

# PRODUCT MANUAL

## eDART® v10 VALVE GATE CONTROL INSTALLATION AND SETUP



*TRAINING AND TECHNOLOGY FOR INJECTION MOLDING*



# PRODUCT MANUAL

## eDART® v10 VALVE GATE CONTROL

### INSTALLATION AND SETUP

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# PRODUCT MANUAL

## eDART® v10 VALVE GATE CONTROL

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# PRODUCT MANUAL

## eDART® v10 VALVE GATE CONTROL

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## INTRODUCTION

Read, understand, and comply with all following instructions. This guide must be kept available for reference at all times.

### DISCLAIMER

Inasmuch as RJG, Inc. has no control over the use to which others may put this material, it does not guarantee that the same results as those described herein will be obtained. Nor does RJG, Inc. guarantee the effectiveness or safety of any possible or suggested design for articles of manufacture as illustrated herein by any photographs, technical drawings, and the like. Each user of the material or design or both should make his own tests to determine the suitability of the material or any material for the design as well as the suitability of the material, process, and/or design for his own particular use. Statements concerning possible or suggested uses of the material or designs described herein are not to be construed as constituting a license under any RJG, Inc. patent covering such use or as recommendations for use of such material or designs in the infringement of any patent.

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## SAFETY SYMBOLS

These operating instructions must be read, understood and implemented in all respects by all personnel who are responsible for the eDART System. These operating instructions should be kept available so all personnel can quickly refer to them at any given time.

Please refer to this table if you have any questions regarding the importance or meaning of the safety symbols used in this manual or on the eDART System™.



This symbol is used as an operational safety symbol for all work that involves a risk of life and limb for personnel. This symbol also identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss. Where this symbol appears throughout this manual, please exercise particular care and caution while carrying out tasks.

### CAUTION

This precautionary warning is shown at locations of particular sensitivity, in order to avoid any damage and/or destruction of the device or system and/or other parts of the installation.

### NOTE

This sign draws attention to a particular technical feature.



This symbol is used as an operational safety symbol for all work that involves risk of electrocution. For instance, it can represent areas of high voltage where power should be disconnected in advance of any servicing.

**TABLE 1. EXPLANATION OF SYMBOLS**

**CAUTION:** WHENEVER YOU SET UP CONTROL OUTPUTS, ALWAYS START WITH A NEW JOB SETUP. IF THE JOB IS ALREADY RUNNING, STOP THE JOB AND START IT AGAIN BEFORE CHANGING CONTROL OR VALVE GATE OUTPUTS.



# VALVE GATE HARDWARE SETUP

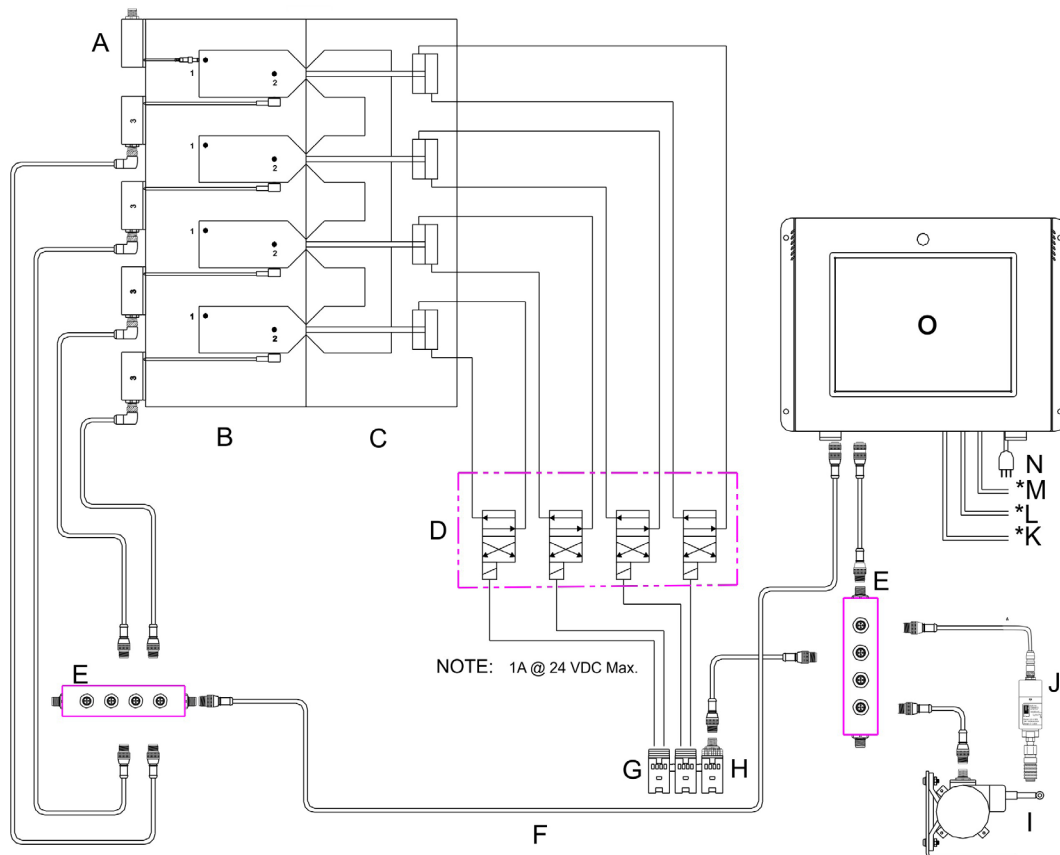
## INTRODUCTION

The eDART® has the capability to control valve gates directly while it is doing other monitoring and control functions. The Valve Gate software must be purchased and have enough Relay Output (OR2-D) modules to operate the number of gates required.

Once installed, you can set up a process to open and close each gate independently using pressure, position, time, temperature, or the operation of other valve gates. This makes the process more capable by precisely controlling pressures, flow lines, knit lines or allowing reduced clamp tonnage through alternate filling and packing.



**DURING MACHINE OPERATION THE VALVE GATE POWER SOURCE MUST BE INTERRUPTED BY THE MACHINE'S E-STOP! THIS IS THE RESPONSIBILITY OF THE INSTALLER AND FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY AND/OR DEATH.**



**FIGURE 1. VALVE GATE-EDART CONNECTIONS.JPG**

<b>A</b>	Lynx Sensors In-Cavity Control	<b>E</b>	J-LX5	<b>I</b>	Stroke	<b>M</b>	Mouse
<b>B</b>	Cavity Half	<b>F</b>	Lynx Cable to eDART®	<b>J</b>	Hydraulic	<b>N</b>	Power
<b>C</b>	Valve Gate Manifold	<b>G</b>	OR2-D	<b>K</b>	Video	<b>O</b>	eDART®
<b>D</b>	Valve Gate Solenoid	<b>H</b>	ID7-D-SEQ	<b>L</b>	Keyboard		

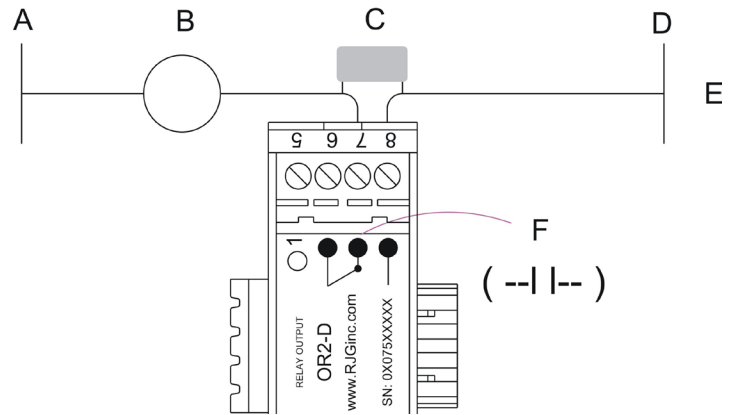
**TABLE 2. VALVE GATE-EDART CONNECTIONS**



# INSTALLATION AND CHECKOUT

## WIRING AND DIAGRAM

<b>A</b>	+24 V DC Power
<b>B</b>	Valve Gate Solenoid
<b>C</b>	OR2-D Relay Contacts (& Arc Suppressor)
<b>D</b>	DC Common (Ground)
<b>E</b>	Shown wired to the normally-open contacts
<b>TABLE 3. OR2-D WIRING DIAGRAM</b>	



**FIGURE 2. OR2-D WIRING DIAGRAM.JPG**

**NOTE:** MAX CURRENT 1 A @ 24 VDC. IF SOLENOID REQUIRES MORE - USE AUXILIARY RELAY. DC POWER SUPPLIED BY CUSTOMER MACHINE OR VALVE POWER PACK. ARC SUPPRESSOR LOCATION SHOWN IS OPTIMUM. IF THERE IS NO ACCESS TO COMMON (D), THEN IT MAY BE WIRED ACROSS THE NORMALLY OPEN CONTACTS OF THE OR2-D.

