

# **HBLT Pressure Manager For Win2000/XP**

## **Operations Manual**

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**Crescent Design, Inc.  
9932 Mesa Rim Road, Suite B  
San Diego, California 92121-3930  
(858) 452-3240  
[www.crescentdesign.com](http://www.crescentdesign.com)  
[crescent@crescentdesign.com](mailto:crescent@crescentdesign.com)**

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## Introduction

HBLT Pressure Manager is a Windows based program that provides remote operation and data collection from a Hydraulic Burst Leak Tester (HBLT). Pressure Manager can execute either HBLT native tests or Pressure Manager scripts. Pressure Manager collects and displays current pressure, peak pressure and one of two volumetric data points at up to 1/100 second intervals. The operator may save the collected data as a comma delimited file for later display using Pressure Manager or for input to other data analysis programs.

Pressure Manager supports a HBLT with a Smart Manifold attached. Pressure Manager provides a Smart Manifold summary screen that displays summary information by channel during the test. There are test setup values and script commands to set the manifold options. When finished with a test or script, the operator may view, save, or print the data as a whole or by channel.

## Installation

Crescent Design delivers the HBLT Pressure Manager software on a CD-ROM. The installation script checks for installed components and tailors the installation to the computer's configuration. The script first installs the security drivers. The script then checks for and installs the laser micrometer components required for execution. Finally, the script installs the Pressure Manager program along with the necessary Lab Windows/CVI and NI-VISA components.

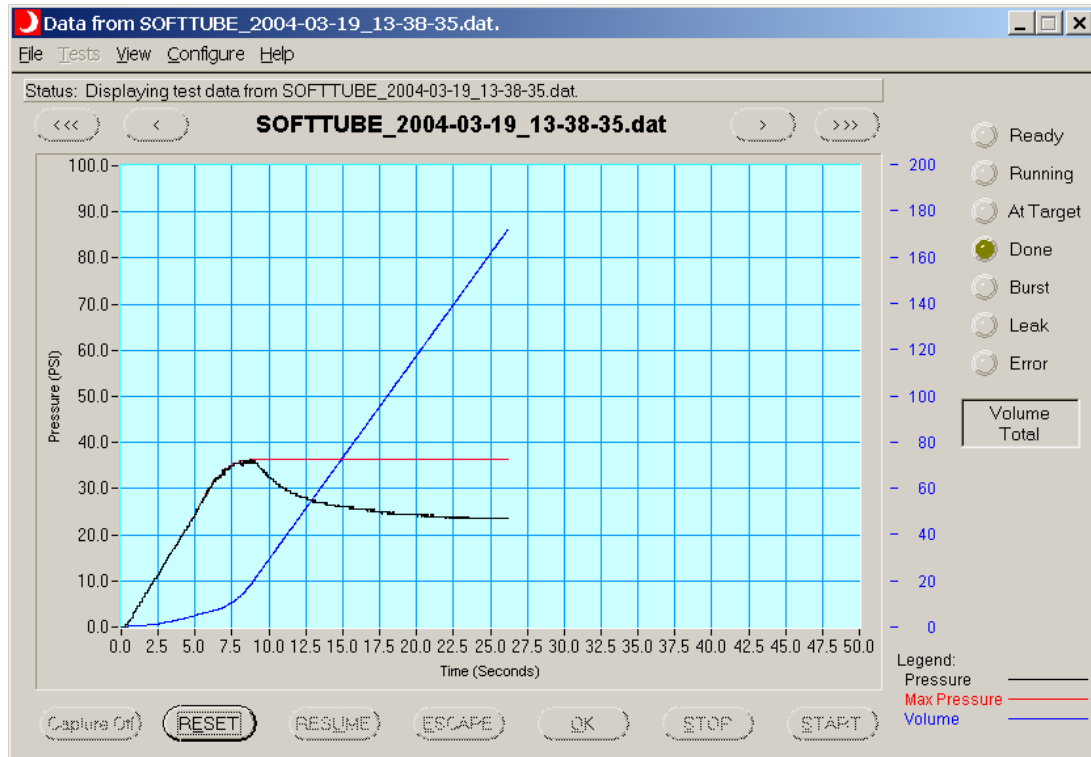
Follow these instructions to install the software:

1. If the security key is USB, unplug it from the system.
2. Insert the CR-ROM into the CD\_ROM drive.
3. If your computer has autostart enabled, wait until the install script starts. If your computer does not have autostart enabled, navigate to the CD-ROM and double click on the PM\_INSTALL program. This is the install script.
4. The script asks if you want to install the software. Answer Yes.
5. If you are not installing from a CD-ROM, the script may ask for the path to the installation directory. Enter the path and click OK.
6. When the Pressure Manager install script runs, keep clicking the next button until the script finishes. Use all the default settings.
7. When the Pressure Manager script finishes, there may be window requesting a system restart. Select the restart system button.
8. Your HBLT must be at least version 2.51 to operate correctly with Pressure Manager version 1.65. Connect the serial cable to the HBLT and the PC. Then double click the GO.BAT file located in this directory. On the HBLT, select the Download New Program function under the Engineering menu. Wait until the download completes. Or, use the DLDF2 to download the HBLT software. See the DLDF2 documentation for instructions.
9. Store the CD-ROM in secure place.
10. Finally, install the Rainbow Sentinel-Pro software key on the PC printer port. The key is transparent to the printer. If the security key is a USB key, plug it into a USB port.

## Operation

This manual describes the operation of Pressure Manager by describing the elements of each program panel. After a general panel function description, the manual lists and describes each control, indicator and menu item the operator may use.



### Pressure Profile Panel



This is the main Pressure Manager panel. Use the main menu to select special functions and to open the other panels. Use the buttons located at the bottom of the panel to control a test's execution. Use the top buttons to scroll the strip chart data after a test completes.

### Panel Controls

The standard Windows panel controls activated are:

- Minimize Panel** Use the  button to minimize the panel.
- Close Panel** Use the  button to close the panel and end the program.

### Panel Indicators

- Status** This message box displays messages about the run status of Pressure Manager.
- Ready** This indicator illuminates green when Pressure Manager is ready to conduct a test.
- Running** This indicator illuminates yellow when Pressure Manager conducts a test or a script.

<b>At Target</b>	This indicator illuminates blue when the HBLT is maintaining pressure. This indicator then illuminates green when the HBLT is dwelling.
<b>Done</b>	This indicator illuminates dark yellow when Pressure Manager completes a test or script with no error conditions.
<b>Burst</b>	This indicator illuminates orange when a test or script completes with a burst event.
<b>Leak</b>	This indicator illuminates purple when a test or script completes with a leak event.
<b>Error</b>	This indicator illuminates magenta when a test or script completes with an error other than a burst event or leak event. This indicator also illuminates when other Program Manager errors occur. Check the log panel to determine the cause of the error. Click on this indicator to reset it to off.
<b>Pressure Profile</b>	<p>The strip chart indicator is a window onto a long strip chart. As a test proceeds, the HBLT sends data points to Pressure Manager. The black trace is the current pressure. The red trace is the maximum pressure. The blue trace is one of two volumetric values. If a test lasts more than the last second mark, the strip chart window scrolls to keep the active trace in view.</p> <p>When the test ends, use the direction arrows above the strip chart or the keypad arrow keys to navigate back and forth along the strip chart. See button descriptions below.</p> <p>The operator may save data or print the strip chart using options under the File menu. Printing the strip chart prints the entire panel. Pressure Manager only prints the currently displayed portion of the strip chart.</p>

## Panel Buttons

The buttons on this panel are not always active. As the state of the test changes, Pressure Manager may dim some of the buttons. These dimmed buttons do nothing when clicked.

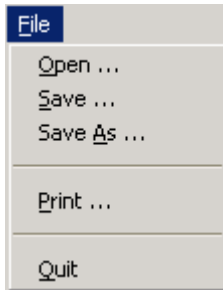
<b>Capture On/Off</b>	Press this button to toggle the data capture on or off. Use this button when pausing a test.
<b>Reset</b>	Press this button to reset Pressure Manager. Reset clears the strip chart, clears the Log panel, and clears the Report panel. This button does the same action as pressing the Reset button on the front of the HBLT during standalone operation.
<b>Resume</b>	Press this button to resume a paused test. This button does the same action as pressing the Resume button on the front of the HBLT during standalone operation.
<b>Escape</b>	Press this button to Escape to the previous function on HBLT. This button does the same action as pressing the Escape button on the front of the HBLT during standalone operation. When pressed at the end of test, the HBLT abandons the test.
<b>OK</b>	Press this button to continue test operation. This button does the same action as pressing the OK button on the front of the HBLT during standalone operation. When pressed at the end of a test, the HBLT completes the test and generates a report.



<b>Stop</b>	Press this button to stop test operation. This button does the same action as pressing the Stop button on the front of the HBLT during standalone operation.
<b>Start</b>	Press this button to start test operation. This button does the same action as pressing the Start button on the front of the HBLT during standalone operation.
<b>&lt;&lt;</b>	This button shifts the strip chart window to the left one full screen or to the beginning of the strip chart. The down arrow key performs the same function as this button.
<b>&lt;</b>	This button shifts the strip chart window to the left one increment. The left arrow key performs the same function as this button.
<b>&gt;&gt;</b>	This button shifts the strip chart window to the right one full screen or to the end of the strip chart. The up arrow key performs the same function as this button.
<b>&gt;</b>	This button shifts the strip chart window to the right one increment. The right arrow key performs the same function as this button.

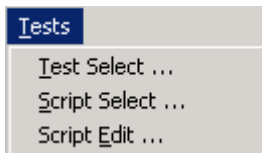
## Panel Menu

This drop down menu provides file-related functions.



<b><u>F</u>ile&gt;&gt;<u>O</u>pen</b>	This menu item opens a previously saved data set. A dialog box opens to allow the operator to select from previously saved data sets.
<b><u>F</u>ile&gt;&gt;<u>S</u>ave</b>	This menu item saves the current data set. If the data set was previously saved, the save occurs immediately. If the data set is new, this menu item behaves just like <b><u>F</u>ile&gt;&gt;<u>S</u>ave <u>A</u>s</b> .
<b><u>F</u>ile&gt;&gt;<u>S</u>ave <u>A</u>s</b>	This menu item opens a dialog box for the operator to enter the save file name. In addition, the operator may choose another directory.
<b><u>F</u>ile&gt;&gt;<u>P</u>rint</b>	This menu item prints the currently displayed strip chart section on the printer. The operator may select any installed printer.
<b><u>F</u>ile&gt;&gt;<u>Q</u>uit</b>	This menu item closes the panel and ends the program execution.

This drop down menu provides test-related functions.

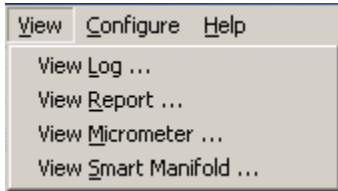


<b><u>T</u>ests&gt;&gt;<u>T</u>est Select</b>	This menu item opens the HBLT Test Parameters window to create, edit or select a predefined HBLT test.
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**Tests>>Script Select** This menu item opens the Pressure Manager Script Select panel to select a predefined script.

**Tests>>Script Edit** This menu item opens the Pressure Manager Script Edit panel to create a new script or edit an exiting script.

This drop down menu provides view-related functions.



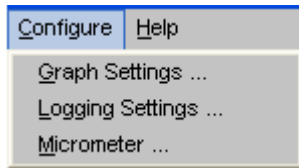
**View>>View Log** This menu item opens the Log window.

**View>>View Report** This menu item opens the Report window.

**View>>View Micrometer** This menu item opens the Micrometer window.

**View>>View Smart Manifold** This menu item opens the Smart Manifold summary window.

This drop down menu provides communications, graphics, and logging configuration.

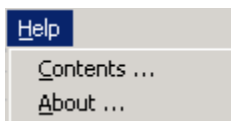


**Configure>>Graph Settings** This menu item opens the Graph Settings panel.

**Configure>>Logging Settings** This menu item opens the Logging Settings panel.

**Configure>>Micrometer Settings** This menu item opens the Micrometer Settings panel.

This drop down menu provides help functions.

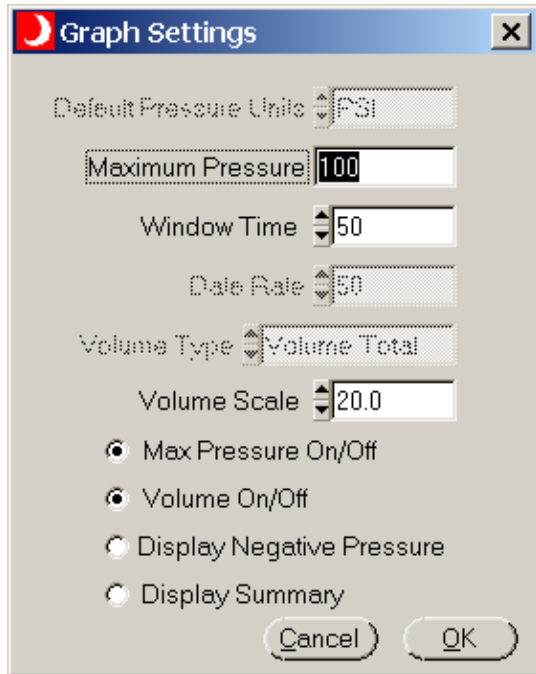


**Help>>Contents** This menu item opens the on-line help.

**Help>>About** This menu item opens the About panel.


## ***Graph Settings Panel***

Use the **Configure>>Graph Settings** menu item to open this panel.



## Panel Controls

The standard Windows panel controls activated are:

**Close Panel** Use the  button to close the panel.

## Panel Entry Controls

**Default Pressure Units** Use this control to specify the default pressure units that the script editor uses when creating a new script. Use either the arrows or click and select one of the valid options. Changing this control also changes the Maximum Pressure value to the new units value.

**Maximum Pressure** Use this control to specify the graphs maximum pressure in the default pressure units. Changing this value also changes the other pressure unit's maximum pressure to match. Changing this value with no data displayed sets the default maximum pressure. Changing this value with data displayed temporarily changes the maximum pressure. Pressing the RESET button restores the default settings.

**Window Time** Use this control to specify the number of seconds the strip chart displays. Since the strip chart control has a maximum number of data points, the maximum number of seconds depends on the data rate. Higher data rates decrease the maximum number of seconds. Lower data rates increase the maximum number of seconds.

The value for this control is stepped. Valid values are listed in the following table.

Data Rate (records/second)	Time Scale Options (Seconds)
100	1, 2, 5, 10, 20, 50
50	2, 5, 10, 20, 50, 100

20	5, 10, 20, 50, 100, 200
10	10, 20, 50, 100, 200, 500
5	20, 50, 100, 200, 500
2	50, 100, 200, 500
1	100, 200, 500

**Data Rate** Use this control to specify the data rate sent from the HBLT. This is not the serial baud rate. It is the rate the HBLT uses to send pressure information packets. Use either the arrows or click and select one of the valid options. Choices are 1, 2, 5, 10, 20, 50 or 100 pressure packets per second.

**Volume Type** Use this control to specify the volume type the HBLT sends with a pressure packet. Use either the arrows or click and select one of the valid options.

The valid options are:  
 Volume Total  
 Volume Increment  
 No Volume

**Volume Scale (%)** Use this control to specify the number of cc's per graph unit. The possible choices are: 0.1, 0.2, 0.5, 1.0, 2.0, 5.0, 10.0, 20.0, 50.0, 100.0.

**Max Pressure On/Off** Use this control to enable or disable the display of the maximum pressure trace (red line) on the strip chart.

**Volume On/Off** Use this control to enable or disable the display of the volume data trace (blue line) on the strip chart.

**Display Negative Pressure** Use this control to select between displaying the graph allowing for negative pressure and not allowing for negative pressure.

**Display Summary** Use this control to enable or disable displaying the summary panel. The summary panel displays the event pressure, peak pressure and time into last state. Also, the summary panel displays the messages for this test.

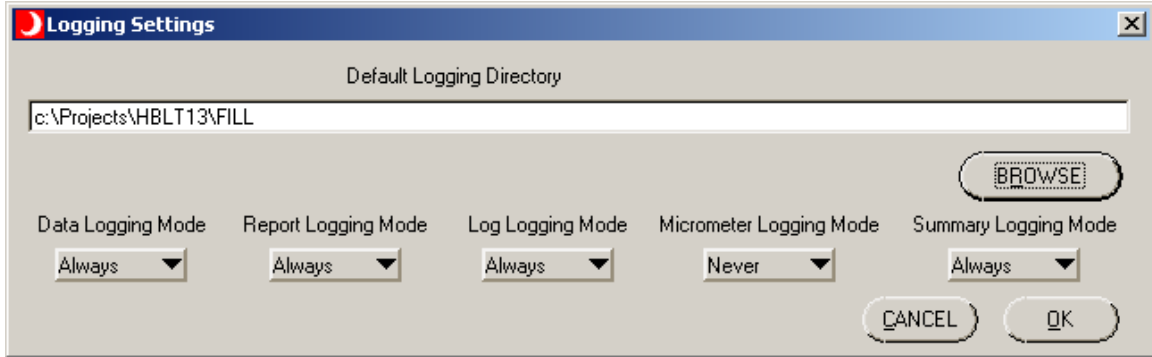
## Panel Buttons

**Cancel** Use this button to close the Graph Settings panel without any changes.

**OK** Use this button to close the Graph Settings panel with all changes.


## Logging Options Panel

Use the **Configure>>Logging Settings** menu item to open this panel.



## Panel Controls

The standard Windows panel controls activated are:

**Close Panel** Use the  button to close the panel.

## Panel Entry Controls

### Default Logging Directory

Use this control to set the default directory for logging all five-log items. To select a directory, double click on the control. This opens the select directory dialog box. This dialog box allows the operator to select an existing directory or select a new directory.

**Data Logging Mode** Use this control to set the mode for graph data logging. Select Always, Never, or Ask.

**Report Logging Mode** Use this control to set the mode for graph report logging. Select Always, Never, or Ask.

**Log Logging Mode** Use this control to set the mode for graph log logging. Select Always, Never, or Ask.

### Micrometer Logging Mode

Use this control to set the mode for micrometer report logging. Select Always, Never, or Ask.

### Summary Logging Mode

Use this control to set the mode for summary report logging. The summary may be the normal results panel or the Smart Manifold results panel. Select Always, Never, or Ask.

## Panel Buttons

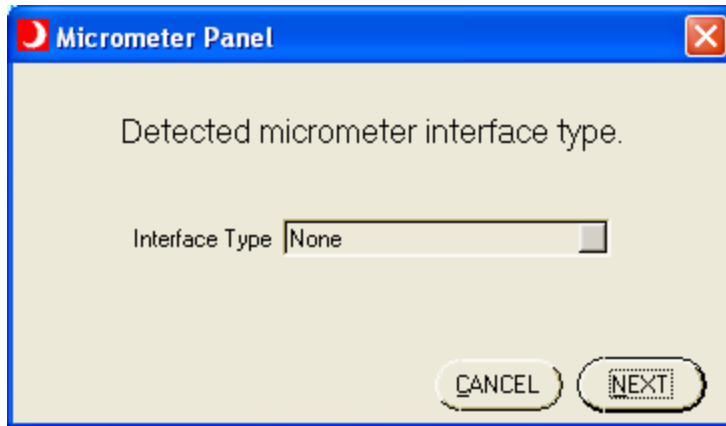
**Browse** Use this button to open the Select New Directory panel and select a new logging directory.

**Cancel** Use this button to close the Logging Options panel without any changes.

**OK** Use this button to close the Logging Options panel with all changes.

## Micrometer Panel 1


Use the **Configure>>Configure Micrometer** menu item to open this panel from the main panel.



This panel displays the micrometer interface type detected at startup.

## Panel Controls

The standard Windows panel controls activated are:

**Close Panel** Use the  button to close the panel.

## Panel Entry Controls

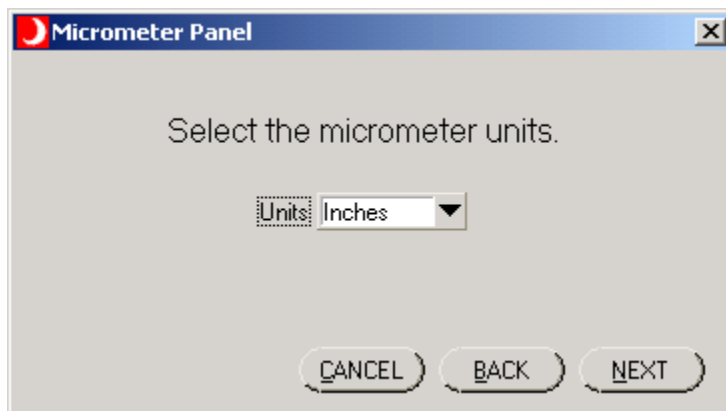
**Interface Type** Use this control to confirm one of the interface types. The options are;  
**NONE**  
**Mitutoyo**  
**Keyence Serial**

## Panel Buttons

**Cancel** Use this button to close the Micrometer Wizard panel without any changes.

**Next** Use this button to open the next Micrometer Wizard panel.


## Micrometer Panel 2



Use this panel to select the micrometer units.

## Panel Controls

The standard Windows panel controls activated are:

**Close Panel** Use the  button to close the panel.

## Panel Entry Controls

**Units** Use this control to select the micrometer units. The options are:  
**Inches**  
**mm.**

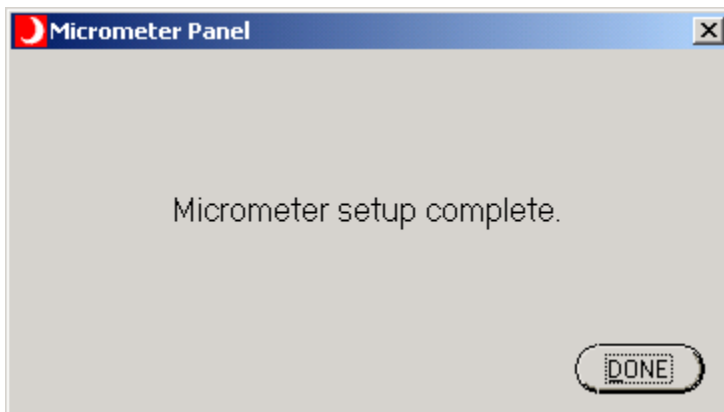
## Panel Buttons

**Cancel** Use this button to close the Micrometer Wizard panel without any changes.

**Back** Use this button to open the previous Micrometer Wizard panel.

**Next** Use this button to open the next Micrometer Wizard panel.


## *Micrometer Panel 3*



Use this panel to close the Micrometer Wizard.

## Panel Controls

The standard Windows panel controls activated are:

**Close Panel** Use the  button to close the panel. Closing the panel with this method does not change the micrometer settings.

## Panel Buttons

**Done** Use this button to close the Micrometer Wizard panel with any changes.

## *Test Parameters Panel*

Use the **Tests>>Test Select** menu item to open this panel from the main panel.

**HBLT Test Parameters**

File Functions Tests

Operator  Lot Id

Test Name

Process Types  Pressure Units

Product Id  Engineer Id

Compliance  Fill Speed (cc/sec)  Target Pressure

Leak Rate  Leak Dip  Up Burst Rate

Down Burst Rate  Initial Pressure  Max Pressure

Incremental Pressure  Return Pressure  ☐ No Return

Up Ramp Rate  Down Ramp Rate

Dwell Time  Maintain Time

Cycle  Cycle Delay  Cycle Repeat

Edit Date  Creation Date

**Custom Targets**

	Targets
1	500.00
2	200.00
3	100.00
4	0.00
5	0.00
6	0.00
7	0.00
8	0.00
9	0.00
10	0.00
11	0.00
12	0.00
13	0.00
14	0.00
15	0.00
16	0.00

This panel displays the test parameters and allows selection of native HBLT tests. Indicators that have no relevance to the selected test appear dimmed. This panel does not allow editing or creating group tests. In addition, this panel does not allow editing of the Smart Manifold settings.

## Panel Controls

The standard Windows panel controls activated are:

**Close Panel** Use the  button to close the panel.

## Panel Entry

**Operator** Use this control to enter the operator ID text. This control coerces characters into the valid HBLT character set A-Z, 0-9, '.', '/', '\*', '-' and space. The maximum number of characters is 14.

**Lot ID** Use this control to enter the lot ID text. This control coerces characters into the valid HBLT character set A-Z, 0-9, '.', '/', '\*', '-' and space. The maximum number of characters is 14.

## Panel Indicators

The panel indicators may also serve as panel entry controls when defining or editing a test. When using these indicators for input, Pressure Manager validates the values entered and coerces the values to stay within those bounds. Bounds for the values vary depending on the HBLT model and pressure units selected.



When creating a new test or editing an existing test, Pressure Manager changes the necessary indicators to controls based on the current test type. Pressure Manager also dims indicators not needed for the current test type.

<b>Test Name</b>	This indicator/control displays the name given to this test. Each test requires a unique test name. This control coerces characters into the valid HBLT character set A-Z, 0-9, '.', '/', '*', '-' and space. The maximum number of characters is 11.
<b>Process Types</b>	This indicator/control displays the test process type for this test. The five process types are Ramp, Staircase, Fatigue, Incremental, and Custom.
<b>Pressure Units</b>	This indicator/control displays the test pressure units displayed for the test. The four pressure units are PSI (pounds per square inch), ATM (atmospheres), KPA (kilopascals) and BAR (bars).
<b>Product ID</b>	This indicator/control displays the test product ID. This control coerces characters into the valid HBLT character set A-Z, 0-9, '.', '/', '*', '-' and space. The product ID is optional. The maximum number of characters is 14.
<b>Engineer ID</b>	This indicator/control displays the test engineer ID. This control coerces characters into the valid HBLT character set A-Z, 0-9, '.', '/', '*', '-' and space. The engineer ID is optional. The maximum number of characters is 14.
<b>Compliance</b>	This indicator/control displays the test product compliance factor. Values range from 1 (rigid) to 10 (soft balloon). All tests require this parameter.
<b>Fill Speed</b>	This indicator/control displays the test fill speed. This is the speed that the HBLT fills the product before the test begins. This value is always cc/sec. All tests require this parameter. Setting fill speed to zero disables product fill. The following table gives the minimum and maximum values for each HBLT model.

