Version 9 *eDART™*

This contains all of the software tools of the *eDART™* software.

Setup Tools

This section describes the features found in the Setup Tools section of the *eDART™* software.

In this Section

➢ Job Setup

➢ Machine Size

➢ Ejector Pin Sizes

➢ Zero Injection Pressure

➢ Set Screw Bottom

➢ Setup Notes

Job Setup

The *eDART™* software is customizable by Mold and Machine. The first time a mold or machine is used with the *eDART* System™, you will need to enter them into the Job Setup tool. When the *eDART™* is powered up, the Job Setup tool will be the first to appear. Refer to "Creating a Job Setup" for important concepts and helpful tips for setting up a job.

Job Setup (eDART #174)	?
	Accept

Identifying sensor found (S/N: 03 040 00459, identifies Machine)
All identifying sensors found.
Identifying sensor found (S/N: 01 236 00123, identifies Mold)

Mold

Mold Number	1040 Valve Gate	▽	Create New
Material	Polypro	▽	Create New
Cavities	2 cavity	▽	Create New

Machine

Plant	RJG	▽	Create New
Cell	1	▽	Create New
Machine	174	▽	Create New

Status List
This narrow white box at the top of the tool displays all of the sensors that the software finds and indicates when it is done searching. The scroll bar at the right allows you to view all of the sensors that are found.

Mold Selection (Mold Number, Material, Cavities)
If you are entering a new mold into the system, type in a new Mold Number (or name). Refer to the "Creating Naming Standards" section for helpful tips. Note that some characters are restricted because they confuse the file system. These include such things as the asterisk, question mark, pound sign (#) and others. Restricted characters simply will not type.

> **NOTE:**
> You must enter text in the Mold Number box. The Material and Cavities boxes are optional. If you use the Cavities level, you must also use the Materials level. To make these levels required, you can contact RJG to have this change made to your system.

If the mold you are running has already been entered into the system, simply use the combo boxes to select that mold. The software will automatically find the saved data.

> **NOTE:**
> You must enter text in the Mold Number, Plant, Cell, and Machine boxes.

Machine Selection (Plant, Cell, Machine)
If you are entering a new machine into the system, type in a name for the Plant, Cell, and Machine. Refer to the Creating Naming Standards section for helpful tips. The machine names have the same restriction as the mold name.

If the machine you are running has already been entered into the system, simply use the combo boxes to select that machine. The software will automatically find the saved data. You can also type in the exact name of the existing mold to select it.

(Job Setup continued)

<u>Accept</u>
When all data has been entered, click the Accept button to start the job.

Start Job

If the user stops a job manually but no new identifying sensors are attached, the Job Setup screen displays only the uppermost region (hiding the mold and machine levels).

> **NOTE**
> **Auto Accept Timeout**
> <u>Auto Accept in: Seconds</u>
> Auto Accept Timeout is an override. If you do not tell the software to accept the current setup, it will automatically accept what is there when the timer runs out. Changing the autoaccept settings in the system. config file, then restarting the *eDART™* enables this. Contact RJG if you wish to enable this feature.

At this point, the "Start Job" button will become visible before the Required button. Hitting "Start Job" displays the mold and machine levels so you can choose a new job. This also causes the "Start Job" button to disappear.

When you type a new mold name in, any lower levels will be blanked out and their combo boxes will be emptied.

If you type in a name that matches a listing in the combo box for that level, the software treats this the same as selecting that combo box item

While you can type in names using upper and lower case, typing an existing name from the combo box in a different case will result in selection of the existing name with its original case.

The name for each level must be 36 characters long or less.
If you would like different level configurations on your Job Setup tool (e.g. no Plant or Cell field, or names other than Plant or Cell), contact RJG. This is done by changing settings in the system.config file, then restarting the *eDART™*.

Job Setup's Role in Software Configuration
It is important to note that the names (or numbers) you enter in the Job Setup tool form a sort of "recipe" or job setup that fully describes the mold and machine. The setups include pin sizes, machine size (screw diameter, etc.), control setpoints, alarm settings, etc. Job Setups also include which tools in the software run and which do not. Each setup you create is stored and can be re-accessed by choosing the correct entries from the combo boxes.

(Start Job continued)

Choosing Machines and Molds

The first thing you see when the *eDART™* software starts up is the Job Setup tool. This section will explain how to create job setups, choose machine and mold names, and provide some helpful tips.

Type in Mold # (or name) or select one from the drop down menu.

Optional - use if you use different materials or have multiple cavities

Type in Plant, Cell, and Machine names (numbers) or select them from the drop down menu

Key Concept 1: Creating a Job Setup
It is important to remember that the names (or numbers) you enter in the Job Setup tool form a sort of "recipe" or job setup that fully describes the mold, machine and, in the future, some auxiliaries. The setups include pin sizes, machine size (screw diameter, etc.), control setpoints, alarm settings, etc. Job Setups also include which tools in the software run and which do not. Each setup you create is stored and can be re-accessed by choosing the correct entries from the combo boxes.

NOTE:
The fields are not case sensitive so it doesn't matter if the name is typed in lower case or all caps.

In the illustration above "M248/ABS/8" is the setup for the current mold, "RJG/3/Arburg" is the setup for the current machine. Together, these form a Job Setup. At this point, you've set up one mold to run in one machine. To configure a new mold to run in this machine, simply create a new mold setup (Mold Number/Material/Cavities). If the *eDART™* controller is moved to a different machine, simply create a new machine setup (Plant/Cell/Machine).

(Start Job continued)

Different information is saved at the different "levels" you see on the screen. For example, the ejector pin sizes are saved with the mold name. So every time you run the same mold number (first level) you will get the same pin sizes, regardless of material or number of cavities. On the other hand, the alarm settings are saved with the mold/material/cavities combination. So if you change the material, for example, you will need to come up with new alarms that go with that material. Then whenever you switch materials, the job setup will control which alarm settings you get based on the material name.

Creating Naming Standards in the Job Setup Tool

1. It is important to create a standard for entering mold names, materials, cavitation, etc. If you enter the mold name "M 248" (with a space), it is a different mold than "M248" (without a space). Likewise, the material names "Valox-912" and "Valox 912" are different. If each of your setup personnel enters something different, the alarm settings, templates, and so on will not be available when they restart the job with the material of a slightly different name.

2. To avoid typing in a name incorrectly, use the combo boxes to select an existing entry instead of trying to type in what you think was last used.

3. Using the "Architect", you can create new molds and materials ahead of time so operators never have to type them in.

4. You can set up the security system to allow some users to select molds and machines but not allow them to create either.

5. The light blue fields are the minimum required fields. If you leave any of them blank, you will be prompted to fill them in.
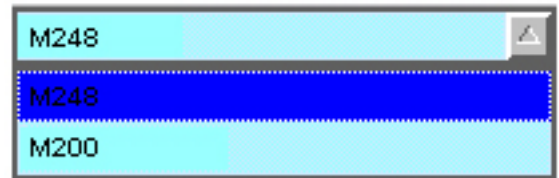
NOTE:
Do not drag the Architect button off the blue work area. The only way to access this tool is through the main menu so it must be enabled.

Step by Step Job Setup

When you enter the Job Setup tool and would like to choose a setup that has already been created, you must enter the correct combination of fields. You may want to keep track of each job setup as it is created to simplify this task.

1. Select a Mold Number (or name) from the current molds by clicking on the combo box arrow. If there are no molds listed, you will need to create one by typing it in.
2. If you use different materials on this mold, select (or type in) a material. This separates control setpoints, alarms, templates, etc. [OPTIONAL]
3. Different cavities: Cavities do not necessarily need to be a number. For example, in a family tool, you could call them "right half", "left half", "both halves", etc. In a multi-cavity tool with identical cavities, a number can be used. When a number is used, the software can use that information for parts counting. [OPTIONAL]
4. Enter a name or number for each plant. If you have a single plant, you will still have to identify it with a name or number.
5. If you are a portable user, you should consider setting up a machine name called "No Sequence" or some such for use on machine from which you have no sequence signals. This machine would have the Sequence Module inputs all set to "Not Used". So every time you start the machine, it would restore those "Not Used" entries so that you do not have to enter them yourself.
   Of course you will need to change the intensification ratio to the correct value (Machine Settings tool) every time you start the "No Sequence" machine. For more information on using the *eDART™* without sequence signals, refer to "How to Set up Machine Sequence Settings".
6. If your plant is set up in cells, simply name or number each cell: If not, you will have to make up a cell structure. If you would like this field to be removed, contact RJG.
7. Finally, enter a name (or number) for the machine you are using. When all information has been entered, click the Accept button.

Key Concept 2: Levels

Different information is saved at the different "levels" you see on the screen. For example, the ejector pin sizes are saved with the mold name. So every time you run the same mold number (first level) you will get the same pin sizes, regardless of material or number of cavities. On the other hand, the alarm settings are saved with the mold/material/cavities combination. So if you change the material, for example, you will need to come up with new alarms that go with that material. Then whenever you switch materials, the job setup will control which alarm settings you get based on the material name.

If you would like a different level arrangement on your Job Setup tool (e.g. no Plant or Cell field), contact RJG.

Machine Size

The Machine Size tool will appear after a new job is setup. Here you can scale all of the machine parts. The software uses the numbers in this tool to scale all of the machine variables to plastic pressure and volume.
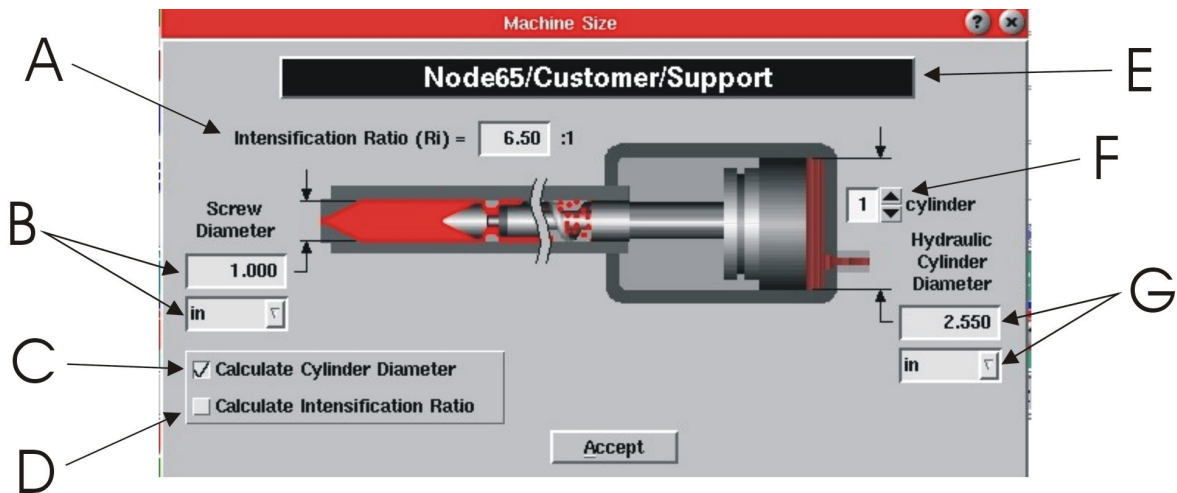
When the system detects a hydraulic sensor on injection or a force signal on injection (electric machines), it displays this tool for initial scaling.

A. Hydraulic cylinder area divided by the screw area
B. Enter screw diameter (barrel inside diameter) and the units
C. Check this box if you have entered the screw diameter and intensification ratio
D. Check this box if you have entered the screw diameter and the hydraulic cylinder diameter
E. This is the machine to which the *eDART™* is connected
F. Enter the # of the hydraulic cylinders that drive the screw
G. Enter the injection cylinder diameter and units

Title bar
Displays the tool name as in Machine Size followed by the names of Plant/Cell/Machine below the title bar.

Intensification Ratio
If you select the "Calculate Cylinder Diameter" check box on the tool, you enter the Intensification ratio and Screw Diameter. If you click Accept without entering either value, the following message is displayed (with the missing value listed).

If you select "Calculate Intensification Ratio" check box on the tool you need to enter Intensification Ration and Hydraulic Cylinder Diameter and Intensification Ratio is calculated automatically.

Screw Diameter
➢ Size: If you enter the size of Screw Diameter you need to enter Intensification ratio as well and it automatically calculates Cylinder Diameter. If you make any changes to your values, it recalculates the Cylinder Diameter.
➢ Units of Measure: If you select a different unit from the drop down combo box list, the Screw Diameter is recalculated on the basis of the changed units.
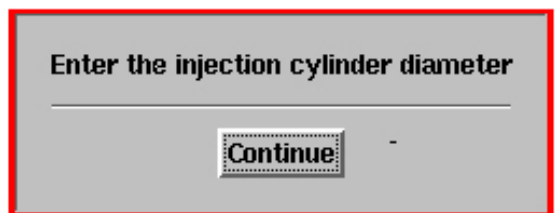
Calculate Cylinder Diameter
Check this box to enable Intensification Ratio input box so that you can enter a value. Also you need to enter Screw Diameter and Cylinder diameter is calculated.

Calculate Intensification Ratio
Check this box to enable Cylinder Diameter input box so that you can enter a value. Also you need to enter Screw Diameter and Intensification Ratio is calculated.

Number of Hydraulic Cylinders
Maximum limit is 4

Hydraulic Cylinder Diameter
If "Calculate Intensification Ratio" is checked, its input box gets enabled, so that you can enter the value. You also need to enter Screw Diameter and Cylinder Diameter is automatically calculated.
➢ Size
➢ Units of Measure- If you select a different unit from the drop down combo box list, the Cylinder diameter is recalculated on the basis of the changed units.

Accept
If all the fields are configured, it saves the configuration and closes the Machine Size tool.
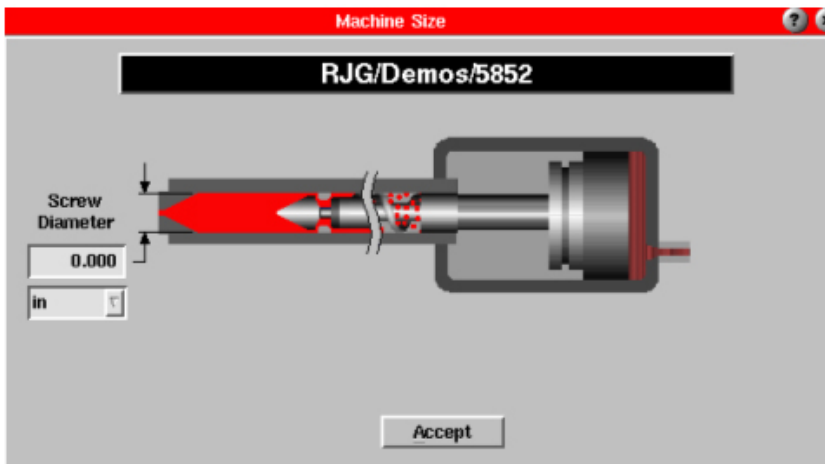

> **NOTE**
> If you have an electric machine producing a plastic pressure signal, you will only need to enter screw diameter.

The length of the numbers can be 9 digits or less. Any number with greater length rounds to 1000000000.00.

Ejector Pin Sizes

This tool is used to convert force on an ejector pin sensor (indirect) into plastic pressure. Use this tool on any mold that uses indirect sensors. You can use it on all molds and it will remain inactive if there are no indirect sensors.
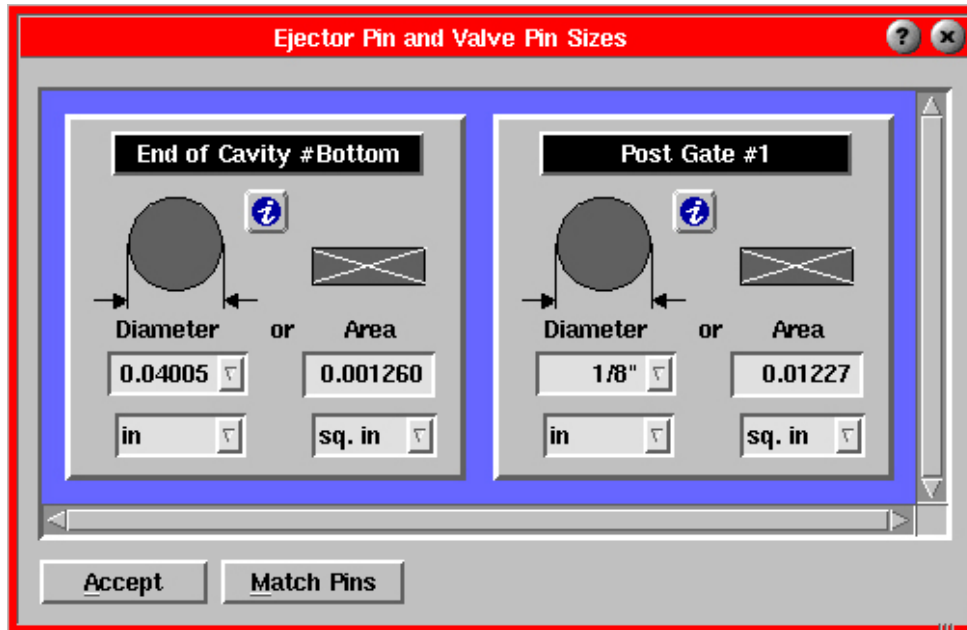
Set the pin diameter or area of the pin (if not round) so that the system can compute the pressure. The pin diameter may be selected directly from the list. You can select either a decimal value (0.134) or a fraction (5/64). Select the units in the bottom boxes. Click the Accept button when finished.

It is important that this tool is setup correctly in order for the software to accurately scale the sensors' output.

If you are using multiple sensors with the same pin size, enter the first pin size and click the Match Pins button to set the remaining pin sizes to match your first entry.

Zero Injection Pressure

Use this tool to manually set plastic injection pressure to zero.

You should only zero the pressure when the pumps are off and residual pressure has fallen to near zero. On a hydraulic machine, this function will zero the injection hydraulic pressure and, if found, the braking pressure. On an electric machine, it will zero the injection force load cell signal.
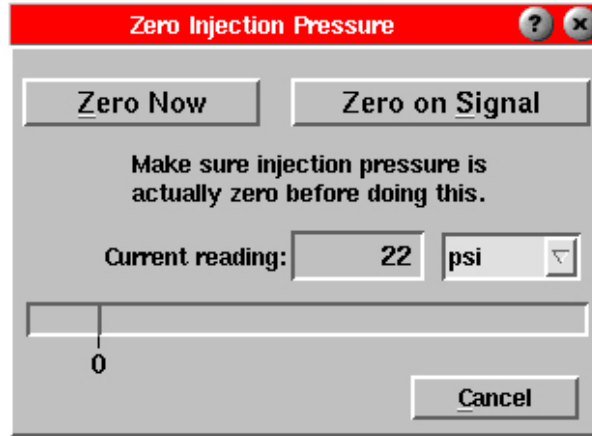
Zero Now
When you click this button, the injection pressure reading will be set to zero.

Only click this button if the pressure is actually zero. Otherwise, you will need to de-pressurize the system and set the injection pressure zero again.

You can start the zero again by selecting "Zero Injection Pressure" from the main menu.

When you zero the pressure, the system takes the current injection pressure value and calls that zero. It then subtracts the zero from the injection pressure as it reads it.

Zero on Signal
When you click this button, you will be prompted to select the signal and level at which to zero. These are sequence signals (e.g. Injection Forward, Screw Run, etc.).

Once you have chosen the signal and level, this program waits for that event and then zeros injection pressure.
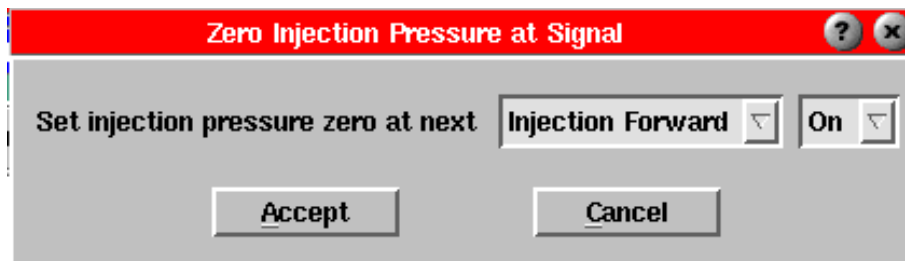
Use this feature if you have a machine that does not produce zero when the pump is off. Some electric machines have analog output signal levels well above zero when the machine is stopped. Also, on Arburgs with dynamic breaking (on which the *eDART™* measures both inject and braking sides) the zero level is hard to find. In most cases, zeroing at Injection Forward, On is sufficient.

(Zero Injection Pressure continued)

It is important to find a good zero because the measurement of effective viscosity will only be consistent between machines if they have the same zero.

Current
This is the value that goes into the computation of plastic pressure in the injection unit.

Units
These are the units for the current value and the level. When you switch units, the values appear in the new units.

Cancel
Click this button to exit the Zero Injection Pressure tool without zeroing injection pressure. You can zero the injection pressure later by selecting the tool from the main menu. Additional Information: If this tool is not available on the Main Menu, it can be launched and included in the Main Menu list from the Architect.

Set Screw Bottom

This feature allows you to set the screw bottom on the Cycle Graph. It should be in the setup section of the main menu.

Drive the screw all the way to the bottom and then click the Bottom the screw... button. Once, you have done this, the "Cushion, Shot Stroke" summary value can be used, to view in the Cycle Values tool for example or to monitor on the Alarm Settings for a warning.

The graph below shows the cursor at the bottom point relative to screw back (all the way forward).
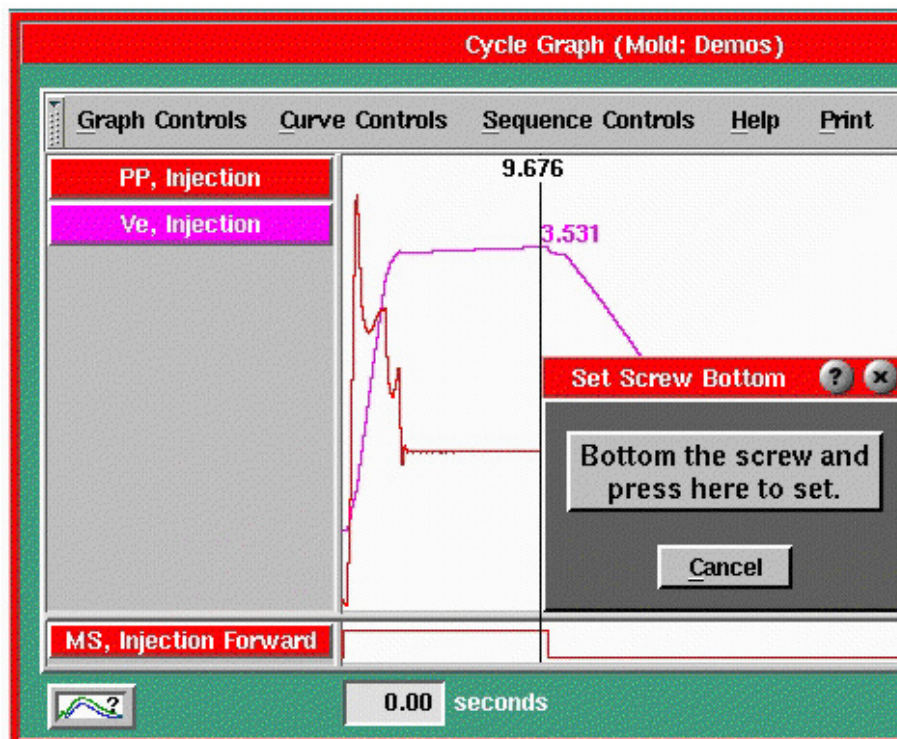
Setup Notes

This is a general-purpose note tool that allows you to enter information about the process, mold, or machine. It will automatically save each note in the appropriate place so that they are always available in the future. The contents of these notes are independent of the View in use. The contents "attach" to the process, mold, or machine regardless of the View.
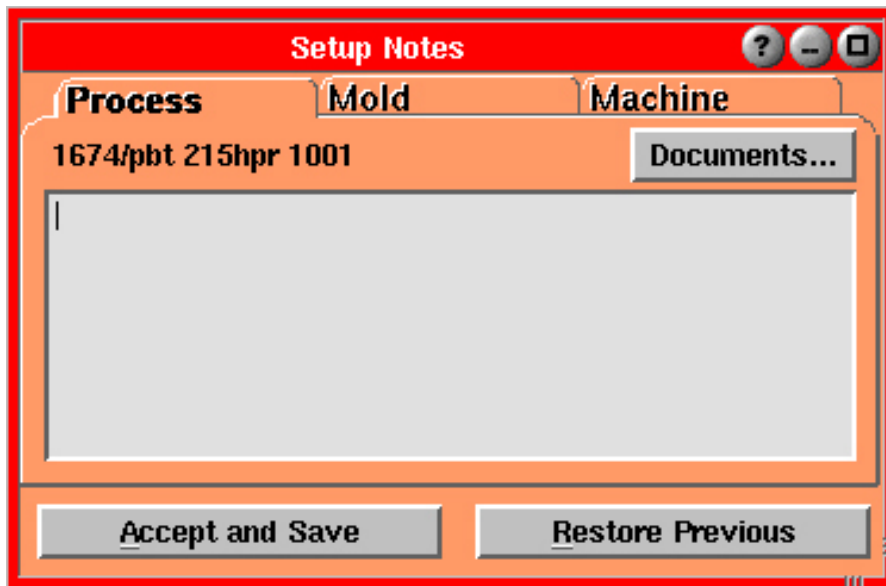
Process Notes
Any text you enter here gets saved with the "process". The process is the combination of mold, material, and cavitation layout. Use this tab to enter such things as melt temperature, required volumetric fill rate, pack rate, or notes about how the process performs.

Mold Notes
Any text you enter here gets saved with the "mold". The mold is just the mold hardware that gets used regardless of the material or cavity layout. Use this tab to enter such things as mold maintenance information, sensor/cavity layout information, etc.

Machine Notes
Any text you enter here gets saved with the "machine". These machine notes will be the same regardless of which mold you have installed. Use this tab to enter such things as operator instructions, machine maintenance information or peculiarities of setting up eDART™ based control (cavity pressure transfer).

Documents
Click to show a list of documents found in "mold" directory (usually plant/cell/machine). You can select any one of those documents to view in the Help Viewer. You can place any documents you wish into the directory to provide on-line documents of parts, setups, etc.

(Setup Notes Continued)

Accept and Save
Saves notes entered on all pages (folder tabs) in their appropriate places.

Restore Previous
If you have previously saved setup notes and then type or delete something by mistake, you can use this button to restore the previously saved notes.

How to Add a Document in the Setup Notes Tool

To add a document (or graphic) file to the Setup Notes tool, use FTP or Windows Explorer to find the desired directory. Copy the document or graphic file into this directory. The example below shows a graphic file copied into the Mold directory. This graphic will now be available in the Setup Notes tool under the Molds tab. The name on the pull-down menu will match the file name but without the extension (e.g. .html).

Some characters confuse the file system or the HTML browser and should **not** be used. These are as follows:

$? " & | * ` ~ \ / < > ' : , #

> **NOTE**
> Documents can include any files ending in html, jpeg, or gif. Graphic files show only the picture. HTM or HT<L files can show text as well as graphics as links. Graphics should be saved in 256-color form for speed. Larger sizes will slow down Phindows.
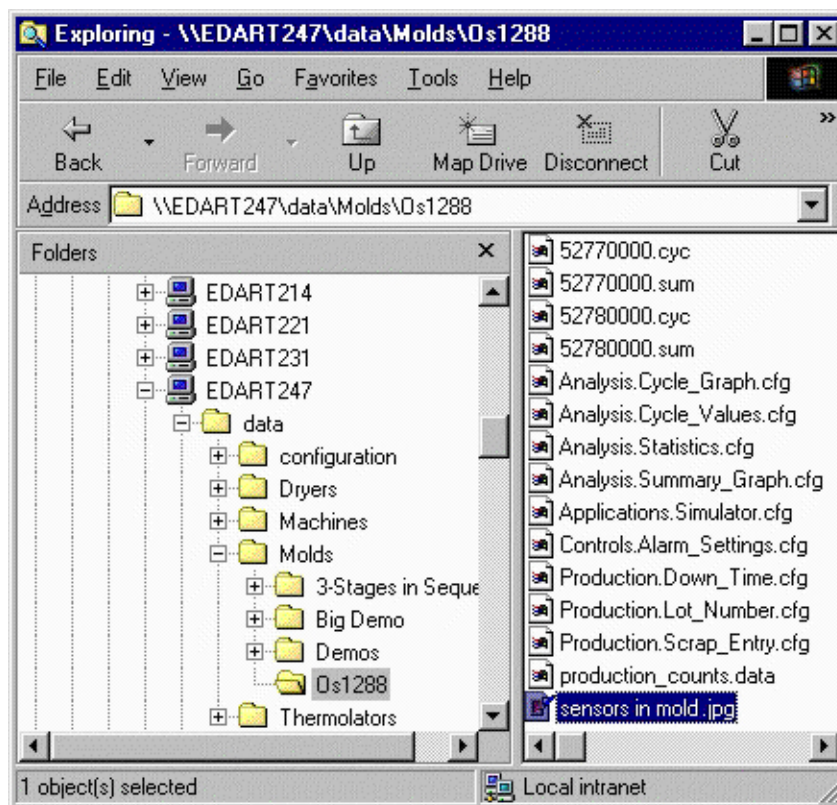
Analysis Tools

This section describes the features found in the Analysis Tools section of the *eDART™* software.

| In this section: |
| --- |
| ➢ Cycle Graph |
| ➢ Cycle Values |
| ➢ Summary Graph |
| ➢ Statistics |
| ➢ Core View Select |
| ➢ Virtual Light Tree |
| ➢ Shot Time Display |
| ➢ Flow Animation |

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Cycle Graph

The Cycle Graph provides a real-time graphical display of cycle data allowing you to compare the current cycle with typical cycles. Multiple measurements can be displayed on the cycle graph. Each curve corresponds to the button of the same color to the left.

The cycle graph is used to view sensor data, which shows the continuously changing values of pressure, volume, velocity, etc. in real-time. The numbers at the cursor are the values for each curve by color. You can overlay curves on the cycle graph to show how the process is changing or create a template to compare to the current process.
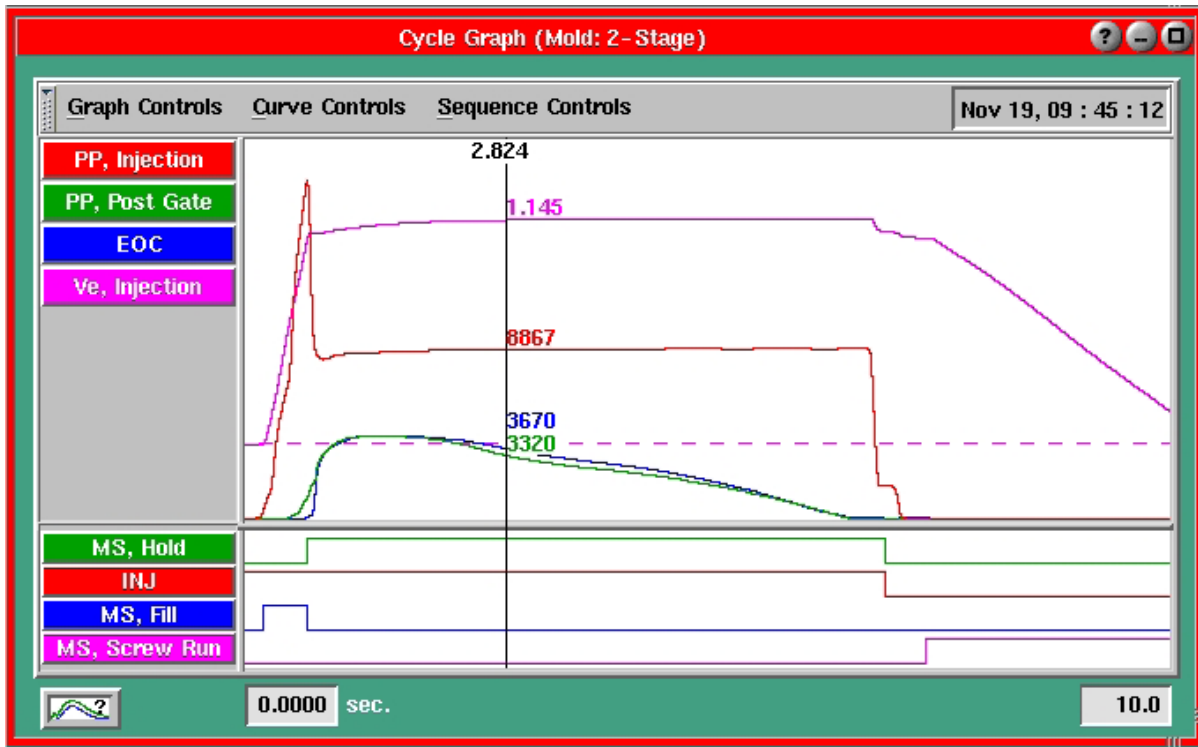
Title Bar
Displays title "Cycle Graph (Mold: <Mold Name>)" where Mold Name is the name of the current mold. Also provides Help (?), minimize (-) and Maximize (?) buttons on the right corner of the title bar.

Menu Bar
Provides buttons for four sub menus titled Graph Controls, Curve Controls, Sequence Controls and Help and also displays current Date and time stamp in the format "Dec 13, 13:16:12" on the right corner of the Menu bar. Menu bar can be hidden by clicking on the tab at the left corner of the bar and can be made visible again by clicking on the tab again.

Device Inputs
Inputs from Lynx devices (e.g. mold pressure, injection pressure, stroke, etc.) will be displayed in the upper section in real time, over time. Right clicking anywhere in this area will allow you to access the Graph Controls menu. Each curve corresponds with the button of the same color to the left. You will be able to access individual curve controls by right clicking on the corresponding button at the left or clicking on the Curve Controls button and selecting a specific curve. Either way, a Curve Controls menu will appear.

Machine Inputs

The bottom section will display various sequence signals and Machine Sequences that represent the state of the process through a cycle. Here, you can see when the sequence signals are going on and off. If the line goes high, the input is on. If the line goes low, the input is off. Each of these lines corresponds with the button of the same color to the left. You will be able to access individual Sequence Controls by right clicking on the corresponding button at the left or clicking on the Sequence Controls button and selecting a specific Machine Input. Either way, a Sequence Controls menu will appear.

By default, the Machine Sequences that are generated by the *eDART™* are usually shown. These can come directly from sequence signals hard wired to the machine or can be derived from injection volume and injection pressure sensor data.

Cursor

The vertical line on the cycle graph that displays the numerical values for each curve. Click and drag to move. The number on the top of the cursor indicates where in time the cursor is on the graph.

Divider Bars

The cycle graph is separated into four sections by moveable divider bars. Click and drag to expand or decrease the size of each section.

Time Scale

These two white boxes below the graph display the time scale that is on the cycle graph.
(Cycle Graph continued)

Graph Controls

The Graph Controls menu is used to manipulate the cursor on the graph and allows you to adjust the views, colors, etc. of the graph as well as add curves and create templates. This menu can be accessed in two ways:

➢ By clicking on the Graph Controls button.
➢ By right-clicking on the curve display area

Zoom

The Zoom menu allows you to view a portion or the entire curve. This helps you zoom in to a small area of the curve to see it in more detail. You can also zoom by simply right clicking and dragging on the graph.

Full Cycle

Full cycle shows you the full cycle based on the current cycle time.
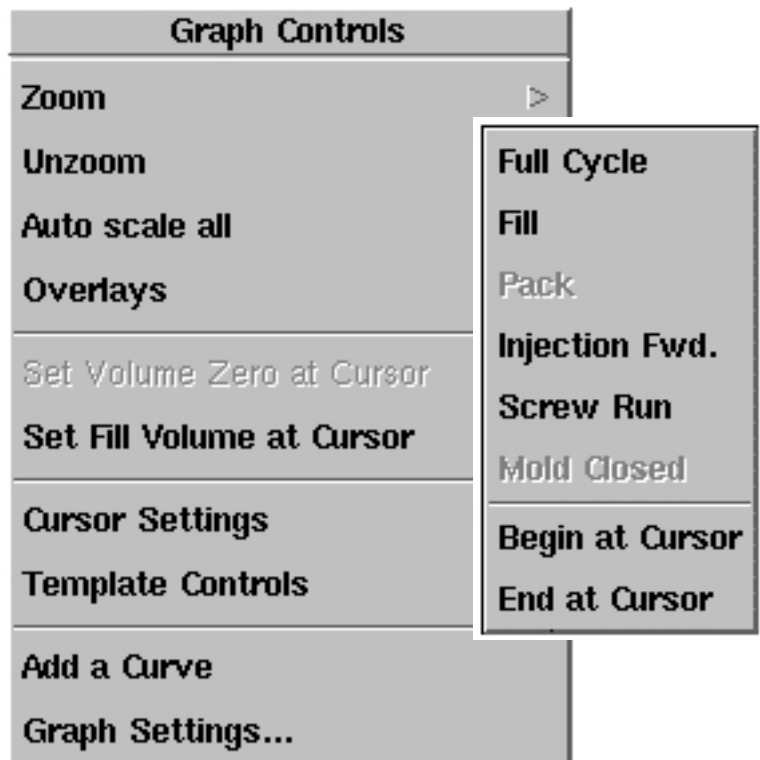
(Cycle Graph continued)

Fill
Fill will zoom to the cycle graph to show only what took place during the fill stage of the process. This is the time that the Fill sequence signal, if available, would be on or the time that you set up on the cycle graph (See "Set Fill Volume").

Pack
Pack will zoom the cycle graph display the fill and pack portions of the cycle graph. This only works if the pack time has been set.

Injection Forward
Injection Forward will zoom the cycle graph to show only what happened during the time the Injection Forward sequence signal was on.

Screw Run
Screw Run will zoom the cycle graph to show the cycle from the start to the end of screw run.

Mold Close
Mold Close will zoom the cycle graph to show you what happened during the entire time the Mold Closed sequence signal was on.

Begin at Cursor
Begin at Cursor when clicked will start the cycle graph display at the point the cursor is on the graph. The data that is in front of the cursor is not lost, but it will not be displayed on the graph.

End at Cursor
End at Cursor when clicked will end the cycle graph display at the point the cursor is on the graph. The data at the end of the cycle is not lost, but it will not be displayed on the graph.

Rezoom/Unzoom
Rezoom will take you to the last zoom that was used on the graph. Unzoom will take you to the entire view of the graph.

Auto scale all
Auto scale all is used to automatically set the vertical scale for all of the curves on the graph at one time.

Auto Scale from Last Cycle
This uses the last cycle to determine the full-scale values for the graph.

