

PRESSCAL

***FIELD CALIBRATION SOFTWARE
FOR
DSA3000/3200/3300 SERIES MODULES
DSA3016 MODULES
ZOC 17/22/23/33 MODULES***

V4.07

Scanivalve

PREFACE

WARNINGS, CAUTIONS AND NOTES



WARNING

The WARNING! symbol indicates that danger of injury for persons and the environment and/or considerable damage (mortal danger, danger of injury) will occur if the respective safety precautions are not taken.



CAUTION

The CAUTION ! symbol indicate danger for the system and material if the respective safety precautions are not taken.



The ESD note symbol indicates that proper precautions for handling Electrostatic Sensitive Devices needs to be taken when performing the related operation. This includes the use of grounded work surfaces and personal wrist straps to prevent damage to sensitive electronic components.

WARRANTY

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not to be defective, shall be at the expense of Buyer or the end user, whichever has returned such product or component part.

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THIS WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY

OPERATION OF LAW OR OTHERWISE, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND IN NO EVENT SHALL SELLER BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

In the event of a failure:

1) Notify Scanivalve Corporation, Customer Service Department. Include model number and serial number. On receipt of this information, service data or shipping instructions will be forwarded. This may be transacted by telephone or e-mail.

2) On receipt of shipping instructions, forward the product, transportation prepaid. Repairs will be made and the product returned.

3) All shipments should be made via "Best Way". The product should be shipped in the original packing container or wrapped in protective material and surrounded by a minimum of four (4) inches of a shock absorbing material.

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All other brand and product names are trademarks or registered trademarks of their respective companies.

PACKAGING FOR SHIPMENT

If the product must be shipped, whether being returned to Scanivalve or relocated to another location it must be packaged properly to minimize the risk of damage. The recommended method of packing is to place the instrument in a container, surrounded on all sides with at least four inches of shock attenuating material such as Styrofoam peanuts.

IMPORTANT NOTICE

Please note that the product specifications and other information contained in this manual are subject to change without notice. Scanivalve Corporation makes an effort and strives to provide complete and current information for the proper use of the equipment. If there are any questions regarding this manual or the proper use of the equipment, contact Scanivalve Corporation.

CONTACT INFORMATION

If there are any questions or concerns regarding any Scanivalve product please do not hesitate to contact us at the following:

Scanivalve Corp.
1722 N. Madson Street
Liberty Lake, WA 99019
Telephone: (800)935-5151 (509)891-9970
Fax: (509)891-9481
scanco@scanivalve.com
www.scanivalve.com

Scanivalve Corporation is an ISO9001:2008 certified company.

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SECTION 1: INTRODUCTION

This software is used to re-calibrate all pressure scanners manufactured by Scanivalve Corp. The calibrations may be performed either in an automatic or manual mode. In the automatic mode the software will communicate with Scanivalve Corp SPC3000 or SPC4000 pressure calibrators. Pressures will be applied without operator intervention. In the manual mode, the user will use other secondary pressure standards and manually control the standard to apply the appropriate pressures. The software will have to be prompted to acquire data at each pressure point. Press-Cal is capable of calibrating multiple pressure ranges using multiple calibrators in a single test in both automatic and manual mode.

REQUIREMENTS

HARDWARE

Pentium III Processor or better
1 Mb RAM

SOFTWARE

Windows XP SP2 or higher (Professional is recommended)

-or-

Windows 7 SP1 or higher (Professional or higher is recommended)

Framework.net V2.0 or higher

NOTE: Framework.net is available as a free download from Microsoft.

