AUTOMATIC MOLD RELEASE SPRAY MACHINE

INSTALLATION MANUAL

HYROBOTICS CORP.
5988 MID RIVER MALL DR. ST.CHARLES MO 63304, USA

ALL INFORMATION ARE SUBJECT TO CHANGE WITHOUT NOTICE
Read this manual completely prior to installing, operation or performing maintenance on this equipment.

I. Safety Recommendations

We recommend that anyone working on robotic equipment read and follow the safety recommendations in THE SOCIETY OF THE PLASTICS INDUSTRY PUBLICATION: “Recommended Guidelines for the Safety Requirements of the Integration, Care and use of Robots Used with Horizontal Injection Molding Machines. ”

II. Restricted Robospray Area

The area in which the Robospray operates should be guarded in compliance with ANSI/RIA 15.06: ‘‘Safety Requirements for Industrial Robots and Robot Systems’’. We recommend you review this document and guard the area where the robpspray operates.

III Control Location

The control and body should be mounted in an area near the molding machine controls. It should be easily accessible to the operator and outside the perimeter guard.

IV. Lockout - Tagout

Before working on any equipments, personnel should follow ANSI standard z 244.1 “Personnel Protection—Lockout/Tagout of Energy Sources—Minimum Safety Requirements.”
A. Packing Inventory

- ROBOSPRAY BOX

Unpack the Robospray and check to see that you have all the parts as shown.

<table>
<thead>
<tr>
<th>NO.</th>
<th>PART DESCRIPTION</th>
<th>EA</th>
<th>NO.</th>
<th>PART DESCRIPTION</th>
<th>EA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ROBOSPRAY BODY WITH CONTROL</td>
<td>1</td>
<td>5</td>
<td>SPRAY NOZZLE WITH DETECTION SENSOR</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>MANIFOLD (2, 4, 6 MANIFOLD)</td>
<td>1</td>
<td>6</td>
<td>SPRAY NOZZLE (2, 4, 6 EA FOR MODEL)</td>
<td>2, 4, 6</td>
</tr>
<tr>
<td>3</td>
<td>INSTALLATION MANUAL</td>
<td>1</td>
<td>7</td>
<td>MOUNTING BRACKET</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>NOZZLE FOR FEMALE ADAPTOR</td>
<td>2</td>
<td>8</td>
<td>POWER CABEL</td>
<td>1</td>
</tr>
</tbody>
</table>
### B. Model and Parts Information

#### For Below 6 oz (130 Ton) I.M.M.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB-SE-2</td>
<td></td>
</tr>
</tbody>
</table>

1 Can (16 Oz) with 2 nozzle

For Below 30 oz (350 Tons) I.M.M.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB-WE-4</td>
<td></td>
</tr>
</tbody>
</table>

2 Can (16 Oz) with 4 nozzle

For Bigger than 30 oz (350 Tons) I.M.M.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB-WE-6</td>
<td></td>
</tr>
</tbody>
</table>

2 Can (16 Oz) with 6 nozzle

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#### ROBOSPRAY PARTS

<table>
<thead>
<tr>
<th>No.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE2</td>
<td></td>
</tr>
<tr>
<td>For 1 Can (16 Oz)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WE4</td>
<td></td>
</tr>
<tr>
<td>For 2 Can (2 x 16 Oz)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WE6</td>
<td></td>
</tr>
<tr>
<td>For 2 Can (2 x 16 Oz)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS2</td>
<td></td>
</tr>
<tr>
<td>2 Nozzle manifold with sensor</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS4</td>
<td></td>
</tr>
<tr>
<td>4 Nozzle manifold with sensor</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-150</td>
<td></td>
</tr>
<tr>
<td>Nozzle for Female Valve Can</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB1</td>
<td></td>
</tr>
<tr>
<td>Magnetic Base</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOZ-1</td>
<td></td>
</tr>
<tr>
<td>Spray Nozzle with Solenoid Valve (Length: 40 Inch)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOZ-2</td>
<td></td>
</tr>
<tr>
<td>Spray Nozzle with Solenoid Valve (Length: 80 Inch)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNOZ-1</td>
<td></td>
</tr>
<tr>
<td>Spray Nozzle with Solenoid Valve Spray Detection Sensor (Length: 40 Inch)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNOZ-2</td>
<td></td>
</tr>
<tr>
<td>Spray Nozzle with Solenoid Valve Spray Detection Sensor (Length: 80 Inch)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part No.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCA-2</td>
<td></td>
</tr>
<tr>
<td>Main Power / Interface Cable for extra Molding Machine (Length: 80 Inch) with Dummy Plug</td>
<td></td>
</tr>
</tbody>
</table>