Auto Scale from This Cycle
This uses the current cycle to determine the full-scale values for the graph.

Auto Scale from Last Cycle

Auto Scale from This Cycle

☐ Scale Pressures to Injection

☐ Continuous Auto-Scale
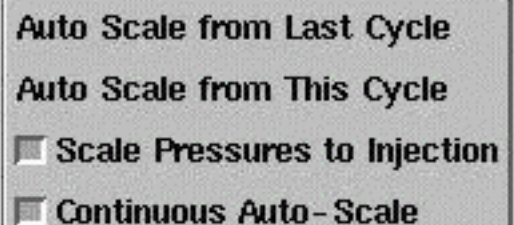
(Cycle Graph continued)

Scale Pressures to Injection
When you check this box, Scale Pressures to Injection is used to set all of the pressure curves on the graph to match the scale of the injection pressure. This shows you the pressure losses across the mold in a graphical sense.

When the box is not checked, autoscaling will set the scale differently for each curve so that all curves are easily viewable.

Continuous Auto-Scale
When you check this box, Continuous Auto-Scale will rescale all of the curves on the graph each cycle based on the current curve.

Overlays
Overlays allow curves to be placed atop one another so that the current cycle can be compared with past cycles.
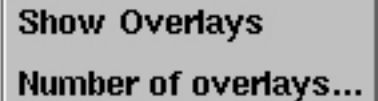
Hide/Show Overlays
Show Overlays will show the overlays. This option can be enabled in the "Number of Overlays" selection. Hide Overlays will remove all overlays from the graph.

Number of Overlays
Number of Overlays is used to set the number of overlays that will be displayed on the graph. You can choose to display a certain number of previous cycles or all future cycles as overlays.
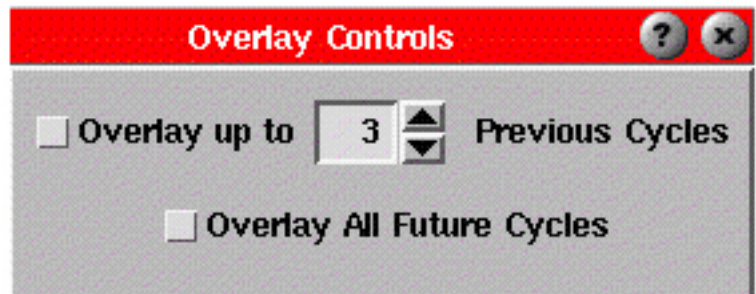
Set Volume Zero at Cursor
If you do not have a Screw Run sequence signal, the stroke zero point has to be set manually. Set Volume Zero at Cursor is used to tell the software where to set this zero position. This option will be grayed out if you do have a Screw Run sequence signal because the software will automatically zero the volume at the end of screw run. For further details, see Set Volume Zero in the Getting Started section.

Set Fill Volume at Cursor
Set Fill Volume at Cursor is used to tell the software the injection volume at which the fill stage ends if you do not have a Fill sequence signal. This option will be grayed out if you do have a Fill sequence signal because the software will know when fill ends.

Cursor Settings
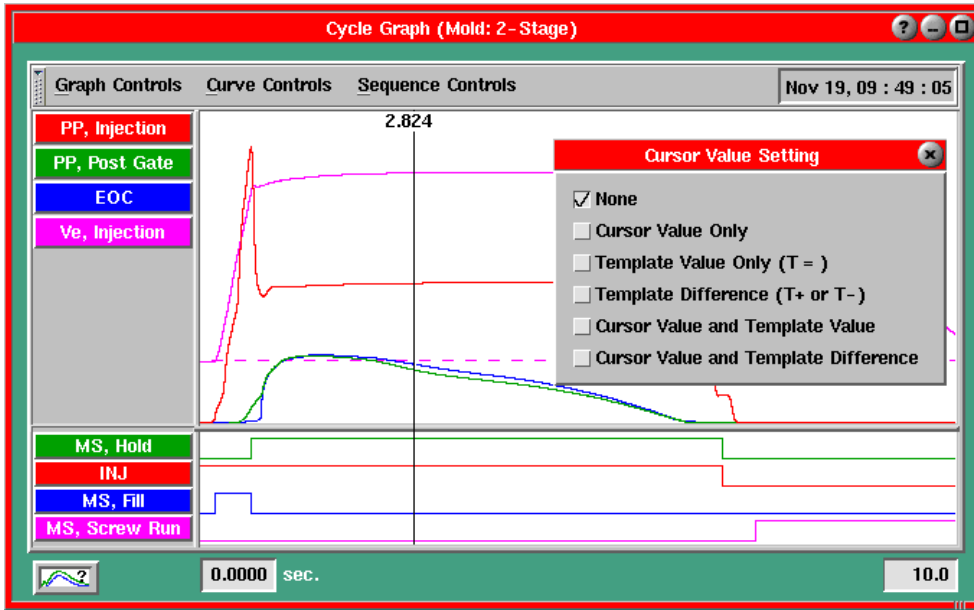Use this option to manipulate the cursor on the graph.

➢ Hide/Show Cursor will hide or show the cursor on the graph.
➢ Cursor Display allows you to display cursor values, template value, template difference, or no values at all on the cursor.
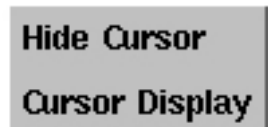
(Cycle Graph continued)

Cursor Display
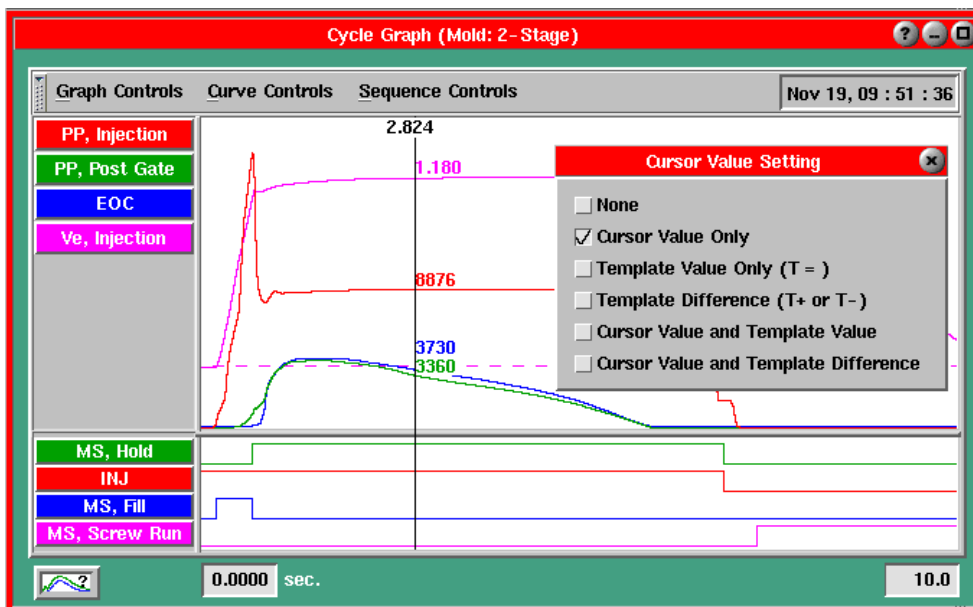From the Cursor Value Setting menu, you can choose to display different values on the cursor.

None
The first option, None, will not display any values on the cursor.

Cursor Value Only
The Cursor Value Only option will show only the value for each curve at the cursor.

NOTE
If the selected value (or difference) is not available, it will be replaced by a "?".
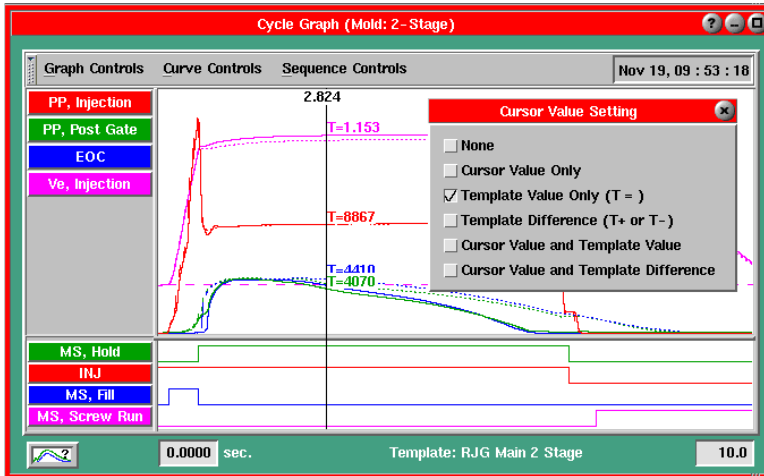
(Cycle Graph continued)

Template Value Only
The Template Value Only option will show only the value for each curve's template at the cursor.
Template Difference

The Template Difference option will show the difference between the cursor value and the template value. T-9 would mean that the current cycle is 9 units lower than the template value. T+90 indicates that the current cycle is 90 units higher than the template value.
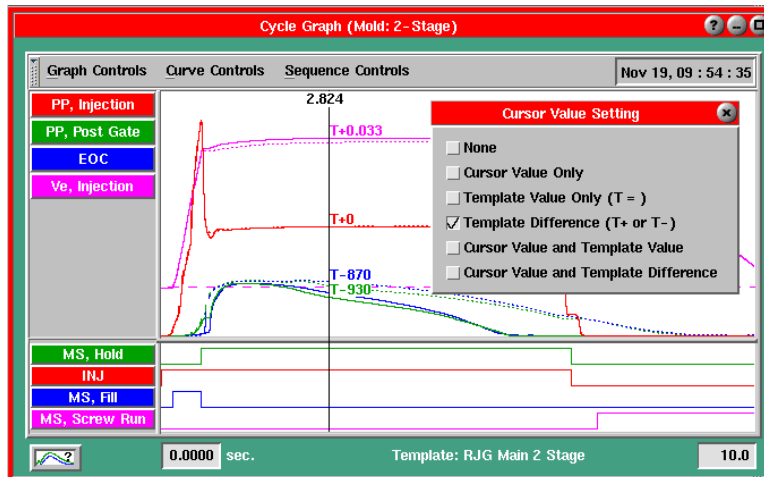
Cursor Value and Template Value
The Cursor Value and Template Value option will display both the cursor value and the template value for each curve.

(Cycle Graph continued)

Cursor Value and Template Difference
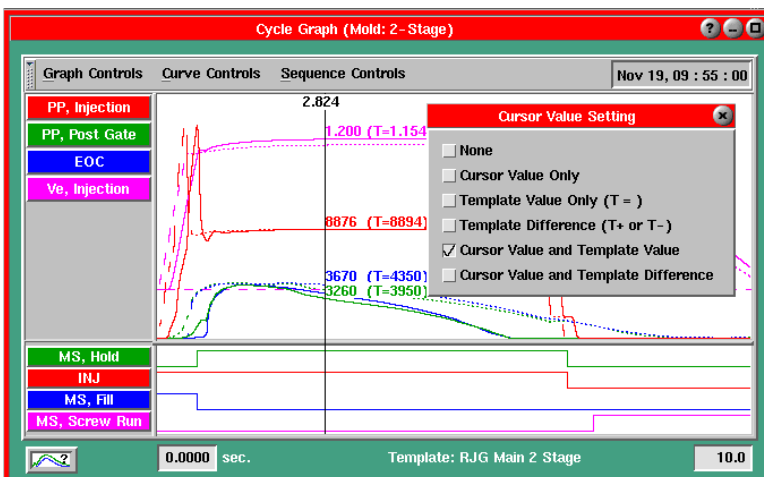The Cursor Value and Template Difference option displays both the cursor value and the difference between the cursor value and template value (See Template Difference above).
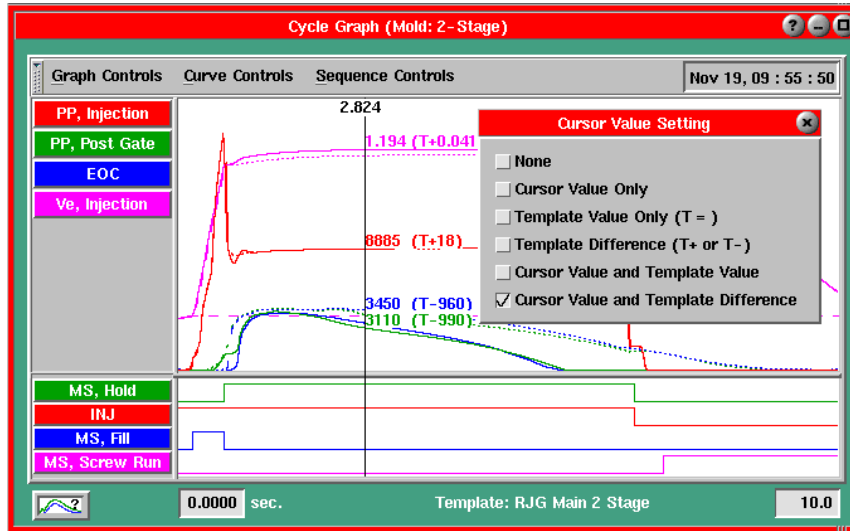
Template Controls
Use the menu options below to select a previously created template, set up a new template, adjust template shift on the graph, or manage all templates. See below for a full description of each selection.

From the Template Controls menu, you have the option of creating templates, selecting previously created templates, correcting template shift, and managing all templates.

You also have the option to "Hide/Show" the selected template curves on the graph and to "Match Sensor Names" on the template with current sensors if they are not named identically.

Select Template
If you have already created templates, you can select the one you would like to use by bringing up the Template Select tool.

Highlight the template you would like to use.

Click this button to turn individual curves on or off (or match changed sensor names).

Click to save changes and apply the selected template.

Click this button to select a template from a different process.

Click to close this window without saving any changes

Select Template
Displays the templates that are available and the date each was created. Click the name with the mouse to select the template (highlight in blue).

Selected Template Description
Displays the template description that was saved when the template was created.

Show Template on Graph
Check this box to view the selected template on the Cycle Graph.

(Cycle Graph continued)

Current Curves Shown
Takes you to a screen where you can choose which template curves are displayed and which are not. If sensor names have changed since the template was created, you can match the sensor names saved with the template with current sensor names (See Matching Sensors below).

Other Processes
Allows you to select a template from a process other than the one that is currently running. From the expanded screen, highlight the desired directory and select a template. You will be asked whether you want to copy the template to the current process. If you close and reopen the Template Select screen, you will need to click the Other Processes button again to see the template selection in the list, although the template name will be displayed as the "Current Template".
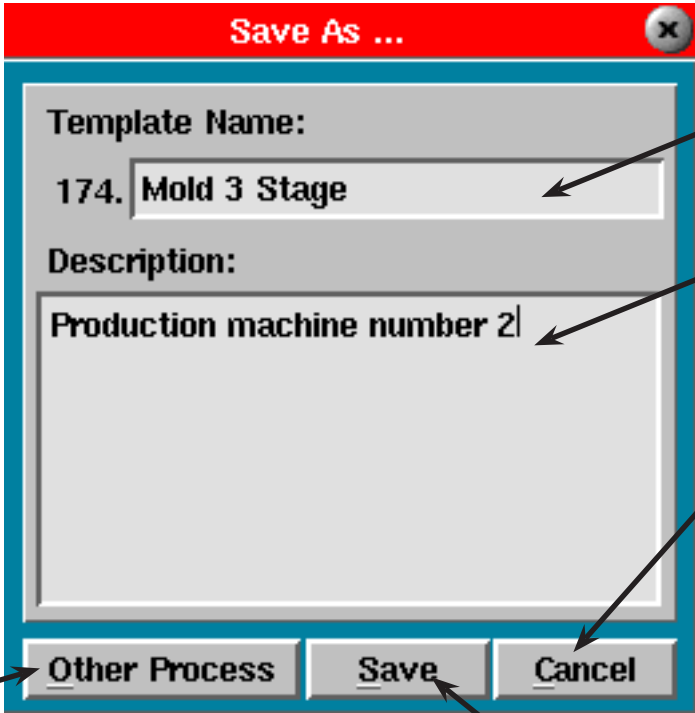
Cancel
Will close the screen without saving any changes.

Accept
Saves changes and applies the selected template to the Cycle Graph.

Save Template
The Save As feature allows you to save a template or "blueprint" of a process that you would like to compare following processes against.

Name your template here

Describe your template here (optional)

Cancels any changes made

Click this button if you would like to save your template with a different process

Saves your template

NOTE
When you save a template, it will be applied to the Cycle Graph at the end of the current cycle.

Template Name/Description
In the Save As screen, name and describe (optional) the template. Some characters are restricted because they confuse the file system.

(Cycle Graph continued)

These include such things as the asterisk, question mark, pound sign (#) and others. Restricted characters simply will not type.

Other Processes
Click this button to save this template to use with other processes other than the one that is currently running. A directory will appear where you can choose where you would like to save the template.

> **NOTE**
> The date is automatically saved with the template so there is no need to enter it when saving a template.

Template Shift
If you have a stroke/velocity encoder and an accurate zero for stroke (at end of screw run), you shouldn't have to use this feature. Once you create a template and run with it on the same machine, the cavity pressure templates will remain aligned with the current cycle relative to start of fill.

The scenarios below describe situations in which you may have to use the Template Shift feature to keep your template aligned with the current cycle.

Check this box if your process now has a stroke sensor and good zero

Shift Template

Shift template from...

☑ Fill start by   ◀─ │ 0.74 │ +▶ sec.

or

☐ Cycle Start by   ◀─ │ 0.00 │ +▶ sec.

Check this box if your process currently has no stroke sensor input

Use these buttons to shift the template right or left on the graph
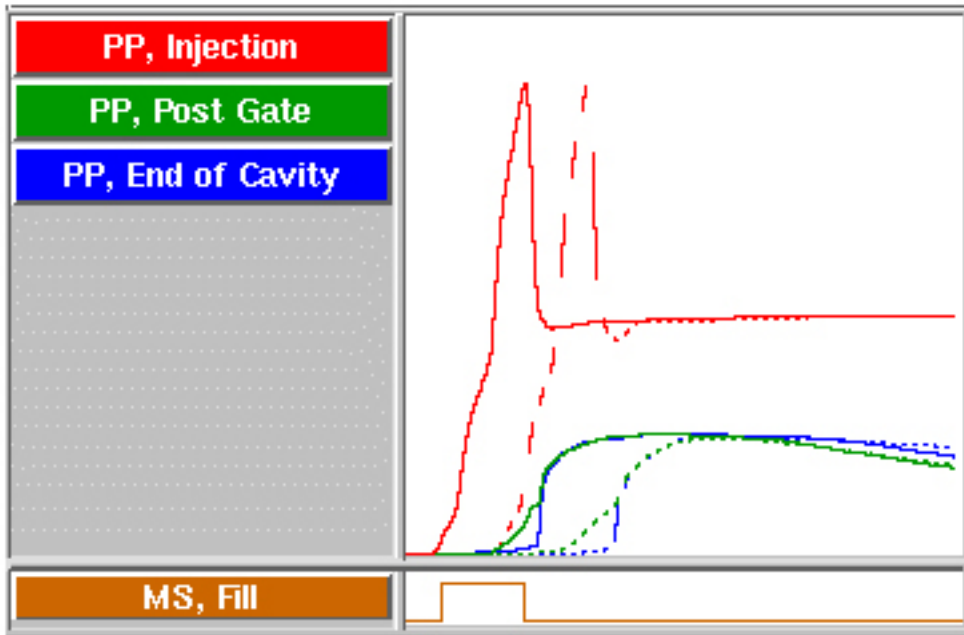
➢ You've set up your process using a stroke sensor and later remove the stroke. In this case, use the "Cycle Start" check box and adjust the template on the graph using the "+" and "-" arrows.

➢ You've set up your process and run without using a stroke sensor. In this case, use the "Cycle Start" check box and adjust the template on the graph using the "+" and "-" arrows.

➢ You've set up your process without using a stroke sensor and later add stroke. In this case, use the "Fill Start" check box and adjust the template on the graph using the "+" and "-" arrows.

➢ You've set up you're process using a stroke sensor and move the template to a machine without a stroke sensor. In this case, use the "Cycle Start" check box and adjust the template on the graph using the "+" and "-" arrows.

"Fill Start": Aligning templates with start of fill works best. If there is any time shift in the start of fill (decompress or injection start delay variation) then the templates will automatically shift to the same time relative to the start of fill. The zero crossing on stroke is the time (as near as can be measured) at which the plastic actually starts flowing into the mold.

(Cycle Graph continued)

Manage Templates

To manage any template across the system, use the Template Management screen below. When accessed, the templates saved with the current process will be displayed on the right side of the screen. To access templates saved with other processes, simply choose a folder from the left side of the screen and highlight the level that contains the desired template(s).

Once a template has been selected, it can be edited, deleted, and copied using the buttons across the top of the screen.
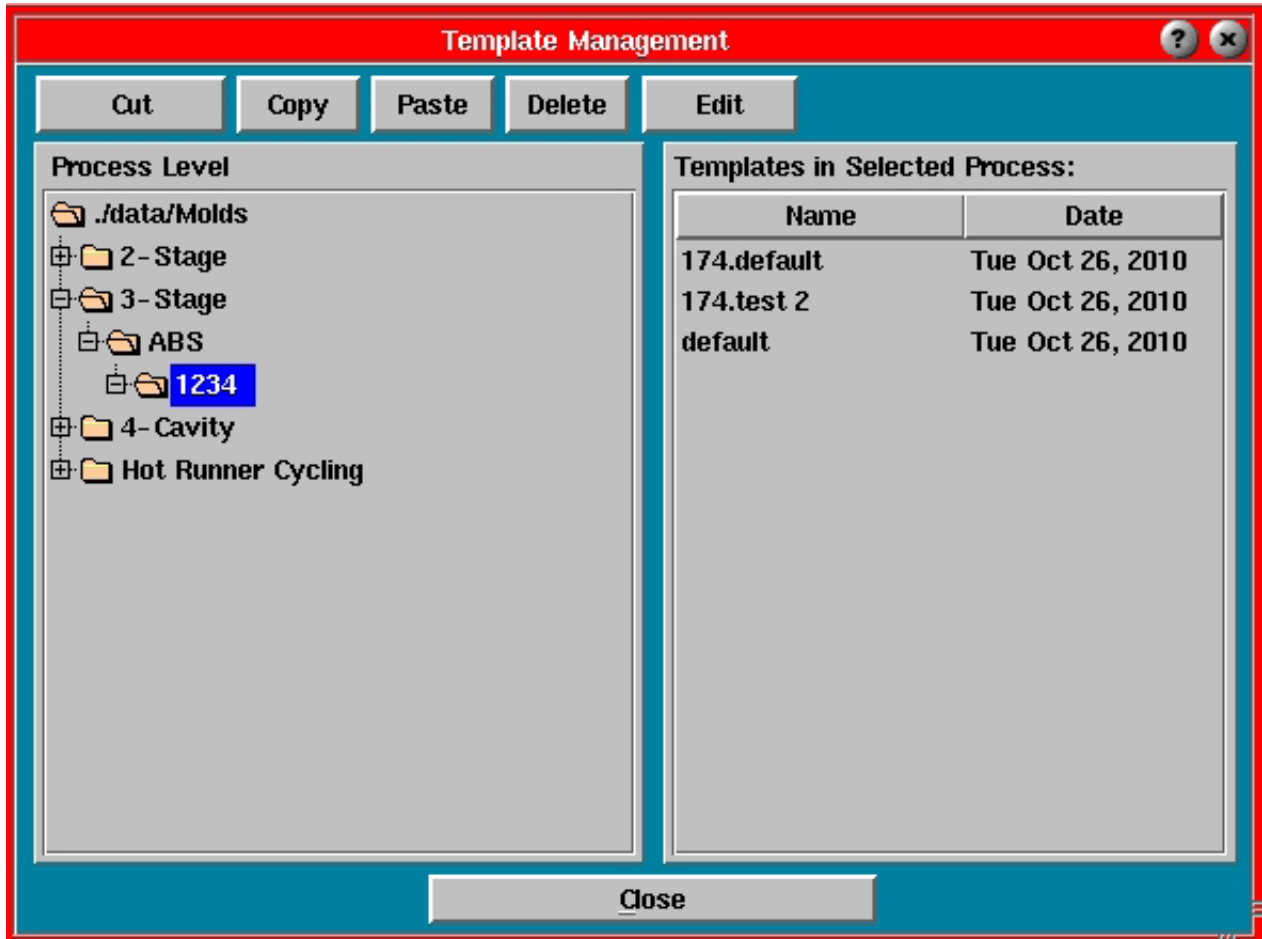
Hide/Show Template Curves

In the Template Select screen, click the Current Curves Shown button to bring up the Show/Match Sensors screen.

Highlight only those curves that you would like to be displayed on the Cycle Graph.

Click this button to match the curves currently on the Cycle Graph to the curves saved with the selected template

Click this button to cancel any changes and return to the Cycle Graph

Click this button to save any changes and return to the Cycle Graph
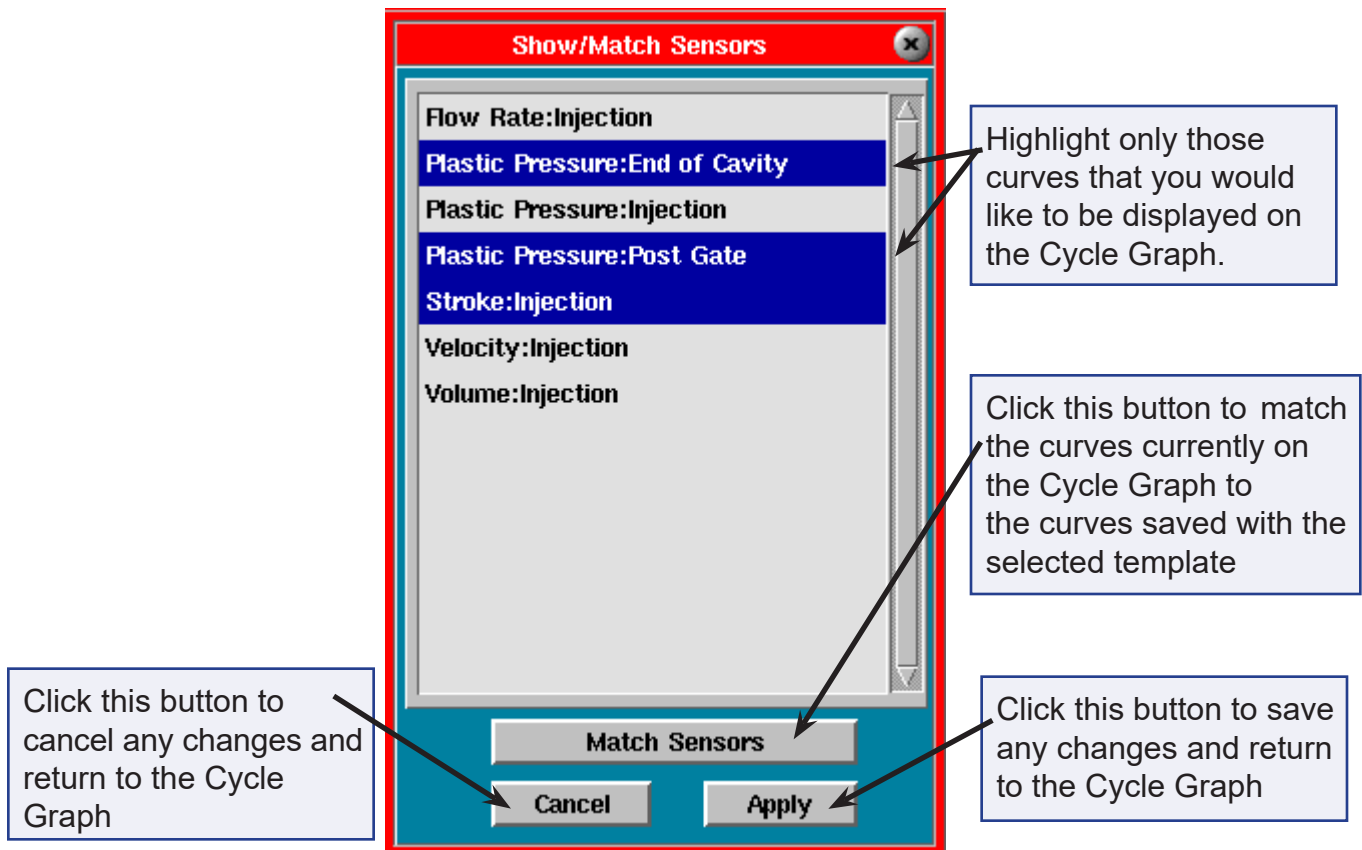
Here, you will see a list of all sensors included in the template you've selected.

To view any or all of these sensors on the Cycle Graph, simply highlight the name(s) and click Apply.

To remove any curve from the cycle display, click that curve to un-highlight it.

(Cycle Graph continued)

Match Sensors

If the sensor names in the selected template are different from the actual sensors available, use this screen to match the names. To bring up this screen, in the Show/Match Sensors screen, click the Match Sensors button. Click the combo boxes to match the sensor to each template curve to the left.

NOTE
This only needs to be done once for any template.

These are the actual sensors that are currently available. Click on the drop down boxes to match the sensor to each template curve to the left.

These are all of the curves that were included in the template you've selected.

Show/Match Sensors

Template Curves	Actual Sensors
Flow Rate:Injection	Flow Rate:Injection
Plastic Pressure:End of Cavity	Plastic Pressure:End of Cavity
Plastic Pressure:Injection	Plastic Pressure:Injection
Plastic Pressure:Post Gate	Plastic Pressure:Post Gate
Stroke:Injection	Stroke:Injection
Velocity:Injection	Velocity:Injection
Volume:Injection	Volume:Injection

Hide Match Sensors

Cancel   Apply

Click this button to collapse this screen and only show the list of template curves.

Click this button to cancel any changes and return to the Cycle Graph

Click this button to save changes and return to the Cycle Graph.

(Cycle Graph continued)

Add a Curve
Add a Curve will bring up a screen where you can add a new curve by type and location. Click the *Apply* button after adding a curve if you plan to add another curve. Click *Apply & Close* if you are finished.
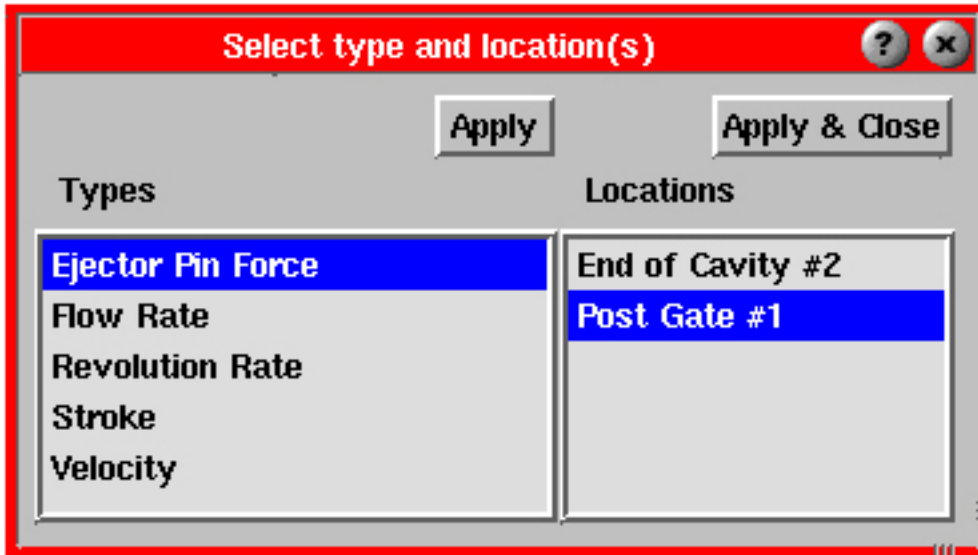
Graph Settings
Will bring up a menu where you can modify the default settings of the cycle graph.

Hide/Show Machine Sequence
Will hide or show the Machine Sequences and buttons. To view the Machine Sequences again, click Graph Settings, Show Machine Sequence.

Background Color
Background Color will bring up a color palette where you can change the graph's background color. Simply click on the color you would like and it will automatically be applied. To change the color, repeat the previous steps. Here you can also set the chosen color as a standard color or to modify preset standard colors.

Flip Graph
Flip Graph will flip the graph so that the curves appear from right to left instead of left to right.

Tick Marks
Tick Marks will place tick marks on the graph for easy measurement. To clear the tick marks, click Graph Settings, Tick Marks, Hide Tick Marks. You may also choose to alter the tick mark spacing and height.
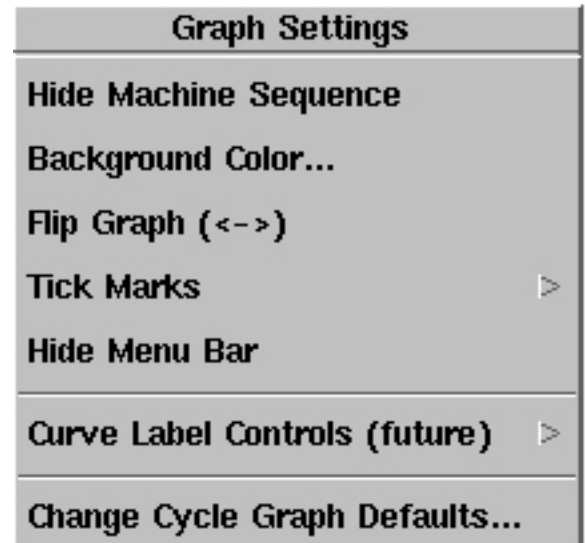
Hide/Show Menu Bar
The Hide Menu Bar selection will hide the horizontal gray menu bar along the top of the cycle graph. This can also be done by clicking on the small tab on the left side of the menu bar. To bring the menu bar back, click the same tab.

Curve Label Controls
This feature is still in development.

Change Cycle Graph Defaults
This allows you to change defaults such as standard curves and colors across the system.

Curve Controls
The Curve Controls menu will list all of the curves you have chosen to monitor. By clicking on any curve in the list, you will bring up a Curve Controls menu for that particular curve. The Curve Controls menu below shows the PST curve. Alternatively, clicking on a curve button will bring up its Curve Controls menu.

PST (Plastic Pressure, Post Gate)

INJ (Plastic Pressure, Injection)

EOC (Plastic Pressure, End of Cavity)

PST Curve Controls

Set Graph Scale

Curve Color...

Show Zero Line

Add Another Curve

Remove This Curve

Set V -> P Xfer
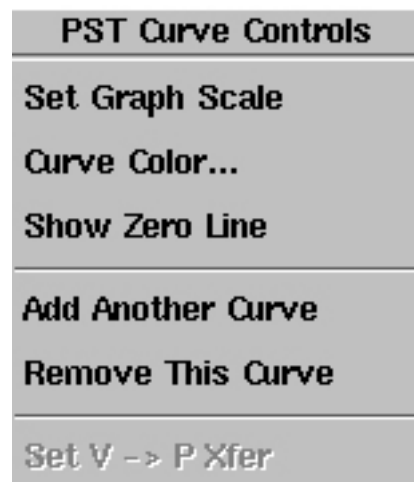
Set Graph Scale
Set Graph Scale will bring up a window where you can manually set the scale for the vertical axis for the selected measurement.

INJ Scaling

Graph Max: 12200

Graph Min: 0.00

psi
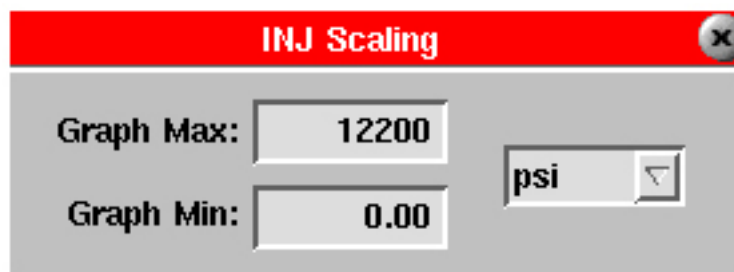
Curve Color
Curve Color will bring up a color palette where you can change the curve color. Simply click on the color you would like and it will automatically be applied. Here you can also set the chosen color as a standard color or modify preset colors.

Hide/Show Zero Line
Hide/Show Zero Line will hide or show the zero line on the cycle graph. The zero line is a dashed line that shows where the "zero" value is. This is useful when the minimum scaling is not zero (e.g. injection volume).

Add Another Curve
Add Another Curve allows you to add a curve to the cycle graph.

Remove This Curve
Remove This Curve removes a particular curve from the cycle graph.

Set V -> P Xfer
Move the cursor to where you want the machine to transfer then click "Set V->P Xfer". The Velocity to Pressure Transfer Control tool must be running. The cavity pressure value at the cursor for the control sensor will be entered into the V -> P tool. This has to be enabled through the Architect.

Sequence Controls
The Sequence Controls menu will list all of the Sequence Module inputs and Machine Sequences you have chosen to monitor. By clicking on any input/sequence in the list, you will bring up a Sequence Controls menu for that particular input or sequence. The SCREW Sequence Controls menu is shown below. Alternatively, clicking an input/sequence button (on the left side of the screen) will take you directly to the Sequence Controls menu for that particular input or sequence.
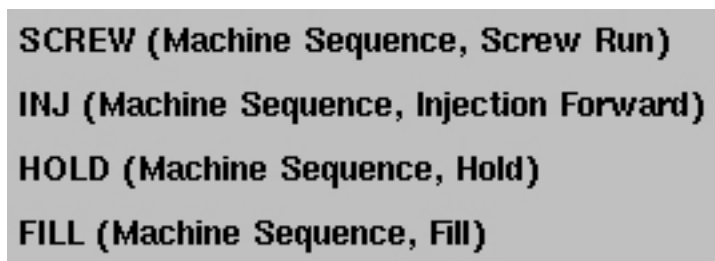
Trace Color
Trace Color will bring up a color palette where you can change the color of each input/sequence. Simply click on the color you would like and it will automatically be applied. To change the color, repeat the previous steps. Here you can also set the chosen color as a standard color or to modify preset colors.

Add a New Sequence Trace
Add a New Sequence Trace allows you to add a new Sequence Module input or Machine Sequence to monitor.

Remove Trace
Remove Trace will remove the selected input/sequence from the cycle graph.

