TOPIV INSTALLATION
( STEP BY STEP )

( WITHOUT SPI PLUG )
1. Picker Body Installation

1-1. Picker Assembly. (Step 1)

1. Read all instructions prior to starting.
2. Unpack the Picker and check contents.
3. Fix base to rigid bench top using C clamp. (Figure 1-1-1)
4. Disconnect 4 bolts from rotational plate of picker body.
5. Lift upper assembly into position, noting the cutout for clamp handle in the base. (Figure 1-1-2)
6. Secure using cap screws provided. (The use of locking adhesives is recommended.)
7. Connect air hoses and wire (Figure 1-1-3). Do not remove cable tie on the swing cylinder at this time.

Note: Use caution when removing the picker body from the box. The swing rotation makes handling difficult. Two suggested methods are shown below in figures 1-1-4 and 1-1-5. When a hoist is available the method shown in fig 1-1-5 is recommended. The picker body weights about 80 lbs. Use caution selecting lifting points.
Read all the installation instructions prior to starting.
Please follow the directions carefully.

1. Place the template on the stationary platen as shown in Figure 1-2-2. Use the transfer punch and hammer to mark the hole locations.
2. You may use either pattern A or B. (Figure 1-2-1)
3. Use a Magnetic Base drill to drill 4 locations (either pattern A or Pattern B) to a depth of more than 1.5 inches. (Figure 1-2-1)
4. Tap 5/16-18 and de-burr.
Note: M 8 may be substituted for 5/16-18 thread.

<table>
<thead>
<tr>
<th>Included</th>
<th>Required</th>
</tr>
</thead>
</table>
1. Rig as shown. (Figure 1-3-1)
2. Slowly lift up and stand the picker vertically.
3. Put the picker on the molding machine as shown. (Figure 1-3-2)
4. Place the Heat shield plate between the picker base and stationary platen. (Figure 1-3-3)
5. Using lock washers, flat washers and 5/16-18 x 1.5 grade 5 bolts, secure the base of the picker firmly to the stationary platen in four or more locations.
6. Make sure the picker installed as shown. (Figure 1-3-4)
7. Remove the cable tie on the swing cylinder.

Supplied
1. Picker 2. Heat shield plate 3. 5/16-18” grade 5 Bolts (4 or 6 Pcs.)

Required
2. Electric Interface Wiring

1. Only qualified personnel should attempt to complete interface wiring.
2. Read all the instruction prior to beginning.
3. Prepare the molding machine for wiring:
   a. Power off the molding machine.
   b. Perform lockout tag out on the molding machine.
   c. Open the electrical control panel.
   d. Locate the wiring diagram for the I.M.M.
4. Evaluate signal voltages used:
   a. The picker is setup to receive 24 V DC signals from the I.M.M.
   b. Contacts are used to supply signal from the robot to the I.M.M. A control voltage up to 110 V may be used.

2-1. Mount Interface Box, Terminal Strip (Step 4)

1. Evaluate the control panel and choose an appropriate place to connect the interface cable, mount the interface box and mount the terminal strip. (Note: Interface box should be mounted in an accessible location)
3. Prepare control panel to accept the cord grip (Drill panel and use 1/2” Knockout)
4. Feed wire and cord grip through hole in the panel and secure with lock nut.
5. Mount terminal strip inside the control panel. (Fig 2-1-1)
6. Do not connect the interface cable to the terminal strip at this time.

<table>
<thead>
<tr>
<th>Supplied</th>
<th>1/2 “Cord Grip (1 Pc), 8-32 Round head screws (8 Pc), Terminal Strip (1 Pc), Hanger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required</td>
<td>Hand drill, Drill and Tap for 8-32, Knock out 1/2”, Punch, Hammer</td>
</tr>
</tbody>
</table>
Read carefully and make sure all the voltage and wiring with actual IMM operation. (Not following all the steps might cause damage on IMM and Robot.)

**From IMM to Robot (IMM Test)**

After finishing Robot body set up. Must test all the IMM voltage (DC 24, AC 110 or Contact) with actual operation.

**Emergency Stop**
1. Locate Emergency Stop Wiring No. (Two Point Required)
2. For Example ES1(Emergency Stop1) and ES2 (Emergency Stop 2).
3. PRESS Emergency Stop Button
4. Measure Voltage ES1 and ES2 (DC 0 Volts, AC 0 Volts or No Continuity)
5. Release Emergency Stop Button
6. Measure Voltage ES1 and ES2 (DC 24 Volts, AC 110 Volts or Continuity)

**Mold Open Limit**
1. Locate Mold Open Complete (Limit) Wiring No. (Two Point Required)
2. For Example MOC1(MoldOpenComplete1) and MOC2 (MoldOpenComplete 2).
3. Mold Close
4. Measure Voltage MOC1 and MOC2 (DC 0 Volts, AC 0 Volts or No Continuity)
5. Mold Open
6. Measure Voltage MOC1 and MOC2 (DC 24 Volts, AC 110 Volts or Continuity)

**Safety Door Closed**
1. Locate Safety Door Closed Wiring No. (Two Point Required)
2. For Example SDC1 (Safety Door Closed1), and SDC2 (Safety Door Closed 2).
3. Close Safety Door
4. Measure Voltage SDC1 and SDC2 (DC 0 Volts, AC 0 Volts or No Continuity)
5. Open Safety Door
6. Measure Voltage SDC1 and SDC2 (DC 24 Volts, AC 110 Volts or Continuity)

**Injection Signal**
1. Locate Injection Signal Wiring No. (Two Point Required)
2. For Example IS1 (Injection Signal 1), and IS2 (Injection Signal 2).
3. Measure Voltage IS1 and IS2 (No Injection)
4. DC 0 Volts, AC 0 Volts or No Continuity
5. Measure Voltage IS1 and IS2 with Injection
6. DC 24 Volts, AC 110 Volts or Continuity

**Full Auto**
1. Locate Full Auto Wiring No. (Two Point Required)
2. For Example FA1 (Full Auto 1), and FS2 (Full Auto 2).
3. Measure Voltage FA1 and FA2 without Full Auto
4. DC 0 Volts, AC 0 Volts or No Continuity
5. Measure Voltage FA1 and FA2 with Full Auto
6. DC 24 Volts, AC 110 Volts or Continuity

**Mold Close Limit** (Not Required)
1. Locate Mold Close Complete (Limit) Wiring No. (Two Point Required)
2. For Example MCC1(MoldCloseComplete1) and MCC2 (MoldCloseComplete 2).
3. Mold Close
4. Measure Voltage MCC1 and MCC2 (DC 0 Volts, AC 0 Volts or No Continuity)
5. Mold Open
6. Measure Voltage MCC1 and MCC2 (DC 24 Volts, AC 110 Volts or Continuity)

There might be some common and write down the each number that actually reading from Voltmeter.