**CAUTION:** VALVE POWER SOURCE (A) MUST BE INTERRUPTED BY THE MACHINE'S E-STOP.

**CAUTION:** PLACE AN ARC SUPPRESSOR SUCH AS AN ITW PAKTRON "QUENCHARC" #504M06QA100 ACROSS EACH SET OF CONTACTS ON THE OR2-D MODULE TO PREVENT DAMAGE TO THE RELAY CONTACT OVER TIME.

You can control two (2) valve gates with one (1) OR2-D module. As you wire each set of contacts, record the valve gate to which it goes by serial number and "signal" number (side 1 or side 2 of the module). A maximum of 14 output devices (currently OR2-D's or analog outputs OAI-D) can be connected to each Lynx port on the eDART.

For each valve gate, you can set the function that is performed when the relay in the OR2-D module becomes energized. You can tell the system that the valve gate opens or that it closes when energized.

## WIRING AND CHOOSING VALVE DIRECTION

WHEN CONTACT CLOSE	ON FAILURE, THE GATE SHOULD	WIRE TO RELAY CONTACTS	"LOCATION" SELECTION	USE WITH APPLICATION...
Gate Opens	Close	N.O.	"Open Gate"	Hot Runner
Gate Opens	Open	N.C.	"Close Gate"	Cold Runner Pinch Gate
Gate Opens	Open	N.O.	"Close Gate"	
Gate Opens	Close	N.C.	"Open Gate"	

**TABLE 4. WIRING AND CHOOSING VALVE DIRECTION**



**HOT RUNNER VALVE GATES MUST BE WIRED SO THAT E-STOP OR POWER LOSS CAUSES THE GATES TO CLOSE.**

## INPUTS TO eDART

LYNX DEVICE	INPUT	FUNCTION	REQUIRED
Sequence Input Module (ID7-D-SEQ)	Injection Forward	Master sequence for start at cycle and opening and closing gates.	Yes
	Screw Run	Stroke direction, zero and material variation information.	Yes
	Mold Clamped	Gate close backup. Accurate cycle time and integration limit.	Yes
	Machine in Manual	User configuration determines whether valve gates are prevented from opening or forced to open during purges. Prevents parts counts/data storage when machine is in manual.	No*
	Valve Pressure Supply	When ON this signals the eDART valve gate control that the hydraulic or air pressure to operate the gates is working, When OFF the eDART assumes that it cannot operate the valves and puts up an alert message to that effect.	No*
Stroke Velocity Encoder (LE-R-50)	N/A	Monitors screw position and speed. Used to sequence valves open or closed on volume.	Yes
Injection Pressure	Hydraulic, nozzle pressure or analog input	Measures injection pressure, sets backups and detects viscosity variations.	No*
Cavity Pressure Sensor	N/A	Controls valve gates by cavity pressure - results can be monitored (Go to <a href="http://www.rjginc.com">www.rjginc.com</a> for more information).	No*

**TABLE 5. INPUTS TO eDART**

**NOTE:** \* WHILE LISTED AS NOT REQUIRED, THESE ARE RECOMMENDED FOR SUCCESSFUL VALVE GATE IMPLEMENTATION.

## OUTPUTS TO eDART

LYNX DEVICE	OUTPUT	FUNCTION	REQUIRED
Dual-Relay Output Module OR2-D	Velocity to Pressure (V→P) Contact Closure	External transfer to the machine to switch from velocity control to pressure control once all of the valves have closed.	Yes
	Inject Enable Contact Closure	The eDART® will open this contact if anything fails. This should stop the machine from injecting before mold damage can occur.	No*
Open Valve Relay Output	Contact closure to valve solenoid**	Each contact closure operates one valve solenoid.	Yes

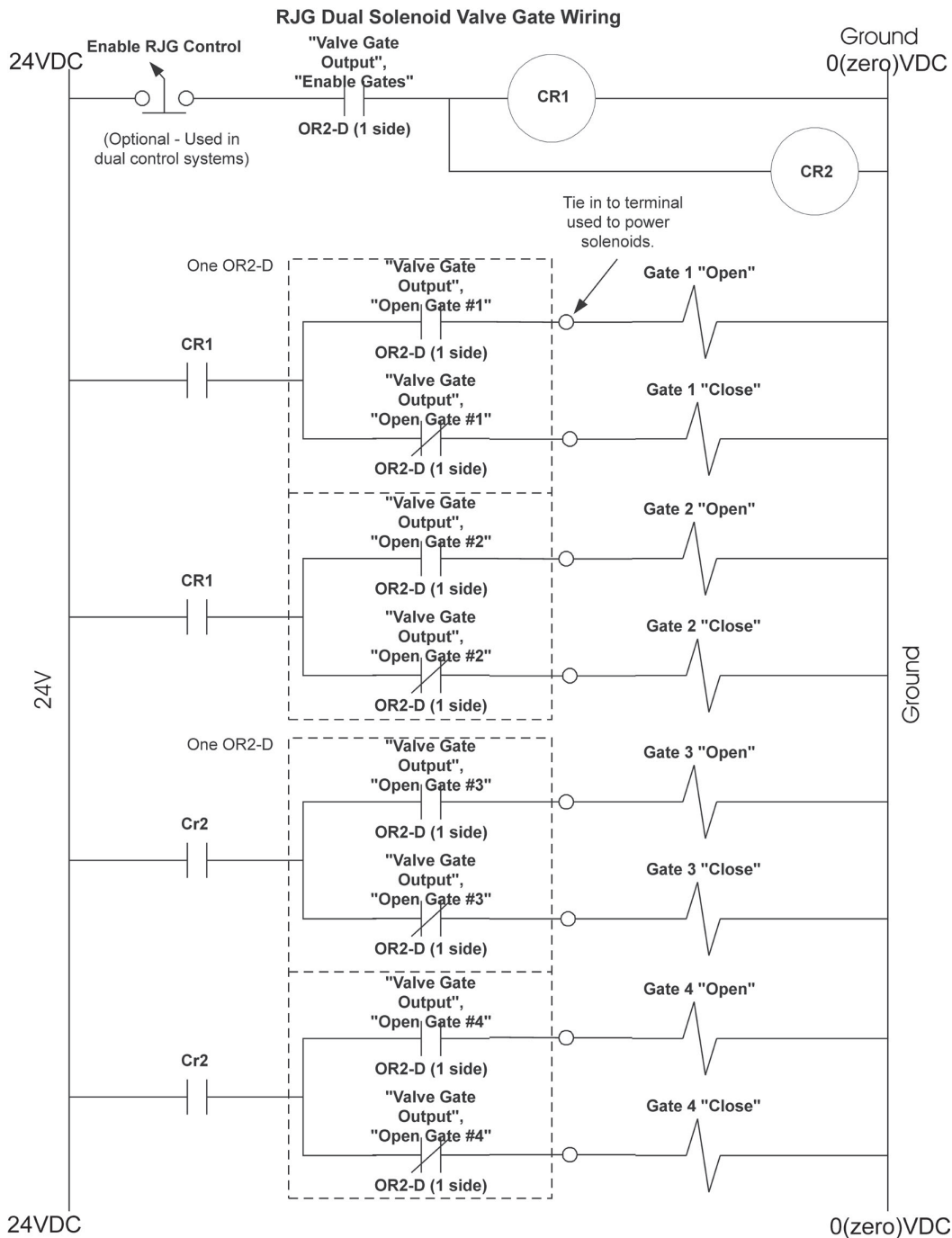
**TABLE 6. OUTPUTS TO eDART**

**NOTE:** \* WHILE LISTED AS NOT REQUIRED, THESE ARE RECOMMENDED FOR SUCCESSFUL VALVE GATE IMPLEMENTATION.

**NOTE:** \*\* RJG DOES NOT CURRENTLY SUPPLY THE SOLENOID OR THE AIR OR HYDRAULIC SUPPLY.

## DUAL SOLENOID SYSTEMS

Some valve gate actuation systems have two solenoids per gate: one to open the gate and one to close it. If you have a dual solenoid system, please refer to the diagram for the best wiring practices.