(Cycle Graph continued)

Machine Sequence Controls
You can right click on the graph section of Machine Sequence and pull up the Machine Sequence
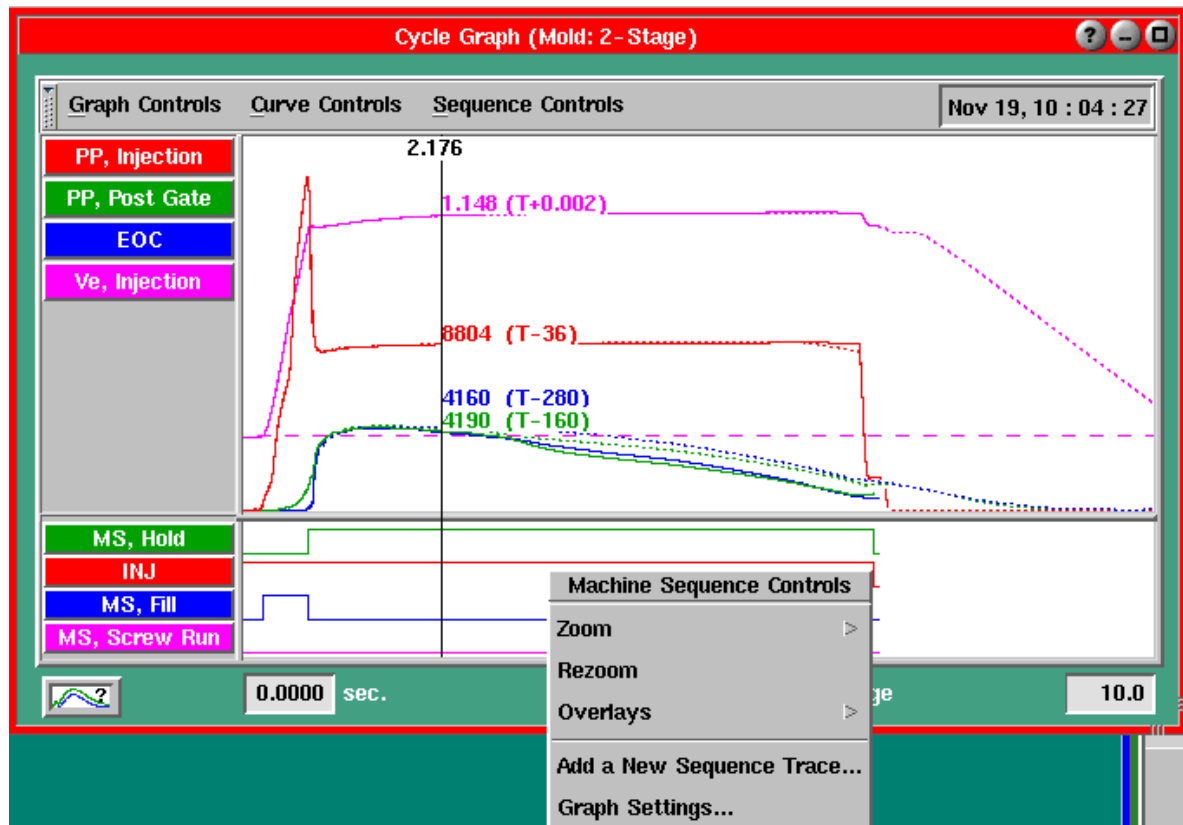
Control.
By default, the Machine Sequences that are generated by the *eDART™* are usually shown. These can come directly from sequence signals hard wired to the machine or can be derived from injection volume and injection pressure sensor data.

(Cycle Graph continued)

Cycle Graph Defaults
Cycle Graph Defaults can be accessed through the "Graph Controls/Graph Settings/Change Cycle Graph Defaults" menu selection. This will launch the Cycle Graph Defaults dialogue.
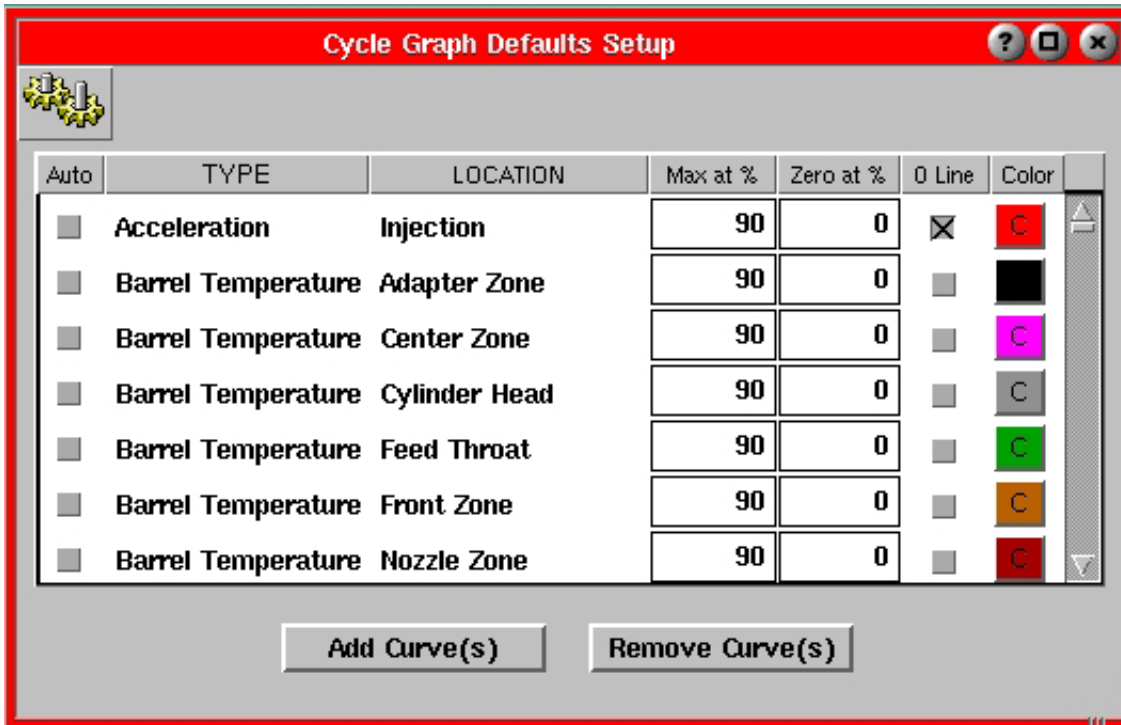
The Cycle Graph Defaults Setup lists individual sensor types, including a default list of the most common sensors and a list of any sensor names that have run on the eDART™ in the past. The scroll bar can be used to access each of these sensors. Any changes made to Cycle Graph Defaults will be applied the next time the cycle graph restarts. The options for each sensor are:

Auto-Add
Select the "Auto" check box to display an "x" for any sensor you wish to auto-add. This will be applied the first time a sensor appears on a mold (a new sensor type on and existing mold or any sensor on a new mold). It will also be applied to any sensor on an existing mold if the "Auto" selection has just been added to a sensor type. Note that only one "Auto" check box will only appear for each sensor type: location and different Ids (e.g. Plastic Pressure, End of Cavity 1 and Plastic Pressure, End of Cavity 2). De-selecting the "Auto" selection will not result in a curve being removed from the Cycle Graph. Also, a curve previously displayed, then removed from the Cycle Graph will not be Auto-added.

Type
This displays the sensor type for each sensor.

Location
This displays the sensor location for each sensor.

(Cycle Graph continued)

Max at %
This setting defines the autoscaling function for each sensor. When the Cycle Graph is autoscaled, the peak data for the sensor will be placed at this percentage of the vertical axis scaling.

Zero at %
This setting defines the autoscaling function for each sensor. When the Cycle Graph is autoscaled, the zero line for the sensor will be placed at this percentage of the vertical axis scaling.

0 Line
Checking this line displays the zero line on the Cycle Graph for this sensor.

Color
This changes the color of the graph displayed on the Cycle Graph.

Add Curve(s)
Add Curve(s) will bring up a "Select Type and Location" tool from where you can add a new sensor by type and location in the list of sensors in the "Cycle Graph Defaults Setup" screen. Click the Apply button after adding a sensor if you planning to add another sensor to the list. Click Apply & Close if you are finished.
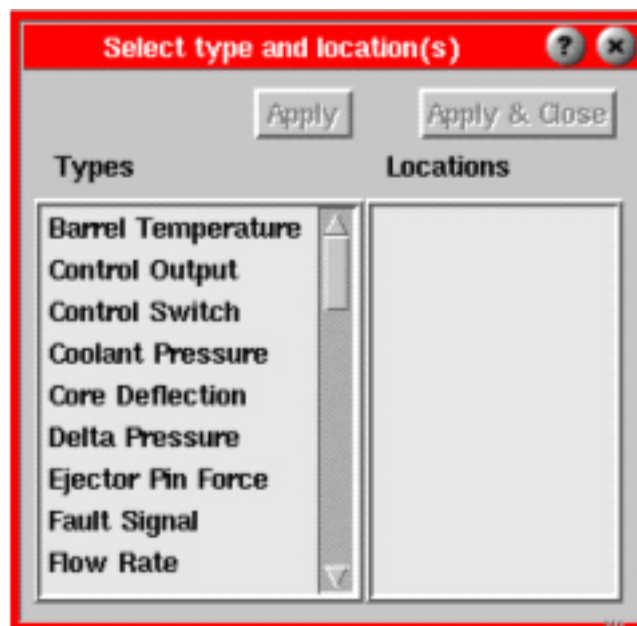
Remove Curve(s)
This features allows you to remove one or more measurements from the list of sensors in the "Cycle Graph Defaults Setup" screen.

(Cycle Graph continued)

Note that you can sort each column by clicking on the label for that column. This can make it easier to find a specific sensor you are looking for in the list.

The Cycle Graph Default settings for each sensor's "0 Line" and "Color" will also be updated if the zero line is displayed directly on the Cycle Graph as described in I.3, or if the color is changed in I.2.

Notes on "Max at %" and "Zero at %": If "Zero at %" is set higher than "Max at %", the graph will be inverted. Also, as an example of how these values work together, if the "Max at %" is 80, the "Min. at %" is 20, and the peak pressure for this curve is 6,000 psi, the Graph Max would be 8000 psi and the Graph Min. would be –2000 psi. Finally, the "Max at %" and "Zero at %" settings for cavity pressure sensors are ignored if "Scale Pressures to Injection" is selected. Here, the Graph Max and Graph Min. are set to the same settings as the Plastic Pressure, Injection curve.

Cycle Values

The Cycle Values tool displays current values for selected cycle graph variables like peak pressures and cycle integrals. Here you can compare the current cycle to a template that may be displayed. You can also display values here that are not being displayed on the summary graph.

Cycle Values (Mold: 3-Stage)					
Template: 174.Normalized					
Cycle Value	Value	Template Value	Diff.	Units	
Pack Rate, Post Gate	**5092**	14350	-64.52 %	psi/s	▽
TM, Viscosity Change	**-9.43**	0.00	0.00 %	percent	▽
Template Match, Mold	**75.76**	0.00	0.00 %	percent	▽
Template Match, Post Gate	**78.96**	0.00	0.00 %	percent	▽
Template Match, End of Cavity	**75.76**	0.00	0.00 %	percent	▽
Template Match, Machine Setup	**94.17**	0.00	0.00 %	percent	▽
Peak, End of Cavity	**3790**	4474	-15.28 %	psi	▽
Injection Integral, End of Cavity	**6433**	8170	-21.27 %	psi-s	▽
Injection Integral, Post Gate	**6805**	7735	-12.02 %	psi-s	▽
Peak, Flow Rate	**3.831**	3.359	14.06 %	cu. in/sec.	▽
Add a Value	Remove Value(s)	☑ Show change as %			

Template
The Template shows the current template that is being used. The selected template will also appear on the Cycle graph tool. Select a Template from the Cycle graph Template controls/Save Template option.

Cycle Value
The Cycle Value column shows you the values that you are displaying. All of the values are being stored, but may not be displayed.

Value
The Value column shows you the current value for its corresponding measurement to the left. This value is for the current cycle on the screen. If a "?" appears in this column, the source of the cycle value may have gone invalid (sensor removed, etc.) For "real-time" values this number changes continuously with the input coming in.

(Cycle Values continued)

Template Value

This is the value of the number when the template is selected in the "Template:" box was saved. If no template is selected (Template: none), the vale will be zero. Also, if the value was not available when the template was first saved, it will show zero.

Difference

The Difference column will show you one of two things. If the "Show change as %" box is <u>not</u> checked, you will see a value that represents the template minus the current cycle. If the "Show change as %" box <u>is</u> checked, you will see a percentage that represents the difference in the template and the current cycle.

Units

The Units column shows you what the units are for the given value.

Add a Value

The Add a Value button is used to add a value that is not currently being monitored. In the Select type and location(s) tool, you can select additional values to monitor.
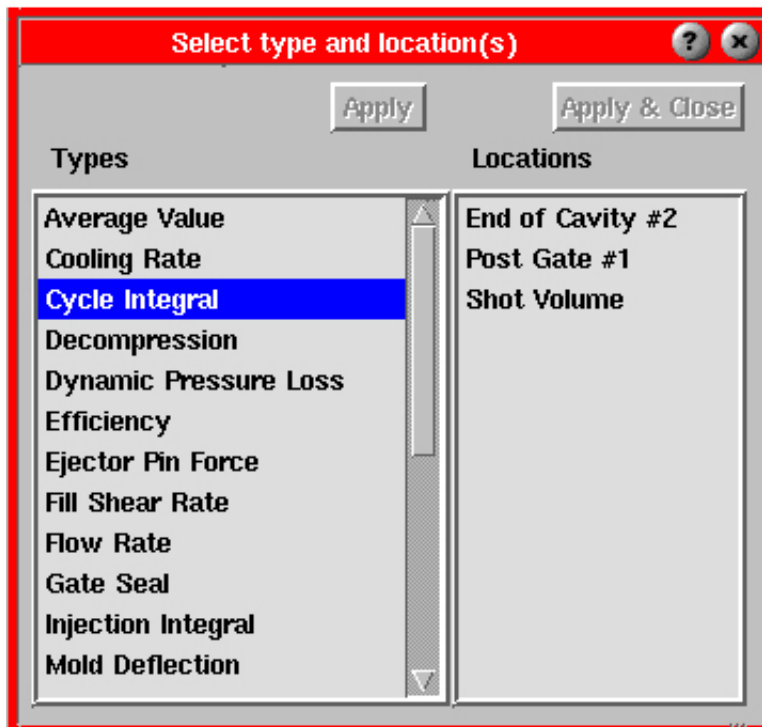
<u>Types</u>

The Types column lists all of the types of values that are available for all of the measurements that are on the system. If a type that you are trying to set is not in the list, it may already be in use or may not be available with the current measurements.

<u>Locations</u>

The Locations column lists all of the places the chosen alarm could be applied. If a particular location does not appear in the list, it may already be in use or may not be available with the current set of measurements.

(Cycle Values continued)

Apply
The Apply button allows you to apply the currently selected value or values without closing the tool. This allows you to select multiple values at one time.

Apply & Close
The Apply & Close button will apply the currently selected values and close the tool.

Remove Value(s)
The Remove Value(s) button allows you to remove the selected values. Highlight the value you would like to remove and press the Remove Value(s) button. The values are not permanently gone, but will not be displayed.

Show Change as %
The Show change as % button changes whether the Difference column shows the actual numbers difference in the template and the actual cycle or the percentage that the current cycle differs from the template.

Summary Graph

The Summary Graph provides a graphical display of summary values allowing you to view trends and alarm conditions. Multiple summary value trends can be displayed here at one time. A summary value is a single number (data point) for each cycle; i.e. peak cycle integral, cycle time, etc. The cursor can be moved on the graph by left clicking on the point you want the cursor to move to. Zoom in on a particular area of the graph by right clicking and dragging on the area you would like to zoom.

Click on Graph Controls and Curve Controls buttons to reveal drop down menus. You can also access the Curve Controls menu by right clicking on the curve display area.
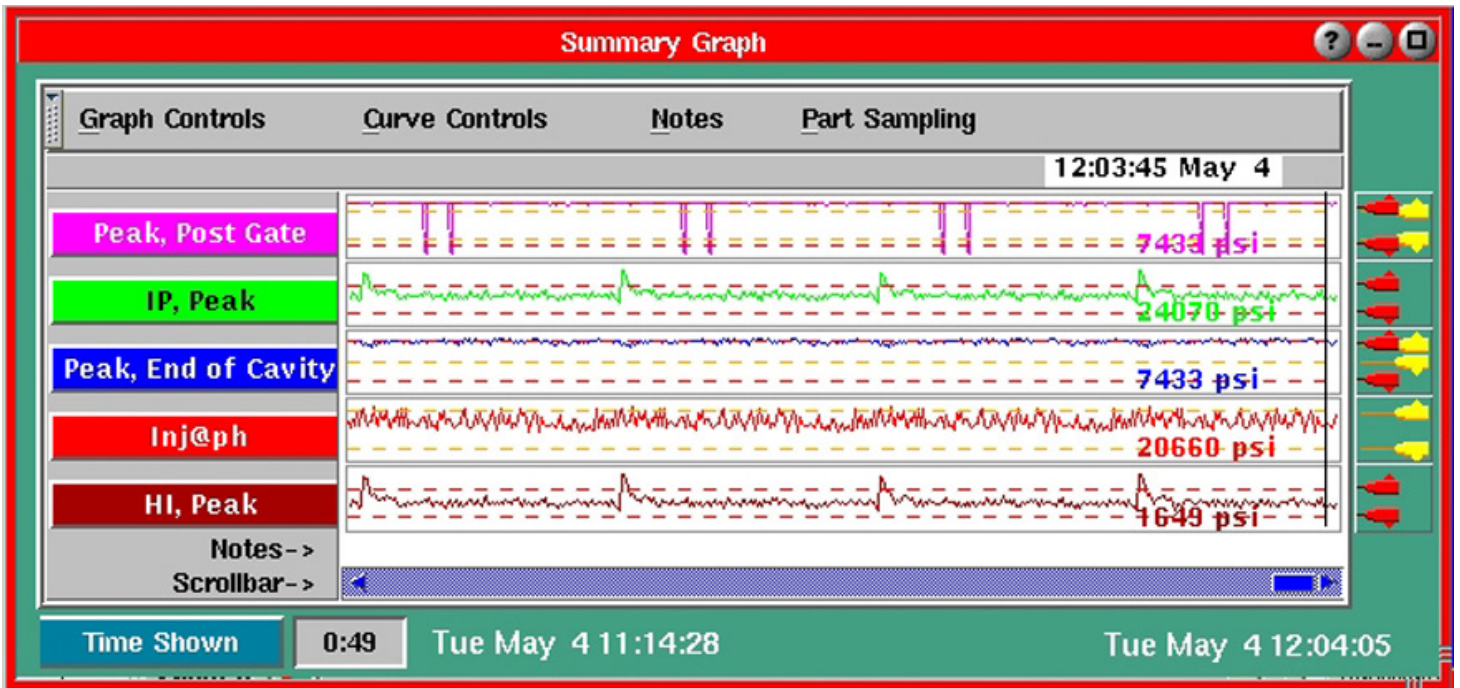
Title Bars
The title bars at the left indicate what curves are on the graph and their colors. To the right, all of the summary curves will be displayed. Here, you can move the cursor to see values for different points.

Menu Bar
Displays the Menu options: Graph Controls, Curve Controls, Notes and Part Sampling. Each of the option except Part Sampling, when clicked, displays the submenu from where more options can be selected as desired. When Part Sampling option is clicked, it brings up the Part Sampling tool. Each option along with its submenu options, is discussed in details in its corresponding section.

On the left corner of the Menu bar is a tab icon with the down arrow, which allows the user to hide Menu Bar, if desired.

(Summary Graph continued)

Graph Controls

The Graph Controls are used to modify the summary graph. The menu can be accessed by clicking on the Graph Controls button or right clicking on the graph.

Zoom/Unzoom

The Zoom/Unzoom option zooms in or out on the graph to the minimum or maximum number of points or time you are displaying.

Auto Scale All Curves

Auto Scale All Curves is an option that continually changes the scaling of the summary curves to ensure that all points on a curve will be displayed. Auto scale has two options: On or Off.

Overlay Curves

Overlay Curves allows you to overlay all of the curves on the graph. This will help you see if some or all of the curves correlate to one another.

Start at Cursor/Start With All Data

Start at Cursor will hide all of the data before the cursor time. Start With All Data will reset the summary graph to include all data.

Add A Curve

The Add A Curve button allows you to add a new curve that is not currently being monitored. A "Select type and location" tool will appear where you can add a new curve to monitor by its specific type and location. After selecting a curve, click Apply to apply the selected curve. Click Apply & Close to apply the curve and return to the summary graph.
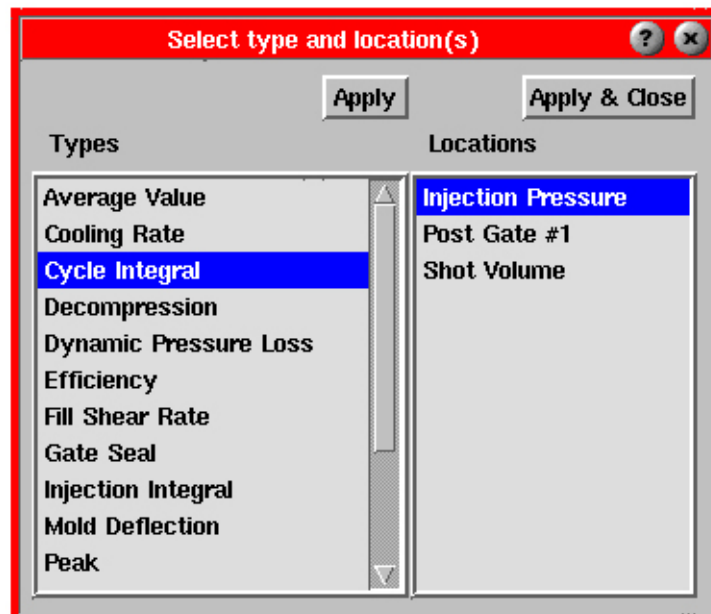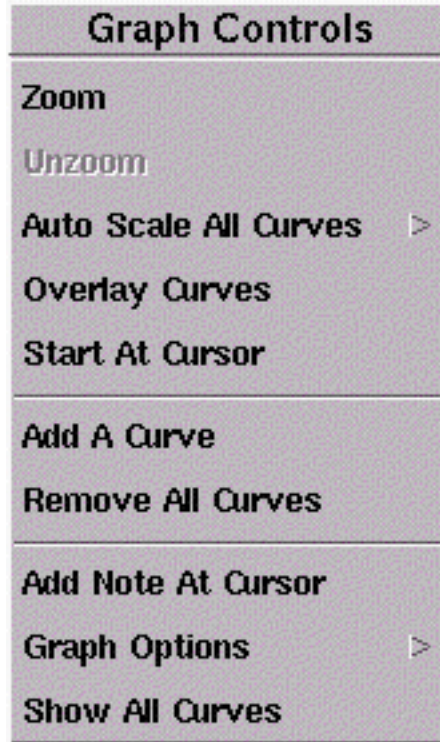
(Summary Graph continued)

Remove All Curves
Removes all curves on the graph.

Add Note at Cursor
Allows you to add a note where the cursor is on the graph. The note will appear on the bottom of the screen as a small tab. To view the note, simply click on this tab.

Graph Options
These options will be applied to all curves on the graph.

Hide/Show All Cursor Units
Will hide or show the units for all values on the cursor. These units will be displayed next to the cursor, for the point that it is on, for each curve.

Hide/Show Alarm Lines
A red dashed line will hide or show the alarm lines that have been set for all curves.

Hide/Show Warning Lines
A yellow dashed line will hide or show the warning lines that have been set for all curves.

Show Min./Max Data Values
Will show the minimum and maximum values for each curve above and below the title bars on the left.

Change Cursor Color
Change Cursor Color brings up a color palette where you can select the color of the cursor.

Change Background Color
Change Background Color brings up a color palette where you can select the screen's background color.

Flip Graph
Flip Graph gives you the option of flipping the graph so that it charts right to left instead of left to right.

Refresh Display
The Refresh Display is used if the tool becomes locked up or does not seem to be displaying the data correctly. This button will reset the graph to the full amount of points.

(Summary Graph continued)

Change Defaults
This tool allows you to change defaults such as standard curves and colors. This tool can also be launched from the Architect by clicking on the summary graph tool where defaults settings can be changed.

The column headings can be clicked to sort the fields (wherever applicable).

Auto Add
If you click this column field for a Type and Location combination then that summary measurement would appear automatically on the Summary Graph tool every time you start a job. Any changes made in the curve during a particular session gets saved and when the job is restarted or Refresh Display is selected from the Graph options, the curve displays all the changes made in the previous session.

Type
Lists the Type of available sensors.

Location
Lists the available location for a sensor type.

Auto %
Allows the user to set the Auto scale percentage to a level between 1 to 99.

Color
Allows the user to change the color of the title and curve of a summary measurement.

Every time the job is restarted the title and curve of a particular summary measurement would appear in the color set in this tool. Later, during a session, you can change the color if you want.

Auto	TYPE	LOCATION	Auto %	AutoSc	Color	Order	
X	Sequence Time	Fill Time	75	X	C		0
▪	Peak	Injection Pressure	75	X	C		0
▪	Cycle Integral	Injection Pressure	75	▪	C		0
▪	Injection Integral	Injection Pressure	75	▪	C		0
▪	Fill & Pack Integral	Post Gate	75	▪	C		0
▪	Effective Viscosity	Fill	75	▪	C		0
▪	Value at V1->V2 X	Shot Volume	75	▪	C		0
▪	Value at V->P Xfer	Shot Volume	75	▪	C		0
▪	Average Value	Hold Pressure	75	▪	C		0
▪	Pack Rate	Post Gate	75	▪	C		0
▪	Cooling Rate	Post Gate	75	▪	C		0
▪	Static Pressure Lo	Inj. to Post Gate	75	▪	C		0

(Summary Graph continued)

Order
Allows the user to set the order of the summary measurements from top to bottom on the Summary Graph Display Window. The arrows on the right or order box allow you to select from 0-32, where zero can be set for no particular order.

Every time a job is started, summary measurement set for an order number appears in the same order with respect to other summary measurements.
(Summary Graph continued)

Show All Curves
After you've selected "Show This Curve Only" option from the Curve Controls menu, select Show All Curves to bring back the "hidden" curves.

Curve Controls
Each curve has its own Curve Control menu where its properties can be changed. These menus can be accessed in two ways:

Curves List
EOC in (Cycle Integral, End of Cavity)
INJ pk (Peak, Injection Pressure)
F&Pk t (Process Time, Fill & Pack Time)

➢ By clicking the Curve Controls button. This will bring up a Curves List menu, which lists of all of   the curves that are on the graph. Click on any curve to bring up a Curve Control menu for that particular curve.

➢ By right clicking on the title bar for any curve. This will bring up a Curve Control menu for that particular curve. The menu shown is the Curve Control menu for an End of Cavity curve.
(Summary Graph continued)

Set Curve Color
Set Curve Color will bring up a color palette where you can set the color of that particular curve.

EOC in Curve Control
Set Curve Color
Auto Scale Off
Set Curve Scale...
Add New Alarm
Add New Warning
Add A Curve
Move Curve ▷
Remove This Curve

(Summary Graph continued)

Set Curve Scale
Set Curve Scale will allow you to set the scale for the graph. It also gives you the option to auto scale the summary graph. This will take the values on the graph and set a maximum and minimum all of the time.

Graph Max
Graph Max is the maximum value that will show up on the summary graph. This represents what the very top of the graph would be. Any data values greater then this would be off the top of the graph. This value can be entered manually if Auto Scale on/off is unchecked. Valid range of values is -1000000.00 To +1000000.00.

Graph Min.
Graph Min. is the minimum value that will show up on the summary graph. This represents what the very bottom of the graph would be. Any data values less than this would be off the bottom of the graph.

This value can be entered manually if Auto Scale on/off is unchecked. Valid range of values is -1000000.00 To +1000000.00.

Units
If this option is on, the cursor will display the Graph Max/Min. in the chosen units. To change units, simply click on the down arrow button and select the proper units from the list.

Auto Scale Percentage
Auto Scale Percentage will allow the auto scale to be set to use a percentage of the available space. If this is set to 80 then 10% of the drawing space at the top of the graph and 10% of the drawing space at the bottom of the graph will not be used. Check the "Auto Scale On/Off" to force the graph to rescale OR wait until the next cycle completes.

The percentage value can be entered manually by clicking the box and entering the value OR by using the up and down arrows on the box. Range is 1- 99.

Auto Scale On/Off
The Auto Scale On/Off check box is used to turn the auto scale on and off for that summary value only. This will not auto scale all of the values.

(Summary Graph continued)

Auto Scale On/Off
Allows you to turn the auto scale function on and off.

Add New Alarm or Add New Warning
Add New Alarm will add both a high and low alarm around the 6 sigma values for the selected value. Warnings are added around the 3 sigma value (by default). Refer to Alarm Settings for details about how the Alarm Settings tool chooses alarms and sort switches.

Alarm settings are indicated by the red indicators, which appear on the right side of the selected curve with red alarm lines representing the upper and lower alarm levels. Allows you to set Alarm and warnings which can be modified by manually dragging the upper and lower alarm indicators and changes can be seen on the Alarm Settings tool.

To remove an Alarm/Warning, you need to bring up the Alarm Settings tool and remove it there.

Add A Curve
Add A Curve is used to add a curve that is not on the graph.

Move Curve
Allows you to move a particular curve on the graph. Simply choose which direction you would like the curve to be moved.
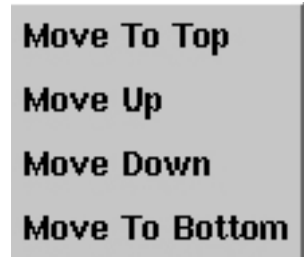
Remove This Curve
Remove This Curve will take the curve off the graph. The curve is not permanently deleted, but will not be displayed.

Show This Curve Only
Will remove all curves except the one you have selected.

Notes
The Notes button brings up a Notes Menu where you can choose to add a note on a certain point on the summary graph. Position the cursor on the graph where you would like to add a note and click "Add Note at Cursor". A small text window will appear where you can type a note. For each note you create, a small tab will appear above the scroll bar. Whenever you would like to view a note, simply click on the appropriate tab. To delete or edit a note, right click on its tab and choose either "Delete Note" or "Edit Note" from the menu.
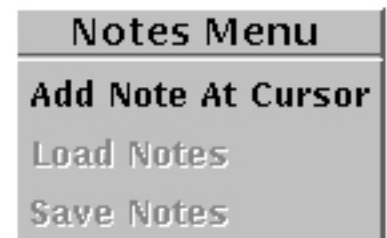
Part Sampling
This button will bring up the Part Sampling tool. Refer to the Part Sampling section of the Manual for further information.

(Summary Graph continued)

Summary Graph Display Window
The summary measurements at the left indicate what curves are on the graph and their colors. To the right, corresponding summary curves will be displayed. Here, you can move the cursor to see values for different points, add an Alarm, add not at cursor etc.

If you click on a summary measurement on the left, the Curve Control options for that.

Scrollbar
The scrollbar beneath the graph allows you to quickly move across the display window from the oldest data to the newest data. When you move the slider all the way to the right it will track the latest data as it arrives, also the slider bar will turn into the color green. When the slider bar is moved to any other position then the right end the slider turns blue and will stay on the data being displayed and not track. Must scroll all the way to the right to begin auto scrolling as new data arrives.

The dates and times below the scrollbar indicate when the data starts and stops.

Cycle/Times
Click on the button to change the information being displayed to the right.

Cycle Total
Displays the total number of cycles being held by the Summary Graph.

Cycle Shown
Displays the number of cycles shown in the display window.

Time Total
Displays the total time between the last cycle held and the first cycle.

Time Shown
Displays the time between the last cycle being displayed and the first cycle being displayed.

Date/Time Stamp
The date/time stamps below the graph show the times and dates when the data starts and stops. The date/time stamp above the graph indicates where the cursor is in time, and it displays only when you click on the cursor.

Statistics

The Statistics tool displays and calculates statistical information on summary data.

Statistic	Cycle Value	Value	Units
Average	Cycle Integral, Post Gate	16450	psi-s
Average	CI, End of Cavity	17010	psi-s
Average	Peak, Post Gate	4166	psi
Average	Peak, Injection Pressure	17670	psi
Average	Peak, End of Cavity	4136	psi
Max	Cycle Integral, Post Gate	33350	psi-s
Max	CI, End of Cavity	32470	psi-s
Max	II, End of Cavity	22080	psi-s
Max	II, Post Gate	20980	psi-s
Max	Peak, Injection Pressure	18630	psi

Statistics (Mold: 2-Stage) — Data Range: Summary View — 69 shots back — Add Val — Remove — Sdev. Multiplier (N) = 3.0

Data Range
The shots over which the statistics are computed can come from three possible ranges:

➢ Summary View: The program computes statistics on only the points shown on the summary graph view. If the summary graph is zoomed in, it includes only the points in the zoomed in portion.

➢ Shots Back: Shows continuous "rolling" numbers from the current shot back the number of shots indicated in the box to the right.

➢ Whole Run: Computes statistics over the whole run or as much of the run as can fit in the *eDART™*'s memory. By default, the *eDART™* can hold 10000 shots of data in memory.

Statistic Type
This is the kind of computation computed for the row shown (e.g. Average, Maximum, Minimum, etc.).

Cycle Value
The value for which the statistic is computed. For example, if the left column says "Average" and this column says "Peak, End of Cavity", the statistic computed is the average of all the end of cavity peaks over the data range.
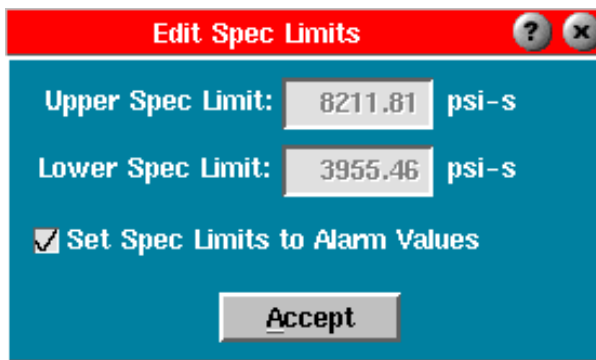
Value
The statistical value computed for the cycle value at the left (shown in units to the right). If there is a "?" in this box, the source of the original cycle value may have gone invalid (sensor removed, etc.). If the computation is CPk or PPk, the spec limits may not have been set. Click the "Limits" button to set the spec limits.

Units
Units for the statistical value. These are actually the same as the units for the value itself (as shown in the Cycle Values, Alarm Settings, or Summary Graph tools).
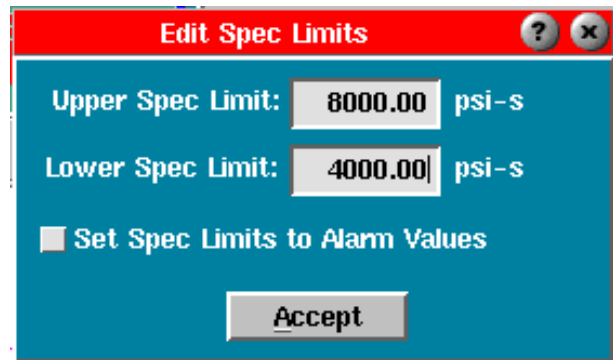
Limits
The Limits button only applies to the CPk and PPk calculations. Click this button to set the upper and lower spec limits. If you have already set alarm values for the calculation, check the box and the limits will automatically match the alarm values. If you've set the upper and lower spec limits previously and perhaps removed the calculation from the Statistics tool, when you add it again, the spec limits will reappear. Range of the values that can be entered in the input boxes is -1000000.00 to +1000000.00.

Specs matching set alarm values   *Manually set spec limits*

Add a Value

Gives you a list of types of statistical computations. After you pick one, you can add one or more cycle values on which you want the statistic computed. For example, when you click this button, you might choose "Average". When you click the Accept button, you can then choose which values you want to show averages for (e.g. "Peak, End of Cavity").

Click Add a Value, select the type of calculation you would like, and click Accept.
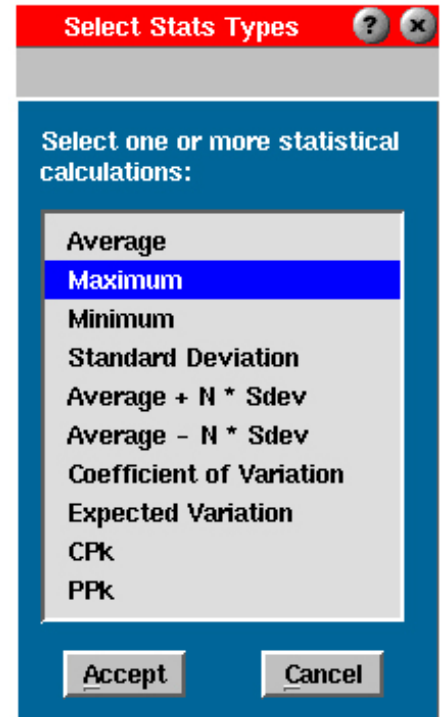
When you click Accept button on "Select Stats Types" tool, "Select Type and Location" tool should open up on the screen from where the desired cycle values can be selected.
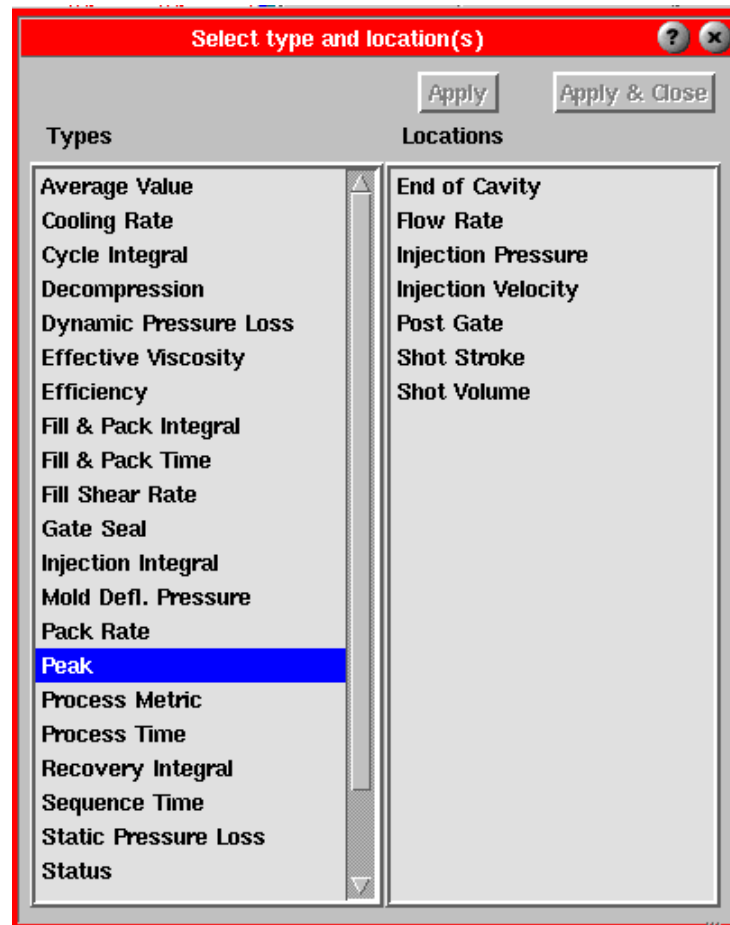
Remove Value(s)

Remove the row(s) selected in blue. You can then click on one or more rows to select them and they will stay highlighted until you click on them again or remove them.

