2    |          | Core 3    |          | Core 4    |  |
|---------------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|--|
| Seq. No       | Set      | Flag      | Set      | Flag      | Set      | Flag      | Set      | Flag      |  |
| Operation     | In(LS17) | Out(LS18) | In(LS19) | Out(LS20) | In(LS21) | Out(LS22) | In(LS23) | Out(LS24) |  |
| ON Dly (sec)  |          |           |          |           |          |           |          |           |  |
| Flow (%)      |          |           |          |           |          |           |          |           |  |
| Pressure(bar) |          |           |          |           |          |           |          |           |  |
| Position(mm)  |          |           |          |           |          |           |          |           |  |
| Time (sec)    |          |           |          |           |          |           |          |           |  |

|  |   |  |   |                            |                      |                      |
|--|---|--|---|----------------------------|----------------------|----------------------|
|  |  |  |  | Core In Priority Sequence  | <input type="text"/> | <input type="text"/> |
|  |   |  |   | Core Out Priority Sequence | <input type="text"/> | <input type="text"/> |

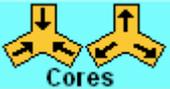
| D.I.                          | D.O.                         |
|-------------------------------|------------------------------|
| LS17 <input type="checkbox"/> | V33 <input type="checkbox"/> |
| LS18 <input type="checkbox"/> | V34 <input type="checkbox"/> |
| LS19 <input type="checkbox"/> | V35 <input type="checkbox"/> |
| LS20 <input type="checkbox"/> | V36 <input type="checkbox"/> |
| LS21 <input type="checkbox"/> | V37 <input type="checkbox"/> |
| LS22 <input type="checkbox"/> | V38 <input type="checkbox"/> |
| LS23 <input type="checkbox"/> | V39 <input type="checkbox"/> |
| LS24 <input type="checkbox"/> | V40 <input type="checkbox"/> |

Page Name: Cores Overview Page | Page No: 09 | Password Level: 01 | Page:09

Keypad

Draft

Function Key



Cores

- All 4 Core settings are settable/configurable/overviewed on this screen.
- On this screen flow, pressure, position & times profiles are configurable for each of hydraulic core operation for hand & auto modes.
- To operate the type of sensors are Limit switches. Timer-based function can also be set.
- To enable any/all cores, they are to master enabled from **Page:58**.
- Once enabled on Page:58, Individual core can be Enabled/Disabled on this screen.
- A core sequence number(0-6) can be set in Seq. No as per the core-die arrangement. Each sequence is detailed in the below table.
- When 2 or more cores are enabled for operation, priority can be set on this screen deciding which core gets **IN** priority & **OUT** priority. This is set in Priority sequence squares.
- **Interlock:** Position of Core x < Mold Slow-3 Position(Page:05).
- The maximum values for flow & pressure can be settable from **Page:33**.
- Actual Present Stage of each Hydraulic core is indicated.
- **CORE 1 IN** is sensed by **LSW 17**, **CORE 1 OUT** is sensed by **LSW 18**.
- **CORE 2 IN** is sensed by **LSW 19**, **CORE 2 OUT** is sensed by **LSW 20**.
- **CORE 3 IN** is sensed by **LSW 21**, **CORE 3 OUT** is sensed by **LSW 22**.
- **CORE 4 IN** is sensed by **LSW 23**, **CORE 4 OUT** is sensed by **LSW 24**.
- Actual Real-time status of cores related digital inputs & outputs are indicated on the right side.

| Sequence No. | Operation                             | Operation                                     |
|--------------|---------------------------------------|---|
| 0            | Disabled                              | Disabled                                      |
| 1            | CORE-IN                               | MOLD CLOSE                                    |
|              | MOLD OPEN                             | CORE-OUT                                      |
| 2            | MOLD CLOSE                            | CORE-IN                                       |
|              | CORE-OUT                              | MOLD OPEN                                     |
| 3            | CORE-IN                               | MOLD CLOSE                                    |
|              | CORE-OUT                              | MOLD OPEN                                     |
| 4            | MOLD CLOSE                            | CORE-IN                                       |
|              | MOLD OPEN                             | CORE-OUT                                      |
| 5            | MOLD CLOSE TO SET POSITION & STOPS    | CORE-IN MOLD CLOSE                            |
|              | MOLD OPEN                             | CORE-OUT MOLD OPEN TO SET POSITION & STOPS    |
| 6            | MOLD CLOSE TO SET POSITION,PARRALLELY | CORE-IN MOLD CLOSE                            |
|              | MOLD OPEN                             | CORE-OUT MOLD OPEN TO SET POSITION,PARRALLELY |

Draft

|                      |         |               |                                 |            |     |
|----------------------|---------|---------------|---------------------------------|------------|-----|
| <b>CORE - 1 DATA</b> |         | Present Stage |                                 | Stage Time | Sec |
| Core-1 Selection     |         |               |                                 |            |     |
| Core-1 Sequence      |         |               |                                 |            |     |
|                      | CORE IN | CORE OUT      |                                 |            |     |
| ON Delay(sec)        |         |               |                                 |            |     |
| Flow (%)             |         |               | Core-1 Operation Based On       |            |     |
| Pressure(bar)        |         |               | Core-1 IN Sol. During Injection |            |     |
| Position (mm)        |         |               | Core-1 IN Sol. Hold ON          |            |     |
| Time (sec)           |         |               | Core-1 OUT Sol. Hold ON         |            |     |

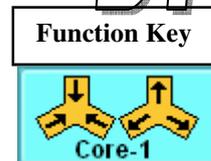



|      |                          |
|------|--------------------------|
| D.I. |                          |
| LS17 | <input type="checkbox"/> |
| LS18 | <input type="checkbox"/> |
| D.O. |                          |
| V33  | <input type="checkbox"/> |
| V34  | <input type="checkbox"/> |

**Page Name:** Mold Open-1    **Page No:** 05    **Password Level:** 01    **Page:** 10

Keypad

# Draft



- Core-1 individual settings are settable/configurable on this screen.
- On this screen flow, pressure, position & times profiles are configurable for Core-1 operation for hand & auto modes.
- To operate the type of sensors are Limit switches. Timer-based function can also be set.
- To enable Core-1, it is to master enabled from **Page:58**.
- Once enabled on Page:58, Core-1 can be Enabled/Disabled on this screen.
- A core sequence number(0-6) can be set in Seq. No as per the core-die arrangement. Each sequence is detailed in overview page.
- **Interlock:** Position of Core 1 < Mold Slow-3 Position(Page:05).
- **Core-1 Operation Based On:** Limit Switch/Timer– Selection whether the core should run on limit switch sensor or TIME.
- **Core-1 Sol. During Injection: Enable/Disable-** Core IN solenoid can be ON/OFF during injection phase.
- **Core-1 IN Sol. Hold ON: Enable/Disable-** Core IN solenoid can be kept ON continuously till Core-1 OUT operation.
- **Core-1 OUT Sol. Hold ON: Enable/Disable-** Core OUT solenoid can be kept ON continuously till Core-1 IN operation.
- The maximum values for flow & pressure can be settable from **Page:33**.
- Actual Present Stage of Hydraulic core operation is indicated along with its stage time.
- **CORE 1 IN** is sensed by **LSW 17**, **CORE 1 OUT** is sensed by **LSW 18**.
- Actual Real-time status of cores related digital inputs & outputs are indicated on the right side.

|                      |         |               |                                 |            |     |
|----------------------|---------|---------------|---------------------------------|------------|-----|
| <b>CORE - 2 DATA</b> |         | Present Stage |                                 | Stage Time | Sec |
| Core-2 Selection     |         |               |                                 |            |     |
| Core-2 Sequence      |         |               |                                 |            |     |
|                      | CORE IN | CORE OUT      |                                 |            |     |
| ON Delay(sec)        |         |               |                                 |            |     |
| Flow (%)             |         |               | Core-2 Operation Based On       |            |     |
| Pressure(bar)        |         |               | Core-2 IN Sol. During Injection |            |     |
| Position (mm)        |         |               | Core-2 IN Sol. Hold ON          |            |     |
| Time (sec)           |         |               | Core-2 OUT Sol. Hold ON         |            |     |




|      |                          |
|------|--------------------------|
| D.I. |                          |
| LS19 | <input type="checkbox"/> |
| LS20 | <input type="checkbox"/> |
| D.O. |                          |
| V35  | <input type="checkbox"/> |
| V36  | <input type="checkbox"/> |

**Page:11**

- Core-2 individual settings are settable/configurable on this screen.
- On this screen flow, pressure, position & times profiles are configurable for Core-2 operation for hand & auto modes.
- To operate the type of sensors are Limit switches. Timer-based function can also be set.
- To enable Core-2, it is to master enabled from **Page:58**.
- Once enabled on Page:58, Core-2 can be Enabled/Disabled on this screen.
- A core sequence number(0-6) can be set in Seq. No as per the core-die arrangement. Each sequence is detailed in overview page.
- **Interlock:** Position of Core 2 < Mold Slow-3 Position(Page:05).
- **Core-2 Operation Based On:** Limit Switch/Timer– Selection whether the core should run on limit switch sensor or TIME.
- **Core-2 Sol. During Injection: Enable/Disable-** Core IN solenoid can be ON/OFF during injection phase.
- **Core-2 IN Sol. Hold ON: Enable/Disable-** Core IN solenoid can be kept ON continuously till Core OUT operation.
- **Core-2 OUT Sol. Hold ON: Enable/Disable-** Core OUT solenoid can be kept ON continuously till Core IN operation.
- The maximum values for flow & pressure can be settable from **Page:33**.
- Actual Present Stage of Hydraulic core operation is indicated along with its stage time.
- **CORE 2 IN** is sensed by **LSW 19**, **CORE 1 OUT** is sensed by **LSW 20**. Actual Real-time status of digital inputs & outputs are

# Draft

| CORE - 3 DATA    |                      | Present Stage        | Stage Time                      | Sec                  |
|------------------|----------------------|----------------------|---------------------------------|----------------------|
| Core-3 Selection | <input type="text"/> |                      |                                 |                      |
| Core-3 Sequence  | <input type="text"/> |                      |                                 |                      |
|                  | CORE IN              | CORE OUT             |                                 |                      |
| ON Delay(sec)    | <input type="text"/> | <input type="text"/> |                                 |                      |
| Flow (%)         | <input type="text"/> | <input type="text"/> |                                 |                      |
| Pressure(bar)    | <input type="text"/> | <input type="text"/> |                                 |                      |
| Position (mm)    | <input type="text"/> | <input type="text"/> |                                 |                      |
| Time (sec)       | <input type="text"/> | <input type="text"/> |                                 |                      |
|                  |                      |                      | Core-3 Operation Based On       | <input type="text"/> |
|                  |                      |                      | Core-3 IN Sol. During Injection | <input type="text"/> |
|                  |                      |                      | Core-3 IN Sol. Hold ON          | <input type="text"/> |
|                  |                      |                      | Core-3 OUT Sol. Hold ON         | <input type="text"/> |

D.I.

LS21

LS22

D.O.

V37

V38

Keypad

HOME

PAGE-DN.

x2

Draft

Function Key

- Page Name: Mold Open-1 | Page No: 05 | Password Level: 01 | Page:12
- Core-3 individual settings are settable/configurable on this screen.
  - On this screen flow, pressure, position & times profiles are configurable for Core-3 operation for hand & auto modes.
  - To operate the type of sensors are Limit switches. Timer-based function can also be set.
  - To enable Core-1, it is to master enabled from **Page:58**.
  - Once enabled on Page:58, Core-3 can be Enabled/Disabled on this screen.
  - A core sequence number(0-6) can be set in Seq. No as per the core-die arrangement. Each sequence is detailed in overview page.
  - **Interlock:** Position of Core 1 < Mold Slow-3 Position(Page:05).
  - **Core-3 Operation Based On:** Limit Switch/Timer– Selection whether the core should run on limit switch sensor or TIME.
  - **Core-3 Sol. During Injection: Enable/Disable-** Core IN solenoid can be ON/OFF during injection phase.
  - **Core-3 IN Sol. Hold ON: Enable/Disable-** Core IN solenoid can be kept ON continuously till Core OUT operation.
  - **Core-3 OUT Sol. Hold ON: Enable/Disable-** Core OUT solenoid can be kept ON continuously till Core IN operation.
  - The maximum values for flow & pressure can be settable from **Page:33**.
  - Actual Present Stage of Hydraulic core operation is indicated along with its stage time.
  - **CORE 3 IN** is sensed by **LSW 21**, **CORE 3 OUT** is sensed by **LSW 22**.
  - Actual Real-time status of cores related digital inputs & outputs are indicated on the right side.

| CORE - 4 DATA    |                      | Present Stage        | Stage Time                      | Sec                  |
|------------------|----------------------|----------------------|---------------------------------|----------------------|
| Core-4 Selection | <input type="text"/> |                      |                                 |                      |
| Core-4 Sequence  | <input type="text"/> |                      |                                 |                      |
|                  | CORE IN              | CORE OUT             |                                 |                      |
| ON Delay(sec)    | <input type="text"/> | <input type="text"/> |                                 |                      |
| Flow (%)         | <input type="text"/> | <input type="text"/> |                                 |                      |
| Pressure(bar)    | <input type="text"/> | <input type="text"/> |                                 |                      |
| Position (mm)    | <input type="text"/> | <input type="text"/> |                                 |                      |
| Time (sec)       | <input type="text"/> | <input type="text"/> |                                 |                      |
|                  |                      |                      | Core-4 Operation Based On       | <input type="text"/> |
|                  |                      |                      | Core-4 IN Sol. During Injection | <input type="text"/> |
|                  |                      |                      | Core-4 IN Sol. Hold ON          | <input type="text"/> |
|                  |                      |                      | Core-4 OUT Sol. Hold ON         | <input type="text"/> |

D.I.

LS23

LS24

D.O.

V39

V40

- Page:13
- Core-4 individual settings are settable/configurable on this screen.
  - On this screen flow, pressure, position & times profiles are configurable for Core-4 operation for hand & auto modes.
  - To operate the type of sensors are Limit switches. Timer-based function can also be set.
  - To enable Core-4, it is to master enabled from **Page:58**.
  - Once enabled on Page:58, Core-4 can be Enabled/Disabled on this screen.
  - A core sequence number(0-6) can be set in Seq. No as per the core-die arrangement. Each sequence is detailed in overview page.
  - **Interlock:** Position of Core 4 < Mold Slow-3 Position(Page:05).
  - **Core-4 Operation Based On:** Limit Switch/Timer– Selection whether the core should run on limit switch sensor or TIME.
  - **Core-4 Sol. During Injection: Enable/Disable-** Core IN solenoid can be ON/OFF during injection phase.
  - **Core-4 IN Sol. Hold ON: Enable/Disable-** Core IN solenoid can be kept ON continuously till Core OUT operation.
  - **Core-4 OUT Sol. Hold ON: Enable/Disable-** Core OUT solenoid can be kept ON continuously till Core IN operation.
  - The maximum values for flow & pressure can be settable from **Page:33**.
  - Actual Present Stage of Hydraulic core operation is indicated along with its stage time.
  - **CORE 4 IN** is sensed by **LSW 23**, **CORE 4 OUT** is sensed by **LSW 24**. Actual Real-time status of digital inputs & outputs are

Draft

| AIR EJECTORS & UNSCREW DATA |                      |                      |                      |                      |                      |
|-----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Air Ejector No.             | AE - 1               | AE - 2               | AE - 3               | AE - 4               | UnScrew              |
| Selection                   | <input type="text"/> |
| Start Position (mm)         | <input type="text"/> |
| On Delay (sec)              | <input type="text"/> |
| Set Strokes                 | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | ---                  |
| ON Time (sec)               | <input type="text"/> |
| OFF Time (sec)              | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | ---                  |
| Present Stage               | <input type="text"/> |
| Present Operation           | <input type="text"/> |
| Act Stage Time              | <input type="text"/> |
| Strokes Executed            | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | ---                  |
| Strokes Remaining           | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | ---                  |

**D.O.**

V41

V42

V43

V44

UnScrew Motor Output No

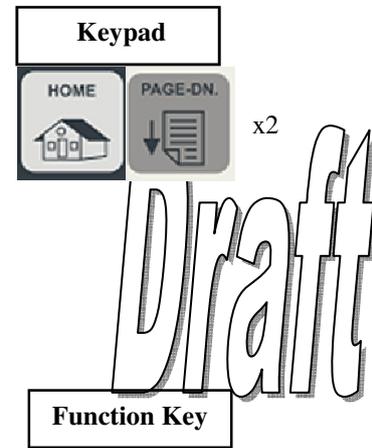
|                               |                    |                           |         |
|-------------------------------|--------------------|---------------------------|---------|
| <i>Page Name:</i> Mold Open-1 | <i>Page No:</i> 05 | <i>Password Level:</i> 01 | Page:14 |
|-------------------------------|--------------------|---------------------------|---------|



- All 4 Air Ejectors & Unscrew settings are settable/configurable/overviewed on this screen.
- On this screen positions, times & strokes profiles are configurable for each of hydraulic core operation for hand & auto modes.
- To enable any/all Air Ejectors, they are to master enabled from **Page:58**.
- Once enabled on Page:58, Individual air ejector/unscrew motor can be Enabled/Disabled on this screen.
- **Start Position:** The clamp open position in mm where the air ejector /unscrew motor operation starts when enabled.
- **Interlock:** Start Position of Air ejector/Unscrew < Mold Slow-3 Position(Page:05).
- The maximum value of clamp scale open position can be adjusted from **PG:55**.
- **On Delay:** Total Time in seconds to delay before the air ejector\unscrew operation.
- **Set Strokes:** Number of times the air ejector blows air.
- **ON Time:** Time in seconds to keep the air blast/unscrew motor ON.
- **OFF Time:** Time in seconds to keep the air blast OFF in each stroke.
- **Unscrew Motor Output No:** User definable digital output number for Unscrew Motor.
- Actual stages, operation & stage times of enabled Air Ejector/Unscrew operation are indicated.
- Actual Strokes executed & strokes remaining of Air Ejector is indicated.
- Actual Real-time status of ejector related digital outputs are indicated on the right side.



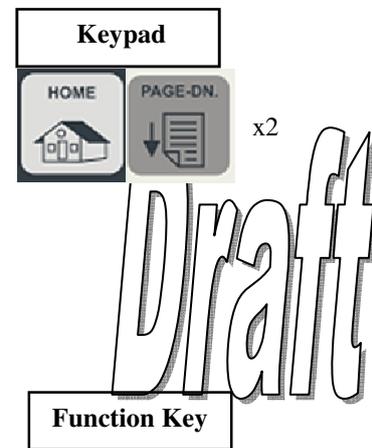
| INJECTION  | Mode    | Total Inj. Time Set                 | Elapsed | Remaining          |                      |                          |             |
|--|---------|-------------------------------------|---------|--------------------|----------------------|--------------------------|-------------|
|  | Stage 5 | Stage 4                             | Stage 3 | Stage 2            | Stage 1              | Intrugen                 | Pre. Inject |
| Flow (%)   |         |                                     |         |                    |                      |                          |             |
| Pressure(bar)  |         |                                     |         |                    |                      |                          |             |
| Position (mm)  |         |                                     |         |                    |                      | -----                    | -----       |
| Time (sec)   |         |                                     |         |                    |                      |                          |             |
| Pumps  |         |                                     |         |                    |                      |                          |             |
| Speeds (mm/s)  |         |                                     |         |                    |                      | RPM=                     | -----       |
| Act Stage Time   |         |                                     |         |                    |                      |                          |             |
| Inject. Pressure   | bar     | Injection Cushion Position (mm)     |         |                    |                      |                          |             |
|  |         | Injection Boost Selection (Stage 2) |         |                    | Solenoid             | <input type="checkbox"/> |             |
| Screw Position   | mm      | Inject For Set Injection Time       |         |                    | (Position Mode Only) |                          |             |
| Page Name: Mold Open-1   |         | Page No: 05                         |         | Password Level: 01 |                      | Page:15                  |             |



- All Injection settings are settable/configurable on this screen.
- On this screen flow, pressure, position & times profiles are configurable for each stage of injection operation for hand & auto modes.
- Fixed pumps can also be configurable for each stage of injection operation for hand & auto modes.
- The type of Screw Position Sensor=Linear Potentiometer. Injection can be executed through timers.
- The maximum value of screw scale position can be adjusted from **Page:55**.
- The maximum values for flow & pressure can be settable from **Page:33**.
- **Mode:** The Injection Operation can be settable to operate in **Position** or **Time**.
- **Total Inj. Time Set:** If Timer is selected as Mode, enter the total injection time in seconds here.
- **Interlock:** Total sum of times of all 5 injection stages <= Total injection time.
- Pre-Injection & Intrugen only work based on times set.
- The maximum Injection times value can be ceiled on **Page:54**.
- If Position is selected as mode, Injection operates as per the set position for each stage.
- To bypass any stage of injection enter **0.00** in Position.
- **Interlock:** Position of Stage1>Stage2>Stage3>Stage4>Stage5
- **Injection Cushion Position:** When Injection process is in timer mode, set this position to allow minimum amount of material to left at the tip of the injection screw. Basically, **End of Hold-ON** stage.
- **Injection Boost Selection:** Enable/Disable– for using a boost circuit output during injection stage 2. Enter the digital output number for this purpose besides in the Solenoid No.
- **Inject for Set Injection Time:** Enable/Disable– If enabled, Total Injection Time acts as master even though injection is in position mode.
- Actual injection force is displayed. A Pressure transducer needs to be connected to the injection pressure port to display this value. Calibrate the Pressure transducer on **Page:44** with the injection pressure gauge on the machine.
- Actual Real-time Speeds for all stages of injection operation are indicated in terms of mm/s.
- Actual times of injection stages, pre-injection & Intrugen are indicated.
- Actual Real-time Screw Position is also indicated.

Draft

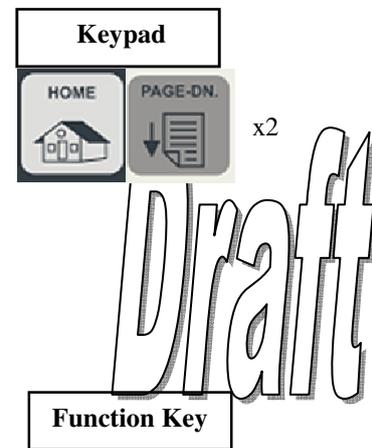
| HOLD ON (RIP)   | Total Hold On Time Set | Elapsed     | Remaining |                    |           |
|---|------------------------|-------------|-----------|--------------------|-----------|
|   |                        |             |           |                    |           |
|   | Init Decomp            | Hold on-4   | Hold on-3 | Hold on-2          | Hold on-1 |
| Flow (%)  |                        | ----        | ----      | ----               |           |
| Pressure(bar)   |                        |             |           |                    |           |
| Time (sec)  |                        |             |           |                    |           |
| Speed (mm/s)  |                        |             |           |                    |           |
| Act Stage Time(sec)   |                        |             |           |                    |           |
| Act Hold On Pressure(bar)   |                        |             |           |                    |           |
| Switch Over Position (mm) <input type="text"/> (For Timer Mode Only)  |                        |             |           |                    |           |
|   |                        |             |           |                    |           |
| Screw Position <input type="text" value="999.9"/> mm  |                        |             |           |                    |           |
| <b>Note</b><br>Injection Volume Q (g) = 1.4 x W (g)<br>Where W = One Shot Weight (Sprue + Runner Weight)<br>Hold On Pressure = 0.6 x Injection Pressure |                        |             |           |                    |           |
| Page Name: Mold Open-1  |                        | Page No: 05 |           | Password Level: 01 |           |
| Page:16   |                        |             |           |                    |           |



- All Injection HOLD ON settings are settable/configurable on this screen.
- On this screen flow, pressure & times profiles are configurable for each stage of **Hold ON** operation for hand & auto modes.
- On this screen flow, pressure & times profiles are configurable for **Init Decomp** operation for hand & auto modes.
- The maximum values for flow & pressure can be settable from **Page:33**.
- The maximum HOLD ON times value can be ceiled on **Page:54**.
- To bypass any stage of Hold ON enter **0.00** in Time.
- **Injection Switch Over Position:** When Injection process is in timer mode, set this position to allow switchover from injection to hold-on stage. Basically, End of **Injection** stage.
- Actual times of Total Hold ON, Elapsed & remaining are indicated.
- Actual Real-time Screw Position is also indicated.
- Actual Real-time status of injection related digital inputs & outputs are indicated on the right side.

