FLUKE®

Calibration

WinPrompt®

Calibration Software

Users Manual

PN 3952236
November 2010

Fluke Corporation

BY USING THIS SOFTWARE PRODUCT IN ANY MANNER, YOU ARE AGREEING TO ACCEPT THE FOLLOWING TERMS AND CONDITIONS.

Fluke Corporation (Fluke) grants you a non-exclusive right to use WinPrompt® Calibration Software (Product) on a single PC or workstation (node), or on multiple nodes, provided that a multi-use license is obtained from Fluke and the number of nodes does not exceed the number of nodes for which license fees are paid. This grant of license does not include the right to copy, modify, rent, lease, sell, transfer or distribute the Product or any portion thereof. You may not reverse engineer, decompile, or disassemble the Product.

Fluke warrants that the Product will perform in its intended environment substantially in accordance with the accompanying written materials for a period of 90 days from the date of license acceptance. Fluke does not warrant any downloading errors or that the Product will be error free or operate without interruption.

FLUKE DISCLAIMS ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE SOFTWARE AND THE ACCOMPANYING WRITTEN MATERIALS. In no event shall Fluke be liable for any damages whatsoever (including, without limitation, indirect, consequential, or incidental damages, damages for loss of business profits, business interruption, loss of business information, or other pecuniary loss) arising out of the use of or inability to use this Product, even if Fluke has been advised of the possibility of such damages.

Table of Contents

List of Tables

List of Figures

Chapter 1
Installation & Setup

Installation & Setup

WinPrompt® provides simplicity and efficiency combined with accuracy and consistency in pressure generation and measurement using a deadweight gauge. It automatically converts pressure to mass and mass to pressure while correcting for piston temperature, head height, absolute and gauge references, local gravity, and air density. WinPrompt® can be operated from a single window for industrial use or from additional detailed windows available for the metrologist.

Features

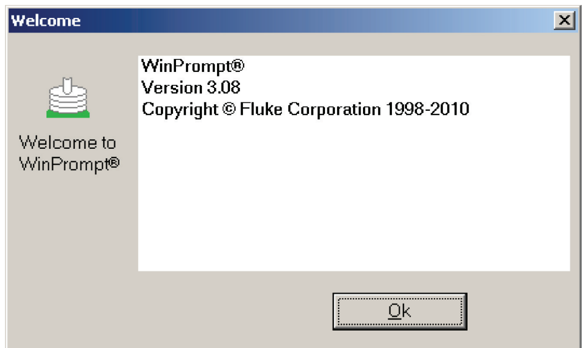
- Stores calibration coefficients for working standards including piston/cylinder effective area, thermal coefficient of expansion, pressure deformation coefficients, and all calibrated mass values and associated density. It also stores all of the critical system and environmental parameters including local gravity, head corrections, and air density.
- Performs all necessary calculations of pressure-to-mass and mass-to-pressure in both S.I. and English units.
- Computes the buoyant effect of the ambient air on the piston gauge masses and compensates accordingly.
- Creates calibration procedures for performing repetitive type calibrations. Procedures include sequence of pressure values, pressure reference, corrections, and window sizes and locations.
- Captures and saves information for direct import into Microsoft Word, Microsoft Excel, and other DDE-enabled applications for custom reports. Saves all information captured during the calibration for review and re-printing of calibration reports.
- Additionally, WinPrompt® supports several interfaces to Ruska deadweight gauges that can provide:
  - Direct acquisition of float position, sink rate, piston temperature, vacuum, ambient temperature, barometric pressure, and humidity with continuous correction of calculated pressure.
  - Real-time graphing of acquired values.
  - Auto-float control of deadweight gauge.

Installing WinPrompt® Calibration Software

1. Insert the WinPrompt® CD ROM into the disk drive. If installation does not start automatically, click **Start→Run** and type **D:\setup**, where D is replaced by the drive letter of your CD ROM.
2. Follow instructions on the screen for installing the software.
3. After installation WinPrompt® can be started by clicking Start→Programs→Fluke→WinPrompt®

Running WinPrompt® for the First Time

WinPrompt® will display the Welcome screen the first time it is run.



gma01.bmp

Figure 1-1. Welcome Screen

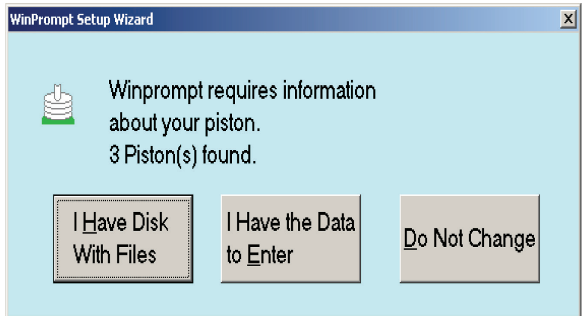
Click **OK** and the WinPrompt® Start menu will appear.

gma02.bmp

Figure 1-2. WinPrompt® Start Screen

If a WinPrompt® supported hardware interface will be used, connect it to the computer and turn it on before starting the **Setup Wizard** (see Appendix D for installing USB drivers). Then click Setup Wizard. It can also be run from the menu by clicking **Help→Wizard** at any time. Follow the onscreen instructions to find hardware interfaces and configure WinPrompt® to use them.

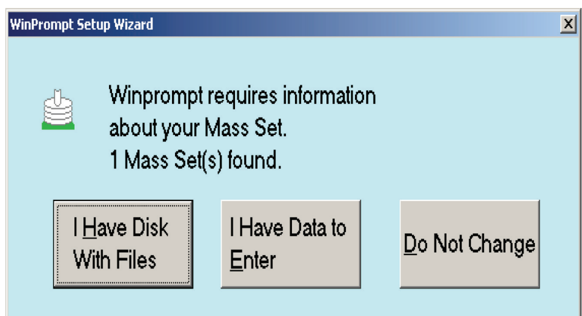
After configuring attached interfaces, the Setup Wizard will check for installed pistons and display the number of pistons found. WinPrompt® will not function without at least one piston installed. The Setup Wizard will prompt for the location of the piston files or for the piston information based on the button clicked. Click **Do Not Change** to skip if pistons are already installed or to enter the information later.



gma03.bmp

Figure 1-3. WinPrompt® Setup Wizard Screen - Piston

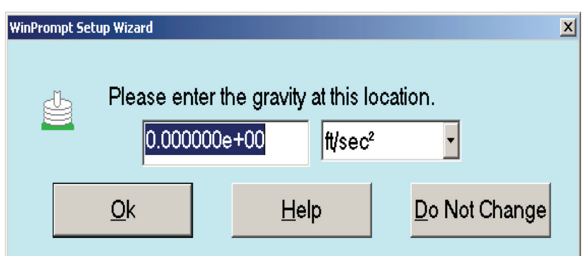
WinPrompt® will also check for installed mass sets. The Setup Wizard will display the number of mass sets found. WinPrompt® will not function without at least one mass set installed. The Setup Wizard will prompt for the location of the mass set files or for the mass set information based on the button clicked. Click **Do Not Change** to skip if mass sets are already installed or to enter the information later.



gma04.bmp

Figure 1-4. WinPrompt® Setup Wizard Screen - Mass Set

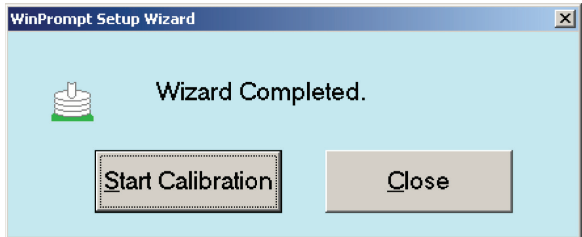
WinPrompt® needs to know the local gravity. WinPrompt® includes an approximation for gravity based on latitude and elevation but use of this formula is not recommended. Change the units using the arrow button before entering the value. Click **Ok** when complete.



gma05.bmp

Figure 1-5. WinPrompt® Setup Wizard Screen - Gravity

After the gravity is entered the Setup Wizard is complete. Click **Start Calibration** to close the Setup Wizard and open the Single Point Window to start a calibration. Click **Close** to just close the Setup Wizard.



gma06.bmp

Figure 1-6. WinPrompt® Setup Wizard Screen - Complete

Chapter 2
Getting Started

Overview

WinPrompt® has a Single Point Window with all the features many users will need. Advanced users may have to open additional windows to add to the Single Point Window functionality. Cross floating cannot be done with the Single Point Window and requires the use of the advanced windows.

New users to WinPrompt® are recommended to start with the Single Point Window unless cross floating is required. If a piston and a mass set file were not provided with the deadweight gauge, they must be created before using the Single Point Window. Refer to Enter Piston/Cylinder Information and Enter Mass Set Information under Advanced WinPrompt® Use then follow the Single Point Window instructions.

How to Contact Fluke

To order accessories, receive operating assistance, or get the location of the nearest Fluke distributor or Service Center, call:

- Technical Support USA: 1-800-99-FLUKE (1-800-993-5853)
- Calibration/Repair USA: 1-888-99-FLUKE (1-888-993-5853)
- Canada: 1-800-36-FLUKE (1-800-363-5853)
- Europe: +31-402-675-200
- China: +86-400-810-3435
- Japan: +81-3-3434-0181
- Singapore: +65-738-5655
- Anywhere in the world: +1-425-446-5500

Or, visit Fluke's website at www.fluke.com.

To register your product, visit http://register.fluke.com.

To view, print, or download the latest manual supplement, visit http://us.fluke.com/usen/support/manuals.

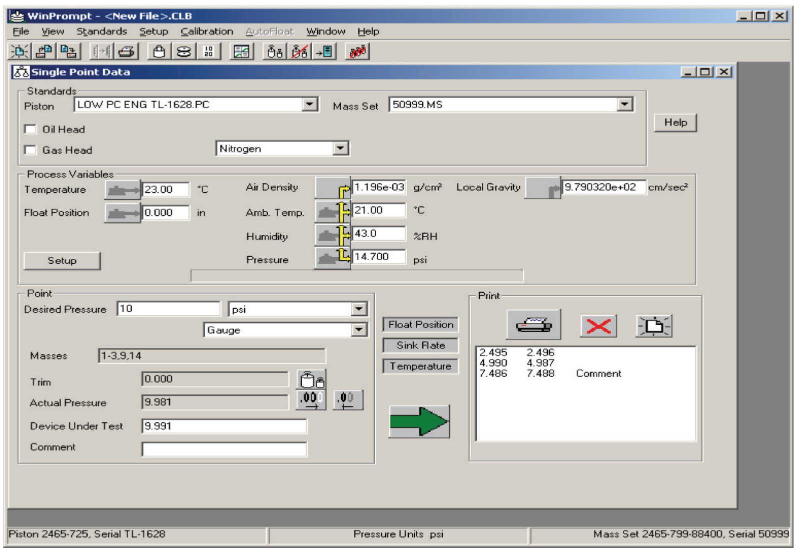
Select WinPrompt® Display Units

1. From the menu select Setup→Units.
2. Select Set SI Units to configure WinPrompt® to display units in the International System of Units, or Set Default Units to configure WinPrompt® to display other default units. In either setting, individual WinPrompt® units can be changed to other options shown for each parameter. These changes will remain effective until changed by the user or by loading a *.PRC or *.CLB file.
3. Click **Ok**.

Single Point Window

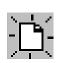
To perform a calibration using the Single Point Data window follow these steps:

1. If the Single Point Window is not already visible, from the menu select **View→Single Point Window**.



gma07.bmp

Figure 2-1. Single Point Data Window

2. Click Clear All Points  to clear the previous calibration. These points will be deleted. Save the file before clearing, if the points are needed.
3. Select your Piston and Mass Set. Click the arrow next to the box to show a list of available pistons and mass sets. The **Piston** and **Mass Set** boxes are loaded with the available *.PC and *.MS files located in the WinPrompt® directory. The pistons and mass sets used will be listed on the Calibration report.

   If the dropdown boxes are empty, then no piston and mass sets have been found in the WinPrompt® directory.
4. Select optional Head corrections.

Oil Head	Check this box to enable oil head correction and show entry boxes.
0.000 in	Enter the distance between the reference plane of the standard and the reference plane of the Device Under Test.
Spinestic 22	Select the oil used in the system.
0.00 in/in³	If <Other> is selected, enter the density of the oil used.

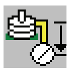
Gas Head Check this box to enable gas head correction and show entry boxes.

0.000 in Enter the distance between the reference plane of the standard and the reference plane of the Device Under Test.

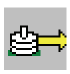
Nitrogen Select the gas used in the system. If a listed gas is used, the density will be corrected for pressure.

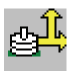
0.00 in/in^3 If <Other> is selected, enter the density of the gas used. The density will not be corrected for pressure

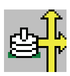
 The Device Under Test is higher than the standard.

 The Device Under Test is lower than the standard.

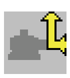
5. Enter or verify process variables. If the background is yellow, the value is out of range. Click **Setup** to choose which fields are displayed in this area. Fields required by the data acquisition settings may be shown even if turned off here. Values with colored backgrounds are outside the normal operating range. See **Setup→Limits**.

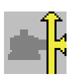
 Read this value directly from the hardware (Driver required).

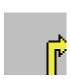
 Read this value directly from the hardware. Provide value to the field above.

 Read this value directly from the hardware. This value and ones below it are provided to the field above.

 This value must be entered manually.

 This value must be entered manually. Provide value to the field above.

 This value must be entered manually. This value and ones below it are provided to the field above.

 Compute this field from the fields below.

 This value must be entered manually.

6. Set the pressure units and reference. Then enter the desired pressure. The Masses and Trim will be updated for the entered pressure.

Gauge Pressure is referenced to atmosphere. Atmospheric pressure is defined as zero. A vacuum is a negative pressure.

Absolute with Vacuum Ref. Pressure is referenced to vacuum. Absolute vacuum is defined as zero. Atmospheric pressure is a positive value.

Absolute with Barometric Ref. Pressure is generated with the deadweight gauge in Gauge mode (referenced to atmospheric pressure). The pressure generated is corrected to reference vacuum using a Barometric reference sensor. The uncertainty of the barometric sensor must be included in the generated pressure uncertainty.

Very Low Gauge Pressure is generated with the deadweight gauge in Absolute mode (referenced to vacuum). The pressure generated is corrected to reference atmosphere using a Barometric reference sensor. The uncertainty of the barometric sensor must be included in the generated pressure uncertainty.

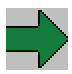
7. Load the masses and trim indicated onto the deadweight gauge. Shows the required masses to generate the entered pressure. If no masses are shown or the field requests all masses be loaded, check piston and mass set selected and gravity value.

    Turns on and off the trim calculation. The trim resolution can be set in Setup Units.

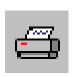
8. Wait for stability. If data acquisition is being used, red shows unstable while green shows stable. The pressure stability curve is adjusted by modifying the pressure at which the maximum sink rate occurs and/or the sink rate at the full scale pressure. These values are then used to derive an equation for a curve that approximates the sink rate at various pressures.

   The Max Sink Rate and the Full Scale Pressure are defined in the selected Piston File.

9. Enter Device Under Test reading and optional comment. The device under test and comment entries are displayed on the calibration report. The device under test reading is not converted when pressure units are changed.

10. Click **Accept**  to save the information associated with the current pressure point. The actual pressure, the device under test reading, and the comment will be displayed in the accepted points window. After accepting, enter the next pressure point in Desired Pressure.

11. Repeat Steps 4 through 10 for each point.

12. Click **Print**  to print a report of the accepted pressure points.

Advanced WinPrompt® Use

Once WinPrompt® has been successfully installed, the user will have to set up a number of files and configure how WinPrompt® receives information. Most of this setup is performed rather infrequently, and is typically required only when a piston or mass set is being used for the first time, when a piston or mass set has been recalibrated, or when a procedure is being established or edited. After this initial setup of the *.PC, *.MS and *.PRC files, routine operation requires only the use of the *.CLB files.

WinPrompt® uses four file types:

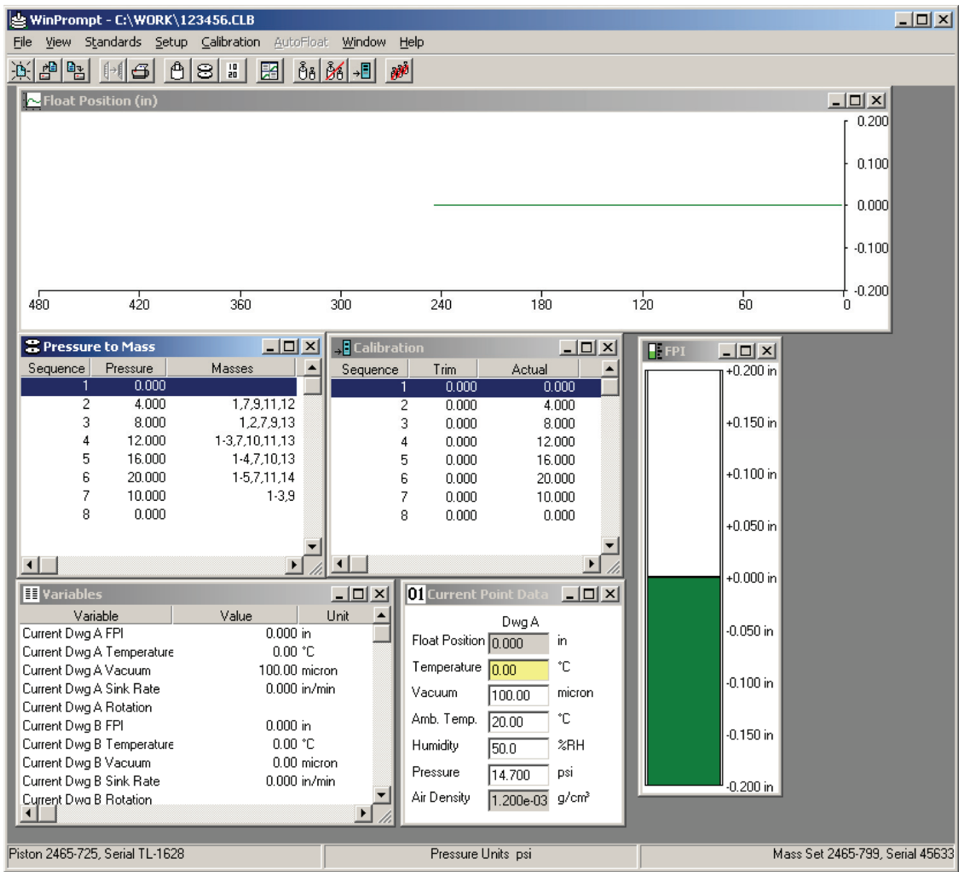
*.PC stores Piston/Cylinder (P/C) calibration coefficients;

*.MS stores Mass Set calibration coefficients;

*.PRC stores "PRoCedure" settings as a template for the *.CLB files (described below), such as data acquisition settings, view options, graph scaling, P/C and Mass selections, pressure units and sequence, and other parameters that will be constant for a given calibration procedure;

*.CLB contains the working file for a given CaLiBration. Generally, a *.CLB file is generated from a *.PRC file, which already includes P/C and Mass selection, pressure sequence, etc., for a given calibration. Once the calibration is performed, the *.CLB file becomes a permanent record of the event. Typically, a new *.CLB file is used for every calibration performed and a unique file name should be assigned accordingly file.