Sdev. Multiplier (N)

This number applies to the "Average + N * Sdev" value and the "Average - N * Sdev". It is the "N" in those statistics. The average +/- statistics are used to show a band around the average (as in 6 sigma schemes). Range of the values is 0.0 to 9.0.

Core View Select

Use this tool on molds with cores instrumented with strain gauge sensors for deflection (X and Y bending). It displays a map of the front of the mold with numbered cores (See figure to the right). To configure the "map", click the Core Layout button. The Core Layout screen (below) will appear where you can set the vertical/horizontal numbering of the cores and enter the number of cores in each row.

When you select a core from the Select Cores to View screen, a Core Deflection View graph will appear for that particular core (See figure below and to the right). Here, you can get a real-time "bird's
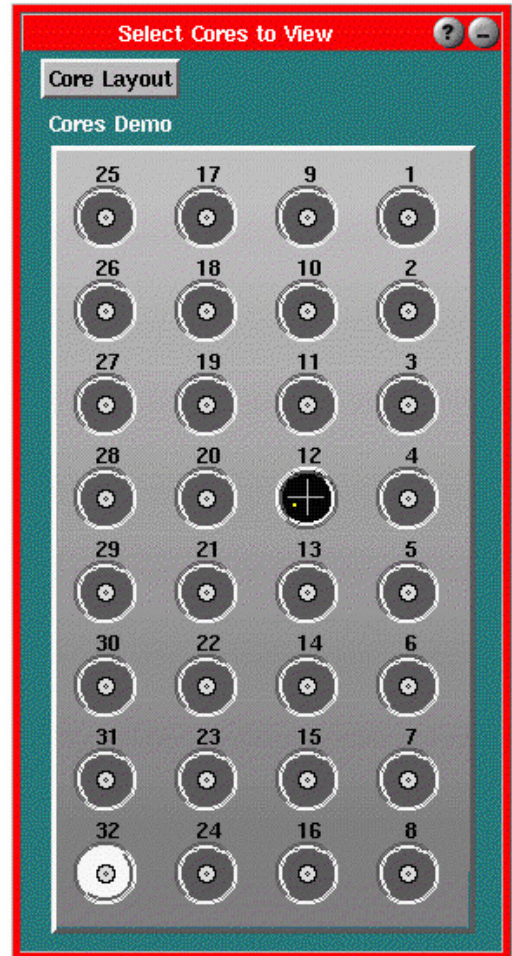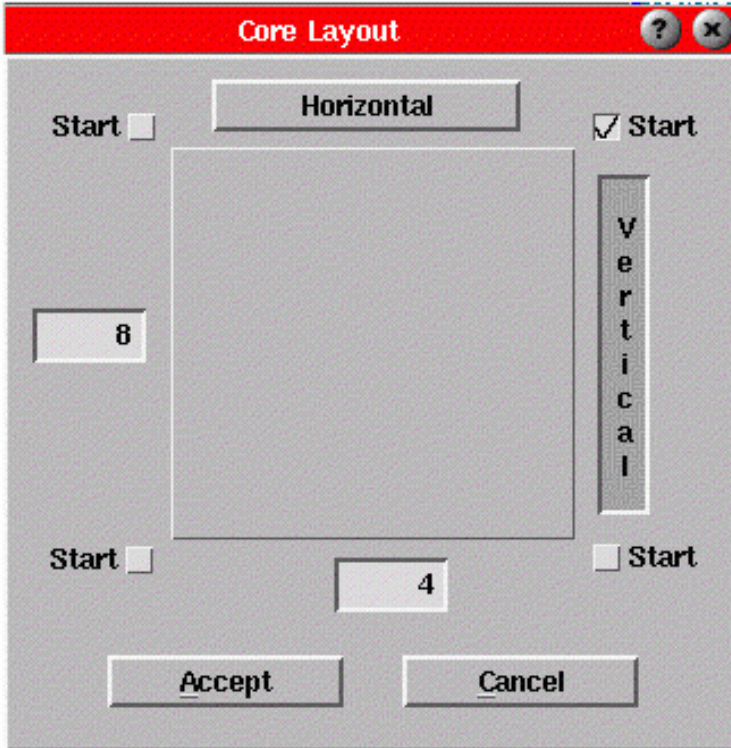
eye" view of the core strain and can view the amount of deflection occurring on each instrumented core. The yellow dot on the graph represents the actual core. The trace behind the dot illustrates the movement of the core during the cycle.

You can also add the "Core Deflection, Magnitude #" sensor to the Cycle Graph and observe it there.
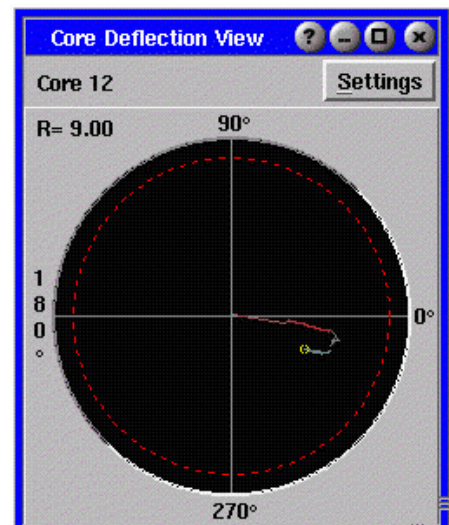
Settings

From the options on the Settings menu, you can change the following settings on the graph:

Set View Radius...

Overlay Cycles

Add Peak Alarm...

Add Peak Warning...

Set X-Y Axis Directions

Allow Non Circular

White Background

Set View Radius
Here, you can set the radius of the viewing area (graph).

View Radius: 9.000

Done

Overlay Cycles
This feature allows you to overlay cycles on the graph for comparison.

Add Peak Alarm
This feature allows you to set an alarm on core deflection. The Alarm Settings tool will appear where you can set up the alarm. A red dashed line will then appear on the Core Deflection View graph showing a visual representation of the alarm (See the graph above).

NOTE
The overlays are lost if you re-size the graph.

Add Peak Warning
This feature allows you to set a warning on core deflection. The Alarm Settings tool will appear where you can set up the warning. A yellow dashed line will then appear on the Core Deflection View graph showing a visual representation of the warning.

X-Y Axis Dir.

☑ Invert X axis

☐ Invert Y axis

Done

Set X-Y Axis Directions
If your core has been installed so that the "bird's eye" view directions do not match the physical core, you can cause the display to switch directions with this feature. For example, if you try to push the core to the right and the dot moves to the left, you can open this dialog and click "Invert X axis" (the horizontal axis).

Allow Non Circular
If you adjust the size of the graph, it will remain proportional (circular) unless you enable this option. Use this feature if you have non-circular cores instrumented.

NOTE
If you have X and Y switched (vertical and horizontal), you will need to open the Sensor Locations tool and switch them there.

White Background
This option will change the background color of the graph for easier viewing or printing.

Virtual Light Tree

This is a model of a light tree on the screen so a remote user can see what the light tree (alarm indicator) is doing.
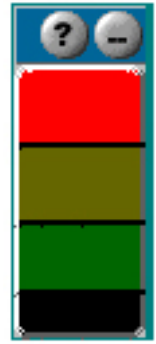
Shot Time Display

Shot Time Display does exactly what the name suggests. It shows you the date and time of the last shot made. To access this function go to the Main Menu then Architect. Click on the Analysis tab and pull the application button over to the main field as shown below. Close Architect.
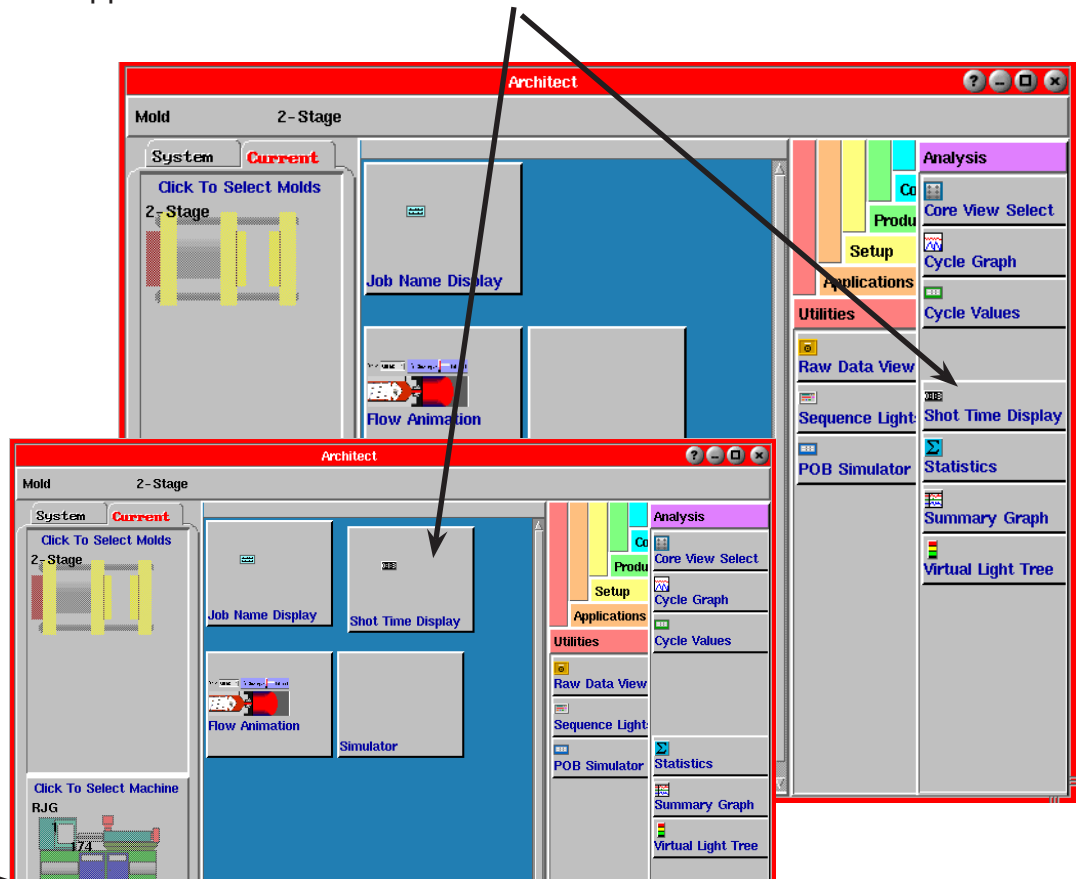
To open the application, click on the button that is now on the bottom of the screen in the tool bar. This will pop up a small window that will show your last shot information.
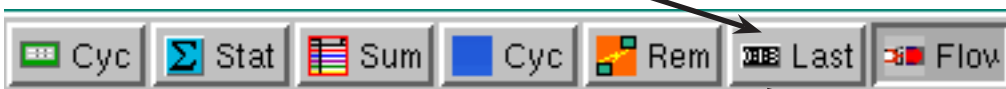
The time on the tool will match with the time fields on the Cycle Graph and Summary Graph tool. The time on the Shot Time Display updates at the end of every cycle.

Flow Animation

To access this function go to the Main Menu then Architect. Click on the Analysis tab and pull the application button over to the main field as shown below. Close Architect.
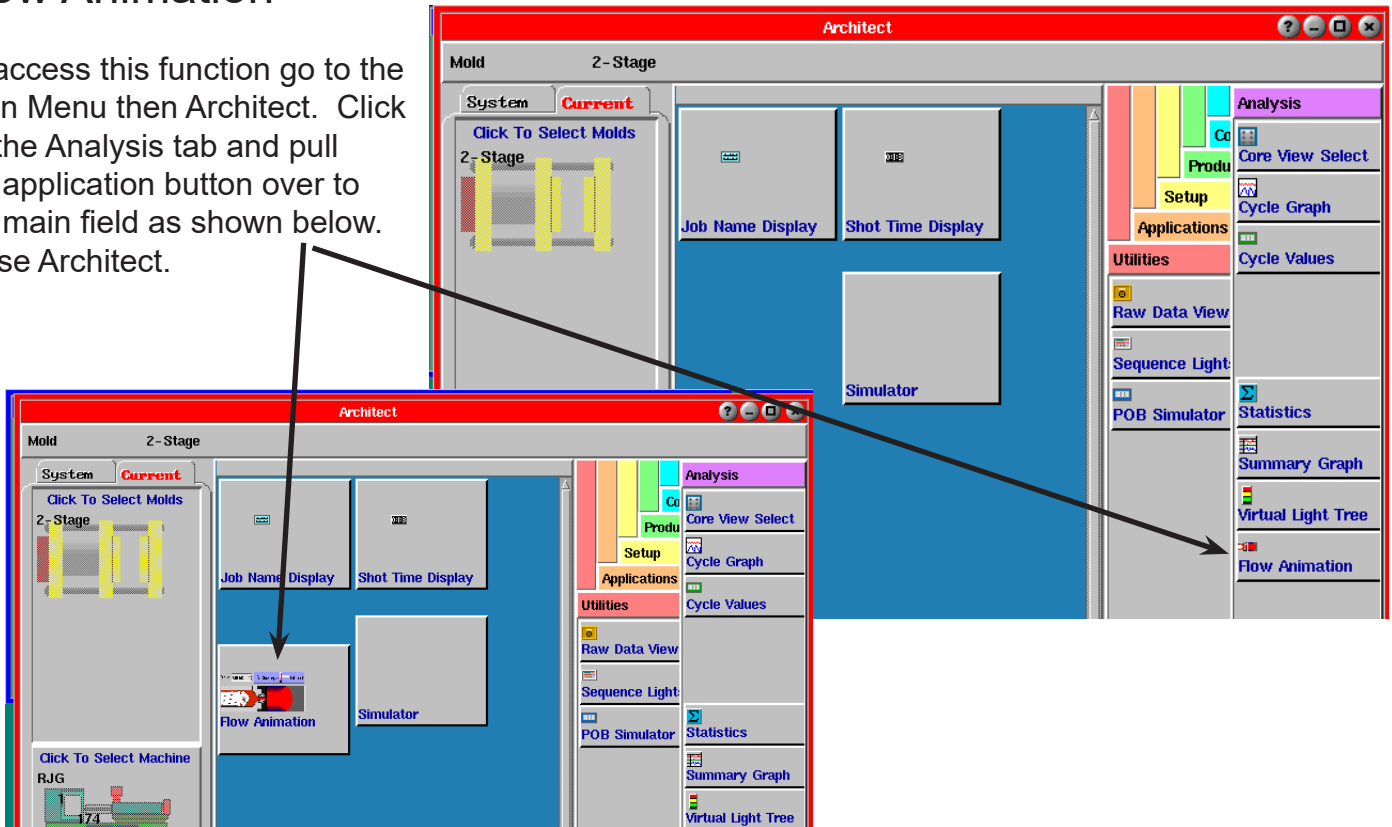
To open the application, click on the button that is now on the bottom of the screen in the tool bar.

A display will pop up on your screen that shows what is going on inside the barrel and mold as your process is flowing. Click on the *Show Pressure* button on the right side of the window to get a more detailed view of your process.
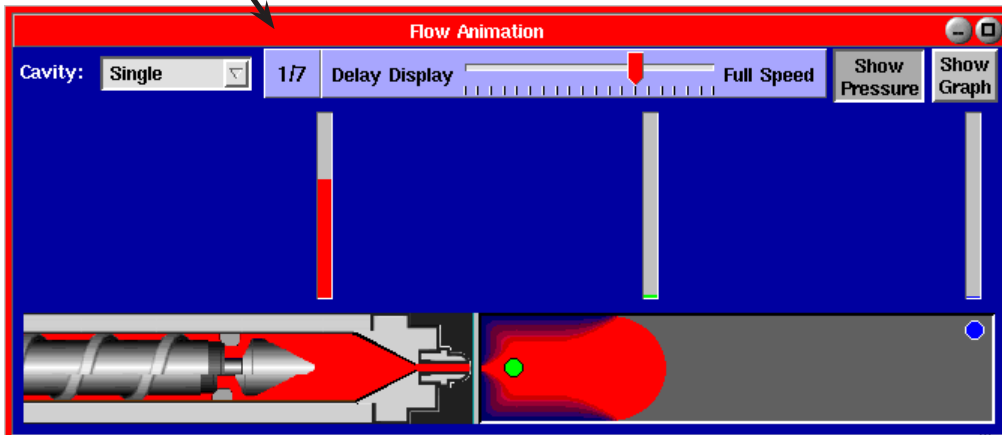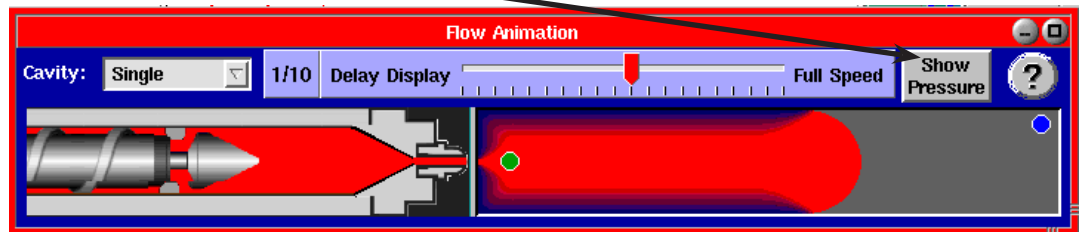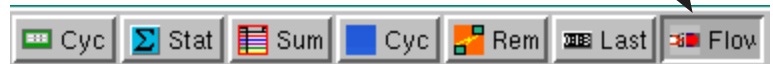
(Flow Animation continued)

Then click on the Show Graph to see the individual curves as the plastic is flowing. On fast cycles
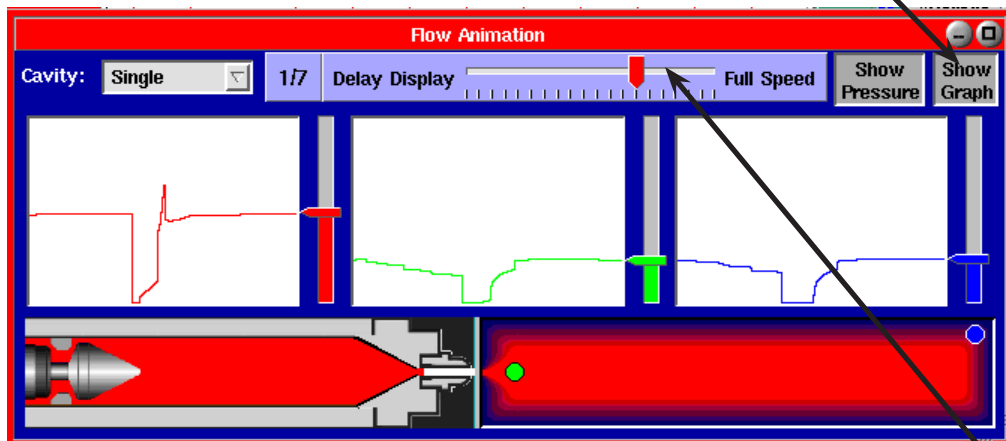
it can be hard to see much as the flow front gets to the end of the cavity so quickly. Use the speed slider at the top to delay the view so that you can see what happens.

The "Flow Animation" tool shows an estimate of how the flow front would move through the cavity if the cavity was a simple rectangle. The purpose of this tool is to help you understand how the screw and flow relate to the movement of the machine and the Cycle Graph curves.

Important points:

➢ The Flow Animation software needs to take calculations from the previous cycle to estimate what will happen in the next cycle. So, if you are making a lot of changes it will not represent the flow front very well until it gets two stable cycles.

➢ The cavity called "Assumed" works with no sensors at all but it is a much less accurate guess of flow front position than if you have cavity pressure sensors.

➢ To even get the "Assumed" flow front to work you need at least Volume, Injection Pressure and Injection Forward and Screw Run sequence inputs. Without them the Flow Animation tool will not even appear. Also the fill volume must be set at slow-down (not after volume peak).

➢ If the *eDART™* can compute a cavity fill time it will adjust the "Assumed" flow front based on the cavity fill time for each cavity. Check the "Sequence Settings" "Other" tab to set how cavity fill is computed.

➢ With cavity pressure sensors the "Cavity:" combo box will allow you to select which one to view. If a cavity has no identifier in "Sensor Locations" then it is just listed as "Single"

➢ The "Machine Sequence/Fill" signal must go off before the cavities are full. Set the fill volume at the slow-down point on the graph or use the Auto-Set feature on the "Sequence Settings" "Fill" tab.

➢ If there is a Post Gate sensor in a cavity this will produce the most accurate representation of the flow front, though still an estimate.

➢ The colored dots on the cavity represent the positions in which sensors would likely be placed. They are only displayed if they actually exist. Their colors are taken from the colors on the cycle graph. If you change a color on the cycle graph it will not change on the Flow Animation sensor until you select a different cavity.

Production Tools

This section describes the features found in the Production Tools of the *eDART™* System software.

In this section
➢ Lot Number
➢ Part Sampling

Lot Number

Current Lot Number

Shows text for current lot number. When the job first starts, this is "none". You may change the lot number with the Change Lot Number button. This button brings up a dialog box where you can enter a new text. The new text is saved as a note in the summary data.

> **NOTE**
> If this job was run before, the lot number will be restored from the previous run.

New Lot Number

Enter any text you want for a new lot number. When you click the Accept button, the program enters a new lot number as a note in the summary data.

> **NOTE**
> You are not required to enter anything in the "Comment" dialog box. If you do enter text here, it will be added to the summary note below the "Lot Number" line.

Part Sampling

Use this tool to mark parts in the data files for later correlation to physical measurements of the parts. The tool places notes in the data files that tell the Parts Measurement tool in the Analyzer to make a space for inserting measurements.

This tool can be dragged onto a specific mold or all "Molds" using the Architect. Or it can be placed on the system menu for starting and stopping at will. It can also be launched from the Summary Graph menu bar.

Number of shots to group for measurment entry and X & R charts

Group name is usually a run number and tells what was set for this group

Notes typed here are part of the sample note as seen on the Analyzer's Summary Graph

Check for interval sampling, un-check for longer DOE runs

Tells you when to start keeping samples and each sample's date and time

Diverter rejects all sampled parts

Parts sampled - you should have this many taken

Allows you to stop sampling and does not record the samples taken

Start a new file before and after a fill DOE run

Part Sampling

Mark next　5　shots as a group

Group Name: High Hold

Additional Notes:

Take the shot in the machine (sample #1).
Shot Time Stamps:
Shot #01 09:33:59
Shot #02 09:34:24
Shot #03 09:34:49

4 Samples Taken

☑ Make a separate file for each group

☑ Reject samples

Start new data file　Stop Sample　Start Sample

Mark Next # Shots

This is the number of "holes" that will be available in your data into which you can put part measurements. Generally, once you start the sampling (Start button), you collect and measure the next # of parts and enter their part measurements into the data later.

Group Name
This becomes part of the note describing the parts. When you bring up the Part Measurements tool in RJG's Windows-based Analyzer program, each group will have the name you enter here as a tag. This helps you keep groups separate (e.g. "Run 1", "Run 2" or "Hold P=3000", "Hold P=4000" etc.).

Additional Notes
Here you can add additional information to the sample. This extra information is visible in the Analyzer Summary Graph as extra text on the notes. These samples are actually saved as notes and picked up (because of special formatting) by the Part Measurements tool in the Analyzer.

You can also start a group by adding a note to the summary data and starting the note with a group name.

Parts Sampling List
This window informs you of what the Part Sampling tool is doing after you click the Start button. It lets you know just when to actually grab the parts and the date/time stamp for each one.

Status Box
Shows the number of parts sampled with a green color bar indicating how long (percentage-wise) until the end.

Make a separate file for each group
If this box is ticked, the data file will "break" and start a new file each time the sampler completes a group. You should use this method if you have remote users editing the part measurements using a windows computer. This is because you must NOT edit part measurements in a file while data storage in progress.

Normally this switch is off if you want to save several groups in a single file for a designed experiment. Then the summary, notes and measurements can all be transported easily in small files.

If you sample on a regular interval (say hourly +/- a random window) then this box should be ticked. Then each file for the sampling will be small and can be uploaded or edited with parts measurements immediately. Also, the FTP file up-load can be set up to limit copying of cycle data (the large stuff) to only those files with notes on them.

If you are running a designed experiment you will normally turn off the "Make a separate file..." switch. Then just before you start the run, press this switch. This will end the current data file which may have setup and stabilization data in it that is not pertinent to the experiment. Then after the experiment is finished press the "Start new data file" switch again. This will end the file with the experimental data in it so that the whole experiment is contained in that one file.

When you press this switch a message pops up saying which file is about to be completed at the end of the current cycle.

Reject Samples

When ticked then the Part Diverter Control is told to reject every cycle during the part sampling. The parts are counted as rejects since that is the bin to which they go. If you are using Insight*Pro*'s Scrap Entry (on the *eDART*™ or Windows) you can later restore them after they have been measured.

Part Sampling tool operates a "Sorting Output", "Sample Parts" signal to an OR2-D relay if you have one defined in Sensor Locations. This signal stays on during the entire cycle for which the parts are sampled. You might use it to tell a robot to place the parts in a special sample location for measurement.

Stop Sample

Lets you stop sampling in mid-group. You might want to do this if something goes wrong and you don't want the note added to the data. The note (which tags the data for later part measurement entry) is not actually added until the total number of samples finishes normally.

Start Sample

Starts part sampling. The note containing the number, group name, and notes is not inserted into the data until the end of the sample. When finished, the note gets inserted on the first sample in the group.

Set-up Security

In this section:

- ➤ Alarm Settings

- ➤ Alarm Stability Checking

- ➤ Part Diverter Controls

- ➤ Excessive Reject

- ➤ Process Stability Dashboard

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Set up Security

The Security feature allows you to give certain personnel access to limited areas of the *eDART™* software. You will create "groups" of software tools and set them up any way you would like. You will then assign individual users to one or more groups. Finally, you will give each user a password to use the tools that you have given them access to. The intention of Security is to block certain areas of the software and track any changes made in the tools you have secured.

1. Log In

Select Log In from the Main Menu.

Figure 1: Main Menu

2. Type in Default Password

When prompted for a password, type in "password". You have just logged in as the administrator and now have access to the Security Maintenance screen where all setup is done.
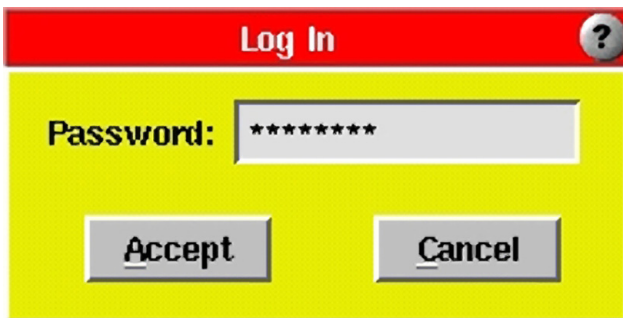
Figure 2: Log In Screen

3. Access the Security Maintenance Screen

Select the "Security" option from the Main Menu. The Security Maintenance screen (shown below) will appear.

The first time you access the Security Maintenance screen, it will contain one default group called Administrator with Admin as single user.

Only those assigned to the Administrator group will have access to this screen to configure Security (You may want to limit this group to one or two users). There are 4 buttons to click that perform different functions.
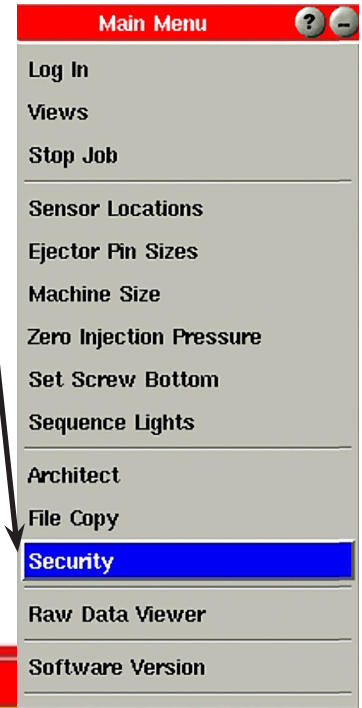
Figure 3: Security Maintenance

Click **User** button to add, remove, or rename a user. You can also set or change passwords here.

Click **User** button to add, remove, or rename or edit a group.

Click **Accept** button to apply changes

Security Settings button takes you to a screen where Default Security Settings can be changed

Figure 4: General Security Settings

4. Security Settings

➤ **Enable System Security**: Check this box to enable the Security feature.

➤ **Prompted Log in Time Out Time:** If a user attempts to make a change in the software without logging in, they will be prompted to log in. After doing so, this is the elapsed amount of time (hrs:mins) they will be given to use the software before the system automatically logs them out. This option is useful for quick changes. NOTE: Minimum Time Out Time is one minute.

➤ **Manual Log In Time Out Time:** When a user logs in manually (through the Main Menu), this is the elapsed amount of time (hrs:mins) they will be given to use the software before the system automatically logs them out. This option is useful for those who are making more lengthy process changes. NOTE: Minimum Time Out Time is one minute.

➤ **Restart timer on mouse or keyboard click:** While a user is logged in, the timer will restart every time they use the mouse or keyboard. This is useful if you would rather not use the timer feature.

➤ **Allow a user to be in multiple groups:** If you would like certain users to have access to more than one group, check this box. This would be the case if you used method #2 in the "Naming Groups" on page 9.

➤ **Select secured functions:** Click this button to choose the system tools and sub-features you would like to secure. If there are certain features to which you want to give everyone access (without logging in), make sure they are unchecked. When you edit a group, these tools will be grayed out. (See "Secured Functions" on the next pages for further details).

5. Secured Functions

The Secured Functions screen (graphics shown on next few pages) lists all Insight System™ tools that can be secured. Most of the software functions can be expanded to show their sub-features. By putting the check mark ✓next to the function with [+] or [-] itself, you are securing that tool and all of its sub-features. You may choose to secure only certain sub-features of a function. This option allows the user to access a function, but does not allow them to alter certain settings. For example, as seen on this graphic – on **Alarm Settings** function every sub-function except **Clear Counts** is secured. While **Diverter Controls** function is completely secured.
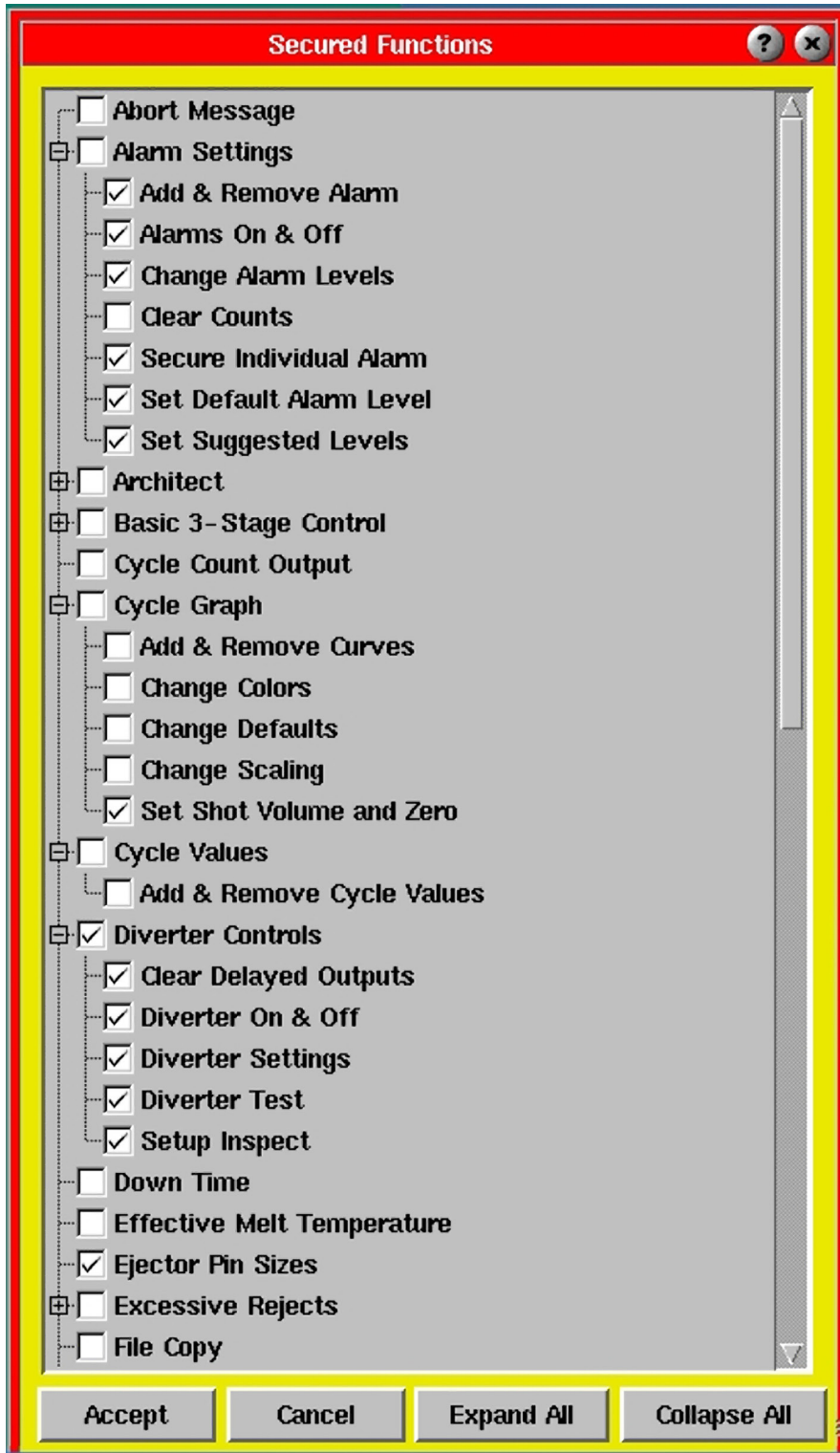
There are 4 buttons at the bottom of the tool – **Accept, Cancel, Expand All, Collapse All.**

When you are finished selecting all the functions you want to secure or un-secure click on **Accept** button to apply the changes you have made or Cancel to cancel out the recent exercise. The **Collapse All** button will display only the functions of as shown.

Expand All - The graphics over the next few pages display in **Expand All** mode. All the functions with a ✓☐check mark are secured, which means that only an Administrator or the group that has been specifically authorized can make changes.

Figure 5: Secured Functions

6. List of Functions (*Figure 6 through Figure 7*)

Put check mark ✓next to the function or stub function to secure. Click [+] to expand or [-] to collapse the list.