Draft

| INJECTION & HOLD ON DATA        |  |                                      |
|---------------------------------|--|--------------------------------------|
| Injection Pressure Ratio        | <input type="text"/>                                 | <input type="text"/>                 |
| Material Injected / cm          | <input type="text"/> cc                              | <input type="text"/>                 |
| Material Density                | <input type="text"/> gms/cc                          | <input type="text"/>                 |
| CLOSED LOOP INJECTION SELECTION |  |                                      |
|                                 | <input type="text"/>                                 | <input type="text"/>                 |
|                                 |  | D.O.<br>V03 <input type="checkbox"/> |
| Operation                       | Injection Speed                                      | Hold ON Pressure                     |
| Proportional Gain               | <input type="text"/>                                 | <input type="text"/>                 |
| Integral Gain                   | <input type="text"/>                                 | <input type="text"/>                 |
| Sampling Time(sec)              | <input type="text"/>                                 | <input type="text"/>                 |
| Integral Time(sec)              | <input type="text"/>                                 | <input type="text"/>                 |
| Integral Limit                  | <input type="text"/>                                 | <input type="text"/>                 |
| DAC No                          | <input type="text"/>                                 | <input type="text"/>                 |
|                                 | 100% Injection Speed                                 | <input type="text"/> mm/sec          |
|                                 | PID Control On Delay Time                            | <input type="text"/> sec             |
|                                 | <b>WARNING</b>                                       |                                      |
|                                 | Please Do Not Change Above Values Without Permission |                                      |
| Page Name: Mold Open-1          |  | Page No: 05                          |
| Password Level: 01              |  | Page:17                              |



- All Closed-Loop Injection settings are settable/configurable on this screen.
- A Pressure transducer needs to be connected to the injection pressure port to execute the closed-loop sequence.
- A separate PQ block also is need for proper control of closed-loop injection.
- On this screen flow, pressure, & times profiles are configurable for closed-loop injection operation for hand & auto modes.
- Based on the article to be molded, its shot-weight, volume, hold times need to set appropriately.
- The characteristics of the material to be used for closed-loop injection like density etc are to be entered.
- **Closed Loop Injection Selection:** Enable/Disable –to ON/OFF close-loop injection.
- PID parameters need to set by authorized personnel for proper closed-loop injection sequence.
- Actual Real-time status of injection related digital inputs & outputs are indicated on the right side.

Draft

| REFILL (DOSING)+SUCKBACK - 1 |          |              |          |          |          | Mode          | Cooling Time Set             | Remaining |
|------------------------------|----------|--------------|----------|----------|----------|---------------|------------------------------|-----------|
|                              | Intrugen | Pre Suckback | Refill 1 | Refill 2 | Refill 3 | Post Suckback |                              |           |
| Selection                    |          |              | ----     | ----     | ----     |               | D.O.                         |           |
| Flow (%)                     |          |              |          |          |          |               | V04 <input type="checkbox"/> |           |
| Sys.Pre (bar)                |          |              |          |          |          |               | V05 <input type="checkbox"/> |           |
| Back Pre(bar)                |          | ----         |          |          |          | ----          | V08 <input type="checkbox"/> |           |
| Position (mm)                | ----     |              |          |          |          |               |                              |           |
| Time (sec)                   |          |              |          |          |          |               |                              |           |
| Screw RPM(Avg)               |          | ----         |          |          |          | ----          |                              |           |
| Speeds (mm/s)                | ----     |              |          |          |          |               |                              |           |
| Act Stage Time               |          |              |          |          |          |               |                              |           |


 Screw Position mm Refilling Boost Selection Solenoid

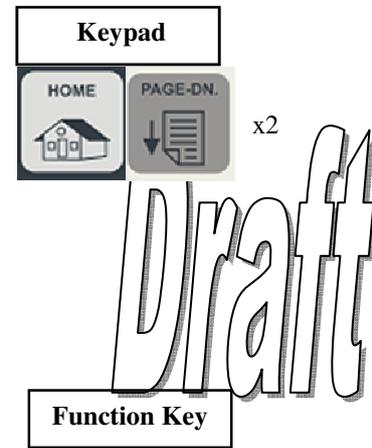
Page Name: Mold Open-1    Page No: 05    Password Level: 01    Page:18



- All Refill+Suckback settings are settable/configurable on this screen.
- On this screen flow, pressure, position & times profiles are configurable for each stage of refill operation for hand & auto modes.
- Fixed pumps can also be configurable for each stage of injection operation for hand & auto modes.
- The type of Screw Position Sensor=Linear Potentiometer. Refill can be executed through timers.
- The maximum value of screw scale position can be adjusted from **Page:55**.
- The maximum values for flow & pressure can be settable from **Page:33**.
- **Mode:** The Refill Operation can be settable to operate in **Position** or **Time**.
- **Interlock:** Total sum of times of all refill stages <= Total Cooling time. OR else Cooling is bypassed.
- Intrugen only works based on time set & in Auto mode ONLY.
- During all Refill stage backpressure can be enabled. A separate proportional valve is needed for the same.
- In Suckback1 & Suckback2 no backpressure valve can be switched ON.
- The maximum Injection times value can be ceiled on **Page:54**.
- If Position is selected as mode, Injection operates as per the set position for each stage.
- To bypass any stage of injection enter **0.00** in Position.
- **Interlock:** Position of Stage1>Stage2>Stage3>Stage4>Stage5
- **Injection Cushion Position:** When Injection process is in timer mode, set this position to allow minimum amount of material to left at the tip of the injection screw. Basically, **End of Hold-ON** stage.
- **Injection Boost Selection:** Enable/Disable– for using a boost circuit output during injection stage 2. Enter the digital output number for this purpose besides in the Solenoid No.
- **Inject for Set Injection Time:** Enable/Disable– If enabled, Total Injection Time acts as master even though injection is in position mode.
- Actual injection force is displayed. A Pressure transducer needs to be connected to the injection pressure port to display this value. Calibrate the Pressure transducer on **Page:44** with the injection pressure gauge on the machine.
- Actual Real-time Speeds for all stages of injection operation are indicated in terms of mm/s.
- Actual times of injection stages, pre-injection & Intrugen are indicated.
- Actual Real-time Screw Position is also indicated.

Draft

| REFILL (DOSING)+SUCKBACK - 2  |  | Parallel Refilling Present Stage |   |
|---|--|----------------------------------|---|
| Parallel Refilling Selection  | <input type="text"/>                   | Solenoids                        | <input type="text"/> + <input type="text"/> + <input type="text"/> + <input type="text"/> |
| Parallel Refilling Flow DAC No  | <input type="text"/>                   | Parallel Refilling Flow Dac out  | <input type="text"/>  |
| Parallel Refilling Pres DAC No  | <input type="text"/>                   | Parallel Refilling Pres Dac out  | <input type="text"/>  |
| Back Pressure Solenoid Selection  | <input type="text"/>                   |                                  |   |
| Full Auto Cycle Selection   | <input type="text"/>                   |                                  |   |
| <b>Note</b>   |  | <b>AUTO PURGE SELECTION</b>      | <input type="text"/>  |
| Minimum Cooling Time = $t_c = \frac{h^2}{\alpha \pi^2} \ln \left  \frac{4}{\pi} \left( \frac{T_M - T_W}{T_E - T_W} \right) \right $ |  | Injection                        | Refill  |
| Where $\alpha$ = Thermal Diffusivity $T_W$ = Mold Wall Temperature  |  | Flow (%)                         | <input type="text"/>  |
| $h$ = Plate Thickness $T_M$ = Mold Temperature  |  | Pressure (bar)                   | <input type="text"/>  |
| $T_E$ = Ejection Temperature  |  | Back Pres (bar)                  | ---   |
|   | Screw Position <input type="text"/> mm | Position (mm)                    | <input type="text"/>  |
|   |  | Purge Repeats                    | <input type="text"/> Remaining  |
| <b>Page Name:</b> Mold Open-1   |  | <b>Page No:</b> 05               | <b>Password Level:</b> 01   |
|   |  |                                  | <b>Page:</b> 19   |



- All Parallel Refill+Auto Purge settings are settable/configurable on this screen.
- On this screen DAC's connected to PQ block, & digital outputs of parallel refill operation need to be set.
- Up to 4 individual digital outputs for parallel refill can be set.
- During all Refill stage backpressure can be enabled. A separate proportional valve is needed for the same.
- **Back Pressure Solenoid Selection:** Enable/Disable— TO ON/OFF backpressure is required.
- **Full Auto Cycle Selection:** Enable/Disable— To ON/OFF AUTO cycle in order to protect mold die life.
- **Auto Purge Selection:** Enable/Disable— To ON/OFF Auto Purge in HAND mode ONLY.
- The flow, pressure, position & repeats are configurable for purge operation for hand modes.
- The maximum value of screw scale position can be adjusted from **Page:55**.
- The maximum values for flow & pressure can be settable from **Page:33**.
- Actual Real-time status of refill & purge related digital inputs & outputs are indicated on the right side.
- Actual Parallel refill stages are indicated.
- Actual Parallel refill DAC out voltages are indicated.
- Actual Purge counts are indicated.
- Actual Real-time Screw Position is also indicated.

**Draft**

| CARRIAGE   |       | Slow Fwd ◀  | Fast Fwd | Fast Ret ▶   | Slow Ret | D.I.                            |                          |
|--|-------|---|----------|--|----------|---------------------------------|--------------------------|
| Flow (%)   |       |   |          |  |          | LS05                            | <input type="checkbox"/> |
| Pressure(bar)  |       |   |          |  |          | LS06                            | <input type="checkbox"/> |
| Position (mm)  |       |   |          |  |          | D.O.                            |                          |
| Time (sec)   | ----- |   |          |  |          | V06                             | <input type="checkbox"/> |
| Speed (mm/s)   |       |   |          |  |          | V07                             | <input type="checkbox"/> |
| <b>Present Operation</b>   |       |   |          |  |          |                                 |                          |
|  |       | <b>Carriage Mode Selection</b> <input type="text"/>               |          | <input type="text"/>                                     |          |                                 |                          |
|  |       | <b>Carriage Move Selection</b> <input type="text"/>               |          | <input type="text"/>                                     |          | <input type="checkbox"/> Refill |                          |
|  |       | <b>Carriage Forward During Injection/RIP</b> <input type="text"/> |          | <input type="text"/>                                     |          |                                 |                          |
|  |       | <b>Carriage Forward During Suckback</b> <input type="text"/>      |          | <input type="text"/>                                     |          |                                 |                          |
|  |       | <b>Carriage Forward During Refill/Dosing</b> <input type="text"/> |          | <input type="text"/>                                     |          |                                 |                          |
| <b>Carriage Pos.</b> <input type="text"/> mm                                     |       | <b>Carriage Forward Start Delay</b> <input type="text"/>          |          | <b>Carriage Retract Start Delay</b> <input type="text"/> |          |                                 |                          |
| <b>Page Name:</b> Mold Open-1  |       | <b>Page No:</b> 05  |          | <b>Password Level:</b> 01                                |          | <b>Page:</b> 20                 |                          |



- All Carriage settings are settable/configurable on this screen.
- On this screen flow, pressure, position & times profiles are configurable for each stage of carriage operation for hand & auto modes.
- The type of Carriage Sensor (“Linear Potentiometer”/”Limit switch”) is machine manufacturer settable from **PG: 58**.
- If time is set in each carriage movement stage, the carriage moves as per the set time.
- **Carriage Mode Selection** is selectable between Fixed/Moving.
- **Fixed**=Carriage Movement Disabled in front position; **Moving**=Moves during Injection/Refill
- **Carriage Move Selection** is selectable between Before/After.
- **Before**=Carriage moves before Refill; **After**=Carriage moves after Refill
- **Carriage Forward During Injection/RIP:** Enable/Disable— To ON/OFF Carriage Forward during Injection.
- **Carriage Forward During Suckback:** Enable/Disable— To ON/OFF Carriage Forward during Suckback.
- **Carriage Forward During Refill/Dosing:** Enable/Disable— To ON/OFF Carriage Forward during Refill.
- **Carriage Forward Start Delay:** Delay in seconds before Carriage forward movement starts.
- **Carriage Retract Start Delay:** Delay in seconds before Carriage retract movement starts.
- The maximum value of carriage scale position can be adjusted from **PG:55**.
- The maximum values for flow & pressure can be settable from **PG:33**.
- Actual Real-time Speeds for all stages of Carriage operation are indicated in terms of mm/s.
- Actual Real-time Carriage Position are also indicated.
- Actual Real-time status of carriage related digital inputs & outputs are indicated on the right side.

Draft

| ZONE TEMPERATURE SETTINGS     |           |          |                    |          |                           |       |                |          |
|-------------------------------|-----------|----------|--------------------|----------|---------------------------|-------|----------------|----------|
| Zones                         | Selection | Pre Heat | Set.Temp           | Lo.Alarm | Hi.Alarm                  | %Duty | Status         | Act Temp |
| Zone 1                        | ↕         |          |                    | -        | +                         |       |                |          |
| Zone 2                        | ↕         |          |                    | -        | +                         |       |                |          |
| Zone 3                        | ↕         |          |                    | -        | +                         |       |                |          |
| Zone 4                        | ↕         |          |                    | -        | +                         |       |                |          |
| Zone 5                        | ↕         |          |                    | -        | +                         |       |                |          |
| Zone 6                        | ↕         |          |                    | -        | +                         |       |                |          |
| Zone 7                        | ↕         |          |                    | -        | +                         |       |                |          |
| Zone 8                        | ↕         |          |                    | -        | +                         |       |                |          |
| Zone 9                        | ↕         |          |                    | -        | +                         |       |                |          |
| Zone 10                       | ↕         |          |                    | -        | +                         |       |                |          |
| Hyd.Oil                       | ↕         |          | ---                | ---      | +                         |       |                |          |
| <i>Page Name: Mold Open-1</i> |           |          | <i>Page No: 05</i> |          | <i>Password Level: 01</i> |       | <i>Page:21</i> |          |



- All Barrel temperature zone & Hydraulic Oil settings are settable/configurable on this screen.
- On this screen Selection, Pre-heat, Set Temperature, Alarms & duty cycle are configurable for each temperature zone.
- **Selection:** Enable/Disable— To ON/OFF Zone heating control.
- **Pre Heat:** A temperature point set to keep the feed material in melted condition in the barrel during non-production times.
- **Set Temp:** A temperature point set to keep the feed material in melted condition before the actual injection operation.
- **Lo. Alarm:** A low limit relative to the Set Temp to prevent under quality batch production. The machine stops at this limit.
- **Hi. Alarm:** A high limit relative to the Set Temp to prevent over burn batch production. The machine can be opted to stop/run at this limit from **Page: 24.**
- All Zones can also be operated either in Duty Cycle % mode i.e. Timing or a Closed Loop i.e. Sensor feedback. This mode can be set from **Page: 24.**
- Duty Cycle % can be configurable for each zone from 00 to 99%. Nozzle duty cycle % can be set on **Page: 24.**
- The calibration for each Zone can be configured from **Page: 44.**
- Digital Outputs for zone temperature can be configured on **Page: 24.**
- Actual Real-time temperatures of all zones are indicated in terms of °C.
- Actual Real-time status of zone heating ON/OFF are also indicated.

Draft

**BLOWER DATA SETTINGS**

| Blower No. | Selection | Control Zone | Sw.Off Temp | Sw. On Temp | Output No | Status |
|------------|-----------|--------------|-------------|-------------|-----------|--------|
| 1          | ↕         |              | -           | +           |           |        |
| 2          | ↕         |              | -           | +           |           |        |
| 3          | ↕         |              | -           | +           |           |        |
| 4          | ↕         |              | -           | +           |           |        |
| 5          | ↕         |              | -           | +           |           |        |
| 6          | ↕         |              | -           | +           |           |        |
| 7          | ↕         |              | -           | +           |           |        |
| 8          | ↕         |              | -           | +           |           |        |

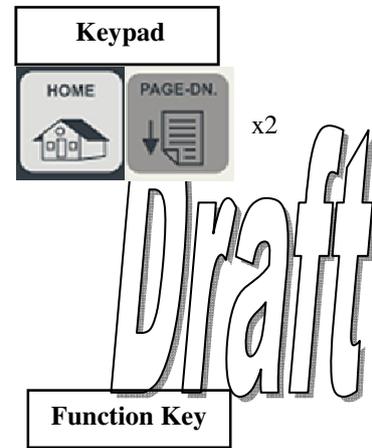


**Page Name:** Mold Open-1      **Page No:** 05      **Password Level:** 01      **Page:**22

- All Barrel zone blower settings are settable/configurable on this screen.
- On this screen Selection, Temperature zone to be controller, Switch ON/OFF Temp & digital output assigned are configurable for each blower
- **Selection:** Enable/Disable— To ON/OFF Zone blower control.
- **Control Zone:** The heating zone that has to be cooled down by blower on temperature rise.
- **Switch OFF Temp:** Zone Temperature – this value is when the blower goes OFF.
- **Switch ON Temp:** Zone Temperature + this value is when the blower goes ON.
- **Output No:** Any PLC Spare Outputs can be assigned for blower control.
- Actual Real-time status of individual blower ON/OFF are also indicated.

# Draft

| CONTROL                       | Selection | Sensor Type | Control            | %Duty | % Max.O/P                 | Output No | Device         | Act Temp |
|-------------------------------|-----------|-------------|--------------------|-------|---------------------------|-----------|----------------|----------|
| Zone 1                        |           |             |                    |       |                           |           |                |          |
| Zone 2                        |           |             |                    |       |                           |           |                |          |
| Zone 3                        |           |             |                    |       |                           |           |                |          |
| Zone 4                        |           |             |                    |       |                           |           |                |          |
| Zone 5                        |           |             |                    |       |                           |           |                |          |
| Zone 6                        |           |             |                    |       |                           |           |                |          |
| Zone 7                        |           |             |                    |       |                           |           |                |          |
| Zone 8                        |           |             |                    |       |                           |           |                |          |
| Zone 9                        |           |             |                    |       |                           |           |                |          |
| Zone 10                       |           |             |                    |       |                           |           |                |          |
| Hyd Oil                       |           |             |                    |       |                           |           | Relay          |          |
| Nozzle                        |           | ---         | ---                |       |                           |           |                | ---      |
| <i>Page Name: Mold Open-1</i> |           |             | <i>Page No: 05</i> |       | <i>Password Level: 01</i> |           | <i>Page:23</i> |          |



- All Barrel temperature zone & Hydraulic Oil settings are settable/configurable on this screen.
- On this screen Selection, Sensor type, Control type, duty cycle, Max o/p, Output No & Device are configurable for each temperature zone.
- **Selection:** Enable/Disable— To ON/OFF Zone heating control.
- **Sensor Type:** The type of sensor used for sensing the zone temperatures in the barrel. Types are: **Pt-100**(RTD), **K-type** & **J-type** Thermocouples. Select the appropriate sensor as present on the machine. The sensor selected is used for heating control purpose.
- All Zones can also be operated either in Duty Cycle % mode i.e. Timing(Open) or a Closed Loop i.e. Sensor feedback.
- **Control type:** Closed/Open Loop. Closed— Heating control based on sensor feedback. Open— Heating control based on time as per the duty cycle set for the respective zone.
- **Duty Cycle %** can be configurable for each zone from 00 to 99%.
- **%Max O/P:** The output power delivered to the heater. Can be configurable for each zone from 00 to 99%. Default- Set 99% for maximum heating delivery.
- **Output No:** The digital outputs for each of the zone heater can be configurable by the end user.
- When **Relay/Contactor** is selected as control element; any unassigned digital outputs from **1-52** can be used.
- When **Digital SSR/Linear SSR** is selected as control element; any unassigned digital outputs from **52-64** has to be used.
- **Device:** The end control device the PLC ON/OFF to deliver the power to the heater. Options are: Relay/Digital SSR/Linear SSR.
- **Relay**— Select this if the control device is Relay or contactor wired to the heaters. ON/OFF control with moving contacts
- **Digital SSR**— Select this if the control device is Digital SSR wired to the heaters. ON/OFF control with no moving contacts
- **Linear SSR**— Select this if the control device is Linear SSR wired to the heaters. Proportional control with no moving contacts
- The calibration for each Zone can be configured from **Page: 44**.
- Actual Real-time temperatures of all zones are indicated in terms of °C.



## GENERAL ZONE TEMPERATURE SETTINGS

|                          |                            |                         |                          |
|--------------------------|----------------------------|-------------------------|--------------------------|
| Cooling Water Zone No    | <input type="text"/>       | Cooling Water Output No | <input type="text"/>     |
| Cooling Water Start Temp | <input type="text"/> Deg.C |                         |                          |
| Nozzle Duty Cycle        | <input type="text"/> %     |                         |                          |
| Minimum Inj Temperature  | <input type="text"/> Deg.C |                         |                          |
| On High Temp Alarm       | <input type="text"/>       |                         |                          |
| Soaking Temperature      | <input type="text"/> Deg.C | Soaking Time            | <input type="text"/> sec |
| Ambient Temperature      | <input type="text"/> Deg.C |                         |                          |



Page Name: Mold Open-1

Page No: 05

Password Level: 01

Page:24

- All general settings related to the zone temperature are settable/configurable on this screen.
- **Cooling Water Zone No:** The Zone No to which the cooling water needs to be supplied to regulate its temperature.
- **Cooling Water Output No:** The digital output number assigned to the pump contactor that controls the cooling water flow.
- **Cooling Water Start Temp:** The set temperature when the cooling water has to be supplied to the Zone to cool its temperature.
- **Minimum Inj. Temperature:** The minimum zone temperature below which the injection operation doesn't start in HAND/AUTO mode. This minimum temperature is based on the material to be injected. Default=50C
- **On High Temp Alarm:** Stop/Run- When any zone's actual temperature raises above the set point & equals the High alarm as set in Page:21, the operator can opt to stop/run machine production at this limit.
- **Soaking Temperature:** When the machine heaters are switched ON after a dry-period, to achieve a smoother & consistent temperature raise, set this soaking temperature.
- **Soaking Time:** The time in seconds during which the zone temperatures are held before raising to the actual set point.

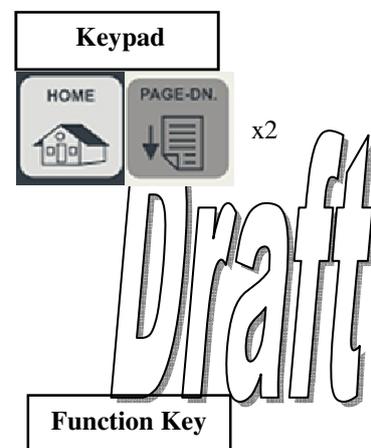
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**WEEKLY HEATING SCHEDULE DATA**

Weekly Heating Schedule Selection  Mode  Weekly off

| Zone Heaters |           |            |             |             | Oil Heaters  |           |           |            |             |             |              |
|--------------|-----------|------------|-------------|-------------|--------------|-----------|-----------|------------|-------------|-------------|--------------|
| Day          | Selection | ON Time Hr | ON Time Min | OFF Time Hr | OFF Time Min | Day       | Selection | ON Time Hr | ON Time Min | OFF Time Hr | OFF Time Min |
| Sunday       |           |            |             |             |              | Sunday    |           |            |             |             |              |
| Monday       |           |            |             |             |              | Monday    |           |            |             |             |              |
| Tuesday      |           |            |             |             |              | Tuesday   |           |            |             |             |              |
| Wednesday    |           |            |             |             |              | Wednesday |           |            |             |             |              |
| Thursday     |           |            |             |             |              | Thursday  |           |            |             |             |              |
| Friday       |           |            |             |             |              | Friday    |           |            |             |             |              |
| Saturday     |           |            |             |             |              | Saturday  |           |            |             |             |              |

Page Name: Weekly Heating Schedule Selection | Page No: 25 | Password Level: 01 | Page:25



- Zone heating & Oil heating ON/OFF through weekly auto scheduler feature are settable/configurable on this screen.
- To enable this feature, the heaters button should be pressed & put ON.
- **Weekly Heating Schedule Selection:** Enable/Disable— ON/OFF the weekly heating auto scheduler.
- **Mode:** Manual/Auto— Manual if auto scheduler should activate with manual switching ON of heaters, Auto if totally automatic
- **Weekly OFF:** The day when the weekly heating auto scheduler is disabled all day.
- **Selection:** Enable/Disable— ON/OFF the auto heating on that given day.
- **ON Time Hr:** When Enabled, the hour when the heating starts; Min: When Enabled, the minute when the heating starts.
- **OFF Time Hr:** When Enabled, the hour when the heating stops; Min: When Enabled, the minute when the heating stops.
- Actual Real-time status of zone heating ON/OFF are also indicated.