Model PSI	Minimum cc/sec	Maximum cc/sec
25	0.01	4.0
100	0.01	4.0
250	0.01	4.0
500	0.01	4.0
1000	0.01	4.0
2000	0.01	2.0
3000	0.01	1.0
5000	0.01	0.8

<b>Target Pressure</b>	This indicator/control displays the test target pressure that is the goal of the test. The linear ramp and fatigue test types require this parameter. Changing this parameter affects the Return Pressure upper bound. See Appendix A for ranges based on model and units.
<b>Leak Rate</b>	This indicator/control displays the test leak rate that will trigger a leak event during a test. Zero entry disables leak rate detection. All tests require this parameter. Pressure Manager enforces a minimum leak

	span of 15 PSI between the Up Burst Rate value and the Leak rate value. See Appendix A for ranges based on model and units.
<b>Leak Dip</b>	This indicator/control displays the test leak dip that will trigger a leak dip event during a test. Zero entry disables leak dip detection. All tests require this parameter. See Appendix A for ranges based on model and units.
<b>Up Burst Rate</b>	This indicator/control displays the test drop pressure rate that will trigger an up burst event during a test while ramping up. All tests require this parameter. Pressure Manager enforces a minimum leak span of 15 PSI between the Up Burst Rate value and the Leak rate value. See Appendix A for ranges based on model and units.
<b>Down Burst Rate</b>	This indicator/control displays the test drop pressure rate that will trigger a down burst event during a test while ramping down. A zero entry disables down burst detection. To prevent false burst reporting, insure that the down burst rate exceeds the down ramp rate. Pressure Manager enforces a minimum leak span of 15 PSI between the Up Burst Rate value and the Leak rate value. All tests require this parameter. See Appendix A for ranges based on model and units.
<b>Initial Pressure</b>	This indicator/control displays the test initial pressure to begin the test. The staircase and incremental test types require this parameter. Changing this parameter affects the Return Pressure upper bound. The Max Pressure caps the Initial Pressure. See Appendix A for ranges based on model and units.
<b>Max Pressure</b>	This indicator/control displays the test maximum pressure that the test achieves. The staircase and incremental test types require this parameter. Max Pressure caps the Initial Pressure. Changing the Max Pressure below the Initial Pressure coerces the Initial Pressure below the Max Pressure. See Appendix A for ranges based on model and units.
<b>Incremental Pressure</b>	This indicator/control displays the test pressure increment. The staircase and incremental test types require this parameter. See Appendix A for ranges based on model and units.
<b>Return Pressure</b>	This indicator/control displays the test return pressure used during fatigue, incremental, and custom tests. The fatigue, incremental and custom test types require this parameter. For Fatigue tests, the upper bound is the Target Pressure-1. For Incremental tests, the upper bound is the Initial Pressure-1. For Custom tests, the upper bound is the Maximum Pressure-1. Pressure Manager grays this control if the No Return control is checked. See Appendix A for ranges based on model and units.
<b>Up Ramp Rate</b>	This indicator/control displays the test up ramp rate. All tests require this parameter. See Appendix A for ranges based on model and units.
<b>Down Ramp Rate</b>	This indicator/control displays the test down ramp rate. To prevent false burst reporting, insure the down ramp rate is less than the down burst rate. All tests require this parameter. See Appendix A for ranges based on model and units.
<b>Dwell Time</b>	This indicator/control displays the test dwell time. All tests require this parameter. This parameter ranges from 1 to 999.

<b>Maintain Time</b>	This indicator/control displays the test maintain time. All tests require this parameter. This parameter ranges from 1 to 999. However, it must always be less than or equal to the Dwell Time parameter.
<b>Cycles</b>	This indicator/control displays the test cycle count. The fatigue test type requires this parameter. This parameter ranges from 1 to 9999.
<b>Cycle Delay</b>	This indicator/control displays the test cycle delay. The incremental, fatigue, and custom test types require this parameter. This parameter ranges from 1 to 99. Pressure Manager grays this control if the No Return control is checked.
<b>Cycle Repeat</b>	This indicator/control displays the test cycle repeat count. The incremental test type requires this parameter. This parameter ranges from 1 to 999.
<b>Custom Targets</b>	This indicator/control displays the list of custom pressure targets. There are 100 possible targets. Double click on a cell to edit the cell content when the test is custom. If the No Return control is not checked, the values range from the minimum to maximum pressure targets. If the No Return control is checked, the minimum pressure is the same as the minimum return pressure. See Appendix A for ranges based on model and units.
<b>No Return</b>	Check this control to disable the return pressure on custom tests. Clicking the control grays the Return Pressure and Cycle Delay controls. Also, the Custom Targets minimum value changes. When checked or unchecked, Pressure Manager forces the Custom Targets within the correct minimum.
<b>Edit Date</b>	This indicator displays the test last-edit date.
<b>Creation Date</b>	This indicator displays the test creation date.

## Panel Buttons

Pressure Manager dims these buttons when they have no valid function.

<b><u>N</u>ew</b>	<p>Press this button to define a new test. If the HBLT is password protected, select the Password menu item and enter the same password before using this function.</p> <p>When pressed, the title of this button changes to <u>N</u>EXT. Successive clicks on this button walk the user through the test creation steps. This guarantees that the user enters the test parameters in the correct order. Most test parameters require the test type and test units be set first to control parameter entry.</p> <p>After updating or canceling the test creation, Pressure Manager resets the title of this button to <u>N</u>ew.</p> <p>Use the <b><u>C</u>ancel</b> button to abandon a new test.</p>
<b><u>S</u>elect</b>	Press this button to select a test for execution and close this panel.
<b><u>U</u>ppdate</b>	<p>Press this button to edit and save a test. If the HBLT is password protected, select the Password menu item and enter the same password before using this function.</p> <p>When pressed, the title of this button changes to <u>S</u>AVE. After editing the desired parameters, click this button again to send the changes to the HBLT.</p>

Use the **Cancel** button to abandon an update test.

### Delete

Press this button to delete a test from the HBLT. If the HBLT is password protected, select the Password menu item and enter the same password before using this function.

### Cancel

Press this button to cancel this screen with no action. Also, this button abandons a new test or test update. This button sets the Pressure Manager state to no test or script selected.

**HBLT Test Parameters**

File Functions Tests

Operator  Lot Id

Test Name

Process Types  Pressure Units

Product Id  Engineer Id

Compliance  Fill Speed (cc/sec)  Target Pressure

Leak Rate  Leak Dip  Up Burst Rate

Down Burst Rate  Initial Pressure  Max Pressure

Minimum Pressure  Return Pressure  ☐ No Return

Up Ramp Rate  Down Ramp Rate

Dwell Time  Maintain Time

Cycles  Cycle Delay  Cycle Repeat

Edit Date  Creation Date

**Custom Targets**

	Targets
1	0.0
2	0.0
3	0.0
4	0.0
5	0.0
6	0.0
7	0.0
8	0.0
9	0.0
10	0.0
11	0.0
12	0.0
13	0.0
14	0.0
15	0.0
16	0.0

**Smart Manifold Mode**

Purge Rate

Cutoff PSI

Timeout

Multi Compliance

# of Multi Ports

This version of the Test Parameters panel displays the Smart Manifold settings on the right hand side of the panel. These settings appear only when the HBLT has a Smart Manifold attached. If the Smart Manifold mode is parallel, the other Smart Manifold settings are active. Otherwise, the other controls are dimmed.

## Panel Indicators – Smart Manifold

The panel indicators may also serve as panel entry controls when defining or editing a test. When using these indicators for input, Pressure Manager validates the values entered and coerces the values to stay within those bounds. Bounds for the values vary depending on the HBLT model and pressure units selected.

When creating a new test or editing an existing test, Pressure Manager changes the necessary indicators to controls based on the current test type. Pressure Manager also dims indicators not needed for the current test type.

**Smart Manifold Mode** This indicator/control displays Smart Manifold mode. The options are single, sequential or parallel mode. Setting the mode to single or sequential disables the other Smart Manifold indicators. Setting the mode to parallel enables the other Smart Manifold indicators.

## Purge Rate

This indicator/control displays Smart Manifold Purge Rate. The following table gives the valid ranges for the purge rate value:

Model PSI	Minimum cc/sec	Maximum cc/sec
25	0.01	7.0
100	0.01	7.0
250	0.01	7.0
500	0.01	7.0
1000	0.01	4.0
2000	0.01	2.0
3000	0.01	1.0
5000	0.01	0.8

The default value is 0.5cc/sec.

The HBLT uses this purge rate to deliver water to a port during the burst port hunt process. If the rate is too low, then the time it takes to fill the device is longer. If the rate is too high, then a backpressure may develop that causes false cutoffs.

This control is active for the Smart Manifold parallel mode only. When the mode is set to single or sequential, Pressure Manager dims this control.

## Cutoff PSI

This indicator/control displays Smart Manifold cutoff PSI. This value ranges from 1PSI to 100 PSI. The default value is 10PSI. If the value is too low, any backpressure may give a false cutoff. If the value is too high, the time to reach cutoff is longer.

The HBLT uses this value as the cutoff PSI in the parallel mode port hunt process.

This control is active for the Smart Manifold parallel mode only. When the mode is set to single or sequential, Pressure Manager dims this control.

## Timeout

This indicator/control displays Smart Manifold timeout. This value ranges from 3 seconds to 300 seconds. The default value is 10 seconds. This time must be long enough to fill the device and reach the cutoff PSI.

The HBLT uses this value as the timeout in the parallel mode port hunt process.

This control is active for the Smart Manifold parallel mode only. When the mode is set to single or sequential, Pressure Manager dims this control.

## Multi Compliance

This indicator/control displays Smart Manifold multiple port compliance. This value ranges from 1 to 10. The default value is the single port compliance value.

The HBLT uses this value as the adaptive compliance in the parallel mode port test or script pressure ramps.

This control is active for the Smart Manifold parallel mode only. When the mode is set to single or sequential, Pressure Manager dims this control.

## # of Multi Ports

This indicator/control displays Smart Manifold multiple port count. This value ranges from 1 to 10. The default value is one.

The HBLT uses this value as the adaptive compliance port count in the parallel mode port test or script pressure ramps.

This control is active for the Smart Manifold parallel mode only. When the mode is set to single or sequential, Pressure Manager dims this control.

## Panel Menu

This drop down menu provides file related functions.



### File>>Open Test

This menu item opens a test file selected by the operator. It opens the file select panel to allow the user to enter the file path.

### File>>Save Test

This menu item saves the current test to an existing test file selected by the operator. It opens the file select panel to allow the user to enter the file path.

### File>>Save Test As

This menu item saves the current test to a new test file selected by the operator. It opens the file select panel to allow the user to enter the file path.

### File>>Delete Test

This menu item opens the Delete Pressure Manager Test dialog box. This function does not delete HBLT tests.

### File>>Open Test Set

This menu item opens a test set file selected by the operator. It opens the file select panel to allow the user to enter the file path.

### File>>Save Test Set

This menu item saves the current test set to an existing test set file selected by the operator. It opens the file select panel to allow the user to enter the file path.

### File>>Save Test Set As

This menu item saves the current test set to a new test set file selected by the operator. It opens the file select panel to allow the user to enter the file path.

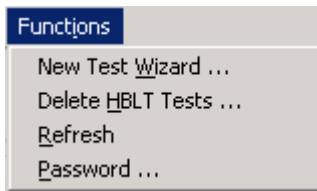
### File>>Delete Test Set

This menu item opens the Delete Pressure Manager Test Set dialog box. The user may then select a test set to delete. This function does not delete HBLT tests.

### File>>Close

This menu item closes the HBLT Test Parameters panel

This drop down menu provides special functions for HBLT tests.



**\Functions>>New Test Wizard**

This menu item opens the new test wizard initial panel.

**Functions>>Delete HBLT Tests**

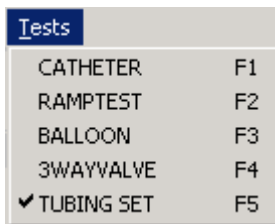
This menu item opens the Delete HBLT Tests panel.

**Functions >>Refresh** This menu item reads the test parameters for all tests defined on the connected HBLT. If the operator enters a new test, edits an existing test or deletes a test using the HBLT front panel, use this button to refresh the current test list and parameters.

**Functions >>Password**

This menu item opens the password panel. Enter the password when creating a new test, editing an existing test or deleting a test from an HBLT that is password protected.

This drop down menu provides selection of the HBLT native tests.



**\Tests>>CATHETER F1**

This and the other menu items are the test names received from the HBLT. Either select with the mouse or select using the shortcut key listed to the right of the test name. These names are examples of user defined tests.

## Password Panel




This panel allows the operator to enter the HBLT password for the delete test, new test and update test functions on the HBLT Test Parameters panel. Each time the HBLT Test Parameters panel opens, Pressure Manager resets the password to no characters.

The HBLT password protects against changes to the HBLT configuration by unauthorized persons. This password passes that functionality to Pressure Manager.

## Panel Controls

The standard Windows panel controls activated are:

**Close Panel** Use the  button to close the panel.

## Text Control

**Enter password** Type the password into this control. The characters are smudged with asterisks to prevent others from viewing the password. The valid characters are A-Z, 0-9, "-", "/", ".", "\*" and space. Pressure Manager translates lower case characters to upper case for operator convenience. The maximum password length is 10 characters.

The operator may also type the Enter key to close the panel instead of pressing the OK button.

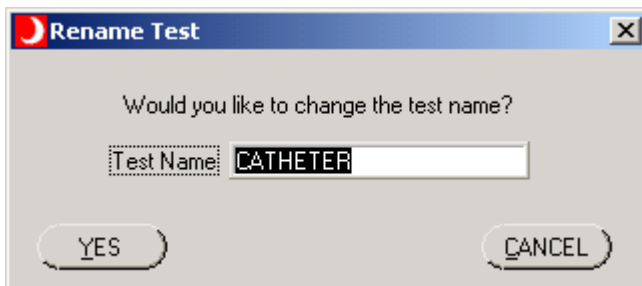
To correct an entry, press the Backspace key until reaching the proper location.

## Panel Buttons

**Cancel** Press this button to close this panel and rub out the password.

**OK** Press this button to close this panel and store the new password.

## Rename Test Panel




This panel allows the operator to change the test name if there is a name conflict.



## Panel Controls

The standard Windows panel controls activated are:

**Close Panel** Use the  button to close the panel.

## Text Control

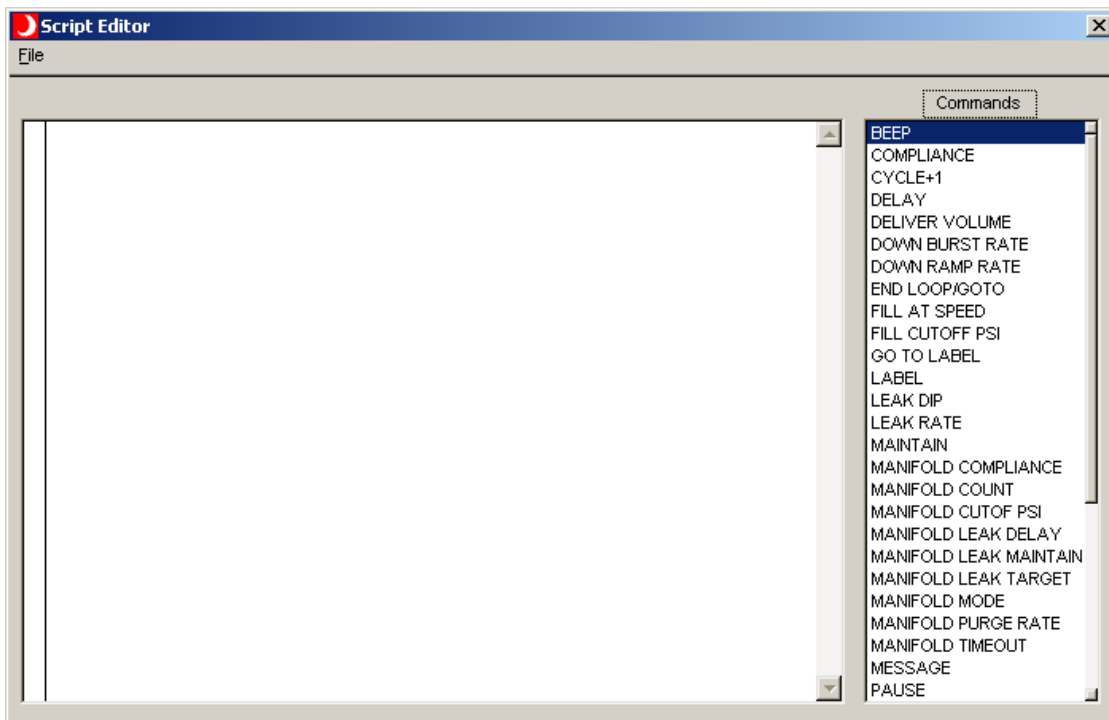
**Test Name** This indicator/control displays the name given to this test. Each test requires a unique test name. This control coerces characters into the valid HBLT character set A-Z, 0-9, '.', '/', '\*', '-', and space. The maximum number of characters is 11.

## Panel Buttons

**Cancel** Press this button to close this panel and cancels the function that caused the name conflict.

**YES** Press this button to close this panel and resubmit the function that caused the name conflict.

## Script Editor Panel



Use the **Tests>>Script Edit** menu item to open this panel from the main panel.


Use this panel to enter a new script or edit an existing script. The editor is content directed. That is the editor knows the syntax of the available script commands. The editor validates and completes the command syntax while the operator keys in new lines. The editor also checks parameter values based on HBLT pressure type and model type. In short, the editor insures that the operator enters only correctly formatted scripts.

Use the list control on the right to enter commands using the mouse. Double click on a command to insert it into the script on a line below the cursor line. A right single click displays a help panel for the highlighted command.

Use the mouse to select the current line in the Script panel. The lines displayed in cyan are not editable.

## Panel Controls

The standard Windows panel controls activated are:

**Close Panel** Use the  button to close the panel.

## Panel Entry Controls

<b>Script</b>	This text box contains the script text. This control responds to the following keys:
<b>Delete</b>	This key deletes the line highlighted by the cursor. However, this does not include the lines displayed with a cyan background.
<b>Enter</b>	This key opens the next line for insertion. After completing the command, type enter to close the line and open a new line. When finished entering commands, type the Enter key to close the insertion line.
<b>Up Arrow</b>	This key moves the cursor line up one line.
<b>Down Arrow</b>	This key moves the cursor line down one line.
<b>Insert</b>	This key opens the previous line for insertion.
<b>Home</b>	This key moves the cursor line to the first line of the script.
<b>End</b>	This key moves the cursor line to the last line of the script.
<b>Page Up</b>	This key moves the cursor line up one full page.
<b>Page Down</b>	This key moves the cursor line down one full page.
<b>Commands</b>	This control lists the valid commands to construct scripts. Double clicking on a list item inserts that item into the script on a new line following the current cursor line. If the command requires a parameter value, the user must type in the value and press the Enter key. The cursor advances to the new line.

## Script Commands

Script commands are directives sent to the HBLT to either set a parameter or initiate an action. The general form of organization is to set the parameters first followed by a list of commands. The script may contain parameter changes interspersed with commands. However, the script designer is responsible for organizing the script in a meaningful way. For instance, the following sequence is correct:

```
RUN TO PRESSURE 100  
MAINTAIN 4  
DELAY 2
```

However, the following sequence is not correct:

```
RUN TO PRESSURE 100  
DELAY 2  
MAINTAIN 4
```

The previous sequence does not work because the DELAY command turns the motor off immediately. The MAINTAIN command, which leaves the motor on, delays 4 seconds but does not truly maintain.

The following lists the valid script commands in alphabetical order:

- BEEP** This command beeps the buzzer on PC.
- COMPLIANCE** This command sets the compliance parameter on the HBLT. This parameter ranges from 1 to 10.
- CYCLE+1** This command increments the cycle count by one each time it executes. This allows the script author to decide when to increment the cycle count. The default cycle count increments on every run to target, deliver volume, and remove volume commands.
- DELAY** This command initiates a delay of specified seconds. Pressure Manager commands the HBLT to stop the motor and wait the specified number of seconds. This parameter ranges from 1 to 32765 seconds.
- DELIVER VOLUME** This command directs the HBLT to deliver the specified volume in 1/10 cc. This command has a gray background to distinguish it from pressure-oriented commands. The following table details the parameter limits.

	Minimum	Default	Maximum	XV Maximum
Model 25	0.1	1.0	68.0	184.0
Model 100	0.1	1.0	68.0	184.0
Model 250	0.1	1.0	68.0	184.0
Model 500	0.1	1.0	68.0	184.0
Model 1000	0.1	1.0	42.0	106.0
Model 2000	0.1	1.0	26.0	62.0
Model 3000	0.1	1.0	10.0	24.0
Model 5000	0.1	1.0	10.0	24.0

The maximum is the volume limit that the cylinder can deliver. The effective maximum volume may be less due to the position of the limit switches and the piston position that allows vacuum goals. The HBLT does not keep track of the sum of **DELIVER VOLUME** or **REMOVE VOLUME** commands. If the script attempts to add or remove an excess of volume, the HBLT will emit either the intake limit or exhaust limit alarm and stop the script.

- DOWN BURST RATE** This command sets the down burst rate parameter on the HBLT. See Appendix A for ranges based on model and units.
- DOWN RAMP RATE** This command sets the down ramp rate parameter on the HBLT. See Appendix A for ranges based on model and units.
- END LOOP/GOTO** This command ends a script loop. Pressure Manager decrements the loop count. If the count is non-zero, Pressure Manager transfers script execution to the line following the label specified. If the count is zero, Pressure Manager continues script execution with the next line. This parameter ranges from 1 to 32767. However, the value must match an exiting LABEL parameter.

**FILL CUTOFF PSI**

This command sets the cutoff PSI parameter on the HBLT. This parameter triggers the end of the product fill phase. This parameter ranges from 1 to 200 PSI.

**FILL AT SPEED**

This command sets the product fill speed parameter on the HBLT. This parameter ranges from 0.00 to 4.00 cc/sec. Setting this parameter to zero causes the HBLT to reposition the cylinder without filling the product. This is useful when using the volume delivery, volume removal script commands and when the product under test weeps or leaks under normal conditions. The following table gives the minimum and maximum values for each HBLT model.

Model PSI	Minimum cc/sec	Maximum cc/sec
25	0.01	4.0
100	0.01	4.0
250	0.01	4.0
500	0.01	4.0
1000	0.01	4.0
2000	0.01	2.0
3000	0.01	1.0
5000	0.01	0.8

**GO TO LABEL**

This command transfers script execution to the following specified label. This parameter ranges from 1 to 32767. However, the value must match an exiting LABEL parameter.

**LABEL**

This command sets a label location within the script. The GO TO LABEL and END LOOP/GOTO commands use this location as a target. This parameter ranges from 1 to 32767.

**LEAK DIP**

This command sets the leak dip parameter on the HBLT. See Appendix A for ranges based on model and units.

**LEAK RATE**

This command sets the leak rate parameter on the HBLT. See Appendix A for ranges based on model and units.

**MAINTAIN**

This command delays the specified number of seconds without sending a motor stop command to the HBLT. This parameter ranges from 1 to 32765.

**MANIFOLD COMPLIANCE**

This command sets the Smart Manifold adaptive compliance. This value ranges from 1 to 10 with a default of one.

**MANIFOLD COUNT**

This command sets the Smart Manifold adaptive compliance port count. This value ranges from 1 to 10 with a default of one.

**MANIFOLD CUTOFF PSI**

This command sets the Smart Manifold burst hunt cutoff PSI. This value ranges from 1 PSI to 100 PSI with a default of one.

**MANIFOLD LEAK DELAY**

This command sets the Smart Manifold leak hunt leak delay. This value ranges from 1 to 32767 seconds. The HBLT uses this delay when hunting for a leaking port in parallel mode.

**MANIFOLD LEAK MAINTAIN**

This command sets the Smart Manifold leak hunt maintain delay. This value ranges from 1 to 32767 seconds. The HBLT uses this delay when hunting for a leaking port in parallel mode.

**MANIFOLD LEAK TARGET**

This command sets the Smart Manifold leak hunt target pressure. See Appendix A for ranges based on model and units.

**MANIFOLD MODE**

This command sets the Smart Manifold testing mode. The mode can be single, sequential, or parallel.

**MANIFOLD PURGE RATE**

This command sets the Smart Manifold burst hunt purge rate. The following table gives the valid ranges for the purge rate value:

Model PSI	Minimum cc/sec	Maximum cc/sec
25	0.01	7.0
100	0.01	7.0
250	0.01	7.0
500	0.01	7.0
1000	0.01	4.0
2000	0.01	2.0
3000	0.01	1.0
5000	0.01	0.8

**MANIFOLD TIMEOUT** This command sets the Smart Manifold burst hunt timeout value. The value can range from 1 second to 32767 seconds with a default of 10 seconds.

**MESSAGE** This command displays a message on the next to last line on the HBLT LCD display.

**PAUSE** This command pauses script execution until the operator clicks the RESUME button on the Pressure Manager panel to continue operation.

**PAUSE DELAY** This command pauses and places the HBLT in the delay mode that checks for bursts and leaks. Click the RESUME button on the Pressure Manager panel to continue operation.

**PAUSE MAINTAIN** This command pauses and places the HBLT in the maintain mode that checks for bursts. Click the RESUME button on the Pressure Manager panel to continue operation.

**READ MICROMETER** This command reads the attached micrometer and inserts the data in the Micrometer panel.

**REMOVE VOLUME** This command directs the HBLT to remove the specified volume in 1/10 cc. This command has a gray background to distinguish it from pressure-oriented commands. The following table details the parameter limits.

	Minimum	Default	Maximum	XV Maximum
Model 25	0.1	1.0	68.0	184.0
Model 100	0.1	1.0	68.0	184.0
Model 250	0.1	1.0	68.0	184.0
Model 500	0.1	1.0	68.0	184.0
Model 1000	0.1	1.0	42.0	106.0
Model 2000	0.1	1.0	26.0	62.0
Model 3000	0.1	1.0	10.0	24.0
Model 5000	0.1	1.0	10.0	24.0

The maximum is the volume limit that the cylinder can deliver. The effective maximum volume may be less due to the position of the limit switches and the piston position that allows vacuum goals. The HBLT does not keep track of the sum of **DELIVER VOLUME** or **REMOVE VOLUME** commands. If the script attempts to add or remove an excess of volume, the HBLT will emit either the intake limit or exhaust limit alarm and stop the script.

- RUN TO PRESSURE** This command directs the HBLT to follow a pressure ramp to the specified target pressure. See Appendix A for ranges based on model and units.
- SET LOOP** This command sets the loop-iteration parameter. Loops may be nested within each other. This parameter ranges from 1 to 32767.
- STOP** This command causes Pressure Manager to stop the script execution. This command does the same action as the END command.
- UP BURST RATE** This command sets the up burst rate parameter on the HBLT. See Appendix A for ranges based on model and units.
- UP RAMP RATE** This command sets the up ramp rate parameter on the HBLT. See Appendix A for ranges based on model and units.
- VACUUM POSITION** This command sets the vacuum piston position value. Values can be LEGACY, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, and 90%. This command works only when there is a negative target in the script.
- VOLUME PRESS LIMIT** This command sets the pressure to stop adding volume for the **DELIVER VOLUME** command. This command has no effect on the **REMOVE VOLUME** command. The **DELIVER VOLUME** adds volume until reaching this pressure. This command has a gray background to distinguish it from pressure-oriented commands.
- The following table gives the minimums, defaults, maximums for all HBLT models and unit types.

Model	Unit	Minimum	Default	Maximum
<b>25</b>	<b>PSI</b>	0.10 (10)	25.00 (2500)	25.00 (2500)
	<b>ATM</b>	0.007 (7)	1.701 (1701)	1.701 (1701)
	<b>BAR</b>	0.007 (7)	1.724 (1724)	1.724 (1724)
	<b>KPA</b>	0.69 (69)	172.37 (17237)	172.37 (17237)
<b>100</b>	<b>PSI</b>	0.5 (5)	100.0 (1000)	100.0 (1000)
	<b>ATM</b>	0.03 (3)	6.81 (681)	6.81 (681)
	<b>BAR</b>	0.03 (3)	6.89 (689)	6.89 (689)
	<b>KPA</b>	3.4 (34)	689.5 (6895)	689.5 (6895)
<b>250</b>	<b>PSI</b>	2.5 (25)	250.0 (2500)	250.0 (2500)
	<b>ATM</b>	0.17 (17)	17.01 (1701)	17.01 (1701)
	<b>BAR</b>	0.17 (17)	17.24 (1724)	17.24 (1724)
	<b>KPA</b>	17 (17)	1724 (1724)	1724 (1724)
<b>500</b>	<b>PSI</b>	5.0 (50)	500.0 (5000)	500.0 (5000)
	<b>ATM</b>	0.34 (34)	34.03 (3403)	34.03 (3403)
	<b>BAR</b>	0.34 (34)	34.47 (3447)	34.47 (3447)
	<b>KPA</b>	34 (34)	3447 (3447)	3447 (3447)
<b>1000</b>	<b>PSI</b>	10 (10)	1000 (1000)	1000 (1000)
	<b>ATM</b>	0.7 (7)	68.1 (681)	68.1 (681)
	<b>BAR</b>	0.7 (7)	68.9 (689)	68.9 (689)
	<b>KPA</b>	69 (69)	6895 (6895)	6895 (6895)
<b>2000</b>	<b>PSI</b>	20 (20)	2000 (2000)	2000 (2000)
	<b>ATM</b>	1.4 (14)	136.1 (1361)	136.1 (1361)
	<b>BAR</b>	1.4 (14)	137.9 (1379)	137.9 (1379)
	<b>KPA</b>	138 (138)	13790 (13790)	13790 (13790)
<b>3000</b>	<b>PSI</b>	20 (20)	3000 (3000)	3000 (3000)
	<b>ATM</b>	1.4 (14)	204.2 (2042)	204.2 (2042)
	<b>BAR</b>	1.4 (14)	206.8 (2068)	206.8 (2068)
	<b>KPA</b>	138 (138)	20684 (20684)	20684 (20684)
<b>5000</b>	<b>PSI</b>	20 (20)	5000 (5000)	5000 (5000)
	<b>ATM</b>	1.4 (14)	340.3 (3403)	340.3 (3403)
	<b>BAR</b>	1.4 (14)	344.7 (3447)	344.7 (3447)
	<b>KPA</b>	138 (138)	32767 (32767)	32767 (32767)

**VOLUME RATE**

This command sets the volume delivery/removal rate in 1/100 cc/sec specified by the parameter. This command has a gray background to distinguish it from pressure-oriented commands. The following table details the ranges for this parameter.