**From Robot to IMM (ROBOT Test)**

After Mounting the robot on IMM, even though Robot fully tested before shipping, we recommend actual voltage or contact reading from Robot before wiring IMM. After finishing IMM Electric Test recommended, test all the ROBOT wire and Make sure all the relay and cable is working properly with (Contact On and Off) with actual robot operation.

To turn on the Robot, Connect the Power and Make Jumper on EC, ED (IMM E-Stop)

**Cable Test**
1. Test Continuity between C, C1, C2 (Each of two wire): No Continuity
2. Test Continuity between D, E, F (Each of two wire): No Continuity
(There should no continuity on each of two wire)

**Robot E-Stop Test**
1. Test Continuity EA and EB with No Robot E-Stop (Continuity)
2. Press Robot E-Stop
3. Test Continuity EA and EB (No Continuity)

**Mold Close Interlock**
1. Adjust Robot arm stroke to prevent damaging Robot arm or mold
2. Test Continuity Between K and L (Continuity)
3. Press Descend Button
4. Test Continuity Between K and L (No Continuity)

**Ejector Interlock** need to run with Molding Machine (In Auto Mode) N, M (Continuity in Manual)
Auto Cycle Start need to run with Molding Machine (In Auto Mode) G, H (No Continuity in Manual)

Follow instruction Manual to test Ejector Interlock and Auto Cycle Start

Also it's possible to test robot relay without IMM operation.

**Mold Open Complete (C, F), Safety Door Closed, (C2, E), Auto Injection (C1, D).**

**From Robot Wire**

**Test:** Mold Open Complete (C, F)

Supply 0 Volt to F and 24 Volt to C, It will activate Mold Open Complete relay (RED Bright LED)
Supply 0 Volt to C and 24 Volt to F, It will activate Mold Open Complete relay (But No LED)

**Test:** Auto Injection (C1, D)

Supply 0 Volt to D and 24 Volt to C1, It will activate Auto Injection relay (RED Bright LED)
Supply 0 Volt to C1 and 24 Volt to D, It will activate Auto Injection relay (But No LED)

**Test:** Safety Door Closed, (C2, E)

Supply 0 Volt to E and 24 Volt to C2, It will activate Safety Door Closed relay (RED Bright LED)
Supply 0 Volt to C2 and 24 Volt to E, It will activate Safety Door Closed relay (But No LED)

**Test:** IMM Full Auto Signal (R (Red + Black))
Also Supply 0 Volt to R, Will see Full Auto Icon in Handy Controller Screen.

Make sure all the test is working properly and Follow interface interlock

If you have any question, Please contact

Sam Lee (Tel: 1-636-578-6059)
1. Locate correct voltage power source (110 Volt)
2. Connect terminal A and B of the I.M.M side of the terminal strip to the supply voltage as shown below.
3. Connect machine ground to the FG.

Note: Your wiring may look different

JUST NEED TO PLUG 110 VOLTS TO WALL SOCKET
1. The mold open complete signal indicates that the mold is fully open and it is safe for the picker to remove product. This signal must be maintained during product removal.

3. Locate this signal and confirm the signal voltage is 24 V DC

4. Connect 0 V (Common) on terminal C and signal on terminal F as shown below.
   - Note: the 0 V common will be used on two inputs. (Mold Open Complete, Door Safety Signal)

5. This signal may be a direct PLC output.

Note: If polarity is reversed the LED on the relay may not light.

Note: Your wiring may look different.
1. This signal indicates the safety door is closed. The picker will not operate automatically without this signal.
2. Locate Door safety signal on the I.M.M. and confirm the signal Voltage is 24 V DC
3. This signal should have the same common as the mold open complete signal.
4. Connect the signal (24V DC) to terminal “E”.
5. If you are unable to locate the signal or the signal voltage is not 24 V DC, contact the factory.
6. This signal may be a direct PLC output.
7. Other normally closed safety devices may be wired in series on this circuit (E.g. Safety mats or door interlocks), If polarity is reversed the LED on the relay may not light

Note: Your wiring may look different
1. This signal confirms the Auto operation of the I.M.M and ensures the correct sequence during the first product removal. Any 24 V signal that is momentarily on during the automatic cycle may be used. Some possible signals are: Auto Injection Signal, Injection Time Complete, Cooling time complete. When the picker is placed in auto mode, it will begin operation after the first molding cycle. After completing the first automatic molding cycle, the picker will operate.

2. Locate this signal and confirm the signal voltage is 24 V DC.

3. This signal uses a separate common for input.

4. Connect the signal (24 V DC) to terminal “D”. Connect 0 V (Common) on terminal “C1”.

5. If you are unable to locate signal or the signal voltage is not 24 V DC contact the factory.

6. This signal may be a direct PLC output. If polarity is reversed the LED on the relay may not light.

Note: Your wiring may look different.
2-6 Cycle Start Signal (Step 9) (From Robot to IMM)

1. The Picker initiates the molding cycle by momentarily closing a normally open contact.
2. Using the I.M.M schematic locate the correct place to wire cycle start contact.
3. It may be necessary to contact the machine builder for information.
4. Connect terminal G and H for cycle start signal. (Depending on the injection molding machine, there may be different name for the cycle start. For example: Rest Time, Stop Time, Cycle Start)
5. Some machine doesn’t required to receive this signal from Robot for Auto Operation

**Note:** Your wiring may look different

---

**WIRING EXAMPLE**

**BEFORE WIRING**

**AFTER WIRING**
1. This circuit prevents the mold from opening if the picker arm is not fully retracted. (e.g. Loss of air pressure and failure of safety lock pin)
2. A normally open contact when wired correctly prevents mold open valve from being activated.
3. Locate the wiring to the mold open valve.
4. Wire in series as shown.