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| MOLD HEIGHT                     |     | Auto Die Height Selection   |         | Method             |      |         |
|---------------------------------|-----|---|---------|--------------------|------|---------|
|                                 |     | DIE   |         | CLAMP              |      |         |
|                                 |     | Backward  | Forward | Counting           | OPEN | CLOSE   |
| Flow (%)                        |     |   |         |                    |      |         |
| Pressure(bar)                   |     |   |         |                    |      |         |
| Position (mm)                   | --- | ---   | ---     |                    |      |         |
| Required Tonnage                |     | Tons  |         | Pulses             |      |         |
| Encoder Scale Factor<Ton/Pulse> |     |   |         |                    |      |         |
| Encoder Count (Remaining)       |     |   |         |                    |      |         |
| Actual Clamp Position           |     | mm  |         |                    |      |         |
| Present Operation               |     |   |         | Stage Time         |      | sec     |
| <b>Note:</b>                    |     | Press < START > Key to Start Auto Die Ht. Sequence  |         |                    |      |         |
|                                 |     | Auto Die Height Functions Only in SET Mode. Press < CLEAR > Key to Stop Auto Die Ht. Sequence |         |                    |      |         |
| Page Name: Mold Height          |     | Page No: 26   |         | Password Level: 01 |      | Page:26 |



- This page is used for auto-die setting & auto tonnage on toggle type machines.
- The following digital inputs & outputs are need for proper functioning of this feature:
  - DIGITAL INPUTS:**
    - Mould Height Retract LSW (DI No:16)
    - Mould Height Forward LSW (DI No:15)
    - Mould Height Pulse Detector (DI No:14)
  - DIGITAL OUTPUTS:**
    - Mould Close/Open Valves (DO No:01/02)
    - Mould Height Increment/Decrement Valves (DO No:11/12)
- Auto Die Height Selection:** Enable/Disable— ON/OFF the auto die setting sequence. Before enabling this, enable Auto Tonnage on **Page:58**.
- Method:** Direct/Indirect— Direct: This is default selection.
- Required Tonnage:** The tonnage setpoint to be achieved for the die to be auto-tonnaged.
- Encoder Scale Factor<Tons/Pulse>:** The number of pulses from encoder/hydro-motor gear teeth that relates to 1 ton of locking force. Default =4(for gear teeth)
- The actual remaining encoder count, clamp position & present operation of auto-die set sequence are indicated at the bottom.
- Actual Real-time status of auto-die set related digital inputs & outputs are indicated on the right side.
- The following steps are to done to enable the operation of Auto-die setting:
  - Enable Auto Tonnage function on Page.26 & Auto Die Height on Page:58.
  - On this page set all required values for flow, pressure, required tonnage & pulses.
  - Put the PLC in SET Mode using the SET key on the keypad.
  - Press the START key to initiate the auto die tonnage sequence.
- The auto-die tonnage sequence executed by the PLC is as follows:
  - Increases the mould height for 3 seconds from the present position.
  - Starts mould closing until LSW2 is cut or mould final close position is achieved.
  - If LSW2 is not cut or final closing position is not achieved or mould scale reading is not reducing then the mould height is not sufficient for the mould to close, so PLC goes to Step 1 to increase the mould height for another 3 seconds.
  - Steps 1 to 3 are repeated until LSW2 is cut as well as final mould close position is achieved.
  - Now the PLC starts decreasing the mould height until the mould height hydraulic motor stops for at least 5 sec.
  - Now the PLC opens mould fully as per the set clamp open position.
  - Finally it decreases mould height for the set number of pulses, to get required locking tonnage.

#### Notes:

- Mould Height Retract & Forward is limited by limit switches (Optional).
- No. of Pulses = 2\* Required Tonnage/Tons per pulse.
- The above sequence can be aborted by changing the PLC mode, the present page or pressing CLR Key on the keypad.
- Mould Close & Open Position settings should be appropriate.
- The number of Pulses/sec is a maximum of 50.

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| FRONT SAFETY GATE DATA       |  | Flag No                    | Stage Time   | sec     |         |  |      |      |      |      |          |                      |                      |                      |               |                      |                      |                      |            |                      |      |       |  |  |
|------------------------------|--|----------------------------|--|---------|---------|--|------|------|------|------|----------|----------------------|----------------------|----------------------|---------------|----------------------|----------------------|----------------------|------------|----------------------|------|-------|--|--|
| Safety Gate Operation        | <input type="text"/> (Manual or Automatic)   |                            | D.I.<br>LS09 <input type="checkbox"/><br>LS10 <input type="checkbox"/> |         |         |  |      |      |      |      |          |                      |                      |                      |               |                      |                      |                      |            |                      |      |       |  |  |
| Safety Gate Type             | <input type="text"/> (Hydraulic or Pneumatic or Electric)  |                            | D.O.<br>V <input type="checkbox"/><br>V <input type="checkbox"/>       |         |         |  |      |      |      |      |          |                      |                      |                      |               |                      |                      |                      |            |                      |      |       |  |  |
| Start Safety Gate Open after | <input type="text"/> (Injection or Refill or Cooling or Mold Open)   |                            |  |         |         |  |      |      |      |      |          |                      |                      |                      |               |                      |                      |                      |            |                      |      |       |  |  |
|                              | <table border="1"> <thead> <tr> <th colspan="2">Closing</th> <th colspan="2">Opening</th> </tr> <tr> <th>Fast</th> <th>Slow</th> <th>Slow</th> <th>Fast</th> </tr> </thead> <tbody> <tr> <td>Flow (%)</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Pressure(bar)</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Time (sec)</td> <td><input type="text"/></td> <td>----</td> <td>-----</td> </tr> </tbody> </table> |                            | Closing  |         | Opening |  | Fast | Slow | Slow | Fast | Flow (%) | <input type="text"/> | <input type="text"/> | <input type="text"/> | Pressure(bar) | <input type="text"/> | <input type="text"/> | <input type="text"/> | Time (sec) | <input type="text"/> | ---- | ----- |  |  |
| Closing                      |  | Opening                    |  |         |         |  |      |      |      |      |          |                      |                      |                      |               |                      |                      |                      |            |                      |      |       |  |  |
| Fast                         | Slow   | Slow                       | Fast   |         |         |  |      |      |      |      |          |                      |                      |                      |               |                      |                      |                      |            |                      |      |       |  |  |
| Flow (%)                     | <input type="text"/>   | <input type="text"/>       | <input type="text"/>   |         |         |  |      |      |      |      |          |                      |                      |                      |               |                      |                      |                      |            |                      |      |       |  |  |
| Pressure(bar)                | <input type="text"/>   | <input type="text"/>       | <input type="text"/>   |         |         |  |      |      |      |      |          |                      |                      |                      |               |                      |                      |                      |            |                      |      |       |  |  |
| Time (sec)                   | <input type="text"/>   | ----                       | -----  |         |         |  |      |      |      |      |          |                      |                      |                      |               |                      |                      |                      |            |                      |      |       |  |  |
| Safety Gate Close ON Delay   | <input type="text"/> sec   | Safety Gate Open ON Delay  | <input type="text"/> sec   |         |         |  |      |      |      |      |          |                      |                      |                      |               |                      |                      |                      |            |                      |      |       |  |  |
| Safety Gate Close OFF Delay  | <input type="text"/> sec   | Safety Gate Open OFF Delay | <input type="text"/> sec   |         |         |  |      |      |      |      |          |                      |                      |                      |               |                      |                      |                      |            |                      |      |       |  |  |
| Safety Gate Close Timeout    | <input type="text"/> sec   |                            |  |         |         |  |      |      |      |      |          |                      |                      |                      |               |                      |                      |                      |            |                      |      |       |  |  |
| Safety Gate Close Output No  | <input type="text"/>   | Safety Gate Open Output No | <input type="text"/>   |         |         |  |      |      |      |      |          |                      |                      |                      |               |                      |                      |                      |            |                      |      |       |  |  |
| Page Name: Mold Height       |  | Page No: 26                | Password Level: 01   | Page:27 |         |  |      |      |      |      |          |                      |                      |                      |               |                      |                      |                      |            |                      |      |       |  |  |



- This page is used for automatic front safety gate operation on all type of machines.
- Front safety gate type, flow, pressure & time profiles are configurable on this page.
- **Safety Gate Operation:** Manual/Automatic;
  - Manual– Select this option when safety gate is manually opened & closed
  - Auto - Select this option when safety gate is automatically opened & closed by the PLC at the set stage of the cycle.
- **Safety Gate Type:** Hydraulic, Pneumatic or Electric;
  - Hydraulic– Select this option, when safety gate is driven by hydraulic cylinder.
  - Pneumatic– Select this option, when safety gate is driven by pneumatic piston.
  - Electric– Select this option, when safety gate is driven by electric motor.
- **Start Safety Gate Open after:** Select the stage after which the safety gate should open— Never, HoldON, Injection, Refill, Suck-back, Cooling, Decompression, Mold open, Hydraulic ejection
- **Safety Gate Close ON Delay:** Time wait in seconds, before which the safety gate close gets ON signal.
- **Safety Gate Close OFF Delay:** Time wait in seconds, before which the safety gate close gets OFF signal.
- **Safety Close Timeout:** Timeout in seconds, before which the safety gate should close or else an alarm is set & machine is stopped.
- **Safety Gate Close Output No:** The user configurable digital output number to which the safety gate close is wired.
- **Safety Gate Open ON Delay:** Time wait in seconds, before which the safety gate open gets ON signal.
- **Safety Gate Open OFF Delay:** Time wait in seconds, before which the safety gate open gets OFF signal.
- **Safety Gate Open Output No:** The user configurable digital output number to which the safety gate open is wired.
- Actual Safety gate stages & times are indicated.
- Actual Real-time status of safety gate operation related digital inputs & outputs are indicated on the right side.

Draft

**ROBOT INTERFACE DATA**      Robot Flag:

Robot Selection

Robot Start Position

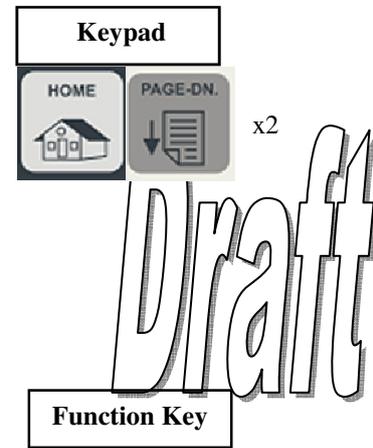
**THE FOLLOWING DATA SHOULD BE SELECTED BY AN EXPERT ONLY.  
ANY WRONG DATA ENTRY WILL DAMAGE THE MOLD AND THE ROBOT.**

| Controller/Robot Interface Signals |  | STANDBY              | ACTIVE               |
|------------------------------------|--|----------------------|----------------------|
| Robot Ready (DI)                   |  | <input type="text"/> | <input type="text"/> |
| Robot Enable (DO)                  |  | <input type="text"/> | <input type="text"/> |
| Robot Cycle Start (DO)             |  | <input type="text"/> | <input type="text"/> |
| Robot Cycle Completed (DI)         |  | <input type="text"/> | <input type="text"/> |

**Note:** Set Above Signals For SHINI (L,H, L,H, L,H, L,H) & For WETEC (L,H, L,H, L,H, H,L) Robots

**WARNING** Please Do Not Change Above Settings Without Permission

Page Name: Mold Height      Page No: 26      Password Level: 01      Page:28



- Integration & control of a **pick-and-place Robot** with the this PLC can be configured from this page.
- The PLC can be readily integrated to and work with Robot of **SHINI & WETEC** make.
- Robot Selection: Enable/Disable— ON/OFF Robot synchronization control with the PLC.
- Robot Start Position: Mold Open/Core-x Out/Ejector Forward, Select the appropriate stage when the robot sequence should be initiated.
- STANDBY: The state of the input/output signal incoming/outgoing to/from PLC, when in idle mode.
- ACTIVE: The state of the input/output signal incoming/outgoing to/from PLC, when in active/operation mode.
- Set the standby/active signal as indicated in the notes section as per the robot make.
- Actual robot & PLC stages are indicated.
- Actual Real-time status of robot operation related digital inputs & outputs are indicated on the right side.

| <b>Robot Sequence for Shini</b>  |   |
|----------------------------------|---|
| <b>Digital Inputs(PLC-Robot)</b> | <b>Operation Event</b>                                  |
| Robot Ready                      | Continuously ON, when Robot is powered ON               |
| Robot Cycle Completed            | High Pulse, when Robot finished its sequence            |
| <b>Digital (Robot-PLC)</b>       |   |
| Robot Enable                     | ON when Robot is Enabled & front safety guard is closed |
| Robot Cycle Start                | ON until Robot completes its cycle sequence             |

| <b>Robot Sequence for Wetec</b>  |   |
|----------------------------------|---|
| <b>Digital Inputs(PLC-Robot)</b> | <b>Operation Event</b>                                  |
| Robot Ready                      | Continuously ON, when Robot is powered ON               |
| Robot Cycle Completed            | ON, when Robot finished its sequence                    |
| <b>Digital (Robot-PLC)</b>       |   |
| Robot Enable                     | ON when Robot is Enabled & front safety guard is closed |
| Robot Cycle Start                | ON until Robot completes its cycle sequence             |



| TIMERS SETTINGS  |     |        |                |     |        |                 |     |        |
|------------------|-----|--------|----------------|-----|--------|-----------------|-----|--------|
| TIMERS           | Set | Actual | TIMERS         | Set | Actual | TIMERS          | Set | Actual |
| Mold Close Time  |     |        | Hold On 1 Time |     |        | Init DecompTime |     |        |
| Mold Safety Time |     |        | Hold On 2 Time |     |        | Pre Suckback    |     |        |
| Mold Lockg Time  |     |        | Hold On 3 Time |     |        | Refill 1 Time   |     |        |
| Pre Inject Time  |     |        | Hold On 4 Time |     |        | Refill 2 Time   |     |        |
| Intrugen Time    |     |        | Cooling Time   |     |        | Refill 3 Time   |     |        |
| Tot Inject Time  |     |        | Mold Open      |     |        | Post Suckback   |     |        |
| Injection 1 Time |     |        | Hold Time      |     |        | Unit Fwd 1 Time |     |        |
| Injection 2 Time |     |        |                |     |        | Unit Ret 1 Time |     |        |
| Injection 3 Time |     |        |                |     |        | Unit Ret 2 Time |     |        |
| Injection 4 Time |     |        |                |     |        | Fin Decom Time  |     |        |
| Injection 5 Time |     |        |                |     |        | Tot Cycle Time  |     |        |

Page Name: Mold Height | Page No: 26 | Password Level: 01 | Page:29

| AUXILIARY TIMERS SETTINGS |     |        |                    |     |        |                    |     |        |
|---------------------------|-----|--------|--------------------|-----|--------|--------------------|-----|--------|
| TIMERS                    | Set | Actual | TIMERS             | Set | Actual | TIMERS             | Set | Actual |
| Core 1 In Time            |     |        | Eject Fwd 1 Time   |     |        | Air Ejec1 On Time  |     |        |
| Core 1 Out Time           |     |        | Eject Fwd 2 Time   |     |        | Air Ejec1 Off Time |     |        |
| Core 2 In Time            |     |        | Eject Ret 1 Time   |     |        | Air Ejec2 On Time  |     |        |
| Core 2 Out Time           |     |        | Eject Ret 2 Time   |     |        | Air Ejec2 Off Time |     |        |
| Core 3 In Time            |     |        | Eject Osc Ret Time |     |        | Air Ejec3 On Time  |     |        |
| Core 3 Out Time           |     |        | Eject Osc Fw Time  |     |        | Air Ejec3 Off Time |     |        |
| Core 4 In Time            |     |        |                    |     |        | Air Ejec4 On Time  |     |        |
| Core 4 Out Time           |     |        |                    |     |        | Air Ejec4 Off Time |     |        |
| Unscrw Motor On           |     |        |                    |     |        |                    |     |        |

Page Name: Mold Height | Page No: 26 | Password Level: 01 | Page:30

| DELAYS SETTINGS    |     |        |                     |     |        |                       |     |        |
|--------------------|-----|--------|---------------------|-----|--------|-----------------------|-----|--------|
| Delays             | Set | Actual | Delays              | Set | Actual | Delays                | Set | Actual |
| Batch Count Delay  |     |        | Core 1 In On Delay  |     |        | Eject Start Delay     |     |        |
| SuckBack Delay     |     |        | Core 1 Out On Delay |     |        | Eject Fwd1Off Delay   |     |        |
| Refill Delay       |     |        | Core 2 In On Delay  |     |        | Eject Fwd20ff Delay   |     |        |
| Cycle Delay        |     |        | Core 2 Out On Delay |     |        | Eject Ret1 Off Delay  |     |        |
| Injection Delay    |     |        | Core 3 In On Delay  |     |        | Eject Ret 2 Off Delay |     |        |
| Pre Mld Lock Delay |     |        | Core 3 Out On Delay |     |        | Ej Osc Ret Off Delay  |     |        |
| Post Mld Lck Delay |     |        | Core 4 In On Delay  |     |        | Ej Osc Fw Off Delay   |     |        |
| Unit Fwd Delay     |     |        | Core 4 Out On Delay |     |        | Air Eject 1 On Delay  |     |        |
| Unit Ret Delay     |     |        |                     |     |        | Air Eject 2 On Delay  |     |        |
|                    |     |        |                     |     |        | Air Eject 3 On Delay  |     |        |
|                    |     |        |                     |     |        | Air Eject 4 On Delay  |     |        |

Page Name: Mold Height | Page No: 26 | Password Level: 01 | Page:31

- Page:29 & Page:30 are the timer pages for different machine operations for HAND/AUTO modes.
- Page:31 are the delay page for different machine operations for HAND/AUTO modes.
- All timing & delays set by the operator are specified in terms of seconds.
- The actual real-times of the variable are indicated.
- Times set on these page are reflected back on the respective individual operation pages & vice-versa.
- Eg: Core x times set here on Page 30 are reflected back on Core x Pages.

**Keypad**

HOME

PAGE-DN.

x2

# Draft

Function Key

# Draft

| ELECTRIC MOTOR SETTINGS  |  | Status  |
|--|--|---|
| Switched On By   | <input type="text"/>   |   |
| Starter Type   | <input type="text"/>   |   |
| Star-Delta Delay   | <input type="text"/> sec <input type="text"/> sec  |   |
| ON Delay   | <input type="text"/> sec <input type="text"/> sec  |   |
| Hand Operation   | <input type="text"/> (When Motor OFF)  |   |
| Power Saving   | <input type="text"/> Switch On Motor <input type="text"/> sec. before cooling time elapses |   |
| <b>Note:</b><br>(When Enabled Motor is Switched off During Cooling Time (After Refilling is Completed) and Switched on again Before Cooling time is Elapsed) |  | D.I.<br>LS31 <input type="checkbox"/><br><br>D.O.<br>V50 <input type="checkbox"/><br>V51 <input type="checkbox"/><br>V52 <input type="checkbox"/> |
| <b>Page Name:</b> Electric Motor Settings  |  | <b>Page No:</b> 32  |
| <b>Password Level:</b> 01  |  | <b>Page:</b> 32   |



- This page is used for main motor operation through PLC.
- **Switched On By:** Manual/PLC; Manual- Motor is ON/OFF manually through a external switch, PLC- Motor is ON/OFF automatically by the PLC
- **Starter Type:** The type of starter on the main motor –D.O.L/StrDelta  
 D.O.L: Direct ON Line Motor. This type requires only single digital output for PLC control. Default= V50  
 StrDelta: Start-Delta Motor. This type requires 3 digital outputs for PLC control. Default= V50,V51,V52
- **Star-Delta Delay:** When StrDelta type motor is selected, this delay in seconds is set for the switchover from Star to Delta phase of motor.
- **ON Delay:** Delay in seconds the motor gets ON after the motor key is pressed. Minimum=01 sec
- **Hand Operation:** Enable/Disable  
 Enable -to allow machine operations in hand without motor being ON  
 Disable -to disallow machine operations in hand without motor being ON
- **Power Saving:** Enable/Disable  
 Enable - to put off motor during long cooling periods to save energy  
 Disable - for continuous motor run in all conditions
- **Switch ON motor:** Time in seconds before cooling when the motor is switched ON back when the power saving option is Enabled.
- Digital Inputs LSW25 & LSW26 should be active/ON for the motor to be ON when the button is pressed.
- Actual Electric Motor status are indicated.
- Actual Real-time status of electric motor related digital inputs & outputs are indicated on the right side.

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| ACCUMULATOR SETTINGS            |  | Status   |
|---------------------------------|--|--|
| Function                        | <input type="text"/>   | D.I.<br>LS07 <input type="checkbox"/><br>LS08 <input type="checkbox"/>   |
| Pressure Sensors                | <input type="text"/>   |  |
| Low Pressure                    | <input type="text"/> bar   | D.O.<br>V <input type="checkbox"/><br>V <input type="checkbox"/><br>V <input type="checkbox"/><br>V <input type="checkbox"/><br>V <input type="checkbox"/><br>V <input type="checkbox"/><br>V <input type="checkbox"/> |
| High Pressure                   | <input type="text"/> bar   |  |
| ON Delay                        | <input type="text"/> sec   |  |
| Charging Sol                    | <input type="text"/> + <input type="text"/> + <input type="text"/> |  |
| Standby Sol                     | <input type="text"/> + <input type="text"/> + <input type="text"/> |  |
| Discharging Sol                 | <input type="text"/> + <input type="text"/> + <input type="text"/> |  |
| Accumulator Pressure            |  | <input type="text"/> bar   |
| Page Name: Accumulator Settings |  | Page No: 33  |
| Password Level: 01              |  | Page:33  |



- This page is used for configuring the accumulator for gas assisted injection operation through PLC.
- **Function:** Enable/Disable; ON/OFF the accumulator assisted injection PLC control.
- **Pressure Sensors:** PT-4/Limit SW. Select the appropriate sensing element connected to the PLC for accumulator operations.
  - PT-4– A pressure transducer should be connected to accumulator pressure port to continuously monitor accumulator pressure
  - Limit SW– Pressure switches to monitor the pressure limits of the accumulator
- **Low Pressure:** When PT-4 selected, The low pressure set-point when the charging of accumulator should be started by the PLC.
- **High Pressure:** When PT-4 selected, The high pressure set-point when the charging of accumulator should be stopped by the PLC.
- **On Delay:** The delay in seconds, before which the accumulator charging is switched ON.
- **Charging Sol:** The digital outputs that are wired to the accumulator & that are to be ON to start charging.
- **Standby Sol:** The digital outputs that are wired to the accumulator & that are to be ON during idle condition of accumulator.
- **Discharging Sol:** The digital outputs that are wired to the accumulator & to be OFF to start discharging.
- When Limit SW is selected, LS07 & LS08 digital inputs are used as the High & Low pressure limits.
- All above digital outputs are configurable by the user.
- Actual Accumulator status is indicated.
- Actual Real-time status of accumulator related digital inputs & outputs are indicated on the right side.