**FIGURE 3. RJG DUAL SOLENOID VALVE GATE WIRING.JPG**



**THE VALVE GATE POWER SOURCE MUST BE INTERRUPTED BY THE MACHINE'S E-STOP! THIS IS THE RESPONSIBILITY OF THE INSTALLER AND FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY AND/OR DEATH.**

# SOFTWARE SETUP

## ASSIGN OUTPUTS

Assign outputs in Mold Setup (A & B).

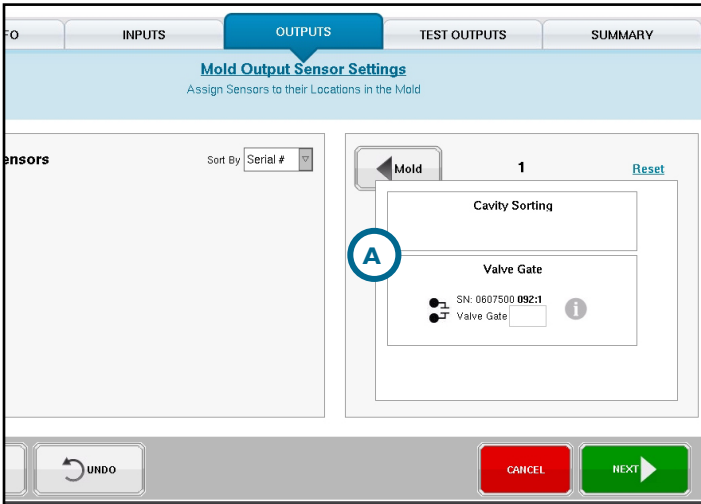


FIGURE 4. SET OUTPUTS - VG.JPG

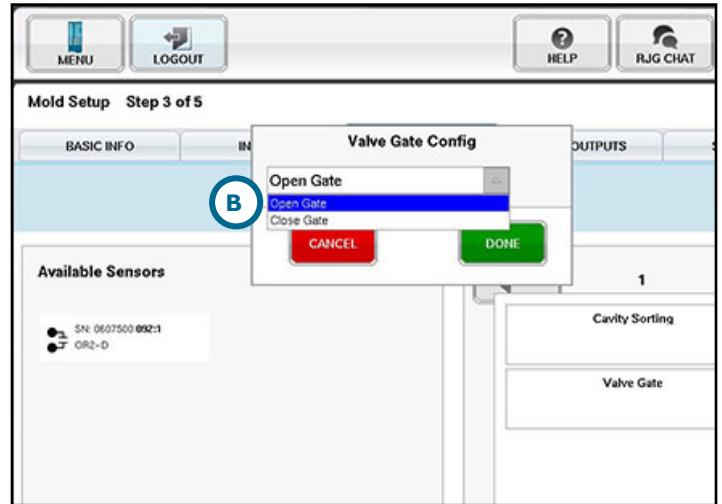


FIGURE 5. CHOOSE VALVE GATE 2.JPG

**NOTE:** IF YOU DO NOT SEE THE VALVE GATE OPTION, THIS MEANS THAT THE SOFTWARE HAS NOT BEEN INSTALLED.

Test outputs in Mold Setup (C).

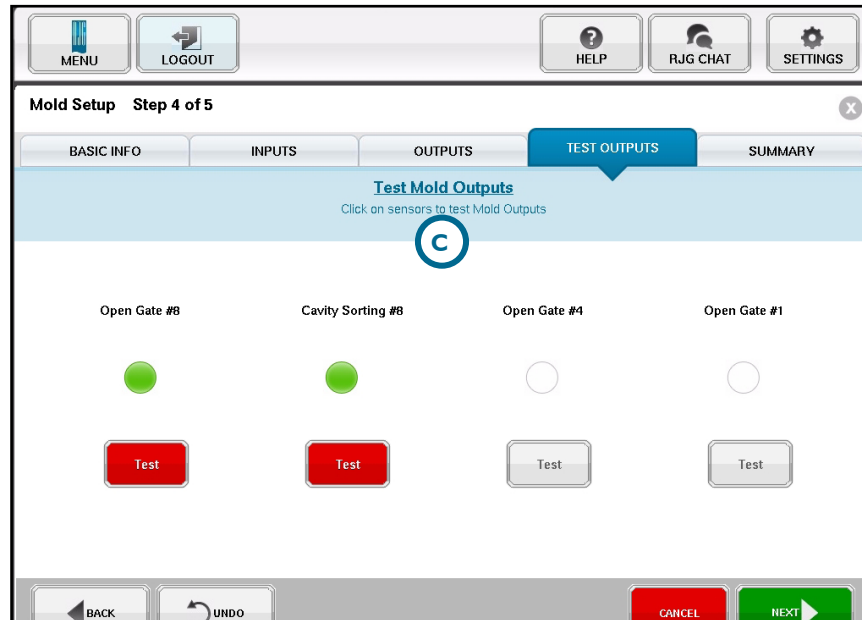


FIGURE 6. TEST VALVE GATES 2.JPG

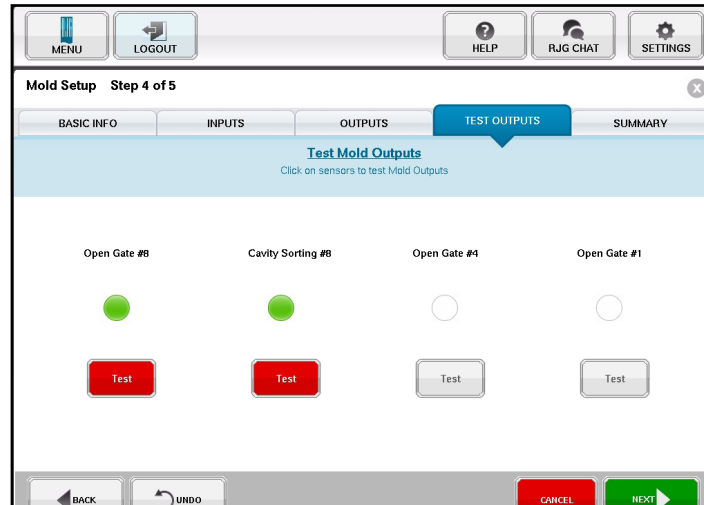
**CAUTION:** BEFORE TESTING THE OUTPUTS MAKE SURE THAT THE VALVE GATES ARE READY (HEATED UP). IF DONE ON A COLD TOOL, POSSIBLE DAMAGE COULD OCCUR.

**NOTE:** THE VALVE GATE SOFTWARE IS AN OPTIONAL TOOL THAT MUST BE PURCHASED AND INSTALLED SEPERATELY.

## VALVE GATE TEST

There are two places where you can test the valve gates. The first is in the Mold Setup section prior to starting the job. Go to the Test Outputs page and click each individual output on the white “Test” button. They should turn green if active and working.

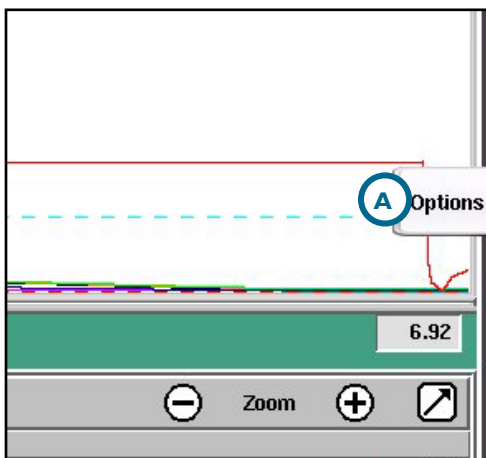
**CAUTION:** TESTING SHOULD ONLY BE DONE WHEN MACHINE IS IN MANUAL!