SOFTWARE INSTALLATION

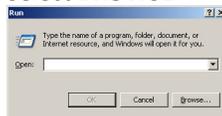
The PressCal Installation disk contains the following programs and files:

PressCal.msi
Setup.exe
Test Library

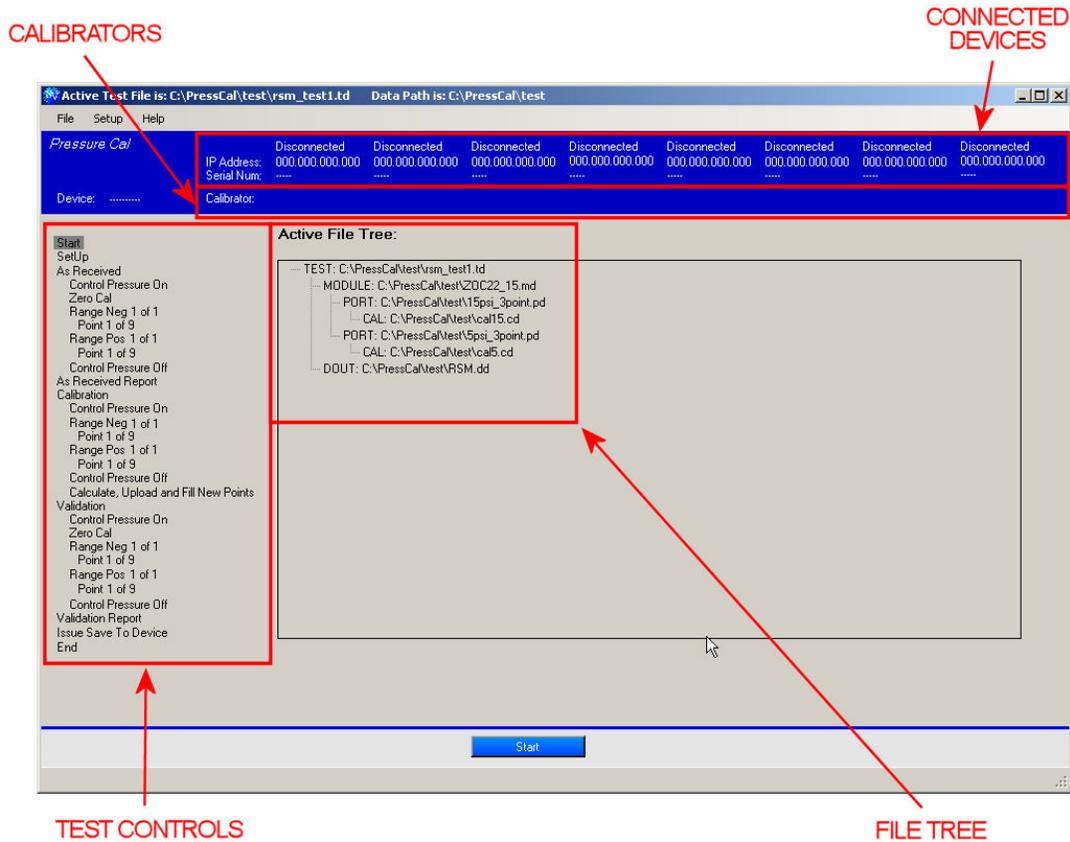
To install the software,

1. Place the Install CD in a CD or DVD drive
2. Click **START**, then **RUN**



3. Select **BROWSE**
- 
- A screenshot of the Windows Run dialog box. The dialog box is titled 'Run' and contains the text 'Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.' Below this text is an 'Open:' text box with a dropdown arrow. At the bottom of the dialog box are three buttons: 'OK', 'Cancel', and 'Browse...'. The 'Browse...' button is highlighted with a mouse cursor.
4. Open the drive where the CD is installed, highlight Setup.exe and click Open
 5. Click OK in the 'Run' window to start the installation process.
 6. Follow the on screen prompts to complete the installation process.

If PressCal has been downloaded from the Scanivalve website, unzip the file and double-click on the Setup.exe file. Follow the on screen prompts to complete the installation process.

START UP PAGE

Connected Devices: Displays all connected devices and their associated IP Address and Serial Number.