Draft

| LUBRICATION DATA SETTINGS  |                      |   |           |     |           |                                 |                      |                      |                            |                      |                      |                           |                      |                      |                           |                      |                      |                                    |                      |                      |                                    |                      |                      |
|--|----------------------|---|-----------|-----|-----------|---------------------------------|----------------------|----------------------|----------------------------|----------------------|----------------------|---------------------------|----------------------|----------------------|---------------------------|----------------------|----------------------|------------------------------------|----------------------|----------------------|------------------------------------|----------------------|----------------------|
| Lubrication Flag   |                      | <input type="checkbox"/>  |           |     |           |                                 |                      |                      |                            |                      |                      |                           |                      |                      |                           |                      |                      |                                    |                      |                      |                                    |                      |                      |
| Lubrication Selection  | <input type="text"/> | (Disable, Grease, Lub.Oil, Open Loop)   |           |     |           |                                 |                      |                      |                            |                      |                      |                           |                      |                      |                           |                      |                      |                                    |                      |                      |                                    |                      |                      |
| Lubrication Mode   | <input type="text"/> | (Timer / Shot Based)  |           |     |           |                                 |                      |                      |                            |                      |                      |                           |                      |                      |                           |                      |                      |                                    |                      |                      |                                    |                      |                      |
| <table border="1"> <thead> <tr> <th>Operation</th> <th>Set</th> <th>Remaining</th> </tr> </thead> <tbody> <tr> <td>Lubrication Interval Time (min)</td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Lubrication Interval Shots</td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Lubrication On Time (sec)</td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Lubrication Repeat Cycles</td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Lubrication Feedback Timeout (sec)</td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Lubrication Minimum Off Time (sec)</td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> </tbody> </table> |                      |   | Operation | Set | Remaining | Lubrication Interval Time (min) | <input type="text"/> | <input type="text"/> | Lubrication Interval Shots | <input type="text"/> | <input type="text"/> | Lubrication On Time (sec) | <input type="text"/> | <input type="text"/> | Lubrication Repeat Cycles | <input type="text"/> | <input type="text"/> | Lubrication Feedback Timeout (sec) | <input type="text"/> | <input type="text"/> | Lubrication Minimum Off Time (sec) | <input type="text"/> | <input type="text"/> |
| Operation  | Set                  | Remaining   |           |     |           |                                 |                      |                      |                            |                      |                      |                           |                      |                      |                           |                      |                      |                                    |                      |                      |                                    |                      |                      |
| Lubrication Interval Time (min)  | <input type="text"/> | <input type="text"/>  |           |     |           |                                 |                      |                      |                            |                      |                      |                           |                      |                      |                           |                      |                      |                                    |                      |                      |                                    |                      |                      |
| Lubrication Interval Shots   | <input type="text"/> | <input type="text"/>  |           |     |           |                                 |                      |                      |                            |                      |                      |                           |                      |                      |                           |                      |                      |                                    |                      |                      |                                    |                      |                      |
| Lubrication On Time (sec)  | <input type="text"/> | <input type="text"/>  |           |     |           |                                 |                      |                      |                            |                      |                      |                           |                      |                      |                           |                      |                      |                                    |                      |                      |                                    |                      |                      |
| Lubrication Repeat Cycles  | <input type="text"/> | <input type="text"/>  |           |     |           |                                 |                      |                      |                            |                      |                      |                           |                      |                      |                           |                      |                      |                                    |                      |                      |                                    |                      |                      |
| Lubrication Feedback Timeout (sec)   | <input type="text"/> | <input type="text"/>  |           |     |           |                                 |                      |                      |                            |                      |                      |                           |                      |                      |                           |                      |                      |                                    |                      |                      |                                    |                      |                      |
| Lubrication Minimum Off Time (sec)   | <input type="text"/> | <input type="text"/>  |           |     |           |                                 |                      |                      |                            |                      |                      |                           |                      |                      |                           |                      |                      |                                    |                      |                      |                                    |                      |                      |
| <div style="border: 1px solid black; padding: 2px; display: inline-block; background-color: red; color: white; border-radius: 5px;">WARNING</div><br><div style="border: 1px solid red; padding: 2px; display: inline-block; background-color: white; color: red;">Please Do Not Change Above Values Without Permission</div>  |                      |   |           |     |           |                                 |                      |                      |                            |                      |                      |                           |                      |                      |                           |                      |                      |                                    |                      |                      |                                    |                      |                      |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">D.I.</div><br>LS25 <input type="checkbox"/><br>LS26 <input type="checkbox"/>  |                      | <div style="border: 1px solid black; padding: 2px; display: inline-block;">D.O.</div><br>V47 <input type="checkbox"/> |           |     |           |                                 |                      |                      |                            |                      |                      |                           |                      |                      |                           |                      |                      |                                    |                      |                      |                                    |                      |                      |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">Keypad</div><br><div style="display: flex; gap: 5px;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">HOME</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">PAGE-DN.</div> </div> <div style="font-size: 2em; font-weight: bold; margin-left: 20px;">Draft</div>  |                      | <div style="border: 1px solid black; padding: 2px; display: inline-block;">Function Key</div>                         |           |     |           |                                 |                      |                      |                            |                      |                      |                           |                      |                      |                           |                      |                      |                                    |                      |                      |                                    |                      |                      |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">Page Name: Lubrication Data Set</div>   |                      | <div style="border: 1px solid black; padding: 2px; display: inline-block;">Page No: 34</div>                          |           |     |           |                                 |                      |                      |                            |                      |                      |                           |                      |                      |                           |                      |                      |                                    |                      |                      |                                    |                      |                      |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">Password Level: 01</div>  |                      | <div style="border: 1px solid black; padding: 2px; display: inline-block;">Page:34</div>                              |           |     |           |                                 |                      |                      |                            |                      |                      |                           |                      |                      |                           |                      |                      |                                    |                      |                      |                                    |                      |                      |

- This page is used for configuring the lubrication control on mostly toggle machines.
- **Lubrication Selection:** Disable/Grease/Lub.Oil/Open Loop  
 Disable- The lubrication system is completely disabled  
 Grease- The lubrication system is grease type. Greasing system should be present on the machine for this option.  
 Lub. Oil- Default type. Select this option when lube oil is used for lubrication & digital inputs used for feedback.  
 Open Loop- Select this option when no lubrication need to done in time mode without any feedbacks
- **Lubrication Mode:** Timer/Shot  
 Timer- lubrication output is ON based on periodic intervals of time defined by the Lubrication Interval Time setting  
 Shot- lubrication output is ON based on the periodic intervals of shots defined by the Lubrication Interval Shots
- **Lubrication Interval Time:** The time interval after which lubrication should be put ON.
- **Lubrication Interval Shots:** The shot interval after which lubrication should be put ON.
- **Lubrication On Time:** Time in seconds, during which the lubrication is put continuously ON.
- **Lubrication Repeat Cycles:** The no of cycles to be repeated in grease mode. When reached the one grease cycle ends.
- **Lubrication Feedback Timeout:** Timeout in seconds before which if feedback is not received the lubrication aborts.
- **Lubrication Minimum Off time:** The minimum time in seconds during which the lubrication system should be OFF.
- Actual Lubrication present status is indicated.
- Actual Real-time status of lubrication related digital inputs & outputs are indicated on the right side.

Draft

| AUXILLARY 1 & 2 DATA    |      |      |
|-------------------------|------|------|
| AUX No.                 | AUX1 | AUX2 |
| Selection               |      |      |
| IN: Start Flag No.      |      |      |
| IN: ON Delay (sec)      |      |      |
| IN: ON Time (sec)       |      |      |
| IN: Digital Output No.  |      |      |
| OUT: Start Flag No.     |      |      |
| OUT: ON Delay (sec)     |      |      |
| OUT: ON Time (sec)      |      |      |
| OUT: Digital Output No. |      |      |
| Present Operation       |      |      |

| D.O. |                          |
|------|--------------------------|
| V    | <input type="checkbox"/> |

|   |   |
|---|---|
| <b>Keypad</b>   |   |
| HOME  | PAGE-DN.  |
|  |  |
| x2  |   |
| Draft   |   |
| <b>Function Key</b>   |   |

|                               |                    |                           |                |
|-------------------------------|--------------------|---------------------------|----------------|
| <i>Page Name:</i> Mold Height | <i>Page No:</i> 26 | <i>Password Level:</i> 01 | <b>Page:35</b> |
|-------------------------------|--------------------|---------------------------|----------------|

- This page is used for operating 2 extra auxiliary/extra/special cylinder pistons at any point of time during the machine cycle.
- On this page the user can configure the Start Flag No, Delays, Digital output of individual auxiliary.
- 2 spare digital outputs are to be used for each auxiliary feature.
- IN: Start Flag No: The flag/stage number when the auxiliary 1/2 forward/IN digital output should be put ON.
- IN: ON Delay(sec): Delay in seconds, before which the Aux-1/2 forward/IN signal is put ON.
- IN: ON Time(sec): Duration in seconds, for which the Aux-1/2 forward/IN signal is put ON.
- IN: Digital Output No.: User configurable digital output to which the Aux 1/2 forward/IN solenoid is wired to.
- OUT: Start Flag No: The flag/stage number when the auxiliary 1/2 retract/OUT digital output should be put ON.
- OUT: ON Delay(sec): Delay in seconds, before which the Aux-1/2 retract/OUT signal is put ON.
- OUT: ON Time(sec): Duration in seconds, for which the Aux-1/2 retract/OUT signal is put ON.
- OUT: Digital Output No.: User configurable digital output to which the Aux 1/2 retract/OUT solenoid is wired to.
- Actual Auxiliary present status is indicated.
- Actual Real-time status of auxiliary related digital inputs & outputs are indicated on the right side.

Draft

**SERVICE MENU**

0. Digital Input Status
1. Digital Output Status
2. Analog Input Calibration
3. Analog Output Calibration
4. Maximum Values Settings
5. Real Time Clock Settings
6. Machine Manufacture Settings
7. Machine Configuration
8. Transferring & Checking of Outputs
9. Keypad Checking

*Page Name:* Mold Height*Page No:* 26*Password Level:* 01

Page:40

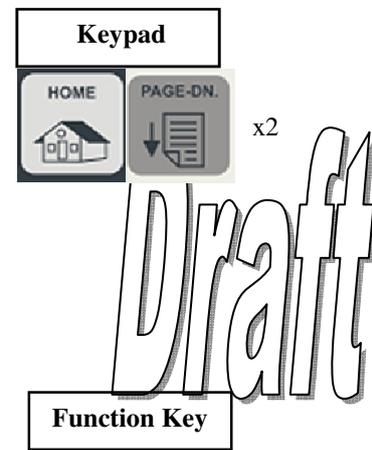
- All service oriented items like PLC Inputs/Outputs Status, Sensor calibration, Real Time clock, Machine Settings, Maximum values of all variables can be selected from this page.
- As per the required item choice from the menu list, one has to enter values between 0-9.
- The user will be redirected automatically to the page of valid choice entered.



Draft

| Inputs                        | Digital Input Description           | Status             | Inputs                    | Digital Input Description       | Status          |
|-------------------------------|-------------------------------------|--------------------|---------------------------|---------------------------------|-----------------|
| LS01                          | Transferable                        |                    | LS17                      | Core-1 In LSW                   |                 |
| LS02                          | Mold locking confirmation           |                    | LS18                      | Core-1 Out LSW                  |                 |
| LS03                          | Ejector forward position            |                    | LS19                      | Core-2 In LSW                   |                 |
| LS04                          | Ejector retract position            |                    | LS20                      | Core-2 Out LSW                  |                 |
| LS05                          | Carriage forward position           |                    | LS21                      | Core-3 In LSW                   |                 |
| LS06                          | Carriage retract position           |                    | LS22                      | Core-3 Out LSW                  |                 |
| LS07                          | Robot Ready input /Accumulator LP   |                    | LS23                      | Core-4 In LSW                   |                 |
| LS08                          | Robot Cycle Complete/Accumulator HP |                    | LS24                      | Core-4 Out LSW                  |                 |
| LS09                          | Front Safety Guard Open LSW         |                    | LS25                      | Hyd.Oil+Lub.Oil Level Low       |                 |
| LS10                          | Front Safety Guard Close LSW        |                    | LS26                      | Lubrication Oil Pressure Sw     |                 |
| LS11                          | Rear Safety Guard Close LSW         |                    | LS27                      | Drop Detector Sensor            |                 |
| LS12                          | Nozle Safety Guard Close LSW        |                    | LS28                      | Energy Meter Pulse Input        |                 |
| LS13                          | Minimum Mold Height Safety LSW      |                    | LS29                      | Hopper Empty Sensor             |                 |
| LS14                          | Die Height Pulse Detector           |                    | LS30                      | Screw Speed Proxy Sensor        |                 |
| LS15                          | Mold Height Forward LSW             |                    | LS31                      | Electric Motor On (Delta) Input |                 |
| LS16                          | Mold Height Retract LSW             |                    | LS32                      | Emergency Push Button Input     |                 |
| <i>Page Name:</i> Mold Height |                                     | <i>Page No:</i> 26 | <i>Password Level:</i> 01 |                                 | <i>Page:</i> 41 |

- All Inputs from **Port:1-4** i.e. Digital Inputs **01-32** status can be viewed from this page.
- Real-time status of the digital input is displayed across in the adjacent status column.
- An “ON” Status indicates PLC is sensing the corresponding signal at the instant.
- An “OFF” Status indicates PLC is not sensing the corresponding signal at the instant.
- No values are settable / configurable on this screen.



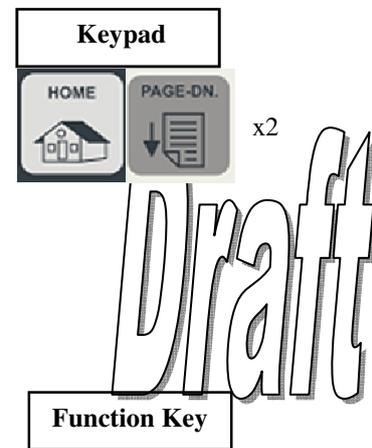
Draft

| Outputs                       | Digital Output Description | Status             | Outputs                   | Digital Output Description | Status         |
|-------------------------------|----------------------------|--------------------|---------------------------|----------------------------|----------------|
| V01                           | Mould Close                |                    | V17                       | Spare (User Defined)       |                |
| V02                           | Mould Open                 |                    | V18                       | Spare (User Defined)       |                |
| V03                           | Injection                  |                    | V19                       | Spare (User Defined)       |                |
| V04                           | Suck Back                  |                    | V20                       | Spare (User Defined)       |                |
| V05                           | Dosing/Refill              |                    | V21                       | Spare (User Defined)       |                |
| V06                           | Carriage Forward           |                    | V22                       | Spare (User Defined)       |                |
| V07                           | Carriage Retract           |                    | V23                       | Spare (User Defined)       |                |
| V08                           | Back Pressure              |                    | V24                       | Spare (User Defined)       |                |
| V09                           | Hyd.Ejector Forward        |                    | V25                       | Spare (User Defined)       |                |
| V10                           | Hyd.Ejector Retract        |                    | V26                       | Spare (User Defined)       |                |
| V11                           | Mould Height Retract(+)    |                    | V27                       | Spare (User Defined)       |                |
| V12                           | Mould Height Forward(-)    |                    | V28                       | Spare (User Defined)       |                |
| V13                           | Pump-1 Vent/Relief         |                    | V29                       | Spare (User Defined)       |                |
| V14                           | Pump-2 Vent/Relief         |                    | V30                       | Spare (User Defined)       |                |
| V15                           | Pump-3 Vent/Relief         |                    | V31                       | Spare (User Defined)       |                |
| V16                           | Pump-4 Vent/Relief         |                    | V32                       | Spare (User Defined)       |                |
| <i>Page Name: Mold Height</i> |                            | <i>Page No: 26</i> | <i>Password Level: 01</i> |                            | <i>Page:42</i> |

- All Outputs from **Port:1-2** i.e. Digital outputs **01-32** status can be viewed from this page.
- Real-time status of the digital output is displayed across in the adjacent status column.
- An “ON” Status indicates PLC is outputting the corresponding signal at the instant.
- An “OFF” Status indicates PLC is not outputting the corresponding signal at the instant.
- No values are settable / configurable on this screen.

| Outputs                       | Digital Output Description | Status             | Outputs                   | Digital Output Description        | Status         |
|-------------------------------|----------------------------|--------------------|---------------------------|-----------------------------------|----------------|
| V33                           | Core 1 In                  |                    | V49                       | Product Unscrew Motor Contactor   |                |
| V34                           | Core 1 Out                 |                    | V50                       | Elect. Motor Starter Contactor K1 |                |
| V35                           | Core 2 In                  |                    | V51                       | Elect. Motor Starter Contactor K2 |                |
| V36                           | Core 2 Out                 |                    | V52                       | Elect. Motor Starter Contactor K3 |                |
| V37                           | Core 3 In                  |                    | V53                       | Zone-01 Linear/Digital SSR        |                |
| V38                           | Core 3 Out                 |                    | V54                       | Zone-02 Linear/Digital SSR        |                |
| V39                           | Core 4 In                  |                    | V55                       | Zone-03 Linear/Digital SSR        |                |
| V40                           | Core 4 Out                 |                    | V56                       | Zone-04 Linear/Digital SSR        |                |
| V41                           | Air Ejector-1              |                    | V57                       | Zone-05 Linear/Digital SSR        |                |
| V42                           | Air Ejector-2              |                    | V58                       | Zone-06 Linear/Digital SSR        |                |
| V43                           | Air Ejector-3              |                    | V59                       | Zone-07 Linear/Digital SSR        |                |
| V44                           | Air Ejector-4              |                    | V60                       | Zone-08 Linear/Digital SSR        |                |
| V45                           | Robot Enable               |                    | V61                       | Zone-09 Linear/Digital SSR        |                |
| V46                           | Robot Cycle Start          |                    | V62                       | Zone-10 Linear/Digital SSR        |                |
| V47                           | Lubrication Relay/SSR      |                    | V63                       | Hyd.Oil Heating Digital SSR       |                |
| V48                           | Hooter/Buzzer Relay/SSR    |                    | V64                       | Nozzle Linear/Digital SSR         |                |
| <i>Page Name: Mold Height</i> |                            | <i>Page No: 26</i> | <i>Password Level: 01</i> |                                   | <i>Page:43</i> |

- All Outputs from **Port:3-4** i.e. Digital outputs **33-64** status can be viewed from this page.
- Real-time status of the digital output is displayed across in the adjacent status column.
- An “ON” Status indicates PLC is outputting the corresponding signal at the instant.
- An “OFF” Status indicates PLC is not outputting the corresponding signal at the instant.
- No values are settable / configurable on this screen.



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| ANALOG INPUT CALIBRATION                             |       |       |             |      | Zone Temp          | Count | Zero    | Span | Deg.C |
|--|-------|-------|-------------|------|--------------------|-------|---------|------|-------|
| <b>Linear Scales</b>                                 |       |       |             |      | Zone 1             |       |         |      |       |
| Clamp  | Scale | Count | Zero        | Span | mm                 |       |         |      |       |
| Screw  | Scale |       |             |      |                    |       |         |      |       |
| Ejector  | Scale |       |             |      |                    |       |         |      |       |
| Carriage   | Scale |       |             |      |                    |       |         |      |       |
| <b>Pre.Transducers</b>                               |       |       |             |      | Zone 2             |       |         |      |       |
| System   | PT    | Count | Zero        | Span | bar                |       |         |      |       |
| Locking  | PT    |       |             |      |                    |       |         |      |       |
| Injection  | PT    |       |             |      |                    |       |         |      |       |
| Accumulator  | PT    |       |             |      |                    |       |         |      |       |
| <b>WARNING</b>                                       |       |       |             |      | Zone 3             |       |         |      |       |
| Please Do Not Change Above Values Without Permission |       |       |             |      | Zone 4             |       |         |      |       |
|  |       |       |             |      | Zone 5             |       |         |      |       |
|  |       |       |             |      | Zone 6             |       |         |      |       |
|  |       |       |             |      | Zone 7             |       |         |      |       |
|  |       |       |             |      | Zone 8             |       |         |      |       |
|  |       |       |             |      | Zone 9             |       |         |      |       |
|  |       |       |             |      | Zone 10            |       |         |      |       |
|  |       |       |             |      | Hyd.Oil            |       |         |      |       |
|  |       |       |             |      | Amb Temp           |       |         |      |       |
| Page Name: Mold Height                               |       |       | Page No: 26 |      | Password Level: 01 |       | Page:44 |      |       |



- All Linear Potentiometer Scales & Pressure Transducer connected to the PLC are calibrated from this page.
- The four columns i.e. Count, Zero, Span & Value against each sensor form the basis of calibration.
- For scales/linear potentiometer greater than  $\geq 2000$ mm, the jumpers on the I/O Board should be shorted.
- **Only Zero & Span columns are settable/configurable.** Count & Actual Values columns are for monitoring purposes.
- To **CALIBRATE ANY SCALE/LINEAR POTENTIOMETER SENSOR** for the first time:
  - Make the sensor reading minimum, ideally to zero(check from Actual Value column)
  - Now observe the Count value from the Count column against the sensor, & enter the 4-digit count number into Zero column against the sensor.
  - Now make the sensor reading maximum as per the required application (check from Actual Value column)
  - Now observe the Count value against the sensor from the Count column, & enter the 4-digit count number into Span column against the sensor.
  - Now, turn back the sensor to its minimum reading, ideally to zero(check from Actual Value column) & check whether the actual value reflects the minimum value(Zero).If not redo Step(b)
  - Now, turn back the sensor to maximum reading as per the required application (check from Actual Value column) & check whether the actual value reflects the maximum value. If not redo Step(d).
- To **CALIBRATE LOCKING PRESSURE TRANSDUCER** for the first time,
  - Zero— In clamp not locked state, observe the Count value from the Count column against the sensor, & enter the 4-digit count number into Zero column against the sensor.
  - Span— In clamp fully locked state, adjust the 4-digit count number in Span column against the sensor in such a way that the real-value in bar matches to that on the physical pressure gauge of the machine.
- All **TEMPERATURE SENSORS CONNECTED TO THE PLC ARE CALIBRATED** from this page.
- The type of temperature sensor used for measuring actual zone temperature has to be selected
  - PT-100 RTD/J-type/K-type** thermocouple before calibration procedure.
- The four columns i.e. Count, Zero, Span & Value against each sensor form the basis of calibration.
- **Only Zero & Span columns are settable/configurable.** Count & Actual Values columns are for monitoring purposes.
- The maximum possible Temperature zones including Hydraulic Oil =**11**
- If **J-type or K-type thermocouple** is selected it should be **Isolated-type**.
- If 999C is displayed in Deg. C column the temperature sensor is open.
- If 0C is displayed in Deg. C column the temperature sensor is shorted.

| ANALOG INPUT CALIBRATION                             |       |       |      |      | Zone Temp | Count | Zero | Span | Deg.C |
|--|-------|-------|------|------|-----------|-------|------|------|-------|
| <b>Linear Scales</b>                                 |       |       |      |      | Zone 1    |       |      |      |       |
| Clamp  | Scale | Count | Zero | Span | mm        |       |      |      |       |
| Screw  | Scale |       |      |      |           |       |      |      |       |
| Ejector  | Scale |       |      |      |           |       |      |      |       |
| Carriage   | Scale |       |      |      |           |       |      |      |       |
| <b>Pre.Transducers</b>                               |       |       |      |      | Zone 2    |       |      |      |       |
| System   | PT    |       | Zero | Span | bar       |       |      |      |       |
| Locking  | PT    |       |      |      |           |       |      |      |       |
| Injection  | PT    |       |      |      |           |       |      |      |       |
| Accumulator  | PT    |       |      |      |           |       |      |      |       |
| <b>WARNING</b>                                       |       |       |      |      | Zone 3    |       |      |      |       |
| Please Do Not Change Above Values Without Permission |       |       |      |      | Zone 4    |       |      |      |       |
| Page Name: Mold Height                               |       |       |      |      | Zone 5    |       |      |      |       |
| Page No: 26  |       |       |      |      | Zone 6    |       |      |      |       |
| Password Level: 01                                   |       |       |      |      | Zone 7    |       |      |      |       |
| Page:44  |       |       |      |      | Zone 8    |       |      |      |       |
|  |       |       |      |      | Zone 9    |       |      |      |       |
|  |       |       |      |      | Zone 10   |       |      |      |       |
|  |       |       |      |      | Hyd.Oil   |       |      |      |       |
|  |       |       |      |      | Amb Temp  |       |      |      |       |



- Generally the temperature channels are factory-calibrated first-time.
- The zero & span values are labelled on the temperature card for quick setting.
- Though to calibrate any temperature sensor:

### Zero Adjustment:

**Thermocouple**> **Short** zone  $\pm$  terminals & adjust zero count such that it displays ambient temperature in actual reading.

