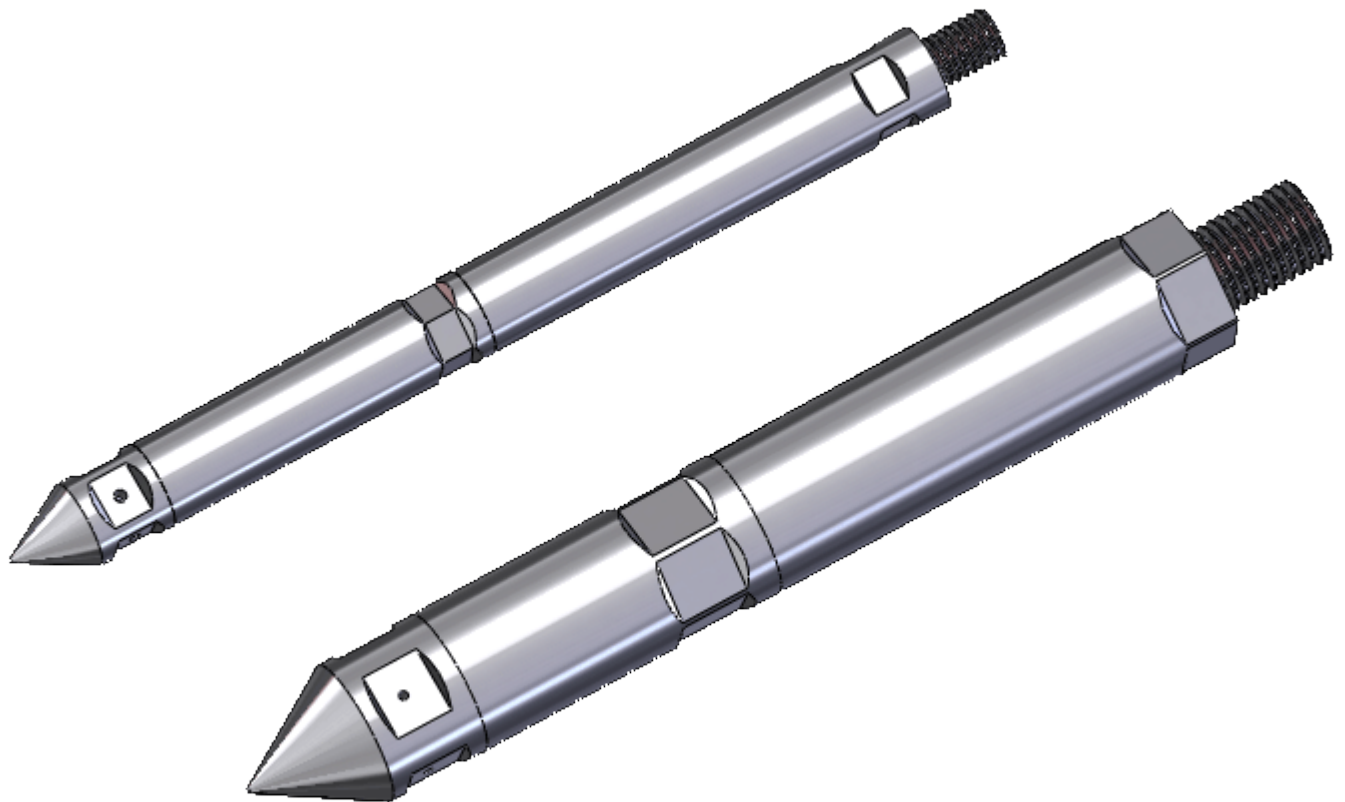**Micro-SMART Systems, Inc**

MICRO-SMART SYSTEMS

HT-750 & HT-1250

Mini Smart

Operator's Manual

1.15.16

Memory Pressure Gauge

HT-750 Kit

HT-1250 Kit

HT-7502 Kit

Table of Contents

Introduction

1.1 Forward

Thank you for using Micro-Smart Tools.

To help our repeat customers, or our customers who have time constraints, we have provided a **SMART Manual** to help ensure no critical steps are missed which might cause costly delays or unnecessary problems using our tool.   We have an outstanding reliability record when our customers follow the prescribed procedures. Our goal is to make the experience with our tools as Rewarding and Trouble-Free as possible.

The second page (page 2) is a photographic image of our different HT Kits

This manual is designed to provide detailed information about installing and using our Smart Data Software, setting up the tool for a downhole run and redressing the tool. We recommend that you read the entire manual, in sequence, while setting up the tool for the first time, prior to its downhole run. To help in using this manual, **Notes** and **Warnings** are provided in **black**, **blue** and **red** according to importance.

1.2 Introduction

The Micro-Smart **HT** and **Mini Smart 2** Series Pressure Temperature Gauges are versatile and useful for almost any type of Pressure Temperature Test. With superior reliability, small size, high temperature capabilities and enhanced detail features make the HT series gauges outperformers against the competition.

The **Micro-Smart - HT / Mini Smart 2 features:**

1.3 Specifications

| Memory Capacity		500,000 Data Sets
Pressure Ranges:	HT-750	1.5Ksi, 3Ksi, 5Ksi, 10Ksi, 15Ksi
	HT-1250	5Ksi, 10Ksi, 15Ksi, 20Ksi
Sampling Intervals		1 second to 1 hour
Operating Temperature		32° F to 356°F (0° C to 180°C)
Resolution		Pressure - .03 psi Temperature - .03°F
Accuracy		Pressure ± .05% Full Scale Temperature
Weight	HT-750	< 1lb. (.45Kg)
	HT-1250	1lb. (.45Kg)
Power	HT-750	3.6V (1-'AA' Cell Lithium)
	HT-1250	3.6V (1-'C' Cell Lithium)
Housing Material		Inconel 718

1.4 System Description

The **HT-750 / HT-1250** pressure gauge is a microprocessor based tool combining two major assemblies in a small package: the Battery Section, and Electronic Section. The housing material is made of Inconel 718

☐ The Battery Section houses a 3.6V 1-'AA' Cell Lithium battery pack in the HT-750 and 3.6V 1-'C' Cell Lithium battery in the HT-1250.

   Note: For extended tests a 3.6V 'C-C' Cell Lithium Battery Pack can be used on the HT-1250

☐ The Electronics Section is microprocessor programmable to a wide range of different sample rates and captures all points in flash memory. The flash memory is capable of holding 500,000 data sets.

   All housing material is made of Inconel 718. The Flats are provided on the housings to tighten the tool without using pipe wrenches.
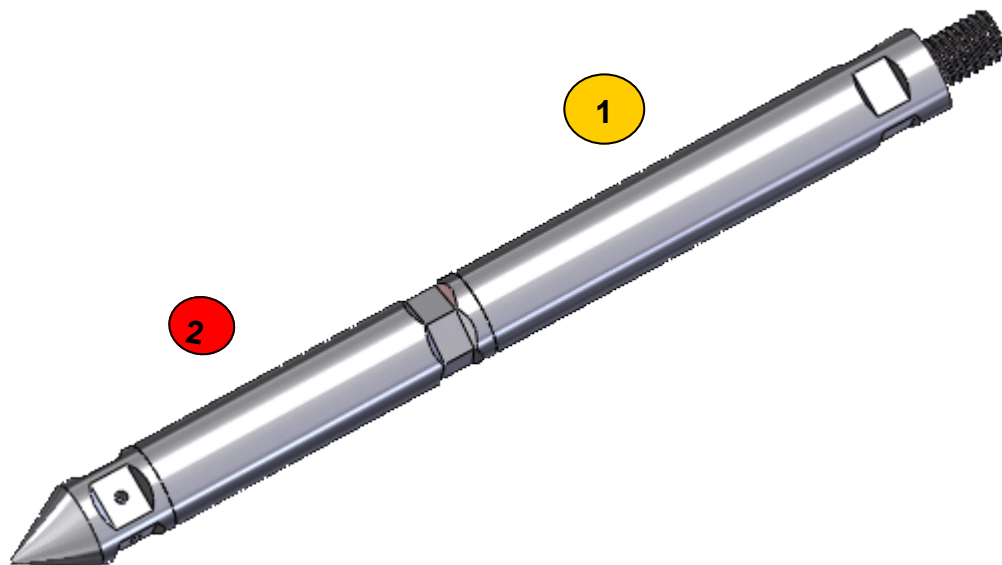
1.5 Running Configuration

The HT-750 / HT-1250 can be placed in numerous locations in the well. Placement can be determined by test type and objective.

- The HT-750 has a ½" - 13 UN Thread Pin (male) Looking Up. The bottom has a ½" - 13 UN Thread Box (female) looking down that can be observed with the removal of the landing nose.

- The HT-1250 has an Amerada pin (male) looking up. The bottom has an Amerada box (female) looking down that can be observed with the removal of the landing nose. An Amerada to Sucker Rod crossover is typically supplied in the gauge transit case.

Smart Data Installation & Communication

Smart Data is the software package created by Micro-Smart Systems to navigate, program and test our tools. The software also includes Graphing and Report Generating features, to enhance the data presentation to your customer.

2.1 SOFTWARE REQUIREMENTS

2.1.1 The Smart Data software can be used with Windows XP, Vista, Windows 7, Windows 8 / 8.1 or Windows 10.

2.1.2 It is recommended that the screen resolution be set to 800x600 (and font size set to small) or 1024x768 to properly view the program screens. Other screen resolutions can be used, however program screens may very in size.

Note: Some older computers will not allow 800x600 resolution

2.1.4 To change resolution, **right click** on a blank area of the desktop, left click **Properties**, left click **Settings**, change resolution to **800x600**, change font size to **small and select OK**. It may be necessary to reboot the computer.

2.2 SOFTWARE INSTALLATION

2.2.1 Insert the USB Thumb Drive into a USB port.

2.2.2 Install the Smart Data software on drive C
Note: It is recommended that User Access Control be turned off prior to installation (App. D)

2.2.3 Double Click the appropriate drive letter of the USB Thumb Drive from **My Computer**

2.2.4 Double Click on "**Setup.exe**" (without the quotes ("))

2.2.5 Choose the default options by clicking "**NEXT**"

2.2.6 A **Smart Data** folder is created in the **C:\Program Files** directory. This folder will be the location of the program files.

2.2.7 When the program is first run, a folder named **Micro Smart Data** is created in the **C:** directory folder and data files will be stored there.

2.2.8 If a shortcut is not automatically created on the desktop, it can be accomplished by a right mouse click, anywhere on the desktop. From the menu, select New, Shortcut, Browse and find C:\Program Files\Smart Data\Smart Data.exe, select Open, Next and Finish.

a. If using Windows Vista or Windows 7, make a shortcut folder to C:\Users\<name>\App Data\Local\Virtual Store\Program Files\Smart Data

Note: If shortcuts for Smart Data, SST and Slick Shot are not created, this could be an indication that the software did not install correctly
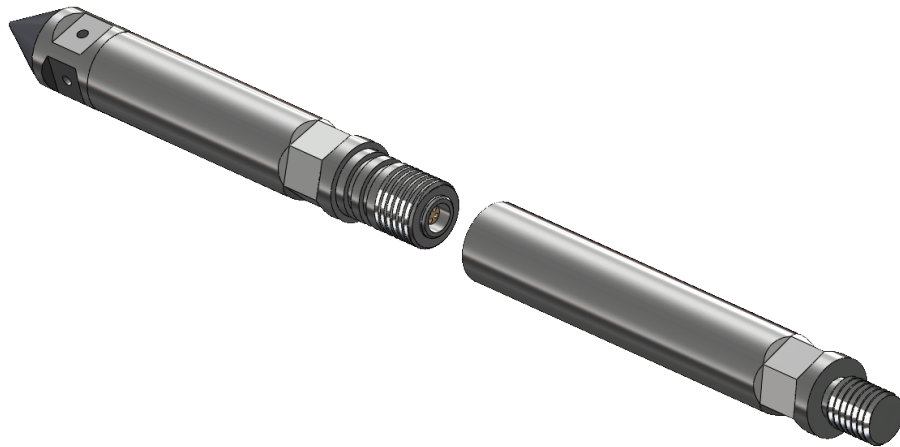
2.2.9 Installation Instructions of USB driver can be found in Appendix C in the back of the manual

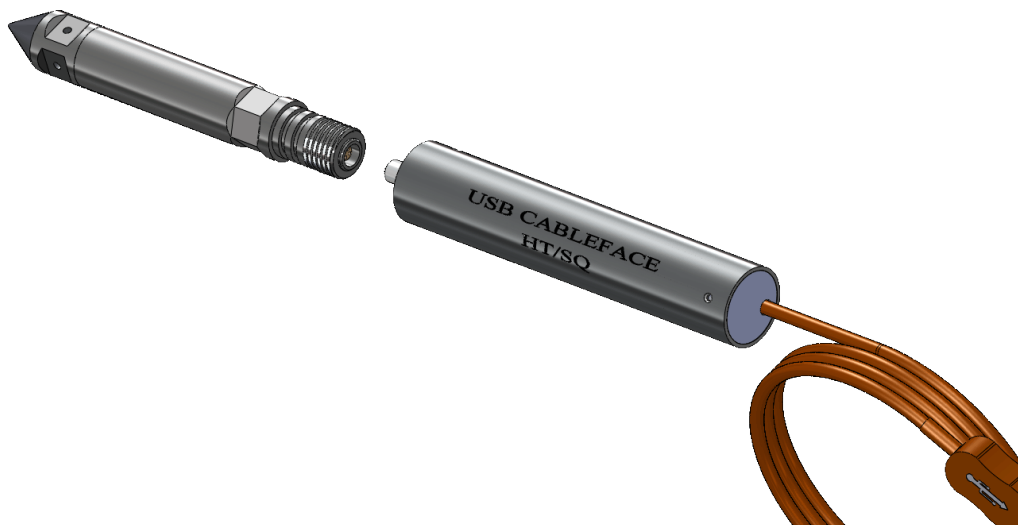## 2.3 Communicating With Smart Data

2.3.1 Connect the USB connector to a USB port on your computer.

2.3.2 Remove the battery housing and battery, if necessary, from to HT-750/1250 using the supplied wrenches.
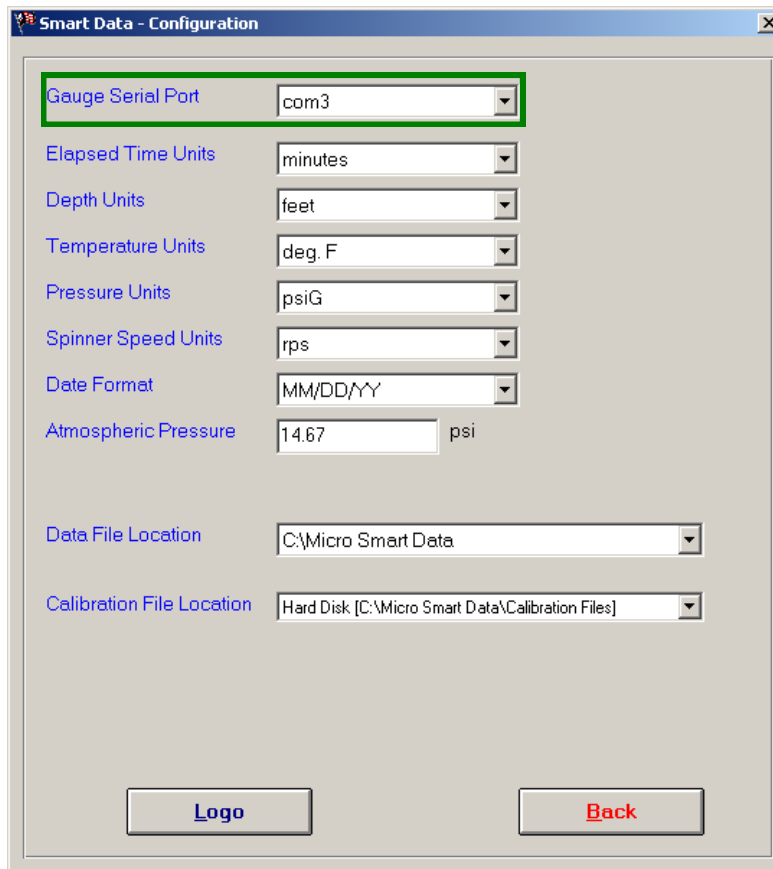
2.3.4 Connect the cableface to the receiver end of the Electronics Section.
(Verify that correct interface cable is being used. The cable for the HT-750 / HT-1250 is orange)

2.4 COMMUNICATION PROBLEMS - TROUBLESHOOTING THE INTERFACE

2.4.1 If the software is unable to find the tool followed by an error message:

   a. Verify All connections

   b. From the Main Program screen, select **User Setup**

   c. From the Configuration Screen, check to ensure that the proper communication port selected.

