

Thermal Advantage Instrument Control



Q Series™ Getting Started Guide

Revision E
Issued February 2004



Notice

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Notes, Cautions, and Warnings

The following conventions are used throughout this guide to point out items of importance to you as you read through the instructions.

A NOTE highlights important information about equipment or procedures.



A CAUTION emphasizes a procedure that may damage equipment or cause loss of data if not followed correctly.



A WARNING indicates a procedure that may be hazardous to the operator or to the environment if not followed correctly.

Chapter 1

Getting Started with Instrument Control

Overview

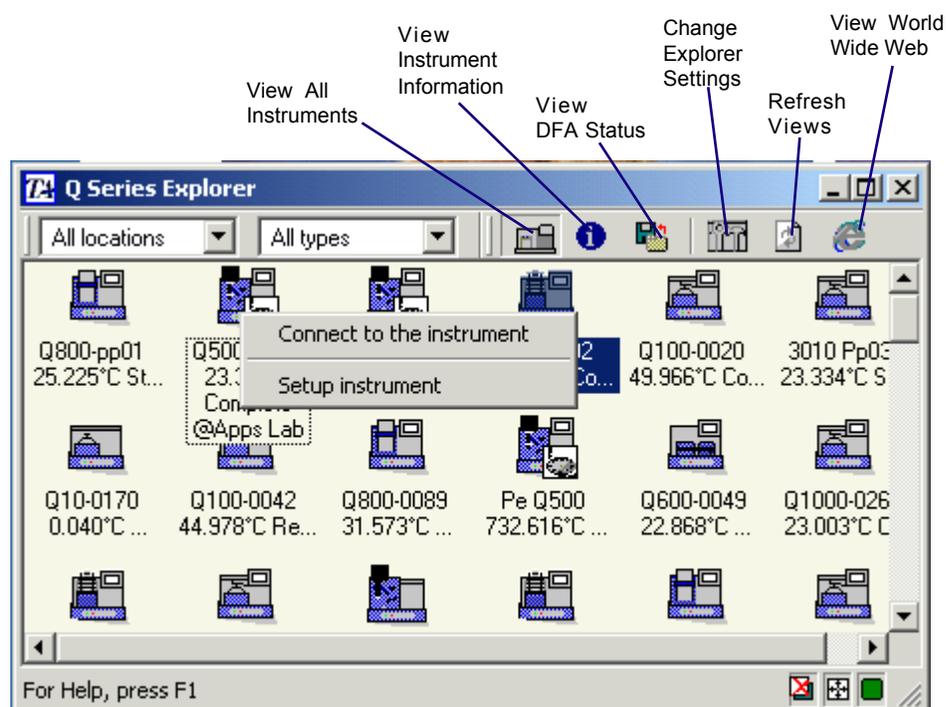
Before you begin this section, we recommend that you familiarize yourself with the basic operation of the operating system. Refer to the documentation provided with the operating system for information.

This manual provides you with a brief explanation of the Q Series™ Explorer, which is used to access the networked instruments, and Thermal Advantage Q Series™ Instrument Control, which is used to control a specific instrument, and general guidelines for setting up an experimental run sequence.

If you have the Advantage Integrity™ option, instrument control operation is slightly different. Consult the *Advantage Integrity Getting Started Guide* and online help for additional information.

Introducing the Q Series™ Explorer

The Q Series Explorer Window (shown below) is a customizable graphical user interface for TA Messaging Agent (TAMA). It allows you to set up, view and control any instruments currently connected to the supplied private Ethernet Hub or a Local Area Network (LAN). The Q Series Explorer is also used to monitor the status of data transmission from the instrument to any controller via the Data File Acceptor (DFA).



Before starting the Q Series Explorer, check that both the instrument(s) and the controller are connected to the hub and powered on. For further details regarding the connection and operation of the instrument refer to the appropriate instrument Getting Started guide or the online help.

Opening the Q Series Explorer

To open the Q Series Explorer, double click on the  icon located on your desktop to start the program.

The Q Series Explorer is used to perform the following functions:

To connect to an instrument and open instrument control:

- Double click on the instrument icon (e.g., ) in the Online Instrument view to connect to a selected instrument and automatically open the instrument control software for that instrument. See the next section for basic information on the instrument control software.
- Right click on the instrument icon (e.g., ) on the Online Instrument view, then select **Connect to the instrument** to connect to the instrument and automatically open the instrument control software for that instrument. See the next section for basic information on the instrument control software.