Advanced windows are created using the View menu. The windows can be moved by dragging the title bar or resized by dragging the borders. A typical advanced setup is shown in Figure 2-2.



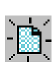
gma08.bmp

Figure 2-2. Typical Advanced Setup

Setup

Enter Piston/Cylinder Information

For each piston/cylinder assembly that has not yet been used with this installation of WinPrompt® the user must set up a *.PC file.

1. Click  or from the menu select **File→New**.
2. Select **Piston/Cylinder** and click **OK**.
3. Fill in the Piston/Cylinder header information.
4. Click **View Details**.
5. Fill in the Piston/Cylinder detail information.

Note

The value in the Apparent Mass Reference Density field must be the reference density of the Apparent Mass designation. If Apparent Mass versus Brass Standards is used, the Density value will typically be 8400 kg/m^3. If Apparent Mass versus Stainless Steel Standards is used, the Density value will typically be 8000 kg/m^3.

6. If uncertainty information is desired click **Uncertainties**, fill in the uncertainty information and click **OK**. No Uncertainty computations are performed within WinPrompt®.
7. Click **OK** for the detail information.
8. Click **OK** for the header information
9. Click **Yes** to save changes.
10. Enter the file name for the piston/cylinder. Click **OK**.
11. Piston/Cylinder File has been created.

Enter Mass Set Information

For each mass set that has not yet been used with this installation of WinPrompt®, the user must setup a *.MS file.

1. Click or from the menu select **FILE→NEW**.
2. Select **Mass Set** and click **OK**.
3. Fill in the Mass Set header information.
4. Click **VIEW DETAILS**.
5. Fill in the Mass Set detail information.

Note

The value in the Apparent Mass Reference Density field must be the reference density of the Apparent Mass designation. If Apparent Mass versus Brass Standards is used, the Density value will typically be 8400 kg/m^3. If Apparent Mass versus Stainless Steel Standards is used, the Density value will typically be 8000 kg/m^3.

Note

The Sleeve Mass Offset is a correction to the FPI Sensor when the low mass sleeve is loaded by itself, or loaded with other masses. If the mass set includes the low mass version of the sleeve weight, then this value should be set to – 0.1016 cm, otherwise it should be set to 0.0 cm.

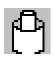
6. For each mass in the set:
   a. Click **ADD**.
   b. Fill in the mass information.
   c. Click **OK**.

Note

Enter the Apparent Mass Reference Density reported for the material the masses are made of (average density if made of more than one material) in the ***TRUE DENSITY*** *field. If any individual mass does not load directly onto the deadweight gauge, enter the value of the required mass in the* ***REQUIRES*** *field (e.g. mass number 2 typically requires the hanger mass number 1; mass number 3 may also require number 1. The* ***REQUIRES*** *field defaults to mass number 1).*

7. Click OK for the detail information.
8. Click OK for the header information.
9. Click YES to save changes.
10. Enter the file name for the mass set. Click OK.
11. Mass Set File has been created.

Create a Procedure Template

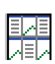
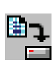
1. Click  or from the menu select **File→New**.
2. Select **Procedure** and click **OK**.
3. Click  or from the menu select **Standards→Standard Piston/Cylinder→Load**.
4. Select piston/cylinder file desired and click **Open**.
5. Click  or from the menu select **Standards→Standard Mass Set→Load.**
6. Select mass set file desired and click **Open**.
7. Select from the menu **Setup→Remote Acquisition**.
8. For each Deadweight Gauge A, Deadweight Gauge B and Ambient Variable to be received from an installed driver, set the **Remote Acquisition** field to **Data Acquisition**, otherwise, set it to constant.

   If the Air Density will be computed from the Ambient values, set the Air Density field to Formula, otherwise set it to Constant. If no value is known for the Local Gravity, set the Local Gravity field to Formula, otherwise set it to Constant.

Note

It is the user's responsibility to know the Local Gravity value. No level of uncertainty is expressed or implied in the Formula computed value within WinPrompt®, and the value may vary greatly from a certified or surveyed value.

9. Click **OK**.
10. Select from the menu **Setup→Process Variables**.
11. Enter the values for the variables that are not acquired remotely.
12. If uncertainty information is desired, click **Uncertainties**, fill in the uncertainty information and click **OK**. No Uncertainty computations are performed within WinPrompt®.
13. Click **OK** for the Process Variables.

14. Select from the menu **Setup→Reference→ Media**.
15. Enter the reference and media information and click **OK**.
    a. If the Absolute with Vacuum Ref. mode is selected, enter the Expected Vacuum, typically 100 mTorr (13.33 Pa). If the Absolute with Barometer mode is selected, enter the Expected Barometer, typically 14.7 psi (101.35 kPa), then enter the Barometer Head Height. This value is used to correct for any head pressure that may exist between the barometer and the deadweight gauge. The polarity of the value will be positive if the barometer's reference plane is higher than the float position marking the deadweight gauge.
    b. If the system includes a section filled with liquid, select the appropriate fluid in the OIL/MEDIUM field. Select other if system fluid is not listed. If other is selected, enter the density of the fluid in the density field. If the Absolute with Barometer mode is selected, enter the height of the offset between the test instrument reference plane and the marking on the deadweight gauge used to establish the proper float position. The polarity of the value will be positive if the test instrument reference plane is higher than the float position marking the deadweight gauge.
    c. If the system includes a section filled with gas, select the appropriate fluid in the GAS/MEDIUM field. Select other if system fluid is not listed. If other is selected, enter the density of the fluid in the density field. Enter the height of the offset between the test instrument reference plane and the marking on the deadweight gauge used to establish the proper float position. The polarity of this value will be positive if the test instrument reference plane is higher than the float position marking the deadweight gauge.
16. Click  or from the menu select **Calibration→Sequence**.
17. Click **Generate**.
18. Enter the full scale of the test instrument and the number of increasing and decreasing steps. Entering 10 points up will result in a pressure sequence of 10% increments of full scale.
19. Click **Generate**.
20. Click **OK** for the test sequence.
21. Click  or from the menu select **View→All**. Each window can be resized, repositioned, minimized or closed to suit the desire of the operator. These new window settings will be saved with the other procedure attributes in the *.PRC file.
22. Click  or from the menu select **File→Save As**.
23. Enter the file name for the procedure and click **Save**.
24. Procedure File has been created.

Perform a Calibration

1. Click  or from the menu select File→New.
2. Select **Calibration** and click OK.
3. Select procedure file desired and click Open.
4. From the menu, select Setup→Device Under Test. Enter the test instrument description and click OK.

5. Verify the first point is highlighted in the Pressure to Mass Window or the Calibration Window by clicking on the first point.
6. Load the masses and trim (as applicable), establish the pressure and monitor the deadweight Gauge until the system is stable.
7. Once the system is stable, click , double-click the point in the Calibration Window, or from the menu select Calibration→Accept.
8. Enter the DUT reading and click OK.
9. WinPrompt® will store the entered test instrument information and numerous other deadweight gauge parameters with each point recorded.
10. Repeat Steps 5 through 9 for each point in the pressure sequence.
11. Click  or from the menu select File→Save As.
12. Enter the file name for the calibration and click Open.
13. Click  or from the menu select File→Print to print the default calibration report.

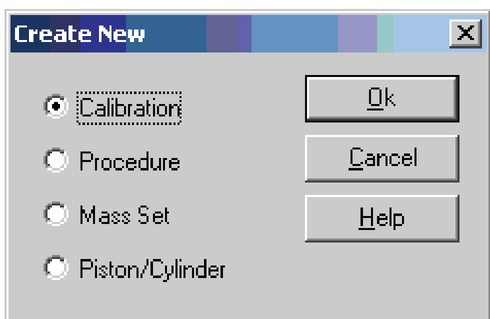
Chapter 3
File Menu

Create New File

The Create New File command brings up the Create New dialog box to select the type of file to create.

Note

Any previously open file is automatically closed. If changes to the previous file have been made and not saved, the user is prompted to save the changes.

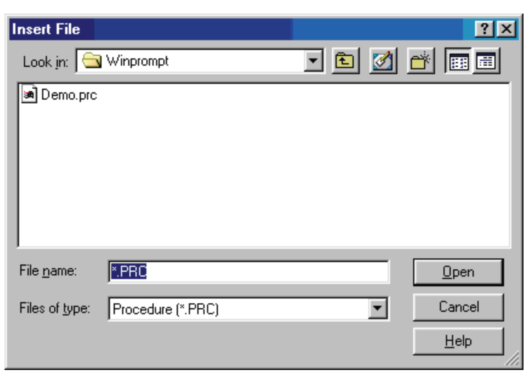


gko_007.bmp

Figure 3-1. Create New Screen

Insert File

When a new Calibration File is created, the Insert File dialog box prompts the user for a Procedure File as a template. Select a procedure template or click on **Cancel** to create the Calibration File without a template.



gko_001.bmp

Figure 3-2. Insert File Screen

Open Existing File

Opens an existing file for viewing or editing. The default is to list calibration files. Use the **Files of Type** box to list other file types.

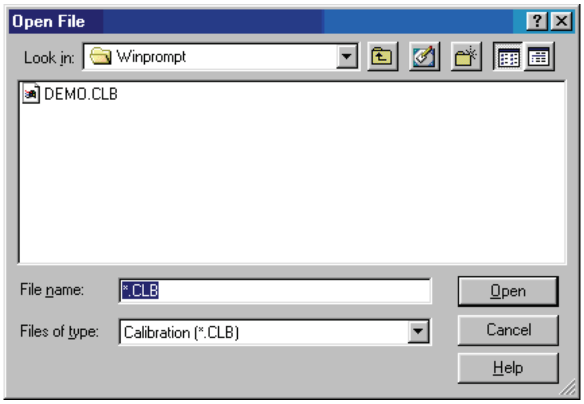
Look in Select the drive and directory from which to display files.

File Name Type or select the filename to be opened.

Files of Type Allows display of calibration files, procedures files, mass set files or piston/cylinder files.

Note

Any previously open file is automatically closed. If changes to the previous file have been made and not saved, the user is prompted to save the changes.



gko_002.bmp

Figure 3-3. Open Existing File Dialog Box

Close File

Closes the currently open file and closes all windows. If changes to the file have been made and not saved the user is prompted to save the changes. If password protection is used, the password must be entered before changes will be saved.

Save File

Saves all changes made to the currently open file back to the file that was opened. To save the contents to a different location, use **Save File As**. If the file is new, **Save File**, is equivalent to **Save File As**.

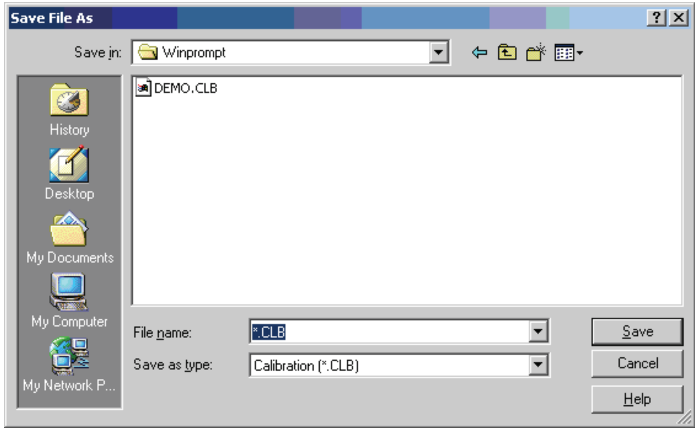
Save File As

Saves all changes open file under a different name or to give a name to a new file. The currently open file is saved to the name entered in the dialog box. The **Save File As Type** can be used to save only part of a file (e.g., save a calibration file as a procedure file to be used as a template for new calibration files).

Save In Select the drive and directory to which to write the current file.

File Name Type or select the filename to name the current file.

Save as Type Saves file as a calibration file, procedure file, mass set file or piston/cylinder file. Only the data corresponding to the file type will be saved.



gko_003.bmp

Figure 3-4. Save File As Dialog Box

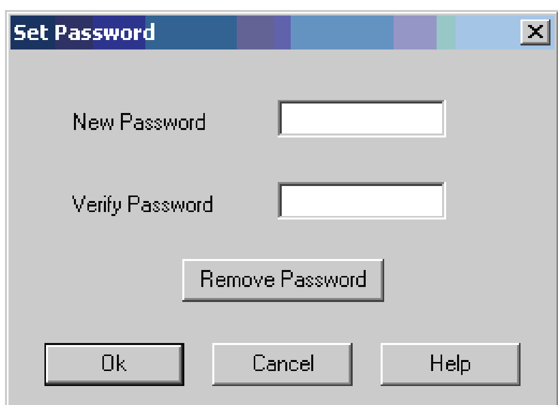
Set Password

Piston/Cylinder, Mass Set and Procedure Files can be password protected. After assigning a password to a file, the user must enter the password for all subsequent file saves until the password is removed. No password is required to use the file in a calibration.

New Password Enter a new password.

Verify Password Enter the new password again to confirm. The New Password and Verify Password fields must match before the password may be changed.

Remove Password The previous password must be entered to remove the password.



gko_004.bmp

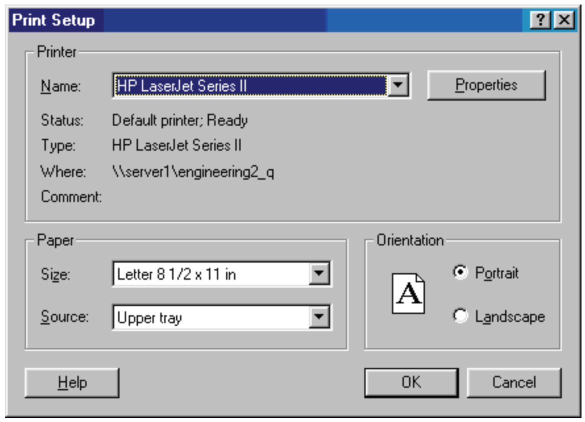
Figure 3-5. Password Protect Dialog Box

Copy to Clipboard

Copies the selected item in the Variables Window to the clipboard. Click an item in the Variables Window, select File | Copy To Clipboard. The value or link may then be pasted into other applications.

Print Setup

Allows the user to select the printer to be used and other options for the printer selected. Only installed printers are listed; see your Windows documentation for information on installing printers.

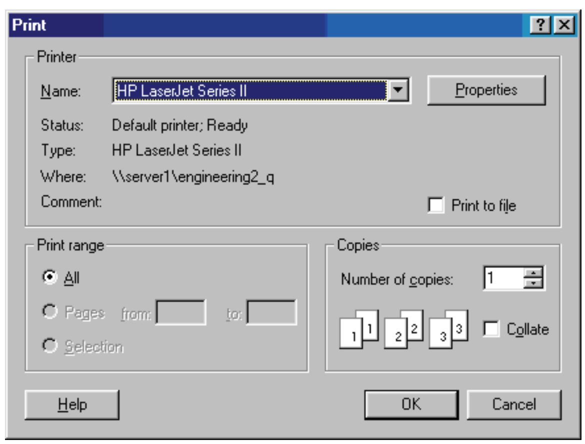


gko_005.bmp

Figure 3-6. Print Setup Dialog Box

Print

Prints the default Calibration Report. Click **Properties** button to set print options. A word processor or spreadsheet application can be used to create customer reports. See Chapter 4, Dynamic Data Exchange (DDE).



gko_006.bmp

Figure 3-7. Print Screen

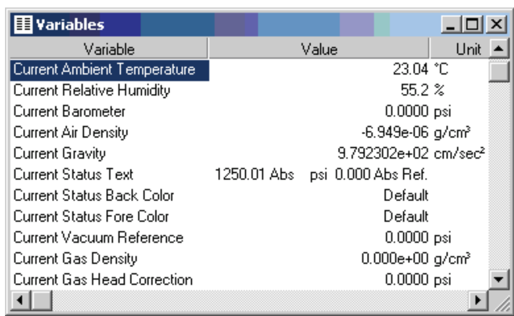
Exit

Exits from WinPrompt®. All windows are closed. If changes have been made and not saved, the user is prompted to save the file.

Chapter 4
View Menu

Variables Window

Displays the current values of the input variables and the calculated values for the current point. Stores the current value for input variables and calculated values for each point in the pressure sequence at the time the point is "accepted". (Refer to Chapter 7.) See the Glossary for definitions of variables.



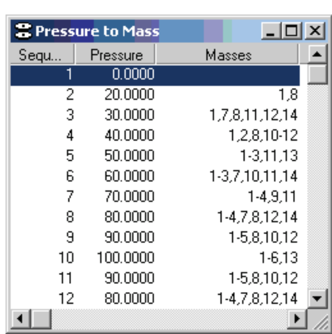
gko_052.bmp

Figure 4-1. Variables Window

Pressure to Mass Window

Displays the pressure points in the current sequence and the identification of the masses needed to generate the pressure. The pressure sequence may be changed with the **Calibration/Sequence** command. If no masses are listed, the required load is less than the smallest mass in the selected mass set.