Smart Data - Configuration			
Gauge Serial Port	com3		
Elapsed Time Units	minutes		
Depth Units	feet		
Temperature Units	deg. F		
Pressure Units	psiG		
Spinner Speed Units	rps		
Date Format	MM/DD/YY		
Atmospheric Pressure	14.67	psi	
Data File Location	C:\Micro Smart Data		
Calibration File Location	Hard Disk [C:\Micro Smart Data\Calibration Files]		
	Logo	**Back**	

2.4.2 If the software is unable to connect, try re-installing Smart Data.

Note: The "Repair" option could fix installation of Smart Data.

Smart Data - User Setup

3.1   Smart Data - User Setup

3.1.1 Double click the Smart Data icon on the desktop of your computer.

3.1.2 Smart data navigation window appears.
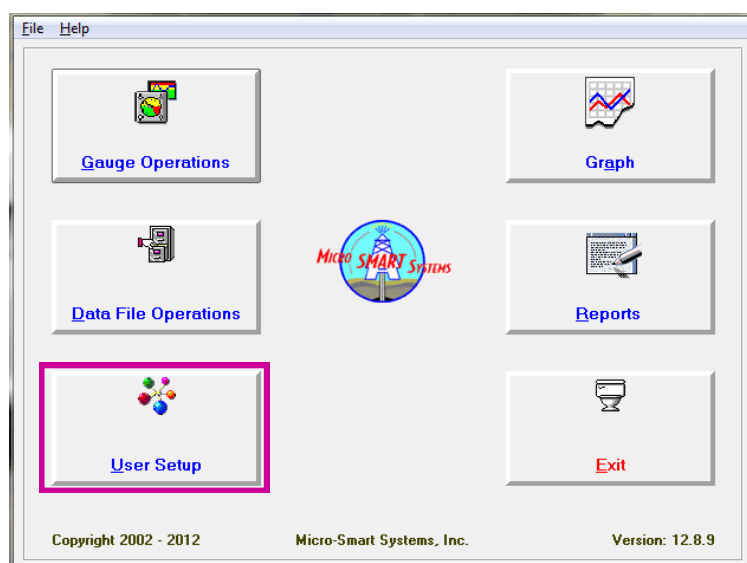
3.1.3 Select **User Setup** (or alt+ U) button to set preferences within Smart Data
- a. Set communications port (com port) for connecting to Smart Tools
- b. Set units of measure for Time, Depth, Pressure, Temperature, and Spinner
- c. Date Format
- d. Set Reference for Atmospheric Pressure
- e. Set Data File and Calibration File locations
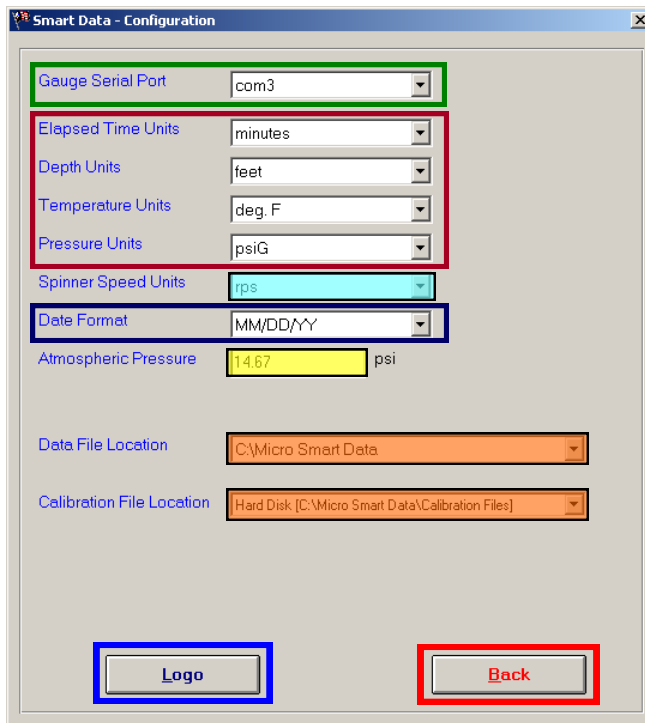
User Setup Options

🟩	Gauge Serial Port (Number)	Com 1 to 14		Note: Found in Ports & Coms in Device Manager	
🟥	Elapsed Time Units	Seconds	Minutes	Hours	
🟥	Depth Units	Feet	Meters		
🟥	Temperature Units	Deg. F	Deg. C	Deg. K	
🟥	Pressure Units	psiG psiA	kPaG kPaA	MPaG MPaA	barG barA	Kg/cm^{2}G Kg/cm^{2}A
🟦	Spinner Speed Units	rps	rpm		
🟦	Date Format	MM/DD/YY		DD/MM/YY	
🟨	Atmospheric Pressure	Atmospheric Value at your location			
🟧	Data File Location	Default: C:\Micro Smart Data\			
🟧	Calibration File Location	Most Common: C:\Micro Smart Data\Calibration Files			
🟦	Logo	Allows you to import your logo for reporting.			
🟥	Back	Saves Information. Goes back to the Smart Data Main Screen			

Note: The **Logo** button provides the option to use company logos on reports. Company logos can be loaded and modified when using this button

3.2 Logo
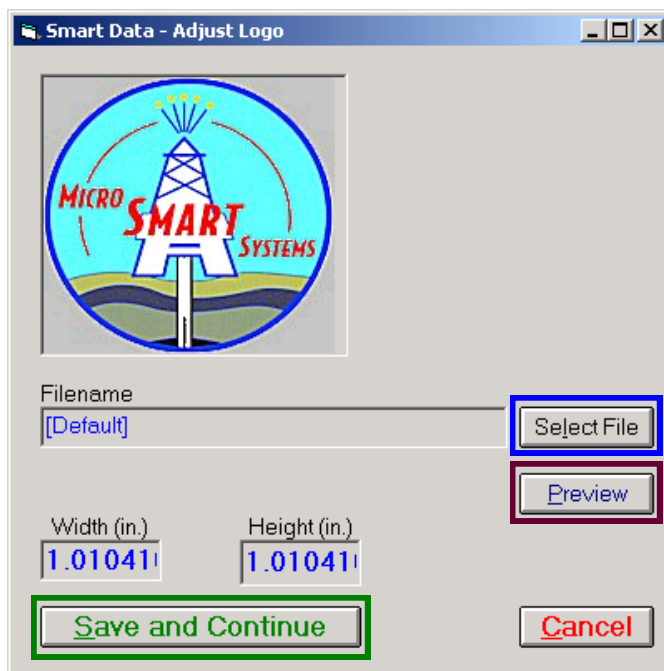
Note: Logo files should be copied into the 'C:\Micro Smart Data\Logos' Folder

3.2.1 On the Adjust Logo Screen (see Screenshot), select **Select File** (or alt + L) to find a graphic file of your logo or your customers logo.

    a. Logo can be no more than 3.25" in width and 1.25" in height

    b. Supported logo formats: *.bmp or *.jpg

3.2.2 Select **Preview** (or alt + P) to see a report page using the selected logo.

3.2.3 Adjust the logo as necessary

3.2.4 Select **Save and Continue** (or alt + S) to save the current setup. Save and Continue goes back to the User Setup Screen
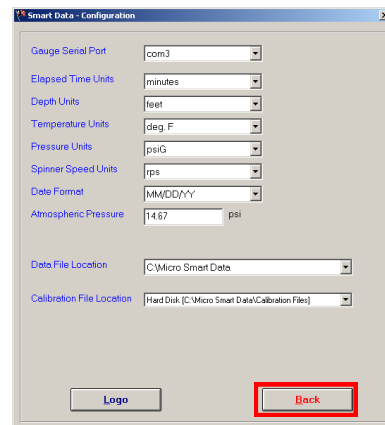
3.2.5 Once all fields have been modified to your specified settings click the **Back** Button. The **Back** button automatically saves the information in this dialog box.
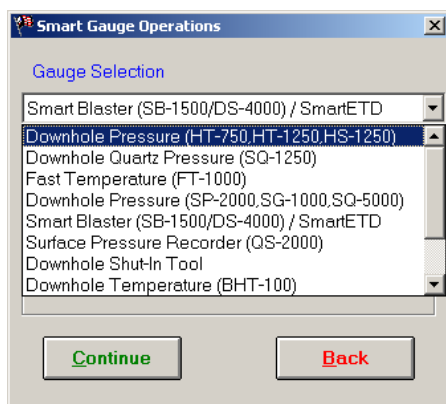
Micro-SMART Systems, Inc

Smart Data - Gauge Operations

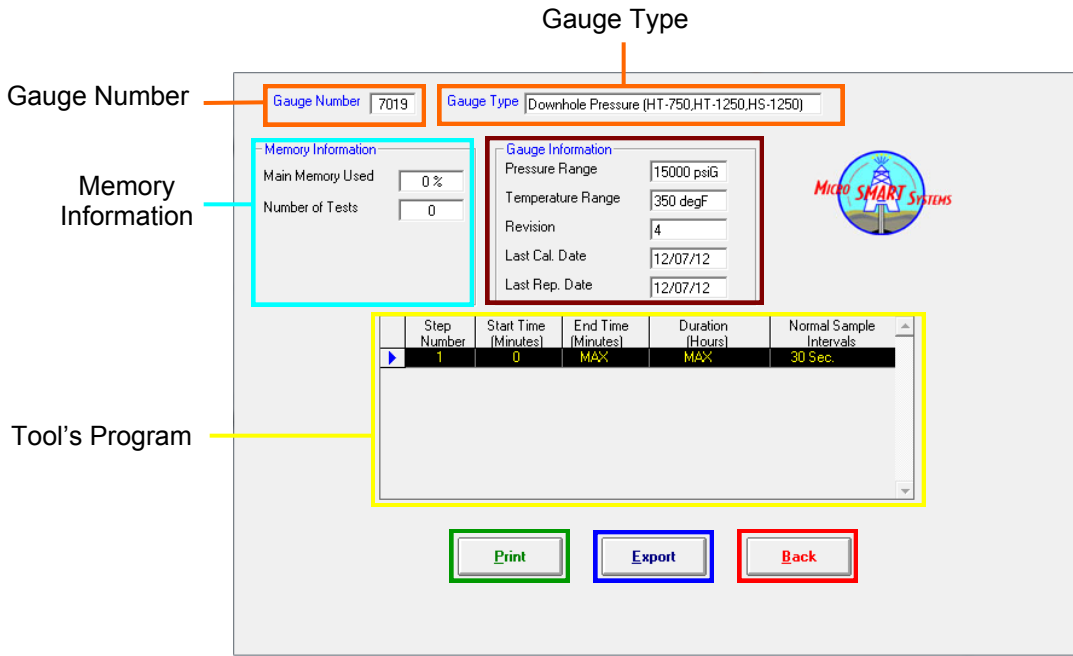## 4.1 Smart Data - Gauge Status

4.1.1 From the Main Menu select **Gauge Operations**
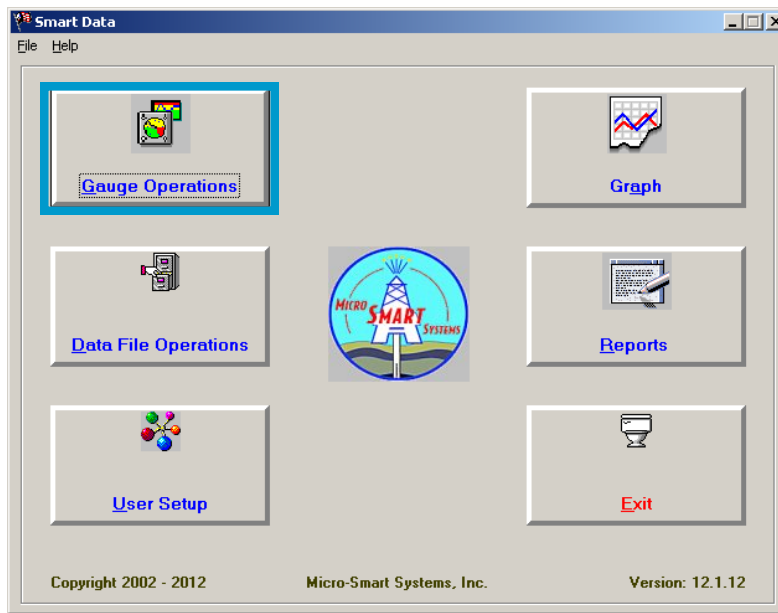
4.1.2 On the Smart Gauge Operations screen, select Downhole Pressure (HT-750, HT-1250, HS-1250) from the drop down list of tools.
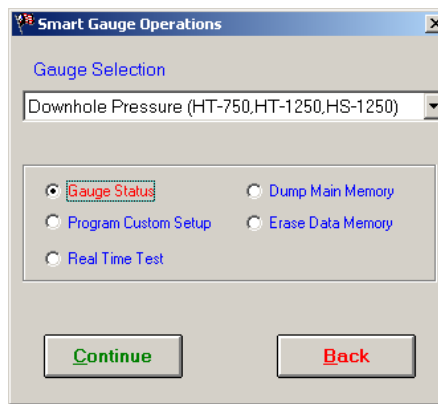