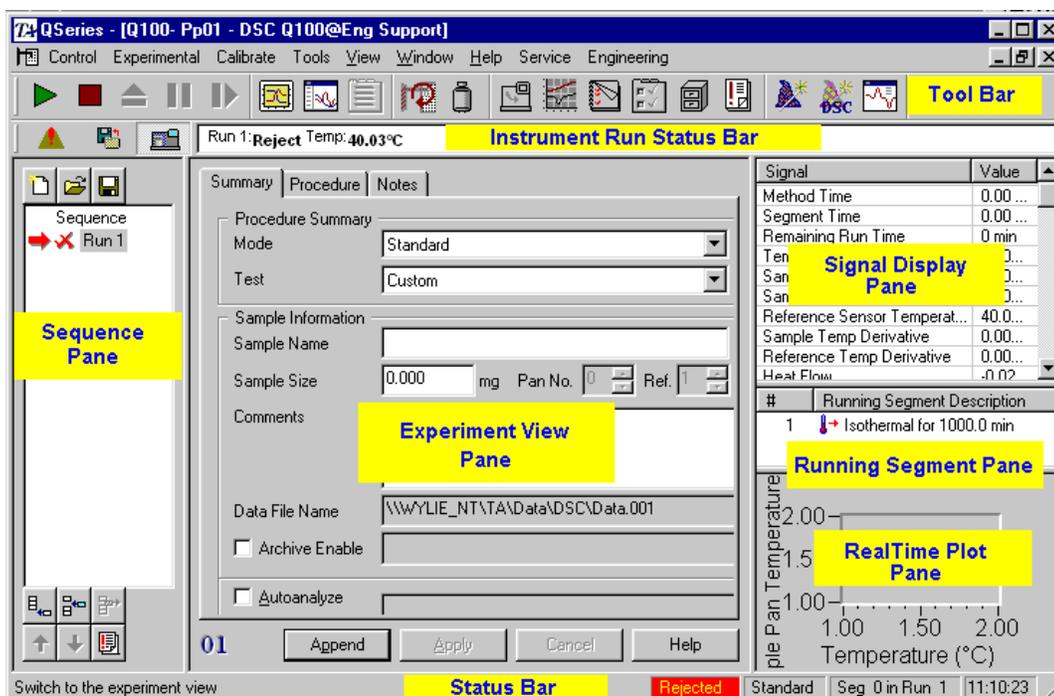
To perform other instrument-related functions:

- Right click on the instrument icon (e.g., ) on the Online Instrument view and select **Setup Instrument** to make changes to the instrument settings such as: synchronize the instruments and PC's date and time, updating module software, resetting the instruments parameters, and configuring the instrument's network settings.
- Click the various icons on the Q Series Explorer tool bar to view the status of each instrument, any error information associated with that instrument, or the data file acceptor (DFA) status.
- Access the drop-down menu (from the upper left corner icon) and the right click pop-up menu to perform various functions.

NOTE: For more detailed information on the functions of the Explorer, access the online help in the program.

Instrument Control Basics

The Instrument Control Window is divided into three geographical regions, the left pane, the middle pane and right pane with the middle pane having three possible views, Experimental (see figure below), RealTime Plot or RealTime Plot Full View.



- At the top of the window is the main menu and the tool bar.
- Below the tool bar is the instrument run status bar.
- The left pane displays the sequence or run list information.
- The middle pane displays run information and this information can be displayed in any of the following views, Experimental, or RealTime Plot.
- The right pane is divided into three additional panes, the top right, the middle right and the bottom right.
 - The top right pane displays the list of signals.
 - The middle right pane displays the current running method.
 - The bottom right pane displays the RealTime Plot when Experimental view is selected.
- At the very bottom of the window is the Status bar, which displays the current instrument status, current selected mode, method segment and run number for the current sequence, and the instrument time.

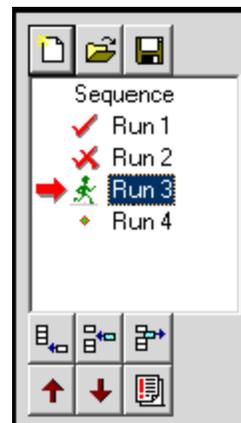
This chapter gives you basic information on each of these items.