The highlighted line indicates the current pressure point. Use the mouse or the arrow keys to change the current pressure point. Changing the current pressure point also affects the **Calibration Window**.



gko_053.bmp

Figure **4-2. Pressure to Mass Window**

Mass to Pressure Conversion

Used to determine the pressure for a given mass load.

Enter the masses and the program will computer the pressure. It can also be used as a quick way to edit individual pressure points within a sequence.

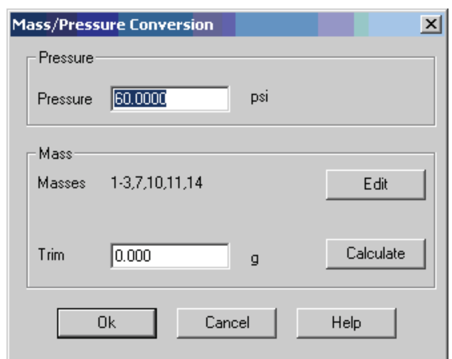
The dialog box is activated only by double-clicking on a pressure point in the **Pressure to Mass Window**. Edited pressure points are displayed in a different color in the **Pressure to Mass Window**.

Pressure When the pressure value is edited, the masses are recomputed and the trim is set to zero.

Edit When the masses are edited (by clicking on **Edit**) the pressure is recomputed from the specified masses and trim.

Trim When the trim is edited, the pressure is re-computed from the specified masses and trim.

Calculate If **Calculate** is clicked, the trim is recomputed for the specified pressure.

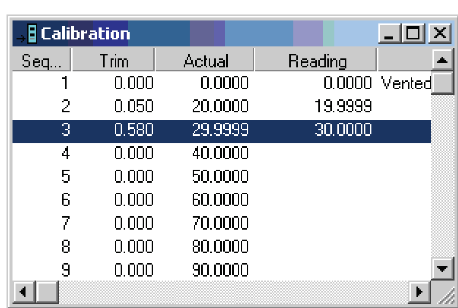


gko_060.bmp

Figure 4-3. Mass to Pressure Conversion Window

Calibration Window

The highlighted line indicates the current pressure point. Use mouse or arrow keys to move highlight. Changing current pressure point also affects **Pressure to Mass Window**. Double-click a pressure point to display **Accept Point** dialog. (See Chapter 7, Accept Calibration Point)



gko_055.bmp

Figure 4-4. Calibration Window

Seq. Pressure Sequence.

Trim (g) The trim required for this point. This value can be changed by Compute Trim, Zero Trim, Zero All Trims, or Mass to Pressure. The resolution of the trim is set in the Setup/Units form.

Actual The actual pressure at the DUT. If the point has been accepted, the pressure recorded is displayed. If it has not been accepted, the current point shows the actual pressure corrected for current conditions. All other points show the requested pressure. (Non cross-float only.)

Reading The DUT reading as entered on the Accept Point dialog box. If the point has not been accepted no value will be shown. (Non cross-float only.)

Std Mass The total mass loaded on the Standard DWG. (Cross-float only).

Test Mass The total mass loaded on the Test DWG. (Cross-float only).

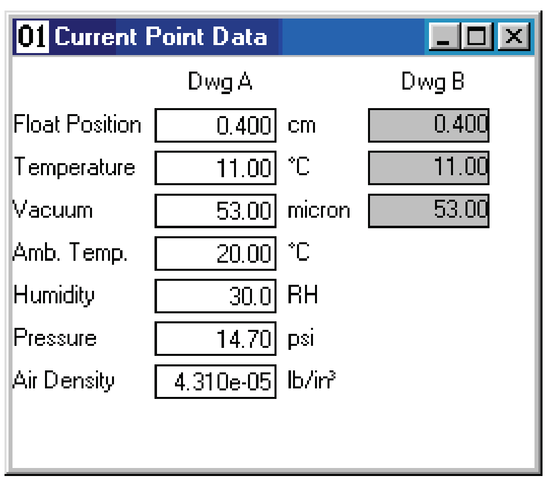
Comment The comment entered on the Accept Point dialog box.

The highlighted line indicates the current pressure point. Use the mouse or the arrow keys to move the highlight. Changing the current pressure point also affects the **Pressure to Mass window**.

Double-click a pressure point to display the **Accept Point** dialog. (See Chapter 7)

Current Point Data Window

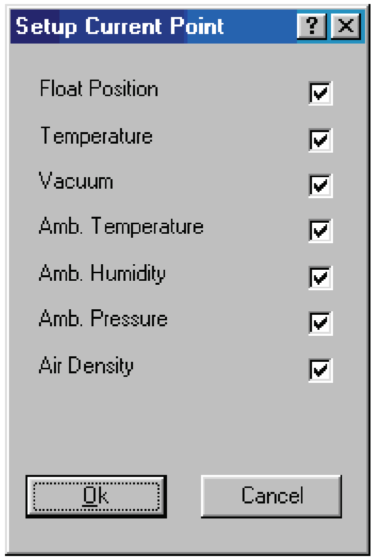
Displays an array of edit boxes showing current point data (gray boxes), or allowing the editing of constant point data (clear boxes), as selected in the Setup | Remote Acquisition menu. Both columns A and B are displayed. Double-clicking the form will display a setup screen.



gko_056.bmp

Figure 4-5. Current Point Data Window

Setup displays a list of available values that can be shown in the Current Point Data window. Checking the box will display that value. The Dwg B column is displayed only when Cross-Float is selected on the Setup menu.

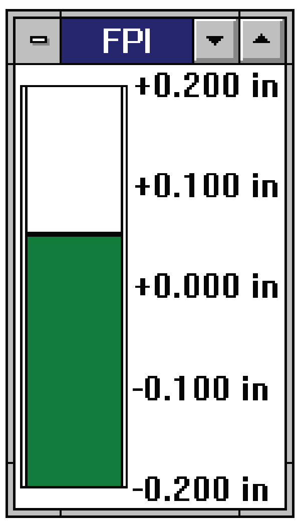


gko_057.bmp

Figure 4-6. Setup Current Point Screen

Float Position Indicator

Displays a bar graph showing the current float position. Both float positions are displayed in cross-float mode. Double-click the window to change the limits of the bar graph. When Float Position Indicator is set to constant, (see Chapter 6, Setup Remote Acquisition), the graph will change to a lighter color.

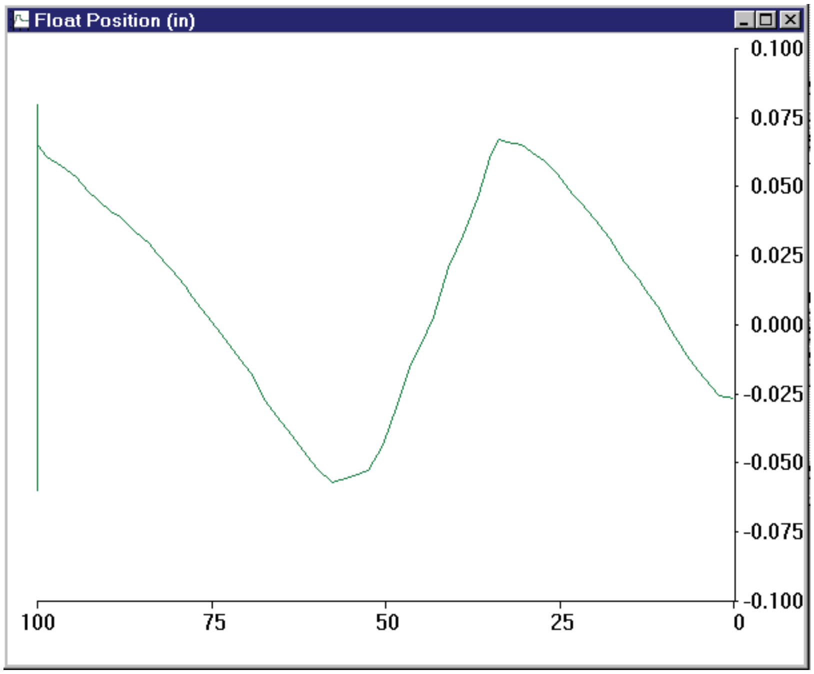


gko_058.bmp

Figure 4-7. Float Position Indicator Window

Float Position Graph

Displays a line graph showing the float position versus elapsed time (seconds). In cross-float mode, both float positions are displayed. Double-click the window to change the limits of the graph.



gko_059.bmp

Figure 4-8. Float Position Graph Window

Sink Rate Graph

Displays a line graph showing the piston sink rate versus elapsed time (seconds). Both sink rates are displayed in cross-float mode. Double-click the window to change the limits of the graph.

Temperature Graph

Displays a line graph showing the Deadweight gauge temperature versus elapsed time (seconds). Both temperatures are displayed in cross-float mode. Double-click the window to change the limits of the graph.

Other Graph

Displays a line graph showing other Deadweight gauge sensor indicators, such as barometric pressure, relative humidity, air density, or vacuum.

View All Windows

Opens all available windows and tiles them to fit on the screen.

Dynamic Data Exchange (DDE)

To use values from WinPrompt® in another application:

1. Open the **Variables Window**.
2. Click with the left mouse button to select a label, value, or unit name.
3. Click on **COPY** on the speed bar. (See Appendix A.)

4. Switch to the other application.
5. Select **PASTE** to insert the selected value.

   -or-

   Select **PASTE LINK** to insert a link to the value. The value will be updated every time WinPrompt® changes the value.

Chapter 5
Standards Menu

Standard Piston/Cylinder

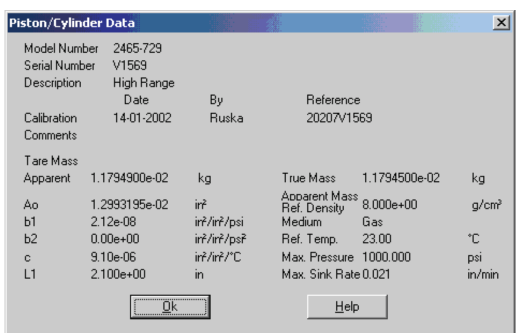
View Standard Piston/Cylinder

Allows the user to view the Standard piston/cylinder information.

View Piston/Cylinder

Contains all information for the Standard piston/cylinder currently loaded for use in the calibration.

This information can only be edited when a piston/cylinder file is opened. See Chapter 3, Open Existing File.

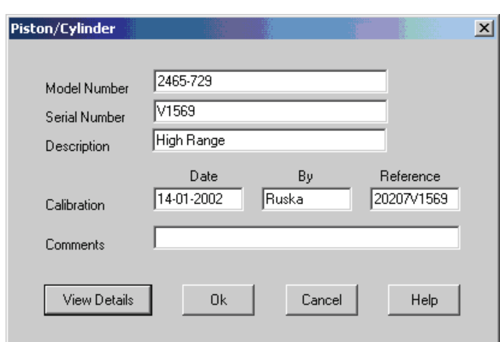


gko_008.bmp

Figure 5-1. Piston/Cylinder Data Screen

Edit Piston/Cylinder Header

Allows editing of the piston/cylinder header information used for reports and displays. Click **View Details** to edit piston/cylinder specifics.

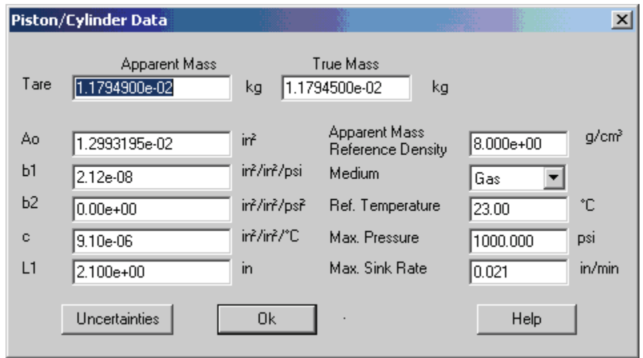


gko_009.bmp

Figure 5-2. Piston/Cylinder Window

Edit Piston/Cylinder Data

Contains all critical information for the Standard piston/cylinder currently loaded for use in the calibration.

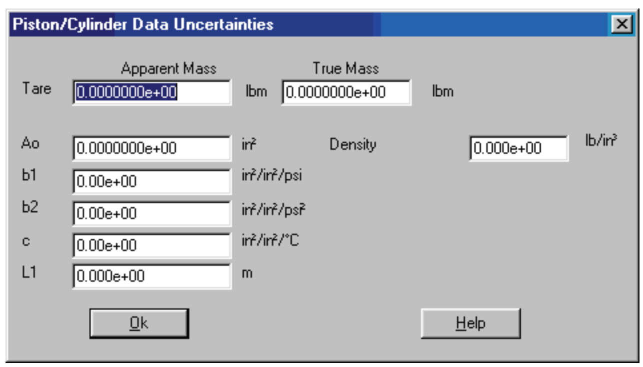


gko_010.bmp

Figure 5-3. View Details in Piston/Cylinder Data Dialog Box

Edit Piston/Cylinder Uncertainties

Enter the uncertainties for the piston/cylinder parameters. This information can be used via DDE in a spreadsheet application to compute the uncertainty of the calibration.



gko_011.bmp

Figure 5-4. Piston/Cylinder Data Uncertainties Dialog Box

Load Standard Piston/Cylinder

Allows the user to select the piston/cylinder file from their database that containing the information for the Standard

Print Standard Piston/Cylinder

Prints the definition of the piston/cylinder loaded for the Standard DWG.

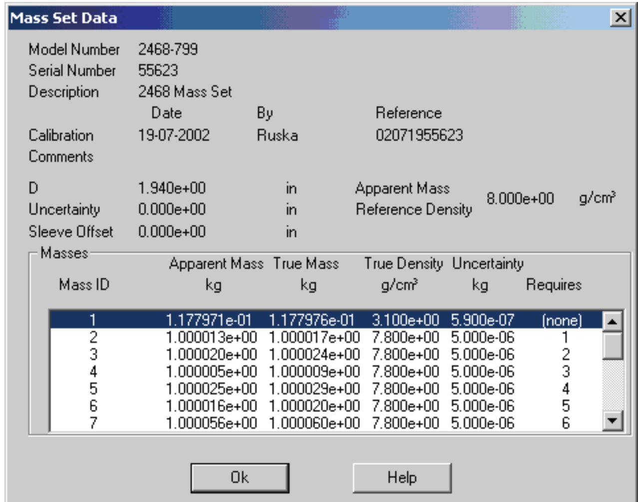
Standard Mass Set

View Standard Mass Set

Allows user to view the Standard mass set information.

Contains all critical information for Standard mass set currently loaded for use in the calibration.

This information can only be edited when a mass set file is opened. See Chapter 3, Open Existing File.

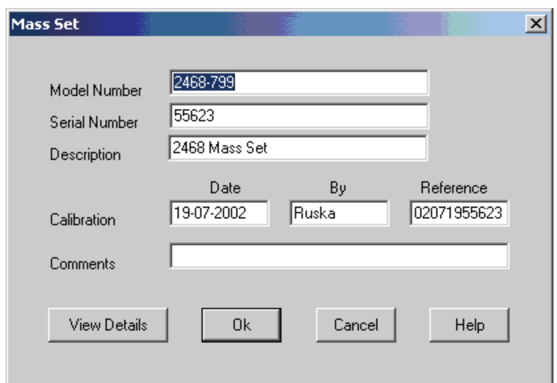


gko_012.bmp

Figure 5-5. Mass Set Data Window

Edit Mass Set Header

Once a mass set file is open, this dialog box allows editing of the mass set header information used for reports and displays. Click on **View Details** to edit mass set specifics.



gko_013.bmp

Figure 5-6. Mass Set Dialog Box

Edit Mass Set

Contains all critical information for the Standard mass set currently loaded for use in the calibration.

The **Apparent Mass Reference Density** is the unit of apparent mass of the selected mass values. There are two common unit of measure for Apparent Mass. One is Apparent Mass verses Stainless Steel, which has a reference density of 8.0 g/cm^3 and the other is Apparent Mass verses Brass, which has a reference density of 8.4 g/cm^3. On the RUSKA calibration report, these are denoted as **Amass8.0** for Apparent Mass Verses Stainless and **Amass8.4** for Apparent Mass verses Brass. If the mass values are selected from the **Amass8.0** table of the calibration report, then with the unit of measurement for density set to g/cm^3 the Apparent Mass Reference Density valve should be set to 8.0 g/cm^3. If the mass values are selected from the **Amass8.4** table of the calibration report, then with the unit of measurement for density set to g/cm^3, the **Apparent Mass Reference Density** valve should be set to 8.4 g/cm^3.

When the float position of the piston is being monitored by a 2465 Autofloat or a 2456 Piston Gauge Monitor, the 2-piece low mass sleeve weight will indicate a different float position based on the other larger masses being loaded, and resting at the bottom of the sleeve mass. The **Sleeve Mass Offset** corrects for this offset. The default value is -4.000e-02 in (-1.016e-03 m) when used with either of the 2465A-799 or 2468A-799 mass sets. All other mass sets should have this value set to zero.

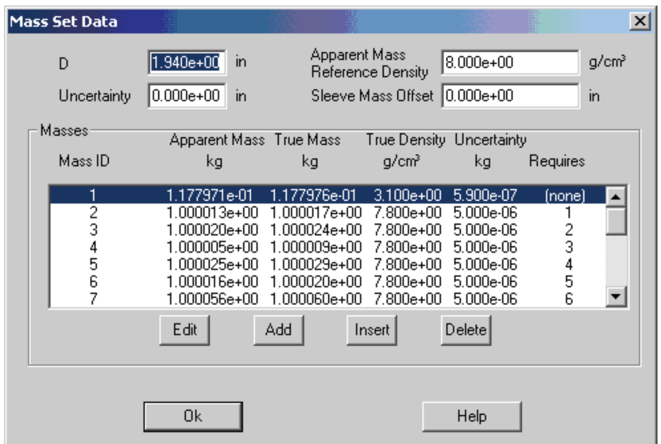
Click on a mass with the mouse to highlight it and then click on:

Edit Edit specifics of highlighted mass.