**PT-100**> Fix **110 $\Omega$**  to zone  $\pm$  terminals & adjust zero count such that it displays **26 $^{\circ}$ C** in actual reading.

### Span Adjustment:

**J-type Thermocouple**> Provide **21.848mv** to zone  $\pm$  terminals & adjust span count such that it displays **400 $^{\circ}$ C+ambient temperature** in actual zone reading.

**K-type Thermocouple**> Provide **16.397mv** to zone  $\pm$  terminals & adjust span count such that it displays **400 $^{\circ}$ C+ambient temperature** in actual zone reading.

**PT-100**> Fix **220 $\Omega$**  to zone  $\pm$  terminals & adjust zero count such that it displays **323 $^{\circ}$ C** in actual reading.

- Ambient temperature sensor calibration is factory-done. Don't change the zero & span values of this sensor.

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**DAC - 1 OUTPUT CALIBRATION**

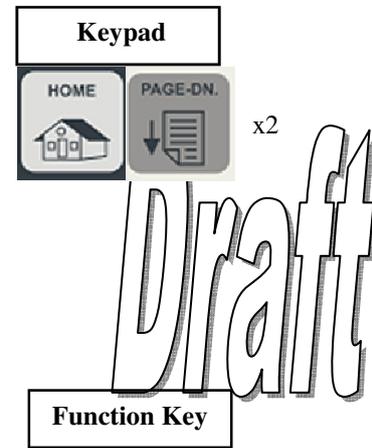
Name

|        |   |   |         |
|--------|---|---|---------|
| +10.00 | + | - | - 10.00 |
| +09.00 | + | - | - 09.00 |
| +08.00 | + | - | - 08.00 |
| +07.00 | + | - | - 07.00 |
| +06.00 | + | - | - 06.00 |
| +05.00 | + | - | - 05.00 |
| +04.00 | + | - | - 04.00 |
| +03.00 | + | - | - 03.00 |
| +02.00 | + | - | - 02.00 |
| +01.00 | + | - | - 01.00 |
| +00.01 | + | - | - 00.01 |

**Note:** To Test DAC Output Press <ACK> Key (SET Mode Only)

Actual DAC - 1 Output

Page Name: Mold Height    Page No: 26    Password Level: 01    Page:45



- This page displays the first analog/proportional outputs, assigned as **DAC1**; to be calibrated by the machine manufacturer.
- Each analog/proportional output gives out a voltage output in range of **-10 to +10 VDC**.
- Each DAC can be calibrated using **10 points** using curve fit method on either side of zero.
- The machine manufacturer can change the calibration according to the proportional valve characteristics or as per the drive connected.
- By default, **DAC1, DAC3, DAC5 & DAC7** channels corresponds to required **Flow output** while **DAC2, DAC4, DAC6 & DAC8** channels corresponds to required **Pressure output** during each stage of machine operation.
- By default, all DAC channels are linearly calibrated.

| Voltage | DAC for 5V max | Voltage | DAC for 2.5V max | Voltage | DAC for 10V max |
|---------|----------------|---------|------------------|---------|-----------------|
| 0.0     | 0.00           | 0.0     | 0.00             | 0.0     | 0.00            |
| 1.0     | 0.50           | 1.0     | 0.25             | 1.0     | 1.00            |
| 2.0     | 1.00           | 2.0     | 0.50             | 2.0     | 2.00            |
| 3.0     | 1.50           | 3.0     | 0.75             | 3.0     | 3.00            |
| 4.0     | 2.00           | 4.0     | 1.00             | 4.0     | 4.00            |
| 5.0     | 2.50           | 5.0     | 1.25             | 5.0     | 5.00            |
| 6.0     | 3.00           | 6.0     | 1.50             | 6.0     | 6.00            |
| 7.0     | 3.50           | 7.0     | 1.75             | 7.0     | 7.00            |
| 8.0     | 4.00           | 8.0     | 2.00             | 8.0     | 8.00            |
| 9.0     | 4.50           | 9.0     | 2.25             | 9.0     | 9.00            |
| 10.0    | 5.00           | 10.0    | 2.50             | 10.0    | 10.00           |

- The graph on the right depicts the calibration curve as per the values set in the calibration table. In general, a linear curve contributes to a smoother function.
- The actual voltage generated & outputted at the corresponding DAC channel output is shown below the graph.
- To view the actual voltage outputted, place the cursor on any of the values & press <ACK> button in SET mode.
- The maximum limit, gain & offset of each DAC channel can be configured on **Page:55**.
- The polarity, delays & ramps of the DAC signal outputted can be set on **Page:90 & Page:91** in HAND & AUTO mode respectively.
- The dither on DAC signal can be adjusted from **Page:55**.

**DAC - 2 OUTPUT CALIBRATION**

Name:

|        |   |   |         |
|--------|---|---|---------|
| +10.00 | + | - | - 10.00 |
| +09.00 | + | - | - 09.00 |
| +08.00 | + | - | - 08.00 |
| +07.00 | + | - | - 07.00 |
| +06.00 | + | - | - 06.00 |
| +05.00 | + | - | - 05.00 |
| +04.00 | + | - | - 04.00 |
| +03.00 | + | - | - 03.00 |
| +02.00 | + | - | - 02.00 |
| +01.00 | + | - | - 01.00 |
| +00.01 | + | - | - 00.01 |

Note: To Test DAC Output Press <ACK> Key (SET Mode Only) Actual DAC - 2 Output

Page Name: Mold Height | Page No: 26 | Password Level: 01 | Page:46



- This page displays the second analog/proportional outputs, assigned as **DAC2**; to be calibrated by the machine manufacturer.
- Each analog/proportional output gives out a voltage output in range of **-10 to +10 VDC**.
- Each DAC can be calibrated using **10 points** using curve fit method on either side of zero.
- The machine manufacturer can change the calibration according to the proportional valve characteristics or as per the drive connected.
- By default, **DAC1, DAC3, DAC5 & DAC7** channels corresponds to required **Flow output** while **DAC2, DAC4, DAC6 & DAC8** channels corresponds to required **Pressure output** during each stage of machine operation.
- By default, all DAC channels are linearly calibrated.

| Voltage | DAC for 5V max | Voltage | DAC for 2.5V max | Voltage | DAC for 10V max |
|---------|----------------|---------|------------------|---------|-----------------|
| 0.0     | 0.00           | 0.0     | 0.00             | 0.0     | 0.00            |
| 1.0     | 0.50           | 1.0     | 0.25             | 1.0     | 1.00            |
| 2.0     | 1.00           | 2.0     | 0.50             | 2.0     | 2.00            |
| 3.0     | 1.50           | 3.0     | 0.75             | 3.0     | 3.00            |
| 4.0     | 2.00           | 4.0     | 1.00             | 4.0     | 4.00            |
| 5.0     | 2.50           | 5.0     | 1.25             | 5.0     | 5.00            |
| 6.0     | 3.00           | 6.0     | 1.50             | 6.0     | 6.00            |
| 7.0     | 3.50           | 7.0     | 1.75             | 7.0     | 7.00            |
| 8.0     | 4.00           | 8.0     | 2.00             | 8.0     | 8.00            |
| 9.0     | 4.50           | 9.0     | 2.25             | 9.0     | 9.00            |
| 10.0    | 5.00           | 10.0    | 2.50             | 10.0    | 10.00           |

- The graph on the right depicts the calibration curve as per the values set in the calibration table. In general, a linear curve contributes to a smoother function.
- The actual voltage generated & outputted at the corresponding DAC channel output is shown below the graph.
- To view the actual voltage outputted, place the cursor on any of the values & press <ACK> button in SET mode.
- The maximum limit, gain & offset of each DAC channel can be configured on **Page:55**.
- The polarity, delays & ramps of the DAC signal outputted can be set on **Page:90 & Page:91** in HAND & AUTO mode respectively.
- The dither on DAC signal can be adjusted from **Page:55**.

**DAC - 3 OUTPUT CALIBRATION**

Name

|        |   |   |         |
|--------|---|---|---------|
| +10.00 | + | - | - 10.00 |
| +09.00 | + | - | - 09.00 |
| +08.00 | + | - | - 08.00 |
| +07.00 | + | - | - 07.00 |
| +06.00 | + | - | - 06.00 |
| +05.00 | + | - | - 05.00 |
| +04.00 | + | - | - 04.00 |
| +03.00 | + | - | - 03.00 |
| +02.00 | + | - | - 02.00 |
| +01.00 | + | - | - 01.00 |
| +00.01 | + | - | - 00.01 |

**Note:** To Test DAC Output Press <ACK> Key (SET Mode Only) Actual DAC - 3 Output

Page Name: Mold Height | Page No: 26 | Password Level: 01 | Page:47

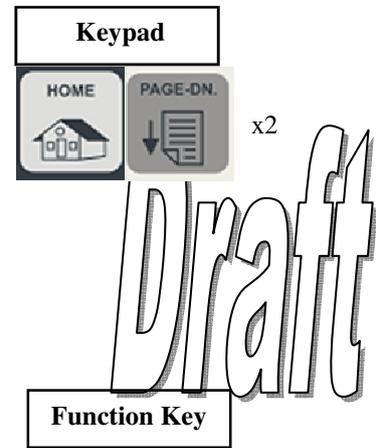
**DAC - 4 OUTPUT CALIBRATION**

Name

|        |   |   |         |
|--------|---|---|---------|
| +10.00 | + | - | - 10.00 |
| +09.00 | + | - | - 09.00 |
| +08.00 | + | - | - 08.00 |
| +07.00 | + | - | - 07.00 |
| +06.00 | + | - | - 06.00 |
| +05.00 | + | - | - 05.00 |
| +04.00 | + | - | - 04.00 |
| +03.00 | + | - | - 03.00 |
| +02.00 | + | - | - 02.00 |
| +01.00 | + | - | - 01.00 |
| +00.01 | + | - | - 00.01 |

**Note:** To Test DAC Output Press <ACK> Key (SET Mode Only) Actual DAC - 4 Output

Page Name: Mold Height | Page No: 26 | Password Level: 01 | Page:48



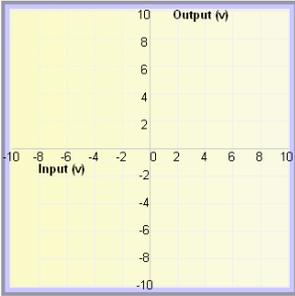
- The above page displays the 3rd & 4th analog/proportional outputs, assigned as **DAC3 & DAC4** respectively; to be calibrated by the machine manufacturer.
- For calibration read description for Page:45, Page:46.

Draft

**DAC - 5 OUTPUT CALIBRATION**

Name

|        |   |   |         |
|--------|---|---|---------|
| +10.00 | + | - | - 10.00 |
| +09.00 | + | - | - 09.00 |
| +08.00 | + | - | - 08.00 |
| +07.00 | + | - | - 07.00 |
| +06.00 | + | - | - 06.00 |
| +05.00 | + | - | - 05.00 |
| +04.00 | + | - | - 04.00 |
| +03.00 | + | - | - 03.00 |
| +02.00 | + | - | - 02.00 |
| +01.00 | + | - | - 01.00 |
| +00.01 | + | - | - 00.01 |



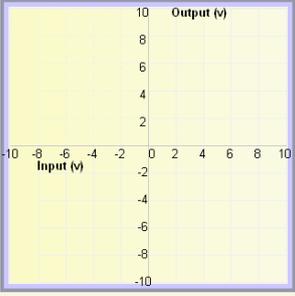
**Note:** To Test DAC Output Press <ACK> Key (SET Mode Only) Actual DAC - 5 Output

Page:49

**DAC - 6 OUTPUT CALIBRATION**

Name

|        |   |   |         |
|--------|---|---|---------|
| +10.00 | + | - | - 10.00 |
| +09.00 | + | - | - 09.00 |
| +08.00 | + | - | - 08.00 |
| +07.00 | + | - | - 07.00 |
| +06.00 | + | - | - 06.00 |
| +05.00 | + | - | - 05.00 |
| +04.00 | + | - | - 04.00 |
| +03.00 | + | - | - 03.00 |
| +02.00 | + | - | - 02.00 |
| +01.00 | + | - | - 01.00 |
| +00.01 | + | - | - 00.01 |



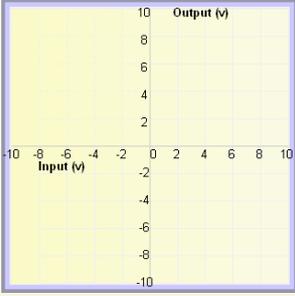
**Note:** To Test DAC Output Press <ACK> Key (SET Mode Only) Actual DAC - 6 Output

Page:50

**DAC - 7 OUTPUT CALIBRATION**

Name

|        |   |   |         |
|--------|---|---|---------|
| +10.00 | + | - | - 10.00 |
| +09.00 | + | - | - 09.00 |
| +08.00 | + | - | - 08.00 |
| +07.00 | + | - | - 07.00 |
| +06.00 | + | - | - 06.00 |
| +05.00 | + | - | - 05.00 |
| +04.00 | + | - | - 04.00 |
| +03.00 | + | - | - 03.00 |
| +02.00 | + | - | - 02.00 |
| +01.00 | + | - | - 01.00 |
| +00.01 | + | - | - 00.01 |



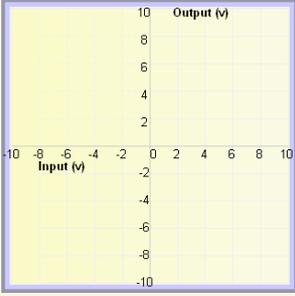
**Note:** To Test DAC Output Press <ACK> Key (SET Mode Only) Actual DAC - 7 Output

Page:51

**DAC - 8 OUTPUT CALIBRATION**

Name

|        |   |   |         |
|--------|---|---|---------|
| +10.00 | + | - | - 10.00 |
| +09.00 | + | - | - 09.00 |
| +08.00 | + | - | - 08.00 |
| +07.00 | + | - | - 07.00 |
| +06.00 | + | - | - 06.00 |
| +05.00 | + | - | - 05.00 |
| +04.00 | + | - | - 04.00 |
| +03.00 | + | - | - 03.00 |
| +02.00 | + | - | - 02.00 |
| +01.00 | + | - | - 01.00 |
| +00.01 | + | - | - 00.01 |



**Note:** To Test DAC Output Press <ACK> Key (SET Mode Only) Actual DAC - 8 Output

Page:52

- The above pages displays the 5th, 6th, 7th & 8th analog/proportional outputs, assigned as **DAC5, DAC6, DAC7 & DAC8** respectively; to be calibrated by the machine manufacturer.
- For calibration read description for Page:45, Page:46.

**Keypad**

HOME PAGE-DN. x2

**Draft**

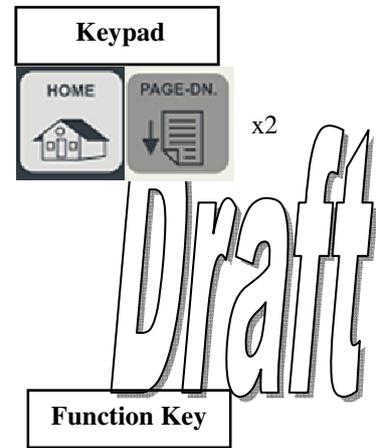
**Function Key**

**Draft**

| MAXIMUM VALUES FOR FLOW & PRESSURE |           |                |               |           |                |
|------------------------------------|-----------|----------------|---------------|-----------|----------------|
| Operations                         | Speeds(%) | Pressures(bar) | Operation     | Speeds(%) | Pressures(bar) |
| Clamp                              |           |                | Decompression |           |                |
| Safety                             |           |                | Ejector       |           |                |
| Locking                            |           |                | Cores         |           |                |
| Clamp Tonnage                      |           |                | Mold Height   |           |                |
| Carriage                           |           |                | Safety Gate   |           |                |
| Pre Injection                      |           |                |               |           |                |
| Intrugen                           |           |                |               |           |                |
| Injection                          |           |                |               |           |                |
| Refill                             |           |                |               |           |                |
| Suckback                           |           |                |               |           |                |

| SET MODE | Clamp Open  |  |  |
|----------|-------------|--|--|
|          | Clamp Close |  |  |



Page Name: Mold Height | Page No: 26 | Password Level: 01 | Page:53

- All maximum values/upper limit for flow & pressure for each stage of machine operation can be set from this page only by the machine manufacturer.
- The maximum possible limit for pressure is prefixed by the machine manufacturer on **Page:58/Manufacturer Settings**.
- In Instances, although the flow max=99% for a particular stage, but actually not outputting at the assigned DAC channel, check the PQ limit on **Page:58** (OR) check the solenoid chart tables on **Page:90/Page:91**.
- Changing the upper limit on this page reflects data entry range on the corresponding page.
- The maximum flow & pressure for Clamp Open & Close in SET mode can be configured on this page.

| MAXIMUM VALUES FOR TIMERS |           |                |           |
|---------------------------|-----------|----------------|-----------|
| Operations                | Time(sec) | Operations     | Time(sec) |
| Mold Close                |           | Decompression  |           |
| Mold Safety               |           | Cores In/Out   |           |
| Locking                   |           | Hyd Ejector    |           |
| Pre Injection             |           | Cycle Delay    |           |
| Intrugen                  |           | Total Cycle    |           |
| Total Injection           |           | Lubrication On |           |
| Hold On (RIP)             |           | Safety Gate    |           |
| Refill/Dosing             |           |                |           |
| Suckback                  |           |                |           |
| Cooling                   |           |                |           |

Page:54

- All maximum values/upper limit for times for each stage of machine operation can be set from this page only by the machine manufacturer.
- Changing the upper limit on this page reflects data entry range on the corresponding page.



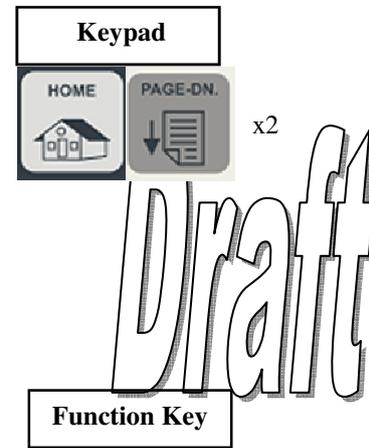
| MAXIMUM POSITIONS FOR LINEAR SCALES |               | MAXIMUM LIMITS FOR DAC OUTPUTS |     |      |        |              |      |
|-------------------------------------|---------------|--------------------------------|-----|------|--------|--------------|------|
| Linear Scales                       | Positions(mm) | DAC Out                        | Max | Gain | Offset | Dither Volts | Freq |
| Clamp                               |               | DAC 1                          |     |      |        |              |      |
| Screw                               |               | DAC 2                          |     |      |        |              |      |
| Ejector                             |               | DAC 3                          |     |      |        |              |      |
| Carriage                            |               | DAC 4                          |     |      |        |              |      |
|                                     |               | DAC 5                          |     |      |        |              |      |
|                                     |               | DAC 6                          |     |      |        |              |      |
|                                     |               | DAC 7                          |     |      |        |              |      |
|                                     |               | DAC 8                          |     |      |        |              |      |

| MAXIMUM PRESSURES FOR PRES. TRANS |                |
|-----------------------------------|----------------|
| Pres. Transducers                 | Pressures(bar) |
| System                            |                |
| Locking                           |                |
| Injection                         |                |
| Accumulator                       |                |

**WARNING**  
Please Do Not Change Above Values Without Permission

|                        |             |                    |         |
|------------------------|-------------|--------------------|---------|
| Page Name: Mold Height | Page No: 26 | Password Level: 01 | Page:55 |
|------------------------|-------------|--------------------|---------|



- All maximum values for Linear scale, Pressure transducers & DACx/Proportional outputs can be set on this page.
- The maximum permissible values for data entry of linear scales can be set in the Positions(mm) column. This in result becomes the maximum position values of respective scales.
- Eg. If Position=750mm for Clamp the operator cannot set Clamp positions on any of the operating pages more than 750mm.
- The maximum permissible values for data entry of pressure transducer can be set in the Pressures(bar) column. This in result becomes the maximum position values of respective pressure sensor.
- Eg. If Pressure=450bar for Locking the operator cannot set Locking pressure on any of the operating pages more than 450bar.
- The maximum limit, gain, offset & dither of each DAC channel can be configured on this page.
- Eg. If Max= 7V is set for DAC2, then the actual voltage outputted on DAC2 will be limited to <=7V.
- The **gains** of any of the **DAC channels** can be adjusted digitally. **Gain value range =000-999**. This feature can be used to integrate with servodrives.
- Eg: To set a gain of 500 to DAC 2; move the cursor to the gain entry of DAC2 & enter 500 (OR) following password to be entered in the password page **Page:84**.

| DAC Channel | Password |
|-------------|----------|
| DAC2        | DAC2G500 |

- Any DAC channel can be positively offset to 9.99 volt maximum for idle conditions, **Offset value range =0.00-9.99**.
- The DAC channel can be positively shifted by moving the cursor to the offset entry of DAC & enter the 3-digit volt (OR) using passwords as stated below on the password page **Pg.84**.
- Eg: If voltage offset required=+0.750V on DAC1 channel then;

| DAC Channel | Password |
|-------------|----------|
| DAC1        | DAC1-567 |

| DAC Channel | Password |
|-------------|----------|
| DAC1        | DAC1+500 |

- Any DAC channel can be reset/zeroed, if any positive voltage exists on DAC channel during idle conditions.
- Upto 999mv can be reset on any DAC channel.
- The DAC channel can be reset by using passwords as stated below on the password page **Pg.84**.
- Eg: If voltage present=+0.950V on DAC1 channel then;

| DAC Channel | Password |
|-------------|----------|
| DAC1        | DAC1-500 |



| REAL TIME CLOCK SETTINGS                           |                      |                      |                      | RTC BATTERY STATUS  |                                  |  |
|--|----------------------|----------------------|----------------------|---|----------------------------------|--|
| TIME:  | Hours                | Minutes              | Seconds              |  | Voltage (V) <input type="text"/> |  |
|  | <input type="text"/> | <input type="text"/> | <input type="text"/> |   |                                  | Percentage (%) <input type="text"/>      |
| DATE:  | Date                 | Month                | Year                 |   |                                  | Time Left (in days) <input type="text"/> |
|  | <input type="text"/> | <input type="text"/> | <input type="text"/> |   |                                  |  |
| DAY:   | <input type="text"/> |                      |                      |   |                                  |  |
| <p>Note: Press &lt;ACK&gt; Key to Set New Time</p> |                      |                      |                      |   |                                  |  |
| Page Name: Mold Height                             |                      | Page No: 26          |                      | Password Level: 01  |                                  |  |
| Page:57  |                      |                      |                      |   |                                  |  |



- The PLC Time, Date & Day of the Week can be set on this page.
- Time & Date can be set by moving the cursor & changing the value.
- Press <ENTER> Key to set & to move cursor use arrow keys on the keypad.
- Time is to be set in 24 hour format while Date is to be set in DD-MM-YYYY format
- Day of Week can be changed by using <INC> & <DEC> keys of the keypad & then pressing <ENTER> key.
- To put the new time into effect, press <ACK> key on the keypad.
- The status of the RTC battery is also displayed on this page. Battery Actual Voltage, % of charge left & days of battery life are all indicated for viewing battery status.