	Minimum	Maximum
Model 25	0.01	7.00
Model 100	0.01	7.00
Model 250	0.01	7.00
Model 500	0.01	7.00
Model 1000	0.01	4.00
Model 2000	0.01	2.00
Model 3000	0.01	1.00
Model 5000	0.01	0.80

The default volume rate is 0.10 cc/sec.

The actual delivery rate differs from the specified rate depending on the pressure and the product compliance. Since the HBLT does not know the product compliance characteristics, it cannot predict the delivery speed. The HBLT is controlling closed loop on the motor speed and not on the volume rate. Best results occur at low pressures with extremely compliant products. However, the script designer can empirically determine a rate that meets requirements.

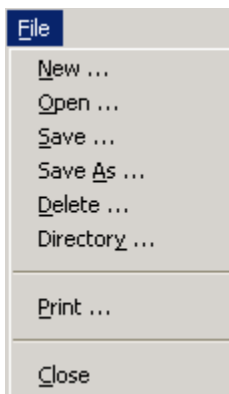
Setting the volume rate to a high value can trigger false up or down bursts when using the REMOVE VOLUME command. If this problem occurs, raise the burst rate or lower the volume rate.

**; COMMENT**

This command does nothing. It provides comment lines within a script.

## Panel Menu

This drop down menu provides file related functions.



**File>>New**

This menu item clears the text box and sets the system for a new script. If there is a script displayed, Pressure Manager prompts to save the script.

**File>>Open**

This menu item opens an existing script for editing.

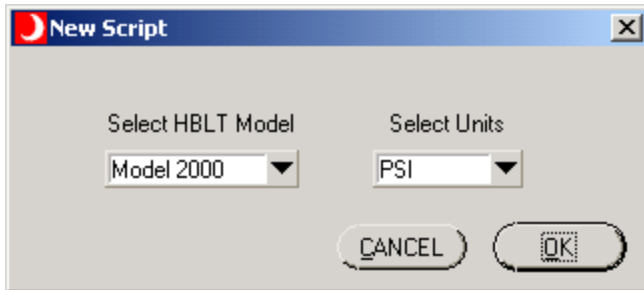
**File>>Save**

This menu item saves a previously saved script. If not a previously saved script, then this menu item does a **File>>Save As**.




<b><u>F</u>ile&gt;&gt;<u>S</u>ave <u>A</u>s</b>	This menu item saves a script with a new name.
<b><u>F</u>ile&gt;&gt;<u>D</u>elete</b>	This menu item deletes the currently open script.
<b><u>F</u>ile&gt;&gt;<u>D</u>irectory</b>	This menu item sets the default directory for opening and saving scripts.
<b><u>F</u>ile&gt;&gt;<u>P</u>rint</b>	This menu item prints the currently open script on the default system printer with a header and line numbers.
<b><u>F</u>ile&gt;&gt;<u>C</u>lose</b>	This menu item closes the panel. If a script is open, Pressure Manager prompts for a save.

### ***New Script Popup Panel***



### **Panel Controls**

The standard Windows panel controls activated are:

**Close Panel** Use the  button to close the panel.

### **Panel Buttons**

**OK** Press this button to use the selected options for the new script.

**Cancel** Press this button to close this panel and abandon the new script function.

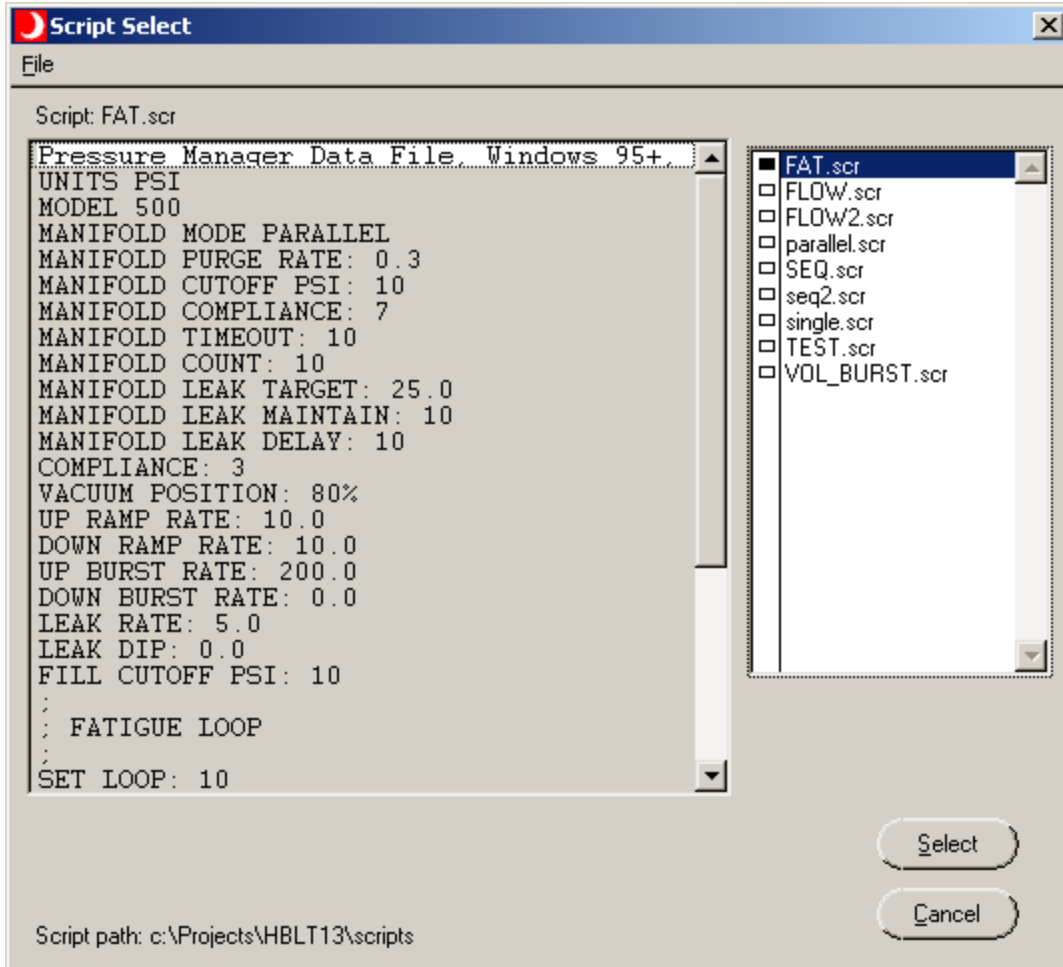
### **Panel Entry**

**Select HBLT Model** Use this control to select the HBLT model for the new script.

**Select Units** Use this control to select the pressure units for the new script.

### ***Script Select Panel***

Use the **Tests>>Script Select** menu item to open this panel from the main panel.




Use this panel to select the Pressure Manager script to run. First choose a script name in the Scripts list box and double click on it. You may need to use the scroll bars to see the entire list. Look at the text in the Pressure Manager Script text box to insure you have the correct script. The text box is not editable on this panel. Click on the **Select** button to choose this script and close this panel. Click the **Cancel** button to close this panel with no action.

The script select panel on right side of the screen displays on valid scripts. If a test does not appear in this list, return to the script editor and check for errors. The most common error is a mismatch between the script machine type (25,100, 250, 500, 1000, 2000, 3000,5000) and the attached HBLT.

## Panel Controls

The standard Windows panel controls activated are:

**Close Panel** Use the  button to close the panel.

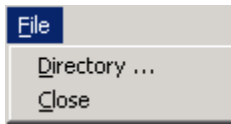
## Panel Buttons

**Select** Press this button to select the current script and close this panel.

**Cancel** Press this button to close this panel with no action.

## Panel Menu

This drop down menu provides file related functions.



### **File>>Directory**

Use this menu item to change the directory that Pressure Manager uses to retrieve scripts.

### **File>>Close**

Use this menu item to close the Select Script panel.

## Panel Indicator Controls

### **Scripts**

This control contains the available scripts. Scroll through the list using the scroll bar. Then click on the selected script name. Pressure Manager displays the script text in the text box for checking for proper script.

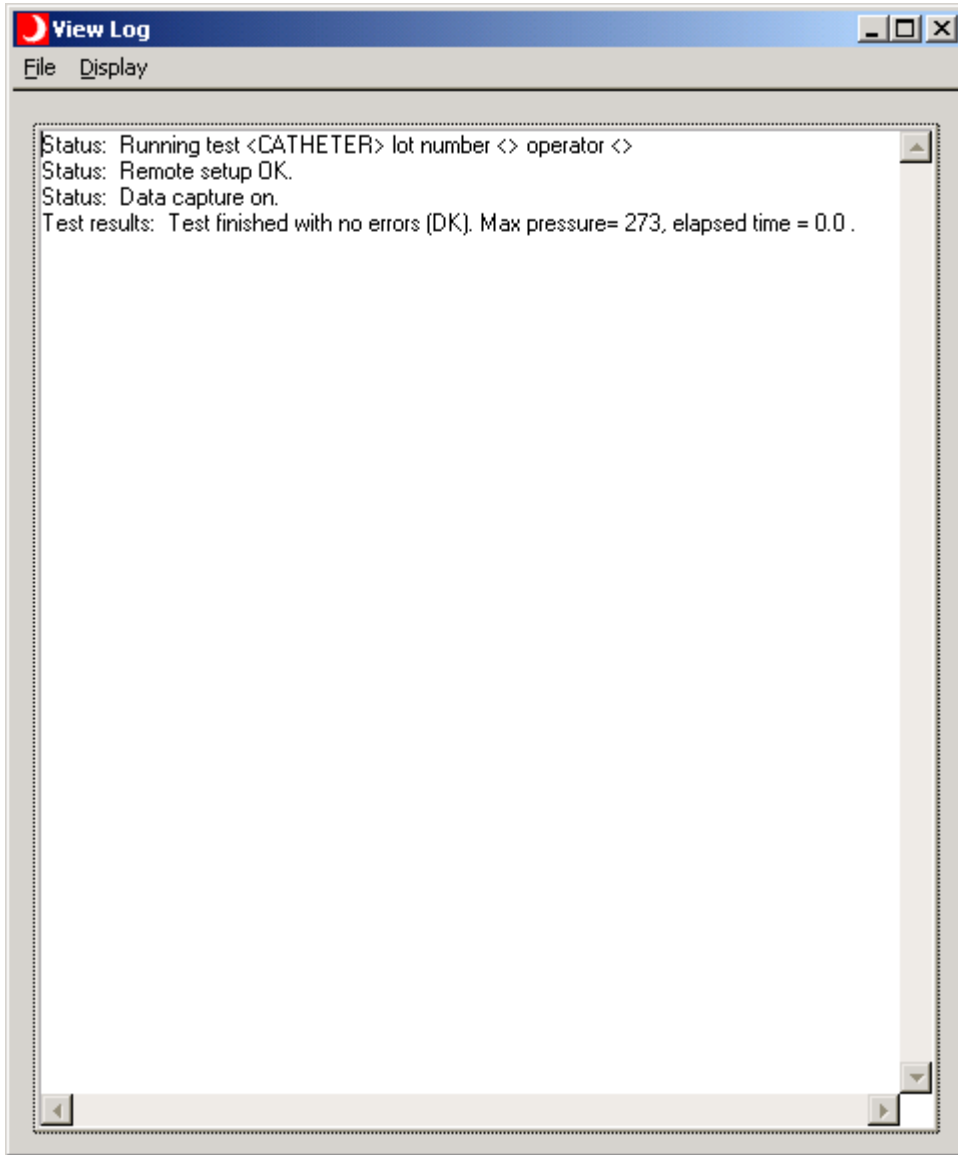
### **Script**

This control contains the script for viewing but not editing the selected script. Use the scroll bar to scroll through lengthy scripts.

### **Script Path**

This text indicator displays the current script path.

## Log Panel







This panel displays the technical log of the script progress. This information is primarily for system development. However, it may be useful in diagnosing system problems.

Five different types of information are available. The first is status. Status information lines are diagnostic comments from the program. The second is data. Data is the pressure points displayed on the screen. The third is Input. Input is the raw input received from the HBLT. Fourth is Output. Output is the raw output sent to the HBLT. Fifth are Script lines. Pressure Manager inserts script lines into the log during execution.

The operator may enter notes anywhere in the panel. This allows comments about special events. Pressure Manager saves or prints these notes as part of the report.

## Panel Controls

The standard Windows panel controls activated are:

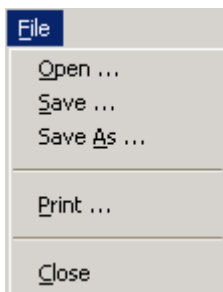
<b>Minimize Panel</b>	Use the  button to minimize the panel.
<b>Maximize Panel</b>	Use the  or  buttons to maximize or tile the panel.
<b>Close Panel</b>	Use the  button to close the panel.
<b>Resize Panel</b>	Use the mouse to resize the panel.

## Log Text Box

This control contains the log text. The operator may also type notes into the box. The scroll bars permit viewing text outside the text box maximum area.

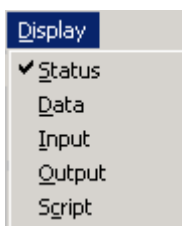
## Panel Menu

This drop down menu provides file related functions.



<b><u>F</u>ile&gt;&gt;<u>O</u>pen</b>	This menu item opens a previously saved log. A dialog box opens to allow the operator to select from previously saved logs.
<b><u>F</u>ile&gt;&gt;<u>S</u>ave</b>	This menu item saves the current log. If the log was previously saved, the save occurs immediately. If the log is new, this menu item behaves just like Save As.
<b><u>F</u>ile&gt;&gt;<u>S</u>ave <u>A</u>s</b>	This menu item opens a dialog box for the operator to enter the save file name. In addition, the operator may choose another directory.
<b><u>F</u>ile&gt;&gt;<u>P</u>rint</b>	This menu item prints the log on the default system printer. The log includes a header with the file name, date, and time. Also, the log lines are numbered for easy reference. The user must save the log prior to printing. Pressure Manager actually prints as the file's contents.
<b><u>F</u>ile&gt;&gt;<u>C</u>lose</b>	This menu item closes the log panel.

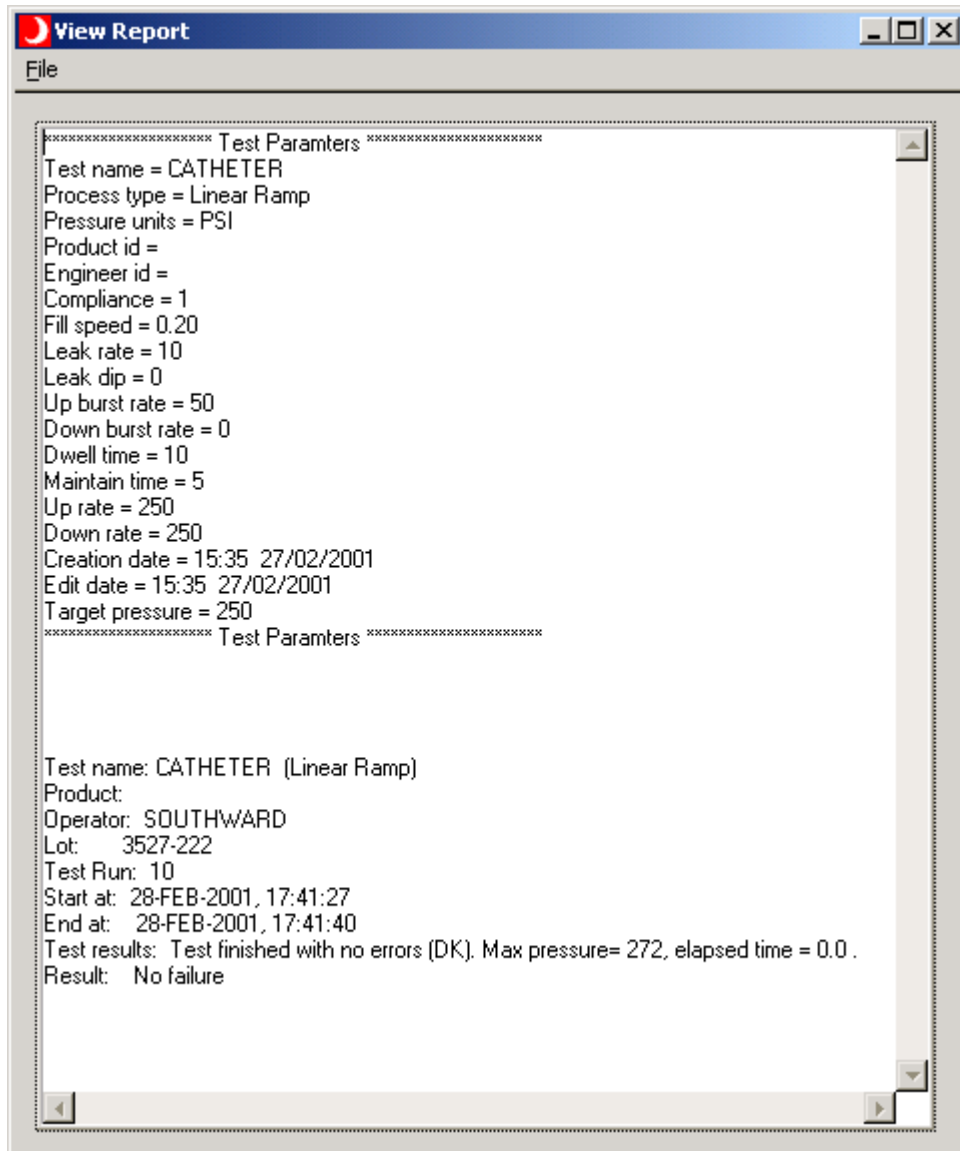
This drop down menu provides log capture modes. Items selected have a check mark to the left of the item.



<b><u>D</u>isplay&gt;&gt;<u>S</u>tatus</b>	This menu item selects program status messages. The default is selected.
--	--

- Display>>Data** This menu item selects pressure data points from the HBLT. The default is de-selected.
- Display>>Input** This menu item selects raw input as received from the HBLT. The default is de-selected.
- Display>>Output** This menu item selects raw output as sent to the HBLT. The default is de-selected.
- Display>>Script** This menu item selects script lines as executed. The default is de-selected.

## ***Report Panel***







This panel displays the results of the current test. For HBLT tests, Pressure Manager displays the test parameters followed by the test results. For Pressure Manager scripts, Pressure Manager displays the script followed by the test results.

When the test completes, the operator may choose from the File menu to either Save As and/or Print the test results. At a later time, the operator may open the saved file for review or printing.

The test results include the same results that the HBLT prints via the parallel port on the back panel.

## Panel Controls

The standard Windows panel controls activated are:

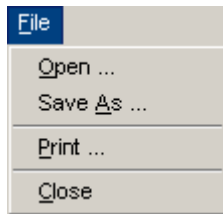
- |                       |   |
|-----------------------|---|
| <b>Minimize Panel</b> | Use the  button to minimize the panel.   |
| <b>Maximize Panel</b> | Use the  or  buttons to maximize or tile the panel. |
| <b>Close Panel</b>    | Use the  button to close the panel.  |
| <b>Resize Panel</b>   | Use the mouse to resize the panel.  |

## Report Text Box

This control contains the report text. The operator may also type notes into the box. The scroll bars permit viewing text outside the text box maximum area.

## Panel Menu

This drop down menu provides file related functions.



- |   |  |
|---|--|
| <b><u>F</u>ile&gt;&gt;<u>O</u>pen</b>           | This menu item opens a previously saved report. A dialog box opens to allow the operator to select from previously saved reports.  |
| <b><u>F</u>ile&gt;&gt;<u>S</u>ave <u>A</u>s</b> | This menu item opens a dialog box for the operator to enter the save file name. In addition, the operator may choose another directory.  |
| <b><u>F</u>ile&gt;&gt;<u>P</u>rint</b>          | This menu item prints the report on the default system printer. The report includes a header with the file name, date, and time. Also, the report lines are numbered for easy reference. |
| <b><u>F</u>ile&gt;&gt;<u>C</u>lose</b>          | This menu item closes the report panel.  |

## ***Micrometer Panel***




This panel displays the pressure and micrometer readings of the current test.

### **Panel Controls**

The standard Windows panel controls activated are:

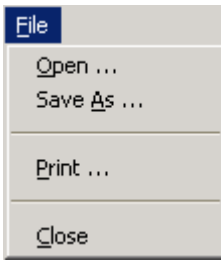
**Minimize Panel**      Use the  button to minimize the panel.

**Close Panel**      Use the  button to close the panel.



## Panel Menu

This drop down menu provides file related functions.



### File>>Open

This menu item opens a previously saved micrometer table. A dialog box opens to allow the operator to select from previously saved reports.

### File>>Save As

This menu item opens a dialog box for the operator to enter the save file name. In addition, the operator may choose another directory.

### File>>Print

This menu item prints the micrometer table on the default system printer. The report includes a header with the file name, date, and time. Also, the report lines are numbered for easy reference.

### File>>Close

This menu item closes the report panel.

## ***New Test Wizard Panel – Test General Information***


A screenshot of the 'New Test Wizard' dialog box. The title bar says 'New Test Wizard' with a red crescent logo and a close button. The main text says 'Enter information about the test.' Below this are five input fields: 'Test Name' (text box), 'Process Types' (dropdown menu showing 'Linear Ramp'), 'Pressure Units' (dropdown menu showing 'PSI'), 'Engineer Id' (text box), and 'Product Id' (text box). At the bottom right are two buttons: 'CANCEL' and 'NEXT'.

Use this panel to enter the initial information about a new HBLT test. The panels that follow use the process type and pressure unit information to control the Test Wizards function.

## Panel Controls

The standard Windows panel controls activated are:

### **Close Panel**

Use the  button to close the panel. Does the same action as the **Cancel** button.

## Panel Buttons

### **CANCEL**

Use this button to close the New Test Wizard without creating a new test.

### **NEXT**

Use this button to move to the next panel.

## Panel Entry

### **Test Name**

Use this control to enter the test name. This control coerces characters into the valid HBLT character set A-Z, 0-9, '.', '/', '\*', '-', and space. Also, Pressure Manager insures there are no duplicate test names. The maximum characters are 11.

### **Process Types**

Use this control to select one of the process types. Either click on the arrows to cycle through the different types or click on the control and select the desired type from the drop down window. The process types are ramp, staircase, fatigue, incremental, and custom.

### **Pressure Units**

Use this control to select one of the pressure unit types. Either click on the arrows to cycle through the units or click on the control and select the desired unit type from the drop down window. The unit types are pounds per square inch (PSI), kilopascals (KPA), atmospheres (ATM), and bars (BAR).

### **Engineer ID**

Use this control to enter the engineer identification. . This control coerces characters into the valid HBLT character set A-Z, 0-9, '.', '/', '\*', '-', and space. The maximum ID size is 14 characters. The engineer ID is optional.

### **Product ID**

Use this control to enter the product identification. . This control coerces characters into the valid HBLT character set A-Z, 0-9, '.', '/', '\*', '-', and space. The maximum ID size is 14 characters. The product ID is optional.

## ***New Test Wizard Panel – Parameters Common to All Tests***

The screenshot shows a software window titled "New Test Wizard" with a close button in the top right corner. The main area of the window has a light gray background and contains the text "Enter settings common to all tests." Below this text are ten input fields arranged in two columns. Each field has a small up/down arrow icon to its left. The fields and their values are: Compliance (1), Fill Speed (0.20), Up Burst Rate (50), Down Burst Rate (0), Up Ramp Rate (250), Down Ramp Rate (250), Leak Rate (10), Leak Dip (0), Dwell Time (10), and Maintain Time (5). At the bottom of the window are three buttons: "CANCEL", "BACK", and "NEXT". The "CANCEL" button is highlighted with a dashed border.

Parameter	Value
Compliance	1
Fill Speed	0.20
Up Burst Rate	50
Down Burst Rate	0
Up Ramp Rate	250
Down Ramp Rate	250
Leak Rate	10
Leak Dip	0
Dwell Time	10
Maintain Time	5

Use this panel to enter information common to all the tests.

## Panel Controls

The standard Windows panel controls activated are:

**Close Panel** Use the  button to close the panel. This button does the same action as the **CANCEL** button.

## Panel Buttons

**BACK** Use this button to move back to the previous panel.

**CANCEL** Use this button to close the New Test Wizard without creating a new test.

**NEXT** Use this button to move to the next panel. The next panel depends on the test type.

## Panel Entry

**Compliance** Use this control to enter the product's compliance. This value ranges from 1 (very rigid) to 10 (very compliant). Use the lowest value that does not overshoot the target value. Start at 1 and increase until there is no overshoot. Entering too high a value causes pressure ramps to step.

**Fill Speed** Use this control to enter the product fill speed. The units for this value are always cc/sec. This parameter ranges from 0.01 to 4.00 cc/sec.

**Up Burst Rate** Use this control to enter the up burst rate. This pressure drop rate triggers a burst event. Pressure Manager enforces a minimum leak span of 15 PSI between the Up Burst Rate value and the Leak rate value. See Appendix A for ranges based on model and units.

**Down Burst Rate** Use this control to enter the down burst rate. This pressure drop rate triggers a burst event. Insure that this value is greater than the down ramp rate. Otherwise, the HBLT triggers a burst event on every down ramp. If the down burst event is not needed, enter a zero value here. Pressure Manager enforces a minimum leak span of 15 PSI between the Up Burst Rate value and the Leak rate value. See Appendix A for ranges based on model and units.

**Up Ramp Rate** Use this control to enter the up ramp rate. The HBLT follows this pressure ramp to the target pressure. See Appendix A for ranges based on model and units.