Add Add new mass to the end of the list.

Insert Add new mass before the highlighted mass.

Delete Removes the highlighted mass from the mass set.

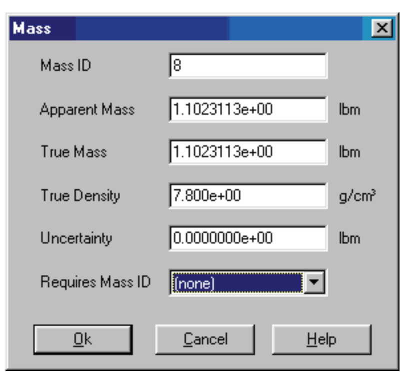


gko_014.bmp

Figure 5-7. Edit Mass Set Data Dialog Box

Edit Mass

If **Edit**, **Add** or **Insert** is selected, this dialog box allows the mass calibration information to be entered or edited.



gko_015.bmp

Figure 5-8. Edit Mass Dialog Box

Load Standard Mass Set

Allows the user to select the mass set file from their database that contains information for the mass set for the Standard to be used in the calibration.

Print Standard Mass Set

Prints the definition of the mass set loaded for the Standard DWG.

Test Piston/Cylinder

View Test Piston/Cylinder

Contains all critical information for the Test piston/cylinder currently loaded for use in the calibration.

Load Test Piston/Cylinder

Allows the user to select the piston/cylinder file from their database that contains the information for the Test piston/cylinder to be used in the calibration.

The only piston/cylinder fields that are required for the Test piston/cylinder are True Mass tare for Absolute calibrations and Apparent Mass Tare and Density for Gauge calibrations.

Print Test Piston/Cylinder

Prints the definition of the piston/cylinder loaded for the Test Deadweight Gauge.

Test Mass Set

View Test Mass Set

Contains all critical information for the Test mass set currently loaded for use in the calibration.

Load Test Mass Set

Allows the user to select the mass set file from their database that contains the information for the Test mass set to be used in the calibration.

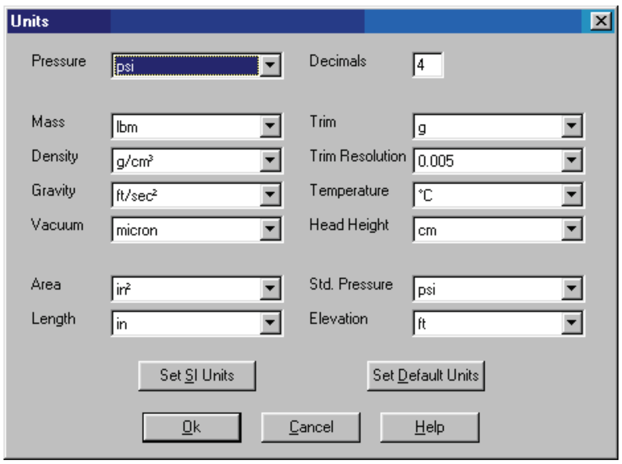
Print Test Mass Set

Prints the definition of the mass set loaded for the Test DWG.

Chapter 6
Setup Menu

Setup Units

Allows the selection of units for display of values.



gko_016.bmp

Figure 6-1. Units Window

Table 6-1. Units for Display of Values

UNIT FIELD	AFFECTS
Pressure	Pressure values.
Decimals	Number of decimals for pressure values.
Mass	Mass values (excluding trim mass)
Trim	Trim mass.
Density	Density of Ambient Air, Oil, Gas
Trim Resolution	Trim Mass Round-off Resolution
Gravity	Gravity values
Temperature	Temperatures, c
Vacuum	Reference pressure
Head Height	Head heights, Float position, Sink rate

Table 6-1. Units for Display of Values, cont.

UNIT FIELD	AFFECTS
Area	Piston area, b1, b2, c
Std. Pressure	b1, b2
Length	L1, D
Elevation	Elevation

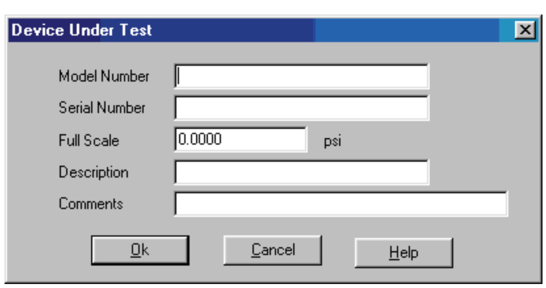
The Set SI Units and Set Default Units can be used to set all units to a standard map.

Table 6-2. SI and Default Units

	Set SI Units	Set Default Units
Pressure	MPa	Psi
Decimals	Unchanged	Unchanged
Mass	Kg	lbm
Trim	g	g
Density	kg/m^3	lb/in^3
Trim Resolution	kg/m^3	lb/in^3
Gravity	m/sec^2	ft/sec^2
Temperature	^oC	^oC
Vacuum	Pa	micron
Head Height	cm	in
Area	m^2	in^2
Std. Pressure	MPa	psi
Length	m	in
Elevation	m	ft

Setup Device Under Test

Allows entry of Device Under Test description to record the device calibrated. Fields are labeled for common usage. None of these fields is required.



gko_017.bmp

Figure 6-2. Device Under Test Dialog Box

Setup Cross-Float

Turns on and off cross-float support. When a check mark appears next to the menu option, cross-float support is turned on. Cross-float support toggles each time this menu item is selected.

Checked Calibration of a Deadweight gauge against another Deadweight gauge. All DWG B fields are enabled.

Unchecked Calibration of any pressure gauge against a Deadweight gauge. All DWG B fields are disabled.

Setup Remote Acquisition

Controls whether each input variable is read by data acquisition or a constant value is used.

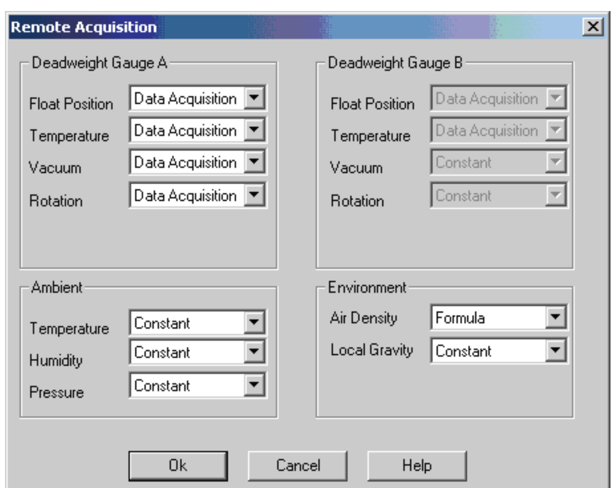
Data Acquisition Updated in real-time by remote driver.

Data Acq.—Average Updated in real-time by remote driver averaging dual FPI inputs.

Formula Computed from other values. (Air Density is from Ambient temperature, Humidity, and Pressure. Gravity is computed from Elevation and Latitude. Gravity formula is not recommended.)

Constant Entered in Process Variables, Current Point Data Window, or Single Point Window.

Same As A This value for Deadweight Gauge B will use the same value as defined for Deadweight Gauge A.

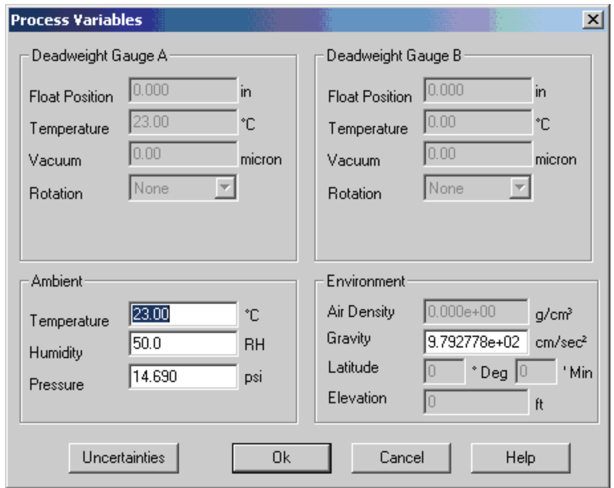


gko_018.bmp

Figure 6-3. Remote Acquisition Dialog Box

Edit Process Variables

Edit the constant values for input variables. Editing is only allowed if the variable has been defined as Constant in **Set Up→Remote Acquisition** (Chapter 6, Setup Remote Acquisition).

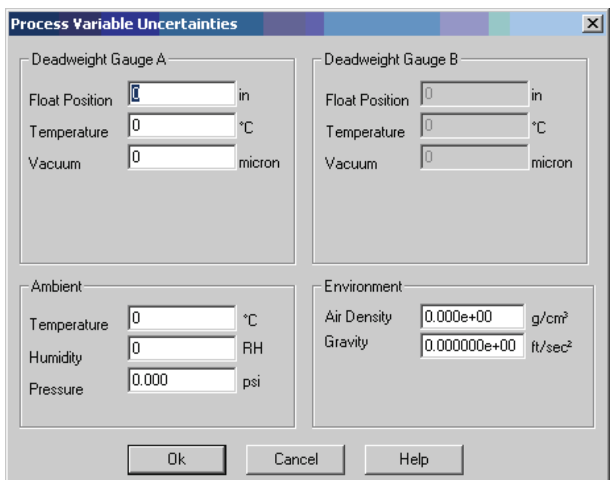


gko_019.bmp

Figure 6-4. Process Variables Window

Process Variable Uncertainties

Enter the uncertainties for the process variables. All values may be entered whether the variable is defined as **Constant** or **Data Acquisition**.



gko_020.bmp

Figure 6-5. Process Variable Uncertainties Window

Edit Reference and Media

For Absolute mode with a Vacuum Reference, select **Absolute with Vacuum Ref** and enter the **Expected Vacuum**. The expected vacuum is used to calculate the masses and trim needed so that the masses may be loaded before the vacuum is applied to the Deadweight Gauge.

For Absolute mode with a Barometer, select **Absolute with Barometer** and Winprompt® will add the current ambient pressure to the deadweight gauge pressure reading. This allows a "gauge" mode only deadweight gauge to operate in the absolute mode by inputting or reading the current barometric pressure. This can be entered as a constant or collected by data acquisition, depending on the specific setup for the unit. When defined as a constant (Ambient/Pressure field in the *Remote Acquisition* form, (Chapter 6, Setup Remote Acquisition), the current barometric pressure reading will need to be entered. Note that this is the same value that appears in the Ambient/Pressure field in the *Process Variable* form (Chapter 6, Edit Process Variables).

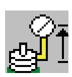
The **Barometer Head Height** is the vertical height between the barometer and the reference plane of the deadweight gauge, when a remote barometer is used.

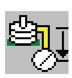
Head correction is provided for oil and gas, and for systems with both oil and gas. If the system does not have both, the other **Medium** should be set to **None** and the **Head Height** to zero. Standard media are provided, or the medium may be set to **Other** and the **Density** entered directly.

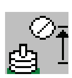
Provision is made to enter a head correction for Zero pressure points for oil systems. When operating in an oil medium, a value may be entered for the column head height between the reference plane of the Device Under Test (DUT) and the physical location where the system is vented to atmosphere when zeroing the DUT. Enter the height difference in the DUT field, and select the Above/Below button to indicate the relative position of the DUT to the controller.

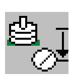
Gauge mode is used to generate pressures referenced to atmosphere. Positive pressures are generated with the top of the deadweight gauge open to atmosphere. This mode also supports negative gauge with the bottom of the piston connected to atmosphere and the bell jar installed on top with a pressure below atmosphere.

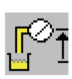
Very Low Gauge mode is used to generate gauge pressures very close to atmospheric pressure or for negative gauge pressures. When operating in this mode, the deadweight gauge is physically operated in the absolute mode. The first point that is generated in the pressure table is a pressure point used to align the internal Auto-float’s barometer. This corrected barometric pressure reading is then subtracted from the deadweight gauge readings for the remainder of the pressure points used in the calibration. This initial point is designated as “R” in the sequence column of the Pressure-to-Mass and Calibration windows.

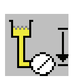
 The Device Under Test is above the standard.

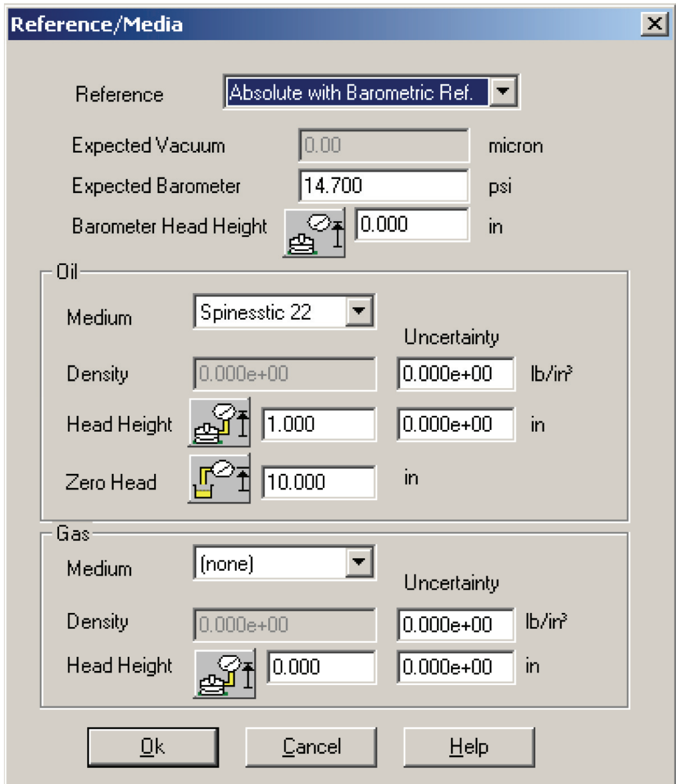
 The Device Under Test is below the standard.

 The barometer is above the standard.

 The barometer is below the standard.

 The Device Under Test is above the reservoir level.

 The Device Under Test is below the reservoir level.



gma09.bmp

Figure 6-6. Reference Media Window

To start the calibration:

1. Double click on the first sequence labeled as “R” in the **Pressure-to-Mass window**.
2. Type the reading from the internal barometric reference sensor as the desired pressure in the **Mass/Pressure Conversion** pop up window and hit **Enter** or select **Ok**. This value should be obtained from the bottom, center section of the main WinPrompt screen. It should show the current barometric reading followed by **Abs Ref.** label.
3. Click trim icon to calculate the proper trim mass value and load the mass and trim mass onto the deadweight gauge.
4. Place the bell jar onto the instrument base and Autofloat this pressure.
5. Once a stable pressure has been obtained, double click on the first sequence labeled “R” in the Calibration window. The value for the internal barometer will automatically be shown in this “Accept” window. Click **Ok.** WinPrompt® will calculate the other masses required in the remainder of the procedure.

Limits

Lists variables that have maximum and minimum allowable values that may be set by the user. Some of these values are verified when data is entered by the user; others are verified when a point is accepted or verified as needed as the program runs.

Edit	Minimum and Maximum values for selected variable may be changed.
Factory	Returns selected variable to Factory defaults.
Factory All	Returns all variables to Factory defaults.

Install/Remove Communications Drivers

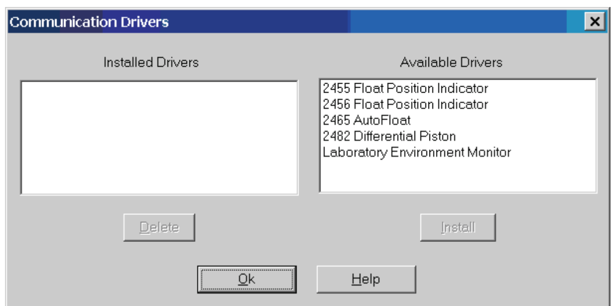
WinPrompt® supports several interfaces to Ruska deadweight gauges that can provide data acquisition, real-time graphing, and auto-float control. See Appendix D for more information on specific drivers.

Installing a Driver

1. Remove all drivers from **Installed Drivers** list.
2. Select driver to be installed from **Available Drivers** list.
3. Click **Install**.
4. Click **OK** when complete.

Removing a Driver

1. Select driver to be removed from **Installed Drivers** list.
2. Click **Delete**.
3. Click **OK** when complete



gko022.bmp

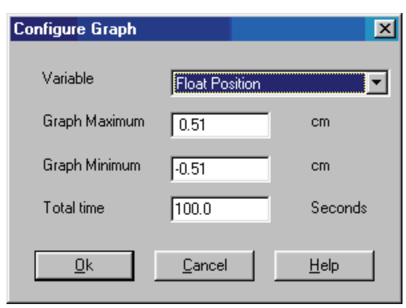
Figure 6-7. Communication Drivers Window

Setup Window

The **Setup Window** command is equivalent to double-clicking the current window. A dialog box is displayed according to current window type.

Setup Graph Window

Allows changing of graph variable and limits.

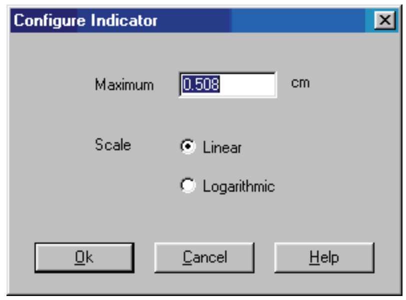


gko_030.bmp

Figure 6-8. Configure Graph Window

Setup Float Position Indicator

Allows setting range of indicator graph. Graph limits are plus and minus the maximum value. Additionally, graph scale can be either Linear or Logarithmic to give more resolution at mid-float.



gko_031.bmp

Figure 6-9. Configure Indicator Window

Chapter 7
Calibration Menu

Introduction

The Calibration menu includes functions for adding and deleting pressure points, computing and clearing trims, and accepting and clearing calibrations.