Functions of the Panes

Each window pane allows you to perform certain functions while keeping other operations in view. The basic function of each pane is described as follows:

Sequence Pane

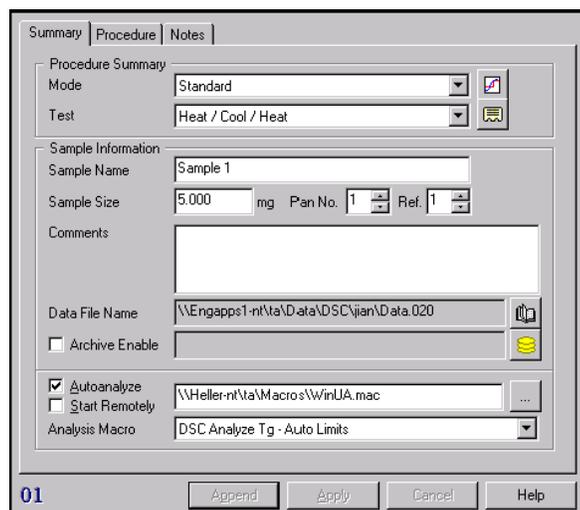
The **Sequence Pane** displays the list of runs and the current sequence current run status for each of the runs in the sequence. The run with the arrow next to it is the scheduled run, the run that will execute when **Start** is selected. Buttons and a pop-up menu are also available in this pane to perform various functions on the runs in the sequence.



Experimental View Pane

The **Experiment View Pane**, located in the middle of the Instrument Control window is used to define the selected mode, the sample information, and the method conditions for each run. The corresponding run number is displayed in the lower left corner of this window. The window is divided into three main information pages, Summary, Procedure and Notes. Below is a brief

description of the three Experimental View pages. For detailed information refer to the online help in the instrument control software.



Summary Page: The Summary Page contains the selected test, sample name and pan number, comments, data file name and path and any selected automated Autoanalysis.

Procedure Page: The Procedure Page contains run condition information for the selected test such as the method and the advanced and post test parameters.

Notes Page: The Notes Page contains the operator name, pan type as well as Mass Flow Control (MFC) information for the sample purge such as selected gas type and flow rates, if applicable.

Signal Display Pane

The **Signal Display Pane** (DSC shown to the right) is a customizable instrument control window that allows the user to select the real time signals they want displayed during an experiment. These same signals are also available for plotting in the RealTime Plot window.

Signal	Value
Method Time	0.00 min
Segment Time	0.00 min
Remaining Run Time	0 min
Temperature	40.03 °C
Heat Flow	1.370 mW
Sample Purge Flow	49.99 mL/min
Set Point Temp	40.00 °C
Heater Power	3.019 W
Flange Temperature	35.72 °C

Customize Signal Display

Running Segment Pane

When a run is in progress, you can see which method segment the instrument is processing in the procedure by viewing the **Running Segment Pane**. The Running Segment Pane is used to view the loaded method segments for the current run (*i.e.*, the run number with the arrow next to it in the sequence list). The red check mark indicates that the method segment has been successfully completed and the green arrow signifies the current running method segment.

To modify the running procedure, right click inside this pane to open a pop-up menu and click on **Modify Running Method** or **Go To Next Segment**. For more information on this function, consult the online documentation.

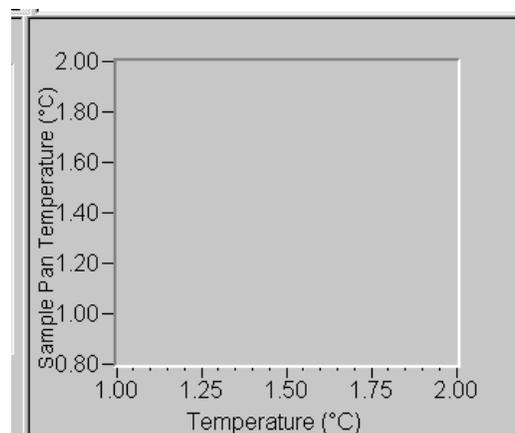
#	Running Segment Description
✓ 1	Ramp 20.00 °C/min to 80.00 °C
✓ 2	Isothermal for 1.00 min
➔ 3	Increment by 20.00 °C
4	Isothermal for 1.00 min
5	Repeat segment 2 until 120.00 °C

Modify Running Method...
Go To Next Segment

RealTime Plot Pane

To view the data points as they are collected from the instrument during a run, look at the **RealTime Plot Pane**. You can customize the way the plot is displayed by changing the axis signals, colors and fonts used. Right-click inside the **RealTime Plot Pane** to display the menu available for these functions.