Draft

| MACHINE MANUFACTURER SETTINGS      |                            |
|------------------------------------|----------------------------|
| <b>Machine Selecting Operation</b> |                            |
| Core Pull                          | <input type="text"/>       |
| Air Ejection                       | <input type="text"/>       |
| Auto Tonnage                       | <input type="text"/>       |
| Drop Detector                      | <input type="text"/>       |
| <b>Machine Operating Sensors</b>   |                            |
| Ejector                            | <input type="text"/> Based |
| Carriage                           | <input type="text"/> Based |
| Mold Locking Confirmed By          | <input type="text"/>       |
| Maximum System Pressure            | <input type="text"/> bar   |
| Pump PQ Limit (HP Control)         | <input type="text"/> %     |
| System Trip Current                | <input type="text"/> amps  |

|                        |             |                    |         |
|------------------------|-------------|--------------------|---------|
| Page Name: Mold Height | Page No: 26 | Password Level: 01 | Page:58 |
|------------------------|-------------|--------------------|---------|

# Draft

- All machine parameters like Special Functions, Sensors type selection, Maximum Pump PQ Limit & Maximum System Pressure can be set on this page by the machine manufacturer.
- Special Functions like Core Pull Operation, Air Ejectors Operation, Auto Tonnage Feature & Drop Detect Logic can be Enabled / Disabled by selecting the required function & using **<INC>** & **<DEC>** keys on the keypad.
- **Core Pull:** Enable/Disable– ON/OFF Core Pull logic sequence. This is the master enable/disable switch for the operation.
- **Air Ejection:** Enable/Disable– ON/OFF Air ejector logic sequence. This is the master enable/disable switch for operation.
- **Auto Tonnage:** Enable/Disable– ON/OFF Auto tonnage sequence. This is the master enable/disable switch for operation.
- **Drop Detector:** Enable/Disable– ON/OFF Drop detector sequence. This is the master enable/disable switch for operation.
- The type of sensor based on which the Clamp, Screw, are sensed is **Linear Scale/Potentiometer**.
- Ejector & Carriage parts are sensed for operation can be selected between Linear Potentiometer/Limit Switch/Timer. This selection can be done by selecting the appropriate part & using the **<INC>** & **<DEC>** keys on the keypad.
- **Ejector Sensor:** Linear/LSW3+4/LSW 4/Timers
  - Linear– Ejector movement is sensed by linear scale
  - LSW 3+4— Ejector is movement sensed by two limit switches connected to digital inputs 3 & 4
  - LSW 4— Ejector is movement sensed by just one limit switch connected to digital inputs 4
  - Timers— Ejector is moved based on timers set on Page:05.
- **Carriage Sensor:** Linear/LSW
  - Linear– Carriage movement is sensed by linear scale
  - LSW 5+6— Carriage movement is sensed by two limit switches connected to digital inputs.
- **Mold Locking Confirmed by:** Timers/PS1+PS2/Pres. Tran
  - Timers— Mold Locking is confirmed by the time set in Mold Locking Stage 1 & Stage2
  - PS1+PS2— Mold Locking is confirmed by the pressure switches wired to Locking Stage 1 & Stage 2
  - Pres. Tran— Mold Locking is confirmed by the pressure sensor reading w.r.t Stage 1 & Stage 2 Locking
- **Maximum System Pressure:** The maximum allowable working pressure of the machine can be configured in the entry. To be set by the machine manufacturer & thereby upper limiting the maximum locking pressure.
- **Pump PQ Limit:** To avoid overloading the delivering pump one can restrict the maximum PQ delivered to the machine system. This can be controlled by setting the PQ limit. The **Max PQ Limit** can be set in the range of **00-99%**.
- **System Trip current:** To stop the machine when the current exceeds a certain limit due to some electrical fault & alert the operator, the machine manufacturer set this parameter with the trip limit. Default= 10A

# Draft

| PUMP SELECTION BY            |            |              | SELECT FIX PUMPS AS PER OPERATING STAGE |  |                 |
|------------------------------|------------|--------------|---|--|-----------------|
| SELECT PUMPS BY SET FLOW (%) |            |              | Mold Close Slow                         |  | Pre-Injection   |
| Pump 1                       | Pump 2     | Pump 1+2     | Mold Close Fast                         |  | Intrugen        |
| < <                          | < <        | < <          | Mold Close Safety                       |  | Injection - 1   |
| Pump 3                       | Pump 1+3   | Pump 2+3     | Mold Close Locking                      |  | Injection - 2   |
| < <                          | < <        | < <          | Mold Decompression                      |  | Injection - 3   |
| Pump 1+2+3                   | Pump 4     | Pump 1+4     | Mold Open Slow                          |  | Injection - 4   |
| < <                          | < <        | < <          | Mold Open Fast                          |  | Injection - 5   |
| Pump 2+4                     | Pump 1+2+4 | Pump 3+4     | Hydraulic Ejector                       |  | Hold On (RIP)   |
| < <                          | < <        | < <          | Hydraulic Cores                         |  | Refill/Dosing-1 |
| Pump 1+3+4                   | Pump 2+3+4 | Pump 1+2+3+4 | Mold Height                             |  | Refill/Dosing-2 |
| < <                          | < <        | < <          | Front Safety Gate                       |  | Refill/Dosing-3 |
|                              |            |              | Carriage (Unit)                         |  | Suckback        |
| Page Name: Mold Height       |            | Page No: 26  | Password Level: 01                      |  | Page:59         |

Draft

- On this page, the pumps configuration during the cycle can be configured by the machine manufacturer.
- By default, when machine uses a single pump for all operations it is termed to be a using a Small(Single) Pump. In this case, On Flow Range can be set from minimum(0%) to maximum(99.9%) i.e. all flowrates are delivered by this pump only.
- In a case when a machine uses two or more pumps of same/different capacities to share the designed delivered flow rate the two pumps are termed as Small & Big pumps that are to be configured as needed.

**Pump Selection By:** Set Flow/Fixed

**Set Flow**— The flow delivered by the pumps is based on the Flow % set during that particular flag/stage. This is set on the left side of the above page.

E.g.: Pump1=0 to 125 lpm(Small Capacity), Pump2=0 to 175 lpm(Big Capacity). In this scenario, to deliver a maximum of 300lpm On Flow Ranges can be configured as follows:

Small Pump On Flow Range>00.1% & <41.6% (Upto 125lpm)

Big Pump On Flow Range>41.7% & <58.3% (Upto 175lpm)

Both Pumps On Flow Range>58.4% & <99.9% (Upto 300lpm)

**Fixed**— In multi pump configuration, the flow is delivered by switching on a particular set of pumps as configured in the operating stage. This is set on the right side of the above page.

E.g: Supposing there are 4 pumps, If 1234 is set by side of Injection-1, during Injection-1 all four pumps are switched ON by the PLC to deliver the flow.

Draft

| MACHINE CONFIGURATION         |                      |                    |   |
|-------------------------------|----------------------|--------------------|---|
| Machine Model                 | <input type="text"/> |                    |   |
| Serial Number                 | <input type="text"/> | Manufacturing Year | <input type="text"/>  |
| Flow Control                  |                      | Tonnage            | <input type="text"/>  |
| Valve Number                  | <input type="text"/> | Make               | <input type="text"/>  |
| Pressure Control              |                      |                    |   |
| Valve Number                  | <input type="text"/> | Make               | <input type="text"/>  |
| Main Motor                    |                      |                    |   |
| Serial Number                 | <input type="text"/> | Make               | <input type="text"/>  |
| Pump Serial Number            | <input type="text"/> | Make               | <input type="text"/>  |
| Power Pack                    | <input type="text"/> | Screw Diameter     | <input type="text"/>  |
| <i>Page Name: Mold Height</i> |                      | <i>Page No: 26</i> | <i>Password Level: 01</i> <span style="float: right;"><i>Page:60</i></span> |

# Draft

- All Machine details like Model Name, Serial Number, Date of Manufacture & Tonnage can be set on this page by the machine manufacturer.
- All PQ block details like Model Name, Serial Number, & Manufacturer can be set on this page by the machine manufacturer.
- All Pump block details like Model Name, Serial Number, & Manufacturer can be set on this page by the machine manufacturer.
- All details above can be entered using the alphanumeric keypad.

# Draft

| TRANSFERING & CHECKING OF OUTPUTS |            |            |            |            |            |            |            | Check Selected Digital Output in SET Mode: |              |
|-----------------------------------|------------|------------|------------|------------|------------|------------|------------|--|--------------|
| Transfer Digital Outputs:         |            |            |            |            |            |            |            | Energise Output                            | for Checking |
| Transfr To                        | Transfr To | Transfr To | Transfr To | Transfr To | Transfr To | Transfr To | Transfr To | DAC Out                                    |              |
| 01→                               | 09→        | 17→        | 25→        | 33→        | 41→        | 49→        | 57→        | 01→  |              |
| 02→                               | 10→        | 18→        | 26→        | 34→        | 42→        | 50→        | 58→        | 02→  |              |
| 03→                               | 11→        | 19→        | 27→        | 35→        | 43→        | 51→        | 59→        | 03→  |              |
| 04→                               | 12→        | 20→        | 28→        | 36→        | 44→        | 52→        | 60→        | 04→  |              |
| 05→                               | 13→        | 21→        | 29→        | 37→        | 45→        | 53→        | 61→        | 05→  |              |
| 06→                               | 14→        | 22→        | 30→        | 38→        | 46→        | 54→        | 62→        | 06→  |              |
| 07→                               | 15→        | 23→        | 31→        | 39→        | 47→        | 55→        | 63→        | 07→  |              |
| 08→                               | 16→        | 24→        | 32→        | 40→        | 48→        | 56→        | 64→        | 08→  |              |

|                        |             |                    |         |
|------------------------|-------------|--------------------|---------|
| Page Name: Mold Height | Page No: 26 | Password Level: 01 | Page:61 |
|------------------------|-------------|--------------------|---------|

# Draft

- All digital output related control operations like Output checking & Output transferring can be done from this page.
- The PLC has to be put in **SET** mode for all output control operations.
- By default, All Spare Digital Outputs and can be used to take up a new function or take up the function of an existing digital output.
- To take up the function of an existing digital output, the latter has to be transferred to any other available output.
- This transfer can be done by setting the destination digital output number in **Transfer to** column by side of the source digital output number.
- This is like copying one digital output to the other one (OR) mirroring it.
- **Energize Output:** To test the functionality of any digital output, enter the Output number here & Check the status on Digital Output **Page:32**.
- Similarly, any DAC channel can be copied to any other DAC channel.
- **DACOUT:** Enter the destination DAC number besides the source DAC channel.

# Draft

| KEYPAD CHECKING  |      |      |                    |      |      |                           |      |                 |
|--|------|------|--------------------|------|------|---------------------------|------|-----------------|
| DIG0   | DIG8 | LUB  | ACK                | CLR  | AX10 | AX20                      | GTCL | F8              |
| DIG1   | DIG9 | HTRS | INC                | DEC  | AX11 | AX21                      | GTOP | F7              |
| DIG2   | ENTR | ROBO | PGUP               | PGDN | REFL | SUBK                      | UNRE | F6              |
| DIG3   | STAR | MTR  | PRIN               | TIMR | INJ  | PUGE                      | UNFR | F5              |
| DIG4   | LEFT | SET  | SERV               | HIST | ARSE | AREJ                      | UNSR | F4              |
| DIG5   | RIGH | HAND | HOME               | DIR  | CORE | CORI                      | CORO | F3              |
| DIG6   | DOWN | SEMI | TREN               | SAVE | MLCL | EJFR                      | MLH- | F2              |
| DIG7   | UP   | AUTO | PASS               | PGLK | MLOP | EJRE                      | MLH+ | F1              |
| <b>Note:</b> Press <HOME+ENTER> Keys together to go to Home Page |      |      |                    |      |      |                           |      |                 |
| <i>Page Name:</i> Mold Height                                    |      |      | <i>Page No:</i> 26 |      |      | <i>Password Level:</i> 01 |      | <i>Page:</i> 62 |

# Draft

- All MMI keys can be checked for proper functionality from this page.
- When a key is pressed/hit, the corresponding key text is highlighted & flashed along with a buzzer tone; indicating the key pressed is properly functioning.
- No values are settable / configurable on this screen.
- To exit this page & return to home screen, one has to press <HOME> & <ENTER> keys together.

# Draft

**ACCESS LEVEL & PASSWORD CHANGING:**

Enter Password to Get Required access level

Enter Your Password  You Can Access Upto Level

To Change the Password, Enter Access Level, New Password & Press <ACK> Key to Store.

Access Level  New Password

Master Function Key 1

Master Function Key 2

Page Name: Mold Height    Page No: 26    Password Level: 01    Page:84

# Draft

- This page is used for accessing various pages of the PLC locked at various access levels.
- By default, the hierarchy of password levels is as follows:
  - On Power-up password level=0.
  - Password Levels 1 & 2=For machine operator & maintenance personnel
  - Password Level 3 = Machine floor supervisor
  - Password Level 4= Machine Original manufacturer
  - Password Level 5= PLC(VIGNAN) Manufacturer
- One has to enter the appropriate password to get access to the required level.
- **By default, the passwords for each level are:**  
**Password for Level 1=1234, Level 2=2345, Level 3=3456, Level 4=4567**
- **Enter Your Password:** Enter the password in this box
- The default password for a particular level can be changed at any given time provided the present password has been entered for the level in context.
- **Access Level:** Enter the Access Level number in this box
- **New Password:** Enter the new password in this box. ONLY numerical
- The new password will be registered on entering the new 4-digit password & pressing the **<ACK>** key on the keypad.
- A confirmation messages will played whether the new password has been registered or not by displaying messages
- “O.K. - New Password Accepted” or “Sorry- New Password Rejected” in the latter case.
- A special password called the Master Function key is provided for special usages.
- The Master Function key is made up of 2 blocks of 8 alphanumeric password which tallies the Master Function key to 16 alphanumeric key.
- The Master Function key is made up of 2 blocks of 8 alphanumeric password which tallies the Master Function key to 16 alphanumeric key.

Master Function key for special usages are:

| Block 1  | Block 2 | Usage  |
|----------|---------|--|
| CLRHRSPR |         | Clear Hourly Production Data for last 30 days                                    |
| SETDFTOP |         | Set Default Outputs (DO & PWM)   |
| RSTUSRPW |         | Reset Passwords of Level 1,2,3 to default  |
| DACx-vvv |         | DAC offset adjustment DACx-vvv<br>Where x=DAC#, -=sign & vvv=millivolts(000-999) |
| DACxGvvv |         | DAC amplication adjustment DACxGvvv<br>Where x=DAC#, G='G' & vvv=000-999         |

- Original Machine Manufacturer can contact Vignan Electronics Pvt. Ltd. For manufacturer specific Master Function key.
- The present password level & work hierarchy are shown on the right.

# Draft

Draft

| MOLD DATA DIRECTORY - 1 |           |     |           |     | Present Program | Change Prog Name |           |     |           |  |
|-------------------------|-----------|-----|-----------|-----|-----------------|------------------|-----------|-----|-----------|--|
| No                      | Mold Name | No  | Mold Name | No  | Mold Name       | No               | Mold Name | No  | Mold Name |  |
| 001                     |           | 011 |           | 021 |                 | 031              |           | 041 |           |  |
| 002                     |           | 012 |           | 022 |                 | 032              |           | 042 |           |  |
| 003                     |           | 013 |           | 023 |                 | 033              |           | 043 |           |  |
| 004                     |           | 014 |           | 024 |                 | 034              |           | 044 |           |  |
| 005                     |           | 015 |           | 025 |                 | 035              |           | 045 |           |  |
| 006                     |           | 016 |           | 026 |                 | 036              |           | 046 |           |  |
| 007                     |           | 017 |           | 027 |                 | 037              |           | 047 |           |  |
| 008                     |           | 018 |           | 028 |                 | 038              |           | 048 |           |  |
| 009                     |           | 019 |           | 029 |                 | 039              |           | 049 |           |  |
| 010                     |           | 020 |           | 030 |                 | 040              |           | 050 |           |  |

Copy from Prog No  to  (Press F6 Key) Load New Prog  (Press F7 Key) (Both in SET mode)

Page Name: Mold Height      Page No: 26      Password Level: 01      Page:85

| MOLD DATA DIRECTORY - 2 |           |     |           |     | Present Program | Change Prog Name |           |     |           |  |
|-------------------------|-----------|-----|-----------|-----|-----------------|------------------|-----------|-----|-----------|--|
| No                      | Mold Name | No  | Mold Name | No  | Mold Name       | No               | Mold Name | No  | Mold Name |  |
| 051                     |           | 061 |           | 071 |                 | 081              |           | 091 |           |  |
| 052                     |           | 062 |           | 072 |                 | 082              |           | 092 |           |  |
| 053                     |           | 063 |           | 073 |                 | 083              |           | 093 |           |  |
| 054                     |           | 064 |           | 074 |                 | 084              |           | 094 |           |  |
| 055                     |           | 065 |           | 075 |                 | 085              |           | 095 |           |  |
| 056                     |           | 066 |           | 076 |                 | 086              |           | 096 |           |  |
| 057                     |           | 067 |           | 077 |                 | 087              |           | 097 |           |  |
| 058                     |           | 068 |           | 078 |                 | 088              |           | 098 |           |  |
| 059                     |           | 069 |           | 079 |                 | 089              |           | 099 |           |  |
| 060                     |           | 070 |           | 080 |                 | 090              |           | 100 |           |  |

Copy from Prog No  to  (Press F6 Key) Load New Prog  (Press F7 Key) (Both in SET mode) Page:86

| MOLD DATA DIRECTORY - 3 |           |     |           |     | Present Program | Change Prog Name |           |     |           |  |
|-------------------------|-----------|-----|-----------|-----|-----------------|------------------|-----------|-----|-----------|--|
| No                      | Mold Name | No  | Mold Name | No  | Mold Name       | No               | Mold Name | No  | Mold Name |  |
| 101                     |           | 111 |           | 121 |                 | 131              |           | 141 |           |  |
| 102                     |           | 112 |           | 122 |                 | 132              |           | 142 |           |  |
| 103                     |           | 113 |           | 123 |                 | 133              |           | 143 |           |  |
| 104                     |           | 114 |           | 124 |                 | 134              |           | 144 |           |  |
| 105                     |           | 115 |           | 125 |                 | 135              |           | 145 |           |  |
| 106                     |           | 116 |           | 126 |                 | 136              |           | 146 |           |  |
| 107                     |           | 117 |           | 127 |                 | 137              |           | 147 |           |  |
| 108                     |           | 118 |           | 128 |                 | 138              |           | 148 |           |  |
| 109                     |           | 119 |           | 129 |                 | 139              |           | 149 |           |  |
| 110                     |           | 120 |           | 130 |                 | 140              |           | 150 |           |  |

Copy from Prog No  to  (Press F6 Key) Load New Prog  (Press F7 Key) (Both in SET mode) Page:87

- These pages above **Page:85, Page:86, Page:87** shows the entire directory of **150** mould programs available on the PLC.
- Upto 50 programs are visible on each directory page. To scroll up or down the directory of 120 programs **<PAGEUP>** or **<PAGEDN>** keys are to be pressed respectively on the keypad.
- The present program loaded is indicated by number in the Present Program Block.
- To load a new program, put the PLC in **SET** mode & enter the new program number in the **Load New Prog** input entry & press **<F7>** key on the keypad.
- To rename a program name, the program has to be loaded first & then a new name for the program can be entered at the input entry of **Change Program Name**.
- Once a new name has been entered for the program in context **<SAVE>** key has to be pressed to update the new name.
- To copy one program to another program slot, the Copy from section has to be used.
- To copy, the PLC has to be in SET mode, the **Copy from Prog No** (source program) & **TO program** numbers (destination program) are to be entered.
- The program number should be in the range of 01 to 150.
- **<F6>** key on the keypad is to be pressed to initiate the copy process.
- The message "Data Copied...OK" will be displayed indicating the end of copy process.

Draft

| HAND MODE DIGITAL & ANALOG DATA SETTINGS |              |               |                |          |       |                      |
|--|--------------|---------------|----------------|----------|-------|----------------------|
| Flag: <input type="text"/>               |              |               |                |          |       |                      |
| Digital Outputs                          | ON Delay(ms) | OFF Delay(ms) | Analog Outputs | Polarity | Delay | Ramps(ms)<br>Up Down |
|  |              |               | DAC 1          | ↓        | ↓     |                      |
|  |              |               | DAC 2          | ↓        | ↓     |                      |
|  |              |               | DAC 3          | ↓        | ↓     |                      |
|  |              |               | DAC 4          | ↓        | ↓     |                      |
|  |              |               | DAC 5          | ↓        | ↓     |                      |
|  |              |               | DAC 6          | ↓        | ↓     |                      |
|  |              |               | DAC 7          | ↓        | ↓     |                      |
|  |              |               | DAC 8          | ↓        | ↓     |                      |

**WARNING** Please Do Not Change Above Values Without Permission

Page Name: Mold Height      Page No: 26      Password Level: 01      Page:90

# Draft

- This page is used to energize/de-energize (ON/OFF) digital outputs, define the proportional characteristics as per the requirement for any & each operational stage in **HAND mode** only.
- The setting on this page is to be done by the machine manufacturer or under the supervision of the authorized personnel.
- Using the chart on this page the user can enter the flag/stage number in the Flag entry to reprogram the digital valves.
- **Valid Flag No:** 0-95
- Upto 8 distinct digital outputs can be put ON in each stage of the cycle.
- **Digital Outputs:** Any outputs between 1-52
- The ON & OFF(0-999ms) delays can also be configured along with digital outputs.
- **ON delay:** The delay in ms, before which the corresponding digital output is put ON.
- **OFF delay:** The delay in ms, after which the corresponding digital output is put OFF.
- The characteristic of the DAC channel can be configured by selecting the right **Analog Output** parameter.
- **Analog Output**— Set Flow/Set Pres/Set BkPr/xx% Fxd/Not Used/Hold Val

| Analog Output Type | DAC Channel output   |
|--------------------|--|
| <b>Set Flow</b>    | As per the flow set in the corresponding stage/flag                              |
| <b>Set Pres</b>    | As per the pressure set in the corresponding stage/flag                          |
| <b>Set BkPr</b>    | As per the back pressure set in the corresponding stage                          |
| <b>XX% Fxd</b>     | 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90% OF DAC CHANNEL MAX. CALIBRATED VALUE |
| <b>Full Val</b>    | 100% OF DAC CHANNEL MAX. CALIBRATED VALUE  |
| <b>Hold Val</b>    | Holds & doesn't reset the last proportional value                                |
| <b>Not Used</b>    | Not used/Not wired   |

- **Polarity:** A Positive at any DAC channel configures a positive analog voltage output from 0 to +10VDC.
- A Negative at any DAC channel configures a negative analog voltage output from 0 to -10VDC.
- **Delay:** Delay in seconds before which the DAC signal outputs on the corresponding channel.
- **Ramp Up/Acceleration:** How fast in time a parameter(Flow/Pressure) reaches its set point from zero.
- **Ramp Down/Deceleration:** How fast in time a parameter(Flow/Pressure) reaches zero from its setpoint.
- The Ramp Up & Down times for each analog output can be set from this page only by the machine manufacturer.
- The Up & Down Ramping times can be set in range of **010** to **999** milliseconds.
- Once the required stages/flags are programmed change Flag No=00 then press **<SAVE>** key to update the Hand Solenoid Energization Chart.
- To check the flag/stage # for particular machine operation, check the chart on next page.