Accept Calibration Point

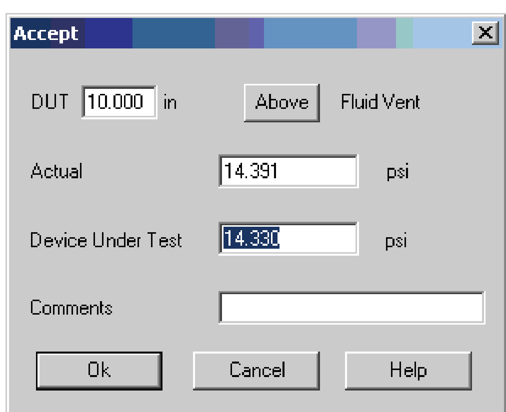
Displays one of two dialog boxes depending on the setting of the cross float flag:

- Accept Point (Non-Cross-Float)
- Accept Point (Cross-Float)

Accept Point (Non-Cross-Float)

When the sink rate and float position have stabilized and the data point is ready to be recorded:

1. Select Accept Point from the Calibration menu or double-click on the Current Pressure Calibration window.
2. A dialog box will appear requesting the reading of the device under test. A short comment on the details of that data point may be included. The comment field is limited to 44 characters and will be saved with the data. When the pressure is 0, the DUT line is displayed. This is identical to the DUT line in the Oil section of the Reference/Media setup screen.
3. Choose OK and the data box will close.
4. WinPrompt® will index to the next indicated data point.

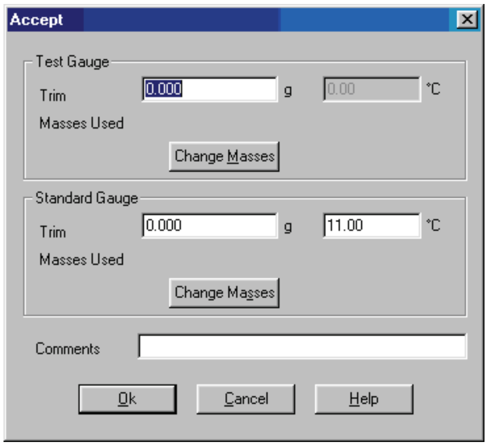


gko_032.bmp

Figure 7-1. Accept Window

Accept Point (Cross-Float)

Allows user to edit the masses and trim used on both the Test and Standard Deadweight Gauges. Use **Change Masses** buttons to correct the list of masses used. Enter the correct values and an optional comment, and click on **OK** to capture all the data associated with the calibration point.

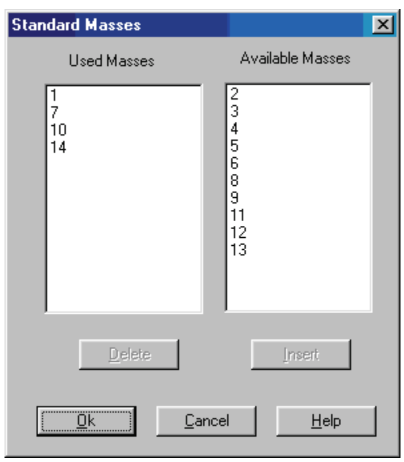


gko_033.bmp

Figure 7-2. Accept Point (Cross-Float) Dialog Box

Change Masses

Displays two lists: Used Masses are the masses currently selected as loaded; Available Masses are the rest of the masses in the Mass Set.



gko_034.bmp

Figure 7-3. Standard Masses Window

To Load a Mass:

1. Highlight the mass by clicking it.
2. Click **Insert**.
3. Click **Ok** when complete

To Remove a Mass:

1. Highlight the mass by clicking it with the mouse.
2. Click **Delete**.
3. Click **Ok** when complete

Compute Trim

Click on a data point in the Calibration Window. Actual pressure resulting from application of the list of masses indicated in the Pressure to Mass Window will be displayed based on the current ambient conditions. To generate the requested pressure, additional Trim Mass may be required. This trim is determined by selecting **Compute Trim** in the **Calibration Menu**.

The **Compute Trim** command returns the value of the trim mass necessary to generate the requested pressure at the current ambient conditions using the masses calculated for that pressure and displayed in the **Pressure to Mass Window**.

The trim mass is selectable for one data point entry at a time. This provides for changes in ambient conditions as the test sequence progresses.

The trim mass required is displayed in the **Calibration Window**. It is listed to the left of the actual pressure.

Zero Trim

Removes calculated Trim Mass value for the current data point. This returns the actual pressure to the value generated from application of the list of masses indicated in **Pressure to Mass Window**.

Zero Trim will not be allowed once Accept Point has been activated for a test sequence data point.

Edit Pressure Sequence Definition

Edits the pressure sequence used in calibration. Click to highlight a pressure point before using **Edit**, **Insert**, or **Delete**.

Description Name or comment to identify the pressure sequence.

Point List of pressures currently in the pressure sequence.

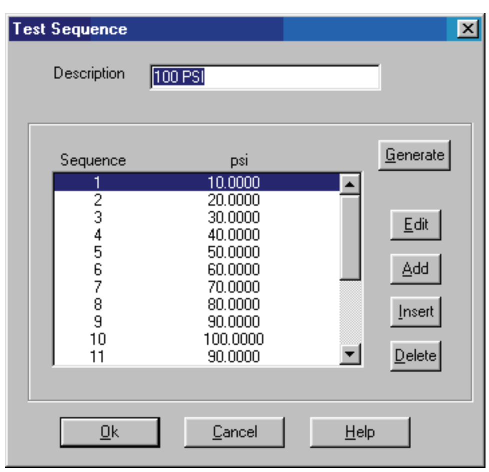
Generate Use automatic generation to define the pressure points.

Edit Change pressure of the selected point.

Add Add a new pressure to the end of the sequence.

Insert Insert a new pressure before the selected point.

Delete Delete the current point.



gko_035.bmp

Figure 7-4. Test Sequence Dialog Box

Edit Pressure Point

This dialog box is used to enter the pressure for each point in the pressure sequence. See **Edit Pressure Sequence Definition**.

Generate Sequence

Generate Sequence is used to automatically generate a pressure sequence from 0 to **Full Scale Pressure**. The sequence has **Points Up** points from 0 to **Full Scale Pressure** and **Points Down** points from **Full Scale Pressure** back to 0.

Example:

Full Scale Pressure 100

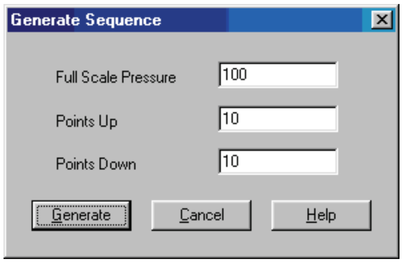
Points Up 4

Points Down 2

Generates 7 points: 0, 25, 50, 75, 100, 50, 0.

Note

All previous defined points in the pressure sequence are deleted when ***Generate*** *is pressed.*



gko_036.bmp

Figure 7-5. Generate Sequence Dialog Box

Zero All Trims

Removes all of the calculated trim mass values for each of the test sequence data points.

This selection will be grayed-out and is not available once a data point has been accepted in the test sequence.

Clear Accepted Calibration Point

Removes an accepted data point from the accepted list. Click on the line in the **Calibration Window**. Choose **Clear Point**, click **Ok** to verify the removal. The sequence point is then available for input of new data.

Clear All Accepted Calibration Points

Removes all of the accepted data for a test sequence. Click **Ok** to verify and mark all points as not accepted.

Chapter 8
Windows Menu

Arrange Windows Overlapping

Resizes and layers open windows so that each title bar is visible.

Arrange Windows Non-Overlapping

Resizes and arranges the open windows side by side.

Arrange Minimized Windows

Arranges minimized windows in a row along the bottom of the screen.

Large Toolbar Buttons

Toggles between large and small toolbar buttons.

Graph Line Width

Sets the width of the line used for graphs.

Close All Windows

The Close All Windows command closes all open windows.

Chapter 9
Help Menu

Introduction

Displays help and version information.

Contents

Displays the Help File contents page.

Wizard

Starts the Initial Setup Wizard. See Chapter 1.

About WinPrompt®

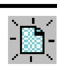
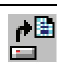
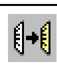
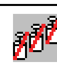
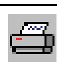
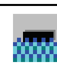
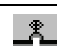
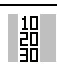
Displays current installed version of WinPrompt® and copyright notice as well as versions of active drivers.

Appendix A
Speed Bar and Formula

Speed Bar

Provides shortcuts to the most frequently used menu items. Position the mouse cursor over the icon for text label.

Table A-1. Speed Bar Icon and Description

Icon	Description	Icon	Description
	Create New File		Compute Trim
	Open Existing File		Zero Trim
	Save File		Accept Calibration Point
	Copy to Clipboard		Zero All Trims
	Print		Start Auto-Float
	View Piston/Cylinder		Pressurize System
	View Mass Set		Vent Pressure
	Edit Pressure Sequence Definition		Stop Auto-Float
	View All Windows		

Formulas

The formulas used in WinPrompt® are listed for information and verification. Remember to include units when verifying formulas. Formulas may reference other formulas and variables found in the glossary.

Pressure to Mass

The conversion from pressure to mass is used to compute the necessary masses and trim. Certain variables may use expected values instead of actual values where the actual value is expected to change significantly.

Calculate Corrected Pressure (kPa)

$$P_c = (P + P_{OH} + P_{GH} - P_{REF})x1000$$

Convert Corrected Pressure to Mass (kg)

$$M = P_c \; x \; A_o \; x \left(1 + b_1 \; x \; P_c + b_2 \; x \; P_c^{\,2}\right) x \; \frac{1 + c \; x \left(T - T_{REF}\right)}{G \; x \left(1 - \frac{D_{AIR}}{D_{MREF}}\right) x \; 10^{-8}}$$

Mass to Pressure

Calculate Pressure from Mass (kPa)

$$P_D = \frac{\frac{M}{1 + c \; x \; (T - T_{REF})} \; x \; G \; x \left(1 - \frac{D_{AIR}}{D_{MASS}}\right) x \; 10^{-8}}{A_o}$$

Correct Pressure

$$P = \frac{P_D}{1 + b_1 \; x \left|P_D\right| + b_2 \; x \; P_D^{\,2}} \; x \; 1000 + P_{REF} - P_{GH} - P_{OH}$$

Head Pressure

Corrects for reference plane offsets.

Head Pressures with Gas at Piston (kPa)

$$P_{GH} = \left(H_{GAS} + \left(L - D\right) x \; 100 - H_{FPI}\right) x \; D_{GAS} \; x \; 9.80665$$

$$P_{OH} = H_{OIL} \; x \; D_{OIL} \; x \; 9.80665$$

Head Pressures with Oil at Piston (kPa)

$$P_{GH} = H_{GAS} \; x \; D_{GAS} \; x \; 9.80665$$

$$P_{OH} = \left(H_{OIL} + \left(L - D\right) x \; 100 - H_{FPI}\right) x \; D_{OIL} \; x \; 9.80665$$

Gas Density (g/cm^3)

WinPrompt® includes formulas for common gases based on pressure since the density of a gas varies significantly with pressure.

Nitrogen Gas Density below 6895 kPa (1000 psia)

$$D_{GAS} = 1.1347 \; x \; 10^{-5} \; x \; P$$

Nitrogen Gas Density from 6895 kPa (1000 psia) to 103400 kPa (15000 psia)

$$D_{GAS} = -5.5087 \; x \; 10^{-11} \; x \; P^2 + 1.1016 \; x \; 10^{-5} \; x \; P + 6.573 \; x \; 10^{-3}$$

Zero Air Gas Density below 20680 kPa (3000 psia)

$$D_{GAS} = 1.17 \; x \; 10^{-5} \; x \; P$$

Helium Gas Density below 689.5 kPa (1000 psia)

$$D_{GAS} = 1.585 \; x \; 10^{-6} \; x \; P$$

Helium Gas Density from 689.5 kPa (1000 psia) to 103400 kPa (15000 psia)

$$D_{GAS} = -3.886 \; x \; 10^{-12} \; x \; P^2 + 1.508 \; x \; 10^{-6} \; x \; P + 3.136 \; x \; 10^{-4}$$

Oil Density (g/cm^3)

Spinesstic 22

0.858 g/cm^3

DOS Sebacate

0.913 g/cm^3

Reference Pressure (kPa)

The Reference pressure must be corrected since Absolute vacuum is not achieved and atmosphere must be corrected for head heights.

Absolute Readings:

The reference pressure for Absolute readings is the current vacuum level.

Gauge Readings:

$$P_{REF} = D_{AIR} \; x \; H \; x \; 9.80665$$

Mass

Apparent mass is corrected for air buoyancy in positive gauge mode. Absolute mode uses true mass without buoyancy correction. Negative gauge mode uses true mass but corrects for air buoyancy.

Total Mass

$$M = M_{TARE} + \sum m_i$$

$$M_{TARE} = M_{APP} \times \frac{1 - \dfrac{D_{AIR}}{D_{PISTON}}}{1 - \dfrac{D_{AIR}}{D_{MASS}}}$$

True Mass and Apparent Mass

$$M_{TRUE} = M_{APP} \ x \ \frac{\left(1 - \frac{D_{AIR}}{D_{REF}}\right)}{\left(1 - \frac{D_{AIR}}{D_{TRUE}}\right)}$$

$$M_{APP} = M_{TRUE} \ x \ \frac{\left(1 - \frac{D_{AIR}}{D_{TRUE}}\right)}{\left(1 - \frac{D_{AIR}}{D_{REF}}\right)}$$

Appendix B
Error Messages

Error Messages

WinPrompt® error messages are listed in alphabetic order below with additional information.

Table B-1. Error Messages

Error	Description
<Filename> has changed. Save Changes?	The file specified has unsaved changes and you have either tried to exit WinPrompt® or open a different file. Press **Yes** to save the changes or **No** to discard the changes.
<New File> has changed. Save changes?	A new file has been created. User has either tried to exit WinPrompt® or open a different file. Press **Yes** to save the changes or **No** to discard the changes.
Apparent Mass Reference Density must not be zero.	Converting between Apparent Mass and True Mass requires a valid Apparent Mass Reference Density.
Calibration point already cleared.	The calibration point specified to be cleared was already cleared.
Calibration point has been accepted and cannot be changed.	Once a point has been accepted it cannot be changed unless the point is cleared. See **Clear Calibration Point**.
Cannot save Piston or Mass Set Link.	Procedure files only contain references to the Piston and Mass Set therefore, **Save As** cannot be used to save a Procedure file as a Piston or Mass Set file.
Clear Accepted Calibration Point?	Requests confirmation before the highlighted calibration point is cleared.
Clear All Accepted Calibration Points?	Requests confirmation before all calibration points are cleared.
Error Loading <Filename> or one of its dependents.	The driver could not be loaded. Verify that the driver is in the same directory as WinPromp.exe Any IEEE-488 driver requires the GPIB.DLL driver.
Error writing to file.	The complete file could not be written. Check to make sure the disk is not full.

Table B-2. Error Messages, cont.

Error	Description
File <Filename> already exists. Overwrite?	The file name entered in **Save As** already exists. Press **Yes** to overwrite the file.
Incorrect Password.	The password entered is not correct. The correct password must be entered before opening a protected file.
Invalid File Format <Filename>.	The file is either corrupted or from a previous version.
Invalid Mass Set Data (CRC).	The Mass Set information has been corrupted. Verify the Mass Set before using.
Invalid Mass Set File <Filename>.	The Mass Set file specified is invalid.
Invalid Mass Set Link (CRC).	The Mass Set reference in the procedure file is invalid.
Invalid Piston/Cylinder Data (CRC).	The Piston information has been corrupted. Verify the Piston before using.
Invalid Piston/Cylinder File <Filename>.	The Piston file specified is invalid.
Invalid Piston/Cylinder Link (CRC)....	The Piston reference in the procedure file is invalid.
Maximum Number of points is <numbers>.	A test sequence cannot have more than the specified number of pressure points.
Nothing to save for this file type.	**Save As** was used to save the file in a different format but the loaded file contains no information to save in the requested format. (e.g., Saving a Piston file as a Mass Set file.)
Out of Timers.	Windows does not have a timer available. The graph windows will not update. Shutdown other applications and restart WinPrompt®.
Password Verify must match New Password.	The two fields must match before the password is changed.
Reference must be calibrated and accepted first.	The current point cannot be accepted because the reference point (listed first) must be accepted first to calibrate the reference sensor before any other point may be accepted. Select the reference point, float the pressure, and accept the point. Then other points can be accepted.
Serial Port Not Available Error (<code>).	The serial port requested is in use by another application. Shut down the other application or use a different serial port.
True Density must not be zero.	Converting between Apparent Mass and True Mass requires a valid True Mass.
Unable to Start Print.	The printer could not be started. Check your printer driver and setup then try printing again.
Unable to write to file.	The file could not be created. Verify rights are available to write to the disk and try the save again.

Appendix C
Dynamic Data Exchange (DDE)

Dynamic Data Exchange (DDE)

The following DDE commands may be inserted into Excel to pull values from WinPrompt®.