NOTE: You can resize all of these panes just like you resize windows, by pulling the sides or corners using the double-headed arrows. When you close the *Advantage* program, the views and pane sizes are automatically saved for future recall.

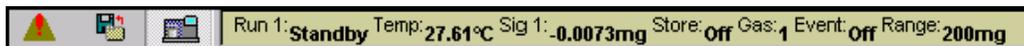


To enlarge the RealTime Plot image you can change the views

by selecting RealTime Plot View  or RealTime Plot Full View  from the tool bar.

Understanding the Instrument Run Status Bar

The Instrument Run Status Bar contains 3 views: Last Error, Data File Acceptor (DFA) Status and Current Run Status.



Select this icon to display the last recorded instrument error.



Select this icon to display the current data file information (DFA status) such as: Transmission State, Number of Bytes Received, and Data Path Name.



Select this icon to display the current Instrument Run Status. This window is user defined (using the Instrument Preferences options) and can contain any or all of the following information such as: Instrument Run State; Temperature; Data Storage State; Gas Number; Event State; Method Segment; Weight Range; three selectable signals: Signal 1, Signal 2, and Signal 3; and color selection for the window.

Viewing the Status Bar

At the very bottom of the window is the status bar, which displays the current instrument status, current selected mode, method segment and run number for the current sequence, and the instrument time.



To display or hide the status bar, check or uncheck the **Status Bar** command in the **View** menu.

The status bar shows actions of menu items as you use the arrow keys to navigate through menus. This area similarly shows messages that describe the actions of tool bar buttons as you move the cursor over them.

Introducing the Tool Bar

Check **View/Tool Bar** to display the tool bar (DSC Autosampler shown here) or uncheck it to clear the tool bar from view.



To customize the tool bar buttons, place the pointer in the tool bar, right click to display the pop-up menu and select **Customize Toolbar**. A window is displayed that allows you to change the buttons.

Use the tool bar to start, stop, suspend, reject, or resume a running experiment. You can also use the tool bar to display selected windows. For an explanation of each button, see online help.

Chapter 2

An Introduction to Experimental Setup

Basic Experimental Steps

The following steps are a guide for conducting a typical thermal analysis experiment. Once you are comfortable with the basic experimental setup, consult the *Thermal Advantage for Q Series™* online help for details on the full utilization of the program. This guide only presents basic information to get you started.

1. Open the **Q Series Explorer** by double clicking on the  icon located on your desktop to start the program.
2. Double click on the instrument icon (e.g., ) in the **Online Instrument** view to connect to a selected instrument and automatically open the instrument control software for that instrument.
3. Select **Tools/Instrument Preferences** from the main menu. Verify/edit the settings before proceeding to the next step.
4. Select the desired technique to set up your experiment—either click the  button to access the **Experimental View** or click the  button to start the **Wizard** functions.
5. Set up all the sample and procedure information through the **Experimental View**. See “Programming the Experiment” on the next page for more detailed information.
6. Prepare the sample(s) and the instrument (*i.e.*, load pans or cups, tare the instrument, etc.)
7. Schedule the run.
8. Start the experiment one of three ways: Select **Control/Start**, click the Start button on the tool bar or select **START** on the instrument's touch screen or keypad.
9. Monitor the real-time signals, plot, and method progress.

Programming the Experiment

You can use the instrument wizard to set up your experiment by stepping through the choices, or you can set up an experiment manually using the instructions found in this section.

To set up your experiment, access the **Experimental View** by selecting  from the tool bar or by selecting **View/Experimental** from the appropriate instrument menu. The **Summary Page** is displayed.

You need to check and update the **Summary**, **Procedure**, and **Notes** pages with the correct information prior to starting each experiment. Once this information is correct, click on either the **Apply** button to save these changes or the **Append Run** button to save these changes and add another run to the end of the sequence.

