AUTOMATIC SPRAY CONTROLLER
Model AES1-ASC01

Item #120927

INSTRUCTION MANUAL

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SAFETY SUMMARY

This manual uses the following signal words to call attention to the safety sign and to designate a degree or level of hazard seriousness.

1. **DANGER:** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations.

2. **WARNING:** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

3. **CAUTION:** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. Also used to alert against unsafe practices or property damage only accidents.

4. **NOTE:** indicates general safe practices, machine use instructions and information, property damage only hazards, temporary hazards, precautions to avoid a hazard, results of not avoiding a hazard, or any combination of these messages.

5. **SYMBOL/PICTORIAL:** conveys a message without words.

6. **SAFETY ALERT SYMBOL:** indicates a potential personal injury hazard; an exclamation point inside a triangle.

SAFETY SUMMARY (continued)

The following is a general alert that applies to the Automatic Spray Controller whenever opening the front panel:

WARNING
Live electric parts could cause shock.
Disconnect power before servicing.

PRODUCT DESCRIPTION

The IMS Automatic Spray Controller is a microprocessor-based controller ideally suited for use with IMS Bulk Spray Systems. Its function is as a direct replacement for the IMS RGS-43 with some additional features through the incorporation of more sophisticated technology.

The heart of the controller is rugged PLC technology, proven in industrial applications for many years. Those with no PLC experience can think of it as an industrially packaged computer that is fully programmable. Out of the box, the program completely emulates the RGS-43 while providing some additional user options. Inside the box are terminals for all input and output signals wired to two-conductor Jones plugs on the box exterior for convenient connection without a need to hard wire connections inside the controller enclosure. A user interface with four 16 character lines provides status information and allows the necessary user programming, so that the controller is adjustable to the process. Packaged in a durable metal enclosure, this controller has a bracket for mounting flush onto a surface or onto the IMS Bulk Spray Cart or IMS Bulk Mold Release Spray System.

This controller counts the mold cycles of an injection press and actuates a mold sweep upon reaching a user selectable number of cycles. The mold sweep then traverses across the mold using a nylon brush to clear it of plastic. After a number of sweep cycles, air to a spray nozzle causes the application of a mold release product into the mold cavity. The number of sweep cycles before this happens is user selectable and the spray nozzle is usually mounted to the end of a mold sweep. Not having to spray every sweep cycle is a feature new to this design. Of course, the user selectable sweep delay, spray delay, and spray time are maintained across designs to ensure that the right amount of spray is applied right where it is needed. There is also a button for manual spraying that is independent of the cycle count.

Should this technology lend itself to other applications in your plant, please contact IMS Technical Service so that we can customize a controller especially for your needs. Additional features available on custom controls include: additional inputs and outputs, serial communication, temperature monitoring and control, high speed counting, and much more. Let us design a controller for you!

PRODUCT SPECIFICATIONS

PHYSICAL

Box Size:.. 10" x 8" x 6"

Mounting Dimensions: ....10.75" x 6"

Weight (unpackaged):... 16 lbs

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Weight (packaged for shipment): ....18 1/2 lbs.

ELECTRICAL

Input Power: .... 120 VAC, 60 Hz, single phase, 2 amps

Control Outputs (3): ....24 VDC supplied from controller, 1.2 amps

Fuse: .... 2A, recommend Bussman AGC-2

Power Cord: ....8' grounded

DISPLAY

4 Line, 16 Character LCD, Backlit

8 Button Tactile Keypad

USER SELECTABLE VALUES

Cycle Count: ....(0 to 9999)

Cycles Per Sweep:...(0 to 9999)

Sweeps Per Spray:...(0 to 9999)

Spray Delay... (0 to 999.9 seconds)

Spray Time.. (0 to 999.9 seconds)

Spray Delay.. (0 to 99.99 seconds)

INSTALLATION

Follow *Steps 1* through *5* if you are setting up a system with the IMS Bulk Spray Cart (IMS #119814 without controller) or IMS Bulk Mold Release Spray System (IMS #121983 with controller).