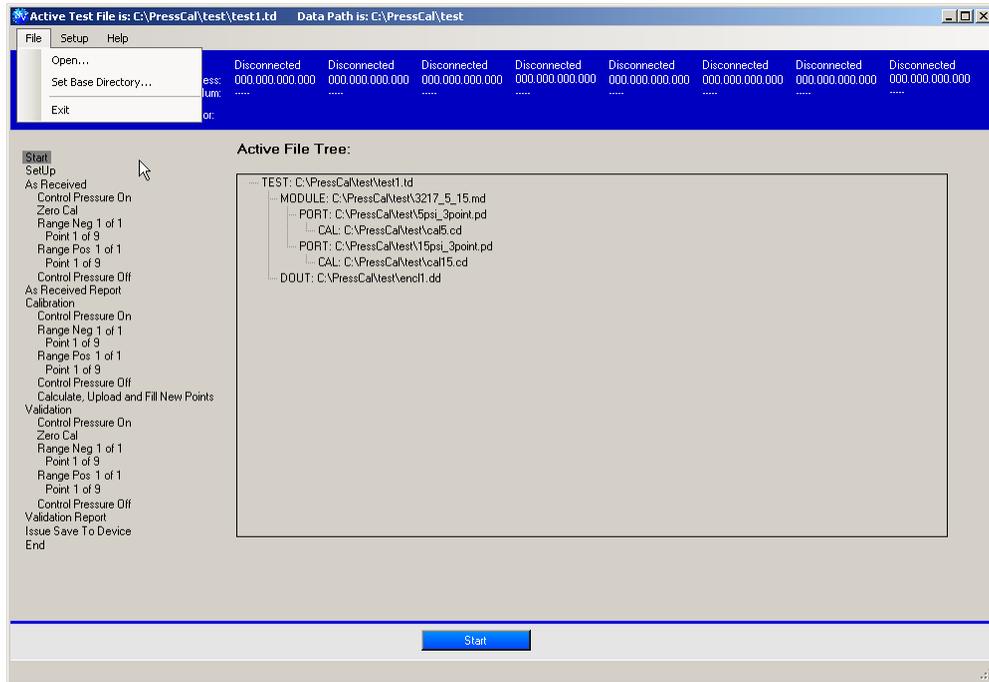
Calibrators: Lists the connected calibrators.

Test Controls: Allows the user to enable or disable test sections (As Received, Calibration, Validation)

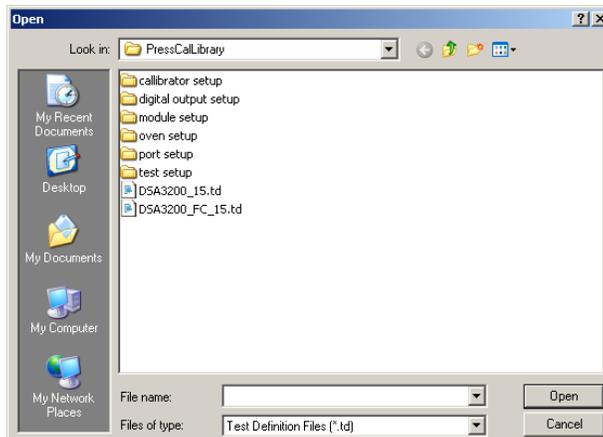
File Tree: Displays files used for the last saved test definition.

MAIN MENUS

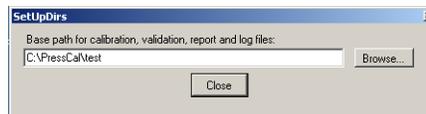
FILE



Open: Clicking this option will open the test selection window.