Secured Functions

- ☐ Abort Message
- ☑ Alarm Settings
  - ☑ Add & Remove Alarm
  - ☑ Alarms On & Off
  - ☑ Change Alarm Levels
  - ☑ Clear Counts
  - ☑ Secure Individual Alarm
  - ☑ Set Default Alarm Level
  - ☑ Set Suggested Levels
- ☑ Architect
  - ☑ Add & Remove folders
  - ☑ Change Options
  - ☑ Set As Default
  - ☑ Start & Stop tools
- ☑ Basic 3-Stage Control
  - ☑ Control Output Off Time
  - ☑ Output Test
  - ☑ Setpoint Percent Change Security
  - ☑ Setpoints – level and enable
- ☑ Cycle Count Output
- ☑ Cycle Graph
  - ☑ Add & Remove Curves
  - ☑ Change Colors
  - ☑ Change Defaults
  - ☑ Change Scaling
  - ☑ Set Shot Volume and Zero
- ☐ Cycle Values
  - ☐ Add & Remove Cycle Values

- ☑ Diverter Controls
  - ☑ Clear Delayed Outputs
  - ☑ Diverter On & Off
  - ☑ Diverter Settings
  - ☑ Diverter Test
  - ☑ Setup Inspect
- ☑ Down Time
- ☑ Effective Melt Temperature
- ☑ Ejector Pin Sizes
- ☐ Excessive Rejects
  - ☐ Clear Output
  - ☑ Settings
- ☑ File Copy
- ☑ Lot Number
- ☑ Machine Size
- ☑ Material Density
- ☑ Job Setup
  - ☑ Create New Plant
  - ☑ Create New Cell
  - ☑ Create New Machine
  - ☑ Create New Mold Number
  - ☑ Create New Material
  - ☑ Create New Cavities
  - ☑ Select Plant
  - ☑ Select Cell
  - ☑ Select Machine
  - ☑ Select Mold Number
  - ☑ Select Material
  - ☑ Select Cavities
  - ☑ Start and Stop Job

Figure 6: List of Functions

List of Functions (continued…)

- ☑ V to P Transfer
  - ☑ Control Output Off Time
  - ☑ Output Test
  - ☑ Setpoint Percent Change Security
  - ☑ Setpoints – level and enable
- ☐ Part Sampling
- ☐ Process Match Meter
  - ☑ Change Settings
  - ☐ Reset Match
- ☐ Production Monitor
  - ☐ Change Settings
  - ☐ Reset Counts
  - ☐ Set Job Standards
- ☐ Production State
  - ☐ Change Settings
  - ☐ Change State
- ☐ Raw Data Viewer
  - ☐ Zero_Inputs
- ☑ Remote User
  - ☑ Clear Remote Users
- ☐ Save Notes
- ☐ Scrap Entry
- ☑ Security
- ☑ Sensor Locations
  - ☑ Change Barrel Sensor
  - ☑ Change Dryer Sensor
  - ☑ Change Machine Sensors
  - ☑ Change Mold Sensor
  - ☑ Change Sensor Scaling
  - ☑ Change Thermolator Sensor
  - ☑ Change Unassigned Sensor

Figure 7: List of Functions

- ☑ Sequence Settings
- ☑ Set Date Time
- ☐ Set Screw Bottom
- ☐ Setup Notes
- ☐ Shutdown or Restart System
- ☑ Shuttle Control
- ☐ Statistics
  - ☐ Add & Remove Statistics
  - ☐ Change Range Selection
  - ☐ Change Spec Limits
  - ☐ Change Std. Dev. Multiplier
- ☐ Summary Graph
  - ☐ Add & Edit Notes
  - ☐ Add & Remove Curves
  - ☐ Change Colors
  - ☐ Change Scaling
- ☑ System Configuration
  - ☑ Change Node
  - ☑ Save Change
- ☐ System Processes
  - ☐ Select Menu
- ☑ Process Stability Dashboard
  - ☑ Change Settings
- ☐ Templates
  - ☑ Manage Template
  - ☑ Match Sensors
  - ☑ Save Template
  - ☑ Select Other Process
  - ☐ Select Template
  - ☑ Shift Template
- ☐ User Interface
  - ☑ Allow Shell
  - ☐ Modify
  - ☐ Stop eDART
- ☑ Valve Gates
  - ☑ Open–Close–Transfer Setup
  - ☑ Pressure & Volume Setpoints
  - ☑ Setpoint Percent Change Security
  - ☑ Valve Control Tests
- ☐ Views
  - ☑ Delete View
  - ☐ Load View
  - ☐ Save View
- ☑ Zero Injection Pressure

| Accept | Cancel | Expand A |

6. Creating Groups

One method of creating groups is to name each group by job title (See Figure 9). This method of creating groups works well to assign specific software features to each personnel group. To create a Group, go to the Security Maintenance Screen, click on the Group menu then Add a Group.
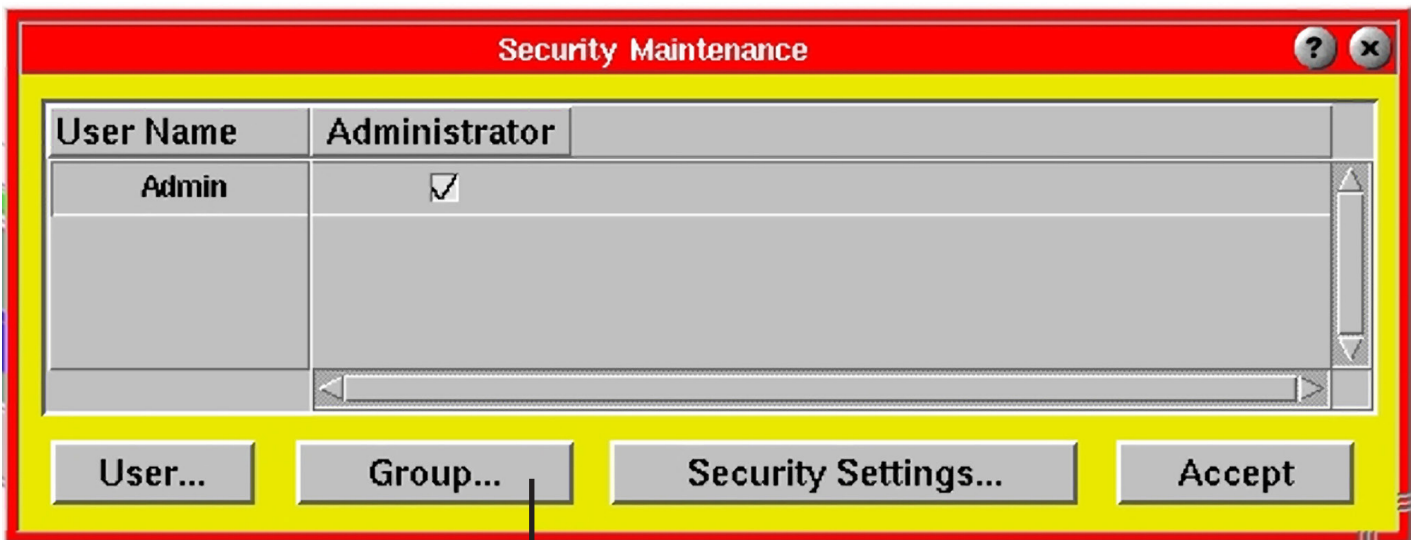
Figure 8: Creating Groups
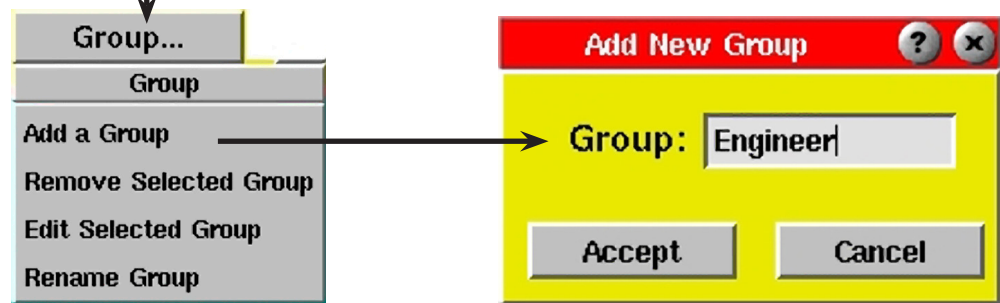
Enter a group name and click on Accept to apply or Cancel to cancel.

7. Edit Group (Giving group specific rights)

Figure 9: Edit Group

Click the group name to highlight then click on the Group button and choose Edit Selected Group.

A list of *eDART™* software tools will appear. Select the tools you would like this group to have access to. You can also choose specific sub-features that can be used by the group.

The Edit Group Selections function works differently than the Select Secured Functions that was previously discussed. In the Edit Group screen the grayed out functions are unsecured and open to all users. Those with un-ticked (white) boxes are secured functions. You must put a check mark next the function to allow the selected group the right use them.

The "Administrator" group is set as default and cannot be edited. This group has access to everything.
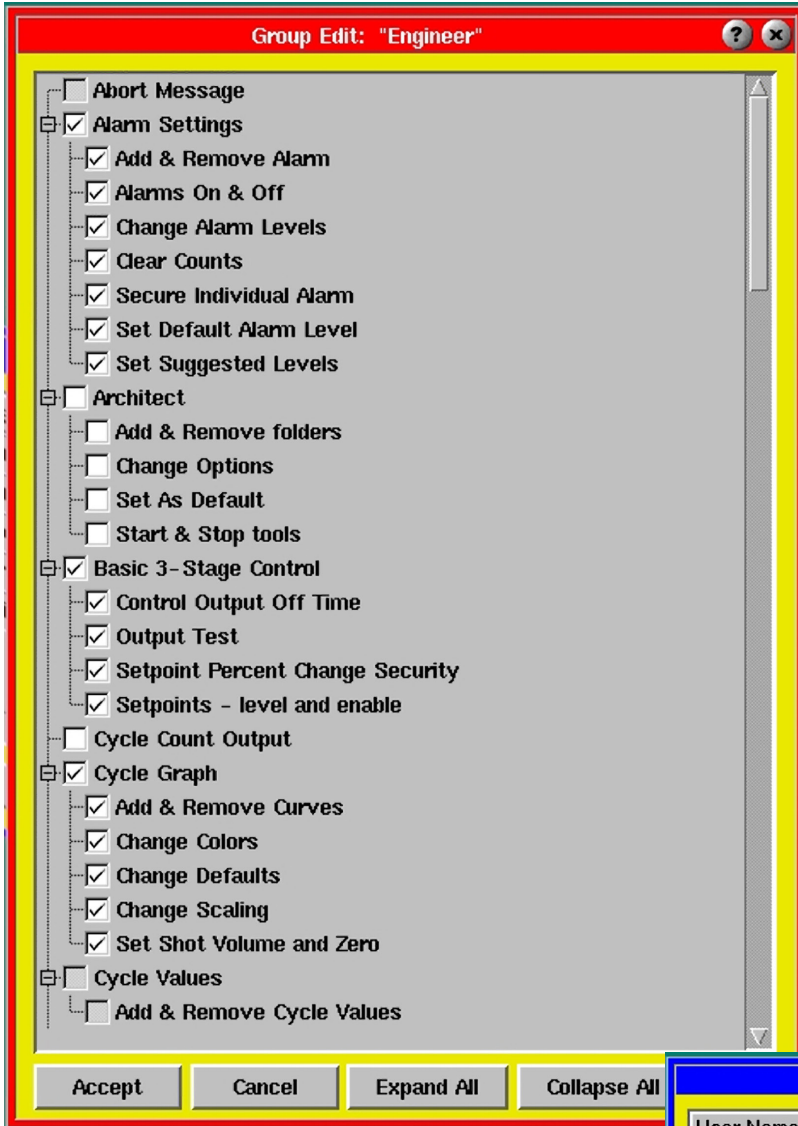
Figure 10: Secured Functions - Group Edit

Tips: On **Secured Function** mode putting a check mark to a function restricts non-administrator users from using the function.

On **Group Edit:** mode putting a check mark to a function gives the non-administrator group the right to use it.

To remove a group that you've created, first remove all check boxes under that group. Next, highlight the group name and click the Group button. From the menu, select "Remove Selected Group".

8. The User button

To add a new user, click the User button from Security Maintenance and select "Add a User" from the menu. Enter the new user's name and password.

NOTE: All usernames and passwords must be unique.

Figure 11: Add New User
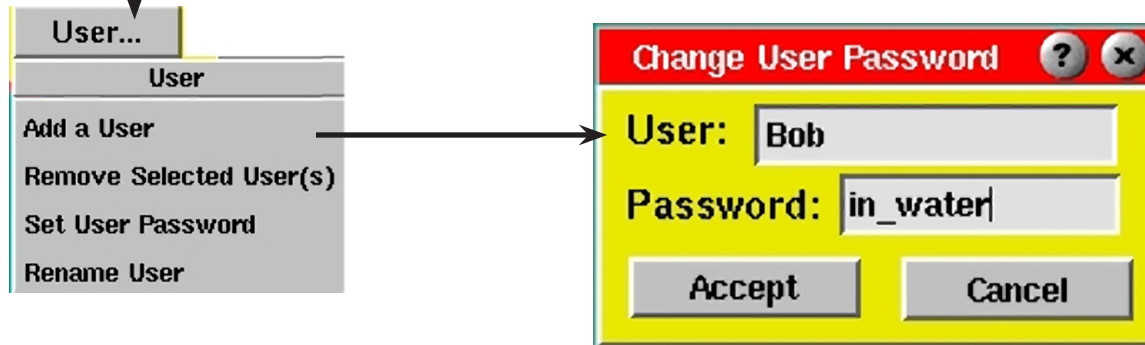
To remove or change user's password or rename a user, first click on the user and from the User... menu. Followed by choose "Remove Selected User(s)" to delete user, Set User Password" to set the password or "Rename User" to change the user's name.

To assign user to a group - Put a check mark on the box under the group name column to assign a user to a group. A user can be in multiple groups if "Allow a user to be in multiple groups" is checked (see *Figure 4*).

Containment Control Tools

This section describes the features found in the Containment Control Tools of the *eDART™* System software.

In this section:

➢ Alarm Settings

➢ Alarm Stability Checking

➢ Part Diverter Controls

➢ Excessive Reject

➢ Process Stability Dashboard

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Alarm Settings

The Alarm Settings tool is used to set alarms on specific summary values. The software then uses these values to sort the parts. The alarm can operate either an indicator (such as a light tree or bell) or a part diverter. Alarm values are set around collected summary data, which can be analyzed to determine what conditions produce suspect and reject parts. Alarm highs and lows can then be set.

The Alarm Settings tool can be accessed in the following ways:

➤ In the Summary Graph tool, right click on the title bar of the curve you would like and select "Add a New Alarm" from the menu.
➤ Load the RJG Alarms View from the Views tool (if Alarm Settings are attached with the Architect already).
➤ Click the Alarm Settings button on the toolbar at the bottom of the screen.

Value name	Shows rows out of range	Value for part that just finished	Sorts parts if ticked	Shows on light tree or "Indicator Output" if ticked

Alarm Settings (Mold: 5-Stage)

Cycle Value	Status	Value	Count	Sort	Alert Indicator	Type	Direction	Alarm Level	Units
ST, Cycle Time		25.188	1	☐	✓	Warn	Below	23.80	sec.
ST, Cycle Time		25.188	2	☐	✓	Warn	Above	50.23	sec.
Gate Seal, Post Gate		100.00	4	✓	✓	Alarm	Below	87.45	percent
Gate Seal, Post Gate	Warn	100.00	18	☐	✓	Warn	Above	97.29	percent
Gate Seal, Post Gate		100.00	4	☐	✓	Warn	Below	91.47	percent
Gate Seal, Post Gate		100.00	1	✓	✓	Alarm	Above	100.6	percent
FSR, Inverse Fill Time		2.114	3	☐	✓	Alarm	Below	1.517	1/sec.
FSR, Inverse Fill Time	Alarm	2.114	1	☐	✓	Alarm	Above	2.070	1/sec.
Effective Viscosity, Fill	Alarm	3820	5	☐	✓	Alarm	Below	3955	psi-s

[Add Alarms (Reject)] [Add Warnings (Suspect)] [<< Collapse]
[Remove Alarm(s) & Warning(s)] [Settings...]

Adds one or more warnings to the list with default levels set to 4.5 sigma	Removes any rows selected and highlighted in blue	Adds one or more warnings to the list with default levels set to 3 sigma	Menu for help, reset of counts, default sigma for new alarms, and action with no alarms set

> **NOTE**
> The list can be sorted on any column by clicking the header for that column. Clicking it again reverses the sort order.

(Alarm Settings continued)

Cycle Value
The Cycle Value column displays the summary values that the alarm is set around. These are values that are computed at the end of screw run for each shot.

Status
The Status column indicates the current state of the alarm: Reject, Suspect, or blank (Good). The Reject alarm will occur only for the alarms that were set to reject above or below a value. The Suspect alarm will occur only for the alarms that were set to warn above or below a value.
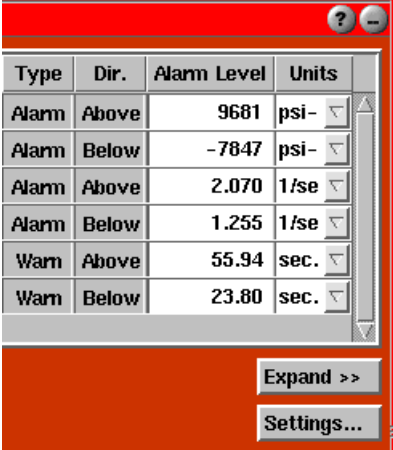
NOTE
If this job was run before, the lot number will be restored from the previous run.

Current Value
The Current Value column displays the actual value for the current cycle (shown in units at right).

If the value is followed by a "?", it is invalid and the parts are suspect. Invalid values can be caused by disconnecting a sensor on which the alarm is based or failing to include a sequence signal needed to compute the value. Since the value cannot be known, the Alarm Settings tool assumes that the parts are suspect as long as the alarm is included. If you remove the alarm, it will no longer force the alarm status to Suspect.

Alarm Count
This column shows the number of alarm occurrences for each cycle value. This number can be reset on a job restart or by clicking on the Settings button and selecting 'Clear Alarm Counts' from the menu.

Sort Output Enable
The Sort Output column contains a check box that allows you to tell the software that you want the system to sort on the values given for that alarm. When checked, the program will operate the part diverter.

NOTE
For the diverter to operate, you must click the Sort button on the Part Diverter Controls tool.

If you are using the security system you can set up security on switching this control.

Alert Indicator
When a box in this column is checked for a particular summary value, the program will cause an indicator light (if found) to show red for reject, yellow for suspect, and green for good.

If you are using the security system you can set up security on switching this control.

(Alarm Settings continued)

Alarm Type
The Alarm Type column is used to select whether the alarm will reject parts or act as a warning. This is set when the alarm is first added to the list.

A Reject alarm will cause the diverter to move to the Bad position if the value falls above or below the level. This overrides any warnings.
A Warn alarm will cause the diverter to move into the Suspect position if the value falls above or below the level.
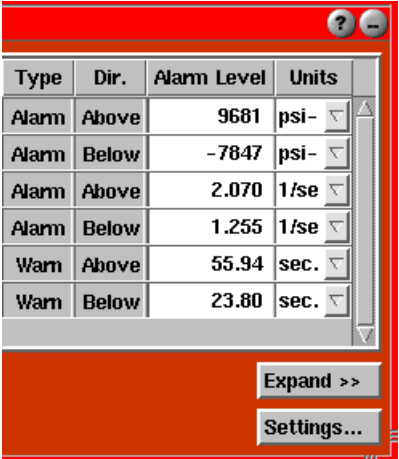
Direction
The Direction column indicates whether the alarm will be triggered when the value goes above the level or below the level. Each Cycle value in the tool will have two rows representing above and below alarm levels. The direction is set when the alarm is first added to the list.

Alarm Level
The Alarm Level column is used to set the level of the condition that must be reached to activate the alarm (in the units shown at right). The alarm or warning will operate when the value for the current shot goes above or below (or equal to) the level set. This is set when the alarm is first added, but can be changed in two ways:

Type	Dir.	Alarm Level	Units
Alarm	Above	9681	psi–
Alarm	Below	–7847	psi–
Alarm	Above	2.070	1/se
Alarm	Below	1.255	1/se
Warn	Above	55.94	sec.
Warn	Below	23.80	sec.

Expand >>
Settings...

➢ Alarm Settings Tool: Highlight the number and type in a new one.

➢ Summary Graph Tool: Clicking the red alarm indicator and dragging them up and down to the desired position. Any changes made in the alarm settings at Summary graph tool gets reflected the Alarm settings tool.

If you are using the security system you can set up security on the changing of levels.

Units
The Units column displays the units for the current value and level.

Add Alarms
The Add Alarms button brings up a Select type and location(s) tool that is used to add summary values to the Alarm Settings tool. Select a summary value type from the Types column. All the locations for that type will appear in the Locations column. Select a Location or several locations using the Control key. You may then apply those types and go on to select other types or apply and close the Select type and location(s) tool. Both high and low ("Above" and "Below") alarms are automatically added. These are "Reject" levels and will turn a Good output off and Reject on.

The the levels are chosen automatically by looking at the statistical information for previous shots. You can change them after the alarms are added. By default these are set to 4.5 sigma (4.5 x standard deviation) above and below the average. The default sigma levels can be changed from the Settings menu using the "Adjusted Suggested Levels" selection.

(Alarm Settings continued)

The Sort switch is turned on automatically for cavity pressures but left off for machine variables (such as viscosity). The indicator ("Alert") switch which operates a light tree or Indicator Output will always be turned on.

If you are using the security system you can set up security on the adding of alarms.

For detailed alarm setting information, refer to the "Alarm Setting Methodologies" document.

Add Warnings
The Add Warnings button brings up a Select type and location(s) tool that is used to add summary values to the Alarm Settings tool. Select a summary value type from the Types column. All the locations for that type will appear in the Locations column. Select a Location or several locations using the Control key. You may then apply those types and go on to select other types or apply and close the Select type and location(s) tool. Both high and low ("Above" and "Below") warnings are automatically added. These are "Suspect" levels and will turn both the Good and Reject outputs off.

The the levels are chosen automatically by looking at the statistical information for previous shots. You can change them after the warnings are added. By default these are set to 3 sigma (3 x standard deviation) above and below the average. The default sigma levels can be changed from the Settings menu using the "Adjust Suggested Levels" selection.

The Sort switch is turned on automatically for cavity pressures but left off for machine variables (such as viscosity). The indicator ("Alert") switch which operates a light tree or Indicator Output will always be turned on.

If you are using the security system you can set up security on the adding of warnings.

For detailed alarm setting information, refer to the "Alarm Setting Methodologies" document.

Remove Alarm(s) & Warning(s)
The Remove Alarm(s) and Warning(s) button removes any alarms selected from the list. Once removed, the alarms no longer function to operate the part diverter or any alert indicators or lights. To select rows for removal, click on the name of each row you wish to remove. The selected rows highlight in blue. Click on a selected row to "un-select" it.

Collapse/Expand
The Collapse/Expand button changes the size of the screen.

Settings
The Settings button will bring up the following menu:

Clear Alarm Counts
Resets the numbers in the Alarm Count column. If you are using the security system you can set up security on the clearing of these counts.

Alarm Stability Checking

Alarm Stability Checking

When you add alarms or warnings to the Alarm Settings tool it uses (by default) the previous 20 shots to compute the normal variation and set the levels to sensible numbers. If the process is not stable then the calculated levels are useless.

The stability calculation is developed from methods defined by the NIST to look for "random variation". The process stability goes up when there are no obvious trends or cyclic behavior over the selected number of shots.

The stability checking feature lets you wait after setting alarms until the process stabilizes. This ensures a good estimate of what a "normal" process is and reasonable alarm levels.

Set Alarm Immediately:

If you **choose** not to wait for the process to stabilize you can override the stability check, set the alarms immediately and take the consequences.

Cancel Alarm Setting

Cancel the alarm setting if the process is too unstable.

Adjust Suggested Levels

Brings up a Suggested Alarm Levels dialog below:
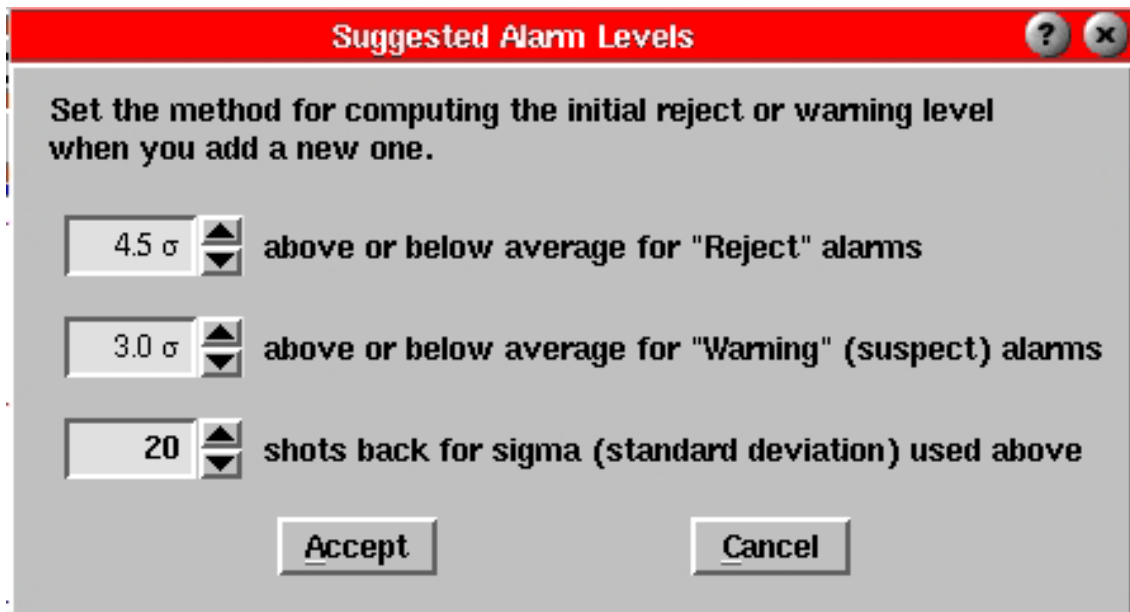
Suggested Alarm: (Reject) Sigma Multiplier
When you add a new alarm, the software computes "sigma" (standard deviation) over the number of preceding shots shown in the "Shots back for sigma" box. It then sets the initial alarm level value to a value above or below the average. The amount above or below is sigma multiplied by the number you set here.

The initial value of six sigma is typical for an initial guess at an alarm level. Any values that fall outside of a six sigma alarm band will represent a serious change in the process. The range of valid values is 0.0 to 100.0.

Suggested Warning: (Suspect) Sigma Multiplier
When you add a new warning, the software computes "Sigma" (standard deviation) over the number of preceding shots shown in the "Shots back for sigma" box. It then sets the initial alarm level value to a value above or below the average. The amount above or below is sigma multiplied by the number you set here. The value of three sigma is typical for an initial guess at a warning level. For "normal" distributions (not typical in injection molding), only 0.14 percent of the shots should fall outside of the three sigma warning band. The range of valid values is 0.0 to 100.0.

Shots back for sigma: (Standard deviation) Computation
Enter the number of shots (cycles) over which you want the Alarm Settings tool to compute standard deviation for initial alarm values.

Normally, you do not need to change this value. However, if your recommended alarm levels (as you set them) are including some early shots that are not a stable process, you can lower this value. On the other hand, if you want to run longer before setting alarms to get a more representative baseline, increase the number of shots. The range of valid values is 3 to 100000.

Part Diverter Controls

This feature controls the machine's part diverter.

Sort
When you click this button, the diverter controls are operating.

Don't Sort
When you click this button, the diverter is not operating. This means that both the Good and Reject sorting outputs will be causing the diverter to stay in the Suspect or Sort position. Thus, the parts are diverted for later manual sorting.

Good
The Good output is ON. At the end of screw run, the part or process was found to be good (inside the warning limits). The diverter control turns this output off when the mold closes or at the start of the next cycle (whichever comes first).

Susp
Both the Good output and the Reject output are OFF. This means that the parts process or parts may or may not be acceptable. The diverter control turns both the Good output and Reject output OFF when the mold closes until the end of screw run. If, when the screw run ends, the part or process is known to be good or bad, the diverter turns on the appropriate output.

Rej.
The Reject output is ON. At the end of screw run, the part or process was found to be bad (reject alarm). The diverter control turns this output OFF when the mold closes or at the start of the next cycle (whichever comes first).

The **Alarm Settings** text at the bottom of the window is an indicator of the cause of the alarm any time the parts are not good. In the case shown above it is the Alarm Settings tool that has decided to reject the part. The other reasons are shown below.

Reasons for Alarms
Here is the list of reasons for alarms whether reject or suspect parts (anything not good). It can also be seen on-line by dropping the help question mark on the box showing the reason.

➢ **In Setup State:** Production State switch at "Setup" or down state just ended.
➢ **No Alarms Tool:** There is no tool running to decide if there is an alarm.
➢ **No Alarms Set:** In the Alarm Settings tool no alarms have been chosen.
➢ **All Alarms Off:** In the Alarm Settings tool all "Sort" switches are off.
➢ **Don't Sort Pressed:** The diverter is stopped by pressing the "Don't Sort"
➢ **Sampling Parts:** The Part Sampling tool is running and sampling parts with its "Reject samples" switch turned on.
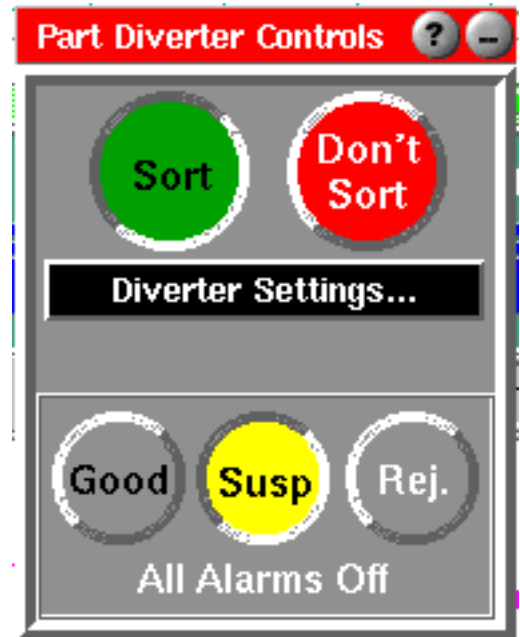
- ➢ **Press is Down:** The press is not running. All that drops out of the mold is diverted so it doesn't go into the good container.
- ➢ **Diverter in Test:** The test buttons on this diverter control are in use.
- ➢ **Press in Manual:** The press is in manual (from the sequence module input).
- ➢ **Match Meter:** The Process Match Meter is set to sort parts and is in the yellow or red zone.
- ➢ **Alarm Settings:** The Alarm Settings tool has one or more active alarms.
- ➢ **Manual Rejects:** More parts were manually rejected than made so some more rejects must be made to match up.
- ➢ **Press Not Cycled:** The job has just started but the press has not cycled yet.
- ➢ **Queue Not Filled:** The diverter delay is set up but not enough parts have been made to get a "good" one to the end of the queue.

Diverter Controls Settings Menu
Clicking on the **Diverter Settings** bar brings up the menu described below:

To bring up this menu, click on either the Diverter Start-Stop button or the Diverter Position button. You can also bring up the menu by right-clicking anywhere on the tool.

Diverter Timing Controls

If this box is checked, the Part Diverter will change the flow direction only when the sorting output status changes.
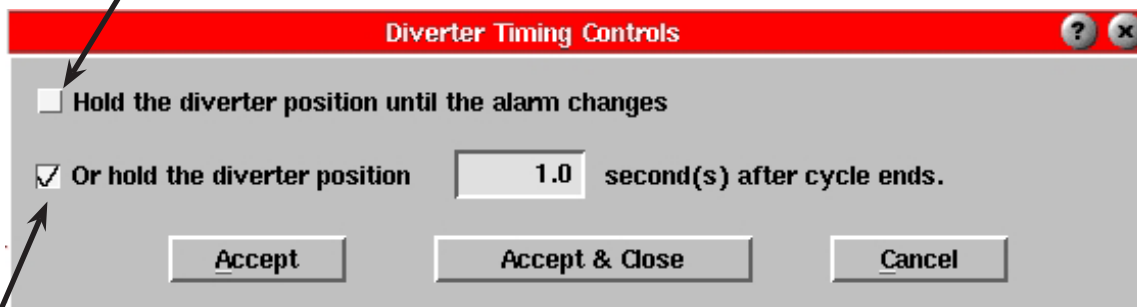
If this box is checked, the Part Diverter will continue in the direction of the sorting output (good or reject) for the said amount of time before it will return to its default flow direction.

Set Reject After Down
System will reject X number of shots after it has been re-started.
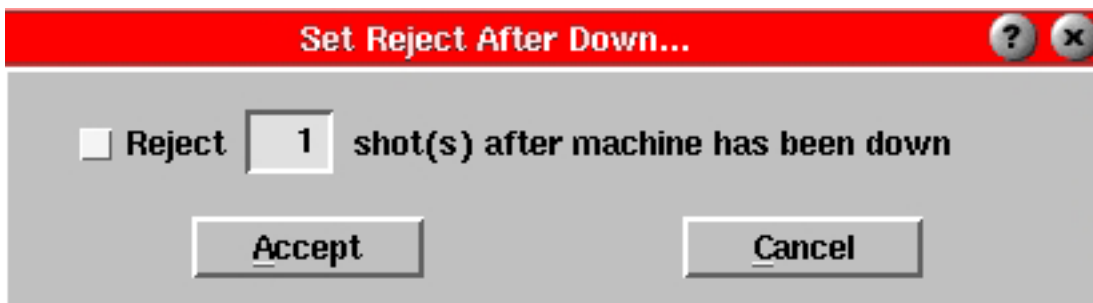
Set Diverter Disabled

Set Diverter Disabled
This tool allows you to choose how you want part diverters and alert indicators (lights) to operate when you disable alarms and indicators. If you want perfect safety on part sorting, you should force the diverters and lights to the "Suspect" position if someone disables all alarms. However, if you just want to turn some alarms off for a while, but look at how the traces appear on the summary graph (without having an effect on part sorting), you can select the "Good" mode.

Good
Select the "Good" check box if you want disabling of alarms (Stop button) or individual alarm rows indicators all off to set the indicator output to "Good" (green).

Suspect
Select the "Suspect" check box if you want disabling of alarms (Stop button) or individual alarm rows indicators all off to set the indicator output to "Suspect" (yellow).

Reject
Select the "Reject" check box if you want disabling of alarms (Stop button) or individual alarm rows indicators all off to set the indicator output to "Reject" (red).

Accept
When you click the Accept button, the new mode will take effect and be saved with the alarm settings on this process for next time.

Cancel
Click the Cancel button if you want to discard any changes you have made to the operation mode.
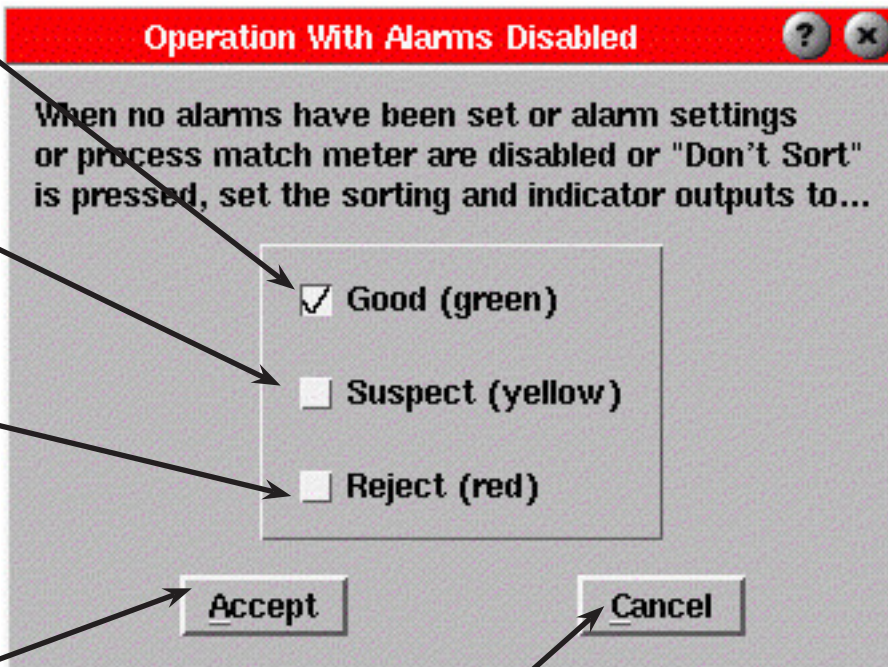
Delay Diverter Outputs

Delay Diverter Output Enable
When this box is checked, the outputs from the diverter are delayed by the number of cycles shown below.
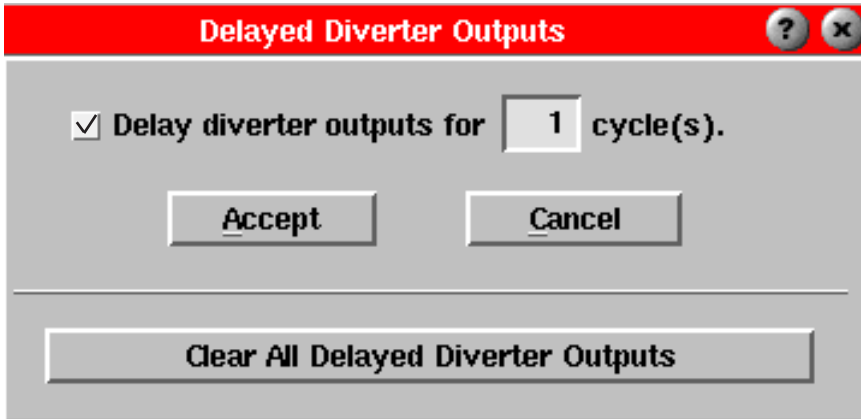
> **CAUTION**
> Any disruption of the chain of parts moving through to the diverter could cause bad parts to be counted as good. The physical setup must be such that any parts in the "queue" always arrive at the end in the same sequence in which their alarms were computed.

For example, if the part in shot 3 is found to be Reject and the delay is set to 2 cycles, the actual contact closure for Reject will not occur until the end of cycle 5. Values equal to and between 1 and 20 can be entered for the number of cycles.

Use this feature when you have a multi-position process in which the part that has alarms computed on it does not reach the actual diverter until some cycles later.

This setting is saved with the combination mold and machine.

Clear Delayed Outputs
When you click this button, all of the delayed diverter signals stored internally are removed. Thus, for the number of cycles set, the diverter output will stay in the Suspect position until the first part with a known alarm state comes through.

If there were any good parts in the queue when you cleared the outputs, these get counted as suspect parts in the production counts.

Part just made is good

Part before that is bad

Third back is good

Next cycle diverter goes "Good"

Pinched Part Detect

Pinched Part Detection Enable
Always leave this box checked for fail-safe operation.

With pinched part detect enabled, when the eDART™ sees two or more Mold Opening signals at the end of a cycle, the diverter control will switch to Reject and count the part as such.
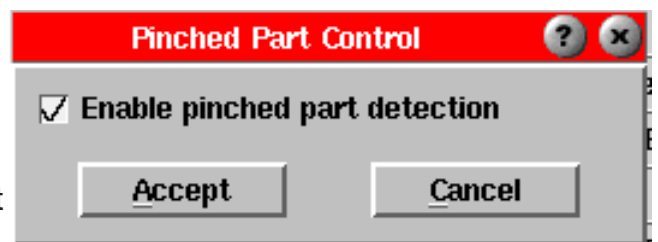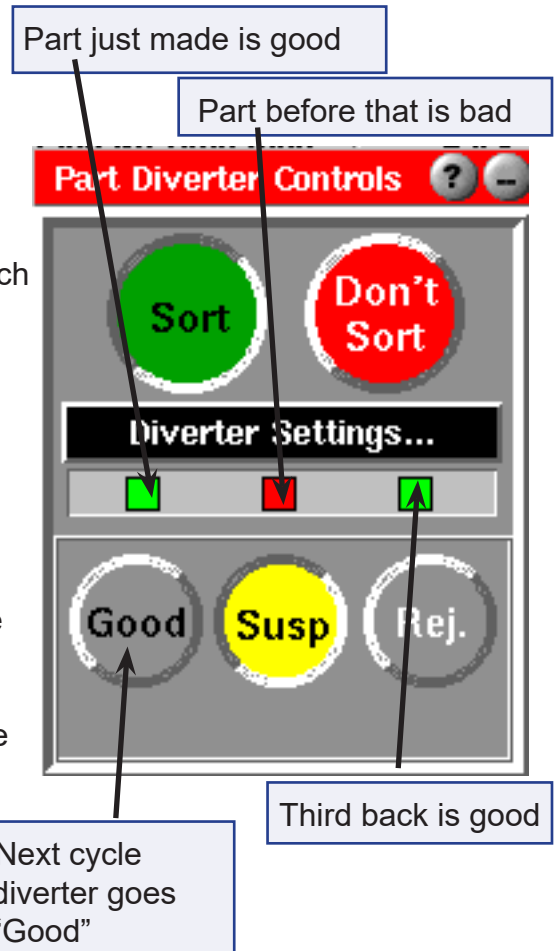
There are only two instances where you might need to turn this switch off.

1. Operator control with palm switches with potential "bounce".
2. Robot programmed to take a pulse input for control.

In the first case, a double mold opening may happen if you remove your hands from the palm switches during mold opening. You could thus interpret the Mold Opening signal and continue again causing two Mold Open signals with no pinched part.

In case 2 above, a robot may be programmed to accept the "good" pulse at the end of a cycle and then position itself to good regardless of what happens later. In this case, you could disable the pinched part detection so that the parts counts match what the robot actually does. Notice however, that the pinched part could still end up in the good bin unless the robot is smart enough to ignore the second mold opening. If it DOES ignore the second one and the pinched part gets discarded, you should keep Pinched Part Detect on.

Manual Diverter Test

Good
Click this button to force the part diverter into the Good position. If the button is grayed out, no sorting output exists for Good.

Using this control overrides the sorting outputs so that bad parts end up in the Good bin.