4.1.3 Select Gauge Status and Click **Continue**

Gauge Type

Gauge Number

Memory Information

Tool's Program

4.1.4 Select **Print** to get a printout of this status

4.1.5 Select **Export** to save this status to a file.

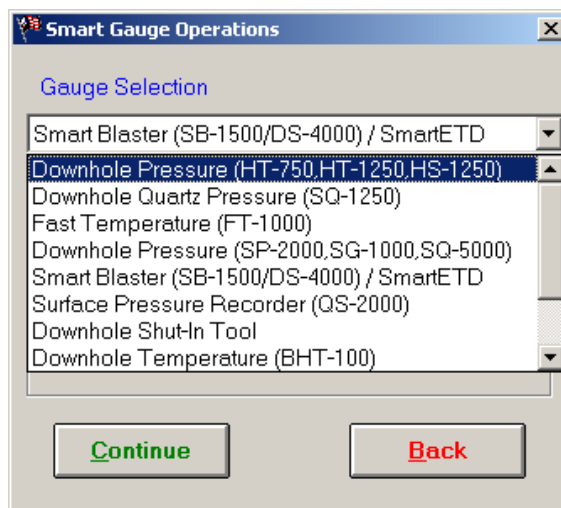4.1.6 Select **Back** to return to the Gauge Operations menu

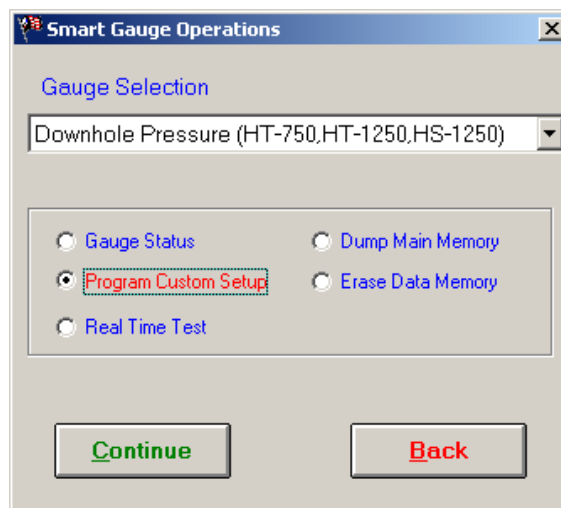|		
🟧	Gauge Header Information	• Gauge Number • Type of Tool connected
🟦	Memory Information	• Memory Used • Number of Test in tool
🟥	Gauge Information	• Pressure Range • Temperature Range • Calibration Date/ Repair Date
🟨	Tool's Current Program	• Tool's current program. Changes to the program must be completed in program custom setup
🟩	Print	• Print Custom Program and Tool's Status
🟦	Export	• Export allows the status window to be exported to another file instead or in addition to printing
🟥	Back	• Returns to the Gauge Operation Menu

4.2 Smart Data - Programming the HT Gauge

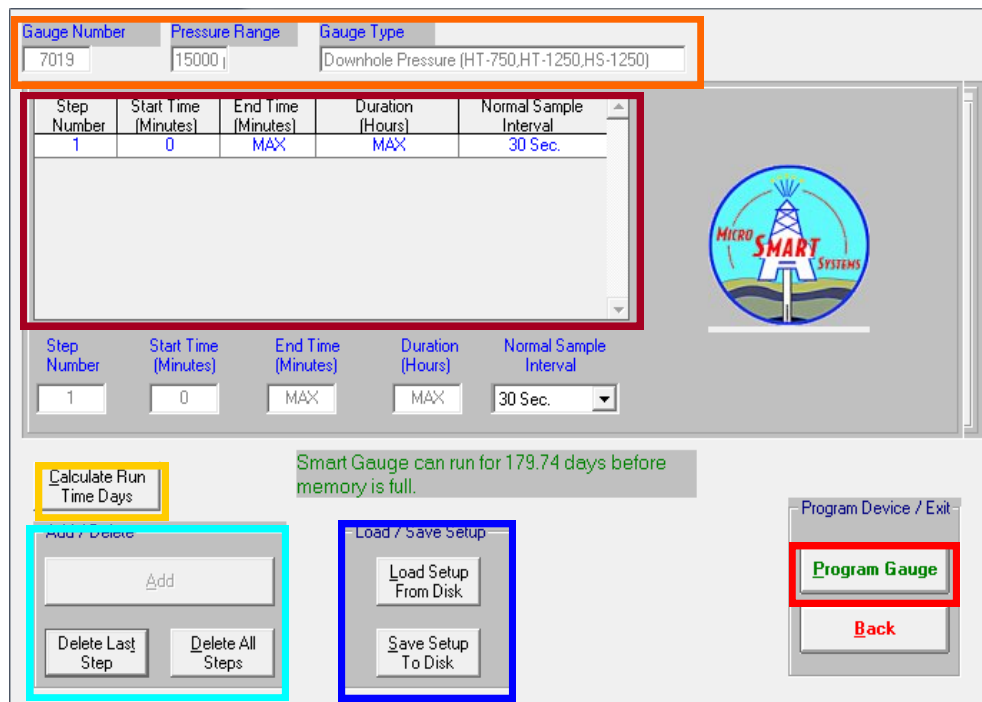4.2.1 If on the Smart Data Main Screen, select the "**Gauge Operations**" Button

Gauge Operations

4.2.2 If "Downhole Pressure (HT-750, HT-1250, HS-1250) is not selected, please choose from the Gauge Selection Screen.

Smart Gauge Operations

Gauge Selection

Smart Blaster (SB-1500/DS-4000) / SmartETD

Downhole Pressure (HT-750,HT-1250,HS-1250)
Downhole Quartz Pressure (SQ-1250)
Fast Temperature (FT-1000)
Downhole Pressure (SP-2000,SG-1000,SQ-5000)
Smart Blaster (SB-1500/DS-4000) / SmartETD
Surface Pressure Recorder (QS-2000)
Downhole Shut-In Tool
Downhole Temperature (BHT-100)

Continue   **Back**

4.2.3 Select Program Custom Setup from the Smart Gauge Operations screen.

Smart Gauge Operations

Gauge Selection

Downhole Pressure (HT-750,HT-1250,HS-1250)

○ Gauge Status   ○ Dump Main Memory
◉ Program Custom Setup   ○ Erase Data Memory
○ Real Time Test

Continue   **Back**

4.2.4 Select Continue

	Gauge Header Information	• Gauge Number • Pressure Range of Tool Connected • Type of Tool connected
	Current program stored in connected tool	
	Calculate Run Time Days	Calculates the number of days the listed program will run before the tool memory is full
	Adding / Deleting Steps in a program	• Adds a step to the program, provided the program is not beyond the 14th step or the maximum time allowed • Delete Last Step - deletes the last step of a program • Delete All Steps - deletes all steps to recreate the custom program
	Load / Save Setup from disk	• Loads a saved custom program • Saves a custom program for another Micro-Smart tool with similar programming features
	Program Device	• Program Gauge - stores the provided program into the Micro-Smart tool
	Back/Exit	• Returns to the Gauge Status screen

Notes:
- The fastest sample rate is 1 second
- Longest sample rate is 1 hour
- Up to 14 different sample rates may be entered into a single program
- The Last step added to the program must have the Max in the End Time and Duration window
- After Programming the gauge, always run a Gauge Status to ensure program was entered and stored

4.2.5 From the **Program Custom Setup** Screen (shown below):
- Add Steps
- Delete Steps
- Load an existing setup from the hard drive.
- Save the current setup to the hard drive.

> NOTE: Steps CANNOT be added or deleted in the middle of the program, but the sample interval can be edited in a step.

4.2.6 Adding Steps - When programming a gauge, enter the **Duration** in hours or the **End Time** in minutes, select the **Normal Sample Interval** from the dropdown menu and select **Add**. (Add will appear "greyed out" when the max step is reached)

4.2.7 The last step added to the program must have **MAX** in the **End Time** and **Duration** windows.
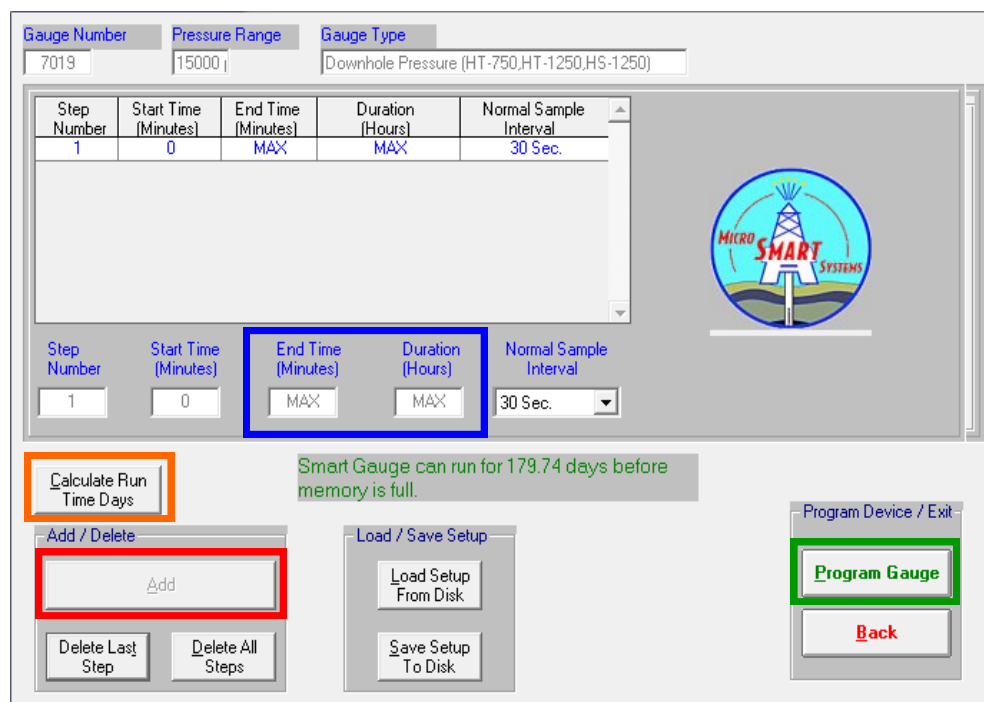
4.2.8 When all the steps are added, select **Program Gauge** (alt +P) to program the gauge.

> Note: Program Gauge can only be clicked when it is highlighted in **green**.

4.2.9 Select **Calculate Run Time Days** (alt + C) to calculate the number of days the tool will run, before the memory is full based on the program entered. The calculated run time is calculated automatically after the last step is added to the program.   Reselect this option if steps have been edited.

> Note: Up to 14 different steps can be programmed into the HT-750 / HT-1250. Each tool can store up to 500,000 data points.

> Note: After programming the gauge, go to Gauge Status to ensure the custom program was correctly entered into the tool's memory.
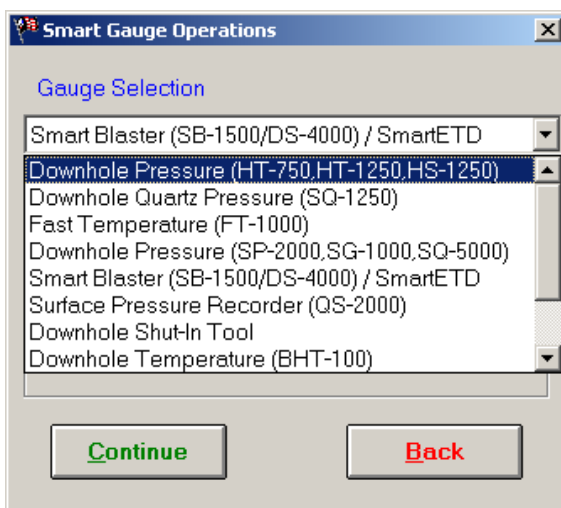
4.3 Smart Data - Real Time Test

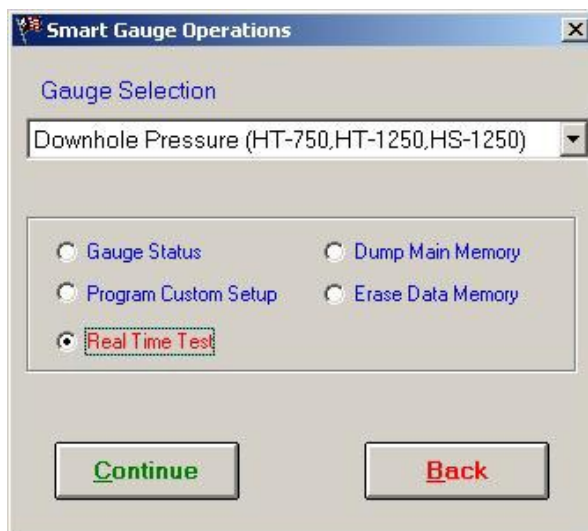Real Time Test provides Time, Pressure and Temperature in real Time

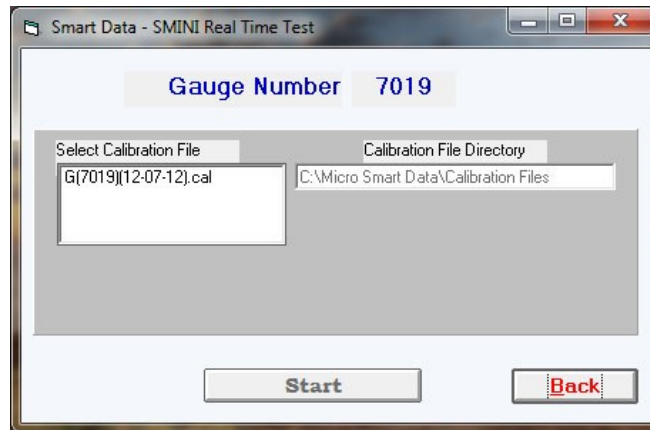4.3.1 If coming from Smart Data Main Menu, choose the "**Gauge Operations"** (alt + G) button

4.3.2 If "Downhole Pressure (HT-750, HT-1250, HS-1250) is not selected, please choose from the Gauge Selection Screen.
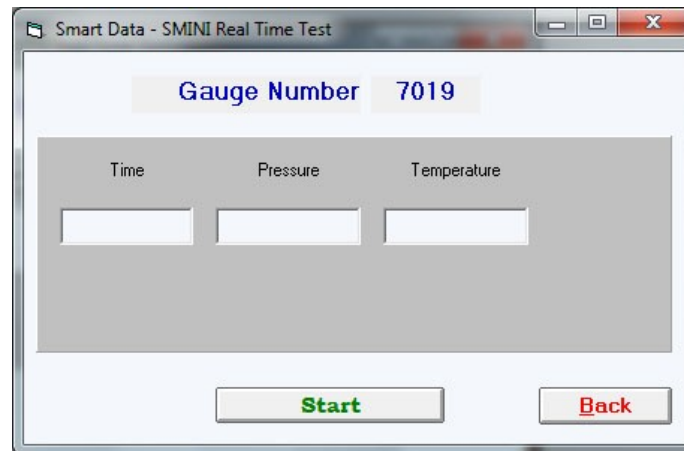

4.3.3 Select "**Real Time Test**" from the Smart Gauge Operations Screen and select **Continue** (alt + C)

4.3.4 The screen below appears after clicking "Continue"

4.3.5 Left click the calibration file and left click "**Start**" button to enable the Real Time Test

4.3.6 Left click the "**Back**" button (alt +B) to end the Real Time test. Back returns to the Gauge Operations Screen.

4.4 Smart Data—Dump Main Memory

Dump Main Memory downloads the data recorded into the tool to the hard drive of the computer. This data can then be graphed or retrieved for building a report.
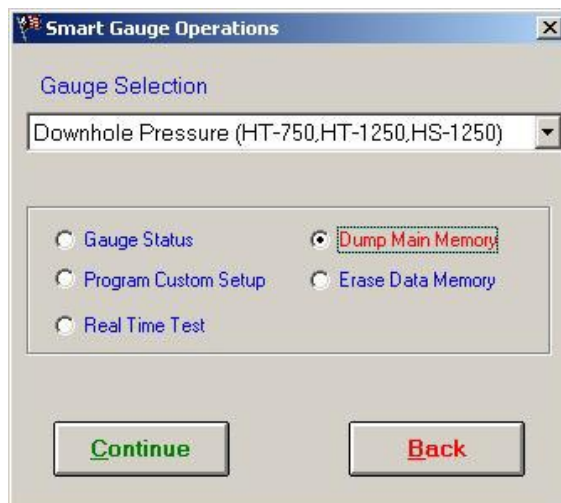
4.4.1 If on the Smart Data Main screen, left click the "**Gauge Operations"** button or (alt + G).