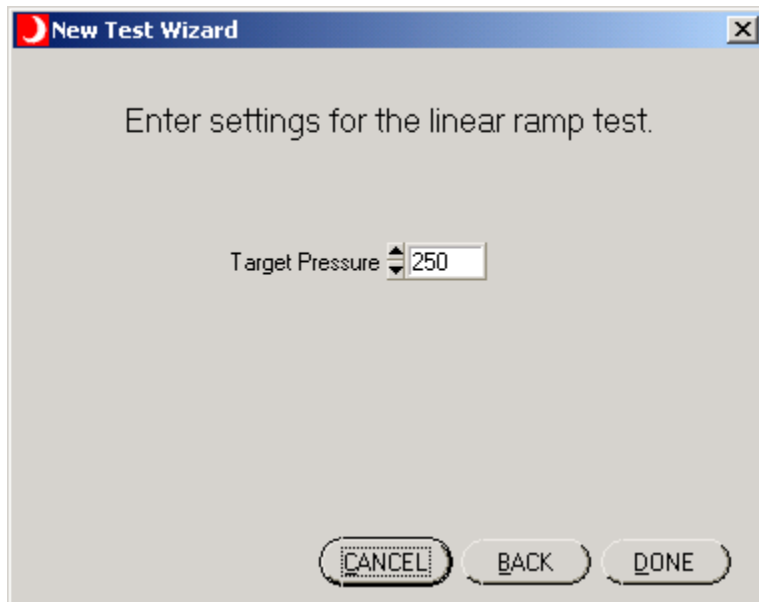
**Down Ramp Rate** Use this control to enter the down ramp rate. The HBLT follows this pressure ramp to the target pressure. Insure that this value is less than the down burst rate. Otherwise, the HBLT triggers a burst event on every down ramp. See Appendix A for ranges based on model and units.

**Leak Rate** Use this control to enter the leak rate. If leak rate testing is not needed, enter a zero value here. Pressure Manager enforces a minimum leak span of 15 PSI between the Up Burst Rate value and the Leak rate value. See Appendix A for ranges based on model and units.

**Leak Dip** Use this control to enter the leak dip. If leak dip testing is not needed, enter a zero value here. See Appendix A for ranges based on model and units.

<b>Dwell Time</b>	Use this control to enter the dwell time. The dwell time is time that starts when a pressure ramp reaches it's target pressure and ends when the next pressure ramp starts. This parameter ranges from 1 to 999.
<b>Maintain Time</b>	Use this control to enter the maintain time. The maintain time is time that starts when a pressure ramp reaches it's target and ends when this value expires. Pressure Manager coerces this value to less than or equal to the dwell time. This parameter ranges from 1 to 999.

### ***New Test Wizard Panel – Linear Ramp Test Parameters***



Use this panel to enter the parameter specific to the linear ramp test.

### **Panel Controls**

The standard Windows panel controls activated are:

<b>Close Panel</b>	Use the  button to close the panel. This button does the same action as the <b>CANCEL</b> button.
--------------------	--

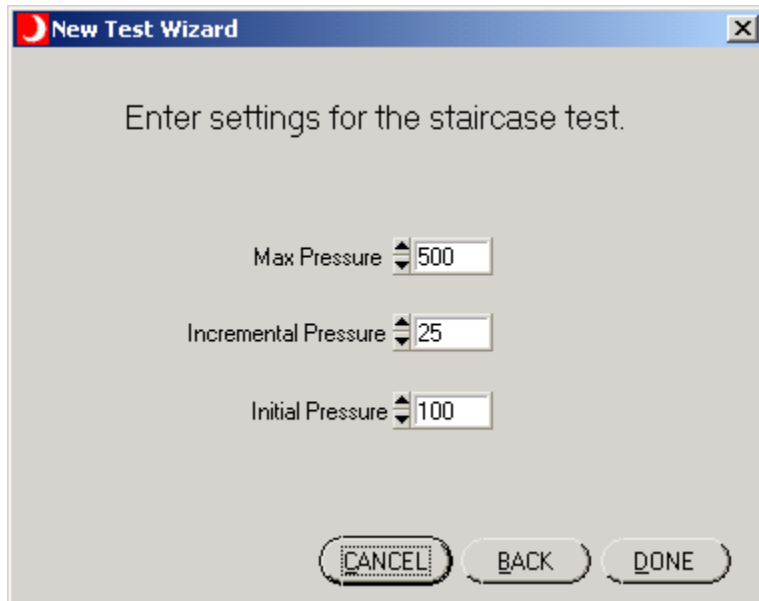
### **Panel Buttons**

<b><u>B</u>ACK</b>	Use this button to move back to the previous panel.
<b><u>C</u>ANCEL</b>	Use this button to close the New Test Wizard without creating a new test.
<b><u>D</u>ONE</b>	Use this button to close the New Test Wizard and create the new HBLT test.

### **Panel Entry**

<b>Target Pressure</b>	Use this control to enter the test's target pressure. See Appendix A for ranges based on model and units.
------------------------	---

## ***New Test Wizard Panel – Staircase Test Parameters***



Use this panel to enter the parameters specific to the staircase test.

### **Panel Controls**

The standard Windows panel controls activated are:

**Close Panel** Use the  button to close the panel. This button does the same action as the **CANCEL** button.

### **Panel Buttons**

**BACK** Use this button to move back to the previous panel.

**CANCEL** Use this button to close the New Test Wizard without creating a new test.

**DONE** Use this button to close the New Test Wizard and create the new HBLT test.

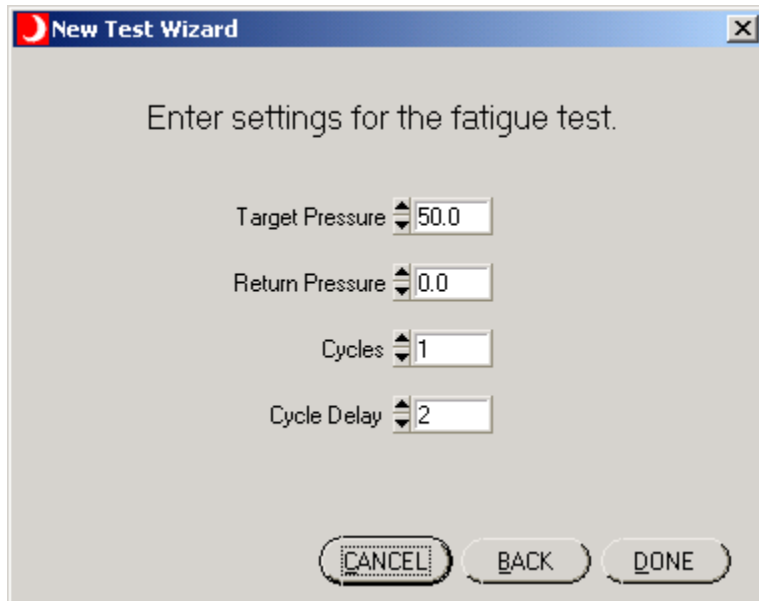
### **Panel Entry**

**Max Pressure** Use this control to enter the maximum pressure for the staircase test. Max Pressure caps the Initial Pressure. Changing the Max Pressure below the Initial Pressure coerces the Initial Pressure below the Max Pressure. See Appendix A for ranges based on model and units.

**Incremental Pressure** Use this control to enter the incremental pressure for the staircase test. See Appendix A for ranges based on model and units.

**Initial Pressure** Use this control to enter the initial pressure for the staircase test. Max Pressure caps the Initial Pressure. See Appendix A for ranges based on model and units.


## ***New Test Wizard Panel – Fatigue Test Parameters***



Use this panel to enter the parameters specific to the fatigue test.

### **Panel Controls**

The standard Windows panel controls activated are:

**Close Panel** Use the  button to close the panel. This button does the same action as the **CANCEL** button.

### **Panel Buttons**

**BACK** Use this button to move back to the previous panel.

**CANCEL** Use this button to close the New Test Wizard without creating a new test.

**DONE** Use this button to close the New Test Wizard and create the new HBLT test.

### **Panel Entry**

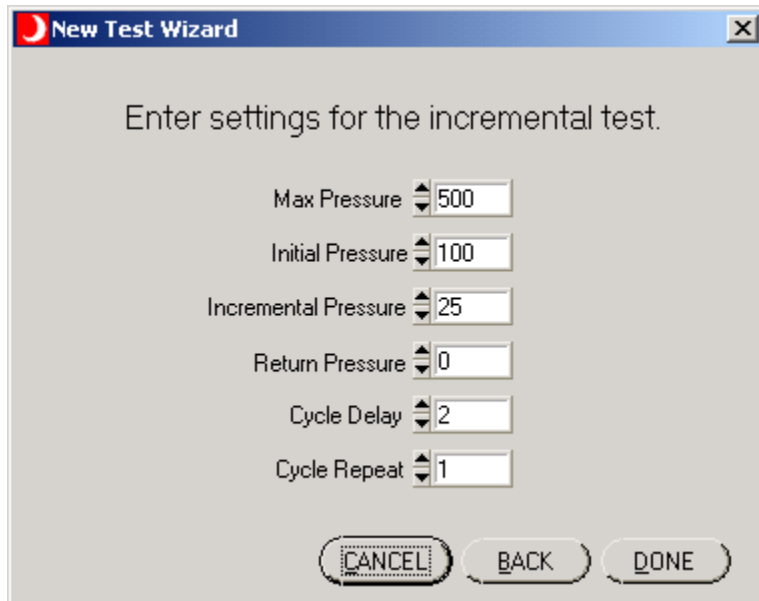
**Target Pressure** Use this control to enter the target pressure for the fatigue test. Changing this entry affects the upper bound or the Return Pressure parameter. See Appendix A for ranges based on model and units.

**Return Pressure** Use this control to enter the return pressure for the fatigue test. The upper bound for this control is the Target Pressure-1. See Appendix A for ranges based on model and units.

**Cycles** Use this control to enter the number of test cycles to run. This parameter ranges from 1 to 9999.

**Cycle Delay** Use this control to enter the delay in seconds between cycles for the fatigue test. This parameter ranges from 1 to 99.

## ***New Test Wizard Panel – Incremental Test Parameters***




The screenshot shows a Windows-style dialog box titled "New Test Wizard" with a close button (X) in the top right corner. The main text inside the dialog reads "Enter settings for the incremental test." Below this text are six spin controls, each with a label and a numerical value in a text box: "Max Pressure" (500), "Initial Pressure" (100), "Incremental Pressure" (25), "Return Pressure" (0), "Cycle Delay" (2), and "Cycle Repeat" (1). At the bottom of the dialog are three buttons: "CANCEL" (highlighted with a dashed border), "BACK", and "DONE".

Use this panel to enter the parameters specific to the incremental test.

### **Panel Controls**

The standard Windows panel controls activated are:

**Close Panel** Use the  button to close the panel. This button does the same action as the **CANCEL** button.

### **Panel Buttons**

**BACK** Use this button to move back to the previous panel.

**CANCEL** Use this button to close the New Test Wizard without creating a new test.

**DONE** Use this button to close the New Test Wizard and create the new HBLT test.

### **Panel Entry**

**Max Pressure** Use this control to enter the maximum pressure for the incremental test. See Appendix A for ranges based on model and units.

**Initial Pressure** Use this control to enter the initial pressure for the incremental test. Changing this entry affects the upper bound or the Return Pressure parameter. Max Pressure caps the Initial Pressure. See Appendix A for ranges based on model and units.

**Incremental Pressure** Use this control to enter the pressure increment for the incremental test. Max Pressure caps the Initial Pressure. Changing the Max Pressure below the Initial Pressure coerces the Initial Pressure below the Max Pressure. See Appendix A for ranges based on model and units.

- Return Pressure** Use this control to enter the return pressure for the incremental test. The upper bound for this control is the Initial Pressure-1. See Appendix A for ranges based on model and units.
- Cycle Delay** Use this control to enter the delay in seconds between cycles for the incremental test. This parameter ranges from 1 to 99.
- Cycle Repeat** Use this control to enter the number of repeat ramps within a cycle. This parameter ranges from 1 to 999.

### ***New Test Wizard Panel – Custom Test Parameters***

The screenshot shows a Windows-style dialog box titled "New Test Wizard". Inside, the text "Enter settings for the custom test." is displayed. Below this, there is a section labeled "Custom Targets" containing a table with 8 rows. The first row has a value of 500.00, while the others are 0.00. To the right of the table are three controls: a "No Return" checkbox (unchecked), a "Return Pressure" spinner set to 00, and a "Cycle Delay" spinner set to 1. At the bottom are three buttons: "CANCEL", "BACK", and "DONE".

	Targets
1	500.00
2	0.00
3	0.00
4	0.00
5	0.00
6	0.00
7	0.00
8	0.00

No Return ☐

Return Pressure: 00

Cycle Delay: 1

CANCEL BACK DONE

Use this panel to enter the parameters specific to the incremental test.

### **Panel Controls**

The standard Windows panel controls activated are:

- Close Panel** Use the  button to close the panel. This button does the same action as the **CANCEL** button.

### **Panel Buttons**

- BACK** Use this button to move back to the previous panel.
- CANCEL** Use this button to close the New Test Wizard without creating a new test.
- DONE** Use this button to close the New Test Wizard and create the new HBLT test.

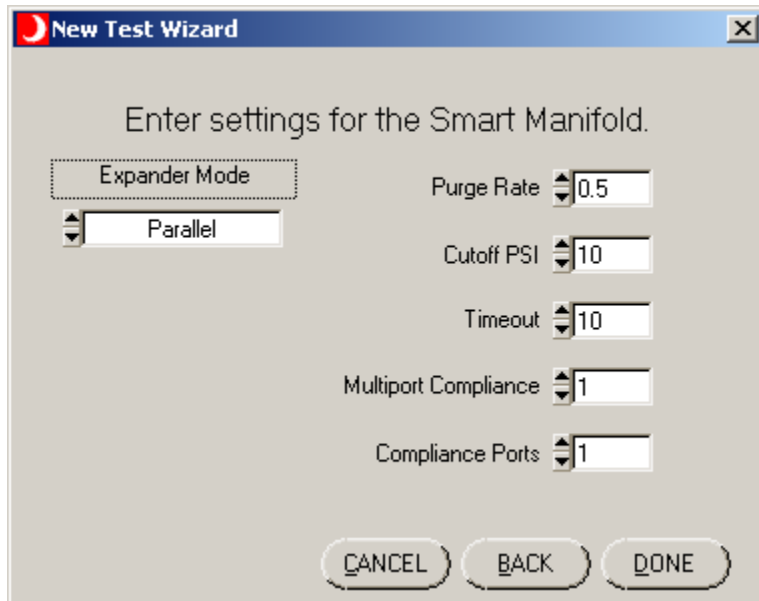
### **Panel Entry**

- Return Pressure** Use this control to enter the return pressure for the custom test. . The upper bound for this control is the Maximum Pressure-1. Pressure Manager grays this control when the No Return control is checked. See Appendix A for ranges based on model and units.



<b>Cycle Delay</b>	Use this control to enter the end of cycle delay for the custom test. This parameter ranges from 1 to 99. Pressure Manager grays this control when the No Return control is checked.
<b>Custom Targets</b>	This control displays the list of custom pressure targets. There are 100 possible targets. Double click on a cell to edit the cell content. If the No Return control is not checked, the values range from the minimum to maximum pressure targets. If the No Return control is checked, the minimum pressure is the same as the minimum return pressure. See Appendix A for ranges based on model and units.
<b>No Return</b>	Check this control to disable the return pressure on custom tests. Clicking the control grays the Return Pressure and Cycle Delay controls. When checked or unchecked, Pressure Manager forces the Custom Targets within the correct minimum.

### ***New Test Wizard Panel – Smart Manifold Parameters***



Use this panel to enter the parameters specific to the Smart Manifold.

### **Panel Controls**

The standard Windows panel controls activated are:

<b>Close Panel</b>	Use the  button to close the panel. This button does the same action as the <b>CANCEL</b> button.
--------------------	--

### **Panel Buttons**

<b><u>B</u>ACK</b>	Use this button to move back to the previous panel.
<b><u>C</u>ANCEL</b>	Use this button to close the New Test Wizard without creating a new test.
<b><u>D</u>ONE</b>	Use this button to close the New Test Wizard and create the new HBLT test.

## Panel Entry

**Smart Manifold Mode** This indicator/control displays Smart Manifold mode. The options are single, sequential or parallel mode. Setting the mode to single or sequential disables the other Smart Manifold indicators. Setting the mode to parallel enables the other Smart Manifold indicators.

**Purge Rate** This indicator/control displays Smart Manifold Purge Rate. The following table gives the valid ranges for the purge rate value:

Model PSI	Minimum cc/sec	Maximum cc/sec
25	0.01	7.0
100	0.01	7.0
250	0.01	7.0
500	0.01	7.0
1000	0.01	4.0
2000	0.01	2.0
3000	0.01	1.0
5000	0.01	0.8

The default value is 0.5cc/sec.

The HBLT uses this purge rate to deliver water to a port during the burst port hunt process. If the rate is too low, then the time it takes to fill the device is longer. If the rate is too high, then a backpressure may develop that causes false cutoffs.

This control is active for the Smart Manifold parallel mode only. When the mode is set to single or sequential, Pressure Manager dims this control.

**Cutoff PSI** This indicator/control displays Smart Manifold cutoff PSI. This value ranges from 1PSI to 100 PSI. The default value is 10PSI. If the value is too low, any backpressure may give a false cutoff. If the value is too high, the time to reach cutoff is longer.

The HBLT uses this value as the cutoff PSI in the parallel mode port hunt process.

This control is active for the Smart Manifold parallel mode only. When the mode is set to single or sequential, Pressure Manager dims this control.

**Timeout** This indicator/control displays Smart Manifold timeout. This value ranges from 3 seconds to 300 seconds. The default value is 10 seconds. This time must be long enough to fill the device and reach the cutoff PSI.

The HBLT uses this value as the timeout in the parallel mode port hunt process.

This control is active for the Smart Manifold parallel mode only. When the mode is set to single or sequential, Pressure Manager dims this control.

**Multi Compliance** This indicator/control displays Smart Manifold multiple port compliance. This value ranges from 1 to 10. The default value is the single port compliance value.

The HBLT uses this value as the adaptive compliance in the parallel mode port test or script pressure ramps.

This control is active for the Smart Manifold parallel mode only. When the mode is set to single or sequential, Pressure Manager dims this control.

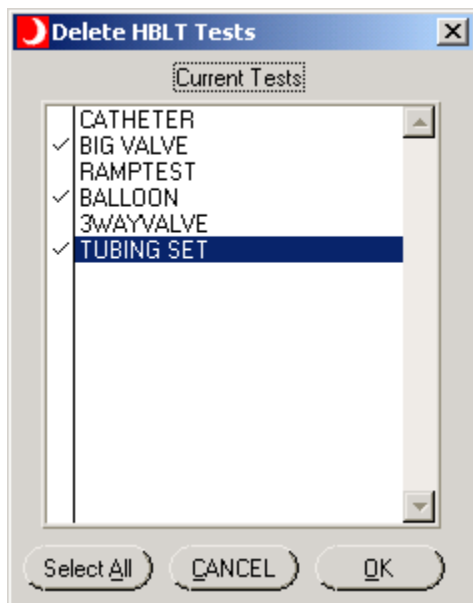
#### # of Multi Ports

This indicator/control displays Smart Manifold multiple port count. This value ranges from 1 to 10. The default value is one.

The HBLT uses this value as the adaptive compliance port count in the parallel mode port test or script pressure ramps.

This control is active for the Smart Manifold parallel mode only. When the mode is set to single or sequential, Pressure Manager dims this control.


### Delete HBLT Tests Panel



Use this panel to delete groups or all files from the HBLT. This function is helpful when downloading a new test set. The single delete mode on the Test Parameters panel uploads all the HBLT tests after each delete to insure Pressure Manager reflects the correct HBLT test status. This panel deletes all checked tests and then does a single upload of all the HBLT tests.

To mark a test for delete, use the mouse to click on the selected test. When selected, the control displays a check mark to the left of the test name. Another method is to click the Select All button and then de-select the HBLT tests to keep.


After making all selections, click the OK button to delete all selected tests. After deleting all the selected tests, Pressure Manager fetches any remaining tests.

Click the Cancel button or  at any time to close this panel with no action.

### Panel Controls

The standard Windows panel controls activated are:

**Close Panel**

Use the  button to close the panel. This button does the same action as the **CANCEL** button.

**Panel Buttons**

**Select All**

Use this button to select all the tests listed for deletion.

**CANCEL**

Use this button to close Delete HBLT test panel without deleting any tests.

**OK**

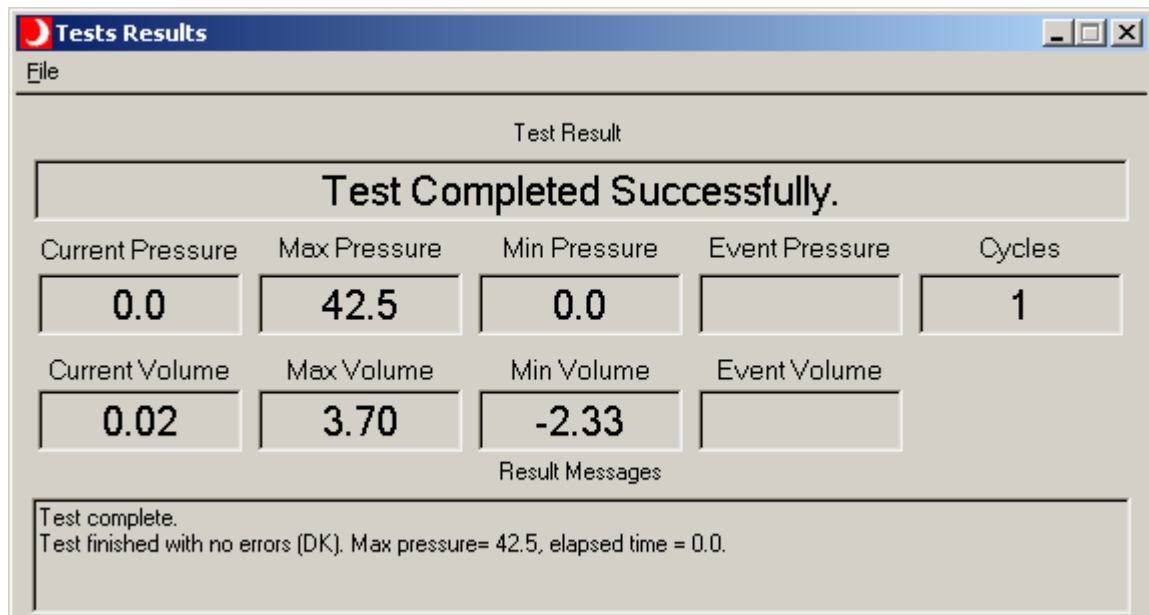
Use this button to close the Delete HBLT test panel and delete all marked tests.

**Panel Indicator Control**

**Current Tests**

Use this control to select or de-select individual tests.

***Test Results Panel***



The screenshot shows a window titled "Tests Results" with a menu bar containing "File". The main content area is titled "Test Result" and displays a large message: "Test Completed Successfully." Below this, there are two rows of data fields. The first row contains "Current Pressure" (0.0), "Max Pressure" (42.5), "Min Pressure" (0.0), "Event Pressure" (empty), and "Cycles" (1). The second row contains "Current Volume" (0.02), "Max Volume" (3.70), "Min Volume" (-2.33), and "Event Volume" (empty). At the bottom, there is a section titled "Result Messages" containing the text: "Test complete. Test finished with no errors (DK). Max pressure= 42.5, elapsed time = 0.0."

Current Pressure	Max Pressure	Min Pressure	Event Pressure	Cycles
0.0	42.5	0.0		1
Current Volume	Max Volume	Min Volume	Event Volume	
0.02	3.70	-2.33		

Result Messages


Test complete.  
Test finished with no errors (DK). Max pressure= 42.5, elapsed time = 0.0.

Pressure Manager displays this panel during a test. This panel provides a summary of the information found in the test report.


**Panel Controls**

The standard Windows panel controls activated are:

**Close Panel**

Use the  button to close the panel

**Minimize Panel**

Use the  button to minimize the panel.

**Panel Indicator Control**

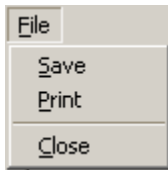
**Max Pressure**

This indicator displays the maximum pressure obtained during the test using the test pressure units.

<b>Min Pressure</b>	This indicator displays the minimum pressure obtained during the test using the test pressure units.
<b>Event Pressure</b>	This indicator displays the pressure of the burst or leak using the test pressure units.
<b>Current Pressure</b>	This indicator displays the current pressure using the test pressure units.
<b>Max Volume</b>	This indicator displays the maximum volume level during the test in cc or cc/sec.
<b>Min Volume</b>	This indicator displays the minimum volume level during the test in cc or cc/sec.
<b>Event Volume</b>	This indicator displays the volume of the burst or leak event in cc or cc/sec.
<b>Current Volume</b>	This indicator displays the current volume in cc or cc/sec.
<b>Cycles</b>	This indicator displays the current test cycle.

## Panel Menu

This drop down menu provides file related functions.



**File>>Save**

This menu item saves the current results.

**File>>Print**

This menu item prints the report on the default system printer.

**File>>Close**

This menu item closes the test results panel.

## Summary Panel

	Port 1	Port 2	Port 3	Port 4	Port 5	Port 6	Port 7	Port 8	Port 9	Port 10
Max Pressure	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5
Min Pressure	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Event Pressure										
Max Volume	7.86	7.86	7.86	7.86	7.86	7.86	7.86	7.86	7.86	7.86
Min Volume	-3.01	-3.01	-3.01	-3.01	-3.01	-3.01	-3.01	-3.01	-3.01	-3.01
Event Volume										
Cycles	10	10	10	10	10	10	10	10	10	10
Event	Finished	Finished	Finished	Finished	Finished	Finished	Finished	Finished	Finished	Finished
Start Date	11-15-2005	11-15-2005	11-15-2005	11-15-2005	11-15-2005	11-15-2005	11-15-2005	11-15-2005	11-15-2005	11-15-2005
Start Time	10:05:05	10:05:05	10:05:05	10:05:05	10:05:05	10:05:05	10:05:05	10:05:05	10:05:05	10:05:05
End Date	11-15-2005	11-15-2005	11-15-2005	11-15-2005	11-15-2005	11-15-2005	11-15-2005	11-15-2005	11-15-2005	11-15-2005
End Time	10:08:50	10:08:50	10:08:50	10:08:50	10:08:50	10:08:50	10:08:50	10:08:50	10:08:50	10:08:50

Pressure Manager displays this panel during a Smart Manifold test. This panel provides a summary of the information found in the test report.

## Panel Controls

The standard Windows panel controls activated are:

**Close Panel** Use the button to close the panel

**Minimize Panel** Use the button to minimize the panel.

## Panel Buttons

**OK** Use this button to close the Smart Manifold Summary panel. This button dims while a test runs.

**Select All Ports** Use this button to select all the ports at once.

## Panel Indicator Control

**Test Results** This indicator displays the test/script result or status.

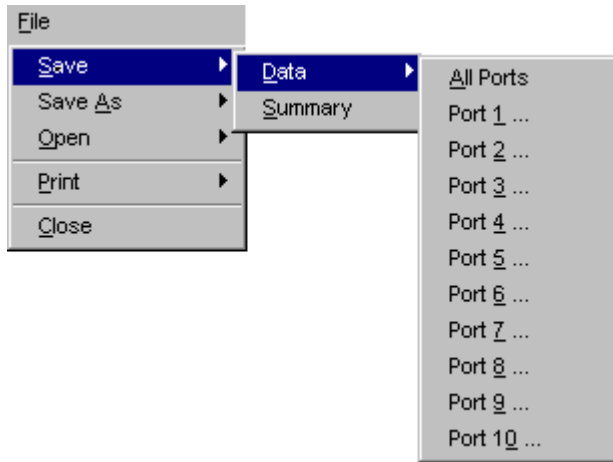
**Current Pressure** This indicator displays the current pressure received from the HBLT.