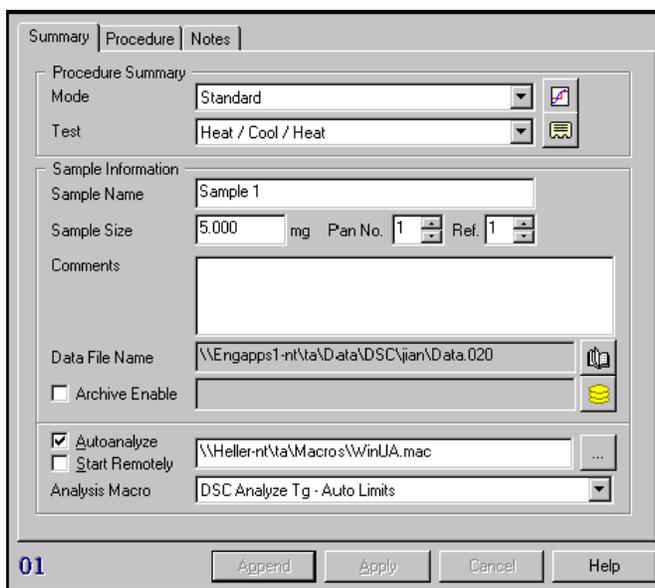
For more details on how to use the three **Experimental View** pages, turn to the next three sections.

Using the Summary Page

Sample information for each run is entered on both the **Summary Page** and **Notes Page**. The **Procedure Page** is used to set up the experimental test conditions. The information on this page will vary based on the instrument and model.

When you select **View/Experiment View** from the menu, the middle pane displays the Summary Page (shown to the right). The Summary Page is used to enter the basic information needed to create a run. The summary information that is currently displayed is applicable to the run number that is highlighted on the **Sequence Pane**. The run that has the arrow pointing to it is the scheduled run. (*i.e.*, The run that will be executed when Start is selected.)

This information should be updated with the correct information prior to starting each experiment.



To use the Summary Page, follow these directions:

1. Select the mode and signals that you want the software to store in the data file by clicking the  button. This displays the **Select Signals to Store** window. Check the desired signals.

2. Select the type of **Test** you want to use from the drop-down test list. The list contains both preprogrammed tests (test templates) and a "custom" test. (The Method Editor is used to create custom procedures.)

Alternatively, you can open a saved procedure file, by selecting "Custom" from the drop-down list, then clicking the **Open File** button, . This file will be added to the test list once you have selected it.

3. View a summary of the chosen procedure by selecting the **Summary** button, . To change any of the summary information, except for the mode, select the **Procedure Page**.

4. *DMA only:* Enter the clamp type, sample shape and dimensions.
TMA only: Enter the probe type, sample shape and dimensions.
 5. Enter the **Sample Name**. Enter up to 32 alphanumeric characters to identify the material.
 6. Enter the **Sample Size(s)**.
 7. *For DSC Q1000 models only:* Check Pan Mass, then enter the weights of the sample and reference pans to use the weights for Extended Tzero calculations. Pan correction is factored into the calculations. Leaving the checkbox blank assumes that the pan weights are equal.
 8. *For Autosamplers only:* Select the Pan number and Reference number from the list. Use this field to specify the number of the Autosampler pan that will be used in the experiment. Click on the down arrow to scroll through the numbers.
 9. Enter any additional text in the **Comments** field to help describe the experiment, for example, sample treatment or experimental conditions could be included. Up to 64 characters may be entered. [Note that you cannot use hard returns (press the Enter button) in this field.]
 10. Enter a **Data File Name** by clicking on the Browse button, , then select the desired storage location and enter in a file name. Click OK when finished. Typical example \\{Computer name}\Program Files\TA\Data\DSC\Data.001. (UNC file names are used.)
 11. Check the **Archive Enable** checkbox if you want to send a copy of your instrument data to another location on your system (*e.g.*, network drive) at the end of a run. Click the Browse button to the right, , then select the desired archive location. Click **Select** when finished. The data will be transferred at the end of the experiment using the same data file name specified in step 10.
 12. If you want to automatically analyze the resulting data file using a macro (created with the Universal Analysis Autoanalysis software option), check the **Autoanalyze** box. Locate the desired macro file name using the Browse button, . Enter the drive, directory, file location, and name for file.
- NOTE:** See the Autoanalysis documentation accompanying the Universal Analysis software for further information on creating macros.
- a. If you want to automatically have the results of the autoanalysis (checked above) sent to a remote computer, which is one other than the controller computer attached to the instrument (also called the local computer), check the **Start Remotely** box. Then enter the same path and data file name chosen in step 10 above. When the data file has been collected, Universal Analysis will automatically open and begin the autoanalysis of the file on both the local and remote computers.
 - b. Click on the **Analysis Macro** list and select a macro from those displayed. This macro will be used to automatically analyze the data file that will result from this experiment.
13. When you have finished setting up this run summary, you should verify the information contained on the **Procedure Page** and the **Notes Page**. (See the next two sections for information.)
 14. Click the **Apply** button to save these changes or click the **Append** button to save these changes and add another run to the end of the sequence.