**WIRING EXAMPLE**

Note: Your wiring may look different
2-8. Mold Close Interlock (Step 11) (From Robot to IMM)

- This circuit prevents the mold from closing while the picker arm is down.
- A Normally open contact when wired correctly prevents the mold close valve from being activated.
- Locate the wiring to the mold close valve.
- Wire in series as shown below.

Note: Your wiring may look different

**WIRING EXAMPLE**

I.M.M CONTROL BOX

Valve for Mold Close

**BEFORE WIRING**

Valve for Mold Close

**AFTER WIRING**
1. If you do not have an ejector feature you may skip this step.
2. The picker delays the ejector signal until the gripper or Vacuum unit is in place to receive the product.
3. This is accomplished by placing a normally open contact in series with the supply to the ejector valve solenoid.
4. Locate I.M.M signal to ejector solenoid.
5. Wire M and N as shown below.
   Note: This feature may be disabled by turning the ejector switch off on the interface box.

WIRING EXAMPLE

Note: Your wiring may look different

I.M.M CONTROL BOX

Before Wiring

Ejector Valve

Output to Ejector Valve or Servo Controller

After Wiring

Ejector Valve
2-9-1. IMM to PICKER Emergency Stop Circuit  (Step 12-1)

1. If the IMM has a contact to activate the E-stop on auxiliary equipment it should be wired to the picker.
2. The picker requires a 24 V DC or normally closed bare contact or
3. When 24 DC disconnect or the contact opens from IMM, the picker E-stop will be activated.
4. Wire as shown below
5. When IMM have 110Vols output for E-Stop signal, remove 24 VDC relay from Relay and connect 110 V AC relay.

Note: Your wiring may look different
1. The picker has a contact available for use in the IMM’s E-Stop circuit
2. This contact is normally closed and will open when the E-stop on the picker’s handy control is pressed. When wired correctly the picker E-Stop will trigger the IMM E-Stop
3. Locate the external E-Stop circuit on the I.M.M
4. Wire as shown and remove jumper as required

Note: Your wiring may look different

**WIRING EXAMPLE**

One more wire required.

IMM is in Full Auto Mode
NEED TO SUPPLY 0 Volt to R (Red + Black Wire)
when IMM is in Full Auto (Use Robot O Volt and R (Red + Black Wire)
2-10. Finish Wiring and Test Preparation (Step 13)

1. Double check all wiring connections.
2. Wire interface cable from the interface box to picker side of the terminal strip.
3. Attach the cable from picker to the interface box and secure to prevent damage during operation. (Figure 2-10-1)

![Figure 2-10-1](image)

![Figure 2-10-2](image)

2-11. Set up for testing (Step 14)

1. Loosen the cap screws on extension cylinder stop and move stop down to till it touches the shock absorber. Tighten cap screws on the stop. (Figure 2-11-1)
2. Check to make sure that picker arm will not enter mold even when fully extended.
3. Now you are ready to check interlocks.

![Figure 2-11-1](image)
2-12 Connect Air (Step 15)

1. Make sure the picker arm is retracted and in the vertical position.
2. Beware that the picker may move suddenly as the system is pressurized.
3. Connect the air line to the picker. (Figure 2-12-1)
4. Connect the electric line for Air Shutdown Solenoid Valve
5. Secure the air line to avoid damage.
6. Pull up the adjusting knob and adjust the pressure to 70 psi. (Figure 2-12-2)
7. Air supply should be clean and dry.
8. Check the Emergency Stop button is not pushed.

Installation is now complete.
Before using the robot you must test safety interlocks.
Follow the procedure in section 3.
2.1 Check

2.1.1 Power ON

- **STEP 1**
  Set air pressure as 0.5Mpa (Gauge)

- **STEP 2**
  Power on

- **STEP 3**
  Displays logo and origin point and go to manual mode
2.1.2 Turning System OFF

![WARNING]

Do not turn on and off too fast. Wait more than 1 minute to turn on or turn off the system.

- **STEP 1**
  Turn Off

- **STEP 2**
  Screen will be off
2.1.3 Manual Operation

(1) Manual Operation Description
Selecting Outside Waiting Option will initiate Robot with Swing Operation

⚠️ DANGER ⚠️ CLEARING ROBOT MOTION AREA: It is the responsible of the operator to verify that the robot motion area is clear before any robot operation.