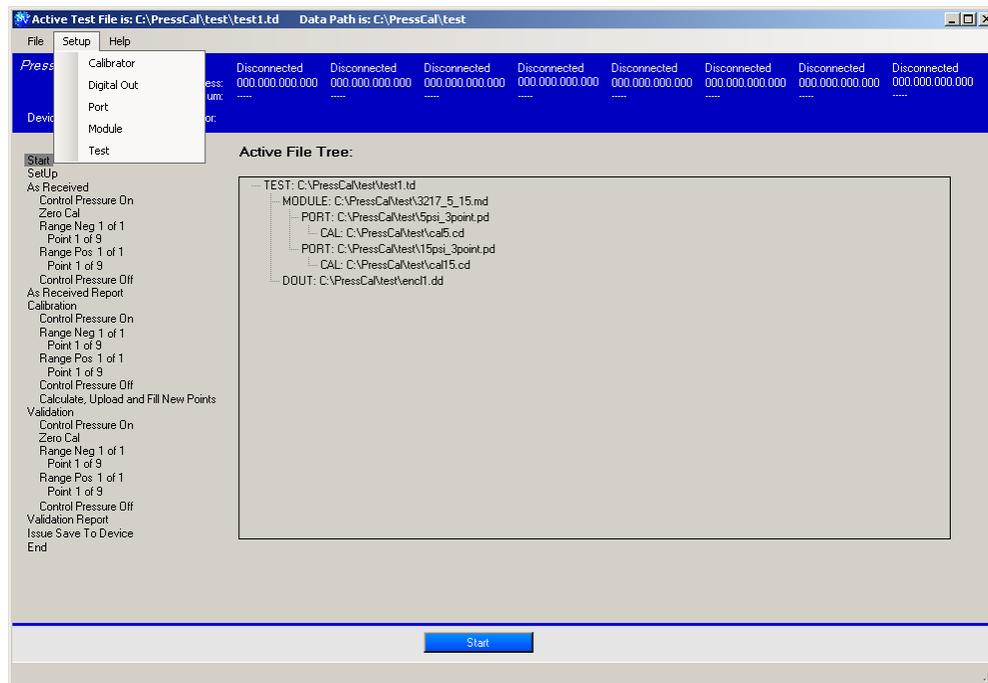
Set Base Directory: Use this option to set the default folder for the test definition files. The browse button allows the user to navigate to the desired directory.



Exit: Clicking this option will close the PressCal program.

SETUP

The options listed under setup are used to define the test. The options are listed in the order in which they must be defined.



Calibrator: This option is used to define the calibrator type, pressure range and location.

Digital Out: This option is used to define the digital outputs used to switch the control pressures.

Port: This option is used to define the pressures to be applied at each port in the module under test

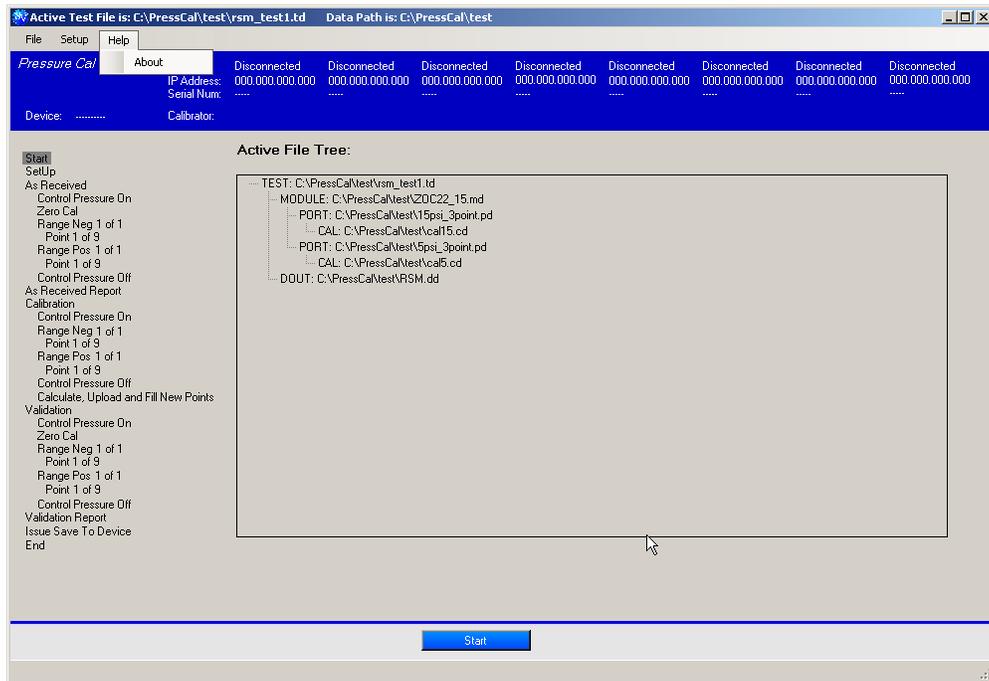
Module: This option is used to define the module location (IP address), the ports to be calibrated, and the port assignments

Test: This option is the final definition of the test.