Using the Procedure Page

The **Procedure Page** is used to specify the test conditions and to save the test to a custom procedure file, if desired.

The procedure information displayed is applicable to the run number that is currently highlighted on the Sequence Pane and its selected mode. (Make sure that you verify the instrument mode [if required] on the Summary Page before setting up the procedure.)

To use the Procedure Page, follow these directions:

1. Select the desired **Test** from the list. The items displayed on the Procedure Page will vary based on the type of test chosen. The test list contains preprogrammed test templates as well as a "custom" test. For further information on custom tests see, "Creating Custom Methods."
2. *For Custom Tests:* Type any Notes that you want to write about the test you will be running. If you want to edit the current method (the name and segment is displayed), click the **Editor** button to display the **Method Editor** window, which is used to create or edit a preprogrammed series of instructions that can be sent to the instrument for execution.

For Test Templates: Enter the desired test conditions for the selected preprogrammed test.

3. To change the parameters that the instrument will use to perform the experimental run, click the **Advanced** button to display the **Advanced Parameters** window applicable to the current instrument.
4. To change the conditions that will be applied at the end of the run (method-end conditions), click the **Post Test** button to display the current settings.
5. Click the **Apply** button when finished to save these changes or click the **Append** button to add another run to the end of the sequence.

NOTE: Some functions are automatically applied (saved). Some examples include: Selecting a test, changing a file name, and selecting Append.

Procedure Page for a Template

Procedure Page for a Custom Test

- If you want to save this to a procedure file, click on the **Save** button.
- When you have finished setting up this procedure you should verify the information contained on the Summary Page and the Notes Page.

To see a summary of the current procedure for this run, open the **Procedure Summary** window using the  button, located on the Summary Page. To view a summary of a saved procedure file, open the **File Utility** window using **Tools/File Utility**.

NOTE: You can use any test template as the basis for a custom test by selecting the desired test template from the list of tests, then click the Apply button and change the test to Custom. Then use the Editor button to make the changes desired.

Saving or Viewing a Procedure

To save a test template to a procedure file, click on the  button on the **Procedure Page**. The **Save Procedure File** window is displayed to allow you to choose the location for your procedure files (*.prc) and name the file before saving it.

To view a summary of the saved procedure file (*.prc), open the **Procedure File Utility** window using **Tools/Procedure File Utility** selected from the instrument menu.

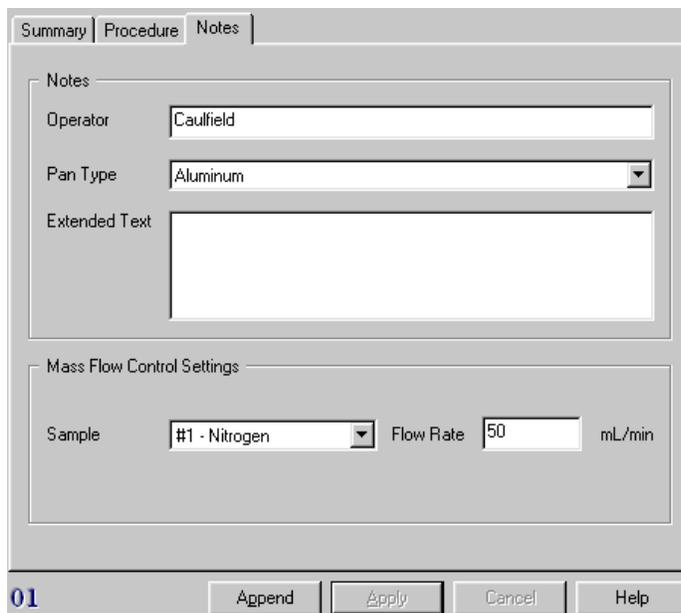
NOTE: You can use any test template as the basis for a Custom test by selecting the desired test template from the list of tests, then click the Apply button and change the test to Custom on the Summary Page. Then you can click on the Procedure Page and then the Editor button to make the changes desired.

Using the Notes Page

Use the **Notes Page** to enter or select additional information to be stored with the selected file. These items cannot be changed once the experiment is in progress.

To enter or select the additional information for your experiment, follow these steps:

- Enter the name of the **Operator**. Up to 25 characters may be entered.
- DSC, TGA, and SDT only:* Select the sample **Pan Type**, which includes the material and/or type of the pan that will be used in the experiment. Click on the down arrow to display a list of pan types, then select the desired pan type.