<table>
<thead>
<tr>
<th>NO</th>
<th>Icon</th>
<th>Description</th>
<th>No</th>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>↓</td>
<td>Main Arm Down</td>
<td>12</td>
<td>✅</td>
<td>Vacuum On</td>
</tr>
<tr>
<td>2</td>
<td>↑</td>
<td>Main Arm Up</td>
<td>13</td>
<td>❌</td>
<td>Vacuum Off</td>
</tr>
<tr>
<td>3</td>
<td>✢</td>
<td>Main Arm Up Complete</td>
<td>14</td>
<td>✰</td>
<td>Chuck Rotation</td>
</tr>
<tr>
<td>4</td>
<td>←</td>
<td>Kick</td>
<td>15</td>
<td>✰</td>
<td>Chuck Rotation Return</td>
</tr>
<tr>
<td>5</td>
<td>→</td>
<td>Kick Return</td>
<td>16</td>
<td>❌</td>
<td>Sub Arm Down</td>
</tr>
<tr>
<td>6</td>
<td>◀</td>
<td>Swing</td>
<td>17</td>
<td>✰</td>
<td>Sub Arm Up</td>
</tr>
<tr>
<td>7</td>
<td>◀</td>
<td>Swing Complete</td>
<td>18</td>
<td>✰</td>
<td>Sub Arm Up Complete</td>
</tr>
<tr>
<td>8</td>
<td>◀</td>
<td>Swing Return</td>
<td>19</td>
<td>✰</td>
<td>Sub Arm Kick</td>
</tr>
<tr>
<td>9</td>
<td>◀</td>
<td>Swing Return Complete</td>
<td>20</td>
<td>✰</td>
<td>Sub Arm Kick Return</td>
</tr>
<tr>
<td>10</td>
<td>✰</td>
<td>Chuck</td>
<td>21</td>
<td>✰</td>
<td>Sub Arm Gripper</td>
</tr>
<tr>
<td>11</td>
<td>✰</td>
<td>Chuck Open</td>
<td>22</td>
<td>✰</td>
<td>Sub Arm Gripper Open</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<th>Icon</th>
<th>Description</th>
<th>NO</th>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>🌍</td>
<td>Full Auto</td>
<td>5</td>
<td>🍀</td>
<td>Mold Open/Close Interlock</td>
</tr>
<tr>
<td>2</td>
<td>🌍</td>
<td>Auto Injection signal</td>
<td>6</td>
<td>⚒</td>
<td>Ejector Interlock</td>
</tr>
<tr>
<td>3</td>
<td>🌍</td>
<td>Mold Open Complete</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>🌍</td>
<td>Door Safety signal</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## (2) Button Function in Manual Mode

### DANGER
CLEARING ROBOT MOTION AREA: It is the responsible of the operator to verify that the robot motion area is clear before any robot operation.

### NOTICE
Robot arm will not descent if mold is not open.

<table>
<thead>
<tr>
<th>NO</th>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image1" alt="TIMER COUNT" /></td>
<td>Press the Timer button, LCD displays timer mode for delay time settings.</td>
</tr>
<tr>
<td>2</td>
<td><img src="image2" alt="SHIFT + TIMER COUNT" /></td>
<td>Press the Timer button with Shift button, (Counter) LCD displays Counter screen, Counter screens display Total Q'ty, Reject Q'ty, Detection Fail.</td>
</tr>
<tr>
<td>3</td>
<td><img src="image3" alt="MODE MOLD" /></td>
<td>Press Mode button, LCD displays Mode screen (Motion Mode).</td>
</tr>
<tr>
<td>4</td>
<td><img src="image4" alt="SHIFT + MODE MOLD" /></td>
<td>Press Mode Button with Shift Button, (Mold) LCD displays Mold Maintenance Screen. (Search Mold Number, Open and Create, Delete Mold File)</td>
</tr>
<tr>
<td>5</td>
<td><img src="image5" alt="STEP 1/O" /></td>
<td>Press Step Button LCD displays Step Motion Mode Screen (Robot can operate Step by Step Operation.)</td>
</tr>
<tr>
<td>6</td>
<td><img src="image6" alt="SHIFT + STEP 1/O" /></td>
<td>Press Step Button with Shift Button, (I/O) LCD display Input / Output Signal.</td>
</tr>
<tr>
<td>7</td>
<td><img src="image7" alt="AUTO CYCLE" /></td>
<td>Press Auto Button LCD displays Auto Mode Screen.</td>
</tr>
<tr>
<td>8</td>
<td><img src="image8" alt="SHIFT + AUTO CYCLE" /></td>
<td>Press Auto Button with Shift Button (Cycle) LCD displays One Cycle Operation Screen.</td>
</tr>
<tr>
<td>9</td>
<td><img src="image9" alt="SHIFT + ▲" /></td>
<td>Press Up Arrow with Shift Button. LCD displays Error History Screen</td>
</tr>
<tr>
<td>10</td>
<td><img src="image10" alt="SHIFT + ▼" /></td>
<td>Press Down Arrow with Shift Button. LCD displays Rom version Information</td>
</tr>
<tr>
<td>12</td>
<td><img src="image11" alt="SHIFT + ▶" /></td>
<td>Press Right Arrow with Shift Button. LCD displays the commend in the screen with selected Language.</td>
</tr>
<tr>
<td>NO</td>
<td>Button</td>
<td>Description</td>
</tr>
<tr>
<td>----</td>
<td>--------</td>
<td>-------------</td>
</tr>
<tr>
<td>13</td>
<td><img src="image" alt="Buzzer Button" /></td>
<td>Press Buzzer Button (Only in Manual Mode) LCD Screen displays setting for Buzzer On/Off</td>
</tr>
<tr>
<td>14</td>
<td><img src="image" alt="Detection Button" /></td>
<td>Press Detection Button with Shift (Only in Manual Mode) On/Off Screen for Parts Verification Function</td>
</tr>
<tr>
<td>15</td>
<td><img src="image" alt="Eject Button" /></td>
<td>Press Ejector Button (Only in Manual Mode) LCD Screen displays Selection for Ejector Control Function</td>
</tr>
<tr>
<td>16</td>
<td><img src="image" alt="Reject Button" /></td>
<td>Press Reject Button (Only in Manual Mode) Robot will separate Rejected Part (Signal From IMM)</td>
</tr>
<tr>
<td>17</td>
<td><img src="image" alt="Descent Button" /></td>
<td>Press Descent Button Move Main Arm Down, Press again, Move Main Arm down.</td>
</tr>
<tr>
<td>18</td>
<td><img src="image" alt="Kick Button" /></td>
<td>Press Kick Button Move Main Arm Kick, Press again, Move Main arm Kick Return</td>
</tr>
<tr>
<td>19</td>
<td><img src="image" alt="Swing Button" /></td>
<td>Press Swing Button Robot arm will Swing, Press again, Robot arm swing return</td>
</tr>
<tr>
<td>20</td>
<td><img src="image" alt="Chuck Button" /></td>
<td>Press Chuck Chuck, Press again, Chuck Release</td>
</tr>
<tr>
<td>21</td>
<td><img src="image" alt="Suction Button" /></td>
<td>Press Suction Suction, Press again, Suction Release</td>
</tr>
<tr>
<td>22</td>
<td><img src="image" alt="Chuck Rotation" /></td>
<td>Press Chuck Rotation Rotate Chuck, Press again, Chuck Rotate Return</td>
</tr>
<tr>
<td>23</td>
<td><img src="image" alt="Descent Button for Sub Arm" /></td>
<td>Press Descent Button for Sub Arm Move Sub Arm Down, Press again, Move Sub Arm up</td>
</tr>
<tr>
<td>24</td>
<td><img src="image" alt="Gripper Button" /></td>
<td>Press Gripper Grip and Grip Release</td>
</tr>
</tbody>
</table>
2.1.4 Interlock Confirmation