**Current Volume** This indicator displays the current volume received from the HBLT

<b>Test Selected</b>	These indicators display the selected status of each port. Click these controls to toggle on/off the corresponding port on the Smart Manifold.
<b>Test Running</b>	These Indicators display the current run status of each Smart Manifold port. When the LED is on, the port is under test. When the LED flashes, the Smart Manifold is doing a hunt test on that port only.
<b>Test Done</b>	These indicator display the final port status. When the LED is on, the test completed successfully for that port. When the LED flashes, the test completed with a burst or leak event.
<b>Max Pressure</b>	This indicator displays the maximum pressure obtained during the test using the test pressure units for each port.
<b>Min Pressure</b>	This indicator displays the minimum pressure obtained during the test using the test pressure units for each port.
<b>Event Pressure</b>	This indicator displays the pressure of the burst or leak using the test pressure units for each port.
<b>Max Volume</b>	This indicator displays the maximum volume level during the test in cc or cc/sec for each port.
<b>Min Volume</b>	This indicator displays the minimum volume level during the test in cc or cc/sec for each port.
<b>Event Volume</b>	This indicator displays the volume of the burst or leak event in cc or cc/sec for each port.
<b>Cycles</b>	This indicator displays the current test cycle for each port.
<b>Event</b>	This indicator displays the test end event for each port.
<b>Start Date</b>	This indicator displays the starting date for each port.
<b>Start Time</b>	This indicator displays the starting time for each port.
<b>End Date</b>	This indicator displays the ending date for each port.
<b>End Time</b>	This indicator displays the ending time for each port.
<b>Test Start</b>	This indicator displays the starting date and time for the entire test.
<b>Test End</b>	This indicator displays the ending date and time for the entire test.

## Panel Menu

This drop down menu provides file Save for graphic data related functions.



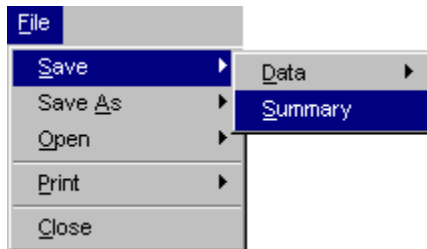
**File>>Save>>Data>>All Ports**

This menu item saves the graph data for all ports.

**File>>Save>>Data>>Port 1 ...**

This menu item saves the graph data for a given port. Select the item to correspond to the desired port.

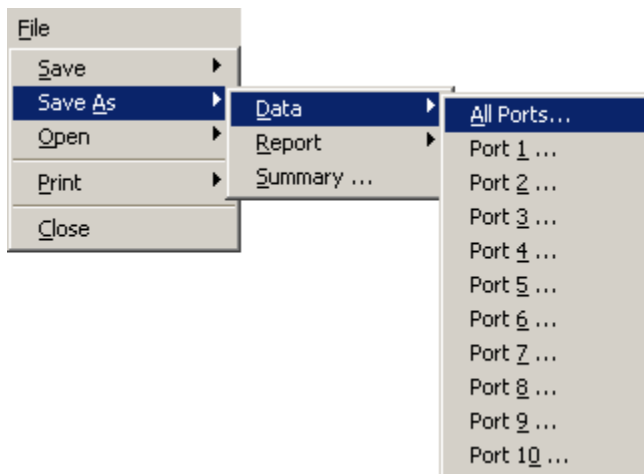
This drop down menu provides file Save for the summary data.



**File>>Save>>Summary**

This menu item saves the summary panel information.

This drop down menu provides file Save As for graphic data related functions.



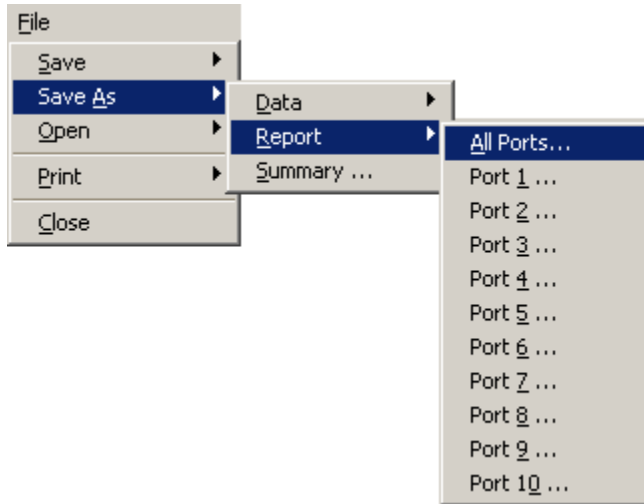
**File>>Save As>>Data>>All Ports**

This menu item saves the graph data for all ports.



**File>>Save As>>Data>>Port 1 ...** This menu item saves the graph data for a given port.  
Select the item to correspond to the desired port.

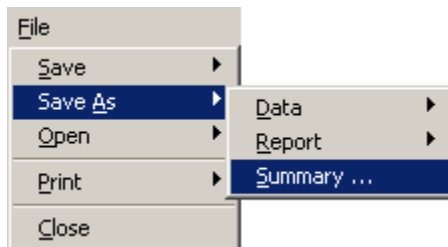
This drop down menu provides file Save As for report related functions.



**File>>Save As>>Report>>All Ports** This menu item saves the report for all ports.

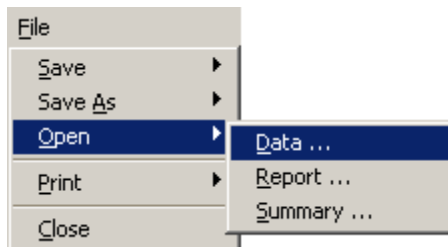
**File>>Save As>>Report >>Port 1 ...** This menu item saves the report for a given port.  
Select the item to correspond to the desired port.

This drop down menu provides file Save As for summary data.



**File>>Save As>>Summary** This menu item saves the summary panel information.

This drop down menu provides file Open related functions.

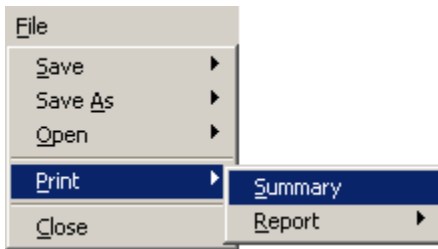


**File>>Open>>Data ...** This menu item opens a graph data file.

**File>>Open >>Report ...** This menu item opens a report file.

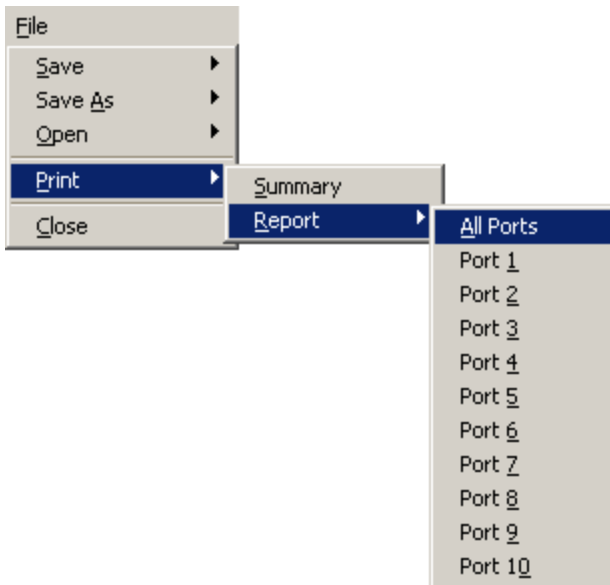
**File>>Open >>Summary ...** This menu item opens a summary data file.

This drop down menu provides file Print for summary data.



**File>>Print>>Summary** This menu item prints the Summary panel information on the default printer.

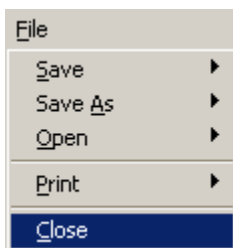
This drop down menu provides file Print for report related functions.



**File>>Print>>Report>>All Ports** This menu item prints all report panel information on the default printer.

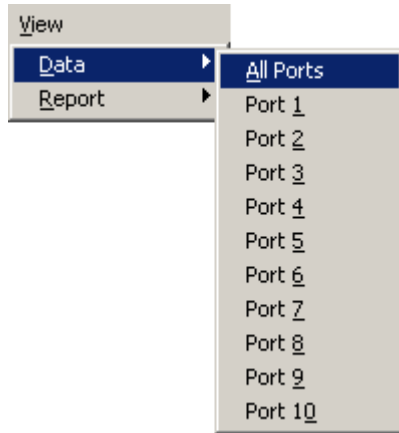
**File>>Print>>Report>>Port 1** This menu item prints the port report information on the default printer.

This drop down menu provides a panel close function.



**File>>Close** This menu item closes the Smart Manifold summary panel.

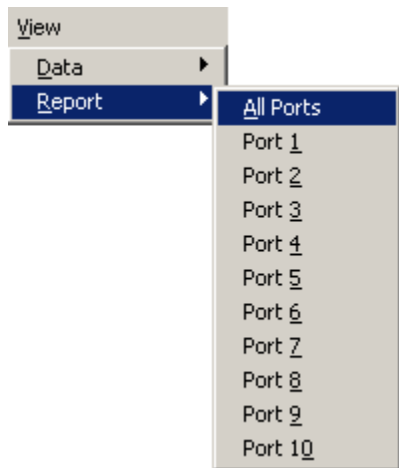
This drop down menu provides view graphic data related functions.



**View>>Data>>All Ports** This menu item shows all port graph data.

**View>>Data>>Port 1** This menu item shows the chosen port graph data.

This drop down menu provides view report related functions.



**View>>Report>>All Ports** This menu item shows all report lines in the report panel.

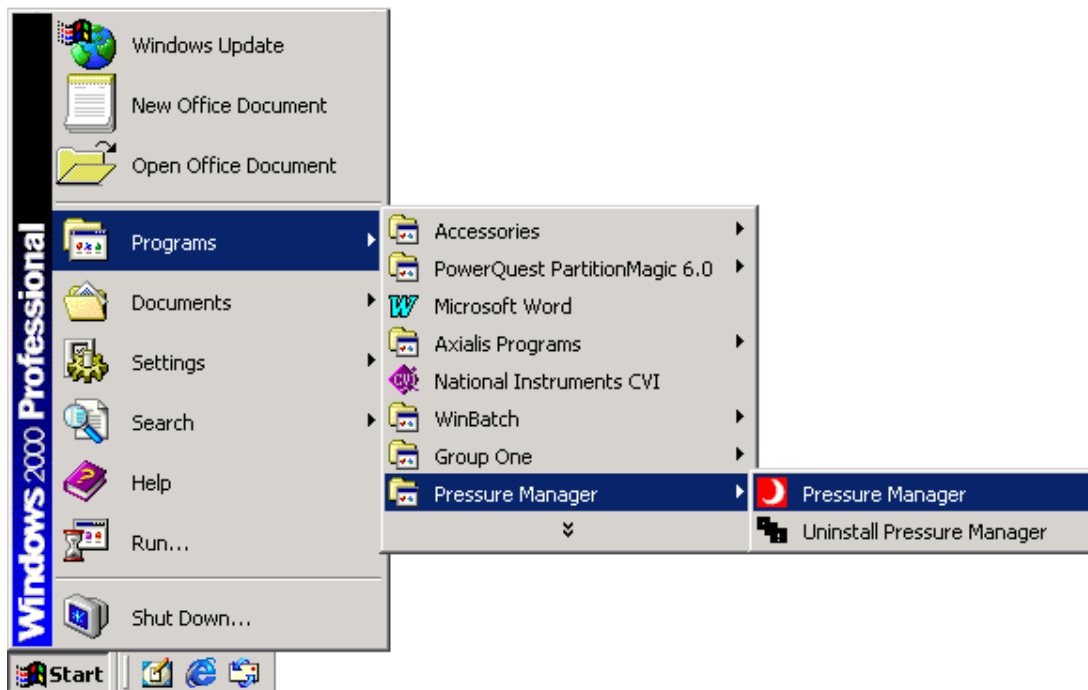
**View>>Report >>Port 1** This menu item shows the chosen port report lines in the report panel.

## HBLT Setup and Cabling

To set up the system, follow these instructions:

1. Connect the HBLT and the computer using the serial cable provided by Crescent Design. Note the comm port on the computer for use in setting the Pressure Manager comm port option.
2. Turn on the HBLT. When the title screen appears, check that the version is 2.47 or above. If it is not, Pressure Manager will not function with this HBLT. Contact Crescent Design for an upgrade application program.
3. Press the GO button on the title screen.
4. Press the Engineering menu button.
5. Press the System configuration button.

6. Verify that the baud rate is set to 38400. If not, press the button to set the baud rate, then press the button on the next screen labeled 38400.
7. Press the Next page >> menu button.
8. Verify that the Enable remote control button is set to YES. If not, press the button and select the Yes option.
9. Press the Escape button to return to the previous menu.
10. Press the Escape button to return to the main menu.
11. On the PC, click on the Start button, the Programs selection, the Pressure Manager selection and finally the Pressure Manager program. See the following illustration.
12. Pressure Manager displays the main window and is now ready for use.



## Applications

This section describes several common procedures using a step by step approach. Instructions using both mouse and keyboard provide alternate methods to suit an individuals style.

In the following sections, these terms have the following meanings:

1. Click means press and release the left mouse button on the item mentioned.
2. Click and hold means press and hold down the left mouse button on the mentioned item.
3. Drag means move the mouse cursor while holding down the left mouse button.
4. Release means releasing the left mouse button.
5. Type means to press the mentioned keys on the keyboard.
6. ALT-A means to press and hold down the ALT key then pressing the A key. Release both keys together.

### ***Creating a New Test Using the New Button***

Starting from the Pressure Profile panel, do the following steps:

1. Click menu **Tests>>Test Select** or type **Alt-T T** to open the Test Parameters panel.
2. Click the **New** button or type **ALT-N** to start a new HBLT test.
3. Type new test name in the highlighted Test Name control followed by the Enter key. Pressure Manager translates lower case characters to upper case characters and removes any invalid characters. The maximum name length is 11 characters. Pressure Manager also verifies that test name is unique. If the name is already in use, Pressure Manager prompts for a new name.
4. Click the **Next** button or type **ALT-N** to select the process type.
5. There are three ways to select the Process type. Click on the control's arrow buttons to scroll through the test types. Use the Up Arrow key or Down Arrow key to scroll through the test types. Click and hold on the control to open a drop down list. Then, drag the cursor down to the desired process type and release the mouse button.
6. Click the **Next** button or type **ALT-N** to select the pressure units.
7. There are three ways to select the Pressure units. Click on the control's arrow buttons to scroll through the test types. Use the Up Arrow key or Down Arrow key to scroll through the test types. Click and hold on the control to open a drop down list. Then, drag the cursor down to the desired process type and release the mouse button.
8. Click the **Next** button or type **ALT-N** to enter the test's parameters.
9. Pressure Manager highlights all parameters that the selected process type uses and dims the remaining controls. Each control now contains the default parameter settings. Click on each test parameter control to enter a new value by typing the value or clicking the control's arrow buttons. Pressure Manager coerces each entry to a valid value based on the connected HBLT model type and the selected pressure units.

The Product ID and Engineer ID are option fields. Each field has a maximum of 14 characters. Pressure Manager coerces lower case characters to upper case characters and removes invalid characters.

If this is a Custom process type, use the Custom Value control to enter values into the Custom Targets list box. First, click on desired line until a check mark appears to the left

of the value. Then, type the new value into the Custom Value control followed by the Enter key. If the item selected was the first zero entry, continue entering values in the Custom Value control. Pressure Manager automatically increments the list check mark. A zero value sets all remaining values to zero.

If there is a Smart Manifold attached, Pressure Manager displays the Smart Manifold specific values. First, select the Smart Manifold mode. If the mode is single or sequential, Pressure Manager dims the following controls. If the mode is single, Pressure Manager activates the following controls.

10. Click the **SAVE** button or type **ALT-S** to close the new test. Pressure Manager sends the test to the connected HBLT. If the HBLT requires a password and it is not entered, Pressure Manager prompts for the password. Pressure Manager then retrieves all the HBLT tests.
11. Choose another function to perform, and then click the **Select** button or type **ALT-S**.

Pressing the **CANCEL** button at any time during this process terminates the creation of the new test and returns the Test Parameters panel to its original state.

### ***Creating a New Test Using the New Test Wizard***

Starting from the Pressure Profile panel, do the following steps:

1. Click menu **Tests>>Test Select** or type **Alt-T T** to open the Test Parameters panel.
2. Click menu **Functions>>New test Wizard** or type **ALT-F W** to open the first wizard panel.
3. Type new test name in the highlighted Test Name control followed by the Enter key. Pressure Manager translates lower case characters to upper case characters and removes any invalid characters. The maximum name length is 11 characters. Pressure Manager also verifies that test name is unique. If the name is already in use, Pressure Manager prompts for a new name.
4. There are three ways to select the Process type. Click on the control's arrow buttons to scroll through the test types. Use the Up Arrow key or Down Arrow key to scroll through the test types. Click and hold on the control to open a drop down list. Then, drag the cursor down to the desired process type and release the mouse button.
5. There are three ways to select the Pressure units. Click on the control's arrow buttons to scroll through the test types. Use the Up Arrow key or Down Arrow key to scroll through the test types. Click and hold on the control to open a drop down list. Then, drag the cursor down to the desired process type and release the mouse button.
6. The Product ID and Engineer ID are optional fields. Each field has a maximum of 14 characters. Pressure Manager coerces lower case characters to upper case characters and removes invalid characters.
7. Click the **Next** button or type **ALT-N** to move to the next panel.
8. This panel contains the parameters common to all process types. Each control contains the default parameter settings. Click on each test parameter control to enter a new value by typing the value or clicking the control's arrow buttons. Pressure Manager coerces each entry to a valid value based on the connected HBLT model type and the selected pressure units.
9. Click the **Next** button or type **ALT-N** to move to the next panel.
10. This panel is one of five different panels selected by process type. Each panel contains parameters needed by the process type selected on the first panel. Click on each test parameter control to enter a new value by typing the value or clicking the control's arrow

buttons. Pressure Manager coerces each entry to a valid value based on the connected HBLT model type and the selected pressure units.

If this is a Custom process type, use the Custom Value control to enter values into the Custom Targets list box. First, click on desired line until a check mark appears to the left of the value. Then, type the new value into the Custom Value control followed by the Enter key. If the item selected was the first zero entry, continue entering values in the Custom Value control. Pressure Manager automatically increments the list check mark. A zero value sets all remaining values to zero.

11. If there is a Smart Manifold attached, click the **Next** button or ALT-N to enter the Smart Manifold settings. First, select the Smart Manifold mode. If the mode is single or sequential, Pressure Manager dims the following controls. If the mode is single, Pressure Manager activates the following controls.
12. Click the **DONE** button or type **ALT-D** to complete the create test function. Pressure Manager sends the test to the connected HBLT. If the HBLT requires a password and it is not entered, Pressure Manager prompts for the password. Pressure Manager then retrieves all the HBLT tests.
13. Choose another function to perform, and then click the **Select** button or type **ALT-S**.

Pressing the **CANCEL** button at any time during this process terminates the creation of the new test and returns the Test Parameters panel to its original state.

Use the **BACK** button or type **ALT\_B** to navigate back to previous wizard panels. Change the process type on the first panel. This action changes the selection of the last panel that contains the test parameters special to a process type.

### ***Editing a Test***

Starting from the Pressure Profile panel, do the following steps:

1. Click menu **Tests>>Test Select** or type **Alt-T T** to open the Test Parameters panel.
2. Click menu **Tests** or type **ALT-T** to open the Tests drop down menu.
3. Click on the desired test name listed on the drop down menu. Alternately, type the function key listed to the right of the test name.
4. Click the **UPDATE** button or type **ALT-U** to update the current test parameters.
5. Pressure Manager highlights all parameters that this process type uses and dims the remaining controls. Click on each test parameter control to enter a new value by typing the value or clicking the control's arrow buttons. Pressure Manager coerces each entry to a valid value based on the connected HBLT model type and the selected pressure units.  
  
If this is a Custom process type, use the Custom Value control to enter values into the Custom Targets list box. First, click on desired line until a check mark appears to the left of the value. Then, type the new value into the Custom Value control followed by the Enter key. If the item selected was the first zero entry, continue entering values in the Custom Value control. Pressure Manager automatically increments the list check mark. A zero value sets all remaining values to zero.
6. Click the **UPDATE** button or type **ALT-U** to close the edited test. Pressure Manager sends the test to the connected HBLT. If the HBLT requires a password and it is not entered, Pressure Manager prompts for the password. Pressure Manager then retrieves all the HBLT tests.
7. Choose another function to perform, click the **Select** button or type **ALT-S**.

Pressing the **CANCEL** button at any time during this process terminates the creation of the new test and returns the Test Parameters panel to its original state.

## ***Deleting a Single Test***

Starting from the Pressure Profile panel, do the following steps:

1. Click menu **T**ests>>**T**est Select or type **Alt-T T** to open the Test Parameters panel.
2. Click menu **T**ests or type **ALT-T** to open the Tests drop down menu.
3. Click on the desired test name listed on the bottom of the drop down menu. Alternately, type the function key listed to the right of the test name.
4. Click the **D**ELETE button or type **ALT-D** to delete the current test parameters.
5. Pressure Manager displays a confirmation popup window. Choose **Y**ES to confirm the delete or type **N**O to cancel the delete.
6. If the choice is **Y**ES, Pressure Manager deletes the test from the HBLT and retrieves the remaining tests. If the choice is **N**O, Pressure Manager does nothing. If the HBLT requires a password and it is not entered, Pressure Manager prompts for the password.
7. Choose another function to perform, click the **S**elect button or type **ALT-S**.

Deleting many tests using this process is time consuming. Use **T**ests>>**D**ele~~te~~ **H**BLT tests to delete many tests quickly.

## ***Deleting Multiple Tests***

Starting from the Pressure Profile panel, do the following steps:

1. Click menu **T**ests>>**T**est Select or type **Alt-T T** to open the Test Parameters panel.
2. Click menu **F**unctions>>**D**ele~~te~~ **H**BLT tests or type **ALT-T H** to open the Delete HBLT tests panel.
3. Pressure Manager displays the current HBLT test names in the list box. There are two ways to select tests to delete. First, click each test name to delete. A check mark appears to the left of a selected test. Second, click the **S**elect **A**ll button or type **ALT-A** to select all tests. Then click individual names to de-select.
4. When finished selecting tests to delete, click the **O**K button or type **ALT-O** to initiate the deletes. If the HBLT requires a password and it is not entered, Pressure Manager prompts for the password.
5. Pressure Manager displays a confirmation popup window. Choose **Y**ES to confirm the deletes or type **N**O to cancel the deletes.
6. If the choice is **Y**ES, Pressure Manager deletes the tests from the HBLT and retrieves any remaining tests. If the choice is **N**O, Pressure Manager closes the panel without deleting any tests.
7. Choose another function to perform, click the **S**elect button, or type **ALT-S**.

Click the **C**ANCEL button or type **ALT-C** at any time to cancel the delete function without deleting any tests.

## ***Selecting a Test***

Starting from the Pressure Profile panel, do the following steps:

1. Click menu **T**ests>>**T**est Select or type **Alt-T T** to open the Test Parameters panel.
2. Click menu **T**ests or type **ALT-T** to open the Tests drop down menu.



3. Click on the desired test name listed on the drop down menu. Alternately, type the function key listed to the right of the test name.
4. Click the **Select** button or type **ALT-S** to select the current test. Pressure Manager closes the HBLT Test Parameters panel and activates the **Start** button on the Pressure Profile panel.

### ***Creating a New Script***

Starting from the Pressure Profile panel, do the following steps:

1. Click menu **Tests>>Script Edit** or type **Alt-T E** to open the Script Editor panel.
2. Click menu **File>>New** or type **ALT-F N** to open a new script. Pressure Manager clears any existing script and inserts the following lines:

```
Pressure Manager Data File, Windows 95+, V1:00
UNITS PSI
MODEL 1000
COMPLIANCE: 1
UP RAMP RATE: 250
DOWN RAMP RATE: 250
UP BURST RATE: 50
DOWN BURST RATE: 0
LEAK RATE: 10
LEAK DIP: 0
CUTOFF: 10
FILL AT SPEED: 0.20
END
```

The units may differ depending upon the default chosen in the configuration panel. Also, the model type changes conditional on the attached HBLT model.

3. IF there is a Smart Manifold attached, Pressure Manager inserts these lines for a new script:

```
Pressure Manager Data File, Windows 95+, V1:00
UNITS PSI
MODEL 500
MANIFOLD MODE PARALLEL
MANIFOLD PURGE RATE: 0.5
MANIFOLD CUTOFF PSI: 10
MANIFOLD TIMEOUT: 10
MANIFOLD COMPLIANCE: 1
MANIFOLD COUNT: 1
COMPLIANCE: 1
UP RAMP RATE: 100.0
DOWN RAMP RATE: 100.0
UP BURST RATE: 200.0
DOWN BURST RATE: 0.0
LEAK RATE: 5.0
LEAK DIP: 0.0
FILL CUTOFF PSI: 10
FILL AT SPEED: 0.20
END
```

4. There are two methods to enter commands. For both methods, first move the cursor, the line with the yellow background, to the line above the desired insertion point.

The first and easiest method is to double click the desired command in the Commands list box. Pressure Manager inserts the command on the line following the cursor line. If

the command requires a parameter, type it in and then type the enter key.

The second method is to type the Enter key. This opens a new blank script line. Then type in the new command. Pressure Manager completes the command after receiving sufficient characters to identify the command. If the command requires a parameter, type it in and then type the Enter key. Pressure Manager closes the new line and inserts a new blank line. Continue entering commands in this manner. When finished, type the Enter key to close the insert line.

5. After entering and editing the script, click menu **File>>Save As** or type **ALT-F A** to open the Save As file selection dialog box. Use the dialog box to select the file path to store the file. The file path consists of the directory and file name.
6. Click the **OK** button to save the script. Click **Cancel** to abort the Save As function.
7. Click menu **File>>Close** or type **ALT-F C** to close the Script Edit panel and return to the Pressure Profile panel.

### ***Editing a Script***

Starting from the Pressure Profile panel, do the following steps:

1. Click menu **Tests>>Script Edit** or type **Alt-T E** to open the Script Editor panel.
2. Click menu **File>>Open** or type **ALT-F O** to open an existing script. Pressure Manager clears any existing script and opens the Script Open file selection window.
3. Use the file selection window to select the desired script file path.
4. Click the **OK** button to open the script. Click **Cancel** to abort the open function.
5. Now edit the script commands. To change a command, first delete the old command and then replace it with a new command. There are two methods to enter commands. For both methods, first move the cursor to the line above the desired insertion point.

The first and easiest method is to double click the desired command in the Commands list box. Pressure Manager inserts the command on the line following the cursor line. If the command requires a parameter, type it in and then type the enter key.

The second method is to type the Enter key. This opens a new blank script line. Then type in the new command. Pressure Manager completes the command after receiving sufficient characters to identify the command. If the command requires a parameter, type it in and then type the Enter key. Pressure Manager closes the new line and inserts a new blank line. Continue entering commands in this manner. When finished, type the Enter key to close the insert line.

To delete a command, move the cursor to the line to delete using the up and down arrow keys or by clicking on the line with the mouse. Then press the Delete key.

6. After entering and editing the script, click menu **File>>Save** or type **ALT-F S** to save the file using it's original file path. Alternately, click menu **File>>Save As** or type **ALT-F A** to open the Save As file selection dialog box. Use the dialog box to select the file path to store the file. The file path consists of the directory and file name.
7. Click menu **File>>Close** or type **ALT-F C** to close the Script Edit panel and return to the Pressure Profile panel.