3. Enter any additional comments in the **Extended Text** field. This may involve information about the sample or experiment, such as sample treatment or data sampling parameters. Up to 500 alphanumeric characters may be entered (approximately 12 lines).
4. *TGA only*: Enter the **Flow Rate** to be used for the **Balance** purge.
5. Select the Gas to be used for the **Sample** purge from the drop-down list, either Gas#1 or #2, and enter the corresponding **Flow Rate** (including units).

The gas entries are used to specify the gas (#1 or #2) and the associated flow rate for each run. If an MFC is installed, these settings will automatically set the gas and flow rate on a run by run basis. (The scheduled run's purge settings will take effect immediately once the Apply button is clicked.

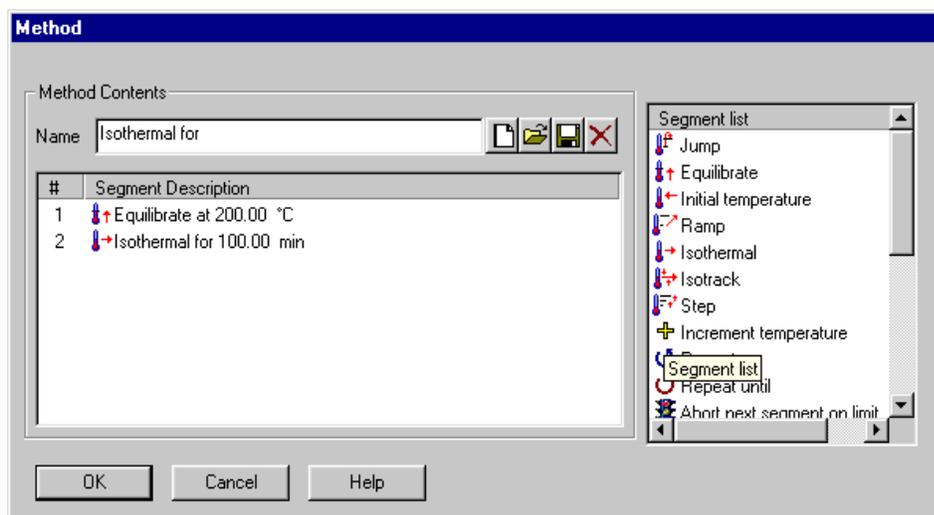
If your instrument does not have an MFC, these fields are for viewing information only. To change the gas type, select **Tools/Instrument Preferences**.

6. Click the **Apply** button to apply the information on this page to the current run.

Creating Custom Methods

You have two options when creating procedures. You can choose to use one of the available preprogrammed templates or you can choose a custom test and create your own method. A custom method can contain up to 225 segments. This help topic describes how to create a custom method.

Access the **Experimental View/Procedure Page**, choose the "Custom" test, then click on the **Editor** button. The **Method Editor** window is displayed, see the figure below. Once you have this window open, you can create a new method, edit the current method, open an existing method, or save the current method to a file.



NOTE: Thermal Advantage/Thermal Solutions method files are not compatible with the Thermal Advantage Q Series™ software.

Basic Instructions for Creating a Custom Method

- You can use the drag-and-drop technique to add, move, or insert segments. Drag the desired segment from the Segment List to the method contents segment description list or within the method contents list.
- To clear the current method contents (name and segment description), click the New button, .
- To remove a segment, select (highlight) the segment in the list and press the keyboard Delete button, the  button, or press the Ctrl+X keystrokes.
- To edit the parameter of an existing segment, double click on the desired segment, then edit the values (or select the segment and press the Ctrl+E keystrokes). Use the TAB key to move between the parameter fields.

Creating a New Method

Follow these steps to create a new custom method:

1. Access the **Procedure Page**. Select the "Custom" test from the list of available templates.
2. Click the **Editor** button to display the **Method Editor** window.
3. Click on the New button, , to clear the current method contents (name and description).
4. Add the desired segment from the Segment List by double clicking on the segment to be added.
5. Make the desired changes to the segment parameters by entering the desired parameter or choosing from the drop-down list of available options. Use the TAB key to move between segment fields.
6. Repeat steps 4 and 5 until all of the desired segments are added to the method.
7. Click OK when finished. (You can save this method or the entire procedure, if you plan to use it again in the future. See page 29 for the instructions.)