Confirming Robot and Injection Molding Machine interlock is for safety operation between two machines

(1) Interlock Signal

<table>
<thead>
<tr>
<th>From Injection Molding Machine to IMM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mold Open Complete Signal</td>
</tr>
<tr>
<td>This signal is present when the contacts are closed (Relay is On) and indicates that the mold is in a predetermined fully open position. The signal is maintained whenever the mold is the predetermined fully open position. (This signal allow robot arm to enter mold area if interlock is working properly.)</td>
</tr>
<tr>
<td>Auto Injection Signal</td>
</tr>
<tr>
<td>This signal is present when the contacts are closed (Relay is ON) and indicates that the mode of operation of the injection molding machine is auto. This signal can be on when the injection molding machine is in automatic processing. The Robot will memorize this signal until receiving the Mold Open Complete signal and robot will start auto operation.</td>
</tr>
<tr>
<td>Door Safety Signal</td>
</tr>
<tr>
<td>This signal is present when the contacts are closed (Relay is ON) and indicates that the movable gates and guard that prevent access to robot motions are closed. The signal maintained as long as the movable gates and guard are closed. When Robot in Auto Mode, if this signal is not present, robot will not operate and move to manual mode.</td>
</tr>
<tr>
<td>Full Auto</td>
</tr>
<tr>
<td>This signal is present when the contacts are closed (Relay is ON) and indicates that the mode of operation of the injections molding machine is fully automatic. This signal is maintained as long as the injection molding machine is in fully automatic</td>
</tr>
<tr>
<td>Reject Part</td>
</tr>
<tr>
<td>This signal is present when the contacts closed (Relay is ON) and indicates that the molded part is not acceptable. If the Robot receives this signal, robot will separate the parts in this cycle as a rejected parts and locate the predetermined position.</td>
</tr>
</tbody>
</table>
### 2. Maintenance

<table>
<thead>
<tr>
<th>IMM EMO</th>
<th>While the injection molding machine emergency stop is activated, the circuit will open and will activate the emergency stop circuit of the robot. The injection molding machine emergency stop circuit will be hard wired in series with the robot emergency stop circuit. The current of this signal must not exceed 6 amps</th>
</tr>
</thead>
</table>

#### From Robot to Injection Molding Machine

<table>
<thead>
<tr>
<th>Mold Closed Interlock</th>
<th>The closing of this contact (Relay is ON) indicates that the robot is in a predetermined safe position and allows the IMM clamp to close. Clamp closing motion must be interrupted whenever this signal is not present. This signal is no longer required once the mold is fully closed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mold Open Interlock</td>
<td>The closing of this contact indicates (Relay is ON) that the robot is in a predetermined safe position and allows IMM clamp Open. Both clamp closing and clamp opening motion must be interrupted whenever this signal is not present. The current of this signal must not exceed 6 amps</td>
</tr>
<tr>
<td>Ejector Interlock</td>
<td>The closing of this contact (Relay is ON) permits the ejectors can go forward. Only operate in Auto mode and when Robot is in Kick Position (Ready to Receive the parts) will send signal to Injection Molding Machine</td>
</tr>
<tr>
<td>Take-Out Complete / Cycle Start</td>
<td>The closing of this contact (Relay is ON) indicates that the robot is in a predetermined safe position and allows the IMM clamp to close. Clamp closing motion must be interrupted whenever this signal is not present.</td>
</tr>
<tr>
<td>Robot EMO</td>
<td>While the robot emergency stop is activated, the circuit will open and activate the emergency stop circuit of the injection molding machine. The robot emergency stop circuit will be hardwired in series with the injection molding machine emergency stop circuit. The current of this signal must not exceed 6 amps.</td>
</tr>
</tbody>
</table>

#### Output Signal tp Conveyor or Stocker or Gate cutter

<table>
<thead>
<tr>
<th>Conveyor</th>
<th>After release (Open) the parts, robot will generate signal momentarily to auxiliary machine for next operation.</th>
</tr>
</thead>
</table>
## (2) Interlock Signal Confirmation

### ① While in Manual Mode

<table>
<thead>
<tr>
<th>Signal</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Mold Open Complete Signal**<br><br> ![Image](image1) | - When Mold Open,  
- Robot arm can be Descent(Down) |
| **Mold Open and Close Interlock**<br><br> ![Image](image2) | - When mold open is permitted  
- Mold can be opened and closed |
| **Ejector Interlock**<br><br> ![Image](image3) | - When Ejector can be operated in manual mode  
- Ejector interlock will working only the Robot in Auto Mode. |
### 2. Maintenance