NOTE: Configuring the setup of a test requires defining definition files for each part of the test. Definition files are required for the calibrator, the digital outputs, the ports, the modules and the overall test configuration. If a user has pre-defined a test, the individual definitions may be skipped. A test must be defined in the order listed in the setup list, from top to bottom.

HELP

The Help feature provides information on the PressCal software.



About: This will display specific software information including the software version number.

DEFINING A TEST**CALIBRATOR DEFINITIONS**

Click Setup, Calibrator to open the Calibrator Definition window. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Calibrator Definition files in the selected directory. Navigate to the desired directory then highlight the file to be used and click: Open. Only Calibrator Definition files will be shown.

If the calibrator must be defined:

1. Enter a Description. This is for reference only.
2. Set the Calibrator Type by highlighting one of the 6 options. Options are:
 - A. Automatic Gauge/Differential (SPC3000) - This should be selected if the calibrator is a SPC3000 using a Digiquartz 202VG as the Secondary Standard.
 - B. Automatic Absolute (SPC3000) - Select this option for all other SPC3000 Calibrators.
 - C. Manual Gauge - Select this option for any other Gauge type pressure standard.
 - D. Manual Absolute - Select this option for any other Absolute type pressure standard.
 - E. Automatic Gauge (SPC4000) - Select this option if the calibrator being used is a SPC4000.
 - F. Automatic Absolute (SPC4000)- Select this option if the calibrator being used is an SPC4000 with an Absolute type pressure standard.
3. Set the Calibrator Address. This will only be used for Automatic Calibrators.
4. Set the Nominal Pressure Range. Highlight the full scale pressure range of the pressure standard being used for the calibration.
5. Set the Max Module Pressure. This is the full scale value of the sensors in the module. This value will be used during the validation calculations to determine the errors of the sensors.
6. Set the Communication Type. This will only be used for Automatic Calibrators. Options are:
 - Serial - Select this if the Automatic Calibrator is an SPC3000 controlled by an enclosure, a DSM, or a direct serial connection. A SPC4000 calibrator may also be connected serially, but it is not recommended.
 - Device - Select this option if the Automatic Calibrator is an SPC3000 installed in a SPCENCL3200 Enclosure controlled by an Ethernet connection. The IP address of the enclosure must be entered. Also, the serial address of the calibrator must be correct.
 - Network - Select this if the Automatic Calibrator is an SPC4000 communicating via Ethernet connection. The IP address of the Network port will also have to be defined.
7. If Calibrator Type is Automatic, the action of the calibrator must be defined.
 - A. Set the Dwell Time in seconds. This is the time delay to allow the calibration pressure to stabilize.
 - B. Set the Stability Percentage. This is the value in percent of full scale to be used by the software to determine if the calibration pressure is stable enough to perform the calibration.
 - C. Check the Trap Pressure box if the pressure is to be trapped after the dwell time has timed out. This should be checked for all calibrations at 5 psi Full Scale and lower when using an SPC3000 calibrator.
8. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

The screenshot shows the 'Calibrator Definition' dialog box. It is divided into several sections:

- 1 Description:** A text input field at the top.
- 2 Characteristics:** A list of Calibrator Type options: Automatic Gauge / Differential (SPC3000), Automatic Absolute (SPC3000), Manual Gauge, Manual Absolute, Automatic Gauge (SPC4000), and Automatic Absolute (SPC4000).
- 3 Calibrator Address:** A numeric input field.
- 4 Nominal Pressure Range:** A vertical list of values: 1, 2.5, 5, 15, 30, 50, 100, 200.
- 5 Max Module Pressure:** A numeric input field.
- 6 Communication:** Radio buttons for Serial, Device, and Network.
- 7 Action:** Fields for Dwell Time in Seconds, Stability Percentage, and a checkbox for Trap Pressure.
- 8 Network:** Input fields for Serial Comm Port, Device IP Address, Network IP Address, and Network Port.

At the bottom are buttons for 'Open Definition', 'Save Definition', 'Close', and 'Cancel'.

DIGITAL OUTPUT DEFINITIONS

Click Setup, Digital Output to open the Digital Output Definition Window. This will setup the control pressure logic for the test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Digital Output Definition Files. Highlight the file to be used and click: Open. Only Digital Output Definition Files will be shown.