# Draft

The default HAND mode energization chart is shown

| Default HAND Solenoid Energization Chart |        |        |        |        |        |        |        |        |
|--|--------|--------|--------|--------|--------|--------|--------|--------|
| STAGE/FLAG                               | Port-0 | Port-1 | Port-2 | Port-3 | Port-4 | Port-5 | Port-6 | Port-7 |
| F-00 IDLE                                | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-01 CYCLE START DELAY                   | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-02 SAFETY GATE CLOSE FAST              | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-03 SAFETY GATE CLOSE SLOW              | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-04 EJECTOR RETRACT                     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-05 CORES IN                            | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-06 MOLD CLOSE SLOW-1                   | OV01   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-07 MOLD CLOSE FAST                     | OV01   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-08 MOLD CLOSE SLOW-2                   | OV01   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-09 SAFETY+CORES IN                     | OV01   | OV10   | 0      | 0      | 0      | 0      | 0      | 0      |
| F-10 MOLD SAFETY                         | OV01   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-11 NOT USED                            | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-12 CORES IN                            | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-13 MOLD LOCKING                        | OV01   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-14 MOLD LOCKING                        | OV01   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-15 PRE INJECTION                       | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-16 CAR. FWD DELAY                      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-17 CAR. FWD FAST                       | OV06   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-18 CAR. FWD SLOW                       | OV06   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-19 INTRUGEN                            | OV05   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-20 INJECTION DELAY                     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-21 INJECTION-1                         | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-22 DECOMPRESSION                       | OV02   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-23 MOLD OPEN                           | OV02   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-24 DEGASING                            | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-25 INJECTION-2                         | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-26 INJECTION-3                         | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-27 INJECTION-4                         | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-28 INJECTION-5                         | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-29 HOLDON-1                            | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-30 HOLDON-2                            | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |

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| STAGE/FLAG               | Port-0 | Port-1 | Port-2 | Port-3 | Port-4 | Port-5 | Port-6 | Port-7 |
|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| F-31 HOLDON-3            | OV03   | 0      | 0      | 0      | 0      |        | 0      | 0      |
| F-32 HOLDON-4            | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-33 MOLD LOCKING        | OV01   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-34 SUCKBACK DELAY      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-35 PRE SUCKBACK        | OV04   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-36 CAR.RET.DELAY       | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-37 CAR.RET.-1          | OV07   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-38 CAR.RET.-2          | OV07   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-39 REFILL DELAY        | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-40 REFILL-1            | OV05   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-41 REFILL-2            | OV05   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-42 REFILL-3            | OV05   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-43 POST SUCKBACK       | OV04   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-44 INIT.DECOMPRESS     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-45 NOT USED            | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-46 CAR.RET.DELAY       | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-47 CAR.RET.-1          | OV07   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-48 CAR.RET.-2          | OV07   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-49 CAR.RET.DELAY       | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-50 FINAL DECOMPRESSION | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-51 CORES OUT           | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-52 MOLD OPEN SLOW-1    | OV02   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-53 MOLD OPEN FAST      | OV02   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-54 MOLD OPEN SLOW-2    | OV02   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-55 CORES OUT           | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-56 EJECTOR SEQ         | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-57 MOLD OPEN FINAL     | OV02   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-58 CORES OUT           | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-59 EJECTOR SEQ         | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-60 SAFETY GATE OPEN    | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |

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| STAGE/FLAG                | Port-0 | Port-1 | Port-2 | Port-3 | Port-4 | Port-5 | Port-6 | Port-7 |
|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| F-61 CYCLE DELAY          | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-62 CYCLE OVER           | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-63 START NEXT CYCLE     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-64 EJECTOR FWD          | 0      | OV09   | 0      | 0      | 0      | 0      | 0      | 0      |
| F-65 EJECTOR RET          | 0      | OV10   | 0      | 0      | 0      | 0      | 0      | 0      |
| F-66 CORE-1 IN            | 0      | 0      | 0      | 0      | OV33   | 0      | 0      | 0      |
| F-67 CORE-1 OUT           | 0      | 0      | 0      | 0      | OV34   | 0      | 0      | 0      |
| F-68 CORE-2 IN            | 0      | 0      | 0      | 0      | OV35   | 0      | 0      | 0      |
| F-69 CORE-2 OUT           | 0      | 0      | 0      | 0      | OV36   | 0      | 0      | 0      |
| F-70 CORE-3 IN            | 0      | 0      | 0      | 0      | OV37   | 0      | 0      | 0      |
| F-71 CORE-3 OUT           | 0      | 0      | 0      | 0      | OV38   | 0      | 0      | 0      |
| F-72 CORE-4 IN            | 0      | 0      | 0      | 0      | OV39   | 0      | 0      | 0      |
| F-73 CORE-4 OUT           | 0      | 0      | 0      | 0      | OV40   | 0      | 0      | 0      |
| F-74 AIR EJECTOR-1        | 0      | 0      | 0      | 0      | 0      | OV41   | 0      | 0      |
| F-75 AIR EJECTOR-2        | 0      | 0      | 0      | 0      | 0      | OV42   | 0      | 0      |
| F-76 AIR EJECTOR-3        | 0      | 0      | 0      | 0      | 0      | OV43   | 0      | 0      |
| F-77 AIR EJECTOR-4        | 0      | 0      | 0      | 0      | 0      | OV44   | 0      | 0      |
| F-78 UNSCREWING           | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-79 ROBOT OPERATION      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-80 MOLD HT-             | 0      | OV12   | 0      | 0      | 0      | 0      | 0      | 0      |
| F-81 MOLD HT+             | 0      | OV11   | 0      | 0      | 0      | 0      | 0      | 0      |
| F-82 PURGE (INJECTION)    | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-83 PURGE (REFILL)       | OV05   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-84 NOT USED             | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-85 NOT USED             | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-86 MOLD HT.RET          | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-87 MOLD CLOSING         | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-88 MOLD HT.FWD.ZERO GAP | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-89 MOLD OPEN            | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-90 MOLD HT.FWD.TONNAGE  | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-91 AUXILLARY FWD/RET    | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-92 PUMP-1 PRE.CHK       | 0      | OV13   | 0      | 0      | 0      | 0      | 0      | 0      |
| F-93 PUMP-2 PRE.CHK       | 0      | OV14   | 0      | 0      | 0      | 0      | 0      | 0      |
| F-94 PUMP-3 PRE.CHK       | 0      | OV15   | 0      | 0      | 0      | 0      | 0      | 0      |
| F-95 PUMP-4 PRE.CHK       | 0      | OV16   | 0      | 0      | 0      | 0      | 0      | 0      |

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| AUTO MODE DIGITAL & ANALOG DATA SETTINGS |              |               |                |          |       |                      |
|--|--------------|---------------|----------------|----------|-------|----------------------|
| Flag: <input type="text"/>               |              |               |                |          |       |                      |
| Digital Outputs                          | ON Delay(ms) | OFF Delay(ms) | Analog Outputs | Polarity | Delay | Ramps(ms)<br>Up Down |
|  |              |               | DAC 1          | ▲▼       | ▲▼    |                      |
|  |              |               | DAC 2          | ▲▼       | ▲▼    |                      |
|  |              |               | DAC 3          | ▲▼       | ▲▼    |                      |
|  |              |               | DAC 4          | ▲▼       | ▲▼    |                      |
|  |              |               | DAC 5          | ▲▼       | ▲▼    |                      |
|  |              |               | DAC 6          | ▲▼       | ▲▼    |                      |
|  |              |               | DAC 7          | ▲▼       | ▲▼    |                      |
|  |              |               | DAC 8          | ▲▼       | ▲▼    |                      |

**WARNING** Please Do Not Change Above Values Without Permission

Page Name: Mold Height      Page No: 26      Password Level: 01      Page:91

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- This page is used to energize/de-energize (ON/OFF) digital outputs, define the proportional characteristics as per the requirement for any & each operational stage in **AUTO mode** only.
- The setting on this page is to be done by the machine manufacturer or under the supervision of the authorized personnel.
- Using the chart on this page the user can enter the flag/stage number in the Flag entry to reprogram the digital valves.
- **Valid Flag No:** 0-63
- Upto 8 distinct digital outputs can be put ON in each stage of the cycle.
- **Digital Outputs:** Any outputs between 1-52
- The ON & OFF(0-999ms) delays can also be configured along with digital outputs.
- **ON delay:** The delay in ms, before which the corresponding digital output is put ON.
- **OFF delay:** The delay in ms, after which the corresponding digital output is put OFF.
- The characteristic of the DAC channel can be configured by selecting the right **Analog Output** parameter.
- **Analog Output**— Set Flow/Set Pres/Set BkPr/xx% Fxd/Not Used/Hold Val

| Analog Output Type | DAC Channel output   |
|--------------------|--|
| <b>Set Flow</b>    | As per the flow set in the corresponding stage/flag                              |
| <b>Set Pres</b>    | As per the pressure set in the corresponding stage/flag                          |
| <b>Set BkPr</b>    | As per the back pressure set in the corresponding stage                          |
| <b>XX% Fxd</b>     | 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90% OF DAC CHANNEL MAX. CALIBRATED VALUE |
| <b>Full Val</b>    | 100% OF DAC CHANNEL MAX. CALIBRATED VALUE  |
| <b>Hold Val</b>    | Holds & doesn't reset the last proportional value                                |
| <b>Not Used</b>    | Not used/Not wired   |

- **Polarity:** A Positive at any DAC channel configures a positive analog voltage output from 0 to +10VDC.  
A Negative at any DAC channel configures a negative analog voltage output from 0 to -10VDC.
- **Delay:** Delay in seconds before which the DAC signal outputs on the corresponding channel.
- **Ramp Up/Acceleration:** How fast in time a parameter(Flow/Pressure) reaches its set point from zero.
- **Ramp Down/Deceleration:** How fast in time a parameter(Flow/Pressure) reaches zero from its setpoint.
- The Ramp Up & Down times for each analog output can be set from this page only by the machine manufacturer.
- The Up & Down Ramping times can be set in range of **010** to **999** milliseconds.
- Once the required stages/flags are programmed change Flag No=00 then press **<SAVE>** key to update the Auto Solenoid Energization Chart.
- To check the flag/stage # for particular machine operation, check the chart on next page.

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The default AUTO mode energization chart is shown

| Default AUTO Solenoid Energization Chart |        |        |        |        |        |        |        |        |
|--|--------|--------|--------|--------|--------|--------|--------|--------|
| STAGE/FLAG                               | Port-0 | Port-1 | Port-2 | Port-3 | Port-4 | Port-5 | Port-6 | Port-7 |
| F-00 IDLE                                | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-01 CYCLE START DELAY                   | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-02 SAFETY GATE CLOSE FAST              | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-03 SAFETY GATE CLOSE SLOW              | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-04 EJECTOR RETRACT                     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-05 CORES IN                            | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-06 MOLD CLOSE SLOW-1                   | OV01   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-07 MOLD CLOSE FAST                     | OV01   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-08 MOLD CLOSE SLOW-2                   | OV01   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-09 SAFETY+CORES IN                     | OV01   | OV10   | 0      | 0      | 0      | 0      | 0      | 0      |
| F-10 MOLD SAFETY                         | OV01   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-11 NOT USED                            | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-12 CORES IN                            | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-13 MOLD LOCKING                        | OV01   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-14 MOLD LOCKING                        | OV01   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-15 PRE INJECTION                       | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-16 CAR. FWD DELAY                      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-17 CAR. FWD FAST                       | OV06   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-18 CAR. FWD SLOW                       | OV06   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-19 INTRUGEN                            | OV05   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-20 INJECTION DELAY                     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-21 INJECTION-1                         | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-22 DECOMPRESSION                       | OV02   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-23 MOLD OPEN                           | OV02   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-24 DEGASING                            | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-25 INJECTION-2                         | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-26 INJECTION-3                         | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-27 INJECTION-4                         | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-28 INJECTION-5                         | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-29 HOLDON-1                            | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-30 HOLDON-2                            | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |

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| STAGE/FLAG               | Port-0 | Port-1 | Port-2 | Port-3 | Port-4 | Port-5 | Port-6 | Port-7 |
|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| F-31 HOLDON-3            | OV03   | 0      | 0      | 0      | 0      |        | 0      | 0      |
| F-32 HOLDON-4            | OV03   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-33 MOLD LOCKING        | OV01   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-34 SUCKBACK DELAY      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-35 PRE SUCKBACK        | OV04   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-36 CAR.RET.DELAY       | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-37 CAR.RET.-1          | OV07   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-38 CAR.RET.-2          | OV07   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-39 REFILL DELAY        | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-40 REFILL-1            | OV05   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-41 REFILL-2            | OV05   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-42 REFILL-3            | OV05   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-43 POST SUCKBACK       | OV04   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-44 INIT.DECOMPRESS     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-45 NOT USED            | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-46 CAR.RET.DELAY       | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-47 CAR.RET.-1          | OV07   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-48 CAR.RET.-2          | OV07   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-49 CAR.RET.DELAY       | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-50 FINAL DECOMPRESSION | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-51 CORES OUT           | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-52 MOLD OPEN SLOW-1    | OV02   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-53 MOLD OPEN FAST      | OV02   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-54 MOLD OPEN SLOW-2    | OV02   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-55 CORES OUT           | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-56 EJECTOR SEQ         | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-57 MOLD OPEN FINAL     | OV02   | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-58 CORES OUT           | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-59 EJECTOR SEQ         | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-60 SAFETY GATE OPEN    | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-61 CYCLE DELAY         | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-62 CYCLE OVER          | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| F-63 START NEXT CYCLE    | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |

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| PLC SETTINGS   |                            |     |  |
|--|----------------------------|-----|--|
| LCD Brightness   | <input type="text"/>       | %   | Ethernet Module Selection <input type="text"/>   |
| Backlight Switch OFF   | Time <input type="text"/>  | sec | IP Address <input type="text"/> . <input type="text"/> . <input type="text"/> . <input type="text"/>                 |
| Password Level Decrement Time  | <input type="text"/>       | sec | Sub Net Mask <input type="text"/> 255 . <input type="text"/> 255 . <input type="text"/> 255 . <input type="text"/> 0 |
| Data Inc / Dec Key   | Time <input type="text"/>  | ms  | CAN ID <input type="text"/>  |
| Keypad Delay for Numeric Data  | <input type="text"/>       | ms  |  |
| Keypad Delay for Page Change   | <input type="text"/>       | ms  | Voice Module Selection <input type="text"/>  |
| Temperature Error Display Delay  | <input type="text"/>       | ms  | GSM Module Selection <input type="text"/>  |
| Hooter ON Time For Data  | Error <input type="text"/> | sec | Moblile Phone Number <input type="text"/>  |
| Hooter ON Time For Machine Error   | <input type="text"/>       | sec |  |
| <p><b>Note:</b> To Load Default Values Press &lt;ACK&gt; + &lt;CLR&gt; Keys Together</p> |                            |     |  |
|  |                            |     | Page:92  |

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| PLC DIAGNOSTICS           |                        |                       |                      |
|---------------------------|------------------------|-----------------------|----------------------|
| CPU Power Status          | <input type="text"/>   | SD Card Detected      | <input type="text"/> |
| I/O Board Supply Voltage  | <input type="text"/> V | SD Card Initialized   | <input type="text"/> |
| I/O Board Supply Current  | <input type="text"/> A | USB Drive Detected    | <input type="text"/> |
| Pre. Tran. Supply Voltage | <input type="text"/> V | USB Drive Initialized | <input type="text"/> |
|                           |                        | USB Reprogrammed      | <input type="text"/> |
| MMI - I/O Board           | Comm. Link Status      | <input type="text"/>  | CPU ID               |
| I/O Board - Temp Card     | Comm. Link Status      | <input type="text"/>  | Software Version     |
| Ethernet                  | Comm. Link Status      | <input type="text"/>  | Release Date         |
| DATA Error Number         | <input type="text"/>   | Value                 | <input type="text"/> |
|                           |                        | Maximum               | <input type="text"/> |
|                           |                        | Minimum               | <input type="text"/> |
|                           |                        |                       | Page:93              |

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| MATERIALS                                    | °C      | MATERIALS                                  | °C      |
|--|---------|--|---------|
| ABS - HI (Acrylonitrile Butadiene Styrene)   | 193-274 | PC / Polyester / Impact Modified           | 246-293 |
| ABS - HR                                     | 246-288 | PC / PTFE                                  | 310-343 |
| ABS - MI                                     | 199-274 | PE / Crosslinked (Poly Ethylene)           | 121-149 |
| ABS - PC                                     | 238-282 | PET (Polyethylene Terphthalate)            | 240-290 |
| ABS - Platable                               | 177-260 | PP / Calcium Carbonate (PolyPropylene)     | 191-274 |
| ABS - Transparent                            | 235-260 | PP / Glass Fiber Reinforced                | 218-246 |
| Acrylic / HR (Poly-Methyl Methacrylate)      | 204-329 | PP / Homopolymer                           | 191-288 |
| Acrylic / Impact Modified                    | 204-260 | PP / Impact Modified+40% Mica              | 177-243 |
| Acrylic / MMA/Styrene                        | 149-260 | PP / Talc 40%                              | 177-288 |
| Acrylic / PC                                 | 232-266 | PS / Acrylonitrile Copolymer (PolyStyrene) | 188-282 |
| Acrylic / PMMA                               | 163-260 | PS / ASA Copolymer                         | 204-243 |
| ETFE (Ethylene Tetra Fluoro-Ethylene)        | 191-288 | PS / Glass Fiber Reinforced                | 204-288 |
| HDPE / Mono (High Density Poly Ethylene)     | 177-260 | PS / Homopolymer                           | 177-260 |
| HDPE / Low, Medium,High Molecular Weight     | 191-260 | PS / High Heat Resistant                   | 232-288 |
| LLDPE (Linear Low Density Poly Ethylene)     | 177-260 | PS / Impact Modified / HHR                 | 218-282 |
| LDPE / Ethyl Acrylate                        | 121-260 | PS / Rubber High Impact                    | 177-274 |
| LDPE / Vinyl Acetate                         | 177-221 | PS / SMA Copolymer                         | 221-266 |
| Nylon 6 / Plain (Polycaprolactam)            | 227-288 | PU / Plain (PolyUrethane)                  | 188-260 |
| Nylon 6 / Long Glass Fiber Reinforced        | 249-282 | PU / Glass Fiber Reinforced                | 227-260 |
| Nylon 6 / Toughened                          | 271-288 | PU / 30% Carbon Fiber                      | 182-232 |
| Nylon 6 / 40% Mineral+Glass Fiber Reinforced | 232-288 | PVC / Plain (Poly Vinyl Chloride)          | 180-220 |
| PC / Low Viscosity (PolyCarbonate)           | 271     | PVC / AMC                                  | 149-213 |
| PC / High Viscosity                          | 293     | PVC / AMC+Tin                              | 193-204 |
| PC / High Heat                               | 304-349 | PVC / Vinyl-Butyra                         | 121-171 |
| PC / 30% Glass Fiber Reinforced              | 288-343 | PVDC (Poly Vinyl Diene Chloride)           | 149-204 |

Note: The Above Temperatures Should Only be Considered for Reference Purposes for VIRGIN Materials

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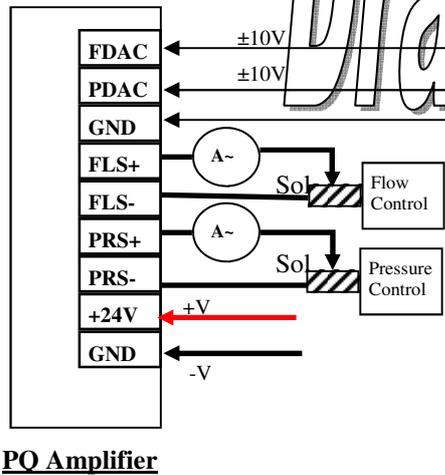
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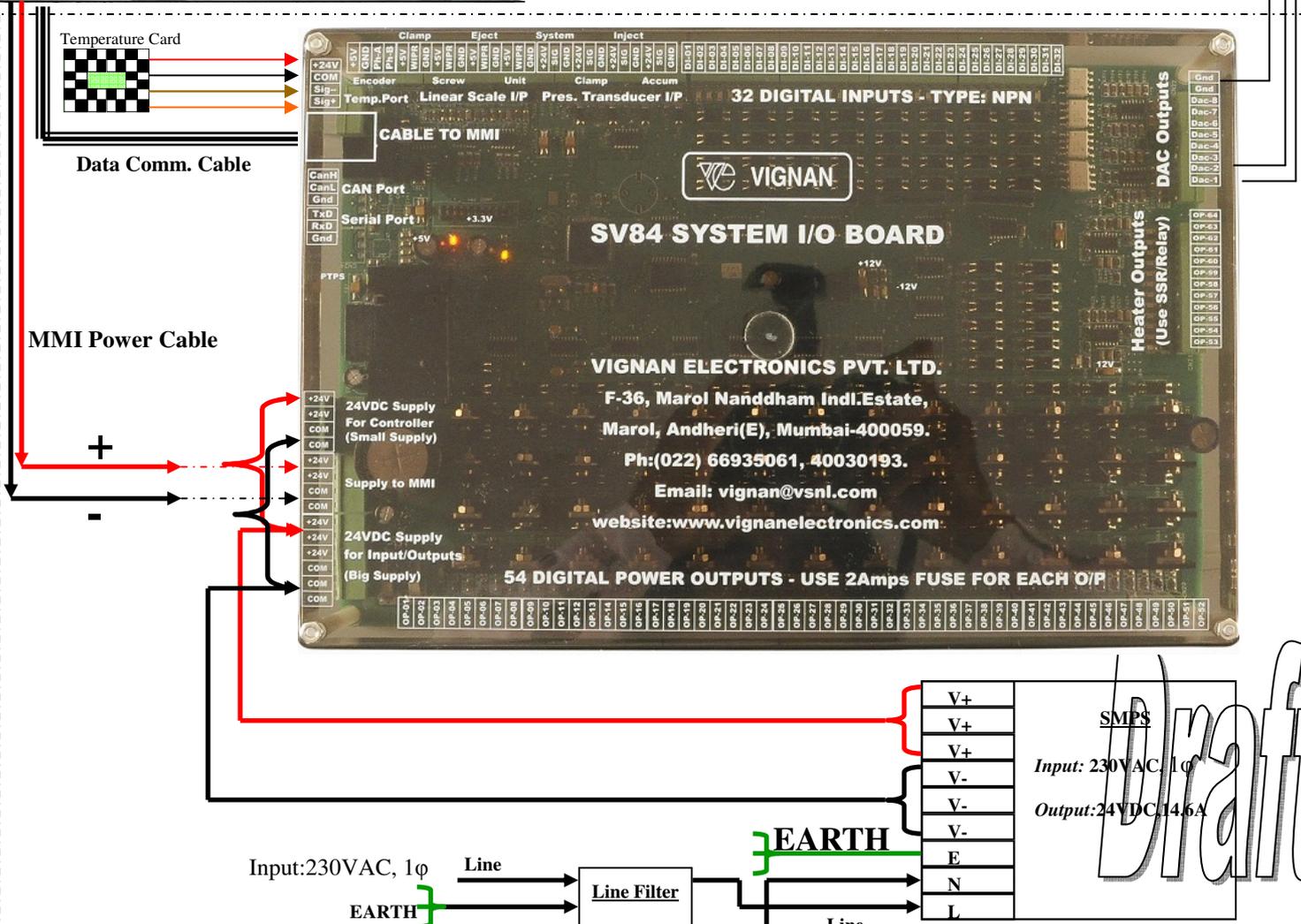
**GENERAL/OVERVIEW WIRING SCHEMATIC**

**MMI<->IOBOARD<->PO AMPLIFIER<->SMPS<->FILTER**

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USB Comm.Cable



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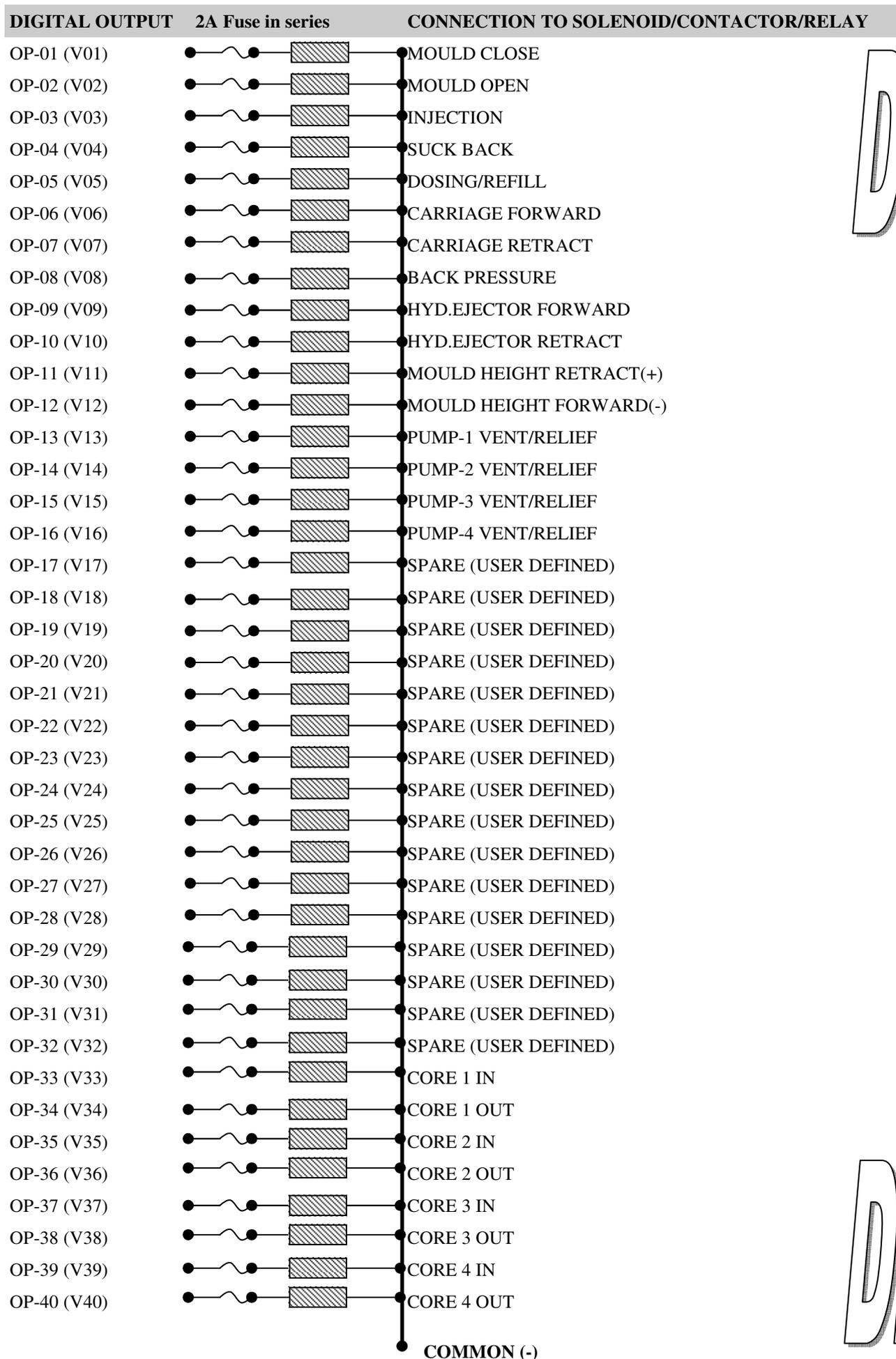
Inside the Bottom Panel