<table>
<thead>
<tr>
<th>Safety Door Signal</th>
<th><img src="image1" alt="Image" /></th>
<th><strong>When Safety Door is closed.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image2" alt="Image" /></td>
<td><img src="image3" alt="Image" /></td>
<td><img src="image4" alt="Image" /></td>
</tr>
<tr>
<td><img src="image5" alt="Image" /></td>
<td><img src="image6" alt="Image" /></td>
<td><img src="image7" alt="Image" /></td>
</tr>
<tr>
<td><img src="image8" alt="Image" /></td>
<td><img src="image9" alt="Image" /></td>
<td><img src="image10" alt="Image" /></td>
</tr>
<tr>
<td><strong>Manual</strong></td>
<td><strong>032</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Auto Injection</th>
<th><img src="image11" alt="Image" /></th>
<th><strong>When IMM in manual and Semi-Manual Mode</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image12" alt="Image" /></td>
<td><img src="image13" alt="Image" /></td>
<td><img src="image14" alt="Image" /></td>
</tr>
<tr>
<td><img src="image15" alt="Image" /></td>
<td><img src="image16" alt="Image" /></td>
<td><img src="image17" alt="Image" /></td>
</tr>
<tr>
<td><img src="image18" alt="Image" /></td>
<td><img src="image19" alt="Image" /></td>
<td><img src="image20" alt="Image" /></td>
</tr>
<tr>
<td><strong>Manual</strong></td>
<td><strong>032</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Full Auto</th>
<th><img src="image21" alt="Image" /></th>
<th><strong>When Injection Molding Machine is not in auto mode.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image22" alt="Image" /></td>
<td><img src="image23" alt="Image" /></td>
<td><img src="image24" alt="Image" /></td>
</tr>
<tr>
<td><img src="image25" alt="Image" /></td>
<td><img src="image26" alt="Image" /></td>
<td><img src="image27" alt="Image" /></td>
</tr>
<tr>
<td><img src="image28" alt="Image" /></td>
<td><img src="image29" alt="Image" /></td>
<td><img src="image30" alt="Image" /></td>
</tr>
<tr>
<td><strong>Manual</strong></td>
<td><strong>32</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Robot EMO</th>
<th><img src="image31" alt="Image" /></th>
<th><strong>When Injection Molding Machine is in fully auto mode.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image32" alt="Image" /></td>
<td><img src="image33" alt="Image" /></td>
<td><img src="image34" alt="Image" /></td>
</tr>
<tr>
<td><img src="image35" alt="Image" /></td>
<td><img src="image36" alt="Image" /></td>
<td><img src="image37" alt="Image" /></td>
</tr>
<tr>
<td><img src="image38" alt="Image" /></td>
<td><img src="image39" alt="Image" /></td>
<td><img src="image40" alt="Image" /></td>
</tr>
<tr>
<td><strong>Manual</strong></td>
<td><strong>32</strong></td>
<td></td>
</tr>
</tbody>
</table>

- **Press Robot EMO button, make sure IMM EMO is operated.**
## 2. Maintenance

### ② Interlock Confirmation in Step Operation

<table>
<thead>
<tr>
<th>Signal</th>
<th>Description</th>
</tr>
</thead>
</table>
| Ejector Interlock | ![Image](image1)  
| Step         | 32                                                                          |
| >Down        |                                                                             |
| Kick         |                                                                             |
| Ejector      |                                                                             |
|              | ◆ When robot is down, kick and ready to receive parts, Ejector should be operated. |

### ③ Interlock confirmation in Auto Mode

<table>
<thead>
<tr>
<th>Signal</th>
<th>Description</th>
</tr>
</thead>
</table>
| Cycle Start  | ![Image](image2)  
| Error        | 32                                                                          |
| 160 VacuumFail |                                                             |
| Open Safety Door |                                                        |
| Fix Prob, Close |                                                             |
|              | ◆ When the Robot has Vacuum error in Auto Mode, next cycle should not be operated with safety door closed |
| Full Auto    | ![Image](image3)  
| Input(Out▶)  | 32                                                                          |
| X1H FullAuto | ●                                                                           |
| X19 Injection | ●                                                                           |
|              | ◆ When IMM is in auto injection with full Auto mode, make sure the signal is on. (Mold Close complete may be substituted Auto Injection Signal) |
| Conveyor    | ![Image](image4)  
| Output(In ◀) | 32                                                                          |
| Y2B EjectorSig | ●                                                                           |
| Y2C Converyer | ●                                                                           |
| Y28 Buzzer   | ○                                                                           |
|              | ◆ Confirm the Conveyor output is on, after ascent complete with release parts |
| Reject       | ![Image](image5)  
| Input(Out▶)  | 32                                                                          |
| X18 MoldOpen | ●                                                                           |
| X1A SafetyDoor | ●                                                                           |
| X1B Reject   | ○                                                                           |
|              | ◆ If the mold parts is accepted, reject signal will be off after mold open complete. |
## 2. Maintenance

<table>
<thead>
<tr>
<th>Reject</th>
<th>Input</th>
<th>32</th>
</tr>
</thead>
<tbody>
<tr>
<td>X18 MoldOpen</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>X1A SafetyDoor</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>X1B Reject</td>
<td>○</td>
<td></td>
</tr>
</tbody>
</table>

- If the mold parts is rejected by IMM, reject signal will be on after mold open complete.

<table>
<thead>
<tr>
<th>IMM EMO Stop</th>
<th>Input</th>
<th>32</th>
</tr>
</thead>
<tbody>
<tr>
<td>X11 EMO stop</td>
<td>●</td>
<td></td>
</tr>
</tbody>
</table>

- Pressing IMM EMO Stop will operate Robot EMO stop
2.1.5 Emergency Off
Press ROBOT EMO button in any dangerous situation (Protect People, Robot, Mold Etc)

- **STEP 1**
  Press ROBOT EMO button.
  Robot will move to waiting position and stop Operation

  Alarm and buzzer will be on and Error message will appear in the handy controller.

<table>
<thead>
<tr>
<th>Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>096 ROBOT EMO Restore ROBOT EMO button.</td>
</tr>
</tbody>
</table>

2.1.6 Restoring Emergency Off

⚠️ WARNING
Eliminate Emergency Off Environment before restoring ROBOT EMO button.

- **STEP 1**
  Eliminate Emergency Off Situation.
  Rotate ROBOT EMO button to Clock Wise.

- **STEP 2**
  Press and stop Alarm and Buzzer, moves to Manual Mode
3. Installation Testing

3-1. Test Preparation (Step 16)

1. Check to make sure the mode plug on the interface box is in the “Robot In Use” socket.
2. Make sure that the picker extension stop is set on shock absorber and arm can not enter mold when extended. Adjust the picker’s extension position if necessary. (Figure 3-1-2) (Also see Section 2-11)

• Note: For your reference, when you use I.M.M. only, it is not necessary to disconnect the air line from the picker, you only need to move the plug from “Robot In Use” to “Robot Not In Use” (Figure 3-1-1)

3-2. Mold Open Complete Signal (Step 17)

1. Power up the I.M.M. and then the picker. Picker power switch is located on the bottom of the handy controller. (Figure 3-2-1). Confirm the emergency stop button is not pushed (if pressed see section 11)
2. Open the mold of injection molding machine.
3. Make sure nothing will interfere with the picker motion.
4. Confirm mold open complete signal on interface box. (Figure 3-2-2)
5. Pressing key on handy control should make robot arm extend. Pressing key again, will return the arm.