Suspect
Click this button to force the part into the Suspect position (good and reject signals off). If the button is grayed out, neither the Good or the Reject sorting output exists.

Using this control overrides the sorting outputs so that all parts end up in the Suspect bin.

Reject
Click this button to force the part diverter into the Reject position. If the button is grayed out, no sorting output exists for Reject.

Using this control overrides the sorting outputs so that all parts end up in the Reject bin whether they are good or not.
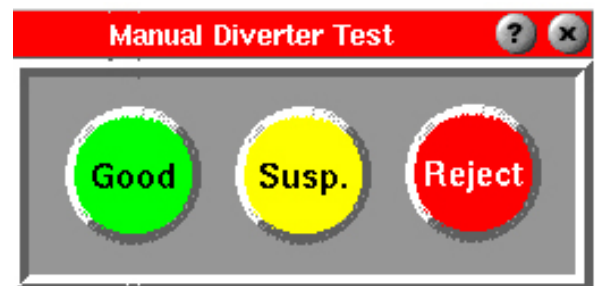
Excessive Rejects

The "Excessive Rejects" software tool provides a way to signal users if too many rejects are being made within a set number of cycles. The tool works by turning on an output (relay contact closure) when too many consecutive rejects have been made. This output may be wired to a light, horn or other mechanism for alerting the operator that excessive rejects have been made. Or it could be used to shut down the machine to prevent further scrap from being made.

This tool provides some flexibility in that you can choose to have the output come on after so many rejects out of so many consecutive cycles. Once the output comes on it "latches" and the user clicks a button on the screen to turn it off again. The "Excessive Rejects" tool only works if Diverter Controls is running (sorting outputs defined).

Installation
a. On the "Sensor Locations and Scaling Page" find the serial number and output number ("channel" to the right of the colon) for the OR2 contact closure you have wired out as the "Excessive Rejects" signal.
b. Click on the "Type" box for that row and select Sorting Output.
c. Click on the "Location" box for the row and select Excessive Rejects.
d. Click "Accept".
e. Wire the contacts from the selected OR2 output to the machine or alarm device for Excessive rejects.

Operation

Below is the interface for the "Excessive Rejects" software when it is running. It starts automatically when the Sorting Output / Excessive Rejects is defined in Sensor Locations. It stops when you stop the job or un-define the output in Sensor Locations (e.g. call it Not Used).
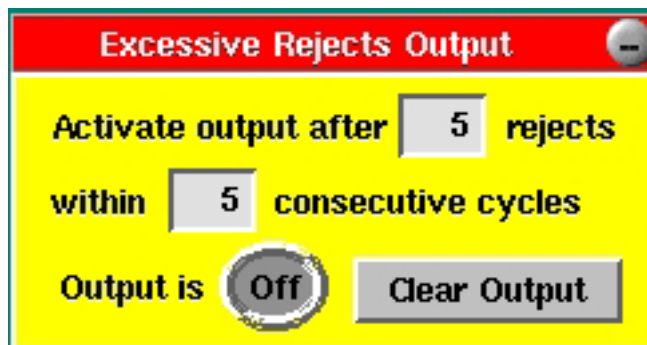
Optional Tool

Process Stability Dashboard

The Process Stability Dashboard lets you see, at a glance, how your process is doing. In order for the Process Stability to function you must have saved and applied a template to your process. (See Analysis Tools document for instructions on saving/selecting a template) Once you record a proper process "template", the eDART™ sends a record of any deviations in machine speeds and pressures from that template to the overview. A quick scan down the overview screen will let you know any processes that aren't being run correctly.
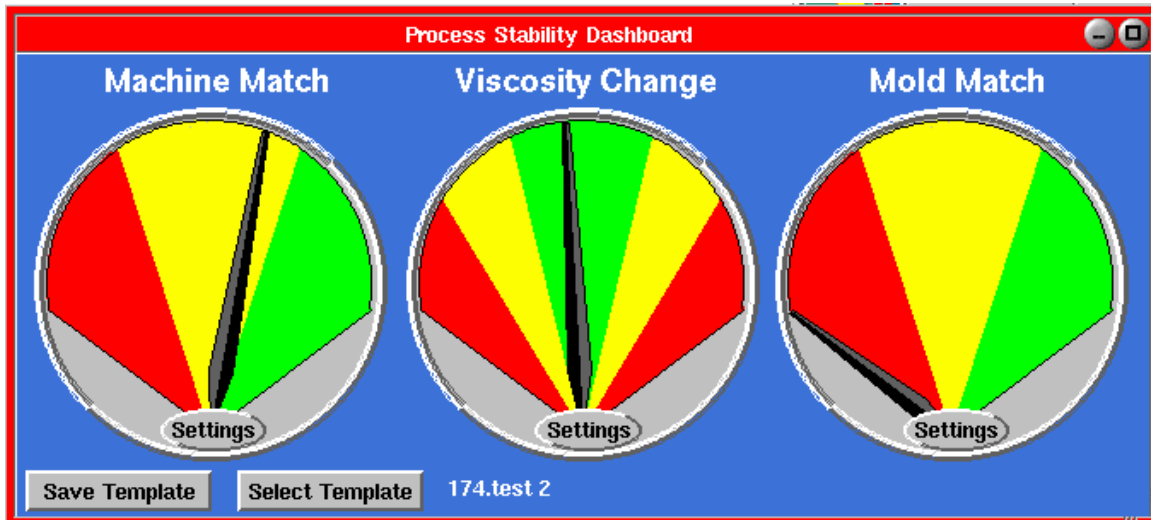
The eDART™ also observes changes in material viscosity comparing them with the value from the saved template. You may see all of the processes properly set in the machines but rise or fall in material viscosity on this second column of meters. This allows you to re-set the process for the different material before the part quality suffers.

The next best thing to cavity pressure is to monitor the machine and material and make corrections in a systematic way. If you have a particular problem or critical molds that require in-cavity sensing you can add sensors to them as needed. These are then displayed in a third meter that tells you if all of your cavity pressure sensors match their templates.

In order to use the Process Stability Dashboard you must move it from the Architect menu to the active field.
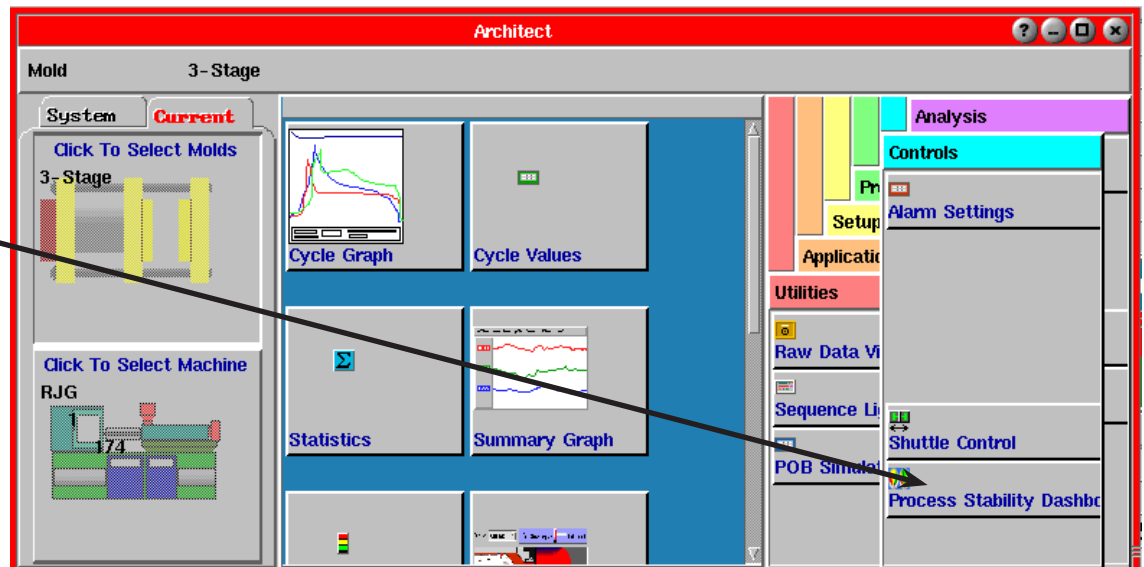
Once the application has been dragged to the active field, close architect and open the application.

To open the application, click on the button at the bottom of the screen.
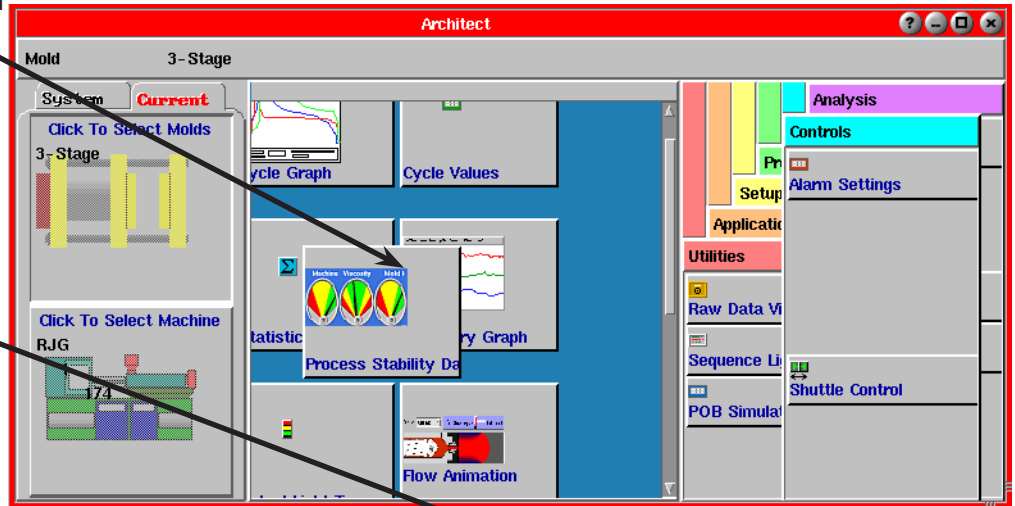
If you need assistance or have any questions, please call RJG Customer Support at1-800-472-0566. If you are calling from Canada, please use 1-231-947-3111 and ask for Custromer Support.

System Tools

This section describes the features found in the System Tools section of the *eDART™* software.

<div style="border:1px solid">

In this section:

➢ Main Menu

➢ System Menu

➢ *eDART™* Configuration

➢ User Interface

</div>

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Main Menu

The Main Menu is a user-configurable menu that allows you fast and easy access to setup tools in the software. You can customize the Main Menu for each job using the Architect tool.

Internally, the *eDART™* orders any tools you place on the menu. This should help you find the items you need quickly because their positions do not change.

The items in the Main Menu are as follows:

➢ Log In, Views, Stop Job
➢ Setup of sensors and machine information
➢ Software Setup (Architect) and Security
➢ Diagnostics, Software Version and Re-start
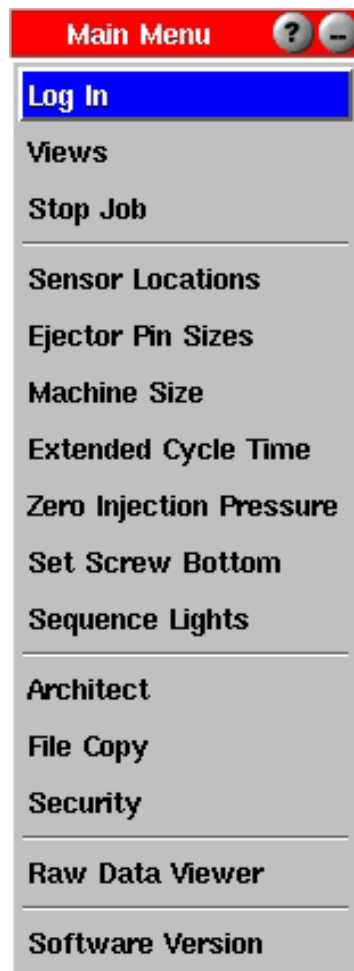
System Menu

The System Menu contains configuration and other various tools for use with Insight System™ applications. The options included on this menu are not user configurable.

To access the System Menu, click the   button at the lower left corner of the screen. The System Menu will appear:

The Restore Toolbar function will close any Phindows applications running on the *eDART™*. If you use this from Phindows, wait about ten seconds and then re-open Phindows to the *eDART™*. The System Menu items are described in the next pages:

Touchscreen Applications

RJG Inc.'s *eDART* System™ now supports the use of touchscreens to replace the keyboard and mouse. If you are using touchscreen features, your System Menu will look like the menu below with the Virtual Keyboard, Virtual Numeric Keys, and Calibrate Touchscreens items visible:

Connections & Setup

System Menu

Language

Notepad

Calculator

Upload Recent Data

Reset Mouse & Kbd

Restore Toolbar

User Interface

Configure eDART

Restart System

Shutdown System

NOTE

If you do not have a keyboard and mouse connected to the *eDART™*, you will have to Phindows into the *eDART™* to setup the touchscreen.

1. Plug your touchscreen into the Video and COM 4 ports on the *eDART™*.
2. Power up the touchscreen.
3. To setup the touchscreen, access the *eDART™* software and bring up the *eDART™* Configuration screen from the System menu. At the bottom right corner of the screen, click the down arrow on the COM 4 combo box and select either "Touch Screen Smartset" or "Touch Screen Intellitouch" depending on the controller you are using. Refer to the illustration below for reference.
4. Click the Save Configuration button.
5. From the System menu, select Restart System.
6. After restarting the *eDART™*, bring up the System menu and select Calibrate Touchscreen (If you do not have a mouse connected to the *eDART™*, you will have to Phindows in to the
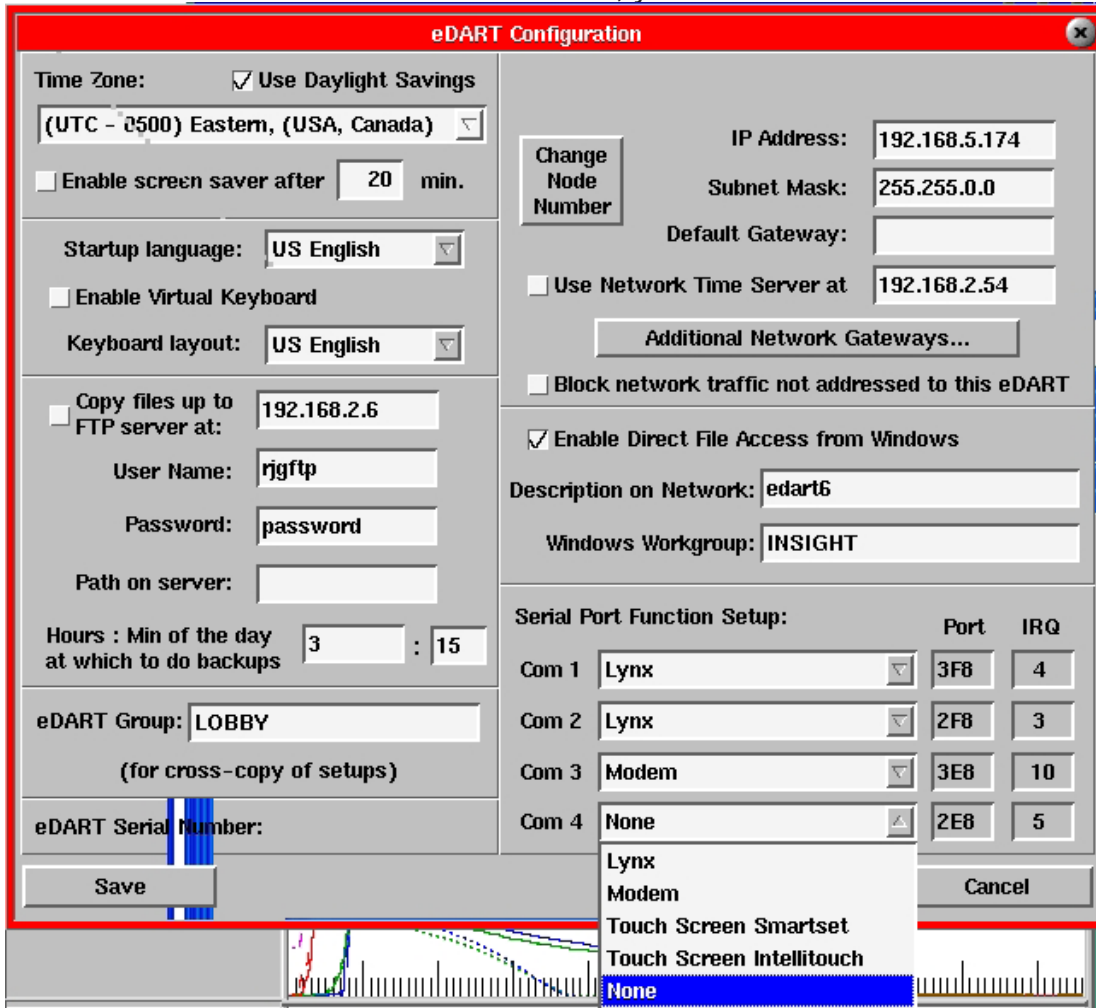
eDART™ from another location to perform this step). A calibration screen will appear where you will be prompted to touch the corners and center of the screen to input the screen size and coordinates. This will only have to be done once, unless the touchscreen is disconnected or a new one is attached.

Using the Touchscreen

Input letters and numbers using the Virtual Keyboard and Numeric Keys options.

Use the arrow button to drag either of these screens to a different location on the screen. Use the 'x' button to exit.

If you have a touchscreen selected in the *eDART™* configuration then three more selections appear on the system menu as shown below.

Virtual Keyboard

Virtual Numeric Keys

Calibrate Touchscreen
This brings up a utility with targets that you press to tell the touchscreen where the corners are. Of

course you need to have at least a keyboard on the system once to get the calibration to work. After that it is remembered on each re-boot.

*Tip: Do NOT Phindow in to calibrate the Touchscreen.

eDART™ Configuration

The *eDART™* Configuration tool allows you to access and change *eDART™* time, language, hardware and network options. Here, you can enable the FTP backup feature, change the *eDART™'s*

IP address, and modify options. To access this tool, bring up the System menu and select "Configure *eDART*".

When you have completed any changes, click "Save". If the *eDART™* has security turned on for configuration then you will be prompted to log in before saving any changes (unless already logged in). Then the *eDART™* must be restarted for most changes to take effect.
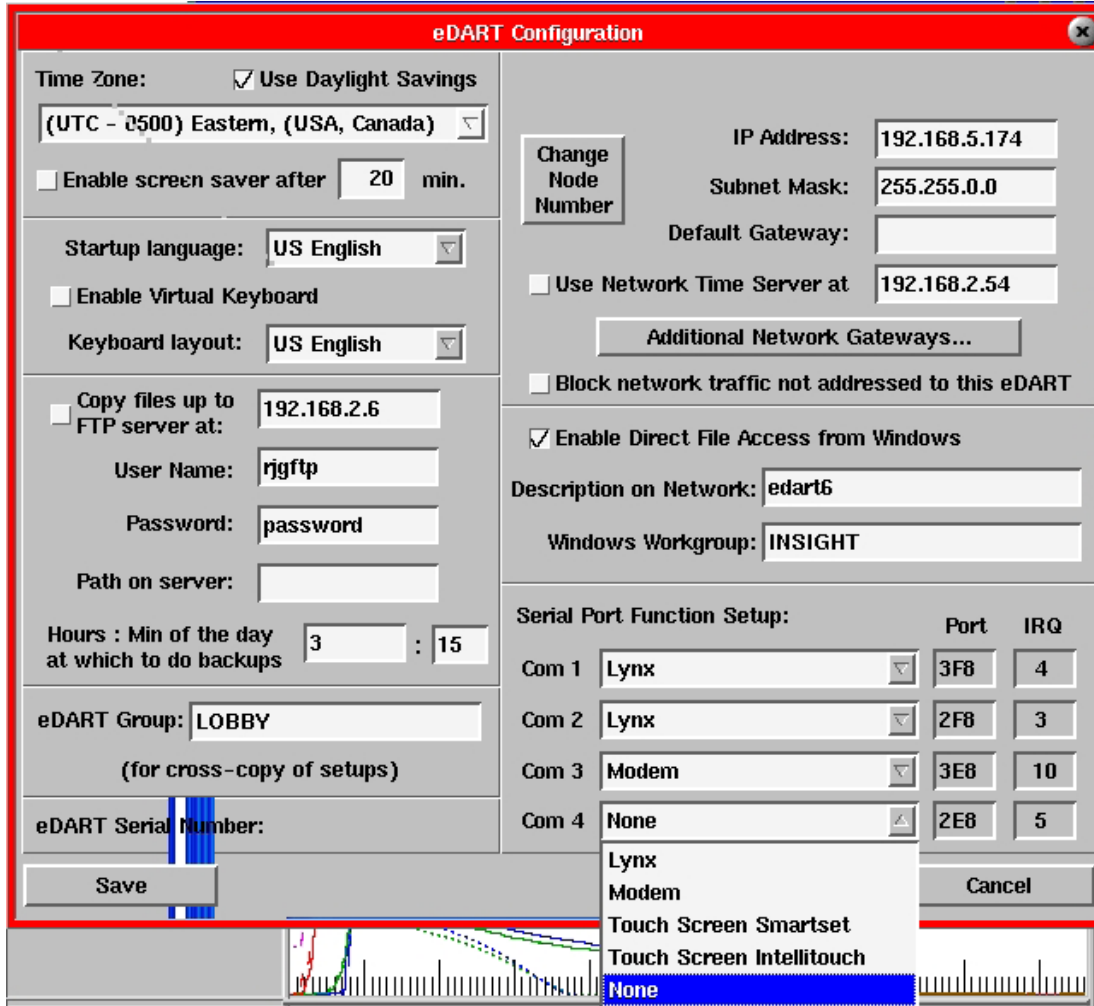
(*eDART™* Configuration continued)

Section I

Time Zone
Select the time zone that you are in.

Use Daylight Savings
Check this box if you are affected by Daylight Savings time.

Enable screen saver after [20] min.
Check this box to enable the screen saver. The screen saver will come on after the number minutes of keyboard or mouse inactivity shown to the right. This time is normally set global to all the *eDART™s* in the same group though they will not use a new time setting until they get restarted.

If someone is using Phindows to connect to and view the eDART™ console then the screen saver will not come on. Also if you start Phindows while the screen saver is running on an *eDART™* then the screen saver on that *eDART™* will stop so that you can see the screen.

Section II

Startup Language
Here, you can select which language you would like the *eDART™* to use when it first starts. You may later change the language "on the fly" with the "Language" selection at the top of the QNX system menu. However when the *eDART™* re-starts it reverts to the selection chosen here.

Keyboard Layout
Choose the type of keyboard physically connected to the *eDART™*. Then the keys will produce on the screen the characters shown on the keyboard. If you do not have a keyboard with all of the language characters needed, you can use the *eDART™'s* "Compose Sequences" to create them.

Section III - If EDM is not present

Copy files up to FTP server at
The FTP copy feature backs up *eDART™* configuration and Phlat files (process data) to an FTP Server on regular intervals.

Make sure the box is checked if you want to use this feature. If the box is unchecked, this section is not functional.

To the right of the check box, type in the Insight Server's IP address.

(*eDART™* Configuration continued)

User Name/Password
You will create a user name and password when setting up the Insight Server. Enter that name and password in these text boxes.

If you enable the FTP file copy feature on the *eDART™* it can move a huge amount of data up to the server. First it will move everything that has accumulated on the *eDART™* up to the time you turn the FTP copy on. Then it can create an additional 50 to 200 megabytes per day of data per *eDART™*, depending on the number of sensors. You must set up a regular purge on the server (with possible archive) or the server's drive will fill up and may crash.

Path on server
This is the path or location that you will place the copied *eDART™* files on the Insight Server.

Hours of the day
In military time, type in the times you would like the *eDART™* files to be backed up. To backup at multiple times a day, use commas and enter the times you would like (See illustration above). We recommend staggering the backup times for each *eDART™* so that they do not all run their backups at the same time.

Section IV

eDART ™ Group
This feature is used for cross copying files between *eDART™s*. When you set up *eDART™s* to cross copy, you can easily move from one machine to another without changing any settings because setups are copied between *eDARTs*.

To create an *eDART™* cross copy group, simply access the System Configuration tool from each *eDART™* you would like to include and type in the same name in the "*eDART* Group" text box. Generally all *eDART™s* on machines that can use a set of molds need to be set to the same group.

NOTE:
This only works if the *eDART™*(s) are on the same "physical" network; i.e. connected with wire and hubs but not run through routers, bridges or TCP/IP switches.

Section V

eDART™ IP Address
This is the IP Address of the *eDART™* you are currently using.

Subnet Mask
The Subnet Mask controls the subnet that the other *eDART™s* have to be on. In order for the *eDARTs* to "see" each other, they must have access to the subnet each is on.

Default Gateway
Here, you can enter the IP Address of the gateway. A gateway is usually a computer with two network cards that must pass the IP communications from the *eDART™* through to another network. The RJG Insight Server is a gateway. The gateway address is only needed if you have an *eDART™* or other IP Address on the other side of the gateway.

NOTE:
The gateway must be in the same or a higher lettered IP class.

Use Network Time Server at
Here, you can enter the IP Address of your time server to keep your *eDART™* time clocks synchronized. If you do not have a time server, leave this entry blank. If you have internet access through a gateway, the U.S. naval observatory time server can be accessed at 192.5.41.209.
(*eDART™* Configuration continued)

NOTE:
The RJG Insight Server is configured as a time server. If you are using an RJG Insight Server, then enter its IP address.

Additional Network Gateways
Use this option if you have more than one network with gateways to them. Click the button to bring up

a screen where multiple Gateway IP Addresses can be entered.

Block network traffic not addressed to this *eDART*™
Normally this switch should be on. However some older *eDARTs* will not communicate on the Ethernet network if this switch is turned off. By default, the switch will be on. Switch this switch off for older *eDART*™*s* that won't communicate with it on.

When turned on, the Ethernet card in the *eDART*™ prevents network traffic not addressed to this *eDART*™ from being processed by the software. The network card actually discards messages not addressed to the *eDART*™ before the operating system needs to deal with them.

This reduces the network load on the *eDART*™ and prevents most network traffic from interrupting the *eDART*™*s* communications with its Lynx™ sensors. Nevertheless, this switch (when ON) will not block "broadcast" network messages; that is messages addressed to all computers on the Ethernet. We have found that some networks have far too much broadcast traffic. If this is true, turning this switch on will not help reduce interruption of the Lynx communications.

Section VI

Enable Direct File Access from Windows
Use this option if you would like to open files saved on the *eDART*™ yourself through a Windows computer. The *eDART*™ files will become available on your computer. Simply select the *eDART*™ you would like to access by clicking on its node name under Network Neighborhood directory. If the *eDARTs* do not show up in "Network Neighborhood", access them directly using "\\ip address\". Normally only the /data, /logs and /tmp directories can be modified.

> **CAUTION**:
> While the *eDART*™ will not run any known virus some, viruses on customer systems have gone about looking for a computer to which they can copy large quantities of data. If this happens, the *eDART*™(s) drive can fill up and cause it to cease functioning. If you have any concerns about this type of virus there are two solutions: Turn the Enable Direct File Access switch off or contact RJG for a method of making the data space on the *eDART*™ "Read-Only".

Description on Network
Type in a short description of the particular *eDART*™. This description will appear in the "Comment" column in Windows file explorer.

Windows Workgroup
Under Network Neighborhood, you may want to group your *eDARTs* into one group. This is where you enter that group name.

Section VII

Serial Port Function Setup
Here, you can configure the connections to the ports on your *eDART*™. This section won't usually need to be changed unless you have to change a port, in which case, you would use the drop down boxes. For example, if you've switched to a touch screen system, you would have to change Com 4 to "Touch Screen".

User Interface

The *eDART*™ User Interface provides an easy way for you to issue QNX commands, check file

listings, copy, delete, rename directories and files, etc.

The screen is divided into three sections. The directory/file lists are on the left, the shell is in the center, and the command buttons are on the right.

Directory Tree

The left side of the screen displays the directory tree for the currently running *eDART™*. You can use this to copy, paste, and delete directories and files within the *eDART™*. Click the '+' and '-' buttons to expand and collapse the list.
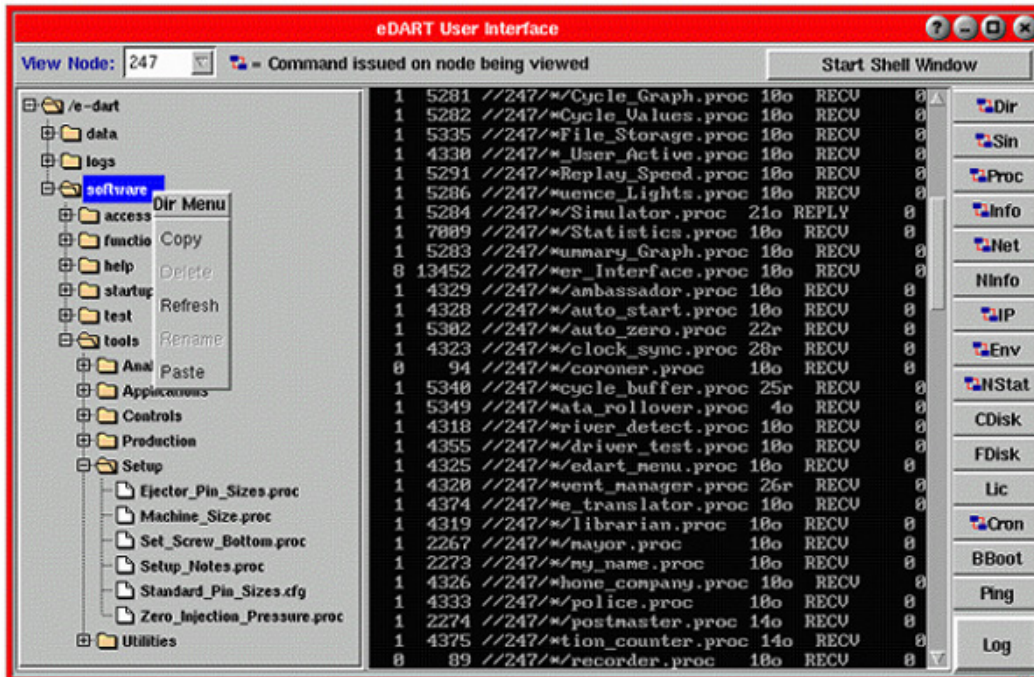
View Node Combo Box

Allows you to select the node number of the *eDART™* on which you would like to issue a command.

Start Shell Window Button

Opens the basic shell where commands must be typed in manually.

Command Buttons

These buttons can be used to execute various system commands.
(User Interface continued)

Remote User

When this window appears, another user is accessing this *eDART™* from another computer.

If you would like to prevent the remote users from viewing the software, click the Clear Remote Users button. This will discontinue their Phindows session.

The number shown (e.g. #247) is the node number of this *eDART™*. This shows the remote user which *eDART™* is being viewing.

Utilities

This section describes the features found in the Utilities section of the *eDART™* software.

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Architect Tool

The Architect is the system configuration tool. Here you can set up the *eDART™* software tools you would like to monitor for each job.

Each *eDART™* "tool" is a separate software program. In the Architect, you will see all the *eDART™* software tools available listed in categories on the right side of the screen. The first time you access the system, certain tools will appear as defaults. These tools will either appear on the screen or they will be minimized on the toolbar at the bottom of the screen. The defaults have been enabled through the Architect. To remove any of these tools or add additional ones, access the Architect from the Main Menu (on the toolbar at the bottom of the screen).
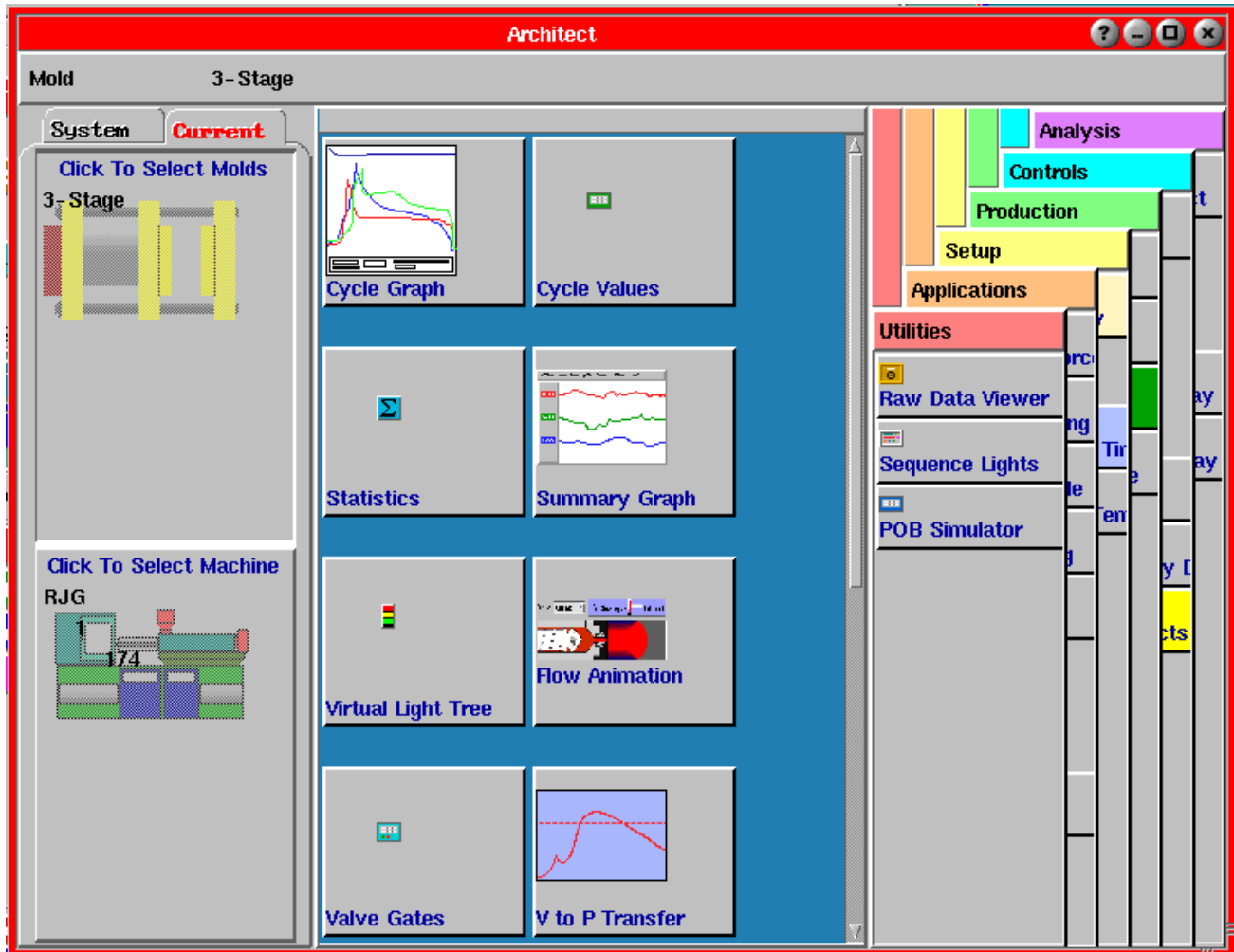
(Architect Tool continued)

Current tab

The Current section of the Architect (under the "Current" tab) is used to edit the setup for the current mold and machine. The tools that you enable to view for the current job will be displayed on the blue work area.

Setting up a Mold
1. Select the "Current" tab at the left side of the Architect and click the large Mold button directly below it.
2. From the six pull-down menus on the right side of the Architect, you will be able to choose the tools you would like to monitor for a particular mold.
3. To select these tools, click on each one (one at a time), hold down the left mouse button, and drag it to the blue work area in the middle of the Architect.
4. When finished, click the Save Changes button at the top right corner. Every time this mold is run, the tools you have selected will be set as defaults (available on the toolbar).
5. To make changes, repeat the above steps and click the Save Changes button.

Setting up a Machine
1. Select the "Current" tab at the left side of the Architect and click the large Machine button below it.
2. From the six pull-down menus on the right side of the Architect, you will be able to choose the tools you would like to monitor for a particular machine.
3. To select these tools, click on each one (one at a time), hold down the left mouse button, and drag it to the blue work area in the middle of the Architect.
4. When finished, click the Save Changes button at the top right corner. Every time this machine is running, the tools you have selected will be set as defaults (available on the toolbar).
5. To make changes, repeat the above steps and click the Save Changes button.

System tab
The System section of the Architect (under the "System" tab) is used to set up defaults that will be used for the entire system. The "System" tab displays a directory structure of where all the data, machine, and mold setups are stored.

Here, you can attach software tools to specific levels of the Job Setup (Mold, Materials, Cavities, etc.). Click the + icons to expand a directory or - to collapse a directory.

This is also where the main menu is configured. For further details on utilizing the Architect's features, see How to Start and Stop Software (Tools).

Start and Stop Software

Each *eDART™* "tool" is a separate software program. The first time you access the system, certain tools will appear as defaults. These tools will either appear on the screen or they will be minimized on the toolbar at the bottom of the screen. The defaults have been enabled through the Architect. To remove any of these tools or add additional ones, access the Architect from the Main Menu (on the toolbar at the bottom of the screen).
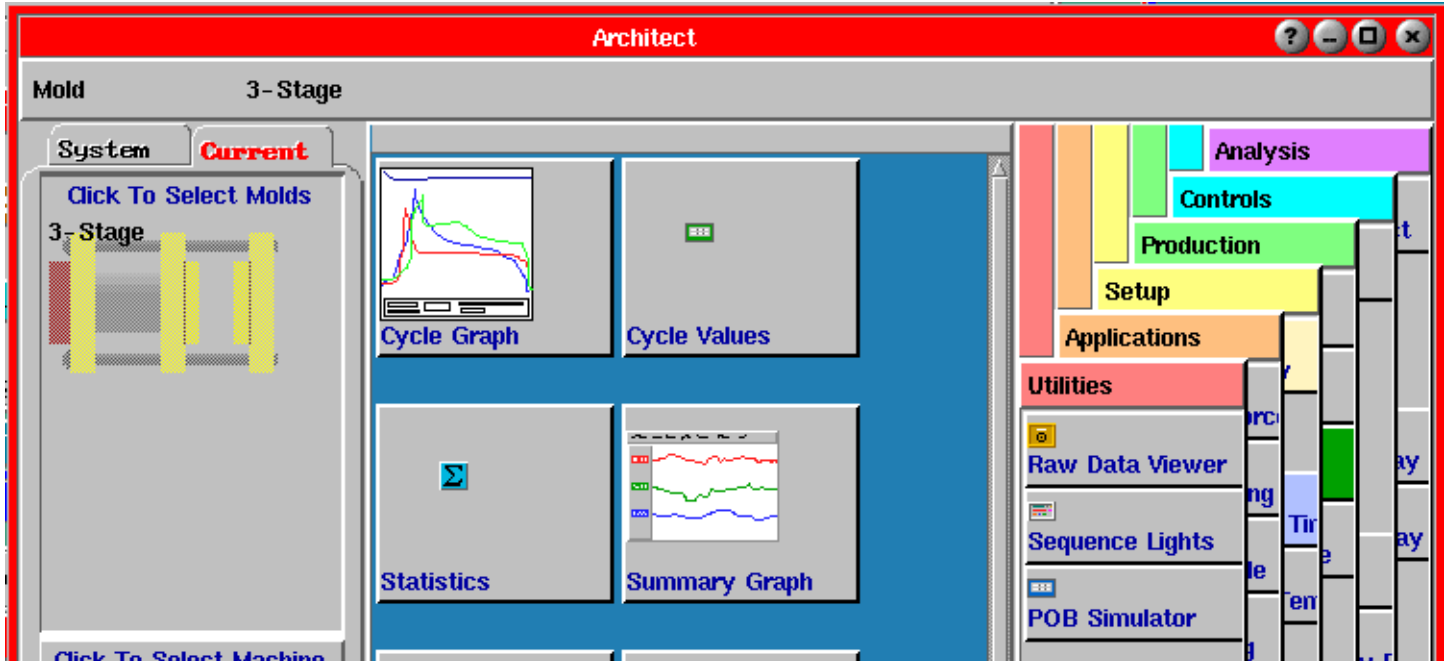
Enabling Tools

In the Architect, you will see all the *eDART™* software tools available listed in categories on the right side of the screen.
Make sure the "Current" tab (on the left side of the screen) is selected. You will see two large buttons directly below it.