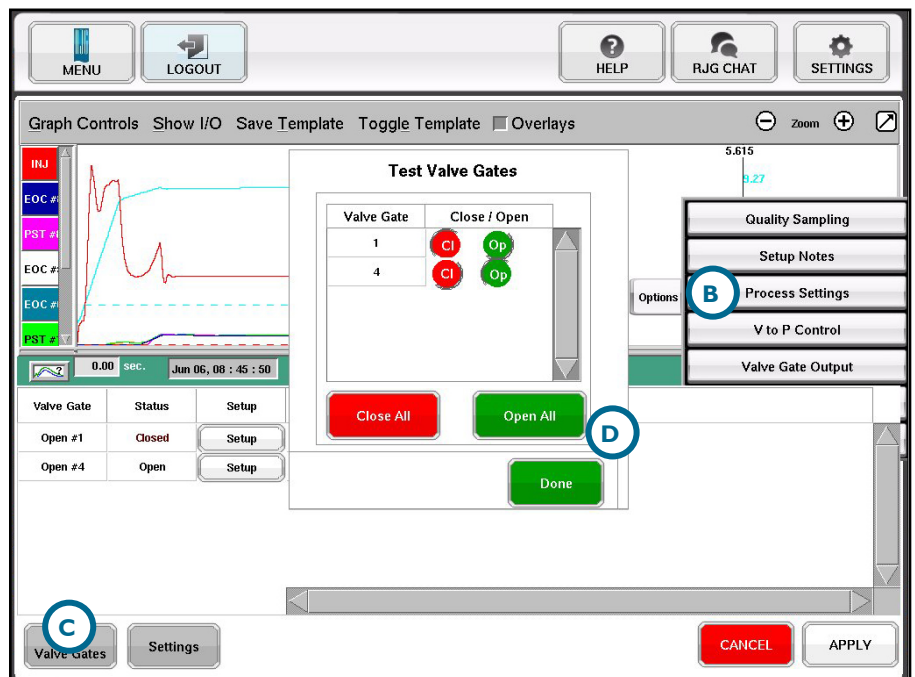
**FIGURE 7. TEST VALVE GATES 2.JPG**

The second is after your job is running. Go to the Cycle Graph/Summary Graph page.

- A** Click on the Options Tab
- B** Then click on the Valve Gate Output button
- C** When the Valve Gate screen comes up, click on the “Test Valve Gates” button
- D** The “Test Valve Gates” screen will pop up and you can test the gates that you have setup for this process.



**FIGURE 8. UNCLICKED OPTIONS TAB.JPG**

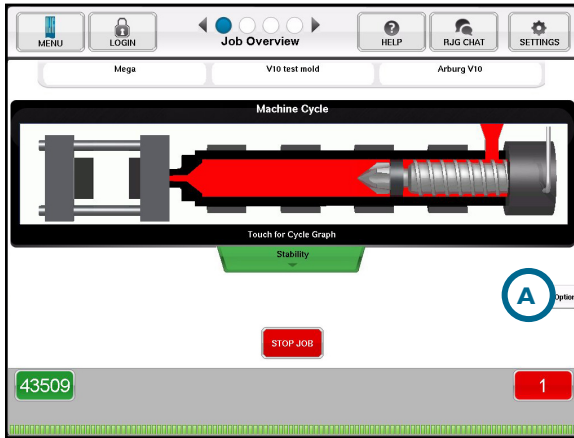


**FIGURE 9. TEST VALVE GATES.JPG**

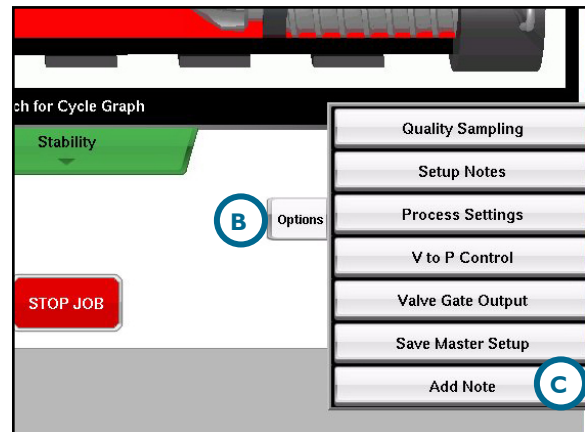


## SETUP

- A** Once the job is running, click on the “Options” Tab from either Job Overview page or the Job Summary page.
- B** A list will appear from the side.
- C** Select “Valve Gate Output” from the “Options” list.



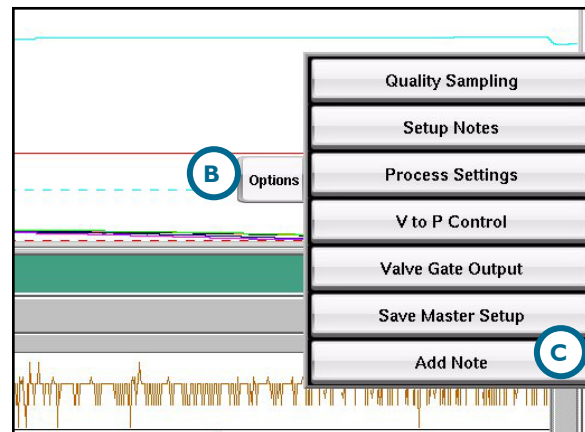
**FIGURE 10. OPTIONS TAB ON MAIN SCREEN.JPG**



**FIGURE 11. SELECT VALVE GATE OUTPUT.JPG**



**FIGURE 12. UNCLICKED OPTIONS TAB.JPG**

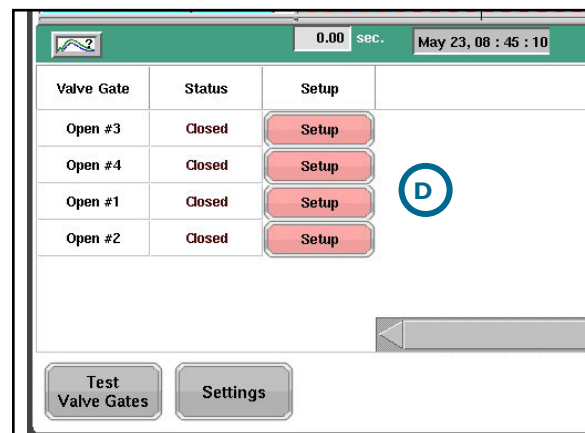


**FIGURE 13. OPTIONS TAB.JPG**

This screen will appear.

- D** Click on the “Setup” button for each valve gate to begin individual cavity setup.

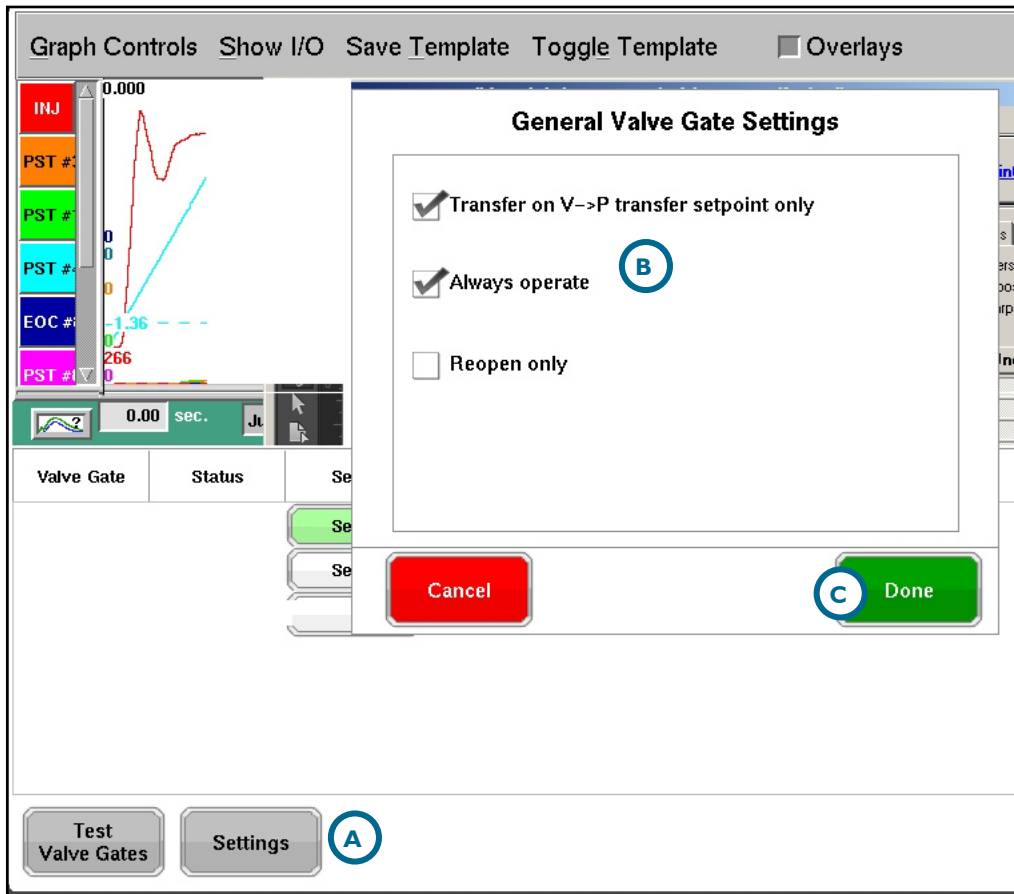
**NOTE:** IF YOU DO NOT HAVE CAVITY PRESSURE SENSORS FOR CONTROL, THE VALVE GATE CAN BE SET TO CLOSE ON A SHOT VOLUME (SEE “CLOSE VALVE AT VOLUME”).