Gauge Operations

4.4.2 If "Downhole Pressure (HT-750, HT-1250, HS-1250) is not selected, please choose from the Gauge Selection Screen.
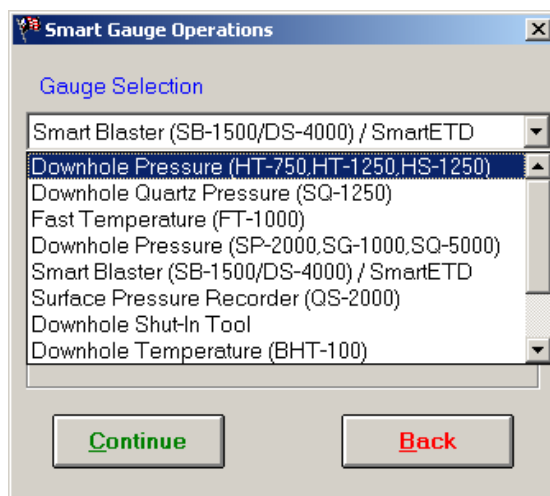
4.4.3 Select "**Dump Main Memory**" from the Smart Gauge Operations Screen and Left click the "**Continue**" button or (alt +C).

🟦 (cyan)	Enter Power up date in (MM/DD/YY) format
🟧 (orange)	Enter Power Up Time (24 hour/ military time), including seconds
🟩 (green)	Continue will start the downloading process Note: Continue will only illuminate green after Power Up Date and Time are entered and a Calibration file is chosen
🟥 (red)	Back returns to the Smart Gauge Operations screen

4.4.4 Enter the Power Up Date **(MM/DD/YY)** 2 digit format

4.4.5 Enter the Power Up Time **(24 hour/military time)**

4.4.6 Choose the Calibration File
        (Typically Software will locate calibration file associated with gauge number)

4.4.7 Left click the "**Continue**" button (alt + C)

Note: Continue will illuminate green after the power up date, time have been entered and a calibration file has been chosen.

🟧	Gauge Number Connected	Gauge connected is 7019
🟧	Gauge Name (Gauge Type)	Pressure Gauges is connected
🟥	Power Up Date/ Time	Date 03/18/11 Time 01:10:11
🟨	Data Points in File	Number of data points in the file. Number of points 28569
🟨	Number of Tests in Data File	The number of tests stored in memory. In the above screen there are 6 different tests stored in memory.
🟪	Min/Max Values and Units	Minimum and Maximum values from the test. Units of measure selected from User Setup
🟧	File Path Directory	File saved to the Micro Smart Data folder on the C drive under tool number and date down loaded
🟩	Print info	Print value depicted on screen
🟦	Export info	Will generate a *.pdf , Microsoft Word or Excel file
🟦	Plot to Screen	Plot to a graphic form
🟥	Back	Back goes back to the Gauge Operations Screen

Note: The file created is an ASCII text file that can be opened in Notepad, WordPad, Word or imported into Excel. It can be attached to an email or copied to a removable disk using Windows Explorer.

4.4.8 The tool downloads the data to the C:\Micro Smart Data directory

    a. The created file will have a name that includes the tool serial number, today's date, and the test number. Ex. F(7019)(03-18-11)(1).dat

Note: The file created is an ASCII text file that can be opened by WordPad, Word or imported into Excel. It can be attached to an email or copied to a removable disk using Windows Explorer.

    b. When dumping of the memory is complete, the program will display a second screen with the minimum and maximum values of the time, pressure and temperature.

Button Options

- **Print Info** will print the information shown on screen
- **Export Info** will generate a *.pdf, Microsoft Word or Microsoft Excel file
- **Plot to Screen** displays the information in graphic form.

## 4.5 Smart Data - Erasing Data from the HT Gauge

4.5.1 Prior to beginning a new downhole test, it is necessary to erase any old data in memory.

Warning: Be careful not to erase any old data before downloading it to the computer.

4.5.2 If on the Smart Data Main screen, left click the "**Gauge Operations**" button or (alt + G).

4.5.3 From the **Gauge Operations** screen choose the **Erase Data Memory** option
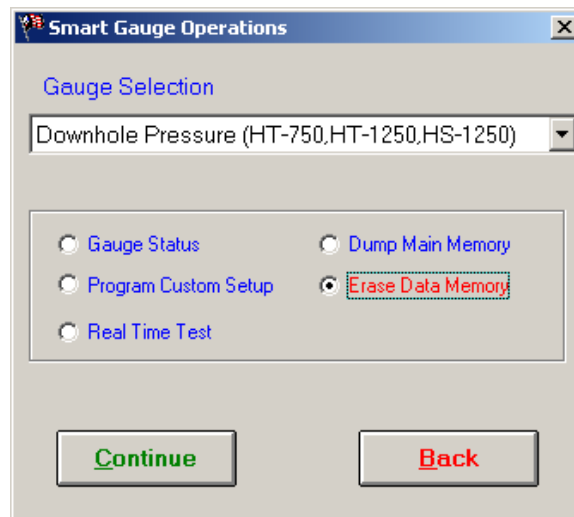
4.5.5 After Left clicking the "**Continue**" button (alt + C), the following screen will appear asking if you are sure you want to erase the data in the tool.   The erase function only erases the data in the tool. It will <u>not</u> erase data on the hard drive of the computer.

4.5.6 Left Click the "<u>Y</u>es" button or (alt + Y) to erase the data on the tool. Run a **Gauge Status** after erasing data to verify the main memory reads 0%. If "<u>N</u>o" or (alt + N) is selected the data will not be erased from the tool.

Note: Reference Gauge Status under Gauge Operations for directions to perform a Gauge Status

Assembling the Tool

5.1 Assembling the HT Tool

5.1.1 Clean and fill the pressure port cavity in the gauge and the landing nose with silicone grease

Warning: Be careful not to poke, puncture or deform the exposed transducer diaphragm.

5.1.2 Ensure the 2 o-rings on the gauge are in good condition and lightly coat the o-rings with silicone grease.

5.1.3 Lightly coat threads with anti-seize.

5.1.4 De-passivate and test battery packs (see Appendix A) – CRITICAL STEP

Note: Log the serial number printed on the battery pack in your gauge operators log book

If using the battery for a longer test, ensure that the battery is new for best results

Either of the Battery Testers could be in the gauge transit case

5.1.9 **The LED light on the battery pack should flash 16 times** after power up indicating that the gauge is operating properly.

Warning: If the light does not begin to flash after 10 seconds, there may be a problem. Remove the battery pack, wait 30 seconds, and re-connect it. If the gauge does not respond, re-test the battery using the battery test procedure (Appendix A)

5.1.10 Screw the battery housing onto the gauge. Tighten all connections using the supplied wrenches.
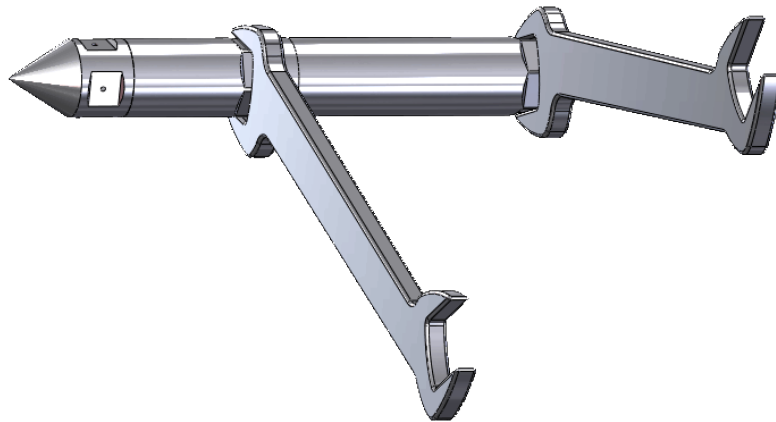
PLEASE: Do NOT use pipe wrenches, vises, or pliers on the body of the gauge. This may damage the housing and threads and WILL decrease the external pressure rating of the gauge.

5.1.11 If the HT-750 or HT-1250 gauges are to be run in tandem, remove the landing nose from one of the gauges and connect the tandem coupling.


5.1.12 Ensure the **pressure port cavity** on the coupling is filled with silicone grease.

5.1.13 After connecting the two gauges, tighten the connections

5.1.14 Note the gauge serial numbers and their positions (top and bottom) in the operator's log book

5.2 The HT-7502 Kit

5.2.1 The HT-750 Gauges should be run in the Micro-Smart 1-1/4" O.D. protective carrier whenever possible to minimize potential damage to the gauges.

5.2.2 Connect the battery housing of each gauge to the center spring shock and tighten (The tandem coupling is not used in this assembly).
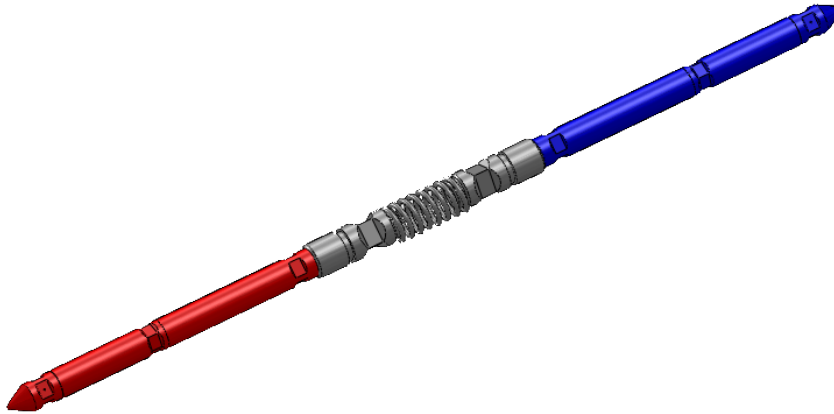
5.2.3 Clean and grease the internal threads of the carrier's end plugs.

5.2.4 Slide the tandem gauge assembly into the carrier and tighten both end plugs, ensuring the landing nose of each mini-smart gauge is centered.

PLEASE: Do not use pipe wrenches, vises, or pliers on the body of the carrier

5.2.5 Gauges are ready to be connected to wireline tool string and go downhole.

Disassembling the Tool

Note: Verify tool has been serviced since previous use. (i.e. check o'rings).

The following instructions are used as preparation for a Downhole Test

6.1 Disassembling the HT tool

6.1.1 Remove Battery Housing and Battery from HT tool.
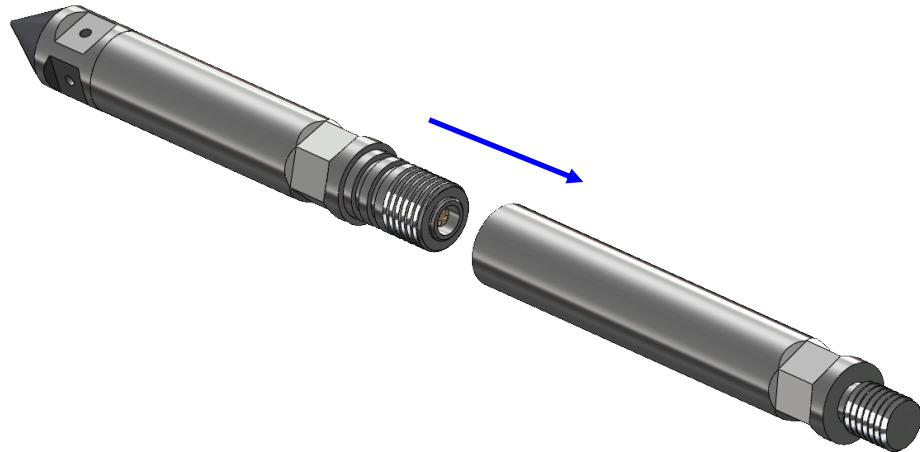
6.1.2   Connect Cableface to Electronics Section of HT tool
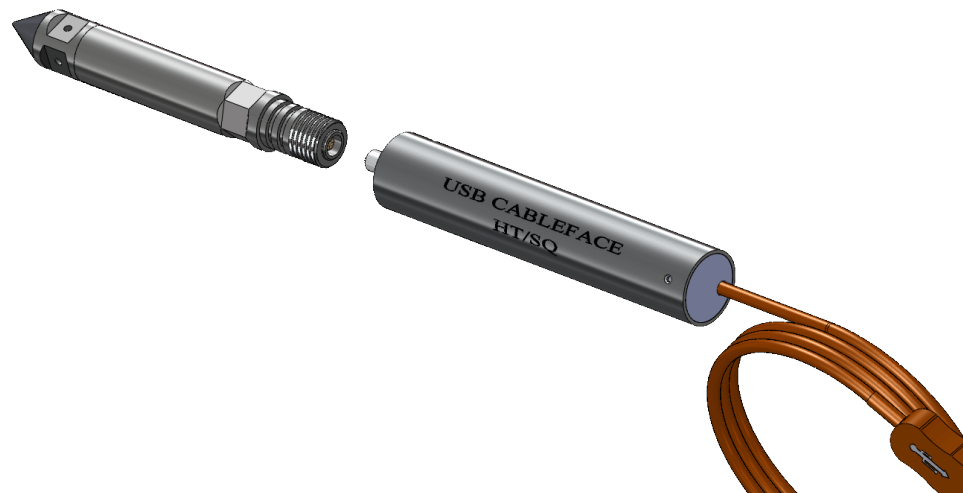
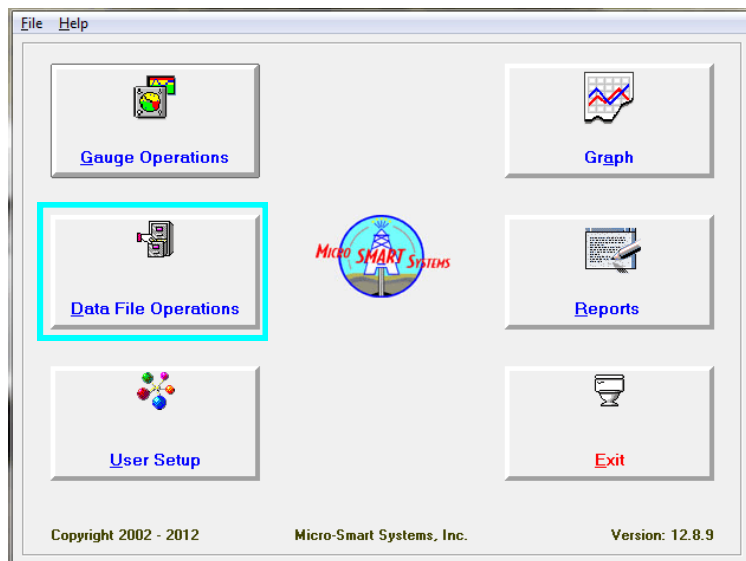6.1.3 Download tool data to computer

Smart Data - Data File Operations

7.1 Smart Data - Data File Operations

7.1.1 If not in Smart Data, double click the Smart Data icon on the desktop of your computer.

7.1.2 Smart data navigation window appears.

7.1.3 Select **Data File Operations** button (or alt + D) to modify, manipulate, or copy Data (*.DAT) Files within Smart Data.