### ***Selecting a Script***

Starting from the Pressure Profile panel, do the following steps:

1. Click menu **Tests>>Script Select** or type **Alt-T S** to open the Test Parameters panel.
2. Click on the desired file name in the list box on the right side of the Script Select panel. Use the scroll bar to navigate up and down the list. Pressure Manager checks the selected script and displays the script text in the script control. If necessary, use the scroll bar to view the entire script.

Pressure Manager displays only valid scripts that the attached HBLT can execute. If there is a flaw in the script or the script model does not match the attached mode, there is no displayed name. Use the Script Edit window to determine and correct the error.

3. After selecting the desired script, click the **Select** button or type **ALT-S** to select the script and close the Script Select panel.
4. Click the **Start** button or type **ALT-S** to run the script.

Click the **Cancel** button or type **ALT-C** any time to close the Script Select panel with no action.

### ***Running the Selected Test or Script***

Starting from the Pressure Profile panel, do the following steps:

1. Click the **Start** button or type ALT-S to start a test or script.
2. When the test completes, Pressure Command activates the **Reset** button. At this time, the user has the following options:
  - Save the test data.
  - Scroll and inspect the strip chart.
  - Change the strip chart configuration.
  - Print the test strip chart panel.
  - View and print the test report.
  - View and print the test log.
3. When finished with the test, click the **Reset** button or type **ALT-E** to reset Pressure Manager. If not already saved and logging is set to **ASK**, Pressure Manager prompts for saving the data, report and log information.
4. Go to step 1 to start another test.

To abort a test or script, Press the **Stop** button or type ALT-S. Pressure Manager activates the **Resume**, **Escape** and **OK** buttons. For a test, these buttons have the same behavior as their counterparts on the HBLT LCD screen. Clicking **OK** ends the test with normal reporting. **Escape** escapes from the test with no further action. **Resume** resumes the test until it ends. Use the same buttons if there is a burst or leak event.

### ***Viewing and Printing a Report***

Starting from the Pressure Profile panel, do the following steps:

1. Click menu **View>>View Report** or type **ALT-V R** to open the View Report panel.
2. Click menu **File>>Save As** or type **ALT-F A** to open the Report Save As file selection window.
3. Enter a file path and click **OK**. Alternatively, click **Cancel** to abort.
4. Click menu **File>>Print** or type **ALT-F P** to print the report file.

5. Click menu **File>>Close** or type **ALT-F C** to close the View Report panel.

### ***Viewing and Printing a Report – Smart Manifold***

Starting from the Pressure Profile panel, do the following steps:

1. Click menu **View>>View Smart Manifold** or type **ALT-V S** to open the Smart Manifold panel.
2. Click menu **View>>Report>>All** or type **ALT-V R A** to view the Report for all ports..
3. Click menu **View>>Report>>Port 1** or type **ALT-V R 1** to view all the Report for port one only. Use the same format to view the report for other ports.
4. Click menu **File>>Print>>All** or type **ALT-F P A** to print the Report for all ports..
5. Click menu **File>>Print>>Port 1** or type **ALT-F P 1** to print all the Report for port one only. Use the same format to print the report for other ports.
6. Click menu **File>>Close** or type **ALT-F C** to close the Smart Manifold panel.

### ***Viewing and Printing a Log***

Starting from the Pressure Profile panel, do the following steps:

1. Click menu **View>>View Log** or type **ALT-V L** to open the View Log panel.
2. Click menu **File>>Save As** or type **ALT-F A** to open the Log Save As file selection window.
3. Enter a file path and click **OK**. Alternatively, click **Cancel** to abort.
4. Click menu **File>>Print** or type **ALT-F P** to print the log file.
5. Click menu **File>>Close** or type **ALT-F C** to close the View Log panel.

### ***Capturing Micrometer Readings***

Before capturing micrometer data, use the micrometer configuration wizard to configure Pressure Manager for the attached micrometer. The wizard collects all the information for each micrometer type.

Pressure Manager reads the micrometer in two ways. For HBLT native tests, Pressure Manager reads the micrometer when the dwell maintain period ends. For scripts, Pressure Manager reads the micrometer when executing a READ MICROMETER command.

Since there is slight delay in reading the micrometer and interpreting the serial data from the HBLT, you should provide at least a 2 second maintain period. This gives Pressure Manager time to receive and process valid pressure data. To minimize any serial data backlog, use the graph configuration panel to set the data rate to 50 to 20 samples per second. This reduces the amount of serial data processed by Pressure Manager.

The micrometer data is saved using comma-delimited format. Many data analysis programs use this format to import data. Specify that a comma is the delimiting character for programs such as Microsoft Excel. The first line is the column headings text. To ignore headings, specify that the import start on the second line. The headings specify both data type and units.

### ***Viewing and Printing a Micrometer Table***

Starting from the Pressure Profile panel, do the following steps:

6. Click menu **View>>View Micrometer** or type **ALT-V M** to open the View Micrometer panel.

7. Click menu **File>>Save As** or type **ALT-F A** to open the Micrometer Save As file selection window.
8. Enter a file path and click **OK**. Alternatively, click **Cancel** to abort.
9. Click menu **File>>Print** or type **ALT-F P** to print the Micrometer file.
10. Click menu **File>>Close** or type **ALT-F C** to close the View Micrometer panel.

## Messages

This section covers messages emitted by Pressure Manager only. This section does not cover HBLT error messages. See the HBLT manual for messages emitted by the HBLT.

### ***Log Machine State Messages***

These messages appear in the log panel. The user has the option of enabling or disabling the display of this message type. The default is to disable this message type.

For these messages, the cause is that the state changed on the data tuple.

Because these messages are for diagnosis only, there is no corrective action.

State: Burst during dwell.

State: Burst during down ramp.

State: Burst during last down ramp.

State: Burst during last down wait.

State: Burst during up ramp.

State: Dwell.

State: Dwell paused.

State: Dwelling.

State: Dwelling paused.

State: Filling product.

State: Last down ramp.

State: Last down ramp paused.

State: Leak dip during dwell.

State: Leak rate during dwell.

State: Ramping down.

State: Ramping down paused.

State: Ramping up.

State: Ramping up paused.

State: Refilling cylinder.

State: Return wait.

State: Return wait paused.

State: Test complete.

### ***Log Input Line Message***

This message type appears in the log panel. The user has the option of enabling or disabling the display of this message type. The default is to disable this message.

**Input: This is text as received from the serial port.**

### ***Test Data Message***

This message type appears in the log panel. The user has the option of enabling or disabling the display of this message type. The default is to disable this message.

**Data: 9999,9999,9999**

**Location: HBLTMAIN.C -> ProcessTuples().**

The numbers represent the translated tuple values. All values are integers. The first number is the current pressure. The second number is the maximum pressure. The third number is the volume data.

This message is primarily a programming development or maintenance tool. But it may be useful in detecting communications problems.

The log panel displays only the selected message types during the test. Pressure Manager discards disabled messages. Therefore, select the message types before running either a test or a script.

### ***Test Results Messages***

This message type appears in the report panel. The pressures represented by **99.9** may change format depending on the model and pressure units selected. The elapsed times are the tenth of seconds from the beginning of the current HBLT operation. For instance, a 1.1 value reported during an up ramp operation would be from the time up ramp started. The time is not from the beginning of the test.

**Test results: Operator abort (DA) alarm. Max pressure = 99.9, elapsed time = 0.0.**

Cause: HBLT user abort event.

Correction: No action required.

**Test results: Operator abort (DA) alarm. Max pressure = 99.9, elapsed time = 0.0, port=1.**

Cause: HBLT user abort event.

Correction: No action required.

**Test results: Up burst (DB) alarm. Max pressure = 99.9, Pressure = 99.9, elapsed time = 0.0, event volume 1.11.**

Cause: HBLT up burst event.

Correction: No action required.

**Test results: Up burst (DB) alarm. Max pressure = 99.9, Pressure = 99.9, elapsed time = 0.0, event volume 1.11, port=1.**

Cause: HBLT up burst event.

Correction: No action required.

**Test results: Down burst (DC) alarm. Max pressure = 99.9, Pressure = 99.9, elapsed time = 0.0, event volume 1.11.**

Cause: HBLT down burst event.

Correction: No action required.

**Test results: Down burst (DC) alarm. Max pressure = 99.9, Pressure = 99.9, elapsed time = 0.0, event volume 1.11, port=1.**

Cause: HBLT down burst event.

Correction: No action required.

**Test results: Leak dip (DD) alarm. Max pressure = 99.9, Pressure = 99.9, elapsed time = 0.0, event volume 1.11.**

Cause: HBLT leak dip event.

Correction: No action required.

**Test results: Leak dip (DD) alarm. Max pressure = 99.9, Pressure = 99.9, elapsed time = 0.0, event volume 1.11, port=1.**

Cause: HBLT leak dip event.

Correction: No action required.

**Test results: Test finished with no errors (DK) alarm. Max pressure = 99.9, elapsed time = 0.0.**

Cause: HBLT test finished without error.

Correction: No action required.

**Test results: Test finished with no errors (DK) alarm. Max pressure = 99.9, elapsed time = 0.0, port=1.**

Cause: HBLT test finished without error.

Correction: No action required.

**Test results: Leak rate (DL) alarm. Max pressure = 99.9, Pressure = 99.9, elapsed time = 0.0, event volume 1.11.**

Cause: HBLT leak rate event.

Correction: No action required.

**99.9, elapsed time = 0.0, event volume 1.11, port=1.**

Cause: HBLT leak rate event.

Correction: No action required.

**Test results: Test aborted due to bad calibration (DZ).**

Cause: HBLT not calibrated event.

Correction: Calibrate the HBLT prior to running a test or script.

**Test results: Script completed.**

Cause: The script completed.

Correction: No action required.

## ***Log Status Messages***

This message type appears in the log panel. Pressure Manager always displays this message type.

**Status: Data capture off.**

Cause: This message announces that the data capture is off.

Correction: No action required.



**Status: Data capture on.**

Cause: This message announces that the data capture is on.

Correction: No action required.

**Status: Displaying test data from <file name>.**

Cause: This message announces that Pressure Manager is displaying previously saved data.

Correction: No action required.

**Status: Idle.**

Cause: This message announces that Pressure Manager is idle.

Correction: No action required.

**Status: No script or test selected.**

Cause: This message announces that there is no test or script selected.

Correction: No action required.

**Status: Operator Escaped process.**

Cause: This message announces that the operator pressed the ESCAPE button.

Correction: No action required.

**Status: Operator pressed OK.**

Cause: This message announces that the operator pressed the OK button.

Correction: No action required.

**Status: Operator stopped process.**

Cause: This message announces that the operator stopped the current process.

Correction: No action required.

**Status: Ready for operation.**

Cause: This message announces that Pressure Manager is ready for operation.

Correction: No action required.

**Status: Ready to run HBLT test <test name>.**

Cause: This message announces that Pressure Manager is ready to run a HBLT test.

Correction: No action required.

**Status: Ready to run script <script name>.**

Cause: This message announces that Pressure Manager is ready to run a script.

Correction: No action required.

**Status: Remote delete OK.**

Cause: This message announces that the remote delete test command completed successfully. That is the HBLT deleted a test specified by Pressure Manager with no errors.

Correction: No action required.

**Status: Remote import OK.**

Cause: This message announces that the remote test import command completed successfully. That is the HBLT received a test from Pressure Manager with no errors.

Correction: No action required.

**Status: Remote retrieve OK.**

Cause: This message announces that the remote test retrieve command completed successfully. That is Pressure Manager received a test from the HBLT with no errors.

Correction: No action required.

**Status: Remote setup OK.**

Cause: This message announces that the remote setup command completed successfully.

Correction: No action required.

**Status: Resuming operation.**

Cause: This message announces that Pressure Manager is resuming operation.

Correction: No action required.

**Status: Running test <name> lot number <lot ID> operator <oper ID>.**

Cause: This message announces that Pressure Manager is starting a test.

Correction: No action required.

**Status: Script setup OK.**

Cause: This message announces that Script setup is OK.

Correction: No action required.

**Status: Working offline.**

Cause: This message announces that Pressure Manager is working in offline mode.

Correction: No action required.

## ***Log Error Messages***

This message type appears in the log panel. Pressure Manager always displays this message type.

**Error: ? command failed with a Acknowledge Format error.**

Cause: The HBLT NAK format was wrong.

Action: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: ? command failed with a Command error.**

Cause: The HBLT NAKed the command "?". The HBLT was not on the proper screen.

Action: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: ? command failed with a Non-numeric error.**

Cause: The HBLT NAKed the command "?" because there was a non-numeric character in the parameter.

Action: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: ? command failed with a Maximum Exceeded error.**

Cause: The HBLT NAKed the command "?" because the parameter value exceeds the maximum for this command given the model type and pressure units.

Action: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: ? command failed with a Minimum Exceeded error.**

Cause: The HBLT NAKed the command "?" because the parameter value exceeds the minimum for this command given the model type and pressure units.

Action: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: ? command failed with a Timeout error.**

Cause: The HBLT NAKed the command "?" because the full text of the command was not received within the allotted time.

Action: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Abort command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Abort script timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: ACK error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: ATM timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: BAR timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Configuration - Failed to write default PERSDATA.CFG file.**

Cause: The system failed to open a file to write the PERSDATA.CFG file. This file contains the persistent setting that must survive between program executions.

Correction: The only known cause for this error is a full disk. Check the disk to insure that it is not full.

**Error: Configuration - Failed to write PERSDATA.CFG file.**

Cause: The system failed to open a file to write the PERSDATA.CFG file. This file contains the persistent setting that must survive between program executions.

Correction: The only known cause for this error is a full disk. Check the disk to insure that it is not full.

**Error: Configuration - Invalid ATM Max Record.**

Cause: The **ATM\_MAX=** record in PERSDATA.CFG is damaged.

Correction: Most likely someone edited the file. Pressure Manager creates and updates this file to hold the persistent settings the operator selects. To fix the problem, select the **Configure>>Graph Settings** menu item. When the panel appears, click the **OK** button. This forces Pressure Manager to overwrite the damaged PERSDATA.CFG with a new PERSDATA.CFG file.

**Error: Configuration - Invalid BAR Max Record.**

Cause: The **BAR\_MAX=** record in PERSDATA.CFG is damaged.

Correction: Most likely someone edited the file. Pressure Manager creates and updates this file to hold the persistent settings the operator selects. To fix the problem, select the **Configure>>Graph Settings** menu item. When the panel appears, click the **OK** button. This forces Pressure Manager to overwrite the damaged PERSDATA.CFG with a new PERSDATA.CFG file.

**Error: Configuration - Invalid Config Record.**

Cause: One of the records in PERSDATA.CFG is damaged.

Correction: Most likely someone edited the file. Pressure Manager creates and updates this file to hold the persistent settings the operator selects. To fix the problem, select the **Configure>>Graph Settings** menu item. When the panel appears, click the **OK** button. This forces Pressure Manager to overwrite the damaged PERSDATA.CFG with a new PERSDATA.CFG file.

**Error: Configuration - Invalid Data Rate Record.**

Cause: The **DATA\_RATE=** record in PERSDATA.CFG is damaged.

Correction: Most likely someone edited the file. Pressure Manager creates and updates this file to hold the persistent settings the operator selects. To fix the problem, select the **Configure>>Graph Settings** menu item. When the panel appears, click the **OK** button. This forces Pressure Manager to overwrite the damaged PERSDATA.CFG with a new PERSDATA.CFG file.

**Error: Configuration - Invalid Default Pressure Units Record.**

Cause: The **DEFAULT\_PRESSURE\_UNITS=** record in PERSDATA.CFG is damaged.

Correction: Most likely someone edited the file. Pressure Manager creates and updates this file to hold the persistent settings the operator selects. To fix the problem, select the **Configure>>Graph Settings** menu item. When the panel appears, click the **OK** button. This forces Pressure Manager to overwrite the damaged PERSDATA.CFG with a new PERSDATA.CFG file.

**Error: Configuration - Invalid DISPLAY\_NEG\_PRESS Record.**

Cause: The **DISPLAY\_NEG\_PRESS =** record in PERSDATA.CFG is damaged.

Correction: Most likely someone edited the file. Pressure Manager creates and updates this file to hold the persistent settings the operator selects. To fix the problem, select the **Configure>>Graph Settings** menu item. When the panel appears, click the **OK** button. This forces Pressure Manager to overwrite the damaged PERSDATA.CFG with a new PERSDATA.CFG file.

**Error: Configuration - Invalid DISPLAY\_SUMMARY Record.**

Cause: The **DISPLAY\_SUMMARY =** record in PERSDATA.CFG is damaged.

Correction: Most likely someone edited the file. Pressure Manager creates and updates this file to hold the persistent settings the operator selects. To fix the problem, select the **Configure>>Graph Settings** menu item. When the panel appears, click the **OK** button. This forces Pressure Manager to overwrite the damaged PERSDATA.CFG with a new PERSDATA.CFG file.

**Error: Configuration - Invalid KPA Max Record.**

Cause: The **KPA\_MAX=** record in PERSDATA.CFG is damaged.

Correction: Most likely someone edited the file. Pressure Manager creates and updates this file to hold the persistent settings the operator selects. To fix the problem, select the **Configure>>Graph Settings** menu item. When the panel appears, click the **OK** button. This forces Pressure Manager to overwrite the damaged PERSDATA.CFG with a new PERSDATA.CFG file.

**Error: Configuration - Invalid MAX\_PRESS\_TRACE Record.**

Cause: The **MAX\_PRESS\_TRACE=** record in PERSDATA.CFG is damaged.

Correction: Most likely someone edited the file. Pressure Manager creates and updates this file to hold the persistent settings the operator selects. To fix the problem, select the **Configure>>Graph Settings** menu item. When the panel appears, click the **OK** button. This forces Pressure Manager to overwrite the damaged PERSDATA.CFG with a new PERSDATA.CFG file.

**Error: Configuration - Invalid PSI Max Record.**

Cause: The **PSI\_MAX=** record in PERSDATA.CFG is damaged.

Correction: Most likely someone edited the file. Pressure Manager creates and updates this file to hold the persistent settings the operator selects. To fix the problem, select the **Configure>>Graph Settings** menu item. When the panel appears, click the **OK** button. This forces Pressure Manager to overwrite the damaged PERSDATA.CFG with a new PERSDATA.CFG file.

**Error: Configuration - Invalid VOL SCALE Record.**

Cause: The **VOL\_SCALE=** record in PERSDATA.CFG is damaged.

Correction: Most likely someone edited the file. Pressure Manager creates and updates this file to hold the persistent settings the operator selects. To fix the problem, select the **Configure>>Graph Settings** menu item. When the panel appears, click the **OK** button. This forces Pressure Manager to overwrite the damaged PERSDATA.CFG with a new PERSDATA.CFG file.

**Error: Configuration - Invalid VOLUME TRACE Record.**

Cause: The **VOLUME\_TRACE=** record in PERSDATA.CFG is damaged.

Correction: Most likely someone edited the file. Pressure Manager creates and updates this file to hold the persistent settings the operator selects. To fix the problem, select the **Configure>>Graph Settings** menu item. When the panel appears, click the **OK** button. This forces Pressure Manager to overwrite the damaged PERSDATA.CFG with a new PERSDATA.CFG file.

**Error: Configuration - Invalid Volume Type Record.**

Cause: The **VOLUME\_TYPE=** record in PERSDATA.CFG is damaged.

Correction: Most likely someone edited the file. Pressure Manager creates and updates this file to hold the persistent settings the operator selects. To fix the problem, select the **Configure>>Graph Settings** menu item. When the panel appears, click the **OK** button. This forces Pressure Manager to overwrite the damaged PERSDATA.CFG with a new PERSDATA.CFG file.

**Error: Configuration - Invalid Window Time Record.**

Cause: The **WINDOW\_TIME=** record in PERSDATA.CFG is damaged.

Correction: Most likely someone edited the file. Pressure Manager creates and updates this file to hold the persistent settings the operator selects. To fix the problem, select the **Configure>>Graph Settings** menu item. When the panel appears, click the **OK** button. This forces Pressure Manager to overwrite the damaged PERSDATA.CFG with a new PERSDATA.CFG file.

**Error: compliance timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Cstate machine state flag error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: cutoff timeout error.**

Cause: There a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Cycle+1 timeout error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Data stream error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: delay timeout error.**

Cause: A script delay command failed to complete. There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: Deliver Volume timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: down burst rate timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: down ramp rate timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Download failed to allocate buffer space.**

Cause: Pressure Manager failed to allocate memory.

Correction: This is a system error. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Download failed to open a disk file.**

Cause: Pressure Manager failed to open a test stored on the disk file.

Correction: The most likely cause is that the file is on removable media and the operator removed the media. Otherwise, this is a programmer error. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Download test canceled.**

Cause: The operator choose to cancel the password request panel when downloading a test.

Correction: Enter the HBLT password when prompted during a test download.

**Error: Download test timed out.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Error in summary line at: <text>.**

Cause: The Smart Manifold summary data is corrupt or the file selected is not a summary data file.

Correction: Check the summary file for damage.

**Error: end script timeout error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Error parsing a DA alarm. Max pressure = 99.9, elapsed time = 0.0.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: Error parsing a DB alarm. Max pressure = 99.9, Pressure = 99.9, elapsed time = 0.0, event volume 1.11.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Error parsing a DC alarm. Max pressure = 99.9, Pressure = 99.9, elapsed time = 0.0, event volume 1.11.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Error parsing a DD alarm. Max pressure = 99.9, Pressure = 99.9, elapsed time = 0.0, event volume 1.11.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.



**Error: Error parsing a DK alarm. Max pressure = 99.9, elapsed time = 0.0.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: Error parsing a DL alarm. Max pressure = 99.9, elapsed time = 0.0, event volume 1.11.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: Failed to allocate memory for script line.**

Cause: This is a programmer error.

Correction: Contact Crescent Design, Inc. and report the error.

**Error: Failed to download test.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error. The HBLT may have detected one or more of the following errors: no test name, bad parse, bad scrutinize, no pressure units line, no process type line, save failed, timeout, HBLT error, input buffer overrun, or invalid password.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Fill At Speed command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Fill At Speed command failed with a Maximum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Fill At Speed command failed with a Minimum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Fill At Speed command failed with a Non-numeric error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Fill At Speed command failed with a Timeout error.**

Cause: There was a serial transmission error, the HBLT is not on the correct screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure that the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: fill at speed timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Get Smart Manifold Input timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Get Smart Manifold status parse error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Get Smart Manifold status timed out.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Get Smart Manifold test results parse error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Group test failed to find a test.**

Cause: Someone deleted a test referenced in a group test.

Correction: Edit the group test to remove the offending test. Alternatively, create a new test replacing the missing test.

**Error: Group test found a nested group test.**

Cause: Someone created a group test with the same name as a test referenced in this group test.

Correction: Edit the group test to remove the offending test. Alternatively, create a new test replacing the missing test.

**Error: Group test found a pressure units conflict.**

Cause: Someone changed the pressure units on a test referenced by a group test. All tests within a group test must use the same pressure units.

Correction: Find the offending test and change the pressure units to match the pressure units in all the other group test.

**Error: Group test found a Smart Manifold mode conflict.**

Cause: Someone changed the Smart Manifold mode on a test referenced by a group test. All tests within a group test must use the same Smart Manifold mode.

Correction: Find the offending test and change the Smart Manifold mode to match the Smart Manifold mode in all the other group test.

**Error: Group test has no tests listed.**

Cause: The HBLT found that a group test has no tests listed. This is a software error.

Correction: Create a new group test to replace the damaged group test. Contact Crescent Design, Inc. and report this error.

**Error: HBLT ran out of water.**

Cause: There are several causes for this error. This error means the HBLT piston activated the exhaust limit switch. See the corrections for causes and fixes.

Correction: Check the HBLT for correct purging. A large air bubble requires compression that uses some of the piston stroke. Check to see if the product or fixture is leaking. If the HBLT cannot reach the target pressure because of a leak, the HBLT continues to run until consuming all the water. If using a Smart Manifold with vacuum targets, make sure that a script does a fill after a negative target. Do this even if the new target pressure is zero PSI.

**Error: HBLT test adaptive compliance count error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test adaptive compliance error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test compliance parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test creation date parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test cycle delay parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test cycles parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test down burst rate parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test down rate parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test dwell time parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test edit date parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test engineer ID parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test Smart Manifold mode parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test fill speed parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test find port cutoff psi parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test find port rate parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test find port timeout parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test group test name parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test incremental pressure parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test initial pressure parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test leak dip parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test leak rate parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test maintain time parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test max pressure parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test name parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test pressure units parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test process type parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test product id parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test repeat cycles parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test return pressure parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test target number parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test target pressure parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test up burst rate parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT test up rate parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: HBLT type too long error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Header label error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: intake limit switch alarm.**

Cause: The HBLT piston activated the intake limit switch.

Correction: Make sure the HBLT is properly purged and calibrated. Check the position of the intake limit switch.

**Error: Invalid alarm error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Invalid data header.**

Cause: The most likely cause is that someone edited the data file. This file may not be a Pressure Manager data file.

Correction: Compare the data file header with a known good data header and correct the error.

**Error: Invalid process name alarm.**

Cause: Pressure Manager directed the HBLT to execute a test that did not exist. There was a serial transmission error, a person deleted the test after Pressure Manager fetched the tests, or there is a programmer error.

Correction: First, check to verify that the test exists on the HBLT. Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: KPA timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: leak dip timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: leak rate timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Machine type parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: maintain timeout error.**

Cause: A script maintain command failed to complete. There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.,

**Error: message timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Motor drive electronics overtemp alarm.**

Cause: The HBLT drive electronics are too hot.

Correction: Check the HBLT circuit board fan for proper operation.

**Error: Motor encoder fault alarm.**

Cause: The HBLT encoder faulted.

Correction: Check the HBLT for proper operation.

**Error: Motor stall alarm.**

Cause: The HBLT motor stalled. An alternate cause may be a fault encoder.

Correction: Check the HBLT encoder for proper operation. The HBLT detects a stall by sensing that the encoder is not turning while current is applied to the motor for a period 4 seconds.

**Error: NAK error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Over pressure alarm.**

Cause: The HBLT exceeded its maximum pressure.

Correction: Check the HBLT for proper operation.



**Error: Over temperature alarm.**

Cause: The HBLT exceeded its maximum temperature.

Correction: Check the HBLT for proper operation.

**Error: Parse buffer overflow alarm.**

Cause: The HBLT exceeded an internal buffer limit while in the product fill mode.

Correction: This is a programmer error. Contact Crescent Design, Inc. to report the error.

**Error: prepare for no vacuum timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: prepare for vacuum timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Pressure Manager error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Process name too long error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: PSI timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Query command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: query timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Quit command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Quit script timeout error.**

Cause: Script quit command timed out without responding. There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: redirect off timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: redirect on timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Redirect report output off error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Redirect report output on error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote delete failed to complete within 2 seconds.**

Cause: There was a serial transmission error or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote delete failed to complete within 4 seconds.**

Cause: The remote delete failed to respond within 4 seconds.

Correction: Check the communications with the HBLT.

**Error: Remote delete invalid name character.**

Cause: The HBLT detected an invalid character in the name record. There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote delete name buffer overrun.**

Cause: The HBLT received too many characters in the name record.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote delete response parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote delete system error.**

Cause: The HBLT detected a system error while receiving the delete command.

Correction: Check the HBLT for proper operation.

**Error: Remote delete test name not found.**

Cause: The HBLT could not find the test name to delete. This may occur because the operator deleted the test from the front panel.

Correction: Check the HBLT to see if the test still exists. If the test does exist, contact Crescent Design, Inc. to report a programmer error.

**Error: Remote delete timeout.**

Cause: The HBLT failed to receive a correct delete command within the timeout period.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote DT target parse error.**

Cause: The HBLT failed to receive a correct DT command within the timeout period.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote DY target parse error.**

Cause: The HBLT failed to receive a correct DY command within the timeout period.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote escaped alarm.**

Cause: Pressure Manager escaped script execution.