Table C-1. Dynamic Data Exchange (DDE)

Topic	Field	DDE Command	Output Sample
Unit			
	Mass	=WinPrompt|Unit!Mass	lbm
	Length	=WinPrompt|Unit!Length	in
	Standard	=WinPrompt|Unit!Standard	psi
	C	=WinPrompt|Unit!'C'	in²/in²/°C
	b1	=WinPrompt|Unit!'b1'	in²/in²/psi
	b2	=WinPrompt|Unit!'b2'	in²/in²/psi²
	Ao	=WinPrompt|Unit!Ao	in²
	Trim	=WinPrompt|Unit!Trim	g
	Gravity	=WinPrompt|Unit!Gravity	ft/sec²
	Head	=WinPrompt|Unit!Head	in
	SinkRate	=WinPrompt|Unit!SinkRate	in/min
	Elevation	=WinPrompt|Unit!Elevation	ft
	Density	=WinPrompt|Unit!Density	lb/in³
	Vacuum	=WinPrompt|Unit!Vacuum	microns
	Temp	=WinPrompt|Unit!Temp	°C
	Humidity	=WinPrompt|Unit!Humidity	%
	Pressure	=WinPrompt|Unit!Pressure	psi

Topic	Field	DDE Command	Output Sample
Piston			
	Model	=WinPrompt|Piston!Model	1-Eng
	Serial	=WinPrompt|Piston!Serial	1
	Description	=WinPrompt|Piston!Description	English Units Test Piston
	CalDate	=WinPrompt|Piston!CalDate	01/01/1996
	CalBy	=WinPrompt|Piston!CalBy	Ruska
	CalRef	=WinPrompt|Piston!CalRef	E-12
	Comment	=WinPrompt|Piston!Comment	0
	TareApp	=WinPrompt|Piston!TareApp	0.84
	TareTrue	=WinPrompt|Piston!TareTrue	0.84
	Ao	=WinPrompt|Piston!Ao	1
	b1	=WinPrompt|Piston!’b1’	0.001
	b2	=WinPrompt|Piston!’b2’	0.00001
	c	=WinPrompt|Piston!’c’	0.000015
	L	=WinPrompt|Piston!L	8
	Density	=WinPrompt|Piston!Density	0.4
	Medium	=WinPrompt|Piston!Medium	Oil
	MedDensity	=WinPrompt|Piston!MedDensity	0
	RefTemp	=WinPrompt|Piston!RefTemp	23
	MaxSink	=WinPrompt|Piston!MaxSink	30
	MaxPress	=WinPrompt|Piston!MaxPress	2400
	TareAppUnc	=WinPrompt|Piston!TareAppUnc	0.001
	TareTrueUnc	=WinPrompt|Piston!TareTrueUnc	0.001
	AoUnc	=WinPrompt|Piston!AoUnc	0.00000001
	b1Unc	=WinPrompt|Piston!b1Unc	0.001
	b2Unc	=WinPrompt|Piston!b2Unc	0.001
	cUnc	=WinPrompt|Piston!cUnc	0.001
	LUnc	=WinPrompt|Piston!Lunc	0.01
	DensityUnc	=WinPrompt|Piston!DensityUnc	0.0001

Topic	Field	DDE Command	Output Sample
MassSet			
	Model	=WinPrompt|MassSet!Model	1-Eng
	Serial	=WinPrompt|MassSet!Serial	1
	Description	=WinPrompt|MassSet!Description	English Standard Mass Set
	CalDate	=WinPrompt|MassSet!CalDate	03/25/1996
	CalBy	=WinPrompt|MassSet!CalBy	Ruska
	CalRef	=WinPrompt|MassSet!CalRef	E-1
	Comment	=WinPrompt|MassSet!Comment	0
	D	=WinPrompt|MassSet!D	0.3937
	Density	=WinPrompt|MassSet!Density	0.2818
	Count	=WinPrompt|MassSet!Count	13
	DUnc	=WinPrompt|MassSet!Dunc	39.37
Masses			
1	MassID	=WinPrompt|Masses!'MassID[0]'	1
2	MassID	=WinPrompt|Masses!'MassID[1]'	2
3	MassID	=WinPrompt|Masses!'MassID[2]'	3
4	MassID	=WinPrompt|Masses!'MassID[3]'	4
5	MassID	=WinPrompt|Masses!'MassID[4]'	5
6	MassID	=WinPrompt|Masses!'MassID[5]'	6
7	MassID	=WinPrompt|Masses!'MassID[6]'	7
8	MassID	=WinPrompt|Masses!'MassID[7]'	8
9	MassID	=WinPrompt|Masses!'MassID[8]'	9
10	MassID	=WinPrompt|Masses!'MassID[9]'	10
1	MassApp	=WinPrompt|Masses!'MassApp[0]'	0.5
2	MassApp	=WinPrompt|Masses!'MassApp[1]'	1
3	MassApp	=WinPrompt|Masses!'MassApp[2]'	1
4	MassApp	=WinPrompt|Masses!'MassApp[3]'	1
5	MassApp	=WinPrompt|Masses!'MassApp[4]'	1
6	MassApp	=WinPrompt|Masses!'MassApp[5]'	1
7	MassApp	=WinPrompt|Masses!'MassApp[6]'	0.5
8	MassApp	=WinPrompt|Masses!'MassApp[7]'	0.3999999
9	MassApp	=WinPrompt|Masses!'MassApp[8]'	0.2
10	MassApp	=WinPrompt|Masses!'MassApp[9]'	0.1

Topic	Field	DDE Command	Output Sample
1	MassTrue	=WinPrompt|Masses!’MassTrue[0]’	0.5
2	MassTrue	=WinPrompt|Masses!’MassTrue[1]’	1
3	MassTrue	=WinPrompt|Masses!’MassTrue[2]’	1
4	MassTrue	=WinPrompt|Masses!’MassTrue[3]’	1
5	MassTrue	=WinPrompt|Masses!’MassTrue[4]’	1
6	MassTrue	=WinPrompt|Masses!’MassTrue[5]’	1
7	MassTrue	=WinPrompt|Masses!’MassTrue[6]’	0.5
8	MassTrue	=WinPrompt|Masses!’MassTrue[7]’	0.3999999
9	MassTrue	=WinPrompt|Masses!’MassTrue[8]’	0.2
10	MassTrue	=WinPrompt|Masses!’MassTrue[9]’	0.1
1	MassRequires	=WinPrompt|Masses!’MassRequires[0]’	(none)
2	MassRequires	=WinPrompt|Masses!’MassRequires[1]’	1
3	MassRequires	=WinPrompt|Masses!’MassRequires[2]’	2
4	MassRequires	=WinPrompt|Masses!’MassRequires[3]’	3
5	MassRequires	=WinPrompt|Masses!’MassRequires[4]’	4
6	MassRequires	=WinPrompt|Masses!’MassRequires[5]’	5
7	MassRequires	=WinPrompt|Masses!’MassRequires[6]’	1
8	MassRequires	=WinPrompt|Masses!’MassRequires[7]’	1
9	MassRequires	=WinPrompt|Masses!’MassRequires[8]’	1
10	MassRequires	=WinPrompt|Masses!’MassRequires[9]’	1
1	MassDensity	=WinPrompt|Masses!’MassDensity[0]’	0.3999
2	MassDensity	=WinPrompt|Masses!’MassDensity[1]’	0.3999
3	MassDensity	=WinPrompt|Masses!’MassDensity[2]’	0.3999
4	MassDensity	=WinPrompt|Masses!’MassDensity[3]’	0.3999
5	MassDensity	=WinPrompt|Masses!’MassDensity[4]’	0.3999
6	MassDensity	=WinPrompt|Masses!’MassDensity[5]’	0.3999
7	MassDensity	=WinPrompt|Masses!’MassDensity[6]’	0.3999
8	MassDensity	=WinPrompt|Masses!’MassDensity[7]’	0.3999
9	MassDensity	=WinPrompt|Masses!’MassDensity[8]’	0.3999
10	MassDensity	=WinPrompt|Masses!’MassDensity[9]’	0.3999
1	MassUnc	=WinPrompt|Masses!’MassUnc[0]’	2.20462E-08
2	MassUnc	=WinPrompt|Masses!’MassUnc[1]’	2.20462E-08
3	MassUnc	=WinPrompt|Masses!’MassUnc[2]’	2.20462E-08
4	MassUnc	=WinPrompt|Masses!’MassUnc[3]’	2.20462E-08

Topic	Field	DDE Command	Output Sample
5	MassUnc	=WinPrompt|Masses!'MassUnc[4]'	2.20462E-08
6	MassUnc	=WinPrompt|Masses!'MassUnc[5]'	2.20462E-08
7	MassUnc	=WinPrompt|Masses!'MassUnc[6]'	2.20462E-08
8	MassUnc	=WinPrompt|Masses!'MassUnc[7]'	2.20462E-08
9	MassUnc	=WinPrompt|Masses!'MassUnc[8]'	2.20462E-08
10	MassUnc	=WinPrompt|Masses!'MassUnc[9]'	2.20462E-08
PistonB			
	Model	=WinPrompt|PistonB!Model	1-Metric
	Serial	=WinPrompt|PistonB!Serial	1
	Description	=WinPrompt|PistonB!Description	Metric Standard Piston
	CalDate	=WinPrompt|PistonB!CalDate	01/01/1996
	CalBy	=WinPrompt|PistonB!CalBy	Ruska
	CalRef	=WinPrompt|PistonB!CalRef	E-12
	Comment	=WinPrompt|PistonB!Comment	0
	TareApp	=WinPrompt|PistonB!TareApp	2.204623
	TareTrue	=WinPrompt|PistonB!TareTrue	2.204623
	Ao	=WinPrompt|PistonB!Ao	0.1550003
	b1	=WinPrompt|PistonB!'b1'	0.0000689
	b2	=WinPrompt|PistonB!'b2'	4.75E-07
	c	=WinPrompt|PistonB!'c'	0.000015
	L	=WinPrompt|PistonB!L	11.81
	Density	=WinPrompt|PistonB!Density	0.3613
	Medium	=WinPrompt|PistonB!Medium	Oil
	MedDensity	=WinPrompt|PistonB!MedDensity	0
	RefTemp	=WinPrompt|PistonB!RefTemp	23
	MaxSink	=WinPrompt|PistonB!MaxSink	29.528
	MaxPress	=WinPrompt|PistonB!MaxPress	2900.754
	TareAppUnc	=WinPrompt|PistonB!TareAppUnc	0.02204623
	TareTrueUnc	=WinPrompt|PistonB!TareTrueUnc	0.02204623
	AoUnc	=WinPrompt|PistonB!AoUnc	0.001550003
	b1Unc	=WinPrompt|PistonB!b1Unc	0.00000689
	b2Unc	=WinPrompt|PistonB!b2Unc	4.75E-08

Topic	Field	DDE Command	Output Sample
	cUnc	=WinPrompt|PistonB!cUnc	0.001
	LUnc	=WinPrompt|PistonB!Lunc	0.003937
	DensityUnc	=WinPrompt|PistonB!DensityUnc	3.613E-09
MassSetB			
	Model	=WinPrompt|MassSetB!Model	1-Metric
	Serial	=WinPrompt|MassSetB!Serial	1
	Description	=WinPrompt|MassSetB!Description	Metric Standard Mass Set
	CalDate	=WinPrompt|MassSetB!CalDate	03/25/1996
	CalBy	=WinPrompt|MassSetB!CalBy	Ruska
	CalRef	=WinPrompt|MassSetB!CalRef	E-1
	Comment	=WinPrompt|MassSetB!Comment	0
	D	=WinPrompt|MassSetB!D	0.394
	Density	=WinPrompt|MassSetB!Density	0.2818
	Count	=WinPrompt|MassSetB!Count	14
	Dunc	=WinPrompt|MassSetB!Dunc	39.37
MassesB			
1	MassID	=WinPrompt|MassesB!'MassID[0]'	1
2	MassID	=WinPrompt|MassesB!'MassID[1]'	2
3	MassID	=WinPrompt|MassesB!'MassID[2]'	3
4	MassID	=WinPrompt|MassesB!'MassID[3]'	4
5	MassID	=WinPrompt|MassesB!'MassID[4]'	5
6	MassID	=WinPrompt|MassesB!'MassID[5]'	6
7	MassID	=WinPrompt|MassesB!'MassID[6]'	7
8	MassID	=WinPrompt|MassesB!'MassID[7]'	8
9	MassID	=WinPrompt|MassesB!'MassID[8]'	9
10	MassID	=WinPrompt|MassesB!'MassID[9]'	10
1	MassApp	=WinPrompt|MassesB!'MassApp[0]'	1.102311
2	MassApp	=WinPrompt|MassesB!'MassApp[1]'	2.204623
3	MassApp	=WinPrompt|MassesB!'MassApp[2]'	2.204623
4	MassApp	=WinPrompt|MassesB!'MassApp[3]'	2.204623
5	MassApp	=WinPrompt|MassesB!'MassApp[4]'	2.204623
6	MassApp	=WinPrompt|MassesB!'MassApp[5]'	2.204623
7	MassApp	=WinPrompt|MassesB!'MassApp[6]'	1.102311
8	MassApp	=WinPrompt|MassesB!'MassApp[7]'	0.6613868

Topic	Field	DDE Command	Output Sample
9	MassApp	=WinPrompt|MassesB!'MassApp[8]'	0.4409245
10	MassApp	=WinPrompt|MassesB!'MassApp[9]'	0.2204623
1	MassTrue	=WinPrompt|MassesB!'MassTrue[0]'	1.102311
2	MassTrue	=WinPrompt|MassesB!'MassTrue[1]'	2.204623
3	MassTrue	=WinPrompt|MassesB!'MassTrue[2]'	2.204623
4	MassTrue	=WinPrompt|MassesB!'MassTrue[3]'	2.204623
5	MassTrue	=WinPrompt|MassesB!'MassTrue[4]'	2.204623
6	MassTrue	=WinPrompt|MassesB!'MassTrue[5]'	2.204623
7	MassTrue	=WinPrompt|MassesB!'MassTrue[6]'	1.102311
8	MassTrue	=WinPrompt|MassesB!'MassTrue[7]'	0.6613868
9	MassTrue	=WinPrompt|MassesB!'MassTrue[8]'	0.4409245
10	MassTrue	=WinPrompt|MassesB!'MassTrue[9]'	0.2204623
1	MassRequires	=WinPrompt|MassesB!'MassRequires[0]'	(none)
2	MassRequires	=WinPrompt|MassesB!'MassRequires[1]'	1
3	MassRequires	=WinPrompt|MassesB!'MassRequires[2]'	2
4	MassRequires	=WinPrompt|MassesB!'MassRequires[3]'	3
5	MassRequires	=WinPrompt|MassesB!'MassRequires[4]'	4
6	MassRequires	=WinPrompt|MassesB!'MassRequires[5]'	5
7	MassRequires	=WinPrompt|MassesB!'MassRequires[6]'	1
8	MassRequires	=WinPrompt|MassesB!'MassRequires[7]'	1
9	MassRequires	=WinPrompt|MassesB!'MassRequires[8]'	1
10	MassRequires	=WinPrompt|MassesB!'MassRequires[9]'	1
1	MassDensity	=WinPrompt|MassesB!'MassDensity[0]'	0.2818
2	MassDensity	=WinPrompt|MassesB!'MassDensity[1]'	0.2818
3	MassDensity	=WinPrompt|MassesB!'MassDensity[2]'	0.2818
4	MassDensity	=WinPrompt|MassesB!'MassDensity[3]'	0.2818
5	MassDensity	=WinPrompt|MassesB!'MassDensity[4]'	0.2818
6	MassDensity	=WinPrompt|MassesB!'MassDensity[5]'	0.2818
7	MassDensity	=WinPrompt|MassesB!'MassDensity[6]'	0.2818
8	MassDensity	=WinPrompt|MassesB!'MassDensity[7]'	0.2818
9	MassDensity	=WinPrompt|MassesB!'MassDensity[8]'	0.2818
10	MassDensity	=WinPrompt|MassesB!'MassDensity[9]'	0.2818
1	MassUnc	=WinPrompt|MassesB!'MassUnc[0]'	2.20462E-08
2	MassUnc	=WinPrompt|MassesB!'MassUnc[1]'	2.20462E-08

Topic	Field	DDE Command	Output Sample
3	MassUnc	=WinPrompt|MassesB!'MassUnc[2]'	2.20462E-08
4	MassUnc	=WinPrompt|MassesB!'MassUnc[3]'	2.20462E-08
5	MassUnc	=WinPrompt|MassesB!'MassUnc[4]'	2.20462E-08
6	MassUnc	=WinPrompt|MassesB!'MassUnc[5]'	2.20462E-08
7	MassUnc	=WinPrompt|MassesB!'MassUnc[6]'	2.20462E-08
8	MassUnc	=WinPrompt|MassesB!'MassUnc[7]'	2.20462E-08
9	MassUnc	=WinPrompt|MassesB!'MassUnc[8]'	2.20462E-08
10	MassUnc	=WinPrompt|MassesB!'MassUnc[9]'	2.20462E-08
Procedure			
	Description	=WinPrompt|Procedure!Description	Test Sequence
	Count	=WinPrompt|Procedure!Count	15
	Reference	=WinPrompt|Procedure!Reference	Gauge
	OilMedium	=WinPrompt|Procedure!OilMedium	(none)
	GasMedium	=WinPrompt|Procedure!GasMedium	(none)
	OilHead	=WinPrompt|Procedure!OilHead	0
	GasHead	=WinPrompt|Procedure!GasHead	0
	OilDensity	=WinPrompt|Procedure!OilDensity	0
	GasDensity	=WinPrompt|Procedure!GasDensity	0
	OilDensityUnc	=WinPrompt|Procedure!OilDensityUnc	0
	GasDensityUnc	=WinPrompt|Procedure!GasDensityUnc	0
	OilHeadUnc	=WinPrompt|Procedure!OilHeadUnc	0
	GasHeadUnc	=WinPrompt|Procedure!GasHeadUnc	0
	DwgAFPIUnc	=WinPrompt|Procedure!DwgAFPIUnc	0.001
	DwgATempUnc	=WinPrompt|Procedure!DwgATempUnc	0.1
	DwgAVacuumUnc	=WinPrompt|Procedure!DwgAVacuumUnc	1
	DwgBFPIUnc	=WinPrompt|Procedure!DwgBFPIUnc	0.001
	DwgBTempUnc	=WinPrompt|Procedure!DwgBTempUnc	0.1
	DwgBVacuumUnc	=WinPrompt|Procedure!DwgBVacuumUnc	1
	TempUnc	=WinPrompt|Procedure!TempUnc	1
	HumidityUnc	=WinPrompt|Procedure!HumidityUnc	3
	BarometerUnc	=WinPrompt|Procedure!BarometerUnc	0.1
	AirDensityUnc	=WinPrompt|Procedure!AirDensityUnc	0.00003
	GravityUnc	=WinPrompt|Procedure!GravityUnc	9.84252E-07