1.   Choose a suitable mounting location. The controller is mounted easily using 1/4" screws centered as illustrated below. Ensure a 120VAC power supply is nearby. The controller has an 8 foot grounded power cable.

2.   Connect the cable coming from the controller that is labeled *SWEEP START*. It has a female Jones plug connector. It connects to the male Jones plug connector that comes from an air solenoid on the spray cart. This cable has the same label.

3.   Connect the cable coming from the controller that is labeled *SPRAY START*. It has a female Jones plug connector. It connects to the male Jones plug connector that comes from an air solenoid on the spray cart. This cable has the same label.

4.   Connect the cable coming from the controller labeled *CYCLE COUNT* to a dry contact in the injection press control panel. A 10 foot cable with a male Jones plug is provided with the controller for wiring to a <u>contact on the press that closes when the mold opens. There should be no current from the press controls passing through this contact</u> (24VDC is supplied from the controller).

5.   Plug the three-pronged power cord into a 120VAC power outlet.

INSTALLATION (continued)

If not using the IMS Bulk Spray Cart or the IMS Bulk Mold Release Spray System, but still using an IMS Aerosol Tank, connect the *SPRAY START* cable of the controller to the solenoid operated spray valve, IMS #112160. A pigtail with a male Jones plug is provided for this purpose.

If a sweep is not used, do not make this connection.

OPERATION
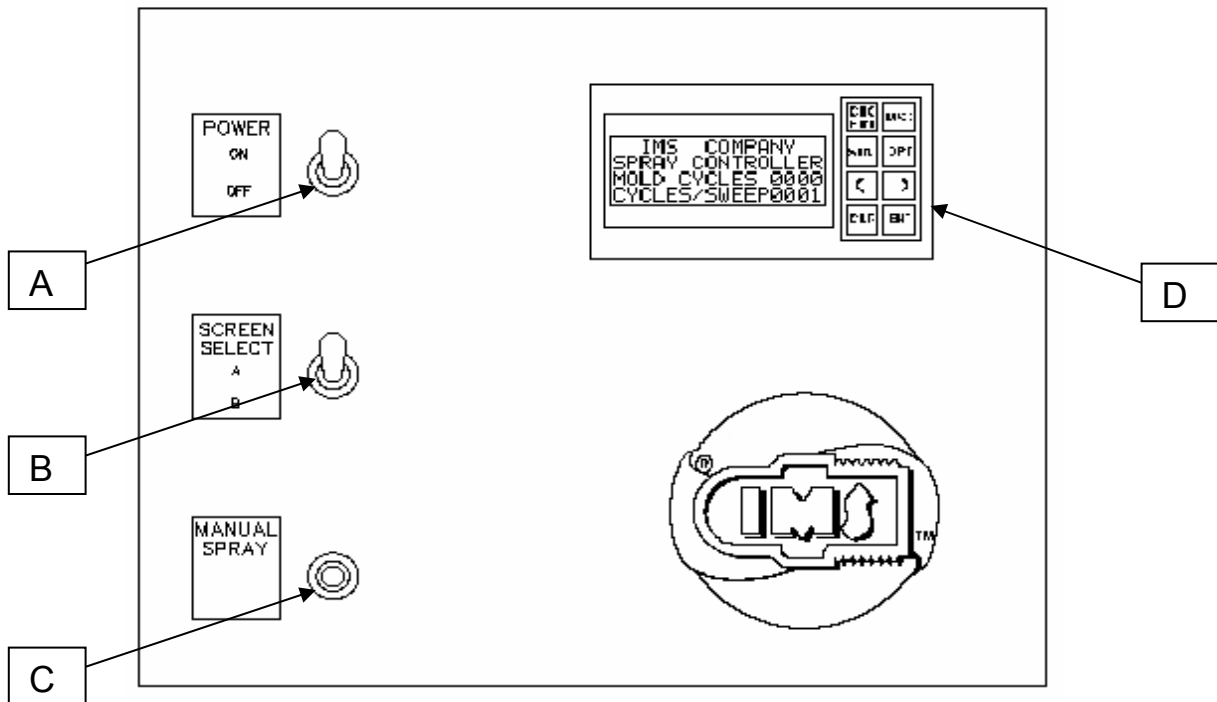
1.   Once all connections have been made, the controller can be switched on using the
      POWER SWITCH (A) on the front panel.