**COMMON/RETURN WIRE FROM LSW/SENSORS/MODULES SHOULD BE CONNECTED TO DIGITAL INPUTS**

| DIGITAL INPUT | CONNECTION TO                              |
|---------------|--|
| DI-01 (LSW01) | TRANSFERABLE                               |
| DI-02 (LSW02) | MOLD LOCKING CONFIRMATION                  |
| DI-03 (LSW03) | EJECTOR FORWARD POSITION                   |
| DI-04 (LSW04) | EJECTOR RETRACT POSITION                   |
| DI-05 (LSW05) | CARRIAGE FORWARD POSITION                  |
| DI-06 (LSW06) | CARRIAGE RETRACT POSITION                  |
| DI-07 (LSW07) | ROBOT READY INPUT /ACCUMULATOR LP SWITCH   |
| DI-08 (LSW08) | ROBOT CYCLE COMPLETE/ACCUMULATOR HP SWITCH |
| DI-09 (LSW09) | FRONT SAFETY GUARD OPEN LSW                |
| DI-10 (LSW10) | FRONT SAFETY GUARD CLOSE LSW               |
| DI-11 (LSW11) | REAR SAFETY GUARD CLOSE LSW                |
| DI-12 (LSW12) | NOZLE SAFETY GUARD CLOSE LSW               |
| DI-13 (LSW13) | MINIMUM MOLD HEIGHT SAFETY LSW             |
| DI-14 (LSW14) | DIE HEIGHT PULSE DETECTOR                  |
| DI-15 (LSW15) | MOLD HEIGHT FORWARD LSW                    |
| DI-16 (LSW16) | MOLD HEIGHT RETRACT LSW                    |
| DI-17 (LSW17) | CORE-1 IN LSW                              |
| DI-18 (LSW18) | CORE-1 OUT LSW                             |
| DI-19 (LSW19) | CORE-2 IN LSW                              |
| DI-20 (LSW20) | CORE-2 OUT LSW                             |
| DI-21 (LSW21) | CORE-3 IN LSW                              |
| DI-22 (LSW22) | CORE-3 OUT LSW                             |
| DI-23 (LSW23) | CORE-4 IN LSW                              |
| DI-24 (LSW24) | CORE-4 OUT LSW                             |
| DI-25 (LSW25) | HYD.OIL+LUB.OIL LEVEL LOW                  |
| DI-26 (LSW26) | LUBRICATION OIL PRESSURE SW                |
| DI-27 (LSW27) | DROP DETECTOR SENSOR                       |
| DI-28 (LSW28) | ENERGY METER PULSE INPUT                   |
| DI-29 (LSW29) | HOPPER EMPTY SENSOR                        |
| DI-30 (LSW30) | SCREW SPEED PROXY SENSOR                   |
| DI-31 (LSW31) | ELECTRIC MOTOR ON (DELTA) INPUT            |
| DI-32 (LSW32) | EMERGENCY PUSH BUTTON INPUT                |

**32 DIGITAL INPUTS :TYPE NPN**  
**DIGITAL INPUTS (1-32) WIRING SCHEMATIC**

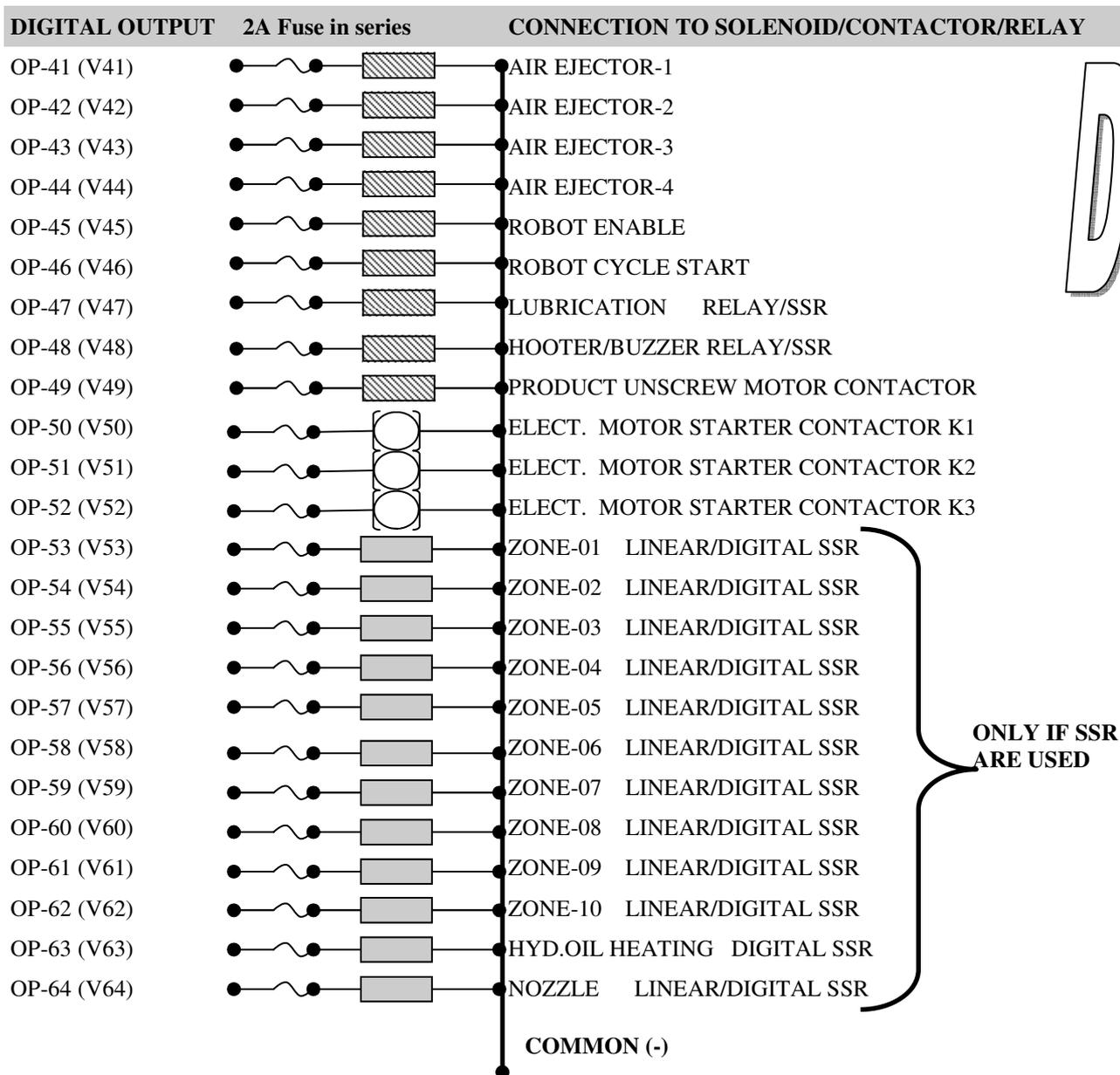
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**DIGITAL OUTPUTS (1-40) WIRING SCHEMATIC**

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**FOR HEATING CONTACTORS/RELAY USE SPARE  
+24VDC DIGITAL OUTPUTS 16-32**

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| DAC OUTPUT (-10 TO +10VDC) | CONNECTION TO                                    |
|----------------------------|--|
| DAC-1 →                    | FLOW CONTROL ELEMENT (DEFAULT)                   |
| DAC-2 →                    | PRESSURE CONTROL ELEMENT (DEFAULT)               |
| DAC-3 →                    | FLOW CONTROL ELEMENT (DEFAULT)                   |
| DAC-4 →                    | PRESSURE CONTROL ELEMENT (DEFAULT)               |
| DAC-5 →                    | FLOW CONTROL ELEMENT (DEFAULT)                   |
| DAC-6 →                    | PRESSURE CONTROL ELEMENT (DEFAULT)               |
| DAC-7 →                    | FLOW CONTROL ELEMENT (DEFAULT)                   |
| DAC-8 →                    | PRESSURE CONTROL ELEMENT (DEFAULT)               |
| GND                        | TO COMMON OF AMPLIFIER CARD/SERVO DRIVE/AC DRIVE |
| GND                        | TO COMMON OF AMPLIFIER CARD/SERVO DRIVE/AC DRIVE |

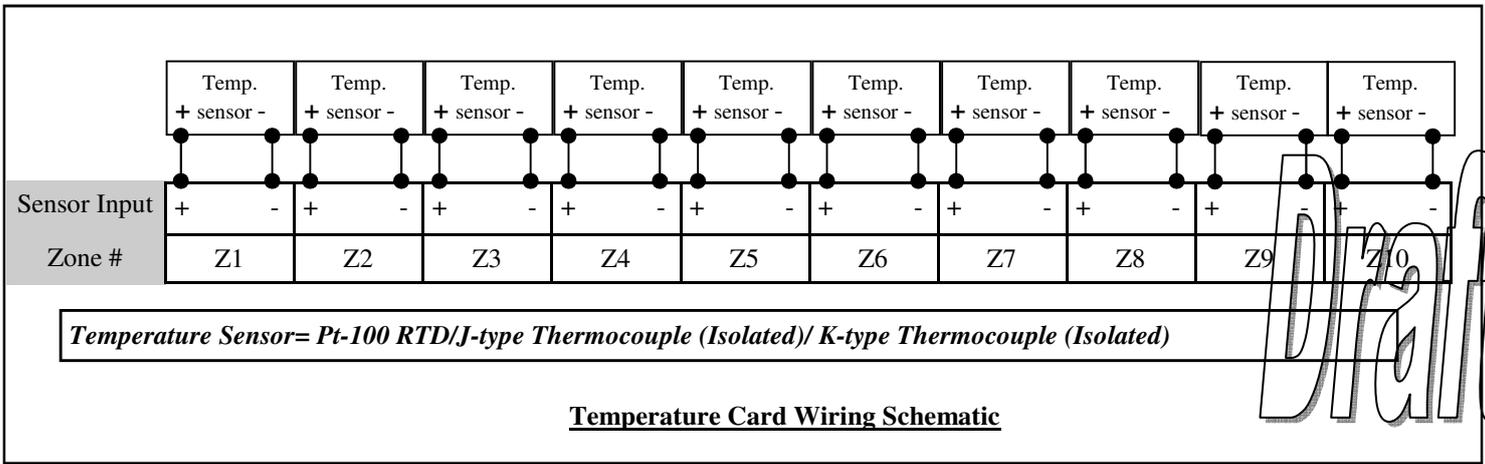
> For Backpressure proportional valve connect DAC-3/4 output to an *extra amplifier card* & set the Auto Solenoid energization tables on MMI accordingly.

#### AMPLIFIER CARD NOTES:

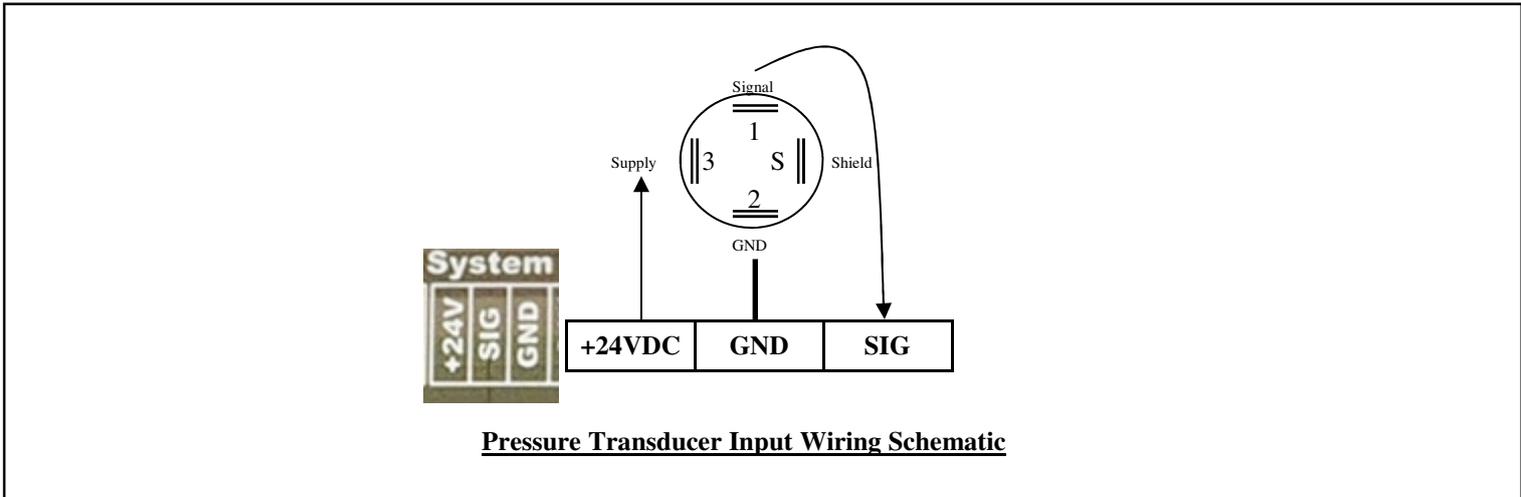
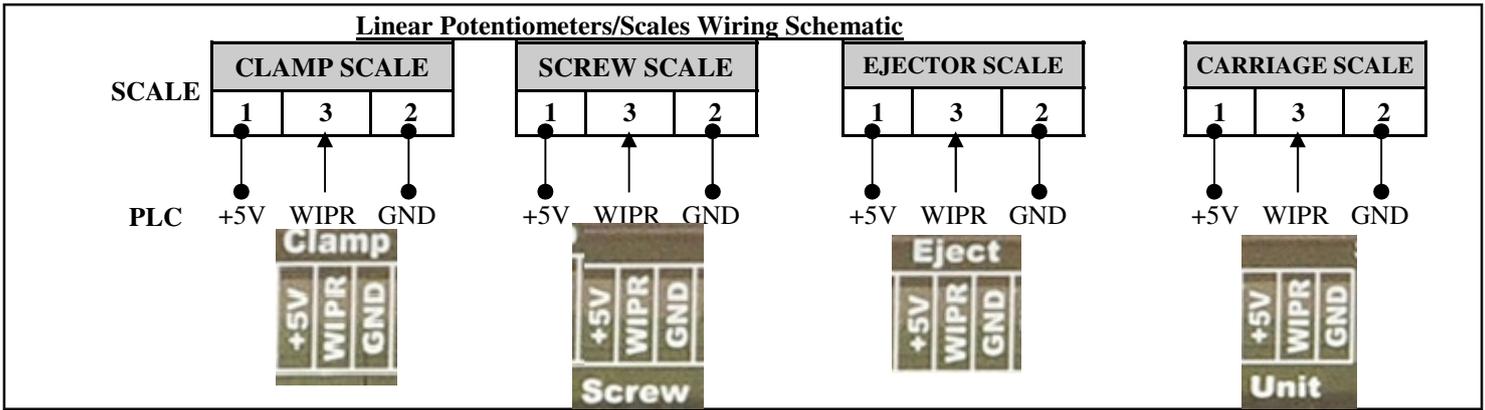
BY DEFAULT AMPLIFIER CARD DRIVES VALVE SOLENOIDS RATED UPTO 24VDC,1.6A

ANY ABOVE VOLTAGE REQUIREMENTS >24VDC, RECONNECT JUMPERS J1,J2 TO HV.

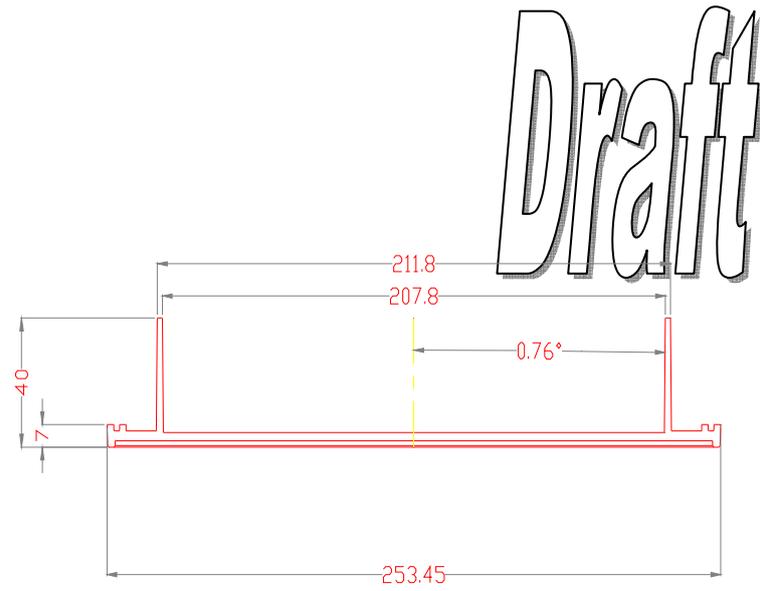
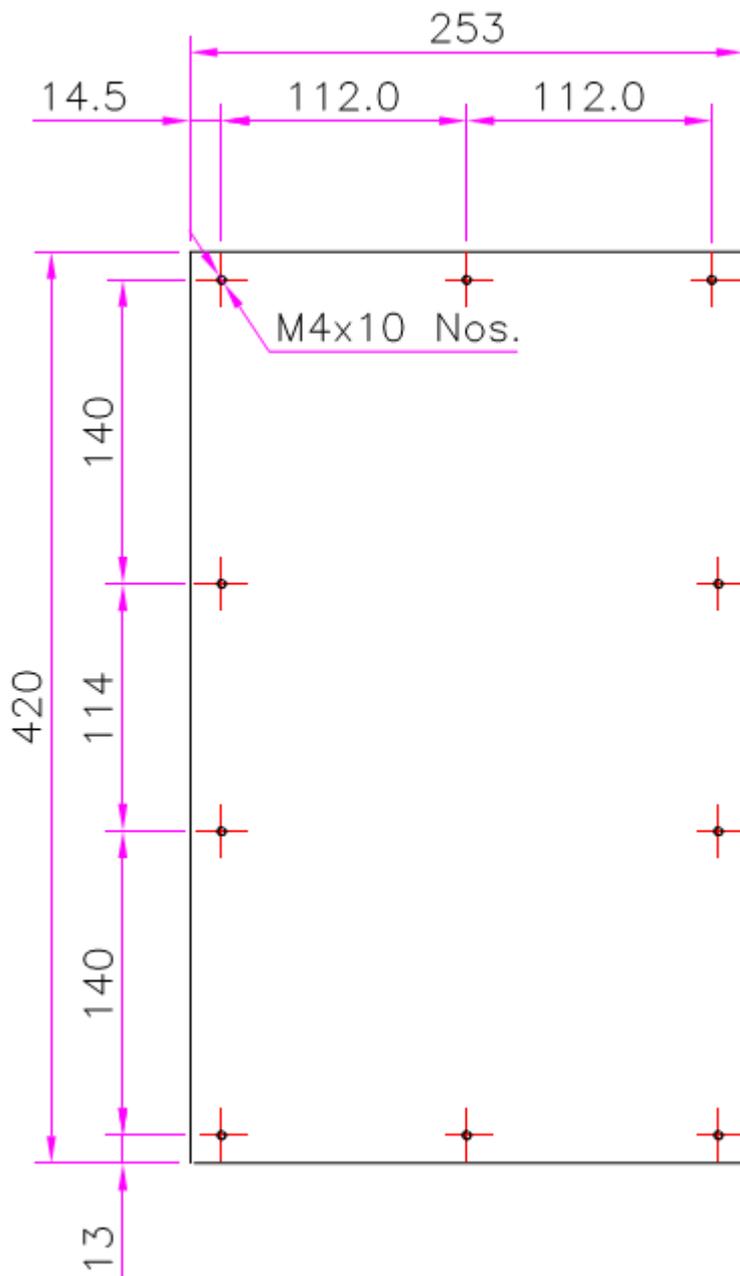
ANY ABOVE CURRENT REQUIREMENTS>1.6A, REPLACE 20E RESISTORS



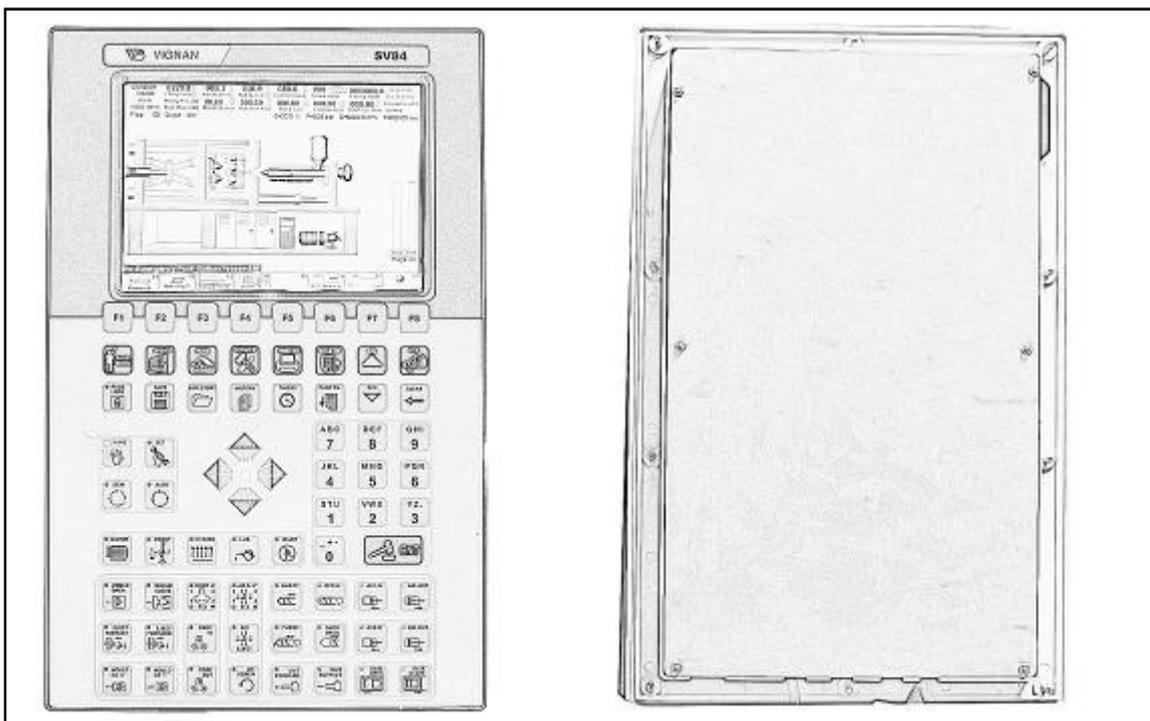
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**Mechanical Dimensions for Frame Fabrication**

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