7.2 Data File Operations—Manipulating and Downloading Data Files

7.2.1 **Create Customer Disk** copies the data file to a specified location**.**
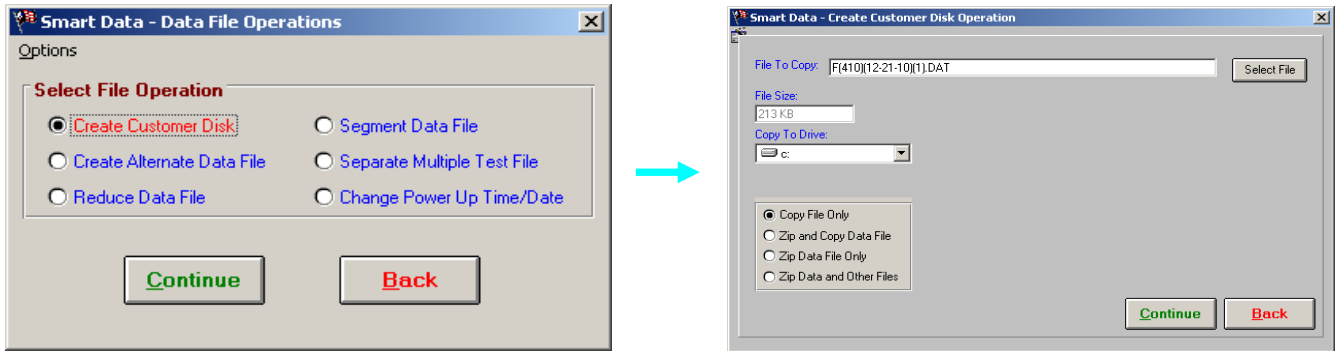
7.2.2 **Create Alternate Data File** adds the real date and the real time to the data file. The data file increases from three columns (Time, Pressure, Temperature to five columns (Real Date, Real Time, Elapsed Time, Pressure and Temperature)

Note: A new file with *.TXT extention is created and cannot be used with the Smart Data Program

Ex. F(410)(12-21-10)(1).TXT

If the power up Date and Time are not correct within the file, see section '7.2.6 to update before proceeding
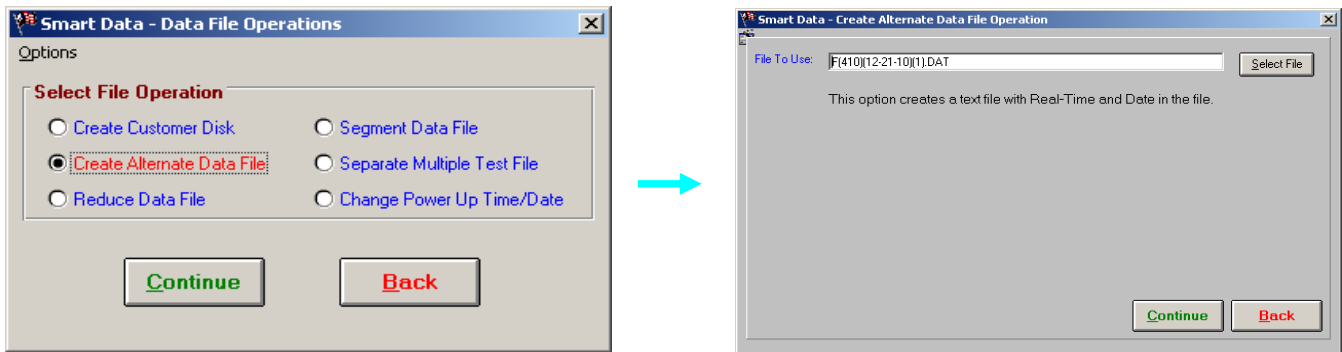
7.2.3 **Reduce Data File** offers a range of reductions from light to super, or manually choose a number of points to be represented. A new file is created with an additional section in the file name (RED),

ex. F(2343)(11-10-03)(1)(RED).dat

29
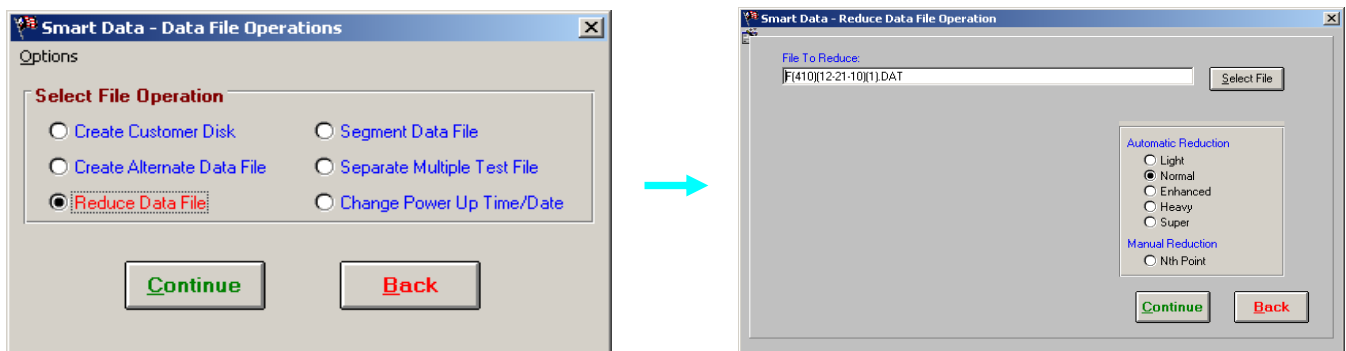
7.2.4 **Segment Data File** allows a selected portion of the data file to be included in a new file. A new file is created with an additional section in the file name (SEG1), ex. F(2343)(11-10-03)(1)(SEG1).DAT
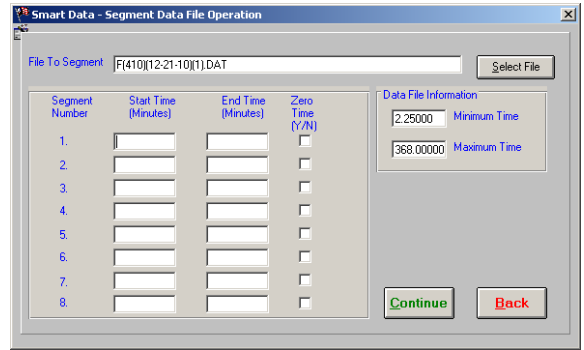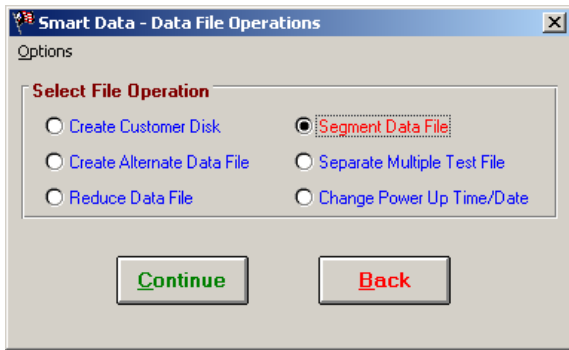

7.2.5 **Separate Multiple Test File** allows for the separation of multiple tests into new individual files. New files are created with an additional section in the file name (TST#), ex. Two tests would create two files F(2343)(11-10-03)(1)(TST1).DAT and

ex. F(2343)(11-10-03)(1)(TST2).DAT
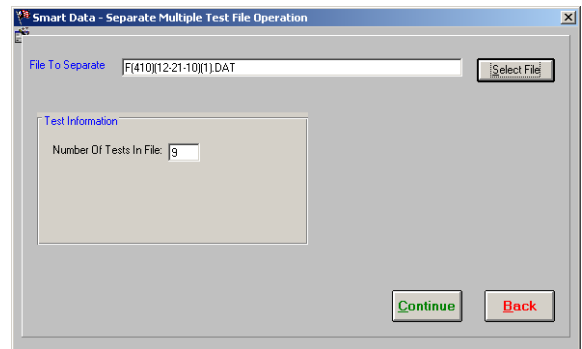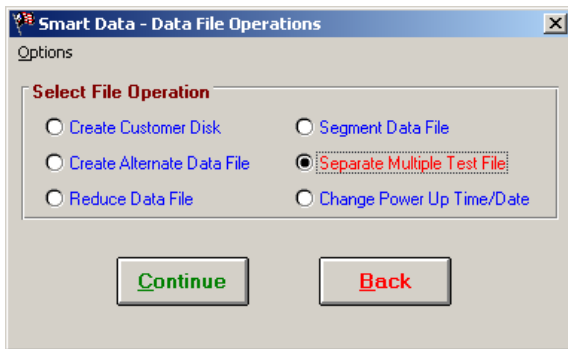
Note: This file has 9 tests. The file would be separated in 9 different files using this option

a. After clicking **Continue** (or alt + C) the following screen will appear
b. The Power Up Date/Time is requested for each test
c. Click **OK** (or alt +O) to proceed to the next screen
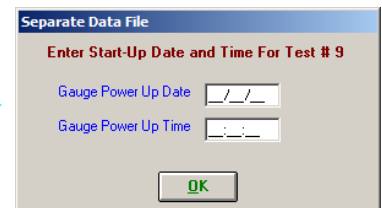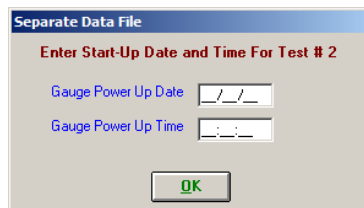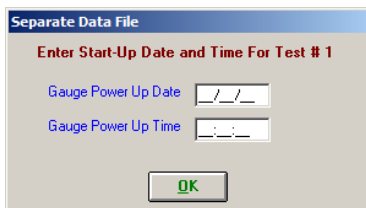
d. The following screen appears when all of the Power Up Date/Times have been entered and **OK** (or alt +O) is clicked
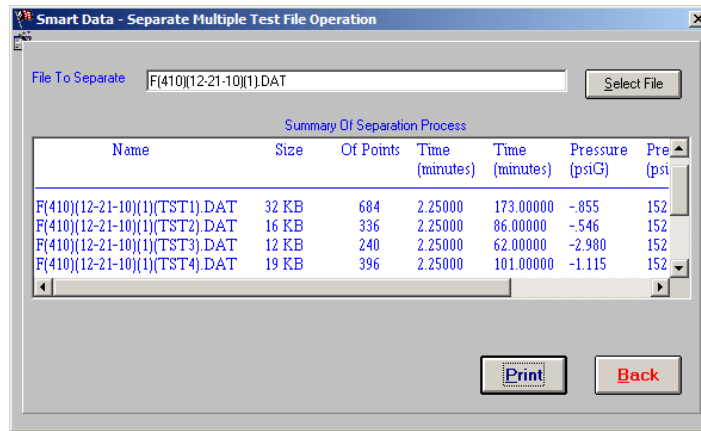
Note: In our example nine (9) files are created, each file created will have a *(TST#) indicating the test number created. These files can be used in Smart Data for graphing and reporting.

Print (or alt + P) creates a printout of the files created

Back (or alt + B) goes to the Data Operations File Screen

7.2.6 **Change Power Up Time/Date** is used to change that information in an existing data file.
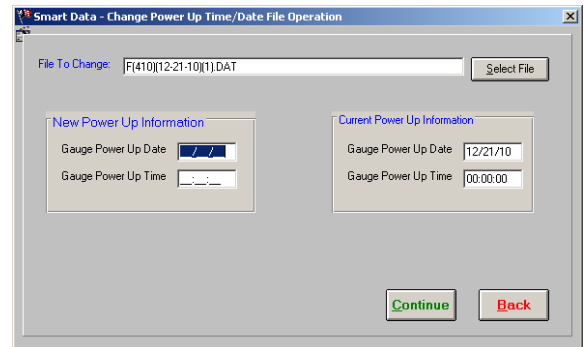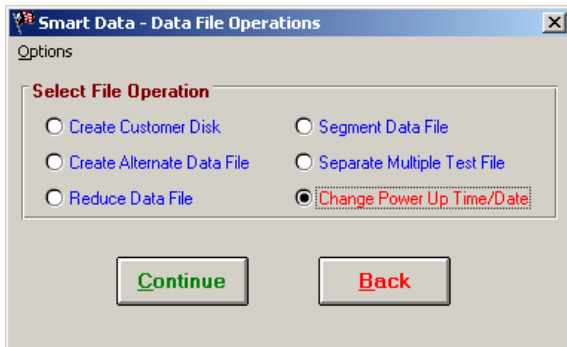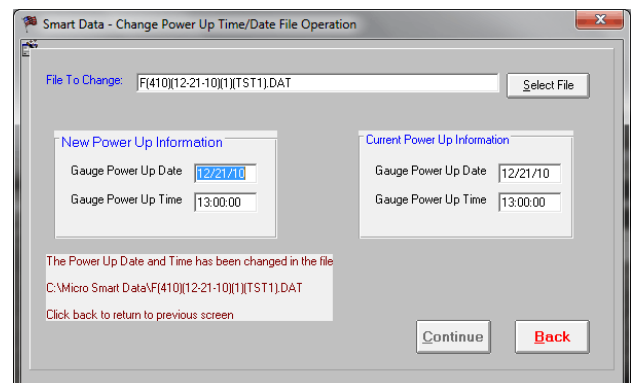

7.2.7 Select **Continue** (or alt + C) from the Data File Operations Screen after highlighting the desired function

a. **Back** (or alt + B) goes to Data File Operations Screen

7.2.8 From the Change Power UP Time/Date File Operation screen select **Continue** (or alt + C) to update the file with the new Power Up Date and Time