Correction: Check the HBLT for proper operation.

**Error: Remote get Smart Manifold test results timed out.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote get machine type failed.**

Cause: The basic cause is a failure to communicate with the HBLT. The 5 common errors that cause this problem are:

1. The HBLT is turned off.
2. Serial cable not connected or wrong cable.
3. HBLT not set for remote operation.
4. Wrong serial BAUD rate set in HBLT.
5. The HBLT is not at the MAIN MENU screen.

This error coincides with a popup window that displays the above list of possible errors. Click the OK button to check for correct operation. The user must resolve this problem before Pressure Manager will operate.

Correction: To correct this problem, check all the items listed above. Then attempt to run Pressure Manager again.

**Error: Remote get machine type failed to complete within 2 seconds.**

Cause: The basic cause is a failure to communicate with the HBLT within 5 seconds. The 5 common errors that cause this problem are:

1. The HBLT is turned off.
2. Serial cable not connected or wrong cable.
3. HBLT not set for remote operation.
4. Wrong serial BAUD rate set in HBLT.
5. The HBLT is not at the MAIN MENU screen.

This error coincides with a popup window that displays the above list of possible errors. Click the OK button to check for correct operation. The user must resolve this problem before Pressure Manager will operate.

Correction: To correct this problem, check all the items listed above. Then attempt to run Pressure Manager again.

**Error: Remote get machine type timed out.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote get tests timed out.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote import bad parse.**

Cause: The HBLT failed to receive a correct parameter record while importing a test from Pressure Manager.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote import bad scrutenize.**

Cause: The HBLT failed to receive a correct parameter value while importing a test from Pressure Manager. This may also be a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT screen for possible error messages. Record any message. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote import buffer overrun.**

Cause: The HBLT receive test buffer overran.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote import HBLT error.**

Cause: A HBLT system error occurred while receiving a test.

Correction: Check the HBLT for proper operation.

**Error: Remote import invalid password.**

Cause: The user provided an incorrect password.

Correction: Check the HBLT password. Then enter the correct password using the password panel.

**Error: Remote import response parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote import save test failed.**

Cause: The HBLT failed to save the test. The most likely cause is the HBLT has exceeded 40 stored tests.

Correction: Check the HBLT to determine if there is room for the test. Starting with version 1.80, the HBLT can store a maximum of 40 tests.

**Error: Remote import timed out.**

Cause: The HBLT did not receive the test in the allotted time.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote import with no name.**

Cause: The HBLT failed to receive a correct name record while importing a test from Pressure Manager.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote import with no pressure units.**

Cause: The HBLT failed to receive a correct pressure units record while importing a test from Pressure Manager.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote import with no process type.**

Cause: The HBLT failed to receive a correct process type record (RAMP, STAIRCASE, FATIGUE, INCREMENTAL, or CUSTOM) while importing a test from Pressure Manager.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote intake limit alarm.**

Cause: The HBLT piston activated the intake limit switch.

Correction: Check the HBLT for proper purging. Check the intake limit switch.

**Error: Remote machine setup failed.**

Cause: There was a serial transmission error, the HBLT is on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the MAIN MENU screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote machine type query failed to complete within 2 seconds.**

Cause: There was a serial transmission error or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote query parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote query parse2 error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote retrieve failure.**

Cause: Pressure Manager failed to receive a correctly formatted test from the HBLT.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote save test set timed out.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote save test timed out.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote setup CPS too high.**

Cause: The computed characters-per-second rate is too high for the selected baud rate.

Correction: This is a programming error. Contact Crescent Design, Inc. for correction.

**Error: Remote setup output timed out.**

Cause: There was a serial transmission error or there is a programmer error. The HBLT may not be at the MAIN MENU screen.

Correction: Check the serial cable to insure the connections are tight. Insure that the HBLT is on the MAIN MENU screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote setup syntax error.**

Cause: There was a serial transmission error or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote setup system error.**

Cause: The HBLT had a system error.

Correction: Check the HBLT to insure that it is operating correctly.

**Error: Remote setup response parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote test fetch failed to complete within 30 seconds.**

Cause: There was a serial transmission error or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote update delete failed to complete within 2 seconds.**

Cause: There was a serial transmission error or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remote update failed to complete within 2 seconds.**

Cause: There was a serial transmission error or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Remove Volume timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Retrieve response parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Run to Target command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Run to Target command failed with a Maximum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Run to Target command failed with a Minimum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Run to Target command failed with a Non-numeric error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Run to Target command failed with a Timeout error.**

Cause: There was a serial transmission error, the HBLT is not on the correct screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure that the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: run to target timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.



**Error: Safety door alarm.**

Cause: For HBLT tests that use a safety enclosure, the door opened during a test.

Correction: Close the safety cover. Check safety cover electronics to insure proper operation.

**Error: Script machine type does not match attached HBLT model.**

Cause: The script model type does not match the model connected to Pressure Manager.

Correction: Edit the script to reference the correct HBLT model.

**Error: Servo exhaust limit hit alarm.**

Cause: The HBLT servo tripped the exhaust limit switch.

Correction: There is not enough water to fulfill the compliance of the product. The user must find a way to work within the limits of the HBLT.

**Error: Servo intake limit hit alarm.**

Cause: The HBLT servo tripped the intake limit switch.

Correction: Some compliant products may cause this error when attempting a vacuum return pressure. Raise the return pressure to 0.

**Error: Set ATM command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, the HBLT is not calibrated, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. Verify correct HBLT calibration. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set BAR command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, the HBLT is not calibrated, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. Verify correct HBLT calibration. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Compliance command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Compliance command failed with a Maximum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Compliance command failed with a Minimum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Compliance command failed with a Non-numeric error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Compliance command failed with a Timeout error.**

Cause: There was a serial transmission error, the HBLT is not on the correct screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure that the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Cutoff command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Cutoff command failed with a Maximum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Cutoff command failed with a Minimum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Cutoff command failed with a Non-numeric error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Cutoff command failed with a Timeout error.**

Cause: There was a serial transmission error, the HBLT is not on the correct screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure that the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set delay time timeout error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Down Burst Rate command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Down Burst Rate command failed with a Maximum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Down Burst Rate command failed with a Minimum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Down Burst Rate command failed with a Non-numeric error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Down Burst Rate command failed with a Timeout error.**

Cause: There was a serial transmission error, the HBLT is not on the correct screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure that the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Down Ramp Rate command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Down Ramp Rate command failed with a Maximum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Down Ramp Rate command failed with a Minimum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Down Ramp Rate command failed with a Non-numeric error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Down Ramp Rate command failed with a Timeout error.**

Cause: There was a serial transmission error, the HBLT is not on the correct screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure that the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set KPA command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, the HBLT is not calibrated, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. Verify correct HBLT calibration. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Leak Dip command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Leak Dip command failed with a Maximum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Leak Dip command failed with a Minimum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Leak Dip command failed with a Non-numeric error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Leak Dip command failed with a Timeout error.**

Cause: There was a serial transmission error, the HBLT is not on the correct screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure that the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Leak Rate command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Leak Rate command failed with a Maximum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Leak Rate command failed with a Minimum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Leak Rate command failed with a Non-numeric error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Leak Rate command failed with a Timeout error.**

Cause: There was a serial transmission error, the HBLT is not on the correct screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure that the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set maintain time timeout error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Message command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Message command failed with a Timeout error.**

Cause: There was a serial transmission error, the HBLT is not on the correct screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure that the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Prepare For Vacuum command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Prepare For No Vacuum command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set PSI command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, the HBLT is not calibrated, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. Verify correct HBLT calibration. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Redirect Off command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Redirect On command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Stream Enable command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Stream Disable command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Up Burst Rate command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Up Burst Rate command failed with a Maximum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Up Burst Rate command failed with a Minimum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Up Burst Rate command failed with a Non-numeric error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Up Burst Rate command failed with a Timeout error.**

Cause: There was a serial transmission error, the HBLT is not on the correct screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure that the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Up Ramp Rate command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Up Ramp Rate command failed with a Maximum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Up Ramp Rate command failed with a Minimum Exceeded error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Up Ramp Rate command failed with a Non-numeric error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Up Ramp Rate command failed with a Timeout error.**

Cause: There was a serial transmission error, the HBLT is not on the correct screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure that the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Volume Press Limit timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Set Volume Rate timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Setup HBLT CPS to high error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Setup HBLT parse error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Setup HBLT syntax error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Setup HBLT system error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Setup HBLT timeout error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.



**Error: Setup output timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Sequence error in data file.**

Cause: The most likely cause is that someone edited the data file. Or, the file is not a Pressure Manager data file.

Correction: Make sure the file read is a Pressure Manager file. Correct any editing errors.

**Error: Stop Motor command failed with a Invalid error.**

Cause: There was a serial transmission error, the HBLT screen is incorrect, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Insure the HBLT is on the correct screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: stop motor timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Stream data error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: stream disable timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: stream enable timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold channel deselect command - parameter non-numeric character.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold channel deselect command - parameter out of range.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold channel Deselect command - Smart Manifold not attached to HBLT.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold channel deselect parse error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold channel deselect timed out.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold channel deselect timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold channel select command - parameter non-numeric character.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold channel select command - parameter out of range.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold channel select command - Smart Manifold not attached to HBLT.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold channel select parse error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold channel select timed out.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold channel Select timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold get input command - input is on.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold get input command - parameter out of range.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold get input command - Smart Manifold not attached to HBLT.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold get input parse error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold get input timed out.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold get status command - Smart Manifold not attached to HBLT.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold Get Status timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold get test results command - reports no test results.**

Cause: The HBLT reports that there are no test results.

Correction: The test results are available after a test or script completes and before resetting the HBLT.

**Error: Smart Manifold get test results command - Smart Manifold not attached to HBLT.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold Get test results timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold output off command - parameter out of range.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold output off command - Smart Manifold not attached to HBLT.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold output off parse error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold output off timed out.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold Output off timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold output on command - parameter out of range.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold output on command - Smart Manifold not attached to HBLT.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold output on parse error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold output on timed out.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold Output on timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold Parallel Mode timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold Sequential Mode timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold set find burst port cutoff psi timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold set find burst port purge rate timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold set find burst port timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold set leak delay timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold set leak maintain timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold set manifold leak target timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold set multport compliance timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold set multport compliance count timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold Single Mode timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Smart Manifold: invalid number of ports selected.**

Cause: There are no ports selected, or if the Smart Manifold mode is single, there are more than one ports selected.

Correction: Select the correct number of ports.

**Error: Syntax error found in data file.**

Cause: The most likely cause is that someone edited the data file. Or, the file is not a Pressure Manager data file.

Correction: Make sure the file read is a Pressure Manager file. Correct any editing errors.

**Error: Turn stream data off error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Turn stream data on error.**

Cause: There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: up burst rate timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: up ramp rate timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Error: Vacuum position timeout error.**

Cause: There was a serial transmission error, the HBLT is off or on the wrong screen, or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. Check the HBLT to make sure it is on the proper screen. If the problem persists, contact Crescent Design, Inc. and report the error.

**Password: Remote delete invalid password.**

Cause: The HBLT received an invalid password for the delete operation.

Correction: Check the HBLT password. Use the password window to enter the correct password for the delete.

**Password: Remote delete invalid password character.**

Cause: The HBLT detected an invalid character in the password record. There was a serial transmission error or there is a programmer error.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.



**Password: Remote delete password buffer overrun.**

Cause: The HBLT received too many characters in the password record.

Correction: Check the serial cable to insure the connections are tight. If the problem persists, contact Crescent Design, Inc. and report the error.

**Warning: Failed to find or create DEFAULT.CAL.**

Cause: Failed to open a new default calibration file.

Correction: Check for a full disk or a write protected disk.

**Warning: Failed to open micrometer serial port.**

Cause: Failed to open the serial port for the micrometer.

Correction: Check the micrometer serial port assignment to insure that the selected port exists and is functional.

### ***Low Level Error Messages***

This class of error messages are mainly software traps to catch programming errors. These error messages occur in two places. The first is the log panel. The second is the ERRORS.LOG file found in the Pressure Manager directory.

These error messages assist the programmer in detecting and locating software flaws. If one of these messages appears in the log panel, please record the *exact* text of the message. Then send it to Crescent Design, Inc. as soon as possible.

These messages have the following forms:

```
**** Event occurred on Jan 1, 2000 at 12:00
      Function=HBLT01 called_function_name, Step=3, Error text here.
      Called from function calling_function_name

**** Event occurred on Jan 1, 2000 at 12:00
      Function=HBLT01 called_function_name, Step=3, ERROR: text here.
      Called from function calling_function_name

**** Event occurred on Jan 1, 2000 at 12:00
      Function=HBLT01 called_function_name, Step=3, WARNING: text here.
      Called from function calling_function_name

**** Event occurred on Jan 1, 2000 at 12:00
      Function=HBLT01 called_function_name, Step=3, Unknown Error 0x99999999.
      Called from function calling_function_name
```

## ***Popup Window Messages***

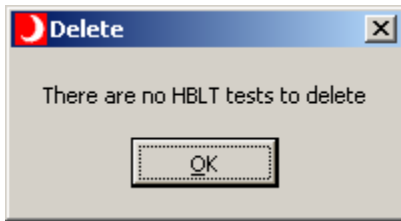
### **About Pressure Manager**



Cause: User selected the **About** menu item.

Correction: This is an informative message only. This message requires no action.

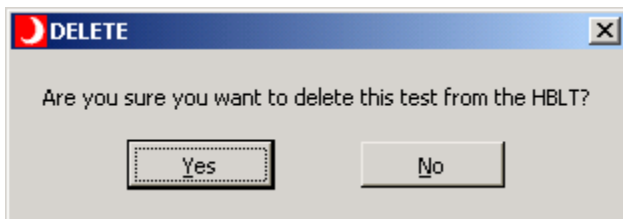
## Delete Popup



Cause: There are no tests currently defined on the HBLT.

Correction: This is an informative message only. This message requires no action.

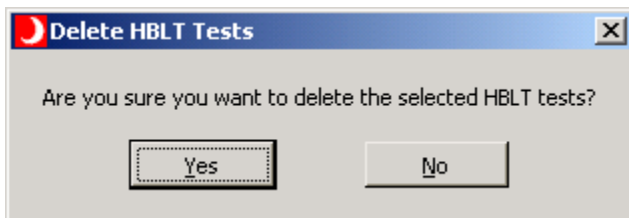
## Delete Confirmation Popup



Cause: Pressure Manager asks the user for confirmation to delete a file.

Correction: Click the **Yes** button to confirm the delete. Click the **No** button to cancel the delete.

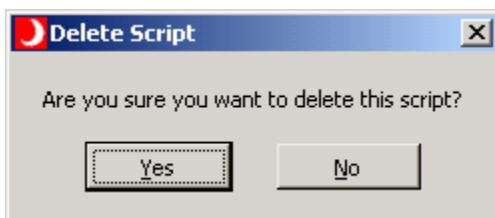
## Delete HBLT Tests Popup



Cause: This message confirms the delete action.

Correction: This message requires no action.

## Delete Script Popup



Cause: This message confirms the delete action.

Correction: This message requires no action.

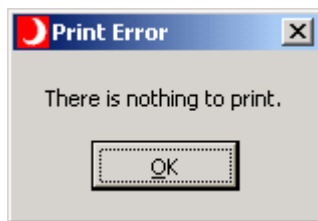
## Safety Door Opened



Cause: The operator opened the HBLT safety door.

Correction: Do not open the safety door during a test or script execution.

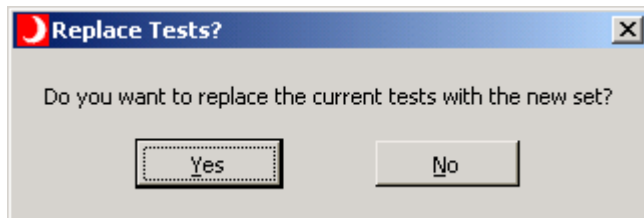
## Print Error Popup



Cause: This message informs the operator that there is nothing to print.

Correction: Click **OK** to close the popup. Then run a test, run a script, or load a saved test before selecting print.

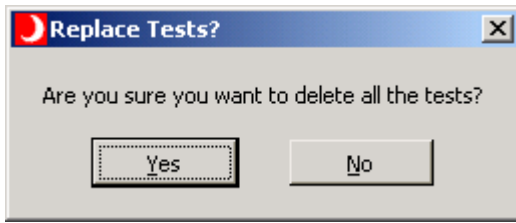
## Replace Tests? Popup



Cause: This message asks the operator whether to replace or add tests from the test set.

Correction: Click the **Yes** button to replace the tests. Click the **No** button to add the tests to the existing tests.

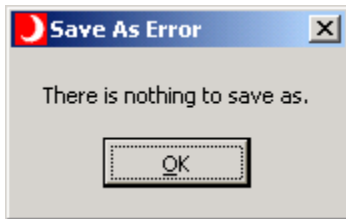
## Replace Tests? Confirmation Popup



Cause: This message asks the operator to verify the delete tests action

Correction: Click the **Yes** button to delete the tests. Click the **No** button to cancel the delete operation. The open confirmation continues by opening a file select popup.

## Save As Error Popup



Cause: The user attempted to save data as when no data is present.

Action: Run a test before saving data.

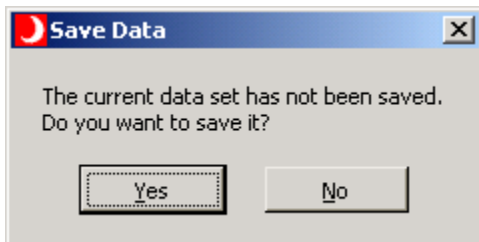
## Save As Error Popup



Cause: The user attempted to save data as when no data is present.

Action: Run a test before saving data.

## Save Data Popup



Cause: The current data is not saved.

Action: Choose to save or discard the data.

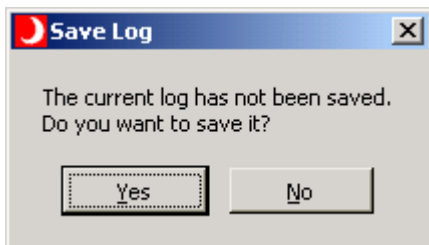
## Save Error Popup



Cause: The user attempted to save data when no data is present.

Action: Run a test before saving data.

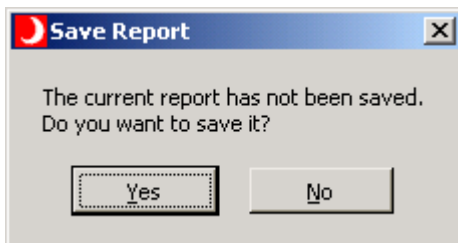
## Save Log Popup



Cause: The current log is not saved.

Action: Choose to save or discard the log.

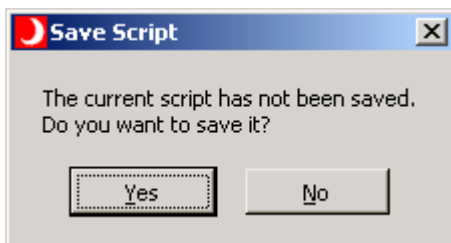
## Save Report Popup



Cause: The current report is not saved.

Action: Choose to save or discard the report.

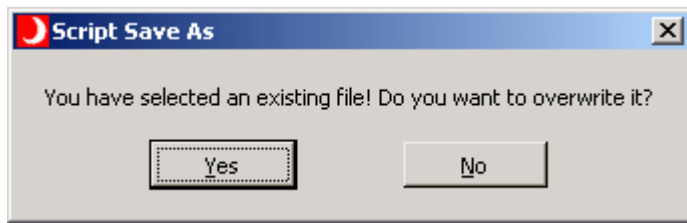
## Save Script Popup



Cause: The user attempted an operation that might require a save script operation.

Action: Choose whether to save the displayed script or not save the displayed script.

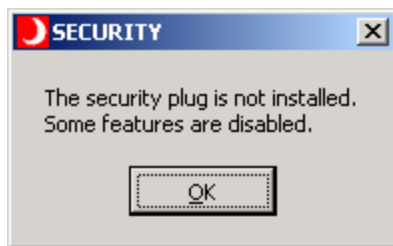
## Script Save As Popup



Cause: The user attempted an operation that might overwrite an existing script.

Action: Choose whether to overwrite the script or not overwrite the script.

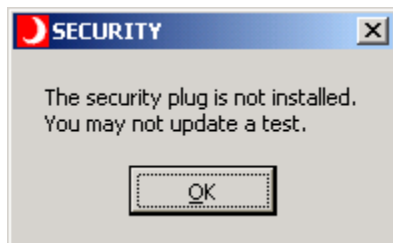
## Security Popup 1



Cause: The Sentinel Pro security plug is not plugged into the parallel printer port or the USB port.

Correction: Plug the Sentinel Pro security plug into the parallel printer port or the USB port and restart Pressure Manager.

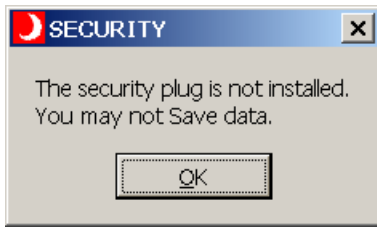
## Security Popup 2



Cause: The Sentinel Pro security plug is not plugged into the parallel printer port or the USB port.

Correction: Plug the Sentinel Pro security plug into the parallel printer port or the USB port and restart Pressure Manager.

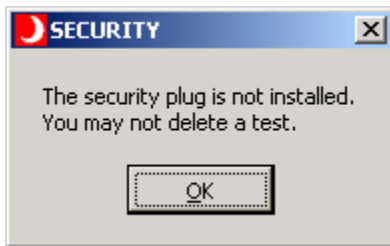
### Security Popup 3



Cause: The Sentinel Pro security plug is not plugged into the parallel printer port of the USB port.

Correction: Plug the Sentinel Pro security plug into the parallel printer port or the USB port and restart Pressure Manager.

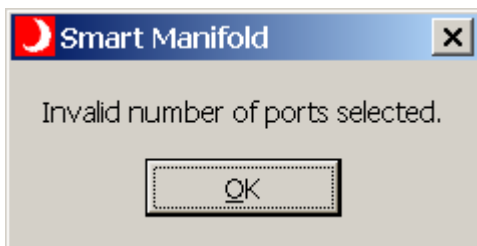
### Security Popup 4



Cause: The Sentinel Pro security plug is not plugged into the parallel printer port the USB port.

Correction: Plug the Sentinel Pro security plug into the parallel printer port or the USB port and restart Pressure Manager.

### Smart Manifold



Cause: The user started a test with an invalid port combination selected on the Smart Manifold. Not selecting any ports or selecting more than one port when using single port mode causes this problem.

Action: Click **OK**. Then, select the correct Smart Manifold ports.



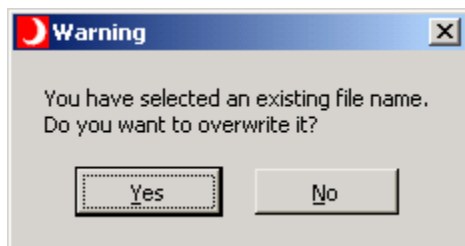
## Warning – Duplicate Test Name Popup



Cause: The user entered a test name that already exists.

Action: Click **OK**. Then, enter another unique test name.

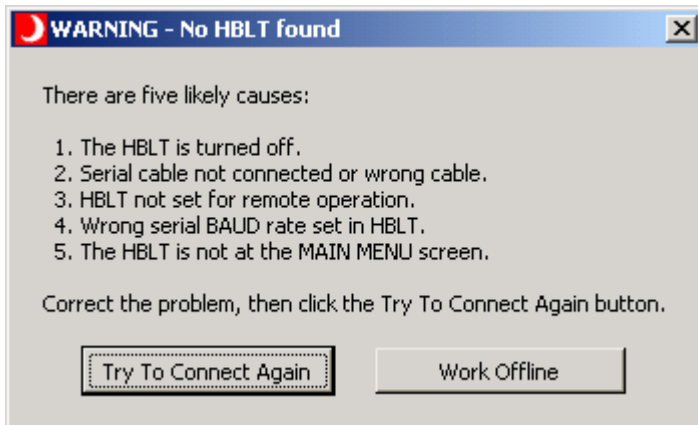
## Warning – Existing File Popup



Cause: User attempted to save a file as an existing file.

Action: Click **Yes** to overwrite the existing file. Click No to cancel the Save As function.

## Warning – No HBLT found Popup

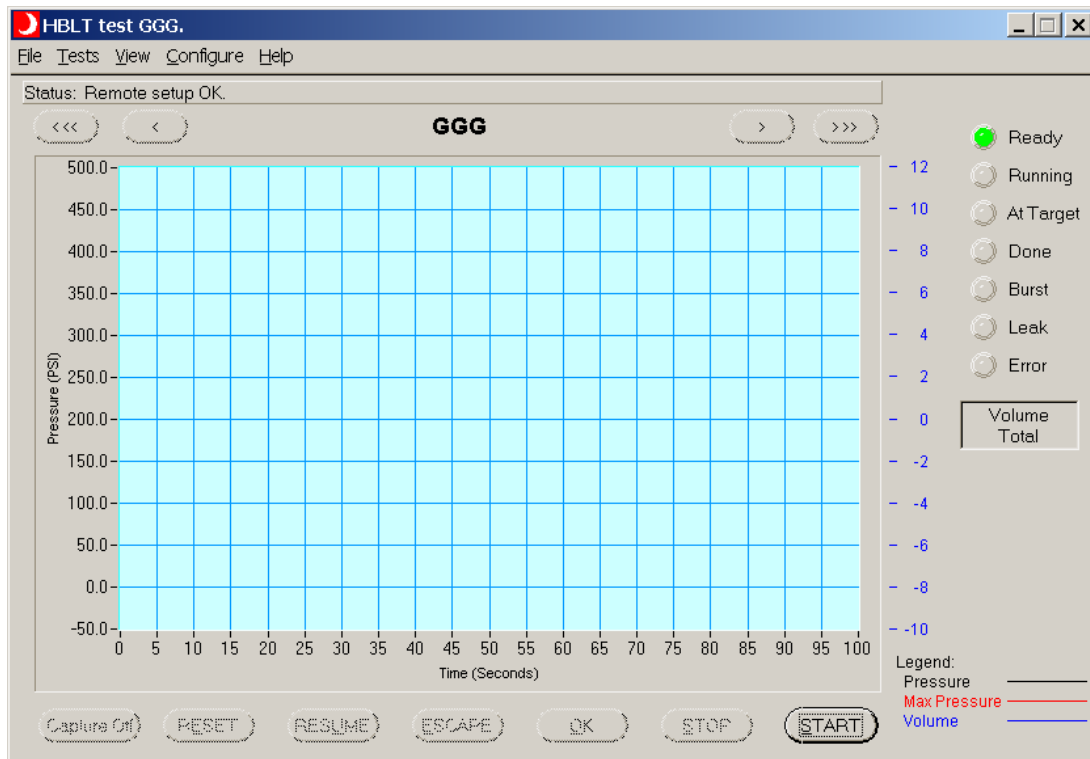


- Cause: The basic cause is a failure to communicate with the HBLT. The five common errors that cause this problem are:
1. The HBLT is turned off.
  2. Serial cable not connected or wrong cable.
  3. HBLT not set for remote operation.
  4. Wrong serial BAUD rate set in HBLT.
  5. The HBLT is not at the MAIN MENU screen.