Topic	Field	DDE Command	Output Sample
Sequence			
1	Pressure	=WinPrompt|Sequence!'Pressure[0]'	1.5
2	Pressure	=WinPrompt|Sequence!'Pressure[1]'	1.75
3	Pressure	=WinPrompt|Sequence!'Pressure[2]'	2
4	Pressure	=WinPrompt|Sequence!'Pressure[3]'	2.25
5	Pressure	=WinPrompt|Sequence!'Pressure[4]'	2.5
6	Pressure	=WinPrompt|Sequence!'Pressure[5]'	2.75
7	Pressure	=WinPrompt|Sequence!'Pressure[6]'	3
8	Pressure	=WinPrompt|Sequence!'Pressure[7]'	3.25
9	Pressure	=WinPrompt|Sequence!'Pressure[8]'	3.5
10	Pressure	=WinPrompt|Sequence!'Pressure[9]'	3.75
Calibration			
	Model	=WinPrompt|Calibration!Model	0
	Serial	=WinPrompt|Calibration!Serial	0
	Description	=WinPrompt|Calibration!Description	0
	Comment	=WinPrompt|Calibration!Comment	0
	Pressure	=WinPrompt|Calibration!Pressure	0
CalDwgA			
1	FPI	=WinPrompt|CalDwgA!'FPI[0]'	0.01
2	FPI	=WinPrompt|CalDwgA!'FPI[1]'	0.01
3	FPI	=WinPrompt|CalDwgA!'FPI[2]'	0.01
4	FPI	=WinPrompt|CalDwgA!'FPI[3]'	0.01
5	FPI	=WinPrompt|CalDwgA!'FPI[4]'	0.01
6	FPI	=WinPrompt|CalDwgA!'FPI[5]'	0.01
7	FPI	=WinPrompt|CalDwgA!'FPI[6]'	0.01
8	FPI	=WinPrompt|CalDwgA!'FPI[7]'	0.01
9	FPI	=WinPrompt|CalDwgA!'FPI[8]'	0.01
10	FPI	=WinPrompt|CalDwgA!'FPI[9]'	0.01
1	Temp	=WinPrompt|CalDwgA!'Temp[0]'	30
2	Temp	=WinPrompt|CalDwgA!'Temp[1]'	30
3	Temp	=WinPrompt|CalDwgA!'Temp[2]'	30
4	Temp	=WinPrompt|CalDwgA!'Temp[3]'	30
5	Temp	=WinPrompt|CalDwgA!'Temp[4]'	30
6	Temp	=WinPrompt|CalDwgA!'Temp[5]'	30

Topic	Field	DDE Command	Output Sample
7	Temp	=WinPrompt|CalDwgA!'Temp[6]'	30
8	Temp	=WinPrompt|CalDwgA!'Temp[7]'	30
9	Temp	=WinPrompt|CalDwgA!'Temp[8]'	30
10	Temp	=WinPrompt|CalDwgA!'Temp[9]'	30
1	Vacuum	=WinPrompt|CalDwgA!'Vacuum[0]'	100
2	Vacuum	=WinPrompt|CalDwgA!'Vacuum[1]'	100
3	Vacuum	=WinPrompt|CalDwgA!'Vacuum[2]'	100
4	Vacuum	=WinPrompt|CalDwgA!'Vacuum[3]'	100
5	Vacuum	=WinPrompt|CalDwgA!'Vacuum[4]'	100
6	Vacuum	=WinPrompt|CalDwgA!'Vacuum[5]'	100
7	Vacuum	=WinPrompt|CalDwgA!'Vacuum[6]'	100
8	Vacuum	=WinPrompt|CalDwgA!'Vacuum[7]'	100
9	Vacuum	=WinPrompt|CalDwgA!'Vacuum[8]'	100
10	Vacuum	=WinPrompt|CalDwgA!'Vacuum[9]'	100
1	SinkRate	=WinPrompt|CalDwgA!'SinkRate[0]'	0
2	SinkRate	=WinPrompt|CalDwgA!'SinkRate[1]'	0
3	SinkRate	=WinPrompt|CalDwgA!'SinkRate[2]'	0
4	SinkRate	=WinPrompt|CalDwgA!'SinkRate[3]'	0
5	SinkRate	=WinPrompt|CalDwgA!'SinkRate[4]'	0
6	SinkRate	=WinPrompt|CalDwgA!'SinkRate[5]'	0
7	SinkRate	=WinPrompt|CalDwgA!'SinkRate[6]'	0
8	SinkRate	=WinPrompt|CalDwgA!'SinkRate[7]'	0
9	SinkRate	=WinPrompt|CalDwgA!'SinkRate[8]'	0
10	SinkRate	=WinPrompt|CalDwgA!'SinkRate[9]'	0
1	Rotation	=WinPrompt|CalDwgA!'Rotation[0]'	CW
2	Rotation	=WinPrompt|CalDwgA!'Rotation[1]'	CW
3	Rotation	=WinPrompt|CalDwgA!'Rotation[2]'	CW
4	Rotation	=WinPrompt|CalDwgA!'Rotation[3]'	CW
5	Rotation	=WinPrompt|CalDwgA!'Rotation[4]'	CW
6	Rotation	=WinPrompt|CalDwgA!'Rotation[5]'	CW
7	Rotation	=WinPrompt|CalDwgA!'Rotation[6]'	CW
8	Rotation	=WinPrompt|CalDwgA!'Rotation[7]'	CW
9	Rotation	=WinPrompt|CalDwgA!'Rotation[8]'	CW
10	Rotation	=WinPrompt|CalDwgA!'Rotation[9]'	CW

Topic	Field	DDE Command	Output Sample
CalDwgB			
1	FPI	=WinPrompt|CalDwgB!'FPI[0]'	0.02
2	FPI	=WinPrompt|CalDwgB!'FPI[1]'	0.02
3	FPI	=WinPrompt|CalDwgB!'FPI[2]'	0.02
4	FPI	=WinPrompt|CalDwgB!'FPI[3]'	0.02
5	FPI	=WinPrompt|CalDwgB!'FPI[4]'	0.02
6	FPI	=WinPrompt|CalDwgB!'FPI[5]'	0.02
7	FPI	=WinPrompt|CalDwgB!'FPI[6]'	0.02
8	FPI	=WinPrompt|CalDwgB!'FPI[7]'	0.02
9	FPI	=WinPrompt|CalDwgB!'FPI[8]'	0.02
10	FPI	=WinPrompt|CalDwgB!'FPI[9]'	0.02
1	Temp	=WinPrompt|CalDwgB!'Temp[0]'	31
2	Temp	=WinPrompt|CalDwgB!'Temp[1]'	31
3	Temp	=WinPrompt|CalDwgB!'Temp[2]'	31
4	Temp	=WinPrompt|CalDwgB!'Temp[3]'	31
5	Temp	=WinPrompt|CalDwgB!'Temp[4]'	31
6	Temp	=WinPrompt|CalDwgB!'Temp[5]'	31
7	Temp	=WinPrompt|CalDwgB!'Temp[6]'	31
8	Temp	=WinPrompt|CalDwgB!'Temp[7]'	31
9	Temp	=WinPrompt|CalDwgB!'Temp[8]'	31
10	Temp	=WinPrompt|CalDwgB!'Temp[9]'	31
1	Vacuum	=WinPrompt|CalDwgB!'Vacuum[0]'	110
2	Vacuum	=WinPrompt|CalDwgB!'Vacuum[1]'	110
3	Vacuum	=WinPrompt|CalDwgB!'Vacuum[2]'	110
4	Vacuum	=WinPrompt|CalDwgB!'Vacuum[3]'	110
5	Vacuum	=WinPrompt|CalDwgB!'Vacuum[4]'	110
6	Vacuum	=WinPrompt|CalDwgB!'Vacuum[5]'	110
7	Vacuum	=WinPrompt|CalDwgB!'Vacuum[6]'	110
8	Vacuum	=WinPrompt|CalDwgB!'Vacuum[7]'	110
9	Vacuum	=WinPrompt|CalDwgB!'Vacuum[8]'	110
10	Vacuum	=WinPrompt|CalDwgB!'Vacuum[9]'	110
1	SinkRate	=WinPrompt|CalDwgB!'SinkRate[0]'	0
2	SinkRate	=WinPrompt|CalDwgB!'SinkRate[1]'	0
3	SinkRate	=WinPrompt|CalDwgB!'SinkRate[2]'	0

Topic	Field	DDE Command	Output Sample
4	SinkRate	=WinPrompt|CalDwgB!'SinkRate[3]'	0
5	SinkRate	=WinPrompt|CalDwgB!'SinkRate[4]'	0
6	SinkRate	=WinPrompt|CalDwgB!'SinkRate[5]'	0
7	SinkRate	=WinPrompt|CalDwgB!'SinkRate[6]'	0
8	SinkRate	=WinPrompt|CalDwgB!'SinkRate[7]'	0
9	SinkRate	=WinPrompt|CalDwgB!'SinkRate[8]'	0
10	SinkRate	=WinPrompt|CalDwgB!'SinkRate[9]'	0
1	Rotation	=WinPrompt|CalDwgB!'Rotation[0]'	CW
2	Rotation	=WinPrompt|CalDwgB!'Rotation[1]'	CW
3	Rotation	=WinPrompt|CalDwgB!'Rotation[2]'	CW
4	Rotation	=WinPrompt|CalDwgB!'Rotation[3]'	CW
5	Rotation	=WinPrompt|CalDwgB!'Rotation[4]'	CW
6	Rotation	=WinPrompt|CalDwgB!'Rotation[5]'	CW
7	Rotation	=WinPrompt|CalDwgB!'Rotation[6]'	CW
8	Rotation	=WinPrompt|CalDwgB!'Rotation[7]'	CW
9	Rotation	=WinPrompt|CalDwgB!'Rotation[8]'	CW
10	Rotation	=WinPrompt|CalDwgB!'Rotation[9]'	CW
CalData			
1	Temp	=WinPrompt|CalData!'Temp[0]'	27
2	Temp	=WinPrompt|CalData!'Temp[1]'	27
3	Temp	=WinPrompt|CalData!'Temp[2]'	27
4	Temp	=WinPrompt|CalData!'Temp[3]'	27
5	Temp	=WinPrompt|CalData!'Temp[4]'	27
6	Temp	=WinPrompt|CalData!'Temp[5]'	27
7	Temp	=WinPrompt|CalData!'Temp[6]'	27
8	Temp	=WinPrompt|CalData!'Temp[7]'	27
9	Temp	=WinPrompt|CalData!'Temp[8]'	27
10	Temp	=WinPrompt|CalData!'Temp[9]'	27
1	Humidity	=WinPrompt|CalData!'Humidity[0]'	65
2	Humidity	=WinPrompt|CalData!'Humidity[1]'	65
3	Humidity	=WinPrompt|CalData!'Humidity[2]'	65
4	Humidity	=WinPrompt|CalData!'Humidity[3]'	65
5	Humidity	=WinPrompt|CalData!'Humidity[4]'	65
6	Humidity	=WinPrompt|CalData!'Humidity[5]'	65

Topic	Field	DDE Command	Output Sample
7	Humidity	=WinPrompt|CalData!'Humidity[6]'	65
8	Humidity	=WinPrompt|CalData!'Humidity[7]'	65
9	Humidity	=WinPrompt|CalData!'Humidity[8]'	65
10	Humidity	=WinPrompt|CalData!'Humidity[9]'	65
1	Barometer	=WinPrompt|CalData!'Barometer[0]'	14.7
2	Barometer	=WinPrompt|CalData!'Barometer[1]'	14.7
3	Barometer	=WinPrompt|CalData!'Barometer[2]'	14.7
4	Barometer	=WinPrompt|CalData!'Barometer[3]'	14.7
5	Barometer	=WinPrompt|CalData!'Barometer[4]'	14.7
6	Barometer	=WinPrompt|CalData!'Barometer[5]'	14.7
7	Barometer	=WinPrompt|CalData!'Barometer[6]'	14.7
8	Barometer	=WinPrompt|CalData!'Barometer[7]'	14.7
9	Barometer	=WinPrompt|CalData!'Barometer[8]'	14.7
10	Barometer	=WinPrompt|CalData!'Barometer[9]'	14.7
1	AirDensity	=WinPrompt|CalData!'AirDensity[0]'	0.00004214
2	AirDensity	=WinPrompt|CalData!'AirDensity[1]'	0.00004214
3	AirDensity	=WinPrompt|CalData!'AirDensity[2]'	0.00004214
4	AirDensity	=WinPrompt|CalData!'AirDensity[3]'	0.00004214
5	AirDensity	=WinPrompt|CalData!'AirDensity[4]'	0.00004214
6	AirDensity	=WinPrompt|CalData!'AirDensity[5]'	0.00004214
7	AirDensity	=WinPrompt|CalData!'AirDensity[6]'	0.00004214
8	AirDensity	=WinPrompt|CalData!'AirDensity[7]'	0.00004214
9	AirDensity	=WinPrompt|CalData!'AirDensity[8]'	0.00004214
10	AirDensity	=WinPrompt|CalData!'AirDensity[9]'	0.00004214
1	Gravity	=WinPrompt|CalData!'Gravity[0]'	32.1044
2	Gravity	=WinPrompt|CalData!'Gravity[1]'	32.1044
3	Gravity	=WinPrompt|CalData!'Gravity[2]'	32.1044
4	Gravity	=WinPrompt|CalData!'Gravity[3]'	32.1044
5	Gravity	=WinPrompt|CalData!'Gravity[4]'	32.1044
6	Gravity	=WinPrompt|CalData!'Gravity[5]'	32.1044
7	Gravity	=WinPrompt|CalData!'Gravity[6]'	32.1044
8	Gravity	=WinPrompt|CalData!'Gravity[7]'	32.1044
9	Gravity	=WinPrompt|CalData!'Gravity[8]'	32.1044
10	Gravity	=WinPrompt|CalData!'Gravity[9]'	32.1044

Topic	Field	DDE Command	Output Sample
1	LatitudeDeg	=WinPrompt|CalData!'LatitudeDeg[0]'	0
2	LatitudeDeg	=WinPrompt|CalData!'LatitudeDeg[1]'	0
3	LatitudeDeg	=WinPrompt|CalData!'LatitudeDeg[2]'	0
4	LatitudeDeg	=WinPrompt|CalData!'LatitudeDeg[3]'	0
5	LatitudeDeg	=WinPrompt|CalData!'LatitudeDeg[4]'	0
6	LatitudeDeg	=WinPrompt|CalData!'LatitudeDeg[5]'	0
7	LatitudeDeg	=WinPrompt|CalData!'LatitudeDeg[6]'	0
8	LatitudeDeg	=WinPrompt|CalData!'LatitudeDeg[7]'	0
9	LatitudeDeg	=WinPrompt|CalData!'LatitudeDeg[8]'	0
10	LatitudeDeg	=WinPrompt|CalData!'LatitudeDeg[9]'	0
1	LatitudeMin	=WinPrompt|CalData!'LatitudeMin[0]'	0
2	LatitudeMin	=WinPrompt|CalData!'LatitudeMin[1]'	0
3	LatitudeMin	=WinPrompt|CalData!'LatitudeMin[2]'	0
4	LatitudeMin	=WinPrompt|CalData!'LatitudeMin[3]'	0
5	LatitudeMin	=WinPrompt|CalData!'LatitudeMin[4]'	0
6	LatitudeMin	=WinPrompt|CalData!'LatitudeMin[5]'	0
7	LatitudeMin	=WinPrompt|CalData!'LatitudeMin[6]'	0
8	LatitudeMin	=WinPrompt|CalData!'LatitudeMin[7]'	0
9	LatitudeMin	=WinPrompt|CalData!'LatitudeMin[8]'	0
10	LatitudeMin	=WinPrompt|CalData!'LatitudeMin[9]'	0
1	Elevation	=WinPrompt|CalData!'Elevation[0]'	0
2	Elevation	=WinPrompt|CalData!'Elevation[1]'	0
3	Elevation	=WinPrompt|CalData!'Elevation[2]'	0
4	Elevation	=WinPrompt|CalData!'Elevation[3]'	0
5	Elevation	=WinPrompt|CalData!'Elevation[4]'	0
6	Elevation	=WinPrompt|CalData!'Elevation[5]'	0
7	Elevation	=WinPrompt|CalData!'Elevation[6]'	0
8	Elevation	=WinPrompt|CalData!'Elevation[7]'	0
9	Elevation	=WinPrompt|CalData!'Elevation[8]'	0
10	Elevation	=WinPrompt|CalData!'Elevation[9]'	0
1	StdTrim	=WinPrompt|CalData!'StdTrim[0]'	7.207
2	StdTrim	=WinPrompt|CalData!'StdTrim[1]'	7.861
3	StdTrim	=WinPrompt|CalData!'StdTrim[2]'	8.574
4	StdTrim	=WinPrompt|CalData!'StdTrim[3]'	0.276

Topic	Field	DDE Command	Output Sample
5	StdTrim	=WinPrompt|CalData!'StdTrim[4]'	1.11
6	StdTrim	=WinPrompt|CalData!'StdTrim[5]'	2.005
7	StdTrim	=WinPrompt|CalData!'StdTrim[6]'	2.962
8	StdTrim	=WinPrompt|CalData!'StdTrim[7]'	3.98
9	StdTrim	=WinPrompt|CalData!'StdTrim[8]'	5.061
10	StdTrim	=WinPrompt|CalData!'StdTrim[9]'	6.205
1	TestTrim	=WinPrompt|CalData!'TestTrim[0]'	7.207
2	TestTrim	=WinPrompt|CalData!'TestTrim[1]'	7.861
3	TestTrim	=WinPrompt|CalData!'TestTrim[2]'	8.574
4	TestTrim	=WinPrompt|CalData!'TestTrim[3]'	0.276
5	TestTrim	=WinPrompt|CalData!'TestTrim[4]'	1.11
6	TestTrim	=WinPrompt|CalData!'TestTrim[5]'	2.005
7	TestTrim	=WinPrompt|CalData!'TestTrim[6]'	2.962
8	TestTrim	=WinPrompt|CalData!'TestTrim[7]'	3.98
9	TestTrim	=WinPrompt|CalData!'TestTrim[8]'	5.061
10	TestTrim	=WinPrompt|CalData!'TestTrim[9]'	6.205
1	Reading	=WinPrompt|CalData!'Reading[0]'	0
2	Reading	=WinPrompt|CalData!'Reading[1]'	0
3	Reading	=WinPrompt|CalData!'Reading[2]'	0
4	Reading	=WinPrompt|CalData!'Reading[3]'	0
5	Reading	=WinPrompt|CalData!'Reading[4]'	0
6	Reading	=WinPrompt|CalData!'Reading[5]'	0
7	Reading	=WinPrompt|CalData!'Reading[6]'	0
8	Reading	=WinPrompt|CalData!'Reading[7]'	0
9	Reading	=WinPrompt|CalData!'Reading[8]'	0
10	Reading	=WinPrompt|CalData!'Reading[9]'	0
1	Actual	=WinPrompt|CalData!'Actual[0]'	1.5
2	Actual	=WinPrompt|CalData!'Actual[1]'	1.75
3	Actual	=WinPrompt|CalData!'Actual[2]'	2
4	Actual	=WinPrompt|CalData!'Actual[3]'	2.25
5	Actual	=WinPrompt|CalData!'Actual[4]'	2.5
6	Actual	=WinPrompt|CalData!'Actual[5]'	2.75
7	Actual	=WinPrompt|CalData!'Actual[6]'	3
8	Actual	=WinPrompt|CalData!'Actual[7]'	3.25