**FIGURE 14. MAIN SCREEN.JPG**

## GENERAL VALVE GATE SETTINGS

- A** To view the General Valve Gate Settings, click on the “Settings” button at the bottom of the Valve Gate page.
- B** It will bring up the “General Valve Gate Settings” screen. Choose what is applicable to your process.
- C** Click on “Done” when you have completed your selection(s).



**FIGURE 15. VALVE GATE SETTINGS CROPPED.JPG**

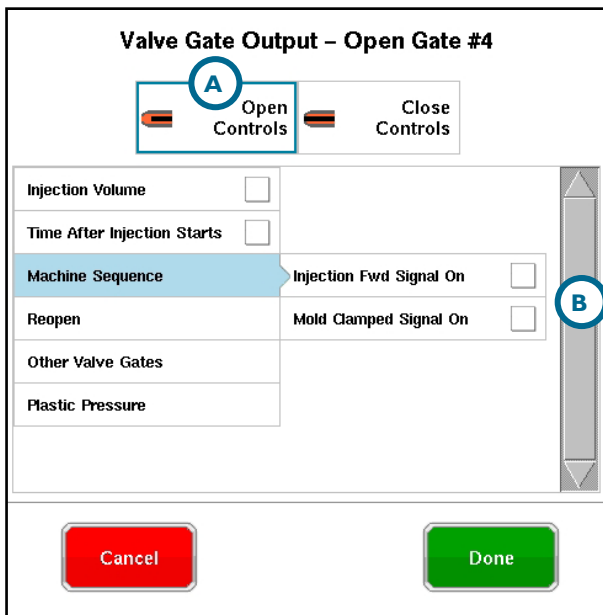
## VALVE GATE OPEN

When setting up your Valve Gates to operate on “Open”:

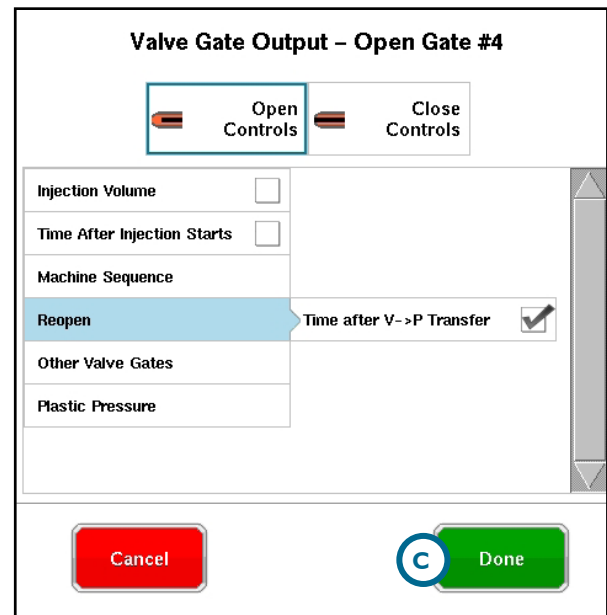
- A** Click on the “Open Controls”.
- B** Use the scroll bar to find the method you wish to use for that valve gate location.
- C** Select the one you want then click on the “Done” button.
- D** To set the values for that valve gate click on the number under “Open on ...Volume, pressure.. or whichever method you have chosen. A keypad will pop up and allow you to set the value you wish to use. Click on “Enter” when finished.

Repeat steps on the remaining Valve Gates.

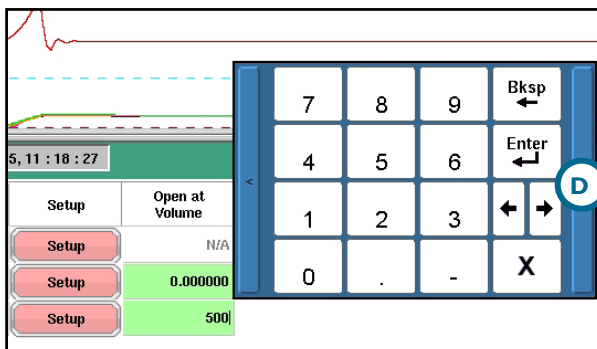
- E** When finished with all of the settings, click on the “Apply” button in the lower right corner of your screen to have all of the settings take effect.



**FIGURE 16. OPEN CONTROLS CROPPED. JPG**



**FIGURE 17. RE-OPEN ON PRESSURE CROPPED.JPG**



**FIGURE 18. SET VALUES.JPG**



**FIGURE 19. CANCEL-APPLY.JPG**

## VALVE GATE OPEN *(continued)*

### OPEN ON INJECTION VOLUME

Requires a stroke sensor—Balance or sequential knitline control

#### 1. Volume Units: Units in which volume is displayed:

This method will open the valve gate when the injection volume (stroke/screw cross sectional area) reaches the value shown to the right of the values window. This can be used for a sort of “running start” in which the machine begins injecting and gets a certain compaction of the melt before the gate opens. Leaving the setpoint at zero will cause the valve gate to open just when filling begins (after using up the decompress length).

#### 2. Volume Setpoint

This is the volume level at which the valve gate opens (shown in the units to the right of the values window).

### INJECTION VOLUME AFTER A TEMPERATURE THRESHOLD

Requires stroke and a mold temperature sensor.

If you have a cavity temperature sensor installed in the mold then you may use it to open the valve gate. This is particularly useful in processes such as structural foam or coining in which there is no pressure in the material as it flows past the sensor. The eDART® picks up the quick rise in temperature even without pressure.

Since temperature detector only detects a quick rise the value that you enter to the right is actually a volume of screw travel AFTER the flow front reaches the sensor. Thus if the sensor is installed in a position slightly upstream of when you want the gate to open you can tell the controller to allow the screw to advance by a certain volume before opening the valve gate. The volume number is the increase in volume from what it was when the flow front reached the sensor.

### MACHINE SEQUENCE

#### 1. Injection Forward Signal On

Requires an Injection Forward signal

If checked, the valve gate will open at start of injection (if not already opened by mold clamped). This function can be used as a backup in case the Mold Clamped signal does not come on for some reason. When starting a new job, this box is always checked.

#### 2. Mold Clamped Signal On

Requires a Mold Clamped signal

If checked, the valve gate will open when the mold clamps. It is especially useful for pre-heating valve pins in polycarbonate applications. This is probably the best method since the valve gate stays closed until just before injection and then opens after there is any chance of drool.

## VALVE GATE OPEN (continued)

### RE-OPEN AT TIME AFTER V→P TRANSFER

Requires V→P transfer modules (OR2-D/Analog Output)

### OPEN ON OTHER VALVE GATES

Opens when a different gate closes—Requires multiple Valve Gate outputs.

Use this function for alternate cavity valve gate control in which one cavity fills and packs before the next one begins.