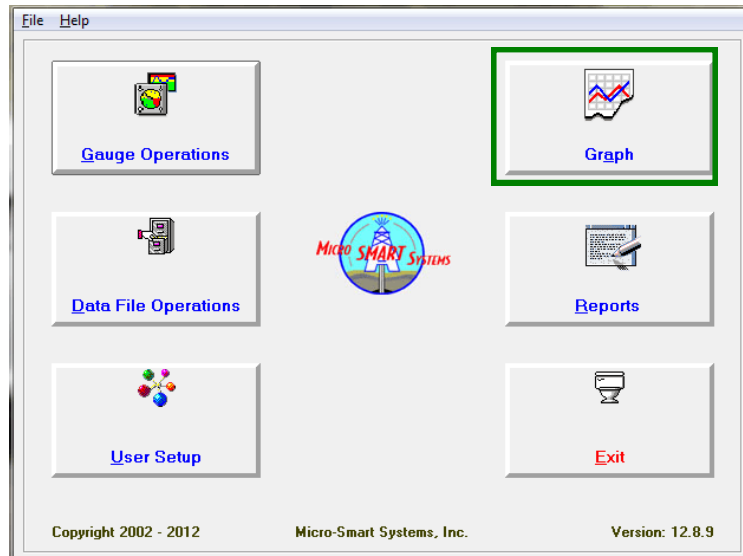a. **Back** (or alt + B) goes to Data File Operations Screen

Smart Data - Graphing

8.1 Getting to Smart Data - Graph

8.1.1 If not in Smart Data, double click the Smart Data icon on the desktop of your computer.

8.1.2 Smart data navigation window appears.

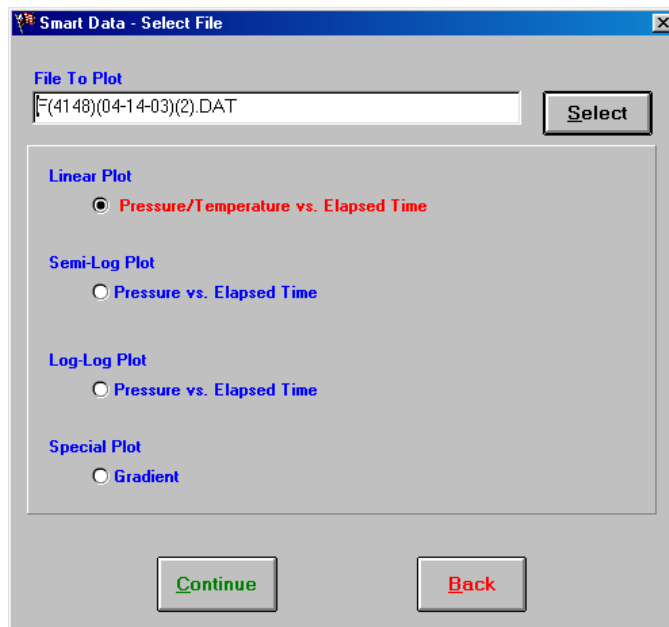8.1.3 Select **Graph** (or alt + A) button to graph within Smart Data

8.2 Smart Data—Select File Screen

8.2.1 **Select** (or alt + S) allows you to select a file to graph
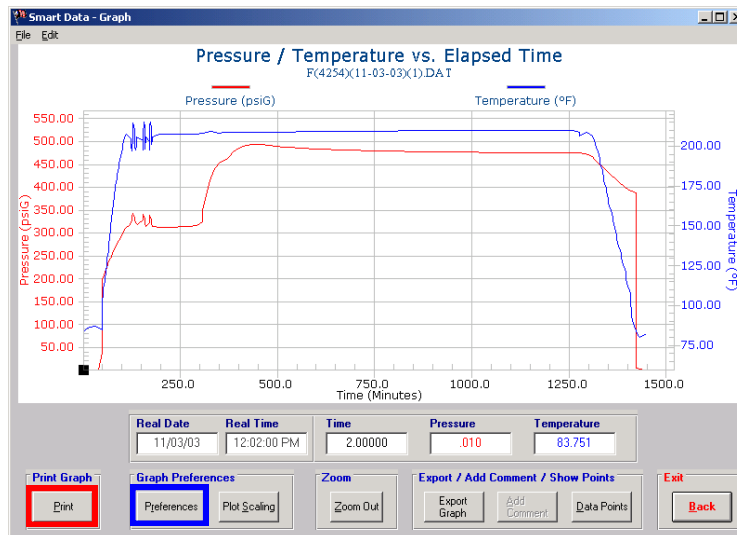
8.2.2 Select the desired plot type

    a. Linear

    b. Semi-Log

    c. Log-Log

    d. Special Plot - Gradient
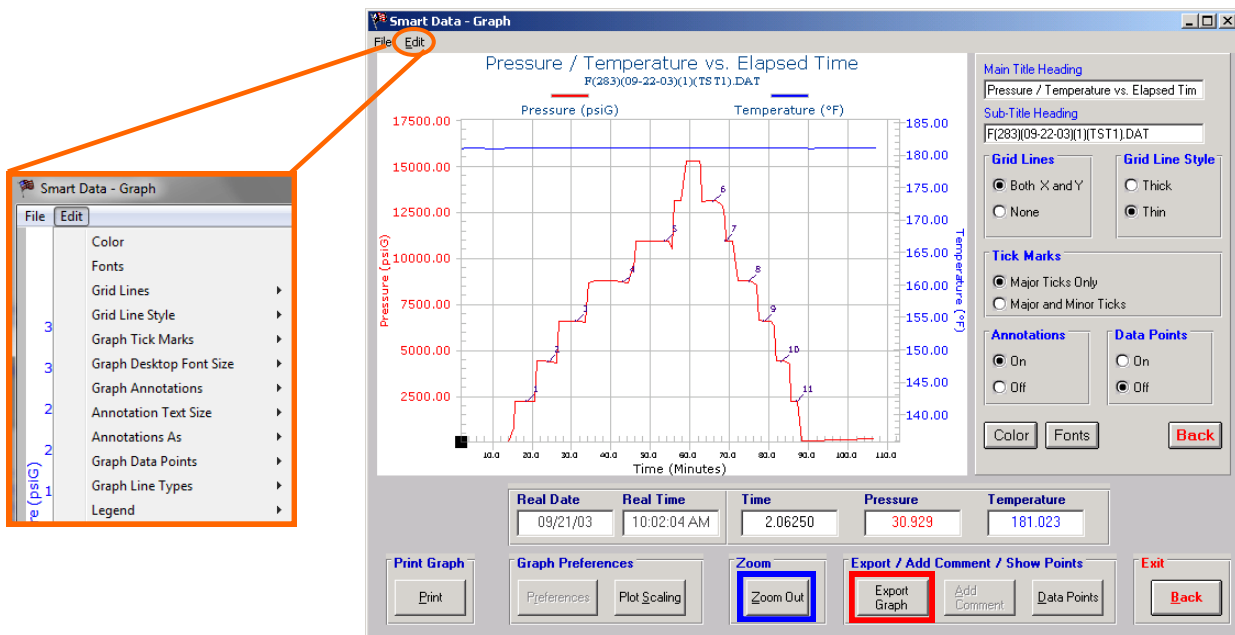
8.2.3 After choosing the file and type of plot, select **Continue** to see the graph.

8.3 Smart Data—Graph Screen

8.3.1 Select Print (or alt + P) to print the current displayed graph

8.3.2 There is also a Preference option under **Edit** (or alt + E) menu which will provide additional options for customizing your graph

8.3.3 Select **Plot Scaling** to change the X and Y scales of the plot

8.3.4 To zoom in on a portion of the graph

    a. Place the cursor on a point above the curve

    b. Click and hold the left mouse button. A circle with a slash through it will appear.

    c. Drag the cursor. The circle icon will become a magnifying glass.

    d. Release the mouse button when you have completed the selection

    e. The new graph will appear.

8.3.5 Select **Zoom Out** (or alt + Z) to return to the original graph.

8.3.6 Select **Export Graph** to save the graphic image as a *.bmp, *.jpg, or *.wmf file.

8.3.7 Adding comments to the graph or selecting gradient stops

    a. Move the cursor over the Pressure line.

    b. A hand with a pointing finger will indicate the cursor is on a valid data point

    c. Select the point with a left mouse click. The point can then be moved with the left or right arrow keys.

Note: More on Comments can be found on the next page

Smart Data - Data Tag Input Screen			
■	Data Point Information		
	■	Tag # :	The number of the comment (annotation) chosen. Tag # will increase by one (1) as each comment is added to the graph
	■	Data Point Information :	Time, Pressure and Temperature for the point chosen
■	Comment - Description or Important information about point chosen		
■	Type of Stop		
	■	NO Gradient Stop - general comment, not a gradient stop	
	■	RIH Gradient Stop - Run In Hole Gradient Stop	
	■	POOH Gradient Stop - Pull Out Of Hole Gradient Stop	
■	Condition of well at stop - Flowing or Static		
■	TVD - True Vertical Depth—Value is used to calculate the gradient		
■	WLM - Wireline Measurement		
■	MPP - Mid Point of Perforations - Put zero (0) if not necessary to extrapolate to MPP		
■	Grid of Comments and comment related information		
■	Depth Comment Button - Automatically creates depth comment after input of RIH/POOH Gradient Stop, Flowing/Static and TVD value		
■	Save Button - saves the comment and comment information entered		
■	Back Button - Returns to the graph screen but does NOT save the comment information		

Smart Data - Report Setup

9.1 Select **Reports** from the Main Screen
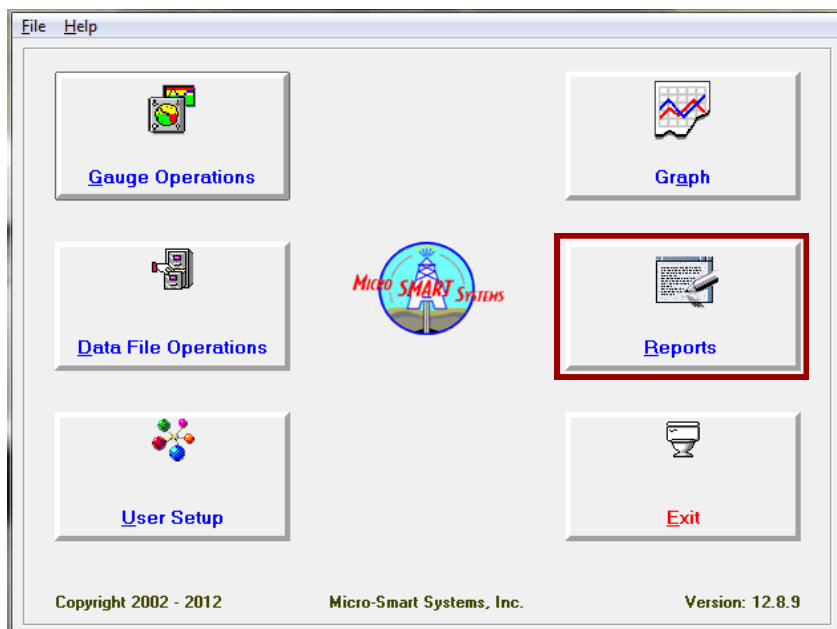
9.2 From **Report** Setup select **Select File** to retrieve the data file to report. Data File defaults from the last *.DAT file created.
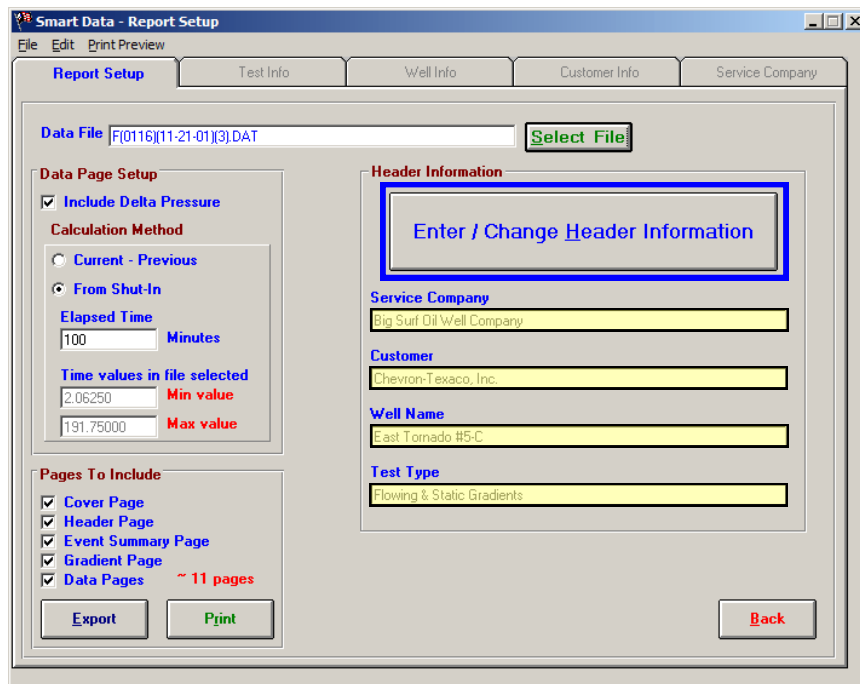
9.3 To enter specific report information Left click **Enter/Change Report Header information** button (alt + H) **.**

Note: Critical data required to print a report section is highlighted in red. They are highlighted in yellow on the Report Setup screen

a. Screens will toggle from right to left. Enter the pertinent data in the fields on the screen

b. The File Cabinet can be used to load saved information or to save for future selection.

c. Click **Continue** (alt + C) to proceed to the next screen or **Back** (alt + B) returns to the previous screen

d. **Clear**   (alt + R) clears the form to start over

9.4 File (alt + F) - Exits out of the Report Setup Window
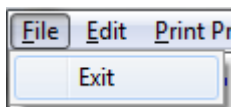
9.5 Edit (alt + E) - Goes to the graph screen to allow the user to add or edit Comments on the graph
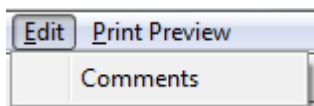
9.6 Print Preview (alt + P) - Allows user to preview pages prior to creating the report.
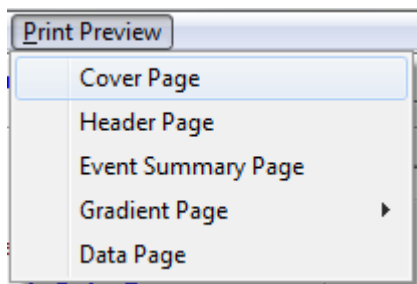
Note: The screens can be printed from Print Preview Screen

Menu options could be less if Cover Page, Header Page and Event Summary Page and Gradient Page are not present

9.7 Data Page Setup - Check Include Delta Pressure if
     there is a preference is to have the Delta Pressures
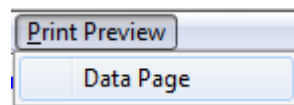   show on data pages

9.8 Delta Pressure can be calculated two ways
     a. Using the Current Value as a base point
     b. Using the Shut-In Value as a base point

     Note: Gradient Values use the value in the TVD field
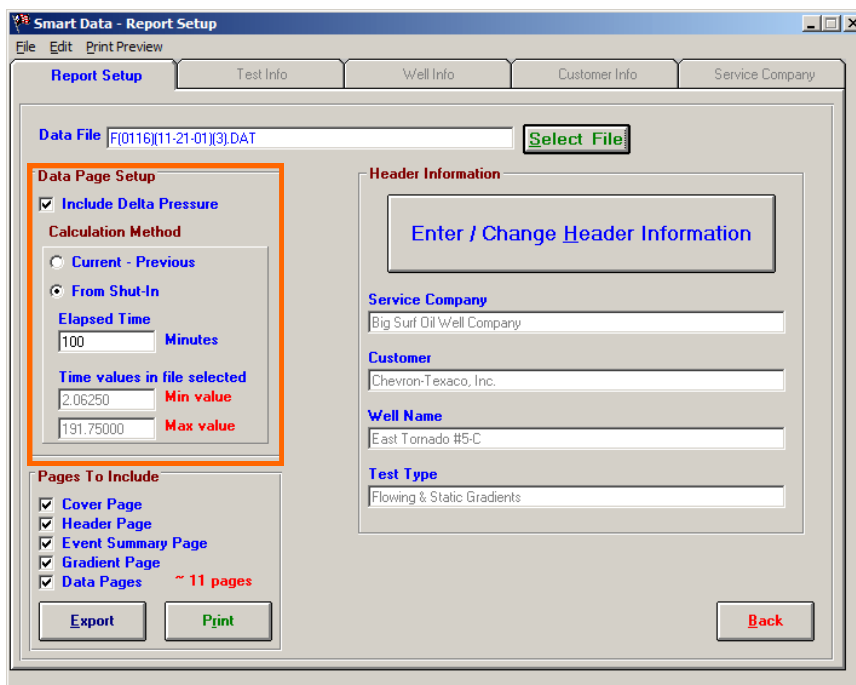
9.9 Select **Export** (alt + E) to export the entire report in *.pdf, *.doc or other file types.