NOTE: The following functions are performed from within the Method Editor window.

Removing a Segment

To remove a segment from the method:

1. Click on the desired segment to be deleted from the Segment Types list to highlight it.
2. Press the keyboard Delete button, the , button, or press the Ctrl+X keystrokes to cut the segment.

Reordering Segments

To change the order of the segments use the drag-and-drop method as follows:

1. Click on the desired segment.
2. Hold down the mouse button while you move the pointer to the desired segment location.
3. Release the button. The segment will be moved to the specified location.

Copying and Pasting Segments

To copy and paste a segment:

1. Highlight the desired segment and press Ctrl+C to copy the segment. Multiple segments may be copied at one time by holding down the Ctrl key while highlighting the segments, then release the key and press Ctrl+C together to copy them.
2. Highlight the desired location within the segment description list and press Ctrl+V to paste the segment.

Inserting a Segment

To insert a segment in the list of existing segments:

1. Click on the desired segment to be added from the Segment List to highlight it.
2. Use the drag-and-drop method to move the segment: Hold down the mouse button while you move the cursor to the desired position in the list of numbered segments. Then release the button.
3. Edit the entry field(s) as desired, using the TAB key to move between fields.

You can also copy and paste a segment to insert it.

Preparing the Instruments

The experimental preparation steps vary for each instrument. A list of general guidelines are below, however, you should consult the specific instrument's Getting Started manual or the appropriate online help for detailed instructions.

1. Check that the purge gas is adjusted to the recommended flow rate.
2. *SDT and TGA only:* The SDT and TGA instruments both require taring procedures, using the empty sample pan(s), before loading the sample. Consult online help for further details.

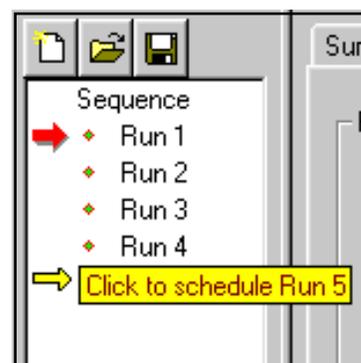
TMA only: A zero probe step is usually performed for the TMA before loading the sample.

3. Prepare and load the sample.
4. Close the furnace or cover the cell as applicable to your instrument.
5. *DMA and TMA only:* A measure step is usually performed for TMA and DMA experiments after you load the sample.

Starting An Experiment

If more than one run is contained in the run sequence, the scheduled run (run with the arrow pointing to it) will be executed. To schedule a run, prior to starting the experiment, move the pointer (cursor) along the left of the run numbers, you should see the pointer change to an arrow as seen in the figure to the right. When it becomes an arrow, you can then click the mouse to position the arrow next to the selected run number. This run becomes the scheduled run, which is the experiment that will be run when Start is selected.

Once the sample has been loaded, the experimental parameters set up, and the run scheduled you can start your experiment one of four ways:



- Select **Control/Start** from the instrument menu.
- Click on the  button on the tool bar.
- The scheduled run can also be executed by double clicking on the red run arrow (➔) in the **Sequence Pane**.
- Schedule the desired run using the controller software (as outlined above), then press the START key on the instrument's touch screen or keypad.
- If you have an Autosampler and it is enabled, the run sequence will be executed, starting with the scheduled run, when Start is selected.

Monitoring Running Experiments

Once your experiment has been started, you can monitor its progress easily with the *Advantage* software. Any one of the four views provide information regarding the running experiment:

- To monitor a plot of the real-time data, select  or  on the tool bar.

- To monitor the real-time signal values view the controller **Signal Display Pane** (for more information see page 10).

This information is also available from the instrument touch screen. Select DISPLAY MENU on the touch screen, then touch either STATUS or SIGNAL DISPLAY from the Display options touch screen shown above to display the real-time signal values.



- To monitor the progress of the test method view the **Running Segment Pane** (shown here). The red check mark indicates that the segment has been successfully completed and the green arrow signifies the current running method segment.

This information is also available from the instrument touch screen. Select DISPLAY MENU to access the Display options touch screen shown above, then SEGMENT LIST to display the running method segments.

#	Running Segment Description
✓ 1	↕↗ Ramp 20.00 °C/min to 80.00 °C
✓ 2	↕↔ Isothermal for 1.00 min
➡ 3	⊕ Increment by 20.00 °C
4	↕↔ Isothermal for 1.00 min
5	↻ Repeat segment 2 until 120.00 °C

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