Topic	Field	DDE Command	Output Sample
9	Actual	=WinPrompt|CalData!'Actual[8]'	3.5
10	Actual	=WinPrompt|CalData!'Actual[9]'	3.75
1	StdMass	=WinPrompt|CalData!'StdMass[0]'	1,10,11
2	StdMass	=WinPrompt|CalData!'StdMass[1]'	1,8
3	StdMass	=WinPrompt|CalData!'StdMass[2]'	1,7,10,11
4	StdMass	=WinPrompt|CalData!'StdMass[3]'	1,7,8,13
5	StdMass	=WinPrompt|CalData!'StdMass[4]'	1,2,10,11,13
6	StdMass	=WinPrompt|CalData!'StdMass[5]'	1,2,8,13
7	StdMass	=WinPrompt|CalData!'StdMass[6]'	1,2,7,10,11,13
8	StdMass	=WinPrompt|CalData!'StdMass[7]'	1,2,7,8,13
9	StdMass	=WinPrompt|CalData!'StdMass[8]'	1-3,10,11,13
10	StdMass	=WinPrompt|CalData!'StdMass[9]'	1-3,8,13
1	TestMass	=WinPrompt|CalData!'TestMass[0]'	1,10,11
2	TestMass	=WinPrompt|CalData!'TestMass[1]'	1,8
3	TestMass	=WinPrompt|CalData!'TestMass[2]'	1,7,10,11
4	TestMass	=WinPrompt|CalData!'TestMass[3]'	1,7,8,13
5	TestMass	=WinPrompt|CalData!'TestMass[4]'	1,2,10,11,13
6	TestMass	=WinPrompt|CalData!'TestMass[5]'	1,2,8,13
7	TestMass	=WinPrompt|CalData!'TestMass[6]'	1,2,7,10,11,13
8	TestMass	=WinPrompt|CalData!'TestMass[7]'	1,2,7,8,13
9	TestMass	=WinPrompt|CalData!'TestMass[8]'	1-3,10,11,13
10	TestMass	=WinPrompt|CalData!'TestMass[9]'	1-3,8,13
1	StdTotal	=WinPrompt|CalData!'StdTotal[0]'	1.505926
2	StdTotal	=WinPrompt|CalData!'StdTotal[1]'	1.757368
3	StdTotal	=WinPrompt|CalData!'StdTotal[2]'	2.00894
4	StdTotal	=WinPrompt|CalData!'StdTotal[3]'	2.260646
5	StdTotal	=WinPrompt|CalData!'StdTotal[4]'	2.512484
6	StdTotal	=WinPrompt|CalData!'StdTotal[5]'	2.764457
7	StdTotal	=WinPrompt|CalData!'StdTotal[6]'	3.016567
8	StdTotal	=WinPrompt|CalData!'StdTotal[7]'	3.268812
9	StdTotal	=WinPrompt|CalData!'StdTotal[8]'	3.521195
10	StdTotal	=WinPrompt|CalData!'StdTotal[9]'	3.773717
1	TestTotal	=WinPrompt|CalData!'TestTotal[0]'	3.653589
2	TestTotal	=WinPrompt|CalData!'TestTotal[1]'	3.985724

Topic	Field	DDE Command	Output Sample
3	TestTotal	=WinPrompt|CalData!'TestTotal[2]'	4.758914
4	TestTotal	=WinPrompt|CalData!'TestTotal[3]'	5.115406
5	TestTotal	=WinPrompt|CalData!'TestTotal[4]'	5.888862
6	TestTotal	=WinPrompt|CalData!'TestTotal[5]'	6.221529
7	TestTotal	=WinPrompt|CalData!'TestTotal[6]'	6.995256
8	TestTotal	=WinPrompt|CalData!'TestTotal[7]'	7.328194
9	TestTotal	=WinPrompt|CalData!'TestTotal[8]'	8.102195
10	TestTotal	=WinPrompt|CalData!'TestTotal[9]'	8.435411
1	Accepted	=WinPrompt|CalData!'Accepted[0]'	Yes
2	Accepted	=WinPrompt|CalData!'Accepted[1]'	Yes
3	Accepted	=WinPrompt|CalData!'Accepted[2]'	Yes
4	Accepted	=WinPrompt|CalData!'Accepted[3]'	Yes
5	Accepted	=WinPrompt|CalData!'Accepted[4]'	Yes
6	Accepted	=WinPrompt|CalData!'Accepted[5]'	Yes
7	Accepted	=WinPrompt|CalData!'Accepted[6]'	Yes
8	Accepted	=WinPrompt|CalData!'Accepted[7]'	Yes
9	Accepted	=WinPrompt|CalData!'Accepted[8]'	Yes
10	Accepted	=WinPrompt|CalData!'Accepted[9]'	Yes
1	Comment	=WinPrompt|CalData!'Comment[0]'	0
2	Comment	=WinPrompt|CalData!'Comment[1]'	0
3	Comment	=WinPrompt|CalData!'Comment[2]'	0
4	Comment	=WinPrompt|CalData!'Comment[3]'	0
5	Comment	=WinPrompt|CalData!'Comment[4]'	0
6	Comment	=WinPrompt|CalData!'Comment[5]'	0
7	Comment	=WinPrompt|CalData!'Comment[6]'	0
8	Comment	=WinPrompt|CalData!'Comment[7]'	0
9	Comment	=WinPrompt|CalData!'Comment[8]'	0
10	Comment	=WinPrompt|CalData!'Comment[9]'	0
1	Date	=WinPrompt|CalData!'Date[0]'	12/03/1996
2	Date	=WinPrompt|CalData!'Date[1]'	12/03/1996
3	Date	=WinPrompt|CalData!'Date[2]'	12/03/1996
4	Date	=WinPrompt|CalData!'Date[3]'	12/03/1996
5	Date	=WinPrompt|CalData!'Date[4]'	12/03/1996
6	Date	=WinPrompt|CalData!'Date[5]'	12/03/1996

Topic	Field	DDE Command	Output Sample
7	Date	=WinPrompt|CalData!'Date[6]'	12/03/1996
8	Date	=WinPrompt|CalData!'Date[7]'	12/03/1996
9	Date	=WinPrompt|CalData!'Date[8]'	12/03/1996
10	Date	=WinPrompt|CalData!'Date[9]'	12/03/1996
1	Time	=WinPrompt|CalData!'Time[0]'	13:42:56
2	Time	=WinPrompt|CalData!'Time[1]'	13:43:31
3	Time	=WinPrompt|CalData!'Time[2]'	13:44:54
4	Time	=WinPrompt|CalData!'Time[3]'	13:45:11
5	Time	=WinPrompt|CalData!'Time[4]'	13:45:28
6	Time	=WinPrompt|CalData!'Time[5]'	13:45:46
7	Time	=WinPrompt|CalData!'Time[6]'	13:46:05
8	Time	=WinPrompt|CalData!'Time[7]'	13:46:49
9	Time	=WinPrompt|CalData!'Time[8]'	13:47:20
10	Time	=WinPrompt|CalData!'Time[9]'	13:47:35
Calculate			
	TotalMass	=WinPrompt|Calculate!TotalMass	5.038437
	TareMass	=WinPrompt|Calculate!TareMass	0.8400371
	Trim	=WinPrompt|Calculate!Trim	3.81
	GasDensity	=WinPrompt|Calculate!GasDensity	0
	OilDensity	=WinPrompt|Calculate!OilDensity	0
	Reference	=WinPrompt|Calculate!Reference	0
	GasHeadPress	=WinPrompt|Calculate!GasHeadPress	0
	OilHeadPress	=WinPrompt|Calculate!OilHeadPress	0
	CorrPress	=WinPrompt|Calculate!CorrPress	5
	NominalMass	=WinPrompt|Calculate!NominalMass	4.903326
	PressCorr	=WinPrompt|Calculate!PressCorr	1.00525
	TempCorr	=WinPrompt|Calculate!TempCorr	1.000105
	GravityCorr	=WinPrompt|Calculate!GravityCorr	9.78396E-06
DwgA			
	Fpi	=WinPrompt|DwgA!Fpi	0.01
	Temp	=WinPrompt|DwgA!Temp	30
	Vacuum	=WinPrompt|DwgA!Vacuum	100
	SinkRate	=WinPrompt|DwgA!SinkRate	0
	Rotation	=WinPrompt|DwgA!Rotation	CW

Topic	Field	DDE Command	Output Sample
DwgB			
	Fpi	=WinPrompt|DwgB!Fpi	0.02
	Temp	=WinPrompt|DwgB!Temp	31
	Vacuum	=WinPrompt|DwgB!Vacuum	110
	SinkRate	=WinPrompt|DwgB!SinkRate	0
	Rotation	=WinPrompt|DwgB!Rotation	CW
Current			
	Temp	=WinPrompt|Current!Temp	27
	Humidity	=WinPrompt|Current!Humidity	65
	Barometer	=WinPrompt|Current!Barometer	14.7
	AirDensity	=WinPrompt|Current!AirDensity	0.00004214
	Gravity	=WinPrompt|Current!Gravity	32.1044
	StatusText	=WinPrompt|Current!StatusText	11.1 Abs psi 14.53 Abs Ref
	StatusColBack	=WinPrompt|Current!StatusColBack	Red
	StatusColFore	=WinPrompt|Current!StatusColFore	Default
System			
	Topics	=WinPrompt|System!Topics	o_System
	SysItems	=WinPrompt|System!SysItems	o_System
	Status	=WinPrompt|System!Status	Ready
	Formats	=WinPrompt|System!Formats	TEXT

Appendix D
Glossary

Glossary

Ao
Effective area of the piston/cylinder at zero pressure and at the reference temperature.

Absolute
Pressure measurement referenced to absolute vacuum. See also gauge.

Accepted
Point for which calibration data has been recorded.

Apparent Mass Reference Density
Density used to computer Apparent Mass values.

b1
Linear coefficient of elastic distortion.

b2
Quadratic coefficient of elastic distortion.

Buoyancy
An object submerged in a fluid is buoyed up by the fluid. The air surrounding the deadweight gauge masses reduces the downward force acting on the piston. The equilibrium pressure acting on the bottom of the piston is also less. The buoyant effect of "normal" air acting on stainless steel deadweight gauge masses reduces the pressure by approximately 0.015% or 150 parts per million. See also Mass Apparent; Reference Density; and Density of Air.

c
Coefficient of thermal expansion.

Calibration File
Records all information for a single calibration. When a new calibration file is created, the user is prompted for a Procedure file to base it on. (Click Cancel on the Insert File dialog to create a Calibration file without loading a procedure.)

Constant
Allows entry of a fixed value for the variable.

Cross Float
The calibration of one deadweight gauge against another deadweight gauge.

D
Reference dimension for the hanger mass.

Data Acquisition
Uses a hardware device to read the value directly. The hardware device must be attached and a driver installed.

Density, Air
Density of the air used to computer the buoyant effect of air on the masses. May be entered directly or computed from ambient temperature, humidity and pressure.

Density, Gas
Density of the gas medium used to compute head corrections. Gas density may be entered directly or may be computed from the gas used and the current pressure.

Density, Oil
Density of the oil medium used to compute head corrections. Oil density may be entered directly or may be selected from the list of available mediums.

Density, True
The actual density (mass per unit volume) of the mass or piston. See

also Reference Density; Density of Air; and Mass Apparent.

DUT
Device under test, the device being calibrated.

English Units:

Pressure	psi
A_0	in^2
b_1	$in^2/in^2/psi$
b_2	$in^2/in^2/psi^2$
c	$in^2/in^2/^oC$
Mass	lbm
Head Height	in
Elevation	ft
Length	in
Sink Rate	in/min
Vacuum	microns
Temperature	^oC
Trim	g
Gravity	cm/sec^2
Density	g/cm^3
Humidity	% RH

Elevation
Elevation above sea level for computing approximate Gravity.

Float Position
Distance of the piston from mid-float. Positive values are higher, negative values are lower than mid-float.

Formula
Calculates the variable using other variables. See Gravity, and Air Density.

Gauge
Pressure measurement referenced to current atmospheric pressure.

Gravity
Force of gravity on the masses. May be entered directly or computed from Latitude and Elevation.

Gravity Factor
Mass correction factor for local gravity.

Head Height
Vertical distance between reference planes. A positive value indicates the Device Under Test is higher than the standard.

Head Correction
Pressure correction for head height.

Humidity
Current ambient relative humidity. Used to compute air density if not entered as a constant.

+INF, -INF
Infinity. The number is bigger than can be represented. Computing altitude at zero pressure will give this value.

L1
Distance from the top of the mass loading surface to the bottom of the piston.

Latitude
Distance from the equator in degrees and minutes of latitude. Used to compute local gravity if not entered as a constant.

Mass, Apparent
May be Apparent Mass versus Brass Standards or Apparent Mass versus Steel Standards. An expression of the effective mass of a given object with an assumed density, typically that of the standard used to measure the mass value. In a practical sense, Apparent Mass versus Brass Standards describes what an object appears to weigh when compared to a brass standard in the presence of a buoyant atmosphere. See also Buoyancy; Reference Density; True Mass; and Density of Air.

Mass, Nominal
Pressure converted to mass before corrections are applied.

Mass, Tare
Mass of the least number of components required to generate a pressure, in many cases the piston only.

Mass, Total
Mass used to generate a pressure. Included both platter masses and trim masses.

Mass, Trim
Small masses used to generate an exact pressure.

Mass Set File
Contains all information for a mass set.

Medium
The fluid or gas used to generate pressure.

+NAN, -NAN
Not A Number. The value cannot be computed (i.e., division by zero).

Piston/Cylinder File
Contains all information for a single piston/cylinder set.

Pressure, Ambient
Local atmospheric pressure.

Pressure, Corrected
Pressure after corrections have been applied.

Pressure Factor
Correction for the effect of pressure on the area of the piston.

Pressure Units:

MPa	Megapascals
kPa	kilopascals
hPa	hectopascals
Pa	pascals
bar	bars
psi	pounds per square inch
kg/cm^2	kilograms per square centimeter
mmHg 0^oC	millimeters of mercury at 0^oC
cmHg 0^oC	centimeters of mercury at 0^oC
inHg 0^oC	inches of mercury at 0^oC
inHg 60^oF	inches of mercury at 60^oF
cmH_2O 4^oC	centimeters of water at 4^oC
inH_2O 4^oC	inches of water at 4^oC
inH_2O 20^oC	inches of water at 20^oC
inH_2O 25^oC	inches of water at 20^oC
feet	feet of altitude
meters	meters of altitude
knots	airspeed knots
km/hr	airspeed kilometers per hour

Procedure File
Contains the setup for a calibration including piston, mass set, pressure sequence and environmental parameters. A procedure file is used to save the setup to be used for multiple calibrations.

Reference Density
Assumed density of the mass standard used to calibrate the mass. For mass values reported under the designation Apparent Mass versus Brass Standards, the Reference Density is typically 8.4 g/cm^3. For the designation Apparent Mass versus Stainless Steel Standards, the Reference Density is typically 8.0 g/cm^3. The appropriate value must be used for the Reference Density to achieve proper buoyancy corrections for gauge mode operation. For more information see Mass True, and Mass Apparent.

Reference Pressure
The pressure all other pressures are measured against. See Absolute and Gauge.

Requires
Indicates what other mass (e.g. hanger mass) is required before the selected mass can be loaded onto the piston.

Rotation
Direction the masses are rotating when measurement is taken.

Same As A
Uses the value from the Deadweight Gauge A variable.

SI Units:

Pressure	MPa
A_o	m^2
b_1	$m^2/m^2/MPa$
b_2	$m^2/m^2/MPa^2$
c	$m^2/m^2/^oC$
Mass	kg
Head Height	cm
Elevation	m
Length	m
Sink Rate	cm/min
Vacuum	mtorr
Temperature	^oC
Trim	g
Gravity	cm/sec^2
Density	g/cm^3
Humidity	% RH

Sink Rate
Rate of descent of piston into cylinder.

Sleeve Mass Offset
Offset is used when a low mass sleeve is used, whether alone, or with additional masses.

Standard Deadweight Gauge (DWG A)
Known gauge that other devices are compared against.

Temperature, Ambient
Temperature of the room.

Temperature, DWG
Temperature of the gas or oil measured at the deadweight gauge.

Temperature Factor
Correction for the effect of temperature on the area of the piston.

Temperature, Reference
Temperature selected by manufacturer for reporting piston/cylinder area.

Test Deadweight Gauge (DWG B)
Unknown gauge in a cross-float calibration.

True Density
Actual density of the mass or piston.

True Mass
Mass based on actual material density as if weighted in vacuum; a.k.a. Newtonian Mass.

Uncertainty
The amount of possible error in the value.

Vacuum
The difference between absolute vacuum and the vacuum actually used.