2.   Once powered with the **SCREEN SELECTOR SWITCH** (B) in the *A* position, the
      CONTROLLER USER INTERFACE DISPLAY (D) will read:

```
       IMS   COMPANY
      SPRAY CONTROLLER
      MOLD CYCLES  0000
      CYCLES/SWEEP0001
```

This screen simply identifies the product, as there may be others from IMS with similar
appearance, and has the first two process parameters.

MOLD CYCLES is an automatic count of the number of times that the mold
opens. This number is reset to zero every time the count reaches the number
programmed in the **CYCLES/SWEEP** Field at the bottom of this same screen.

The **CYCLES/SWEEP** is the frequency of the sweep cycle. For example, if this
number is 0003, every third time that the mold opens, the sweep will
automatically pass across the mold.

IMPORTANT: If a mold sweep is not used then this number must be 0001.

OPERATION (continued)

3.   To get the remainder of the process information from the controller, switch the **SCREEN SELECT SWITCH (**B) to the **B** position. The display will read:

```
SWEEP/SPRAY 0001
SPRAY DELAY  0030
SPRAY TIME   0030
SWEEP DELAY  0040
```

SWEEP/SPRAY is the frequency at which the mold is sprayed. Since the spray system is capable of passing the sweep across the mold without necessarily spraying every time, it is necessary to program the number of sweeps between sprays. To spray every sweep, set this value to 0001.

IMPORTANT: If no sweep is used, the **SWEEP/SPRAY** is actually an indication of **CYCLES/SPRAY** since the **CYCLES/SWEEP** number must be 0001. This value is then used to select whether the user wants the spray applied every time that the mold opens (**SWEEP/SPRAY =0001**) or whether the user want the spray applied every XXXX number of mold cycles (**SWEEP/SPRAY =XXXX**).

The **SPRAY DELAY** value is in units of 0.10 seconds; therefore the value 0010 would be a one second delay. It is necessary to program this value, because the spray should not start until the sweep is directly in front of the mold cavity. Spraying prior to this is wasteful, as the mold release is only effective when applied in the cavity. The **SPRAY DELAY** is useful even without a sweep. For instance, it can be used to allow time for the mold to open before spraying. Also, it can be used to allow time for the parts to drop from the mold or it can be used for any other post injection operation.

IMPORTANT: The **SPRAY DELAY** does not start until after the sweep is initiated (starts to move). If there is no sweep, the **SWEEP DELAY** is set to zero. The spray delay would then start as soon as the mold opens the preset number of times.

The **SPRAY TIME** value is in units of 0.10 seconds; therefore the value 0010 would be a one second spray duration. The spray starts upon the expiration of the delay and lasts until the sweep passes across the entire cavity. The time required to do this is the **SPRAY TIME**.

OPERATION (continued)

The ***SWEEP DELAY*** value is in units of 0.01 seconds; therefore the value 0100 would be a one second sweep delay. This value is programmed when it is desirable to wait for a short time after the mold opens before the sweep transverses the mold. This short wait could give other equipment time to get clear of the mold, it could give parts time to fall from the mold, or it could be used for any other synchronization need.