1. Click the top button to "attach" tools to the current mold.
2. Click the bottom button to "attach" tools to the current machine.

If you would like to attach tools to specific levels of the job setup (Mold, Material, Cavities, etc), follow the steps below:

1. Select the "System" tab on the left side of the Architect.
2. Expand the Mold directory by clicking on the [+] buttons.
3. Click on and highlight the folder (level) where you would like to attach tools.
4. From the categories at the right, select the tools you would like to enable. Click on the tool button that you would like to select.

Holding the left mouse button down, drag the selected button to the blue work area in the center of the Architect.

(Start and Stop Software continued)

These tools will now be enabled and will either appear on the screen or be minimized on the toolbar at the bottom of the screen.

If you would like to select and enable specific tools, follow the steps below:

<div style="border: 1px solid blue;">

NOTE:
Do not drag the Architect button off the blue work area. The only way to access this tool is through the main menu so it must be enabled.

</div>

1. Click on the tool button that you would like to select. In the example above, the Cycle Graph, Cycle Values, and Summary Graph tools have been selected and will be "attached" to the current mold.
2. Holding the left mouse button down, drag the selected button to the blue work area in the center of the Architect.

These tools will now be enabled and will either appear on the screen or be minimized on the toolbar at the bottom of the screen.

Removing Tools

To remove a tool, access the Architect, click on the tool button that you would like to remove, and drag that button to the right side of the Architect. You do not need to place each button on the correct tab. The button will automatically return to the correct tab when you drag it to the right.

Creating New Molds and Machines

Under the System tab, you also have the option of creating new Molds, Machines, etc. as you would in the Job Setup tool.
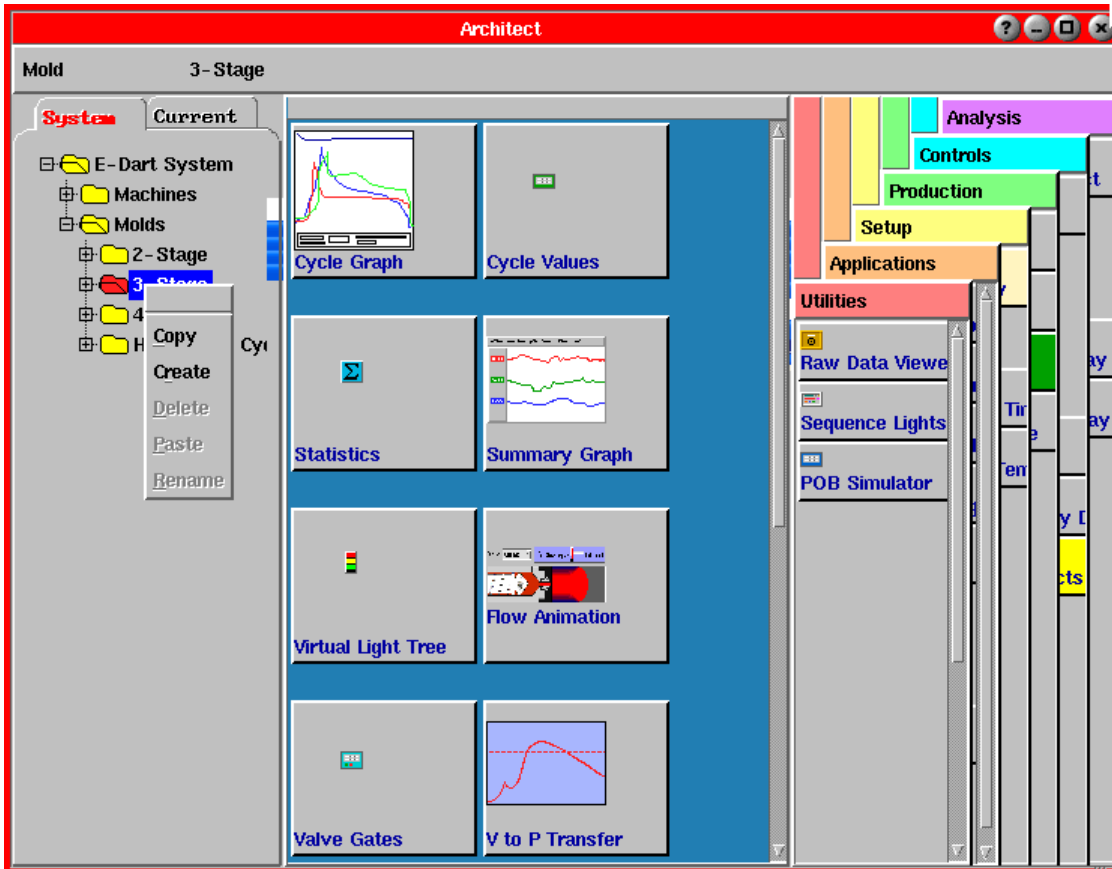
1. Under the System tab, expand the directory to find the level (e.g. Machines, Molds) at which you would like to begin.
2. Click on and highlight the folder (level) you have selected and right click to bring up a Level menu.
3. From the menu, select "Create". The dialog below will appear.

Customizing the Main Menu

The first time you access the system, the Main Menu will contain default tools. This can be reconfigured to include only the tools you would like. The Main Menu is intended as a place to find temporary tools (setup, version, etc.) that do not necessarily need to be in view constantly when a job is running.

To reconfigure the Main Menu, access the Architect through the Main Menu (on the toolbar at the bottom of the screen).
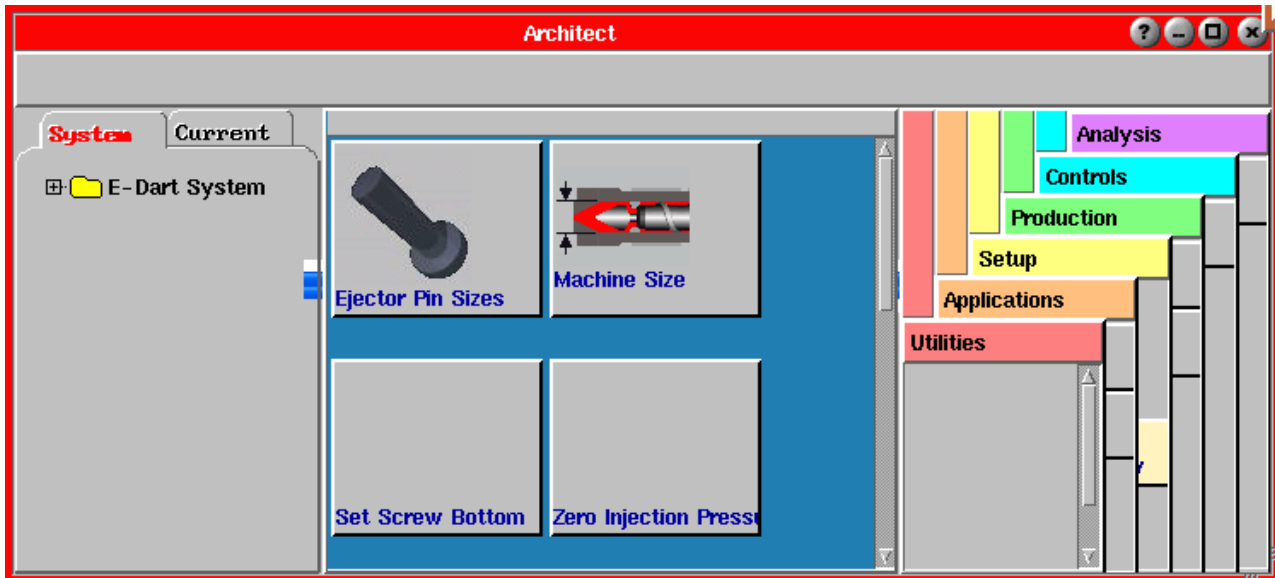
1. Under the "System" tab at the left side of the screen, you will see a "E-Dart System" folder.
2. Double click on this folder to access the Main Menu tool options (make sure that "E-DART System" is highlighted in blue).
3. Here you can drag the tool buttons on and off the blue work area. If the buttons are on the blue work area, they will become available as options on the Main Menu. If they are removed from the blue work area, they will not be available as options on the Main Menu.

Using the System Side of the Architect

If you would like to attach tools to specific levels of the job setup (Mold, Material, Cavities, etc), follow the steps below:

1. Select the "System" tab on the left side of the Architect.
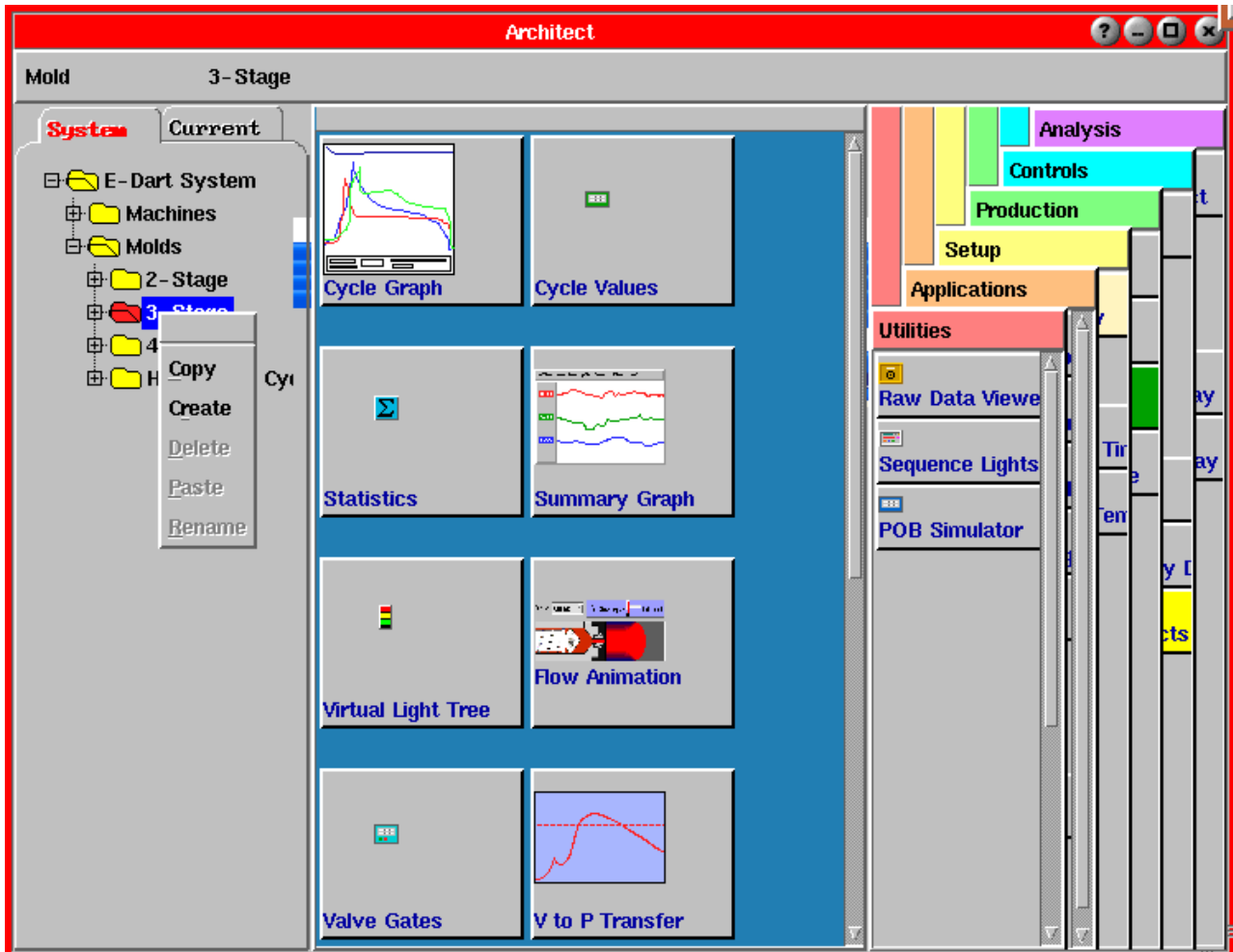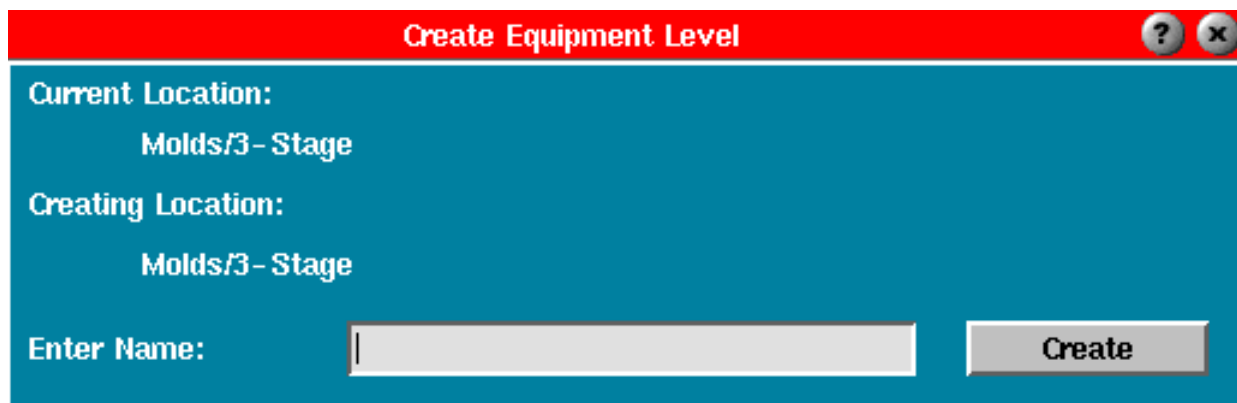
2. Expand the Mold directory by clicking on the [+] buttons.
3. Click on and highlight the folder (level) where you would like to attach tools.
4. To enable tools, drag tool buttons (from the right side of the Architect) on and off the blue work area.
5. Exit the Architect.

Under the System tab, you also have the option of creating new Molds, Machines, etc. as you would in the "Job Setup" tool.

1. Under the System tab, expand the directory to find the level (e.g. Machines, Molds) at which you would like to begin.
2. Click on and highlight the folder (level) you have selected and right click to bring up a Level menu.

1. From the menu, select "Create". The dialog below will appear:

2. Enter the name of your new level and click the Create button.

Architect Tips

Why you would want to:
➤ Attach tools to the Mold: Some molds run V->P and others don't (run 2-stage); maybe Valve Gate control, gas assist, etc.
➤ Attach tools to the Material: Some materials requiring 3-stage (v->p), others only 2-stage
➤ Attach tools to the Machine: Machine with cvp valve retrofit always runs Basic 3-Stage control; shuttle control
➤ All molds: lot number entry, regardless of mold or job; analysis tools usually desired on all molds.

Views

The Views tool allows you to arrange the Insight System™ tools any way you like on the screen and monitor only the ones that you need to at a time. The system comes with four RJG default Views. You can create additional Views if needed.
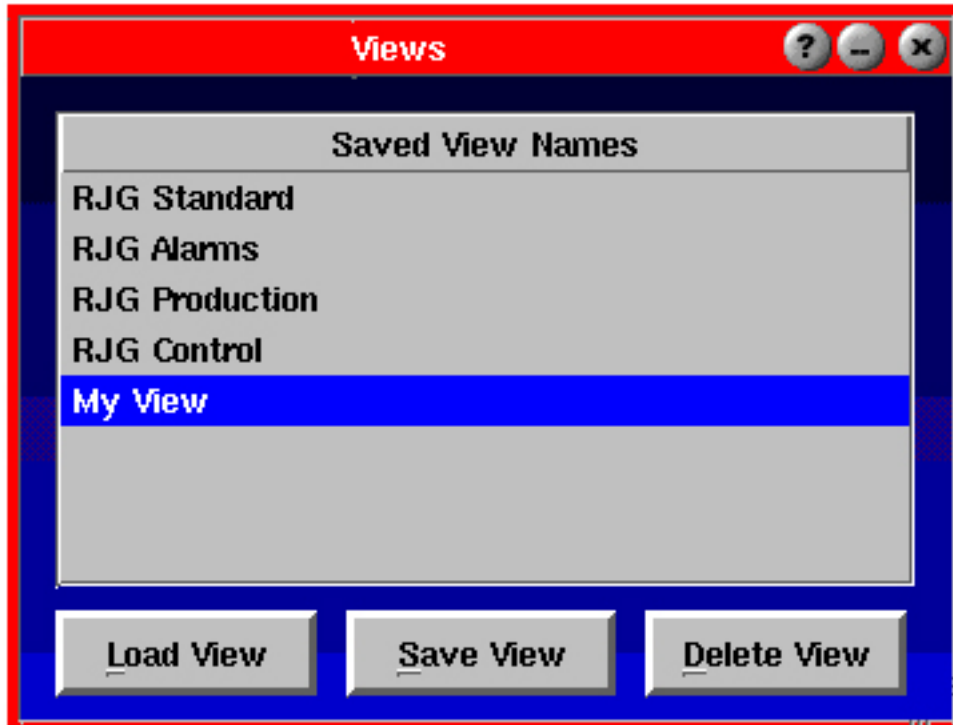
Using a Default View
Open the Views tool by bringing up the Main Menu and selecting Views. Simply click on the View that you would like to use and click the Load View button. All the tools included in that View will appear on the screen unless a particular tool is not running.

> **NOTE**:
> If a tool that you would like to include in a view is not currently there, it can be launched through the Architect.

Load View
Select a view from the list on the tool and click the Load View button. All of the tools included in that view will appear on the screen, unless a particular tool is not running.

Creating a View
From the toolbar across the bottom of the screen, select the tools you would like to include in your view by clicking on their buttons one at a time. Once the windows appear on the screen, position them as you would like to save them (it is best not to overlap windows). When finished, bring up the Main Menu and select Views. When the Views tool appears, click on the Save View button. You will then be prompted to name your view. Type in a name and click the Accept button.

Deleting a View
If you would like to delete a View that you have created, click on its name in the Views tool and then click the Delete View button.

> **NOTE**:
> RJG Default Views cannot be deleted.

Raw Data Viewer

The Raw Data Viewer is used for viewing all of the raw numbers coming in from any of the inputs that are connected to the *eDART™*. It is a troubleshooting tool with several purposes:

- ➢ Check sensors for overrange, underrange etc.
- ➢ Check details on sensor calibration and internal firmware settings (Data Details button)
- ➢ Zero certain sensors that might need zeroing but do not have auto-zero by default.
- ➢ Check the Lynx ports for communication stability and statistics (Data Details on Diagnostic Info, Port N).
- ➢ Verify the contents of the entire *eDART™* data memory for connections to third party software using the Active-X control.

Raw Data Viewer (eDART #207)

☑ Show Sensors Only   Refresh Rate (per second):   [Data Details...]
☑ Show active data only   1   100

S/N:Signal	Attached to	Type	Location	Value	Raw	Accuracy	Status	Last Chg	Failure
		Diagnostic Info	Port 2				Valid	345.780	
		Diagnostic Info	Port 1				Valid	345.790	
01 230 05309:1	Mold	Ejector Pin Force	End of Cavity #SG Bui	0.000000	0	0.18 %	Invalid		Ovrng
00 001 00016:1	Mold	Ejector Pin Force	Post Gate	0.000000	0	1.06 %	Invalid	55.580	Ovrng
00 000 00034:1	Machine	Hydraulic Pressure	Braking	0.000000	0	0.23 %	Valid	345.797	
00 300 00011:1	Machine	Hydraulic Pressure	Injection	0.9158	1	0.25 %	Valid	345.820	
01 040 00102:2	Machine	Seq. Module Input	First Stage		0		Valid		
01 040 00102:6	Machine	Seq. Module Input	Not Used #2		0		Valid		
01 040 00102:5	Machine	Seq. Module Input	Not Used #1		0		Valid		
01 040 00102:7	Machine	Seq. Module Input	Not Used #3		0		Valid		
01 040 00102:4	Machine	Seq. Module Input	Mold Clamped		0		Valid		
01 040 00102:3	Machine	Seq. Module Input	Screw Run		0		Valid		
01 040 00102:1	Machine	Seq. Module Input	Injection Forward		0		Valid		
01 075 00218:2	Machine	Sorting Output	Good Control		0		Valid		
00 000 00003:1	Machine	Stroke	Injection	6.729	5336	0.04 %	No Reply	53.937	
		System Control Output	Operate		0		Valid		
00 000 00003:2	Machine	Velocity	Injection	0.000000	0	0.04 %	No Reply	53.937	

Refresh Rate (per second)
Adjusts the speed at which the numbers get updated (in updates per second). This is initially at five times per second. This is the limit if anyone is using Phindows to view the data.

Show Sensors Only
When checked, the Raw Data Viewer limits the list to show only devices with serial numbers (physical sensors). When unchecked, it shows everything including internal values (such as system clock and timing signals) and cycle buffers (locations ending in -b), all summary values and all production values.

Show Active Data Only
When checked, the Raw Data Viewer limits the list to show only "Valid" values.

Data Details
Brings up a details screen for the selected device. Some devices may need to be manually zeroed; e.g. Stroke, Pull-In Cylinder. If they do then you can find the "Zero" button on the details page for the sensor.

(Raw Data Viewer continued)

S/N: Signal
Device serial number and signal (separated by a colon). The "Signal" is the number of the signal from a device that contains more than one value (e.g. stroke and velocity). The serial numbers are programmed into the devices when they are calibrated. The numbers are ten digits, as follows:

➢ yy ttt nnnnn
➢ yy = Year
➢ ttt = Type of device
➢ nnnnn = Sequence number for that type of device in that year

Attached to
Type of equipment to which the device is attached (Mold, Machine etc.)

Type
Device type (e.g. Hydraulic or Seq. Module Input) or summary value type (e.g. Peak).

Location
The physical location (e.g. Post Gate) or function (e.g. Injection Forward) of the device.

Value
Value converted to engineering units.

Raw
Raw integer counts before scaling.

Accuracy
Precision stored inside the device.

Status
The current status of the device.

Valid
If the Status is "Valid" and the "Raw" counts change when force is applied to the (mold pressure) sensor, you can be confident that the sensor is operating properly.

Stale
A "Stale" status indicates that the device is not being used (no longer being updated). The value cannot be computed or the program has stopped.

No Reply
If the Status is "No Reply", the device is not communicating on the network and may have been unplugged from its network connection.

(Raw Data Viewer continued)

Invalid
There has been a failure reported from the device. The Failure column will read "Ovrng" or "Undrng". "Ovrng" indicates that the device has shifted outside the upper spec. "Undrng" indicates that the device has shifted outside the lower spec. If using a sensor adapter, this can indicate that no sensor has been attached.

Last Change
Last change time in seconds since the Raw Data Viewer started.

Failure
Reason for failure reported from the device. Undrng ("Underrange") is the most common for strain-gage sensors that have been worn beyond their specification over time or have a damaged sensor wire. Ovrng ("Overrange") usually means that the sensor has a damaged sensor wire or that a sensor adapter is not plugged in to the older style sensor (with the T-520 cable).

> **NOTE**:
> This is only to be used in emergencies where something is not running properly due to a software bug. It will stop all control outputs, data collection, data views, etc; so do not use the feature unless you have to.

Sensor Locations

The Sensor Locations tool shows all of the Lynx devices connected to the system. The *eDART™* software will identify each Lynx digital device by serial number and display its Type and Location. This tool requires minimal configuration and can be used to easily monitor machine signals connected to the *eDART™*.

The items shown in gray cannot be changed. For example, a stroke sensor is always measures stroke so you cannot change that. You must identify where each device is located before the Accept will work.

When you click Accept, this tool does a bunch of checks for validity. It requires you to assign a location for each sensor and not leave any blank. It also will not let you have two sensors of the same type and location unless they have a different identifier (e.g. cavity number). If you have Lynx piezo devices (such as the Piezo Adapter or Lynx Piezo Sensor) then this tool checks to see if you have mold operate sequence signals. If not, a message will appear. This is described more fully at the end of this section.

Select sensor locations and scaling

Accept

Serial #. : Signal	Sensor Type	Sensor Location	Identifier	Setup	Value
01 600 00069:1	Stroke	Injection			0
01 300 00013:1	Hydraulic Pressure	Injection			-2.747
01 040 00060:1	Seq. Module Input	Injection Forward			◯
01 040 00060:2	Seq. Module Input	Screw Run			◯
01 040 00060:3	Seq. Module Input	First Stage			◯
01 075 00438:1	Control Output	V->P Transfer			
01 075 00438:2	Control Output	Inject Enable			
01 075 00201:1	Control Output	CVP Valve Slow			
01 224 00035:1	Ejector Pin (indirect)	Post Gate	1		0.3053

Serial/Signal Number

Each Lynx device is assigned a specific serial number. This is how the system identifies each device when attached. The signal number only applies to devices that contain multiple signals (e.g. Stroke/Velocity Encoder or a Sequence Input Module with seven on/off "digital" inputs). Each Serial and Signal # combination is unique for each sensor type.

Sensor Type

Sensor Type tells the system how to analyze the signal from the Lynx device. Most device types are static. For example, a hydraulic pressure sensor only measures hydraulic pressure, but it can be located on the injection unit, clamp, or ejection system. You cannot change most sensor types because they have been pre-programmed.

(Sensor Locations continued)

Sensor Location

The Location describes the physical location of each Lynx device in the system (e.g. End of Cavity vs. Post Gate in a mold or Mold Closed vs. Mold Open on a limit switch). Select the correct location for each device from the combo boxes.

Identifier (Cavity) Number

For multi-cavity applications, you must enter a cavity number or name. You cannot set two mold pressure sensors at the same location (e.g. end-of-cavity) unless they have different cavity numbers or names. For example, you may have two cavities each instrumented with a Post Gate sensor. You could name one "right" and the other "left" if they made right and left side auto lenses, for example. The maximum number of characters that can be entered is 15.

Setup & Scaling

Most Lynx™ devices have built in scaling. However, a Sensor Adapter or an Analog Input Module can measure different types of signals that have different scaling. If they have not been set up yet, you will see the word "Setup…" under Location. Click the Location combo box (or the Setup button) to bring up a Sensor Scaling Setup tool where you can set the scaling.

Sensor Adapters and mold pressure interface devices allow you to pick from a list of standard RJG sensor types. These will fill in the scaling for you automatically. If you have a sensor type not listed, you can use the "Other" selection to set it up yourself. After you have accepted the scaling, you still need to set the Location for the newly scaled sensor.

When finished, click the Accept button.

Value

Shows the device's current input value (for input devices only).
On/off digital device types (e.g. Sequence Module) will show a green light when "on" and gray when "off". Use this light to make sure machine signals are wired correctly (by watching and listening to the machine).

All other input device types (e.g. Lynx mold pressure or Analog Module) will show a numerical value, which represents the device's current input level. You can locate pressure sensors in the mold by pressing on each pin or sensor and watching the value go up and down.

Since most devices start with an initial offset (offset when calibrated), this offset is subtracted. The reading is the actual "un-zeroed" input value. If the device has suffered damage, the value may show an excessively high or low value when there is no load.
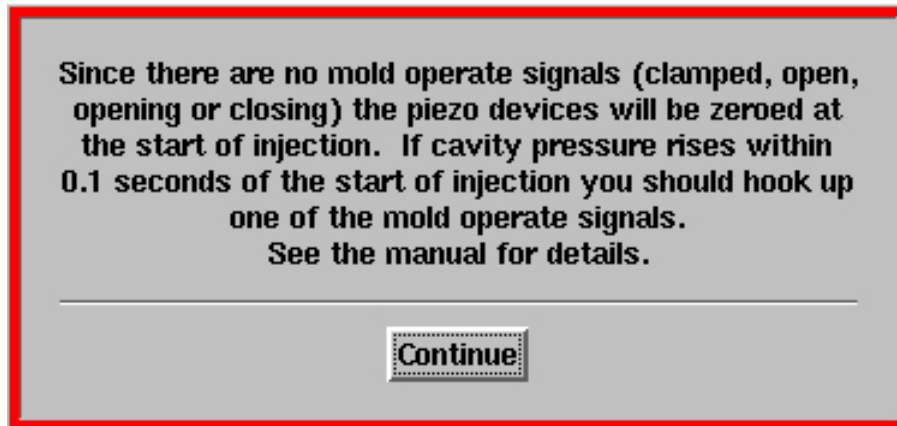
Piezo Sensors Without Mold Sequence

Piezoelectric sensors are attached to the *eDART™* through the Piezo Adapter or Lynx Piezo Sensor head. These devices contain a charge amplifier that needs to have its electronics cleared on each cycle. The *eDART™* normally sends a clear (or zero) signal to these devices when the mold operates (below). The device then clears its electronics within 0.1 second for the next shot.

The signals that zero the electronics are any one of the following, whichever occurs first:

➢ Mold Clamped (Seq. Module Input or Limit Switch) going ON (mold clamps up).
➢ Mold Fully Open (Seq. Module Input or Limit Switch) going OFF (mold is fully open).
➢ Mold Opening (Seq. Module Input) going OFF (mold has stopped opening and is now open)
➢ Mold Closing (Seq. Module Input) going OFF (mold has stopped closing and is now clamping up.
➢ Machine Sequence, Injection Forward going ON (start of cycle).

If none of the mold operation signals exist then the *eDART™* will display the following message. It is simply a reminder so you can click "Continue" after you have been reminded.

> Since there are no mold operate signals (clamped, open, opening or closing) the piezo devices will be zeroed at the start of injection. If cavity pressure rises within 0.1 seconds of the start of injection you should hook up one of the mold operate signals.
> See the manual for details.
>
> [Continue]

This means that the only signal available to the *eDART™* to zero the sensors is the one taken from the start of the cycle. This is often because there are no "hard" sequence inputs but the injection forward signal is assumed to come on when the ram starts to move (see Understanding Sequencing).

In that case the zeroing of the electronics takes place at the start of the cycle and may require up to 0.1 second to complete. If any pressure appears on the sensor during the first 0.1 second of the cycle it will get zeroed out by the *eDART™* and your data will not be entirely accurate. If no pressure appears at the sensor within that first 0.1 second then there is no problem. Most processes do not deliver the material to even the Post Gate sensor in that first 0.1 second so this mechanism is seldom an issue.

(Sensor Locations continued)

On a Running Job
If you attach an identifying sensor, Job Set up should come up on the screen with blank mold and machine levels. You can either select an existing job or create new mold and Machine levels and click Accept. Sensor Locations tool should come up where you can see the sensor type listed. Configure the Sensor Locations tool and click Accept and screen should display the standard view.

Additional Information
Maximum number of Sensors connected to *eDART™* on both the ports together is 60 (30 on each port). Practical limit is 36 Total on both the ports. (32 cavity pressure sensors, 10 Relay output Module OR2D).

Sequence Lights

The Sequence Lights tool shows you what stage of the process is taking place by showing the current on/off status of various Machine Sequences. The *eDART™* does its computations of various process parameters over certain time periods during the cycle. In order for these to be accurate, it generates internal signals called Machine Sequences. These are not necessarily wired to the Sequence Module, but can be created from other signals. For example, "Plastic Cooling" is generated by the *eDART™* as a signal on at the end of fill and off when the mold opens.
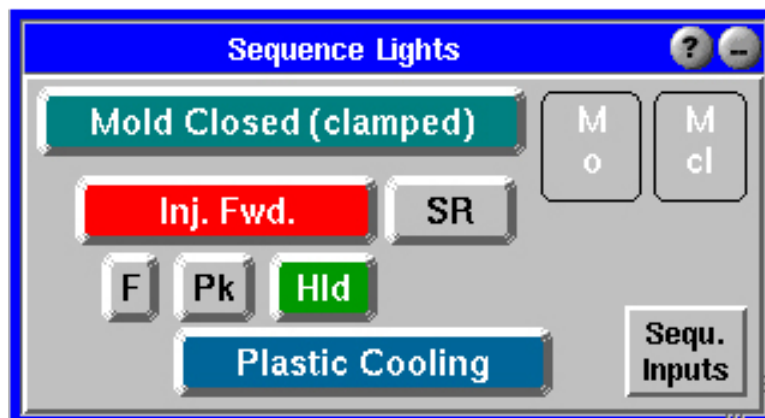
Mold Closed (clamped)
The "Mold Closed" signal is taken from either a digital input (directly wired to the machine), a mold closed limit switch, or when mold closing goes off. In the latter two cases, the mold may not actually be clamped up when this button lights up.

If both are attached, the first one to switch will change the state of the "Mold Closed" sequence signal.

This signal goes:

➢ ON at the end of the "Sequence Module Input, Mold Closing" and
➢ OFF at the start of Sequence Module Input, Mold Opening"

If the Mold Closed (clamped) button is grayed out, neither signal exists.

(Sequence Lights continued)

Mold Open (M o)
The "Mold Open" signal is taken from either a digital input (directly wired to the machine) or a mold open limit switch.

If both are attached, the first one to switch will change the state of the "Mold Open" sequence signal.

This signal goes:

➢ ON at the end of the "Sequence Module Input, Mold Opening" and
➢ OFF at the start of "Sequence Module Input, Mold Closing"

If the M o button is grayed out, neither signal exists.

Mold Closing (M cl)
The "Mold Closing" signal is taken from a wired digital input, if it exists.

This signal goes:

➢ ON when Mold begins to close and
➢ OFF at the start of "Sequence Module Input, Mold Closed (Clamped)"

If the M cl button is grayed out, the signal does not exist.

Injection Forward (Inj. Fwd.)
The "Injection Forward" Machine Sequence is generated by the *eDART*™ using the best source of signals available. These range from simple injection pressure thresholds to a hard-wired "Injection Forward" sequence signal.

If the *eDART*™ detects a hard-wired Injection Forward signal, it will use that to create the "Machine Sequence, Injection Forward" signal which goes ON when Injection starts and OFF when Hold time ends. If there is no hard-wired signal, the *eDART*™ assumes that injection starts on forward motion (from the stroke sensor) and ends with the last sudden drop in injection pressure before the start of Screw Run signal. For all other cases, settings are made in the Sequence Settings tool to set the ON and OFF times for Injection.

If the Inj. Fwd. button is grayed out, the *eDART*™ cannot generate "Injection Forward".

Screw Run (Screw)
The "Screw Run" signal is generated by the *eDART*™ from either a hard-wired sequence signal or a pressure switch in the screw motor hydraulic drive line.

If *eDART*™ detects a hard –wired Screw Run signal, it must go ON when Screw motor starts (during recovery) and go OFF when Screw motor stops.

If the Screw button is grayed out, the *eDART*™ cannot generate "Screw Run".

(Sequence Lights continued)

Fill (F)

The "Fill" signal is generated by the *eDART™* from the best possible signals. If hard-wired to the machine, it should go on as the screw passes through the position to which it recovered just before decompress and will go off when the second to last velocity profile begins.

If the "Fill" signal is not available on the machine, the *eDART™* generates it, turning it on at the zero point on the shot volume and off at a selected fill threshold in the sequencer.

If the F button is grayed out, the *eDART™* cannot generate "Fill".

Pack (Pk)

The "Pack" signal is turned on at the end of fill. It is then turned off by the *eDART™* using the transfer pressure set in cavity pressure control. If cavity pressure control is not in use, pack will only exist if the machine's "Fill" signal is considered to be a "Fill" and "Pack" combined signal.

If the Pk button is grayed out, the *eDART™* cannot generate "Pack".

Hold (Hld)

The *eDART™* turns on the "Hold" signal at the end of pack or, if there is no pack, at the end of fill. It then turns it off at the end of injection forward.

If the Hld button is grayed out, the *eDART™* cannot generate "Hold".

Plastic Cooling

The *eDART™* turns this signal on at the end of fill and turns it off on one of the following (listed in order of priority):

Mold Open goes on
Mold Closed goes off (if there is no mold open)
Screw Run goes off (neither mold open nor mold closed exist)

If the Plastic Cooling button is grayed out, the *eDART™* cannot generate "Plastic Cooling".