If any testing fails, correct wiring and retest prior to proceeding. You risk damage to the mold and the picker otherwise.
3-3. Picker Extension Interlock (Step 18)

1. With the Picker arm retracted, close the mold of the I.M.M.
2. With the mold closed attempt to extend the arm by pressing down button.
3. The arm should remain stationary if the interlock is working.
Note: When the mold is closed the mold open complete signal in the interface box should not be illuminated.

3-4. Mold Close Interlock (Step 19)

1. Open the mold.
2. Press down button on handy controller to extend arm.
3. Make sure the arm has not entered the mold. Proceed only if the picker is clear of the mold. (See Section 2-11)
4. Operate mold close of I.M.M.
5. If mold closes while picker arm is extended, the wiring is incorrect. (Figure 3-4-2)
Note: Mold Open/Close interlock relay LED should be off when arm is extended.

If any testing fails, correct wiring and retest prior to proceeding. You risk damage to the mold and the picker otherwise.
3-5. Mold Open Interlock with Picker Failure (Step 20)

1. Close mold.
2. With the picker arm retracted, close the mold of the I.M.M.
3. With the mold closed attempt to extend the arm by pressing button 0.
4. The picker arm should not extend if wired correctly.
5. Disconnect air from picker.
6. Lift arm, and retract safety lock pin.
7. Allow arm to extend.
8. Attempt to open the mold with the picker in this position. The mold should not open if the interlock is wired correctly.

If any testing fails, correct wiring and retest prior to proceeding. You risk damage to the mold and the picker otherwise.

3-6. Ejector Interlock (Step 21)

1. Testing ejector interlock may only be done in Auto Mode.
2. Check that the ejector Dip Switch is turned on. (Factory Set is On)
3. Choose Auto motion pattern 31. (See 7-2 Auto Mode)
4. Picker will activate ejector valve when in position.
Note: If you want to control the ejector with the I.M.M only while using the picker. Change the Dip switch to off. If you want to disable the picker and eliminate the ejector interlock, then move the plug to the "Robot Not In Use" socket.
3-7. Safety Door Interlock (Step 22)

1. With the safety door opened, attempt to start the picker in Simple Auto Motion Pattern (See Auto Mode).
2. If the picker starts the auto mode, the wiring is wrong.
3. Also with the safety closed, attempt to start the picker in Auto Mode, and while robot is in auto mode running, open the safety door, picker should stop the running the auto mode.

Note: The safety door closed relay should only be illuminated when the door is closed.
In Manual Mode, when the safety door is opened, if down button pressed, robot arm will descent for the setup.

3-8. Auto Injection Signal (Injection Time or Mold Close)(Step 23)

- Power on the IMM
- Start the picker in Auto Motion Pattern without first cycling the I.M.M: If the picker cycles prior to the operating of 1 cycle of I.M.M, the wiring is wrong.
- Start the picker in Auto Motion, operate 1 cycle of IMM, If the picker cycles after the molding cycles, the wiring is right. Be careful picker and I.M.M will operate continuously.

If testing fails, correct wiring and retest prior to proceeding. You risk damage to the mold and the robot otherwise.
3-9. Picker to IMM Emergency Stop Circuit (Step 23-1)

1. Power on the I.M.M and the picker
2. Press the E-Stop button on the picker handy control
3. If wired correctly both the IMM and the picker should be in the Emergency Stop Mode
4. Follow section 11-1 for Picker E-Stop recovery
5. Follow manufacturer's instruction for I.M.M E-Stop recovery

3-10. IMM to picker Emergency Stop Circuit (Step 23-2)

1. Power on the I.M.M and the picker
2. Press the E-Stop button on the IMM
3. If wired correctly both the IMM and the picker should be in the Emergency Stop Mode
4. Follow section 11-1 for Picker E-Stop recovery
5. Follow manufacture's instruction for I.M.M E-Stop recovery

If testing fails, correct wiring and retest prior to proceeding. You risk damage to the mold and the robot otherwise.
6-7. Wrist Rotation ( X and XC type )

1. Pressing button “3” activates the 90 deg wrist. ( X or XC type only ) (Figure 6-7-1)
3. Note : This feature may be used to protect product when dropping to a conveyor.

- The speed of rotation can be controlled by flow control valves in located on the wrist.
- The starting position of the wrist can be adjusted as follows.
  1. Loosen the two cap screws. ( Item 1 in Fig 6-7-2)
  2. With air pressure on rotate wrist to desired position.
  3. Tighten the two cap screws. ( Item 1 in Fig 6-7-2)

- The rotation direction may be changed as follows. ( Often used for dropping to the back side of the machine)
  1. With air off, remove rotation stop. ( Item 2 Fig 6-7-2)
  2. Swap air lines.
  3. Loosen the two cap screws. ( Item 1 Fig 6-7-2)
  4. With air pressure on rotate the wrist to the start position. ( Parallel to platen face)
  5. Tighten the two cap screws. ( Item 1 Fig 6-7-2)
  6. Place rotation stop on opposite side and secure with cap screws.
### SPI INTERFACE DESCRIPTION (EUROMAP 12)

#### PICKER SPI SOCKET

- **PIN 1**: 9 - EMERGENCY STOP (I.M.M)
- **PIN 2**: 16 - MOLD FULLY OPEN (I.M.M)
- **PIN 3**: 11 - MOVABLE GATES CLOSED (I.M.M)
- **PIN 4**: 16 - EJECTOR FULLY RETRACTED
- **PIN 5**: 16 - EJECTOR FULLY FORWARD
- **PIN 6**: 16 - CORE FULLY SET
- **PIN 7**: 16 - CORE FULLY PULLED
- **PIN 8**: 16 - REJECT PART
- **PIN 10**: 16 - FULLY AUTOMATIC
- **PIN 12**: 16 - MOLD FULLY CLOSED
- **PIN 15**: 16 - NO PART AVAILABLE