9.10 To print all of the pages in each selected section, select **Print** (alt + R) .

     Note: Each page will be saved as a separate *.pdf file. The files will have to be combined in order to
     create one (1) pdf report.

     If there is RIH and POOH gradient information, the default file name for these *.pdf files is the same.
     Please save the information with RIH gradient information first, followed by POOH information,
     naming each accordingly.

½" - 13 UN Thread Pin Looking Up

1¼"

8½"

17"

Amerada Pin Looking Up

1¾"

9"

17¾"
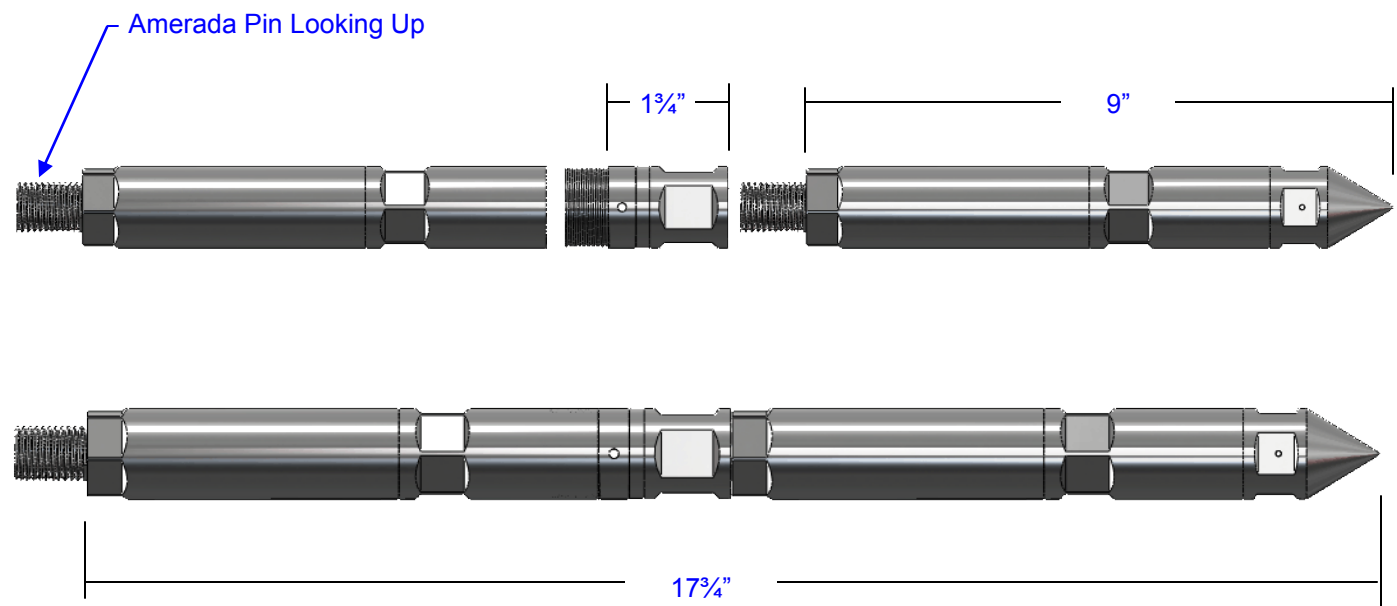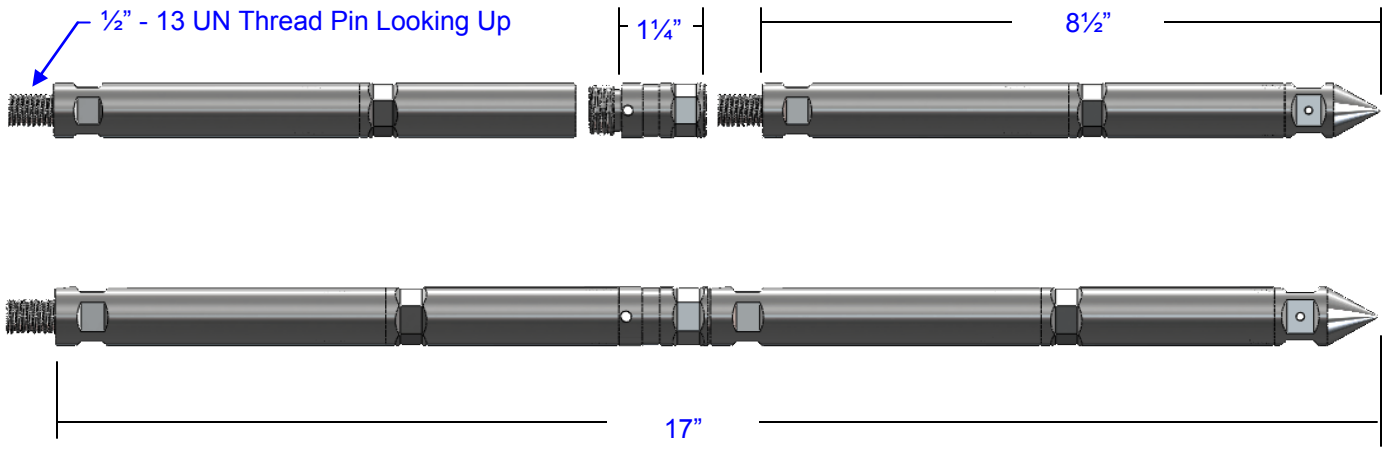
Appendix A

LITHIUM BATTERIES

DE-PASSIVATING AND PREPARING BATTERIES

Note: Lithium Batteries will "passivate". Passivation is a natural barrier that is formed over time by the charge on the battery. It inhibits the flow of power from the battery. A passivated battery will not operate the tool any better than a battery that is too weak. **Test batteries prior to every run** and de-passivate as necessary.

1. Shake battery vigorously for 1-2 minutes.
2. Slight tapping on hard surface length wise could help de-passivate.
3. The battery temperature for testing should be between 70°F and 90°F.
    a. If the battery is colder (<60°F), the battery must be warmed up
        before testing.
    b. When outdoor temperatures are cold, keep the batteries in
        a warm location overnight, if possible.

BATTERY TESTING – TWO MANDATORY TESTS

1. **The battery must be tested under load prior to any lab or downhole test**

2. Observe the voltage. The measured voltage should be brought up to a minimum of 3.5 volts
    before use.

Important Notes:

I. If the battery is tested at room temperature under load and the voltage immediately jumps up
     to 3.9 volts, the battery may not be properly loaded.

II. Batteries that are tested under load, after being removed from downhole and are still hot,
      may measure about 3.9 VDC

III. Lithium batteries that have been used in previous downhole runs may respond differently
     from new batteries. It is often more difficult to de-passivate or bring up a used battery's
     voltage to the minimum voltage required.

        i. Repeated shaking and load testing may be necessary to prepare used batteries
        ii. Temperature cycling of the batteries, by using them downhole, appears to change the
            behavior and life of the battery. They may be reused if the minimum voltage is above
             3.5 volts

Appendix B

Lithium Battery Safety

1. When shipping, lithium batteries are generally considered as hazardous goods.
   a. Follow all recommended company policies and government regulations when shipping.

2. **Do Not** short lithium batteries. They may generate internal heat, build pressure and rupture.

3. **Do Not** immerse lithium batteries in water. The effect is a short circuit with same results as #2 above.

4. **Do Not** greatly over-temperature lithium batteries. They may generate internal pressure and rupture.

5. **Do Not** dispose of lithium batteries in a fire.

6. **Do Not** strike the battery in any manner in an attempt to crush, destroy or open the cell.

7. **Do Not** attempt to recharge lithium batteries.

8. Dispose of depleted lithium batteries according to company policy and government regulations. It is illegal to dispose of these lithium batteries in landfills. They must be treated as hazardous waste. They must be neutralized and disposed of by professional disposal companies.

9. Should lithium batteries leak, the liquid and the vapors are hazardous.

   a. Protection and clean up should conform to hazardous spills guidelines.
   b. Do not inhale the lithium vapors or touch the liquid.
   c. The liquid can be neutralized with common baking soda.

10. In event of fire, use only Class 'D' or "Lith-X" fire extinguishers.

APPENDIX C

Installing Smart USB Drivers

Installing the USB drivers for either the USB to Serial Converter or for the USB Cableface on Vista and/or Windows 7
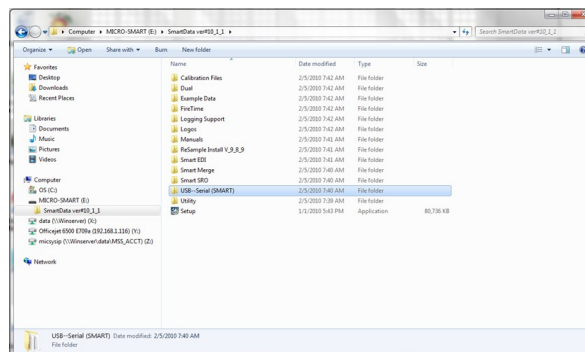
1. Make sure the Micro-Smart Smart Flash Drive is in one of the USD ports on your computer.

2. Once this is done, go to Windows Explorer to access the Flash Drive

   a. This can be done by Right Clicking on the Windows Sign in the bottom left hand corner of the screen.

   b. Choose the "Open Windows Explore" option
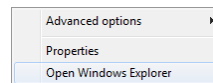
   c. Scroll down to the drive that contains "MICRO_SMART" (usually "D" or "E" drive)


3. Insert the Smart USB-Serial or USB Cableface into one of the USB ports on the computer you are using

4. The computer should recognize that a thumb drive (USB drive) was inserted into one of the USB ports on the computer (Step 1), if not the drivers will have to be installed manually (Step 2)

   a. The computer will start a wizard for installing the drivers
      1. The drivers are located on the USB-Serial Folder on the Smart Data CD or the Smart Flash drive
      2. The wizard should allow for pointing to this folder to obtain the drivers
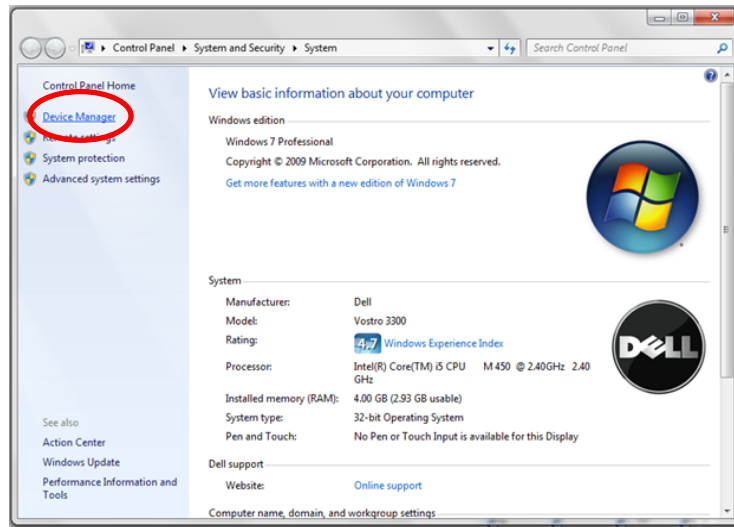
   b. The drivers will have to be manually installed

1. Left click on Windows Icon in the bottom lefthand corner of the screen.

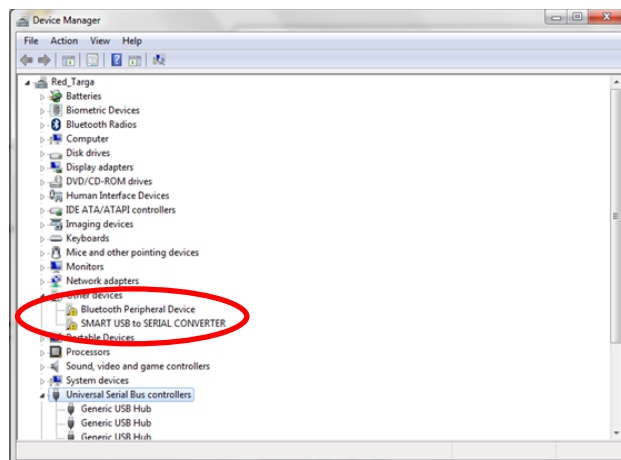 2. Right Click on "My Computer" or "Computer"
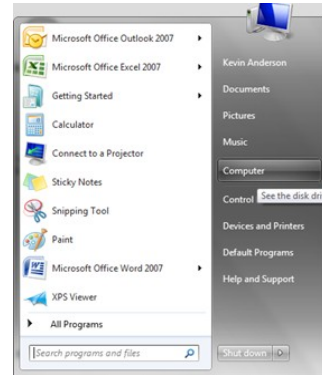
3. After Right Clicking, Left Click "Properties"
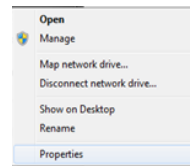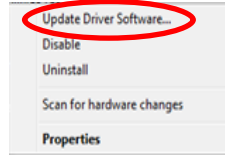
4. Choose Device Manager

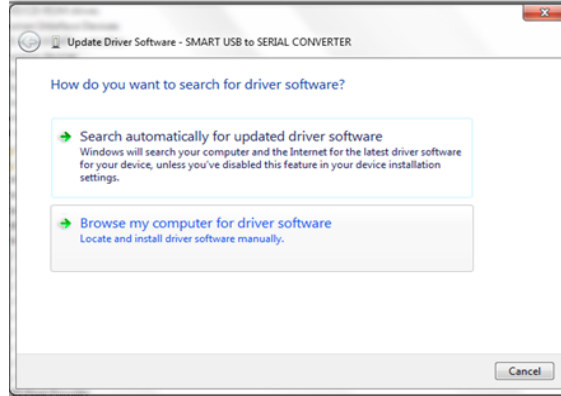5. Windows will highlight drivers that were not installed.