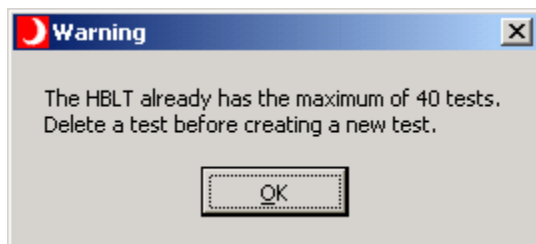
Click the OK button to check for correct operation. The user must resolve this problem before Pressure Manager will operate.

- Correction: To correct this problem, check all the items listed above. Then attempt to run Pressure Manager again by pressing the Try To Connect Again button. If you wish to run Pressure Manager off-line, press the Work Off-line button. This option disables the Test Select, Script Select, and Comm Port Menu items.

There are two ways to re-attach the HBLT and work on-line. First, click the connect button that appears on the right side of the main panel. See the following illustration to locate the **C**onnect button. Second, select the Graph Settings screen and press the **O**K button. Pressure Manager attempts to communicate with the HBLT at this time.



### Warning – Maximum Tests Popup



Cause: The HBLT already contains the maximum number of tests. The maximum number of tests is 40.

Action: Delete an existing test prior to creating or loading a new test or test set.

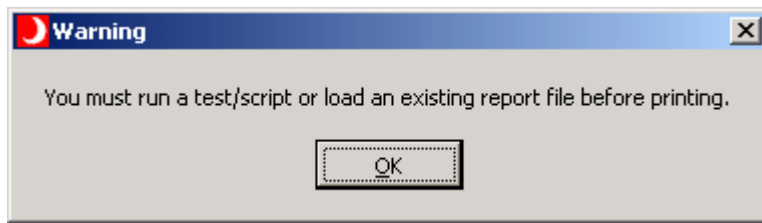
### Warning – No Test Name Popup



Cause: User did not enter a test name.

Action: Enter a test name before clicking the **NEXT** button.

## Warning – Run Test/Script First Popup



Cause: The report or log panel is empty. Run a test, script or open an existing report/log file before using the print command.

Action: Enter a test name before clicking the **NEXT** button.

## Warning Test Popup



Cause: User attempted to start a test while a test, script edit or script select panel is open.

Action: Close the offending panel before clicking the Start button.

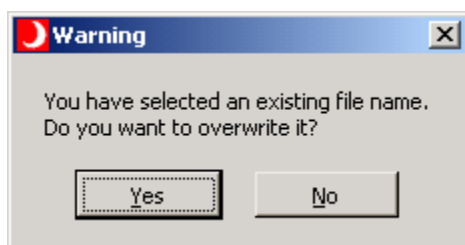
## Warning Micrometer Popup



Cause: User attempted to print micrometer data before running a test or script.

Action: Run a test or script before attempting a print.

## Warning Micrometer Popup



Cause: User attempted to save micrometer data to an existing file.

Action: Choose to either overwrite the file or not.

## Appendix A – HBLT Parameter Minimums, Maximums, and Defaults

The following tables contain the minimums, maximums and defaults for all the pressure parameters. This includes both HBLT native tests and scripts. Each table represents a particular HBLT model. Find the proper table, and then look up the parameter. Finally, find the value in the units column.

Please note that there are relationships between some parameters. Pressure Manager may coerce some parameters into values other than the ones shown here.

With HBLT version 2.47, this version of Pressure Manager uses protocol version 1.45.

In the following tables, a gray field represents a capped parameter. Its value is not the true maximum the machine is capable of producing.

**25 PSI HBLT Model**

<b>100 PSI Model Parameters</b>	<b>PSI</b>	<b>ATM</b>	<b>BAR</b>	<b>KPa</b>
Up Ramp Rate, minimum per second	1.00	0.068	0.069	6.89
Up Ramp Rate, maximum per second	50.0	3.403	3.447	327.67
Up Ramp Rate, default	5.00	0.340	0.345	34.47
Down Ramp Rate, minimum per second	1.00	0.068	0.069	6.89
Down Ramp Rate, maximum per second	50.00	3.403	3.447	327.67
Down Ramp Rate, default	5.00	0.340	0.345	34.47
Initial Pressure, minimum	1.00	0.068	0.069	6.89
Initial Pressure, maximum	25.00	1.701	1.724	172.37
Initial Pressure, default	1.00	0.068	0.069	6.89
Target Pressure, minimum	0.10	0.007	0.007	0.69
Target Pressure, maximum	25.00	1.701	1.724	172.37
Target Pressure, default	10.00	0.681	0.689	68.95
Return Pressure, minimum	-12.00	-0.817	-0.827	-82.74
Return Pressure, maximum	25.00	1.701	1.724	172.37
Return Pressure, default	0.00	0.000	0.000	0.00
Increment Pressure, minimum step	0.10	0.007	0.007	0.69
Increment Pressure, maximum step	25.00	1.701	1.724	172.37
Increment Pressure, default	5.00	0.340	0.345	34.47
Maximum Test Pressure, minimum	1.00	0.068	0.069	6.89
Maximum Test Pressure, maximum	25.00	1.701	1.724	172.37
Maximum Test Pressure, default	10.00	0.681	0.689	68.95
Leak Rate, minimum per second	1.00	0.068	0.069	6.89
Leak Rate, maximum per second	50.00	3.403	3.445	327.67
Leak Rate, default per second	5.00	0.340	0.345	34.47
Up Burst Rate, minimum per second	5.00	0.340	0.345	34.47
Up Burst Rate, maximum per second	100.00	6.805	6.895	327.67
Up Burst Rate, default per second	25.00	1.701	1.724	172.37
Down Burst Rate, minimum per second	5.00	0.340	0.345	34.47
Down Burst Rate, maximum per second	100.00	6.805	6.895	327.67
Down Burst Rate, default per second	0.00	0.000	0.000	0.00
Leak Dip, minimum	1.0	0.068	0.069	6.89
Leak Dip, maximum	25.00	1.701	1.724	172.37
Leak Dip, default	0.00	0.000	0.000	0.00

**100 PSI HBLT Model**

<b>100 PSI Model Parameters</b>	<b>PSI</b>	<b>ATM</b>	<b>BAR</b>	<b>kPa</b>
Up Ramp Rate, minimum per second	1.0	0.07	0.07	6.9
Up Ramp Rate, maximum per second	50.0	3.40	3.45	344.7
Up Ramp Rate, default	50.0	3.40	3.45	344.7
Down Ramp Rate, minimum per second	1.0	0.07	0.07	6.9
Down Ramp Rate, maximum per second	50.0	3.40	3.45	344.7
Down Ramp Rate, default	50.0	3.40	3.45	344.7
Initial Pressure, minimum	1.0	0.07	0.07	6.9
Initial Pressure, maximum	100.0	6.81	6.89	689.5
Initial Pressure, default	10.0	0.68	0.69	68.9
Target Pressure, minimum	1.0	0.17	0.17	6.9
Target Pressure, maximum	100	6.81	6.89	689.5
Target Pressure, default	50.0	3.40	3.45	344.7
Return Pressure, minimum	VAC	VAC	VAC	VAC
Return Pressure, maximum	100.0	6.81	6.89	689.5
Return Pressure, default	0.0	0.00	0.00	0.0
Increment Pressure, minimum step	0.1	0.01	0.01	0.7
Increment Pressure, maximum step	100.0	6.81	6.89	689.5
Increment Pressure, default	5.0	0.34	0.34	34.5
Maximum Test Pressure, minimum	0.5	0.03	0.03	3.4
Maximum Test Pressure, maximum	100.0	6.81	6.89	689.5
Maximum Test Pressure, default	100.0	6.81	6.89	689.5
Leak Rate, minimum per second	1.0	0.07	0.07	6.9
Leak Rate, maximum per second	50.0	3.40	3.45	344.7
Leak Rate, default per second	5.0	0.34	0.34	34.5
Up Burst Rate, minimum per second	5.0	0.34	0.34	34.5
Up Burst Rate, maximum per second	100.0	6.81	6.89	689.5
Up Burst Rate, default per second	25.0	1.70	1.72	172.4
Down Burst Rate, minimum per second	5.0	0.34	0.34	34.5
Down Burst Rate, maximum per second	100.0	6.81	6.89	689.5
Down Burst Rate, default per second	0.0	0.00	0.00	0.0
Leak Dip, minimum	3.0	0.20	0.21	20.7
Leak Dip, maximum	100.0	6.81	6.89	689.5
Leak Dip, default	0.0	0.00	0.00	0.0

**250 PSI HBLT Model**

<b>250 PSI Model Parameters</b>	<b>PSI</b>	<b>ATM</b>	<b>BAR</b>	<b>KPa</b>
Up Ramp Rate, minimum per second	1.0	0.07	0.07	7
Up Ramp Rate, maximum per second	125.0	8.51	8.62	862
Up Ramp Rate, default	125.0	8.51	8.62	862
Down Ramp Rate, minimum per second	1.0	0.07	0.07	7
Down Ramp Rate, maximum per second	125.0	8.51	8.62	862
Down Ramp Rate, default	125.0	8.51	8.62	862
Initial Pressure, minimum	1.0	0.07	0.07	7
Initial Pressure, maximum	250.0	17.01	17.24	1724
Initial Pressure, default	25.0	1.70	1.72	172
Target Pressure, minimum	2.5	0.17	0.17	17
Target Pressure, maximum	250.0	17.01	17.24	1724
Target Pressure, default	100.0	6.81	6.89	689
Return Pressure, minimum	VAC	VAC	VAC	VAC
Return Pressure, maximum	250.0	17.01	17.24	1724
Return Pressure, default	0.0	0.00	0.00	0
Increment Pressure, minimum step	0.1	0.01	0.01	1
Increment Pressure, maximum step	250.0	17.01	17.24	1724
Increment Pressure, default	10.0	0.68	0.69	69
Maximum Test Pressure, minimum	0.5	0.03	0.03	3
Maximum Test Pressure, maximum	250.0	17.01	17.24	1724
Maximum Test Pressure, default	250.0	17.01	17.24	1724
Leak Rate, minimum per second	1.0	0.07	0.07	7
Leak Rate, maximum per second	50.0	3.40	3.45	345
Leak Rate, default per second	5.0	0.34	0.34	34
Up Burst Rate, minimum per second	5.0	0.34	0.34	34
Up Burst Rate, maximum per second	250.0	17.01	17.24	1724
Up Burst Rate, default per second	25.0	1.70	1.72	172
Down Burst Rate, minimum per second	5.0	0.34	0.34	34
Down Burst Rate, maximum per second	250.0	17.01	17.24	1724
Down Burst Rate, default per second	0.0	0.00	0.00	0
Leak Dip, minimum	3.0	0.20	.021	21
Leak Dip, maximum	250.0	17.01	17.24	1724
Leak Dip, default	0.0	0.00	0.00	0



**500 PSI HBLT Model**

<b>500 PSI Model Parameters</b>	<b>PSI</b>	<b>ATM</b>	<b>BAR</b>	<b>KPa</b>
Up Ramp Rate, minimum per second	1.0	0.07	0.07	7
Up Ramp Rate, maximum per second	250.0	17.01	17.24	1724
Up Ramp Rate, default	250.0	17.01	17.24	1724
Down Ramp Rate, minimum per second	1.0	0.07	0.07	7
Down Ramp Rate, maximum per second	250.0	17.01	17.24	1724
Down Ramp Rate, default	250.0	17.01	17.24	1724
Initial Pressure, minimum	5.0	0.34	0.34	34
Initial Pressure, maximum	500.0	34.03	34.47	3447
Initial Pressure, default	25.0	1.70	1.72	172
Target Pressure, minimum	5.0	0.34	0.34	34
Target Pressure, maximum	500.0	34.03	34.47	3447
Target Pressure, default	100.0	6.81	6.89	689
Return Pressure, minimum	VAC	VAC	VAC	VAC
Return Pressure, maximum	500.0	34.03	34.47	3447
Return Pressure, default	0.0	0.00	0.00	0
Increment Pressure, minimum step	0.5	0.03	0.03	3
Increment Pressure, maximum step	500.0	34.03	34.47	3447
Increment Pressure, default	10.0	0.68	0.69	69
Maximum Test Pressure, minimum	0.5	0.3	0.3	3
Maximum Test Pressure, maximum	500.0	34.03	34.47	3447
Maximum Test Pressure, default	500.0	34.03	34.47	3447
Leak Rate, minimum per second	1.0	0.07	0.07	7
Leak Rate, maximum per second	50.0	3.40	3.45	345
Leak Rate, default per second	5.0	0.34	0.34	34
Up Burst Rate, minimum per second	10.0	0.68	0.69	69
Up Burst Rate, maximum per second	500.0	34.03	34.47	3447
Up Burst Rate, default per second	25.0	1.70	1.72	172
Down Burst Rate, minimum per second	10.0	0.68	0.69	69
Down Burst Rate, maximum per second	500.0	34.03	34.47	3447
Down Burst Rate, default per second	0.0	0.00	0.00	0
Leak Dip, minimum	3.0	0.20	0.21	21
Leak Dip, maximum	500.0	34.03	34.47	3447
Leak Dip, default	0.0	0.00	0.00	0

**1000 PSI HBLT Model**

<b>1000 PSI Model Parameters</b>	<b>PSI</b>	<b>ATM</b>	<b>BAR</b>	<b>kPa</b>
Up Ramp Rate, minimum per second	10	0.7	0.7	69
Up Ramp Rate, maximum per second	500	34.0	34.5	3447
Up Ramp Rate, default	250	17.0	17.2	1724
Down Ramp Rate, minimum per second	10	0.7	0.7	69
Down Ramp Rate, maximum per second	500	34.0	34.5	3447
Down Ramp Rate, default	250	17.0	17.2	1724
Initial Pressure, minimum	5	0.3	0.3	34
Initial Pressure, maximum	1000	68.1	68.9	6895
Initial Pressure, default	100	6.8	6.9	689
Target Pressure, minimum	10	0.7	0.7	69
Target Pressure, maximum	1000	68.1	68.9	6895
Target Pressure, default	250	17.0	17.2	1724
Return Pressure, minimum	VAC	VAC	VAC	VAC
Return Pressure, maximum	1000	68.1	68.9	6895
Return Pressure, default	0	0.0	0.0	0
Increment Pressure, minimum step	1	0.1	0.1	7
Increment Pressure, maximum step	1000	68.1	68.9	6895
Increment Pressure, default	25	1.7	1.7	172
Maximum Test Pressure, minimum	5	0.3	0.3	34
Maximum Test Pressure, maximum	1000	68.1	68.9	6895
Maximum Test Pressure, default	500	34.0	34.5	3447
Leak Rate, minimum per second	5	0.3	0.3	34
Leak Rate, maximum per second	50	3.4	3.4	345
Leak Rate, default per second	10	0.7	0.7	69
Up Burst Rate, minimum per second	20	1.4	1.4	138
Up Burst Rate, maximum per second	1000	68.1	68.9	6895
Up Burst Rate, default per second	50	3.4	3.4	345
Down Burst Rate, minimum per second	20	1.4	1.4	138
Down Burst Rate, maximum per second	1000	68.1	68.9	6895
Down Burst Rate, default per second	0	0.0	0.0	0
Leak Dip, minimum	3	0.2	0.2	21
Leak Dip, maximum	1000	68.1	68.9	6895
Leak Dip, default	0	0.0	0.0	0

**2000 PSI HBLT Model**

<b>2000 PSI Model Parameters</b>	<b>PSI</b>	<b>ATM</b>	<b>BAR</b>	<b>kPa</b>
Up Ramp Rate, minimum per second	10	0.7	0.7	69
Up Ramp Rate, maximum per second	1000	68.1	68.9	6895
Up Ramp Rate, default	250	17.0	17.2	1724
Down Ramp Rate, minimum per second	10	0.7	0.7	69
Down Ramp Rate, maximum per second	1000	68.1	68.9	6895
Down Ramp Rate, default	250	17.0	17.2	1724
Initial Pressure, minimum	10	0.7	0.7	69
Initial Pressure, maximum	2000	136.1	137.9	13790
Initial Pressure, default	100	6.8	6.9	689
Target Pressure, minimum	20	1.4	1.4	138
Target Pressure, maximum	2000	136.1	137.9	13790
Target Pressure, default	250	17.0	17.2	1724
Return Pressure, minimum	VAC	VAC	VAC	VAC
Return Pressure, maximum	2000	136.1	137.9	13790
Return Pressure, default	0	0.0	0.0	0
Increment Pressure, minimum step	2	0.1	0.1	14
Increment Pressure, maximum step	2000	136.1	137.9	13790
Increment Pressure, default	25	1.7	1.7	172
Maximum Test Pressure, minimum	10	0.7	0.7	69
Maximum Test Pressure, maximum	2000	136.1	137.9	13790
Maximum Test Pressure, default	500	34.0	34.5	3447
Leak Rate, minimum per second	10	0.7	0.7	69
Leak Rate, maximum per second	100	6.8	6.9	689
Leak Rate, default per second	10	0.7	0.7	69
Up Burst Rate, minimum per second	40	2.7	2.8	276
Up Burst Rate, maximum per second	2000	136.1	137.9	13790
Up Burst Rate, default per second	50	3.4	3.4	345
Down Burst Rate, minimum per second	40	2.7	2.8	276
Down Burst Rate, maximum per second	2000	136.1	137.9	13790
Down Burst Rate, default per second	0	0.0	0.0	0
Leak Dip, minimum	3	0.2	0.2	21
Leak Dip, maximum	2000	136.1	137.9	13790
Leak Dip, default	0	0.0	0.0	0

Note: Up and Down Ramp rate minimums are 10 PSI higher for older actuator machines. Print the manual on the HBLT to get an accurate table for older machines. Pressure Manager is aware of the actuator type and enforces the appropriate limits.

**3000 PSI HBLT Model**

<b>3000 PSI Model Parameters</b>	<b>PSI</b>	<b>ATM</b>	<b>BAR</b>	<b>kPa</b>
Up Ramp Rate, minimum per second	10	0.7	0.7	69
Up Ramp Rate, maximum per second	1000	68.1	68.9	6895
Up Ramp Rate, default	250	17.0	17.2	1724
Down Ramp Rate, minimum per second	10	0.7	0.7	69
Down Ramp Rate, maximum per second	1000	68.1	68.9	6895
Down Ramp Rate, default	250	17.0	17.2	1724
Initial Pressure, minimum	10	0.7	0.7	69
Initial Pressure, maximum	3000	204.2	206.8	20684
Initial Pressure, default	100	6.8	6.9	689
Target Pressure, minimum	20	1.4	1.4	138
Target Pressure, maximum	3000	204.2	206.8	20684
Target Pressure, default	250	17.0	17.2	1724
Return Pressure, minimum	VAC	VAC	VAC	VAC
Return Pressure, maximum	3000	204.2	206.8	20684
Return Pressure, default	0	0.0	0.0	0
Increment Pressure, minimum step	2	0.1	0.1	14
Increment Pressure, maximum step	3000	204.2	206.8	20684
Increment Pressure, default	25	1.7	1.7	172
Maximum Test Pressure, minimum	10	0.7	0.7	69
Maximum Test Pressure, maximum	3000	204.2	206.8	20684
Maximum Test Pressure, default	500	34.0	34.5	3447
Leak Rate, minimum per second	10	0.7	0.7	69
Leak Rate, maximum per second	100	6.8	6.9	689
Leak Rate, default per second	10	0.7	0.7	69
Up Burst Rate, minimum per second	40	2.7	2.8	276
Up Burst Rate, maximum per second	3000	204.2	206.8	20684
Up Burst Rate, default per second	50	3.4	3.4	345
Down Burst Rate, minimum per second	40	2.7	2.8	276
Down Burst Rate, maximum per second	3000	204.2	206.8	20684
Down Burst Rate, default per second	0	0.0	0.0	0
Leak Dip, minimum	3	0.2	0.2	21
Leak Dip, maximum	3000	204.2	206.8	20684
Leak Dip, default	0	0.0	0.0	0

Note: Up and Down Ramp rate minimums are 10 PSI higher for older actuator machines. Print the manual on the HBLT to get an accurate table for older machines. Pressure Manager is aware of the actuator type and enforces the appropriate limits.

**5000 PSI HBLT Model**

<b>5000 PSI Model Parameters</b>	<b>PSI</b>	<b>ATM</b>	<b>BAR</b>	<b>kPa</b>
Up Ramp Rate, minimum per second	10	0.7	0.7	69
Up Ramp Rate, maximum per second	1000	68.1	68.9	6895
Up Ramp Rate, default	250	17.0	17.2	1724
Down Ramp Rate, minimum per second	10	0.7	0.7	69
Down Ramp Rate, maximum per second	1000	68.1	68.9	6895
Down Ramp Rate, default	250	17.0	17.2	1724
Initial Pressure, minimum	10	0.7	0.7	69
Initial Pressure, maximum	5000	340.3	344.7	32767
Initial Pressure, default	100	6.8	6.9	689
Target Pressure, minimum	20	1.4	1.4	138
Target Pressure, maximum	5000	340.3	344.7	32767
Target Pressure, default	250	17.0	17.2	1724
Return Pressure, minimum	VAC	VAC	VAC	VAC
Return Pressure, maximum	5000	340.3	344.7	32767
Return Pressure, default	0	0.0	0.0	0
Increment Pressure, minimum step	2	0.1	0.1	14
Increment Pressure, maximum step	5000	340.3	344.7	32767
Increment Pressure, default	25	1.7	1.7	172
Maximum Test Pressure, minimum	10	0.7	0.7	69
Maximum Test Pressure, maximum	5000	340.3	344.7	32767
Maximum Test Pressure, default	500	34.0	34.5	3447
Leak Rate, minimum per second	10	0.7	0.7	69
Leak Rate, maximum per second	100	6.8	6.9	689
Leak Rate, default per second	10	0.7	0.7	69
Up Burst Rate, minimum per second	40	2.7	2.8	276
Up Burst Rate, maximum per second	5000	340.3	344.7	32767
Up Burst Rate, default per second	50	3.4	3.4	345
Down Burst Rate, minimum per second	40	2.7	2.8	276
Down Burst Rate, maximum per second	5000	340.3	344.7	32767
Down Burst Rate, default per second	0	0.0	0.0	0
Leak Dip, minimum	3	0.2	0.2	21
Leak Dip, maximum	5000	340.3	344.7	32767
Leak Dip, default	0	0.0	0.0	0

Note: Up and Down Ramp rate minimums are 10 PSI higher for older actuator machines. Print the manual on the HBLT to get an accurate table for older machines. Pressure Manager is aware of the actuator type and enforces the appropriate limits.

## Appendix B – Pressure Data File Structure

The pressure data file is organized using the almost universal data format known as comma-delimited format. This format has been around at least since the 8-bit microprocessor era. Almost all spread sheet, database, word processors, etc. programs accept comma-delimited files as input.

The file consists of lines of character information separated by commas. Each line represents a record in the file. Within each record, the items separated by commas represent the fields within the record.

When the operator selects **File>>Save As** from the main Pressure Manager panel, Pressure Manager uses the data sent by the HBLT to build a comma delimited file with the following structure.

The first record contains information about the data set. Pressure Manager uses this information to restore itself to the conditions that existed at the time it wrote the data. The first record is organized as follows:

<b>Environment Record</b>	This record contains environmental information in force at the time of file creation.
<b>Machine Type</b>	This field contains a token that represents the HBLT model. The valid tokens are: HBLT_25_PSI HBLT_100_PSI HBLT_250_PSI HBLT_500_PSI HBLT_1000_PSI HBLT_2000_PSI HBLT_3000_PSI HBLT_5000_PSI
<b>Pressure Units</b>	This field contains a token that represents the pressure units. The valid tokens are: PSI ATM KPA BAR
<b>Volume Type</b>	This field contains a token that represents the volume data type. The valid tokens are: VOLUME_TOTAL VOLUME_INCREMENT NO_VOLUME
<b>Data Rate</b>	This field contains a numeric value that represents the number of data tuples the HBLT sends per second. The valid values are 1, 2, 5, 10, 20, 50, and 100.
<b>Window Time</b>	This field contains a numeric value that represents the width of the strip chart window in seconds. Valid values are 1, 2, 5, 10, 20, 50, 100, 200, and 500.
<b>PSI Maximum</b>	This field contains a numeric value that represents the strip chart pressure scale maximum in pounds per square inch.
<b>KPA Maximum</b>	This field contains a numeric value that represents the strip chart pressure scale maximum in kilopascals.

<b>ATM Maximum</b>	This field contains a numeric value that represents the strip chart pressure scale maximum in atmospheres.
<b>BAR Maximum</b>	This field contains a numeric value that represents the strip chart pressure scale maximum in bars.

The second contains header information.

**Header Text Record** This record contains the text for the column headings when programs such as Microsoft Excel import comma-delimited files. A comma separates each label. The record should appear as follows:  
**Sequence,Pressure,Peak Pressure,Volume**

All the other records are pressure data tuples.

<b>Pressure Record</b>	This record contains the pressure information at the data rate specified in the Environment record. For example, if the data rate is set to 10, then each record represents a pressure reading 1/10 <sup>th</sup> of a second apart. Each record begins with a colon. This is done to match data sets produced by the HBLT remote mode.
<b>Sequence</b>	This field contains the record sequence number. This value always increases by one for each record.
<b>Pressure</b>	This field contains the current pressure number. The value representation depends on the Units field in the Environment record.
<b>Peak Pressure</b>	This field contains the peak pressure number. Peak pressure is the highest pressure obtained from the beginning of the test to this point. The value representation depends on the Units field in the Environment record.
<b>Volume</b>	This field contains the volume number. The value representation depends on the Units field and the Volume Type field in the Environment record. For VOLUME_TOTAL, the units are 1/100 cc's since the start of the test. For VOLUME_INCREMENT, the units are 1/100 cc's per unit of time based on the data rate. However, Pressure Manager displays 1/10 cc's per second to smooth the data.

The following is a portion of a pressure data file:

```
HBLT_1000_PSI,PSI,VOLUME_INCREMENT,100,50,500,4000,40,40
Sequence,Pressure,Peak Pressure,Volume
:0,0,0,0
:1,0,0,0
:2,0,0,0
:3,1,1,17
:4,0,1,55
:5,1,1,81
:6,2,2,84
:7,2,2,89
:8,3,3,104
:9,2,3,121
:10,4,4,132
:11,4,4,138
:12,4,4,151
:13,4,4,164
:14,4,4,171
:15,5,5,180
:16,4,5,190
:17,6,6,200
:18,7,7,207
```

## Appendix C – Micrometer Data File Structure

<b>Header Record</b>	This record contains column-heading information. Each heading consists of its name and units.
<b>Target Pressure</b>	This text field labels the target pressure column.
<b>Actual Pressure</b>	This text field labels the actual pressure column.
<b>Diameter</b>	This text field labels the diameter column.
<b>Pressure Record</b>	This record contains the data recorded at each micrometer reading.
<b>Target Pressure</b>	This field contains the target pressure reading. The units can be PSI, ATM, BAR or KPA. The number of decimal digits changes based on the units.
<b>Actual Pressure</b>	This field contains the actual pressure reading. The units can be PSI, ATM, BAR or KPA. The number of decimal digits changes based on the units.
<b>Diameter</b>	This field contains the micrometer reading. The units can be inches or mm. The number of decimal digits changes based on the type of micrometer and the units.

```
Target Pressure (PSI),Actual Pressure (PSI),Diameter (Inches)
10.0,10.5,-0.02255
15.0,16.0, 0.50350
20.0,20.5,-0.02250
25.0,25.5,-0.02250
30.0,30.5, 0.24615
35.0,35.5, 0.29875
40.0,40.5, 0.17370
45.0,45.5, 0.23030
50.0,50.5, 0.13260
55.0,55.5, 0.04380
60.0,60.5, 0.20880
```