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ALL INFORMATION ARE SUBJECTION TO CHANGE WITHOUT NOTICE. CAN IS NOT INCLUDED.
1. Robospray Hardware installation (Step 1)

1. Read all instructions prior to starting.
2. Unpack the Robospray and check contents (Page 4).
3. Lock out / Tag out all energy sources.
4. Assemble Nozzle with Magnetic Base.
5. Place Magnetic Base with Nozzle to proper place to find good location. (Hose length is about 4 ~ 6 ‘).
6. Activate Magnet.
7. Find proper place for Magnetic Manifold with Robospray Body (About 3~4’).
8. Make sure all the wire / Tubing can be connected (If you need Nozzle has more long tubing, please contact factory).
9. Do not place a can into the Robospray yet.
10. Choose an appropriate place to mount the RoboSpray body. (Next to injection molding machine control panel might be considered.)
11. Drill and tap to hanger the mounting bracket, Mount the Robospray with Mounting Bracket (Supplied).
12. Install the heat shield to block the heat from the Nozzle heat (If robospray install next to nozzle).

- PLEASE CONSIDER BELOW ITEMS TO INSTALL ROBOSPRAY

1. LENGTH OF THE TUBING
2. EASY TO ACCESS TO CONTROL PANEL AND CAN INSTALLATION
3. HEAT STATUS

FOR REFERENCE THE WHITE COLOR TUBING IS HEAT RESISTANCE Teflon TUBING

<table>
<thead>
<tr>
<th>Supplied</th>
<th>1. Mounting Bracket 2. Metric Bolts (M5), Other screw can be used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required</td>
<td>Drill, Tap, Wrench</td>
</tr>
</tbody>
</table>
2. Electric Interface Wiring (Step 2)

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:
   - Power off the molding machine.
   - Perform lockout tag out on the molding machine.
   - Open the electrical control panel.
   - Locate the wiring diagram for the I.M.M.
4. Evaluate the control panel and choose an appropriate place to connect the power interface cable
5. Prepare control panel to accept the cord grip (Not supplied)
6. Feed wire and cord grip through hole in the panel and secure with lock nut.
7. Evaluate signal voltages used. (See next page for detail)
   - Robospray needs 110 Volts for operation.
   - The Robospray is setup to receive 24 VDC signals from the I.M.M for IMM is ready for spray signal (Ejector Retract Complete, Mold Open Complete etc)
   - Robospray will open the contact of IMM mold close signal to delay the mold close while spraying

**ROBOSPRAY WIRING INFORMATION** (Note: Your wiring may look different)

<table>
<thead>
<tr>
<th>CONNECTOR</th>
<th>COLOR</th>
<th>VOLTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MOLD CLOSE INTERLOCK</td>
<td>WHITE</td>
</tr>
<tr>
<td>2</td>
<td>MOLD CLOSE INTERLOCK</td>
<td>BLACK</td>
</tr>
<tr>
<td>3</td>
<td>POWER 110V</td>
<td>GREEN</td>
</tr>
<tr>
<td>4</td>
<td>1 CYCLE COMPLETE SIGNAL OF IMM</td>
<td>RED</td>
</tr>
<tr>
<td>5</td>
<td>1 CYCLE COMPLETE SIGNAL OF IMM</td>
<td>YELLOW</td>
</tr>
<tr>
<td>6</td>
<td>POWER 110 V</td>
<td>BLUE</td>
</tr>
<tr>
<td>7</td>
<td>NOT IN USE</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>NOT IN USE</td>
<td></td>
</tr>
</tbody>
</table>

1. Warning do not supply 220 Volt to 110 Volt, 24 Volt. Damage will result.
2. The Robospray cord has 6 wires, GREEN AND BLUE are for 110 Volts single phase power
3. RED, YELLOW are for cycle complete signal from IMM, like Ejector Retract Complete or mold close command signal (Should be DC 24V). After this step Robospray will spray the mold release.
4. WHITE AND BLACK Color wire used for Mold Close interlock when need more spraying time before mold close. This will delay mold close while Robospray spray. It is normally closed contact and it will open the contact when Sprays the mold release. (Same as Mold Close interlock of Robot or Picker)

*See next page for detail interface wiring*
3. Wiring Power Source (Step 3)

1. Locate correct voltage power source. (110 Volt)
2. Warning do not supply 220 Volt to 110 Volt unit. Damage will result.
3. Connect 110 volts terminal GREEN and BLUE WIRE of the Robospay wires

Note: Your wiring may look different
1. The Ejector Retract complete signal indicates that the mold is fully open and parts is not in position for the robospray to spray mold release agent. This may be maintained signal or momentarily signal.