### VALVE GATE AT WHICH TO OPEN ON CLOSE

From the combo box, select the valve gate at which, when closed, will open this one.

### OPEN ON PLASTIC PRESSURE

From cavity sensors only—Gates may not use any form of injection pressure.

- Open Gate Sensor: Name of pressure sensor to set open gate
- Open at Pressure: Open when pressure reaches set value
- Pressure Units: Units for the pressure value

This can be used in a sequential valve gate system for removing knit lines by opening a gate when the flow front reaches a sensor. It can also be used for a sort of “running start” by selecting injection pressure build up to a certain level before opening the gate.

- Select the sensor (plastic pressure) that you wish to use to open this valve gate.
- Select the pressure level at which you wish the valve gate to open. Note that if you use “Injection”, the pressure shown is NOT hydraulic pressure, but plastic pressure (hydraulic \* intensification ratio).

### OPEN ON MOLD TEMPERATURE

Includes cavity temperature and any other mold temperature such as runner temperature.

### OPEN ON TIME AFTER INJECTION STARTS

Requires injection forward signal.

We do not recommend using time for opening because it is not robust. However if you are replacing an older valve gate control that was based on time with the eDART® control you may wish to enter the old time settings as a starting point. Then, once the process has stabilized you can use the “Convert to Pressure” selection (from the main window’s “Settings” menu) to turn off the time based controls and begin controlling on pressure. If you do not have cavity pressure sensors you can use the “Convert to Volume” to create volume based setpoints and turn off the time control.

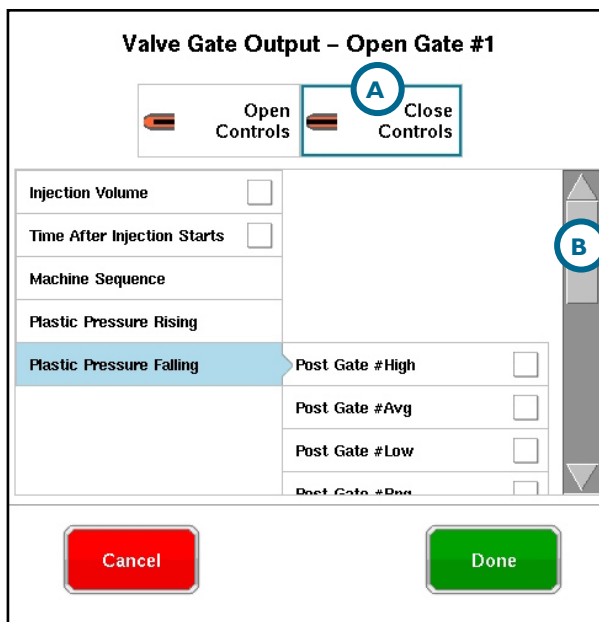
## VALVE GATE CLOSE

When setting up your Valve Gates to operate on “Close”:

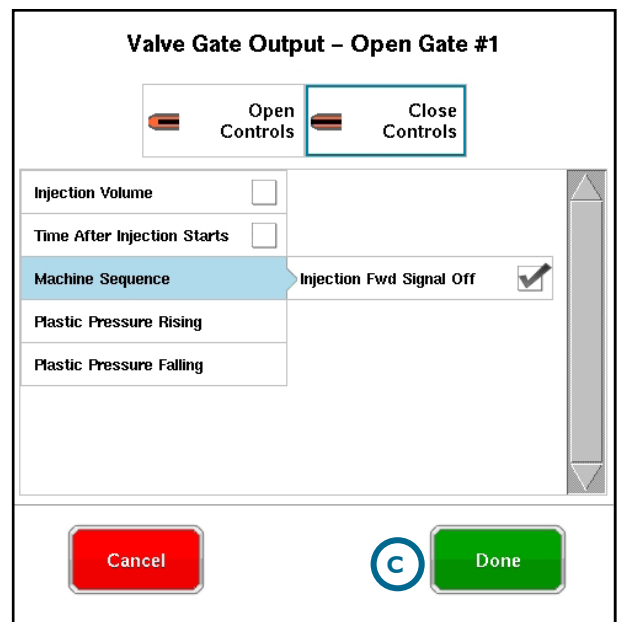
- A** Click on the “Close Controls”.
- B** Use the scroll bar to find the method you wish to use for that valve gate location.
- C** Select the one you want then click on the “Done” button.
- D** To set the values for that valve gate click on the number under “Close on ...Volume, pressure.. or whichever method you have chosen. A keypad will pop up and allow you to set the value you wish to use. Click on “Enter” when finished.

Repeat steps on the remaining Valve Gates.

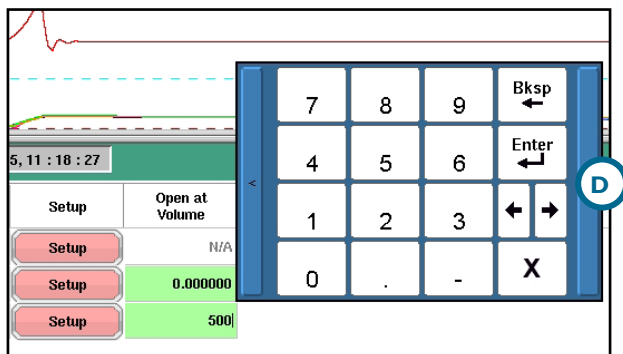
- E** When finished with all of the settings, click on the “Apply” button in the lower right corner of your screen to have all of the settings take effect.



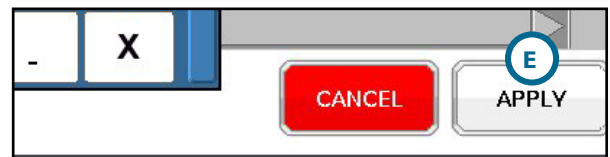
**FIGURE 20. CHOOSE CLOSE CONTROLS. JPG**



**FIGURE 21. SELECT WHICH CLOSE CONTROLS.JPG**



**FIGURE 22. SET VALUES.JPG**



**FIGURE 23. CANCEL-APPLY.JPG**

## **VALVE GATE CLOSE (continued)**

### **CLOSE ON INJECTION VOLUME**

Requires a stroke sensor—Balance or sequential knitline control

Volume Units: Units in which volume is displayed.

Check “Injection volume reaches” box to cause the valve gate to close when the injection volume reaches a certain level. Check this box to cause the valve gate to close when the injection volume reaches a certain level. (see image on previous page)

Use this feature for a backup to the pressure control in case pressures are never reached. This is especially important in alternate cavity systems where the first cavity must close to open the second cavity before the machine speeds up for its next fill stage.

You can also use volume close control if you have no cavity pressure sensors. The process will be controlled fairly well except for check ring leakage variations and variations in material compressibility.

#### **1. Close at Volume Setpoint**

Set this to the volume at which you want the valve gate to close.

#### **2. Volume Units**

These are the units for the volume setpoint.

### **CLOSE ON INJECTION VOLUME AFTER A TEMPERATURE THRESHOLD**

Requires a stroke and a mold temperature sensor.

### **CLOSE ON TIME AFTER INJECTION STARTS**

Requires Injection Forward signal.

This control will close the valve gate at the time after the start of injection. This is a backup in case pressure and volume do not operate. However, if machine speeds change, the amount of material injected in the set time can vary and cause flash or shorts. Generally time should only be used when transferring from an older time-based sequence. If you have a cavity temperature sensor installed in the mold then you may use it to close the valve gate. This is particularly useful in processes such as structural foam in which there is no pressure in the material as it flows past the sensor. It may especially useful for be useful for closing a power vent valve. The eDART picks up the quick rise in temperature even without pressure.

## **VALVE GATE CLOSE (continued)**

### **CLOSE ON MACHINE SEQUENCE**

Injection Forward Signal Off—Requires Injection Forward signal

This is a sort of “last resort” to close the valve gate at the end of injection forward before the screw starts running. It defaults to “On” as a backup in case pressure and volume are not reached or not set. Turn off to add or discharge material during hold.

### **CLOSE ON PLASTIC PRESSURE RISING**

From cavity sensors only—They may not use any form of injection pressure.

### **CLOSE ON PLASTIC PRESSURE FALLING**

From cavity sensors only—They may not use any form of injection pressure.