#### IMM SPI SOCKET

- **PIN 17**: 32 - PERMIT CLAMP CLOSE
- **PIN 18**: 26 - PERMIT CLAMP MOTION
- **PIN 19**: 27 - EMERGENCY STOP
- **PIN 20**: 32 - ROBOT NON-OPERATIONAL
- **PIN 21**: 32 - PERMIT EJECTOR RETRACT
- **PIN 22**: 32 - PERMIT EJECTOR FORWARD
- **PIN 23**: 32 - PERMIT CORE PULL
- **PIN 24**: 32 - PERMIT CORE SET

---

**DIN40050 10AMP**
TOPIV ROBOT SPI INTERFACE WIRING PROCEDURE.

FIRST OF ALL
CONNECT 24 VOLT (RED) to C (WHITE), C1 (RED + GREEN), C2 (PURPLE), Secure the wires.

<table>
<thead>
<tr>
<th>SPI PIN</th>
<th>TOP PIN</th>
<th>SPI PIN</th>
<th>TOP PIN</th>
<th>SIGNAL (FROM IMM TO ROBOT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ED</td>
<td>9</td>
<td>EC</td>
<td>EMERGENCY STOP (I.M.M)</td>
</tr>
<tr>
<td></td>
<td>Green + Yellow</td>
<td></td>
<td>Yellow + Red</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>F</td>
<td>16</td>
<td>OV</td>
<td>MOLD FULLY OPEN (I.M.M)</td>
</tr>
<tr>
<td></td>
<td>Gray</td>
<td></td>
<td>Pink</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>E</td>
<td>11</td>
<td>OV</td>
<td>MOVABLE GATES CLOSED (I.M.M)</td>
</tr>
<tr>
<td></td>
<td>Yellow</td>
<td></td>
<td>Pink</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td></td>
<td></td>
<td>EJECTOR FULLY RETRACTED</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td></td>
<td></td>
<td>EJECTOR FULLY FORWARD</td>
</tr>
<tr>
<td>6</td>
<td>16</td>
<td></td>
<td></td>
<td>CORE FULLY SET</td>
</tr>
<tr>
<td>7</td>
<td>16</td>
<td></td>
<td></td>
<td>CORE FULLY PULLED</td>
</tr>
<tr>
<td>8</td>
<td>REJ</td>
<td>16</td>
<td>OV</td>
<td>REJECT PART</td>
</tr>
<tr>
<td></td>
<td>Yellow + Black</td>
<td></td>
<td>Pink</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>R(REJ)</td>
<td>16</td>
<td>OV</td>
<td>FULLY AUTOMATIC</td>
</tr>
<tr>
<td></td>
<td>Red + Black</td>
<td></td>
<td>Pink</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>D</td>
<td>16</td>
<td>OV</td>
<td>MOLD FULLY CLOSED</td>
</tr>
<tr>
<td></td>
<td>Orange</td>
<td></td>
<td>Pink</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>16</td>
<td></td>
<td></td>
<td>NO PART AVAILABLE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPI PIN</th>
<th>TOP PIN</th>
<th>SPI PIN</th>
<th>TOP PIN</th>
<th>SIGNAL (FROM ROBOT TO IMM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 (1)</td>
<td>L</td>
<td>32 (16)</td>
<td>K</td>
<td>PERMIT CLAMP CLOSE</td>
</tr>
<tr>
<td></td>
<td>Green + White</td>
<td></td>
<td>Green</td>
<td></td>
</tr>
<tr>
<td>18 (2)</td>
<td></td>
<td>26 (10)</td>
<td></td>
<td>PERMIT CLAMP MOTION</td>
</tr>
<tr>
<td>19 (3)</td>
<td>EB</td>
<td>27 (11)</td>
<td>EA</td>
<td>EMERGENCY STOP</td>
</tr>
<tr>
<td></td>
<td>RED + WHITE</td>
<td></td>
<td>WHITE + RED</td>
<td></td>
</tr>
<tr>
<td>20 (4)</td>
<td></td>
<td>32 (16)</td>
<td></td>
<td>ROBOT NON-OPERATIONAL</td>
</tr>
<tr>
<td>21 (5)</td>
<td></td>
<td>32 (16)</td>
<td></td>
<td>PERMIT EJECTOR RETRACT</td>
</tr>
<tr>
<td>22 (6)</td>
<td>N</td>
<td>32 (16)</td>
<td>M</td>
<td>PERMIT EJECTOR FORWARD</td>
</tr>
<tr>
<td></td>
<td>Blue + White</td>
<td></td>
<td>Blue</td>
<td></td>
</tr>
<tr>
<td>23 (7)</td>
<td></td>
<td>32 (16)</td>
<td></td>
<td>PERMIT CORE PULL</td>
</tr>
<tr>
<td>24 (8)</td>
<td></td>
<td>32 (16)</td>
<td></td>
<td>PERMIT CORE SET</td>
</tr>
</tbody>
</table>

Jumper ●——●

ROBOT INTERLOCK WITH SPI SETTING.

TURN ON THE ROBOT PRESS ENTER KEY, IT WILL SHOW INITIAL SETTING.
CHANGE SOME OPTION (AUTO, REJECT, SAFETY DOOR) FROM NO USE TO USE FOR SPI.

PRESSED STOP KEY WILL SEND YOU TO MANUAL KEY. SEE MANULA FOR OPERATION

If have any problem for TOPIV IMM Interlock, contact Sam Lee, Tel: 636-578-6059, Email: hanrobotic@msn.com

After installation, please follow interlock testing procedure in manual.
E. Interlock and EMO Control Circuit

If EMO occurs, all relays are turned off and all solenoids are keep the safe state until user release EMO.