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

4. Connect 0 V (Common) on Red Wire and signal on Yellow wire as shown below.

5. This signal may be a direct PLC output.

Note: Your wiring may look different.
5. Mold Close Interlock (Step 5) (From Robospray to IMM)

- This circuit prevents the mold from closing while the Robospray is spraying.
- 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.

**WIRING EXAMPLE**

Note: Your wiring may look different.
1. **Double check all wiring connections.**
2. **Secure wire and tubing to prevent damage during molding operation.**
3. **Find proper place to spray test for nozzle, adjust spray direction where is safe.** (Floor or table with Pad)
4. **Connect Nozzle tubing and wire to manifold**

### 7. CAN SETUP (Step 7): These procedure may skip for interface interlock testing

The Robospray is designed to use a standard 16 oz aerosol can with male valve stem. A 16 Oz can with a female valve may be used by inserting a valve stem adapter as shown. Contact the factory prior to using any other type of aerosol can.

**WARNING**

Wear protective clothing such as goggles, face mask, long sleeves, long pants, gloves, etc. to prevent contact with the chemicals. Mold release is flammable. Do not operate near heat, spark or open flame. It will cause a fire. Secure any wire of Robospray from heat or external damage.

1. Make sure all parts of robospray are in secure location. (Temperature: 50 ~ 160 F)
2. Make sure the can is right size (16 Oz, Male Can or Female Can with adaptors.)
3. Open the Front door
4. Open the Top valve gate with Pull out thumb screw
5. Insert cans. Robospray is set for 16 Oz cans. Height may be changed with adjust screw. (Do not adjust if not required. Factory set is for Standard 16 Oz.)
6. Slowly lower the gate and adjust can valve location to have right position
   (Slightly push the top of the can to the inside of Robospray to have position might required), Push the gate slightly and Release thumb screw and lock in place (Thumb screw should be in position)
7. If the valve is not in the right location, spray might leak
8. Adjust location, Close the door, Slowly open the Ball valve
9. Now ready to test wiring (Interface)
8. Installation Test Preparation (Step 8)

1. Power up the I.M.M. and then the Robosprays. Robosprays power switch is located on the bottom of the control panel.
2. Power on the Robospray.
3. Make sure the LED of number is ON.
4. Counter, Time LED of Number will be ON.

5. Input Signal LED will be on when Robosprays receive proper 24 Volts signal from Molding Machine. (This will be used counting the cycle and IMM is ready for spray mold release agents.)

6. First two digits are for Molding Cycle. If the number is 03 means after 3rd molding cycle finished, robospray will spray mold release. Last two digits are for Spray time. 24 means Robospray will spray for 2.4 Seconds. Middle one is surplus. If want to change the time lift up with finger nail and push and release will change the number. Make sure Number of LED is change when the number of counter has changed.

7. Sensitivity adjustment switch is for adjusting the sensitivity of the sensor which is in end of nozzle. These will make sure can is not empty. If the can is empty or the sensor is set to Minimum, Robospray will alert. Disconnecting sensor will allow robospray operate without detection (Spray Operation LED will be ON always.)

8. To test interlock, maximize the sensitivity.

9. To proper detection and operation, Spray operation LED should be off without spray and should be on with Spray operation.

10. If the sensor detect the can is being empty, robospray will alert. (Push Manual button, and change Can and Start operation again.)
9. Ejector Retract Complete Signal (9) : Ready to spray Signal

- **Manual Mode**
  1. Open the mold of injection molding machine.
  2. Make sure nothing is interfere with ejector operation
  3. Operate ejector forward and Retract
  4. Input signal LED will be ON / Off

- **Auto Mode**
  1. Press Start Button
  2. Open the mold of injection molding machine.
  3. Make sure nothing is interfere with ejector operation
  4. Operate ejector forward and Retract
  5. Input signal LED will be ON / Off
  6. And Counter Number will be decrease

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

10. Mold Close Interlock (Step 10) : Can be tested without Mold Release Can

- **Manual Mode**
  1. Open the mold.
  2. Press button Manual button to spray operation (Hold)
  3. Operate mold close of I.M.M.
  4. If mold closes while Manual button is pressed, the wiring is incorrect.