### **CLOSE ON PLASTIC PRESSURE SETPOINT**

From cavity sensors only

### **CLOSE AT PRESSURE ENABLE**

Check the “Pressure at” box to cause the valve gate to close when the sensor pressure at the right reaches the level set. Typically, you would use this for packing control. Each valve gate can be controlled separately to make consistent pack pressures at different gate locations or cavities.

#### **1. Sensor for Valve Gate Close**

Select the sensor (plastic pressure) that you wish to use to close the valve gate at the pressure level to the right.

#### **2. Close at Pressure**

The valve gate will close when the pressure (plastic) on the sensor selected reaches the set level.

#### **3. Close Pressure Unit**

These are the units for the pressure setting to the left. The pressure value shown on the main Valve Gates screen is also set in these units (even though the units are not shown there).



## **VALVE GATE CLOSE (continued)**

### **MOLD CLAMPED OFF**

All valves must close at the end of the cycle to prevent drool or discharge on an operator.

### **RE-OPEN AT TIME AFTER TRANSFER**

In some process (e.g. thick-walled parts) you may wish to place hold pressure on the material after all of the valves have closed and the machine transfers to hold.

### **CLOSE ON INJECTION OFF**

This is a sort of “last resort” to close the valve gate at the end of injection before the screw starts running. It defaults to “On” as a backup in case pressure and volume are not reached or not set.

### **CLOSE ON TIME**

This control will close the valve gate at the time after the start of injection. This is a sort of last ditch backup in case pressure and volume do not operate. However, if machine speeds change, the amount of material injected in the set time can vary and cause flash or shorts.

## **VALVE GATE CLOSE CONTROL**

To bring up this screen, select Close Controls from the Setup menu. Here you can choose when the selected valve gate should close. Note that you can select more than one option.

### **CLOSE AT PRESSURE ENABLE**

#### **1. Close During Pressure Rising**

If you select “Pressure Rising”, the valve gate closes when pressure at the sensor above reaches the level selected while the pressure is increasing (before the peak).

#### **2. Close During Pressure**

If you select “Pressure”, the valve gate closes after the peak when the pressure falls below the setting selected. This is useful for controlled discharge after packing to reduce pressure and dimensional gradients.

If you use this method and the pressure never gets as high as the setpoint, the valve gate will NOT close on pressure. Once a valve gate closes, it does not open again until the next “open event” (e.g. Mold Clamped or other selected open control).



# SETTING BACKUPS

## INJECTION VOLUME

Set a backup injection volume setpoint in the V to P Transfer tool in case none of the valves fire (Appx. 10% above the last setting you had on this tool for volume transfer). Supposing during setup that the last valve gate to close had its pressure set to the 3967 psi shown when the shot volume was 1.665 cu. in. Then you would enter 1.85 cu. in. as the injection volume to transfer as shown.

## CAVITY PRESSURE

Now that the valve gates are closing on cavity pressure, it is important that you set backups to prevent damage if for some reason the sensor does not see pressure (due to a mechanical problem, for example). To do this, enter a backup injection volume setpoint in the Valve Close Control screen. This setpoint should be slightly above the actual shot volume at which the gate is currently closing. Find the shot volume where each gate is closing (using the Cycle Graph) and set each cavity's injection volume backup about 10% above that. This keeps check ring and material variation from causing early transfer but still prevents damage if the pressure is not sensed.

In the below example, gates #2 and #4 close when shot volume is 1.665 cu. in. In this case, you would set the injection volume backup for #2 and #4 to 1.85 cu. in.

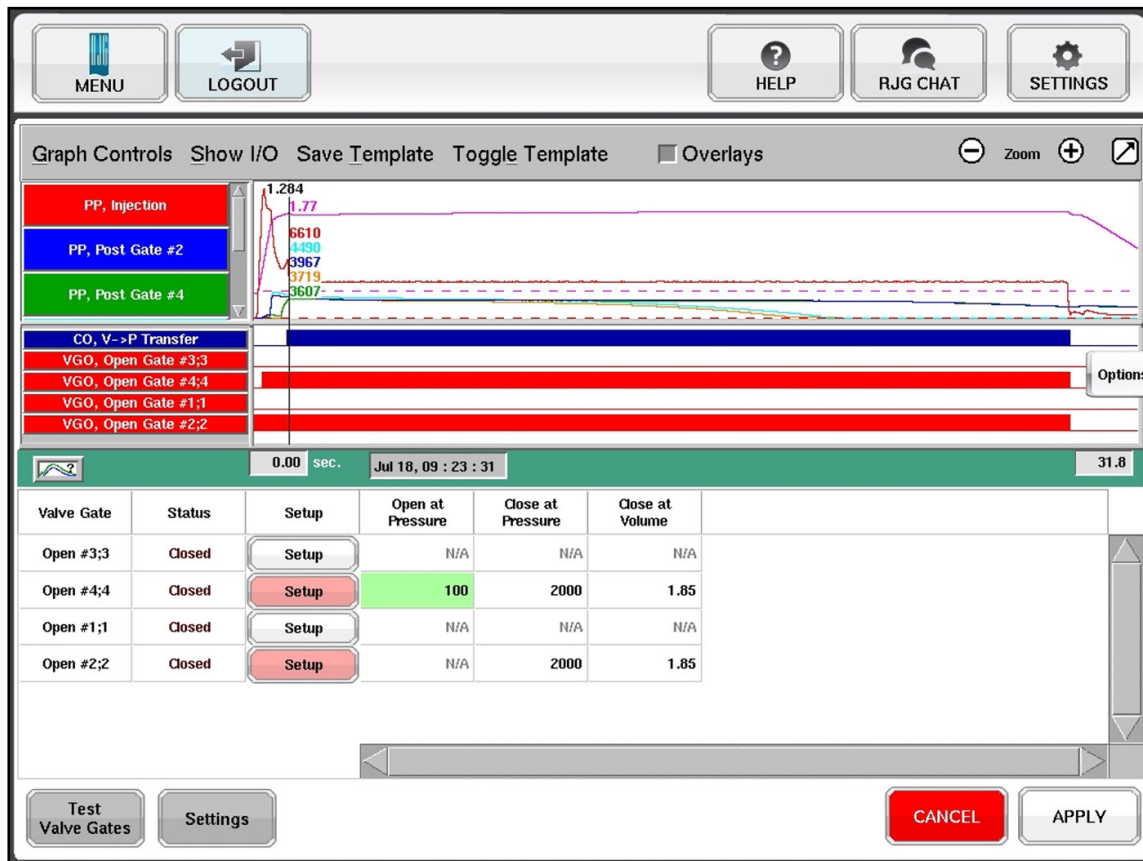


FIGURE 24. SET BACK UPS - VG 3 MIKE F.JPG

## **PREVENTING INTER-CAVITY VARIATION: “RANGE” CONTROL**

There can be a case where a cold slug blocks the material from entering a cavity. In this case, the blocked cavity will not reach its pressure setpoint and the full amount of material will not be injected. In a two-cavity situation, this drives all of the material into one cavity before any of the backups can fire, possibly badly damaging that cavity.

To prevent this, we use the eDART®’s multi-cavity feature to set a backup on a “phantom” pressure level called the “Range”. The “Plastic Pressure, Post Gate #Rng” value is always the difference between the highest and lowest Post Gate sensor value at each instant. The example below is from a mold with only End of Cavity (EOC) sensors.

So you can set a machine transfer setpoint on “Plastic Pressure, Post Gate #Rng” (in the V to P Transfer tool) just as if it was a real sensor. This would prevent the spread between cavities from exceeding a certain range.

If the difference between any two cavities exceeds 2500 psi, the machine will transfer before any damage can be done.

## **VELOCITY TO PRESSURE MACHINE TRANSFER SETTINGS**

To bring up this screen, select General Settings from the Settings menu. Here you can choose when to transfer from low speed pack (velocity) to hold pressure.

## **TRANSFER ON ALL VALVE GATES CLOSED**

In order for this to work, you must use the V to P Transfer tool to transfer the machine from speed to pressure. Then, if you check this box, the machine transfer will occur when all the valve gates have closed (or sooner if some other V -> P transfer control happens first).