To better understand the parameters that are programmed into the controller, a flow chart fully describing the controller logic follows:
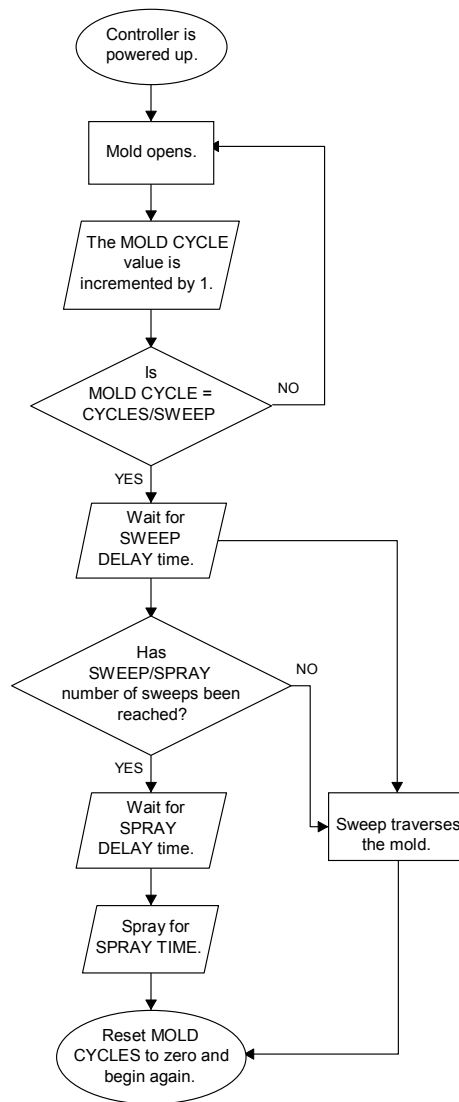
OPERATION (continued)

To change any of the preset values including *CYCLES/SWEEP, SWEEP/SPRAY, SPRAY DELAY, SPRAY TIME, or SWEEP DELAY*, perform this general procedure. You will use the buttons on the front of the controller interface display.

1.   Start by pressing the [CHG PRE] button one time. The display will be:

```
CYC/SWP    0001
SWPS/SPR   0001
SWP DLAY   0040
SPR DLAY   0030
SPR TIME   0030
```

2.   Note that the SPR TIME (SPRAY TIME) is not shown initially, but can be accessed by scrolling the display. The display can be scrolled down by pressing the [+] key and can be scrolled up by pressing the [−] key. The cursor (explained in *Step 3*) must be on the label portion of the screen.

3.   After first pressing the [CHG PRE] key, there will be a black box that is flashing and is located after the *P* in the top row of the display. This is the *CURSOR*. The cursor marks the position of reference. All key presses will affect the point on the display that is marked by the cursor. To change a number on the display, you must first get the cursor over the number.

4.   To move the cursor between the row of labels and their corresponding numbers, press the [ENT] key. Doing this initially will move the cursor from the position in the top row that is just after the *P*, to the far right corner over the *1*. To change this or any other number, first move the cursor to the number side of the screen if it is not already there. Use the [←] and [→] keys to position the cursor on one of the four digits of the number in the top row of the display. Once the cursor is over the digit that you wish to change, use the [+] and [−] keys to increase or decrease the number. Once you get to *9* in any position and press [+] one more time, the display will make that number a *0* and will increment the digit to the left by 1.

OPERATION (continued)

5.   Note that there may be a short delay between the time that you press the button and the time that it takes for the display to change. The controller has to execute its program each time that the display is changed. The display is updated only once per program scan. A program scan takes about 1/4 of a second. Hence, the delay.

6.   Once the values have been set to your desired operating parameters, press the **MSG** button to return to the main display screens. You will be on the screen identified by the **SCREEN SELECT** button on the front of the controller (Screen A or B).

7.   Here is an example using all of the above instructions for changing an operating value. The example starts at the main display which reads **IMS COMPANY** (Screen A) at the top of the screen.

      A.   Press the **CHG PRE** button one time. The display changes so that you can adjust a preset value. We will change the **SWPS/SPR** (SWEEPS PER SPRAY) value which should now show on the second line of the configuration screen.

      B.   Press the **+** key one time to scroll the display such that **SWPS/SPR** is now on the top line of the display.

      C.   Press the **ENT** key so that the cursor moves to the right of the display over the rightmost digit of the **SWPS/SPR** value.

      D.   Press **+** or **−** to adjust this value up or down.

      E.   Once the number is at the desired value, press **MSG** to return to the main display. The **SWPS/SPR** value is on Screen B, so switching to that screen, you should see the value that was just programmed.