- **Auto Mode**
  1. Open the mold.
  2. Set The number 02 cycle and 99 for spray time
  3. Press start for auto mode.
  4. Manually operate Ejector Forward and Retract, it will decrease number of robospray
  5. Operate 2nd Ejector Forward Retract. (It will operate Robospray Spray function 9.9 Seconds)
  6. During the 9.9 Seconds
  7. Operate mold close of I.M.M.
  8. Mold Close will be delayed or not activated while 9.9 second decrease to 0 seconds

If any testing fails, correct wiring and retest prior to proceeding. You risk damage to the mold and the picker otherwise.
11. Operation (Step 11)

If testing procedure has bee successfully passed follow next step to operation.

1. Make sure all the wire and tubing properly
2. Secure the wire and tubing (Extendable wire can be used to movable platen)
3. Locate right direction of Mold release Nozzle
4. Insert Can make sure there is no leaking
5. Turn on the ball valve to supply to release to the end of nozzle
6. Turn on Molding Machine
7. Turn on the Robospray
8. Press Manual button make sure nozzle in right position
9. Adjust sensor sensitivity
10. Determine cycle time and spray time
11. Input cycle time and spray time
12. Press start to Auto operation.
14. Stop Molding Machine
16. Adjust timer or cycle if required and Start Auto Again.

12. Maintenance

1. Clogging Nozzle
   - Most of problem of Robospray is from lack of maintenance. Especially the clogging of nozzle. To prevent the clogging problem use Mold Cleaner (16 Oz) when finish the operation of robospray, and giving it a squirt(Manual Operation) will clean a spray nozzle.

2. Sensor Sensitivity
   - 2 of 16 Oz Cans usually can be operated more than 8 hours with proper setup.
   - Some customer would not like to use this function because of bad environment (Smoking, Oil Fog etc)
   - If don’t like to use this function, maximize sensitivity or disconnect nozzle with sensor use only nozzle
   - Clean the sensor glass with mold cleaner and dry to have better sensitivity.

3. Tubing (Teflon)
   - Teflon tubing is high heat resistance material. Do not replace with other tubing (It may cause fire)

4. Have any problem, please feel free to contact with any question
   - Technical Support: Lee: hanrobotic@msn.com Cell: 636-578-6059
SUBJECT: ROBOSPRAYS being interfaced with IMMs using isolated contacts for output.

Equipment effected: Some Late Model

Some model IMMs may use isolated contacts for output to external devices. In this case it will be required to provide signal voltage to the contacts (Signal from IMM to Robosprays)

SAMPLE SCHEMATIC DIAGRAM (Mitsubishi MAC-VII (MAC-7) CONTROLLER)

[Diagram showing connections for Mitsubishi MAC-VII (MAC-7) CONTROLLER]

Connect YELLOW

Supply + 24V TO RED WIRE

Provide 0 V to COM
13. Lockout Procedure for Robospray

- Qualified personal should perform lockout tagout
- Energy Sources
  1. Compressed Mold Release Liquid from Can
  2. Electric 110 V AC
  3. Electric 24 V DC

- Procedure
  1. Notify all effected personal of lockout.
  2. Remove electrical power source, 110V AC and Lockout / Tagout with approved device. (Normally this power source is the I.M.M.)
  3. Confirm power source has been removed.
     a) Check that LEDs in Robospray are not illuminated (Fig 10-1)
  4. Remove can and release valve to remained compressed air pressure is purged, Lockout/Tagout with approved device.
  5. The robospray is now locked out and in a zero mechanical and electrical state.

- Restoring Robospray to service.
  1. Check the robospray and the immediate area around it to insure that people and tools are clear and that the machine components are operationally intact.
  2. Verify that the spray direction is in the desired position
  3. Remove Lockout / Tagout device
  4. Remove Lockout/Tagout devices from electrical power supply.
  5. Insert Can
  6. Restore electrical supply to Mold spray
  7. Turn on power
  8. Notify all effected personal that the maintenance is completed and the Robospray is ready to use.
NOTICE

1. Every effort was made to ensure that the information in this book was complete and accurate at the time of printing. However, information is subject to change.
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