(Sequence Lights continued)

The button at the lower right corner of the Sequence Lights tool will bring up a Sequence Module Inputs tool.
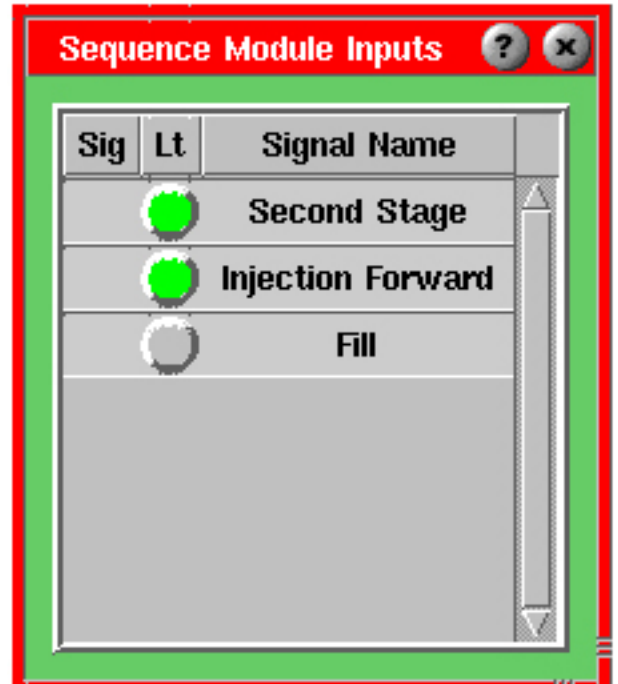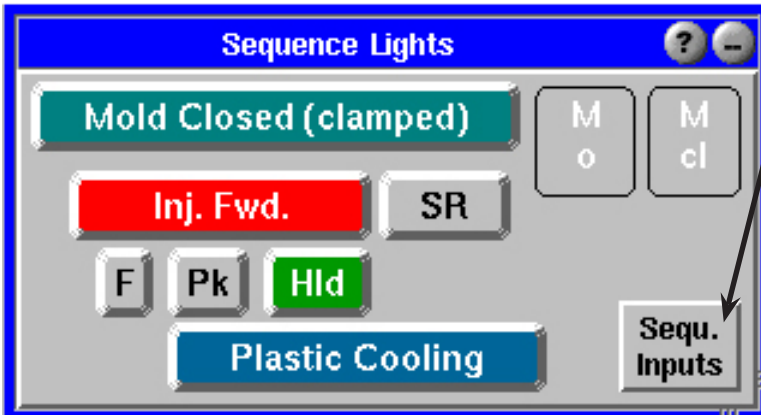
This tool shows the actual hard wired sequence signals instead of those computed by the *eDART™* (as on the main lights panel).

Use this as a diagnostic tool to see if the signals are firing at the right time and are wired to the correct sequence signals on the machine.

Notice that you can get Machine Sequences from the *eDART™*, which are not wired in. For example, "Plastic Cooling" is generated by the *eDART™* as a signal on at the end of fill and off when the mold opens.

Another example is machine "Fill" which can come from a volume zero crossing (ON) and threshold (OFF) as detected by the *eDART™*. In that case, there may not be any "Fill" input sequence signal, but the *eDART™* generates it for use in viscosity and other computations.

Sequence Settings Tool

Check the "Ignore all Sequence Inputs" box at the top of the Sequence Settings tool if your system has confusing sequence signals coming from the Sequence Module (ID7-D-SEQ). This can happen if the incorrect signals were wired to the Sequence Module or the wrong pulses are being delivered.
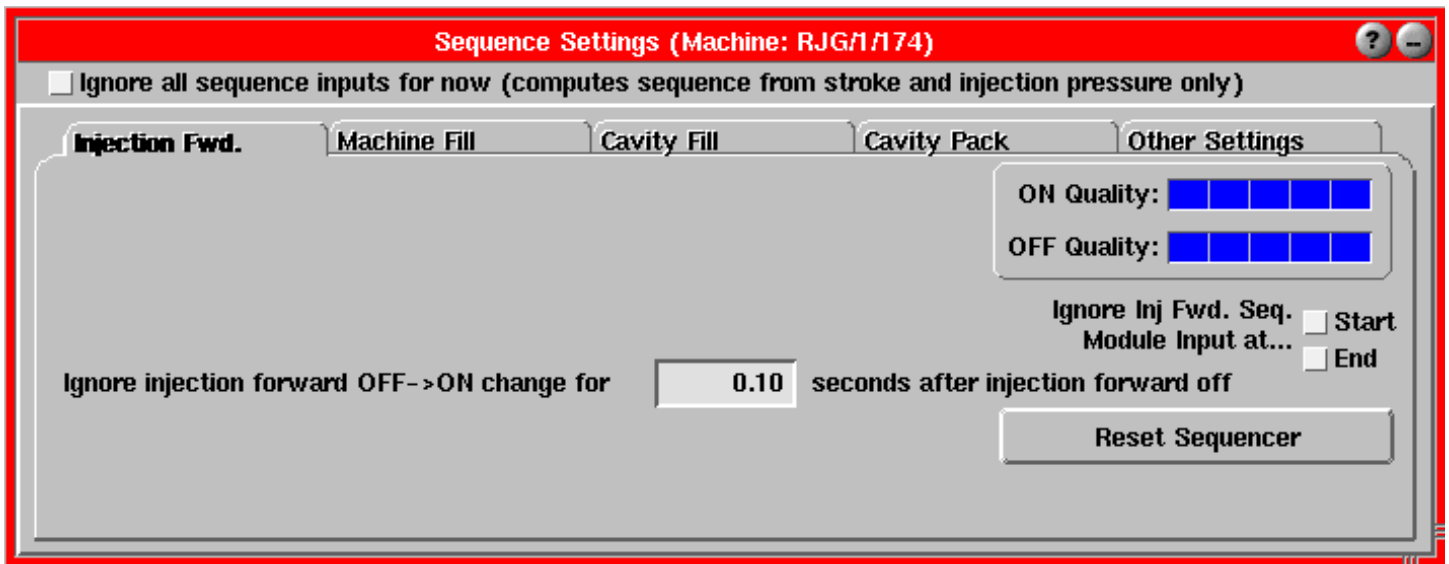
While the box is checked, the *eDART™* will try to compute start of injection from zero crossing of stroke (volume) or an injection pressure setpoint. You can then watch the sequence signals on the "Sequence Lights" or "Cycle Graph" tool and try to determine whether there is a problem or not.

If signals are not wired to the correct inputs on the Sequence Module, select "Sensor Locations" from the Main Menu and switch them to the correct places. If some signals are unavailable or unreliable, use the "Sensor Locations" tool to set them to "Not Used". Once you know that the sequence signals coming in are correct, you can un-check this box.

If signals are not wired to the correct inputs on the Sequence Module, select "Sensor Locations" from the Main Menu and switch them to the correct places. If some signals are unavailable or unreliable, use the Sensor Locations tool to set them to "Not Used". Once you know that the sequence signals coming in are correct, you can un-check this box.

(Sequence Settings Tool continued)

Injection Forward tab
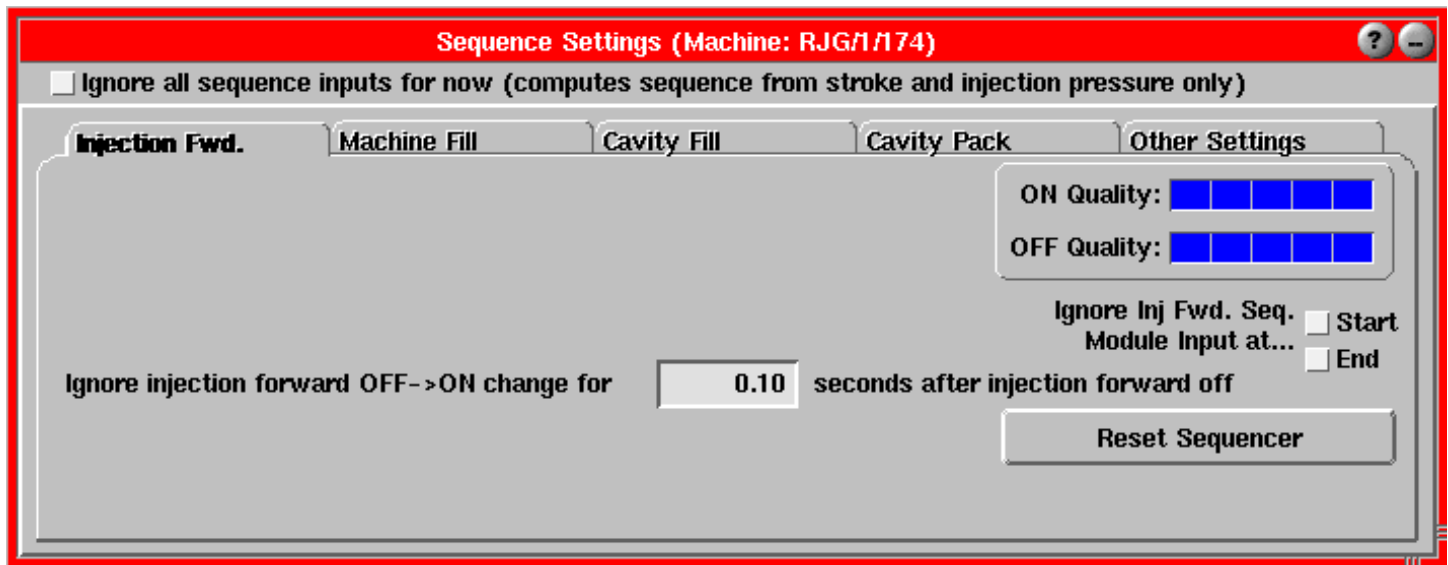
ON Quality
Indicates how accurately the *eDART™* is able to do the OFF to ON switch of the Injection Forward sequence signal.

- ➢ 5 - Accurate Injection Forward sequence signal wired to the machine.
- ➢ 4 - Injection stroke moves above a setpoint from minimum.
- ➢ 3 - Not used.
- ➢ 2 - Fixed time after a Mold Closed input (switch or wired).
- ➢ 1 - Injection pressure above a setpoint that you entered.
- ➢ 0 - Injection Forward ON cannot be created (except by pressing a manual injection forward switch).

Each bar block is one level. A blank bar is 0 and a full bar is 5.

OFF Quality
Indicates how accurately the *eDART™* is able to do the ON to OFF switch of the Injection Forward sequence signal. If screw run comes on before injection forward goes off, injection forward is turned off anyway.

- ➢ 5 - Accurate Injection Forward sequence signal wired to the machine.
- ➢ 4 - Last sudden drop in injection pressure before screw run.
- ➢ 3 - Tiny back motion for 0.75 seconds or 95% of max volume.
- ➢ 2 - Turns off after a fixed ON time period.
- ➢ 1 - Injection pressure below a setpoint that you entered.
- ➢ 0 - Injection Forward OFF cannot be created (except by pressing a manual trigger).

Each bar block is one level. A blank bar is 0 and a full bar is 5.

(Sequence Settings Tool continued)

Ignore Inj Fwd Input Signal

➢ ON - Check this box if the Injection Forward signal from the machine is erratic or suspect as to when it turns on. Sometimes the turn On of the Injection Forward signal is not stable. In that case, it is better to let the *eDART™* use the start of fill from volume crossing zero than the actual hard-wired signal from the machine.

➢ OFF - Check this box if the Injection Forward signal from the machine is erratic or suspect as to when it turns On. With this box checked, the *eDART™* will fall back to trying to find injection off (i.e. velocity to pressure transfer) by looking for a negative velocity or a sudden drop in injection pressure.

Reset Sequencer
Use this button if one or more Machine Sequences are lost after the *eDART™* has found its best method of sequencing injection forward.

After the *eDART™* has found its best method, it will not fall back to an earlier method unless you click this button.

Ignore Injection Forward OFF -> ON Change
In the Injection Forward signal from the machine comes on during screw run (recovery) as well as during injection forward, you will need to tell the *eDART™* to ignore the second OFF to ON signal. Enter a time after injection forward goes off to wait before looking for a rising edge again. If Mold Closed or Screw Run signals are available from the machine, you will not need to set this value. In those cases, the *eDART™* will ignore any Injection Forward signal OFF to ON change until mold closed goes off or screw run goes off.

Machine Fill
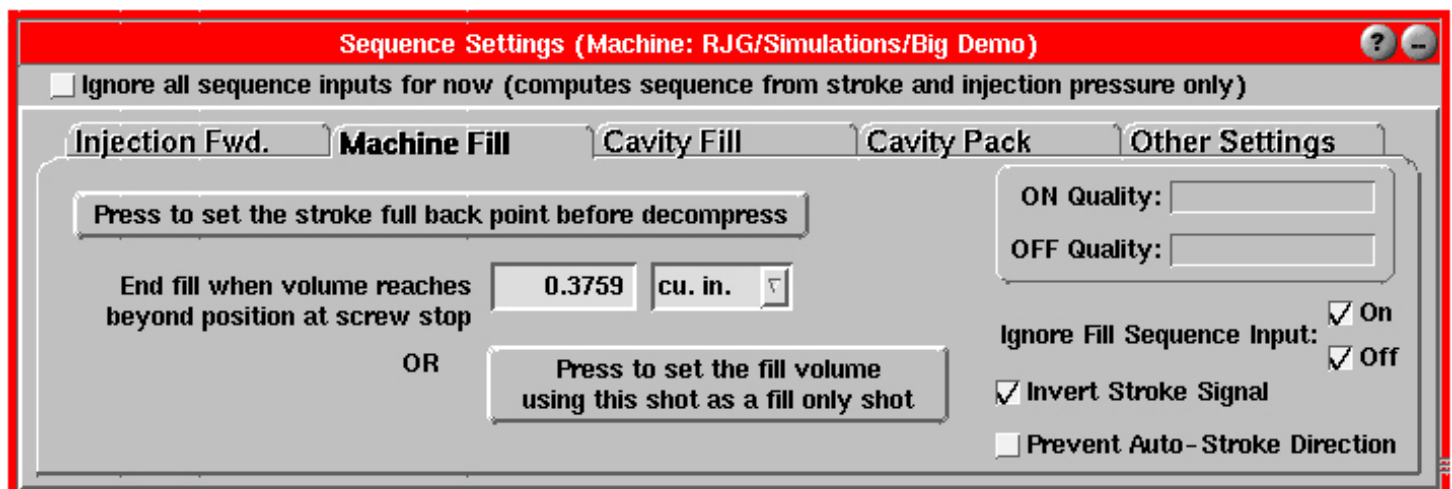
(Sequence Settings Tool continued)

Press to set the stroke full back point
If you cannot get a Screw Run (recovery) signal from the machine, click this button to set the zero volume point before decompress. The Fill signal begins when the injection unit goes forward through this zero point. However, it is often difficult to catch the zero point before decompress occurs. One way to do it is to add a small amount of time in the machine controller between end of screw run and decompress start.

It is probably easier to look at the cycle graph and set the zero point by positioning the cursor at the end of screw run as seen by other curves (such as end of backpressure on injection or a sharp jump back in screw volume) then click this button.

Set the value to the volume of a fill only shot. When the injection volume (stroke * screw area) exceeds this valve going forward, the *eDART™* turns the Fill signal off.

You can also set the value by placing the cursor on the cycle graph at the fill time and setting the fill volume using the Graph Controls Menu (right-mouse click).

If you don't want to use volume for fill (i.e. work off of "First Stage" or injection pressure peak), set the fill volume to a very large number (i.e. 10000).

Press to set the fill volume
To make an accurate Fill signal, make a fill only shot (about 90% full) and then click this button. You can click the button even while the cycle is still in progress. The program uses the maximum volume injected as the fill volume.

If you cannot make a fill only shot, you can enter the 90% full volume in the space above or choose the full volume from the cycle graph using the cursor.

> **NOTE:**
> The "Cavity Fill" portion of the Sequence Settings tool does not actually create a timing Machine Sequence at this time. It simply sets the cavity fill threshold for use by the summary value time calculations.

The fill volume is saved with the mold and material.

ON Quality
Indicates how accurately the *eDART™* is able to do the OFF to ON switch of the Fill sequence signal.

➢ 5 - Not used.
➢ 4 - Accurate Fill signal wired to the machine.
➢ 3 - Injection volume crosses zero point (screw run stop point).
➢ 2 - Injection volume crosses a fixed zero point that you set.
➢ 1 - Turns on when injection forward goes on.
➢ 0 - Fill cannot be created.

(Sequence Settings Tool continued)

Each bar block is one level. A blank bar is 0 and a full bar is 5.

OFF Quality
Indicates how accurately the *eDART™* is able to do the ON to OFF switch of the Fill sequence signal.

➢ 5 - Fill to Pack transfer control fired by this *eDART™*.
➢ 4 - "Fill" sequence signal goes off, *eDART™* Pack -> Hold transfer control fires, or "1st Stage off or 2nd Stage on".
➢ 3 - Injection volume crosses a threshold that you have set.
➢ 2 - Turned OFF at injection pressure peak.
➢ 1 - Turned OFF at screw bounce (so as not to be stuck).
➢ 0 - Fill OFF cannot be created.

Each bar block is one level. A blank bar is 0 and a full bar is 5.

Ignore Fill Input Signal
➢ ON - Check this box if your Fill sequence signal (digital inputs to REDI or Sequence Module) does not go on at the proper time. "Fill on" is defined as the time when the injection stroke moves forward to "use up" all of the decompress (i.e. the point where the ram was when the screw stopped).

> **NOTE**:
> The "Cavity Pack" portion of the Sequence Settings tool does not actually create a timing Machine Sequence at this time. It simply sets the cavity pack setpoint for use by the summary value time calculations.

Most machines provide a "First Stage" (velocity stage) signal, which goes on at the start of injection and off on transfer to the pressure (hold) phase. It that is the case, you must select "First Stage" as the name of the sequence signal in the Sensor Locations tool.

➢ OFF - Check this box if your Fill sequence signal (digital inputs to REDI or Sequence Module) does not go off at the proper time. "Fill off" is defined as the time when the machine switches from high speed fill (before the cavity is full) to a slower controlled pack speed. This is not the same as switch to hold pressure. Usually, this will be a V1 -> V2 switch time.

Most machines provide a "First Stage" (velocity stage) signal, which goes on at the start of injection and off on transfer to the pressure (hold) phase. It that is the case, you must select "First Stage" as the name of the sequence signal in the Sensor Locations tool.

Invert Stroke Signal
Check this box if your stroke is going negative during injection.

If you have the Screw Run sequence signal, the *eDART™* will invert the stroke signal for you if needed. Also, if you have a Screw Run sequence signal, you will not be able to change the value in this box.

The *eDART™* requires that you have stroke going positive during injection, though you can display it the other way on the cycle graph by setting the graph minimum greater than the graph maximum.

(Sequence Settings Tool continued)

Prevent Auto-Stroke Direction
Check this box if you want to prevent the *eDART™* from sensing stroke direction and changing it automatically.

The eDART™ sets stroke direction by "watching" the stroke motion during injection and screw run. If you have partial (aborted) recovery and run the screw a second time, the *eDART™* can get confused. This switch looks like the stroke direction so that once set it will not automatically switch.

Note that when the Prevent Auto Detect is on, the *eDART™* allows you to change stroke direction even if the Screw Run signal is valid.

<u>Cavity Fill</u>
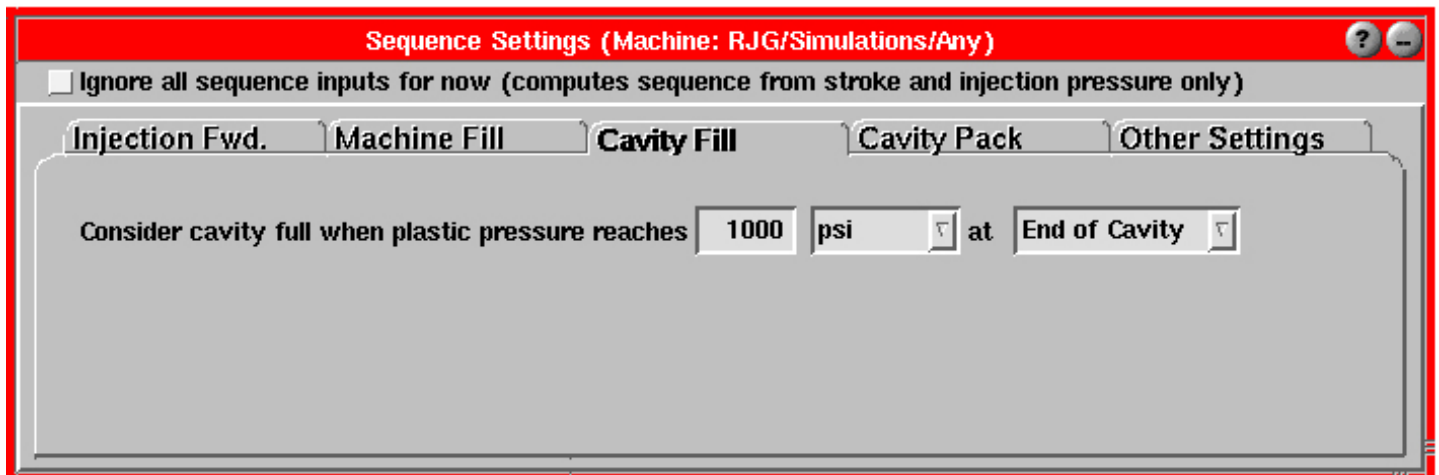
Here, you will set the value to the pressure that represents a full cavity at the sensor location you choose. Then choose the units for the end of fill threshold. Set the cavity location to the location you wish to be used to find the end of cavity fill. The *eDART™* initially sets this to one of the following, if found. The end of fill will be used first, if found, followed by the others in descending order.

➢ End of Fill (if found)
➢ Mid Cavity (if no End of Fill)
➢ Post Gate (if no End of Fill or Mid Cavity)

The *eDART™* stores a separate value for each different type of sensor and for the current process (mold + material etc.). It then provides this value so the system can calculate a "cavity fill" time. If you can match the cavity fill time, you will have the same process (in the fill portion) from the plastic's point of view.

(Sequence Settings Tool continued)

Cavity Pack
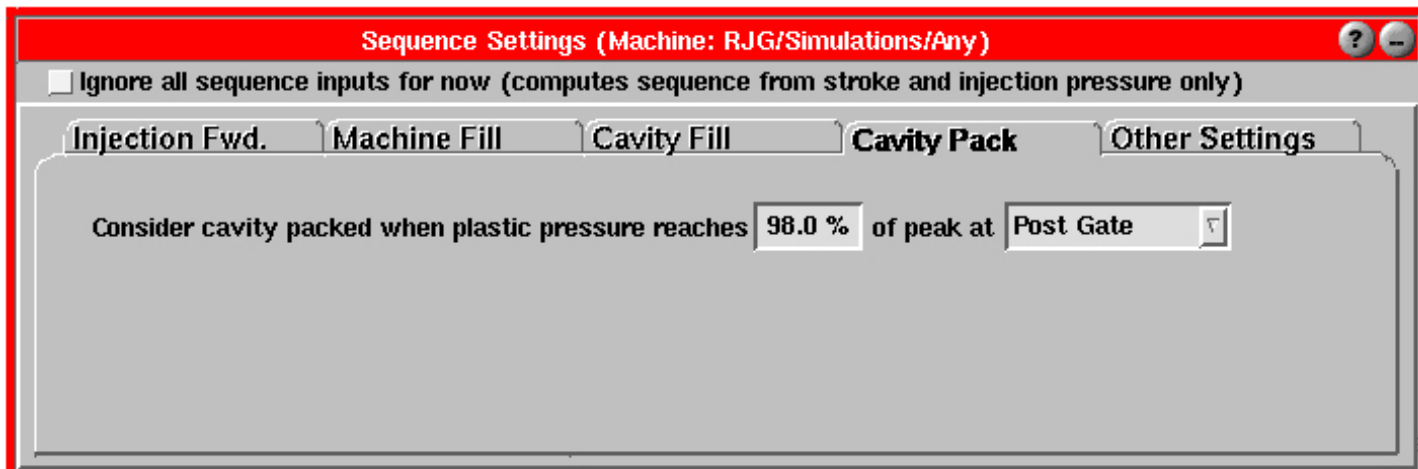
Set the value to the percent of peak at which the cavity is packed. Usually 98% is acceptable. If you have some coining in the mold you may need to reduce this value to pick up the first "hump" in the curve. Something like 90% to 95% would do the job in that case. This field is limited to a minimum of 2% and a maximum of 98%.

Then choose the sensor you want the system use for computing the pack values. Usually this is Post Gate if you have a Post Gate sensor. If not you can switch to End of Cavity.

The system computes the pack rate and time using this setpoint before the peak of cavity pressure for the selected cavity location (usually Post Gate). The *eDART™* stores a separate setpoint for each location in case you need to switch between them.

Other Settings
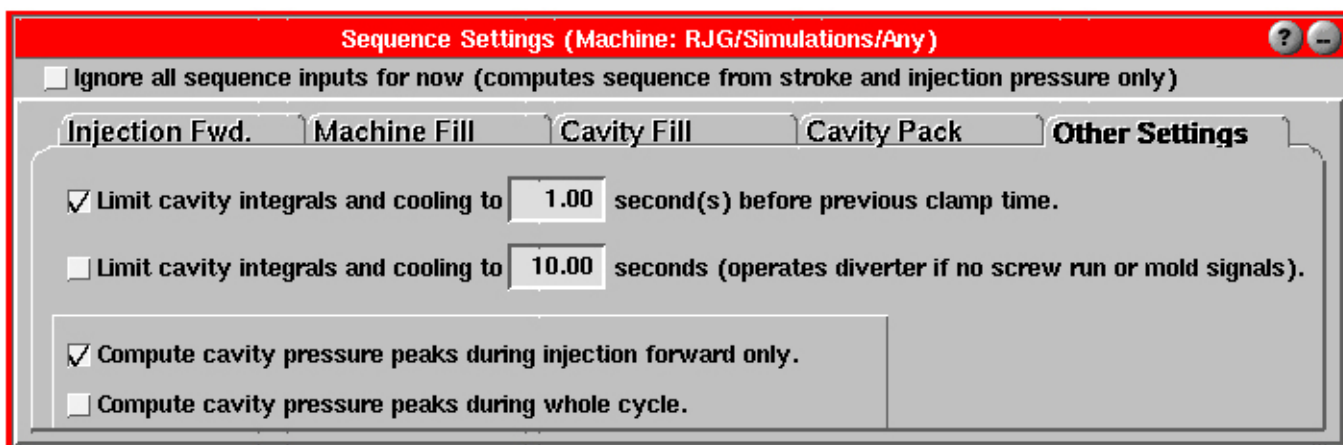
Limit cavity integrals and cooling time before previous clamp time
If the first box is checked, all computations are done before the clamp functions (un-clamped, opening or open, whichever comes first). The software uses the previous cycle's clamp time less the value at right.

NOTE:
If the *eDART™* finds a high level signal (e.g. a hard-wired Injection Forward signal), begins using it, and then the signal goes away, it will not "fall back" to using stroke or other signals. To make it start over and use stroke, you must click the Reset Sequencer button (on the Injection Fwd. tab of the Sequence Settings tool).

(Sequence Settings Tool continued)

Note that some of the time will be used in calculating so the actual time before mold un-clamp will always be slightly shorter than the time specified.

When the cycle reaches that time, all cycle integrals are computed and, if the part diverter is functioning, the diverter operates. This gives the diverter time to get into position before the mold opens.

Note that if the mold opens quicker than on the previous shot (before the time is reached), the diverter operates at mold open time and resets for the next cycle.

If this option is off, the integrals and diverter operate as follows:

➢ With Screw Run only (no mold signals): at end of screw run.
➢ With mold signals: at clamp operate (un-clamp, open, etc.).

If the "Limit Cavity Integrals" switch below (fixed number of seconds) is also set, it can be used to end the computation time if there is not screw run.

Limit cavity integrals and cooling time (operates diverter if no screw run or mold signals)
If the second box is checked, cavity pressure integrals will end at this time in the cycle if there are no mold operate signals.

Also, if there are no mold operate signals and no Screw Run signal, all computations will be completed at this time in the cycle and the parts diverter operated just after.

The second option has several advanced uses:

➢ If you have no mold operation signals (clamped/open, closing, opening) and your screw run time varies and there is no cavity pressure at the end of screw run. If you check the box and set the time shorter than the shortest expected screw run time, the cycle integrals will be stable.

➢ If you have mold operation signals, the cavity pressure integrals get computed until the mold opens. If your part diverter cannot get in position fast enough at mold open, you can set the integration limit shorter to give the diverter more time to operate.

➢ If you have no mold operation signals and no Screw Run signal, you can check the box and set the time at which you want all computations completed. If you do not check the box, the only timing signal by which the software can determine the computation and part diverter time is the end of injection forward, which is generally too early. Using this limit number can extend the computation time closer to the end of the cycle.

Cavity Pressure Peaks During Injection
This is the default setting. The *eDART™* reports the peak value for cavity pressures between the start of "Machine Sequence, Injection Forward" and the end of it. This eliminates possible erroneous data from getting into the peak computation after injection forward goes off.

(Sequence Settings Tool continued)

If you are using Gas Assist or other systems that cause packing after the Injection Forward signal goes off, select the "compute during whole cycle" box.

This value is saved with the process (mold, material, etc.).

Cavity Pressure Peaks During Whole Cycle
If the peak that you are interested in occurs after the Injection Forward signal goes off, check this box. This generally occurs with gas assist and other processes which do not use the machine's hold pressure period for holding or packing.

This setting is saved with the process (mold, material, etc.)

Understanding Sequencing

The *eDART™* interprets the Sequence Module Inputs, stroke, and injection pressure and tries to determine the state of the machine at any given time. The *eDART™* needs to know the state of the machine to accurately calculate the various process and machine variables that you use for analysis and quality control.

The Sequence Settings tool contains the controls for sequencing. If you correctly wire the standard machine signals to the Sequence Module, the Sequence Settings tool requires little attention. You should only need to use it if the system is missing some Sequence Module inputs or is wired to one that is unreliable.

Sequence Module Inputs to Machine Sequences
The *eDART™* bases its computations of times and process variables on internal Machine Sequences. These are similar to Sequence Module inputs, but are created by the *eDART™* using other signals. Each Machine Sequence represents something about the state of the machine.

Sequence Module inputs and Machine Sequences can be plotted on the bottom part of the Cycle Graph. The generated Machine Sequences are shown on the Sequence Lights tool. If you would like to view the actual hard-wired Sequence Module inputs (green lights), click the Seq. Inputs button on the Sequence Lights tool. These lights follow the green lights on the Sequence Module (ID7-D-SEQ).

You will notice on the Sequence Lights tool that there are some Machine Sequences that normally cannot exist as actual wired signals from the machine; Plastic Cooling for example.

eDART™ Uses the Best Inputs Available

To create these internal Machine Sequences, the *eDART™* uses inputs it can find from the Sequence Module and other Lynx™ devices. From all inputs available, the *eDART™* selects the best one to create each signal.
(Sequence Settings Tool continued)

For example, the forward (injecting) motion of the ram is detected by the Lynx™ Stroke-Velocity Encoder. The *eDART™* can use this motion signal to discover that injection has started and create the "Machine Sequence, Injection Forward" signal. However, if it detects a hard-wired Injection

(Sequence Settings Tool continued)

Forward signal from the machine, the *eDART™* will ignore the stroke and simply use the hard-wired signal.

The ON/OFF quality bars on the Sequence Settings tool show how the *eDART™* is computing each Machine Sequence. Also the setpoints and settings available on the Sequence Settings tool are visible for the current set of inputs. If there are none available, the *eDART™* is using hard-wired Sequence Module inputs and no setpoints are required.

Computing Specific Machine Sequences

Computing the *Injection Forward* Machine Sequence

➢ If the *eDART™* detects a hard-wired Injection Forward signal, it will use that signal to create the "Machine Sequence, Injection Forward". If the hard-wired Injection Forward signal acts strangely at the start or end of injection, you can ignore it and force the *eDART™* to use one of the mechanisms below:

➢ If there is no hard-wired signal (or its start or end are ignored), the *eDART™* assumes that injection starts on forward motion (from the stroke sensor) and ends with the last sudden drop in injection pressure before the start of the Screw Run signal. In some cases you may need to adjust the setpoint of stroke used to start injection. In rare cases you may need to adjust how it detects the last drop in injection pressure.

➢ There is no hard-wired Screw Run or injection pressure signal, the *eDART™* assumes that the injection forward ends with a small backward "bounce" of the screw. This may need adjustment so that it does not pick up the bounce at the end of first stage (boost) and instead picks up the bounce at screw delay. If the injection pressure falls below a setpoint before the screw ounce, it will use that fall-below-setpoint time as the end of injection.

➢ In cases where you have no stroke, you can use the "Seq. Module Input, Mold Clamped" with set times for time after clamped to start and injection forward on time.

➢ In cases where you have only a hydraulic or plastic injection pressure input, you can enter setpoints for start and end of injection.

➢ Arming: To avoid using "dead" times, the *eDART™* waits for one of the later signals in the cycle (end of screw run, end of mold clamped, etc.) before it will even watch the "Seq. Module Input, Injection Forward" signal again. This is because some machines do strange things to the "Seq. Module Input, Injection Forward" signal such as turning it on during Screw Run or on and off several times in a cycle. If the *eDART™* never sees any other late cycle signals, it will give you an "ignore" time on the "Injection Fwd." tab so that you can ignore second "On" events on that wire.

(Sequence Settings Tool continued)

Computing the *Screw Run* Machine Sequence

➢ Usually this is just a copy of the hard-wired Screw Run signal. It should be wired to go on during recovery and off when the screw stops.

➢ Some machines (Sumitomo, for example) provide an analog output for screw RPM. If there is no hard-wired Screw Run signal, you can use the "Revolution Rate (on a 0-10V input module), Screw Motor" type and location in the Sensor Locations tool. The *eDART™* makes a sort of guess at setpoints and creates "Machine Sequence, Screw Run" when the RPM signal is up (running) and turns it off when the screw stops.

➢ The *eDART™* can also use "Flow Switch, Screw Motor" or "Pressure Switch, Screw Motor" to create a "Machine Sequence, Screw Run" signal. These switches usually have a physical on/off setpoint adjustment built into them for adjusting the trigger level. Currently, an off-the-shelf flow or pressure switch can be wired to the Sequence Module and labeled "Seq. Module Input, Screw Run".

Computing the *Fill* Machine Sequence

In the world of injection molding, we consider Fill to be one of the most important signals available. The Fill signal should go on when the material begins to move into the mold and go off when the mold is nearly (approx. 95%) full. This signal then determines the period over which "Effective Viscosity, Fill" gets computed, fill times and shear rates, cavity fill rates and times and many other summary values.

> **NOTE**:
> This will not stop the machine, but will tell the machine to stop transferring.) Another warning will appear asking you to start a job. The software is idle at this point.

Start of Fill ("Machine Sequence, Fill" goes On)
When the process uses decompress, there is a short time at the start of the cycle when the ram is moving forward to the point where it was when the screw stopped. This is where filling of the mold actually starts.

➢ If you have a stroke sensor and are using decompress, the *eDART™* assumes fill starts when the volume crosses this "zero" point (the point where the screw stopped).
➢ If you do not have a stroke sensor or are not using decompress (volume greater than or equal to zero at the start of injection), the *eDART™* starts fill at the start of injection.

End of Fill ("Machine Sequence, Fill" goes Off)
The *eDART™* uses three common methods to determine when the fill is complete (nearly full part).

➢ If there is a "Seq. Module Input, 1st Stage" (also called "boost" on some machines) and, if no settings have been chosen (below), the Fill is assumed to end when the 1st Stage signal goes off. This will only be the correct end-of-fill if you are using 2-stage DECOUPLED MOLDING℠: Fill part to 95% (short shot) and then switch to hold.

(Sequence Settings Tool continued)

➢ If there is no 1st Stage signal and no settings have been chosen (below), the *eDART™* assumes that fill ends at the peak on the injection pressure curve. This is only valid if there are no other peaks such as a restriction (cold slug) or a peak when pack ends (in a 3-stage process).

➢ Generally, to get the correct end-of-fill, set the fill volume using either the short shot technique or set the volume from the cycle graph. If you set the fill volume, have a 1st Stage signal, and run a 3-stage process (even Decoupled III Machine), fill will end before the end of 1st Stage.

➢ In most cases you should not use "Seq. Module Input, Fill". However, if the machine has two speeds and gives you a signal on the change from V1 to V2, you could use that signal as "Seq. Module Input, Fill". In that case you could check the "Ignore Fill Sequence Input End" box (on the Sequence Settings tool "Machine Fill" tab). If it also went on after decompress, you could check the "Ignore Fill Sequence Input Start" box because this would be considered a "good" start.

➢ If you run the Basic 3-Stage Control tool, it will automatically turn fill off at the V1 -> V2 speed change time and you will not need to set fill at all.

Computing the *Pack* Machine Sequence

The "Machine Sequence, Pack" signal only exists if you are using 3-stage DECOUPLED MOLDING℠. The *eDART™* sees the process as a 3-stage process if the fill volume is set before the end of 1st Stage or if the fill volume is set before the *eDART™*-controlled V -> P transfer occurs.

Remember that if the process is 2-stage (or seen as such) there will be no Pack signal.

Computing the *Hold* Machine Sequence

➢ If the *eDART™* sees the process as a 2-stage process, it will turn "Machine Sequence, Hold" on at the end of "Machine Sequence, Fill".

➢ If the eDART™ sees the process as a 3-stage process, it will turn Hold on at the end of "Machine Sequence, Pack".

➢ The *eDART™* turns the "Machine Sequence, Hold" signal off at the end of "Machine Sequence, Injection Forward". There may be some delay in computing this signal if the Fill comes from the injection pressure peak or the end of injection does not come from a hard-wired signal. In these cases, the *eDART™* needs to "back-compute" from the end of injection or start of screw run to find the peak (for Fill and thus Hold start) or end of injection.

Computing the *Plastic Cooling* Machine Sequence

We define Plastic Cooling as all of the time from the end of "Machine Sequence, Fill" to the time when the mold is fully open. If you do not have a "Seq. Module Input, Mold Fully Open" signal, the *eDART™* uses the time when the Mold Clamped or Mold Opening signal goes off.

If you have none of these, the *eDART™* uses the end of Screw Run to show the end of plastic cooling. This signal produces the important process parameter "Sequence Time, Plastic Cooling".

(Sequence Settings Tool continued)

This is usually not the Cooling Time set on the machine control, but is the actual time the plastic spent in contact with the cool mold and was cooling.

Computing the *Mold Clamped* Machine Sequence

Most often we take this from the "Seq. Module Input, Mold Clamped" signal. However, if you have Mold Closing and Mold Opening, the eDART™ creates "Machine Sequence, Mold Clamped" as follows:

➢ On at the end of "Seq. Module Input, Mold Closing"
➢ Off at the start of "Seq. Module Input, Mold Opening"

Computing the *Mold Fully Open* Machine Sequence

Most often we take this from the "Seq. Module Input, Mold Fully Open" signal. However, if you have Mold Closing and Mold Opening, the *eDART™* creates "Machine Sequence, Mold Fully Open" as follows:

➢ On at the end of "Seq. Module Input, Mold Opening"
➢ Off at the start of "Seq. Module Input, Mold Closing"

"Contact RJG" Feature

This application requires the *eDART™* Data Manager (EDM) to operate. To operate this feature, the EDM must be allowed to connect with the internet. Once this is done, you can click on the "Contact RJG" button and the EDM will contact RJG Customer Support and establish a 'chat session'. This connection can also allow an RJG support person to remotely access the *eDART™* from which the message was sent.

If you need assistance or have any questions, please call RJG Customer Support at1-800-472-0566. If you are calling from Canada, please use 1-231-947-3111 and ask for Custromer Support.