TROUBLESHOOTING

Symptom: The controller display will not turn ON.
Possible cause(s):
1. The controller is not plugged in. Find a standard 120VAC outlet.
2. The power switch is not in the *ON* position. Change the power switch on the panel front to the *ON* (up) position.
3. The fuse is blown. Turn the black fuse holder on the front panel counterclockwise until the fuse pops out. Replace the 2A fuse. It is recommended that you use a Bussman AGC2 fuse that matches the original fuse shipped with the unit. If you cannot use the Bussman fuse, use a fuse rated at 250VAC, 2A, fast-blow.
4. The display is not connected to the PLC processor.   Unplug from electrical supply outlet, then open the panel and ensure that the beige cable with the phone connectors is plugged into the back of the display and also to the front of the processor.
5. The line and/or neutral connections have come loose inside the panel due to rough handling. Unplug from electrical supply outlet, then open the panel. The neutral connection from the power cord is attached to the PLC in the upper right hand corner. The line connection from the power cord is wired to the power switch on the front panel and then to the PLC in the upper right hand corner. The terminal for the hot wire (#2) is *L* and the terminal for the neutral (#L2) is *N*. The terminals are located under the hinged plastic cover.
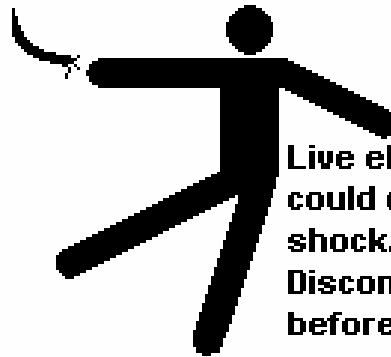
Live electric parts could cause shock. Disconnect power before servicing.

Symptom: The sweep does not turn ON.
Possible cause(s):
1. The compressed air is not connected properly. Check the compressor and all fittings. Adjust the air pressure if necessary.
2. The mold cycle preset has not been reached. Ensure that the mold cycle count increments each time that the mold opens. If it does not, check the contact that is wired to the *MOLD CYCLE* connection. If using a multi-meter, make sure the meter is set to DC voltage. There should be 24 volts between the wire on the input side of the contact and the common with the mold open. When the mold closes, there should be 24 volts between the wire on the output side of the contact and the common. Similarly, there should be zero volts between the input side and output side of the contact when the mold closes. When the mold is open there should be 24 volts across the contact.

TROUBLESHOOTING (continued)

Symptom: The spray does not work.

Possible cause(s):

1. The compressed air is not connected properly. Check the compressor and all fittings. Adjust the air pressure if necessary.

2. The mold cycle preset has not been reached. Ensure that the mold cycle count increments each time the mold opens. If it does not, check the contact that is wired to the *MOLD CYCLE* connection. If using a multi-meter, make sure the meter is set to DC voltage. There should be 24 volts between the wire on the input side of the contact and the common with the mold open. When the mold closes, there should be 24 volts between the wire on the output side of the contact and the common. Similarly, there should be zero volts between the input side and output side of the contact when the mold closes. When the mold is open there should be 24 volts across the contact. If the number is incrementing, make sure that the number of mold cycles has been completed. If it is desired to sweep every cycle, make sure that *SWEEP/CYCLE* preset is 0001.

3. The *SWEEPS/SPRAY* preset has not been reached. If using a mold sweep and the spray is set for actuation other than every sweep, make sure the correct number of sweeps have been completed. If it is desired to spray every sweep, change the *SWEEP/SPRAY* preset to 0001.

4. If using a stand alone aerosol tank with no sweep and it is desired to spray every mold cycle, make sure **SWEEP/CYCLE = 0001** and *SWEEP/SPRAY = 0001*.

Symptom: Switching the Screen A – Screen B switch does nothing to the display.

Possible cause(s):

1. Unplug from electrical supply outlet, then open the cover and make sure that the wires on the back of the switch have not come loose.

After reviewing this manual, most common problems can be resolved by following the guidelines in the *OPERATION or TROUBLESHOOTING* sections of this manual.

If additional instruction would prove useful, please contact IMS Customer Service at 1-800-537-5375. We will be pleased to assist you.

MAINTENANCE RECORDS AND NOTES