## **OPERATE WITH MACHINE IN MANUAL MODE**

If you have wired a “Seq. Module Input, Machine in Manual” input, this switch can be used to control what the valve gates do when the machine is in manual. If you purge through the mold, you should leave this switch on and set the valve gates to open and close on Injection Forward On and Off.

If you want the gates to stay closed in manual mode (to prevent drool, for example), then turn this switch off. You can then retract the carriage and purge without the gates open.

## OPEN ALL VALVE GATES

- A “Click on Test Valve Gates”
- B Click this button to switch all valve gate controls to “Open” simultaneously.

Do NOT use this control on cycle because it overrides your control settings for open and close.

## CLOSE ALL VALVE GATES

- C Click this button to switch all valve gate controls to “Closed” simultaneously. Do NOT use this control on cycle because it overrides your control settings for open and close.

## DONE

When clicked, this button will close this window and return control to the valve gate controller using its setpoints, etc.

## TEST INDIVIDUAL VALVE GATES

To bring up this screen, select Test This Valve from the Setup menu. Here you can test each valve gate individually.

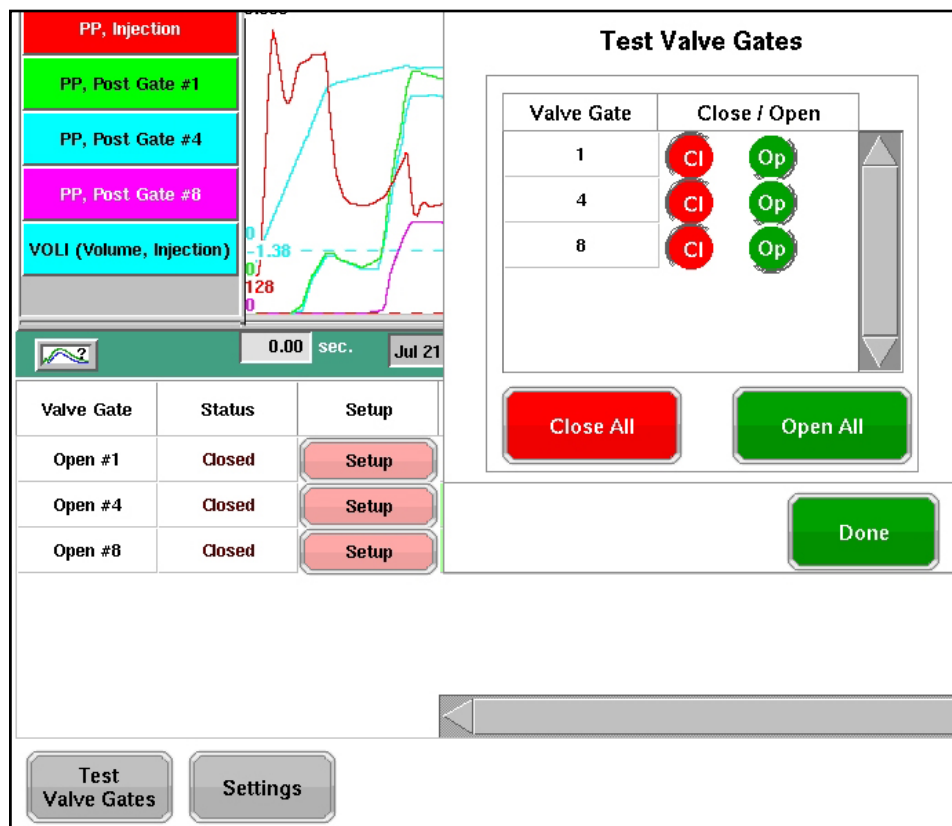


FIGURE 25. OPEN ALL VALVE GATES.JPG



## ADDITIONAL VALVE GATE CONTROL TECHNIQUES

### “RUNNING” START

It has been proposed that some high-speed valve gate applications might work best if all possibility of drool or slow injection at the start is prevented by opening the valve gates late. The valve gate control provides two methods of doing this.

### OPEN ON ZERO VOLUME

This is probably the most consistent method. A good starting point is zero volume that will be crossed once the ram is up to speed. This requires that you use some decompress on the process. It is important to note that if you are using high injection velocities and have a significant delay in the opening of the valve gates, this approach may over-pressurize the manifold. Before setting a late open control, the cycle graph might look like this:

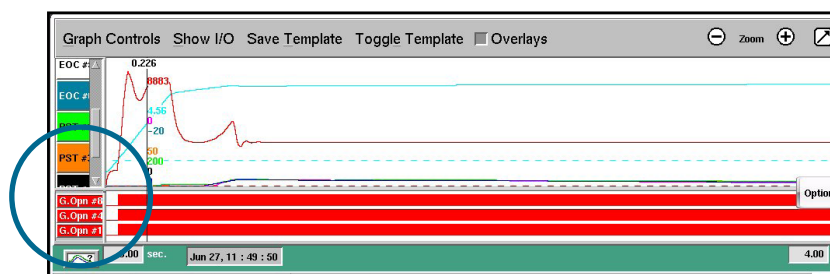


FIGURE 26. OPEN ON VOLUME.JPG

To set this up early (opening on volume), set the open control for each valve gate as follows:

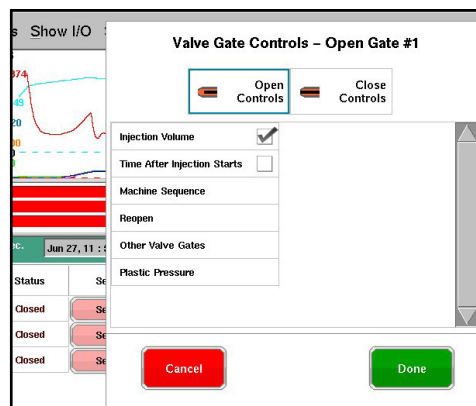


FIGURE 27. CHOOSE OPEN ON VOLUME.JPG

Now the cycle graph will show the gates opening late as follows:

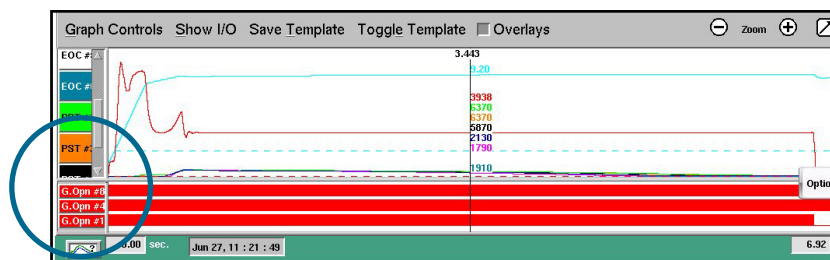


FIGURE 28. OPEN ON INJECTION SMALL.JPG

## NOTES ON SUMMARY VALUES

- Since the Fill Volume (set in the Sequence Settings tool) only gives you the first cavity's fill time, the "Effective Viscosity, Fill" value only applies to that cavity. The "Average Value, Fill Speed" and "Fill Rate" values also similarly apply.
- The "Average Value, Pack Speed" and "Pack Rate" values will only be valid when filling cavity 1 only (cavity 2 never opening). You can still use these values to transfer the process to another machine and match the pack rate, at least for cavity 1.
- The "Process Time, Cavity Fill" value for the second cavity has little meaning. But the "Process Time, Cavity Pack" value should work on the second cavity because this is the time between a full cavity (1000 psi at the end of the cavity, Sequence Settings default) to a packed cavity (98% of peak at post gate).
- Peaks and integrals by cavity function as they would normally.
- Note that the cooling time for cavity 1 is much higher than cavity 2. So you need to use the shorter cooling time on cavity 2 as the "worst case". The "Sequence Time, Plastic Cooling" value only applies to cavity 1.



### FREQUENTLY ASKED QUESTIONS

#### 1. What machine triggers must I have in order to run the Valve Gate control application?

You MUST have Injection Forward, Screw Run, and Mold Clamped signals, at a minimum.

#### 2. Is V→P transfer required?

Generally: Yes. If the eDART cannot transfer the press out of velocity control once all gates close, then the press will continue to try to inject. This can build up pressure and cause leaks or can damage the manifold.

Also, you can set backups on the eDART V→P transfer tab to prevent over-pressurizing the manifold or any or all cavities in the tool.

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