6. Right Click on Smart to USB SERIAL CONVERTER

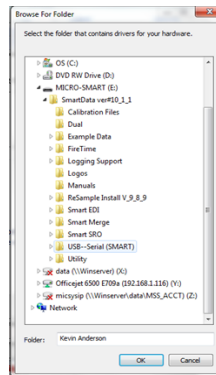7. Choose Update Driver Software
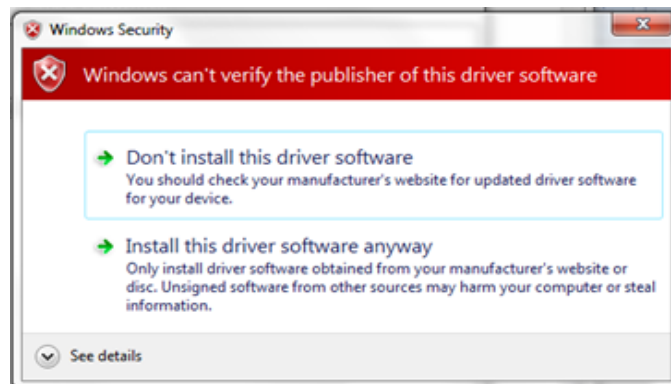

8. Choose Browse Computer for driver software

9. Left click on the Browse option

10. Choose the drive that contains MICRO_SMART\USB-Serial (SMART) Folder
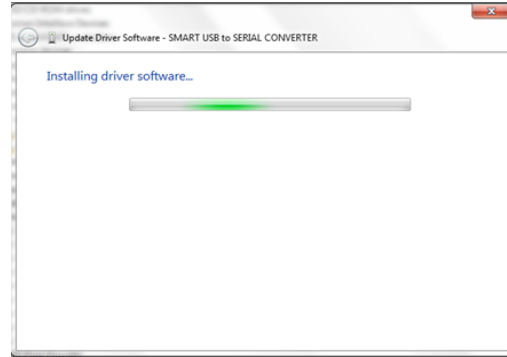

11. Left Click "OK"

12. If you get the window below choose Install this driver software anyway
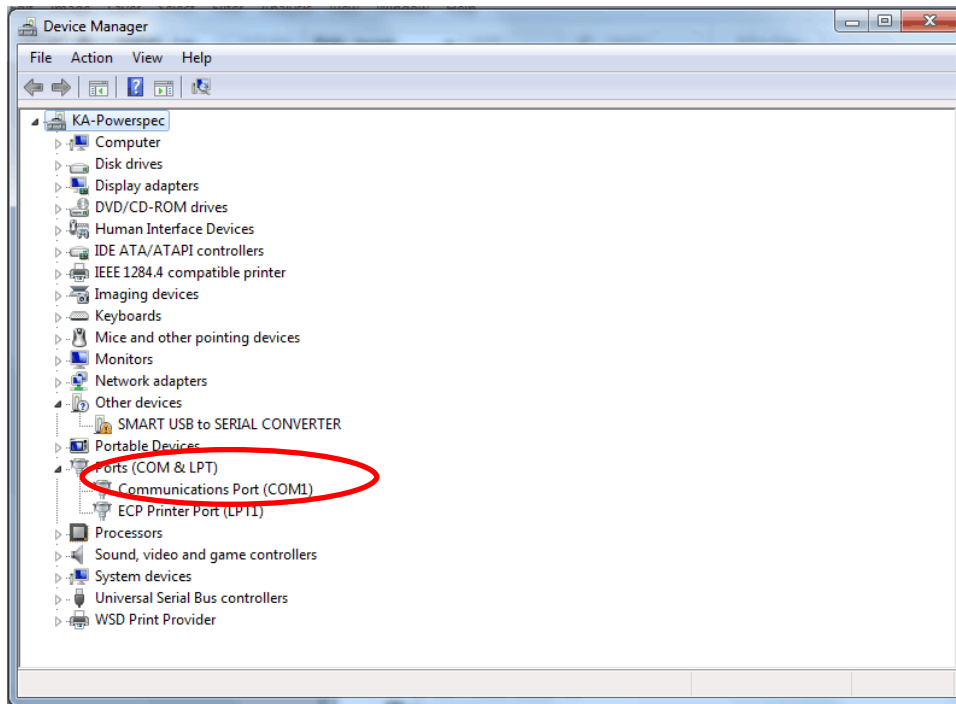
13. Windows will install the driver

14. The driver should be successfully installed

15. Two drivers need to be loaded (one for the USB driver and one for the Serial Driver), so the process will start again. If the process does not start automatically, you will need to install the second driver.

   a. Expand "Other Devices" (This will show you the device that was not previously installed because the operating system could not locate the driver.
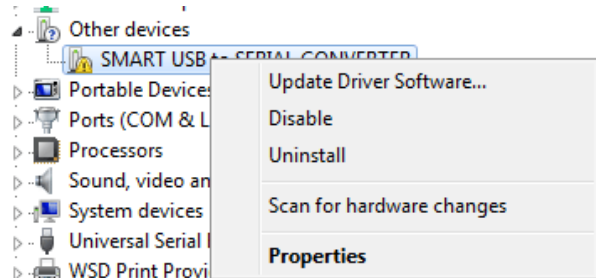
   b. Left Click the "Update Driver/Software…." Option

   c. Repeat Steps from 8 through 14

Note: Computer might prompt if you're sure you want to install the drivers.

16. After the second driver is loaded verify the communications port (Com Port) in Device Manager (Com#). This will be needed in Smart Data under User Setup. Please note that our software cannot use communication ports (com ports) higher than 14. If the comport assigned by the computer is higher than com port 14, we recommend you change it to com port 5 or some other number less than 15.

　　　　To get back to Device Manager
　　　a. Left Click on the Windows Start Button
　　　b. Right Click on the Computer Option
　　　c. Left Click on "Properties"
　　　d. Left Click Device Manager
　　　e. Expand the Ports (COM & LPT1) Option
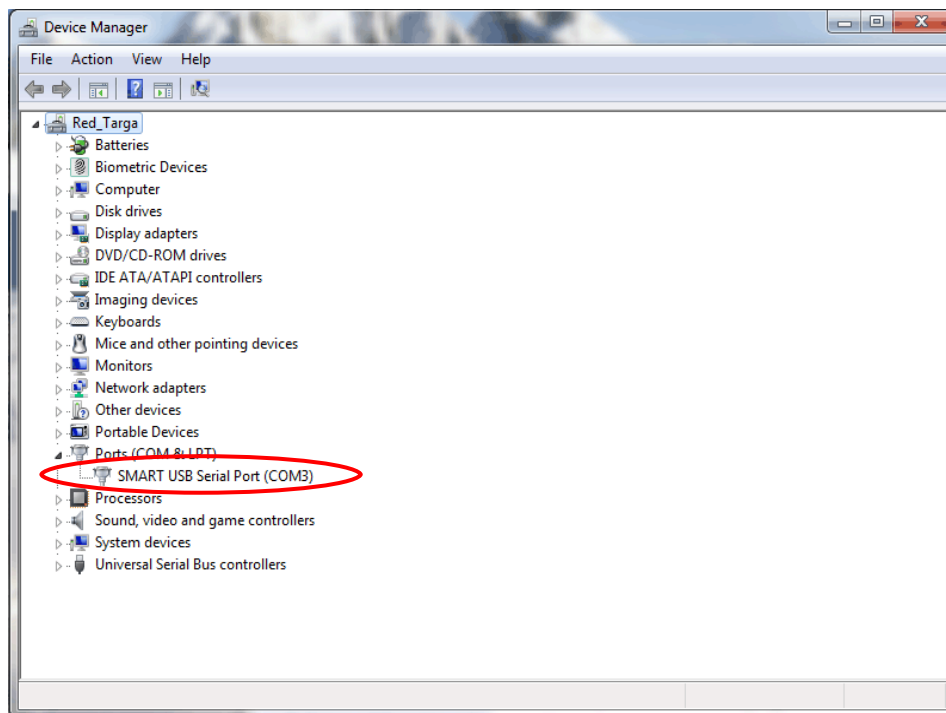
Note: Our Communications Port is COM 3 in our example

Appendix D

Uninstalling Smart USB Drivers

To UnInstall Smart USB Drivers :

1) Plug the Smart USB cable into USB port on computer.
2) Click the Start button, go to Settings \ Control Panel \ System \ Hardware \ Device Manager.

   (On some older versions of Windows, the Device Manager may be a Tab on the System window)

   a) In Device Manager, perform the following steps

      i. Click on the '+' or ▶ next to "Ports" to display the ports installed

      ii. Right click on the SMART USB Serial Port and choose Uninstall or Remove. The Smart USB Serial Port should no longer appear in the list.
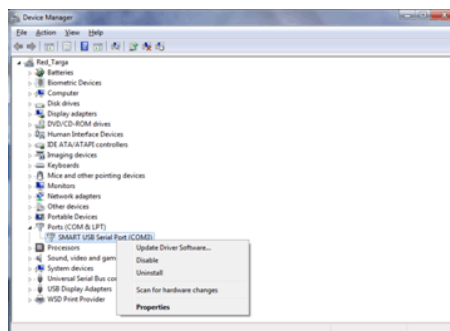
      iii. Click on the '+' next to "Universal Serial Bus Controllers" to display the installed devices

      iv. Right click on Smart USB Serial Converter and choose Uninstall or Remove.
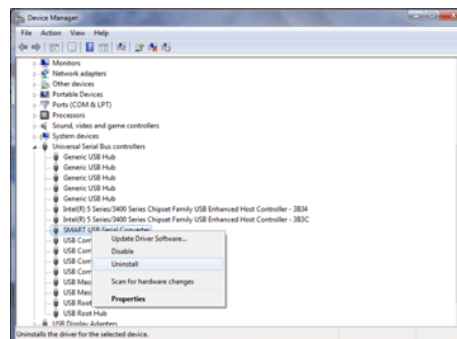
      v. Smart USB Serial Converter should no longer appear in the list.

   Note: If the drivers were not installed properly, the device may appear in Device Manager under Other Devices or Unknown Devices

3) In the Start menu go to Settings \ Control Panel \ Add or Remove Programs
4) In Add or Remove Programs select "Micro-Smart USB-to-Serial Converter Drivers"
5) Click Remove or Uninstall
6) Follow instructions to uninstall (it will tell you to disconnect device)
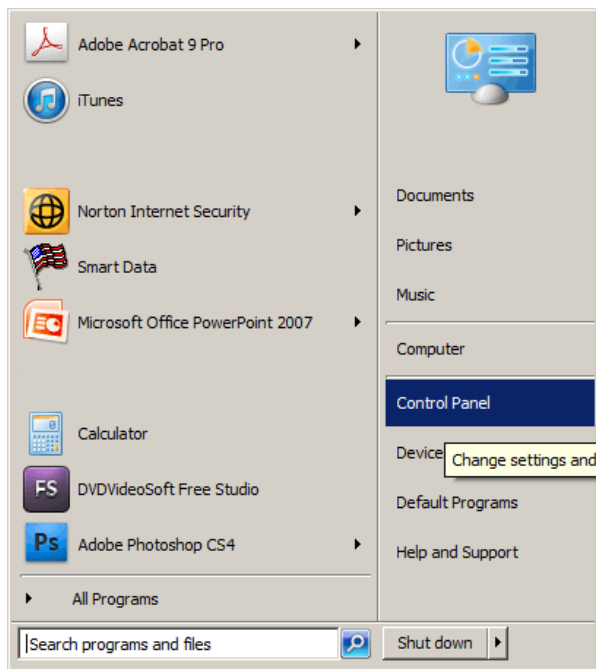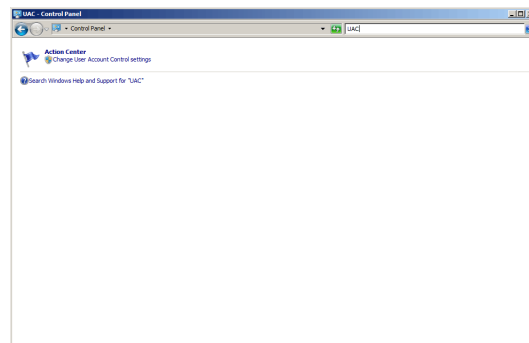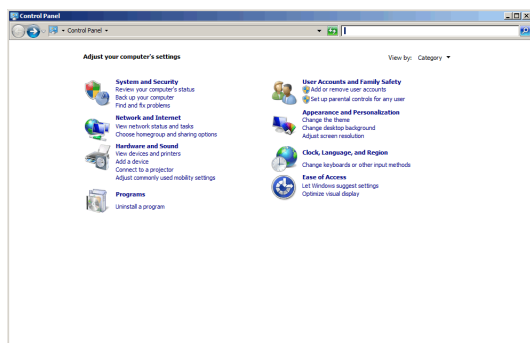7) Reboot computer

APPENDIX E

Turning off User Access Control (UAC)

1. Left click the Start Button or Windows Icon in the bottom lefthand portion of the screen
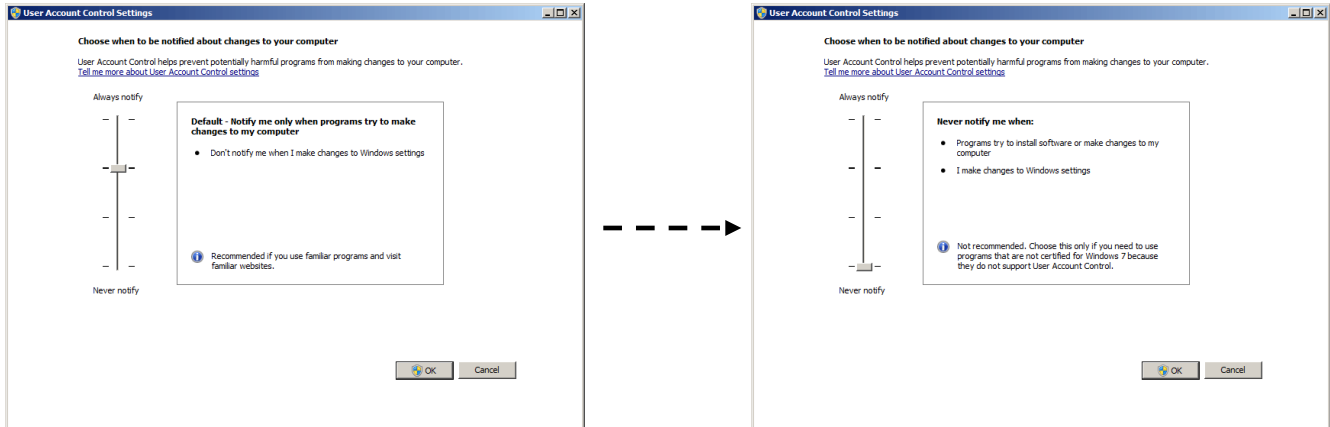
2. Select Control Panel

3. The following window displays. Type "UAC" in the search window in the top righthand portion of the window. Choose change User Account Settings

4. Left click "Action Center"

5. Slide the slider down to "Never Notify". After slider is placed on "Never Notify" left click on "OK". A reboot may be required.

6. Use the UAC at this level when installing Smart Data. This setting can be changed to the original setting after the installation of Smart Data