If the Digital Outputs must be defined:

1. Enter a description. This is for reference only.
2. Click the radio buttons for the digital outputs that will switch the control pressures. Digital Outputs 1 through 5 are generally used by DSM systems. Digital Outputs 6, 7, and 8 are used by DSA Enclosures. SPC3000 modules use Digital Outputs 8, 9, and 10. Digital Outputs 11 and 12 are generally used by a SPC3000 to switch valves on Pressure Distribution Panels. All Digital Outputs must be defined as: On, Off, or No Change. Reference "Appendix F: DOUT Configurations & Valve Logic States" on page 68 for more information.
3. Highlight the command target for the Digital Output control signals. For a SPC3000/CPM3000, highlight Calibrator.
4. Enter the Calibrator Definition File name. Use the Browse button to set the path and file name.
5. The Zero Calibration Setting should not be modified.
6. Set the Control Pressure Dwell time in seconds. 15 seconds is recommended for most tests unless the control pressure lines are very long. Consult Scanivalve for more information if control pressure lines are longer than 50 feet (15.24m).
7. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

The screenshot shows the 'Digital Output Definition' window. It contains the following elements:

- 1** Description: A text input field at the top.
- 2** Digital Out Settings: A table with two columns: 'Calibrate Mode' and 'Power Up Mode'. Each column has three radio buttons labeled 'On', 'Off', and 'NC'. Rows are numbered 1 through 12. A note below reads 'Note: NC - No Change'.
- 5** Zero Calibration Setting: A checkbox labeled 'Use Special Setting' and a text input field for 'Setting (hex)'.
- 6** Control Dwell Time: A text input field followed by the word 'Seconds'.
- 3** Command Target Control: A dropdown menu with options: 'RAD/Enclosure/DSM', 'Ethernet CPM', and 'Calibrator'. An 'Ethernet CPM IP Address:' field is to its right.
- 4** Calibrator Definition: A text input field with a 'Browse...' button to its right.
- 7** Buttons: 'Open Definition', 'Save Definition', 'Close', and 'Cancel' at the bottom.

PORT DEFINITIONS

Click Setup, Port to open the Port definition Window. This page determines the pressures that will be applied to each enabled port during the test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Port definition files. Highlight the file to be used and click: Open. Only port definition files will be shown.

If the ports must be defined:

1. Enter a description. This is for reference only.
2. Highlight the port type. For standard DSA and ZOC modules highlight: Differential.
3. Enter the total number of calibration points. This is the total number of calibration pressures to be applied, including zero.
4. Enter the number of negative calibration points.
5. Enter the total number of validation points. This is the total number of pressures to be applied, including zero.
6. Enter the number of number of negative validation points.
7. Enter the full scale pressure range of the module (in PSI).
8. Enter the pass/fail tolerance desired (in % of full scale).
9. Enter the name of the Calibrator Setup files to be used for the Positive and Negative Calibrator Assignment. For 15 psi modules and lower, the Positive and Negative Calibrator Setup files will be the same. For modules with full scale pressure ranges greater than 15 psi:

A. The Positive Calibrator Assignment file will be the calibrator providing the positive pressures.

B. The Negative Calibrator Assignment file will usually be the 15 psi calibrator.

NOTE: The Calibrator connections in a system **MUST** be verified to prevent damage to the modules.

10. Enter the Calibration pressures. Pressure Point 1 is the lowest Negative point. Pressure Point 5 is the highest Positive point. All pressures must be assigned or unassigned.

NOTE: Recommended Calibration and Validation pressures for all standard range modules may be found in "Appendix A: Recommended As Received/Validation Pressures" on page 61, however each individual calibration varies. If the recommended calibration points do not yield acceptable calibration results, contact Scanivalve for additional recommendations.

11. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

The screenshot shows the 'Port Definition' window with the following fields and callouts:

- 1** Description: [Text Field]
- 2** Port Type: [Dropdown Menu with options: Differential, Absolute, Gauge, True Differential, True Differential Blank]
- 3** Calibration Points: [Spin Box]
- 4** Negative Calibration Points: [Spin Box]
- 5** Validation Points: [Spin Box]
- 6** Negative Validation Points: [Spin Box]
- 7** Full Scale Pressure: [Text Field]
- 8** Tolerance (+/-) % of Full Scale: [Text Field]
- 9** Positive Calibrator Assignment: [Text Field with Browse... button]
- Negative Calibrator Assignment: [Text Field with Browse... button]
- 10** Calibration Control Table:

	Pos Cal	Neg Cal	Pos Val	Neg Val
Pressure Point 1				
Pressure Point 2				
Pressure Point 3				
Pressure Point 4				
Pressure Point 5				
Pressure Point 6				
Pressure Point 7				
Pressure Point 8				
Pressure Point 9				

Buttons at the bottom: Open Definition, Save Definition **11**, Close, Cancel

MODULE DEFINITIONS

Click Setup, Module to open the module definition window. This page determines the port definitions that will be used to apply pressures to each enabled port in the module under test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Module definition files. Highlight the file to be used and click: Open. Only module definition files will be shown.

If the module must be defined:

1. Enter a Description. This is for reference only.
2. Enter the Module Type.
3. Highlight the Number of Ports. The number of ports shown in the window will be automatically adjusted.
4. Enter the name of the Port Definition file that will identify the pressures to be applied to that port in the box next to the port number. If all ports will use the same file, all boxes can be highlighted by:
 - A. Left clicking on the box for Port 1.
 - B. Slide the mouse arrow to the last even port while holding the left button down. All of the boxes will be highlighted. Release the left click.
 - C. The Port definition file window will open. Highlight on the file to be used and click: Open. This file name will be entered in each box.
5. Select a calibration temperature range associated with the individual module.
6. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

The screenshot shows the 'Module Definition' window with the following fields and controls:

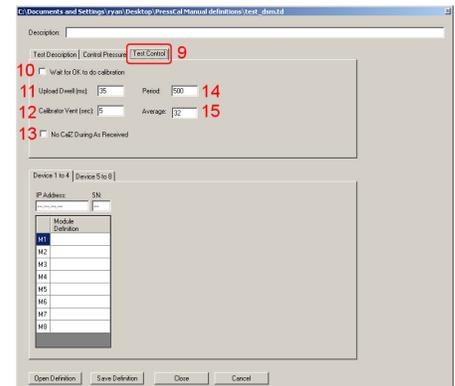
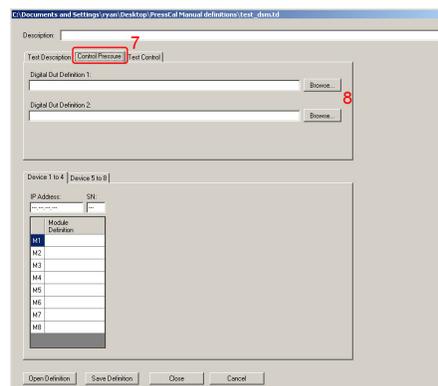
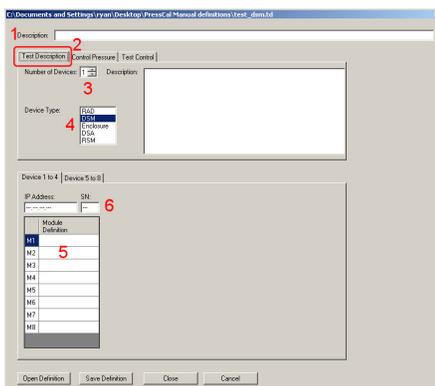
- 1** Description: [Text input field]
- 2** Module Type: [Text input field]
- Number of Ports: **3** (with options 16, 32, 64)
- Number of Temps: **5** (with options: 0 to 72 Temperatures (DSA3217, DSA3218), 0 to 69 Temperatures (ZOC22, ZOC23, ZOC33, ZOC17, DSA3016), 0 to 59 Temperatures (DSA3017, DSA3018, DSA3007, DSA3207, DSA3307))
- Two large tables for defining port definitions, each with columns for 'Odd Port Definition' and 'Even Port Definition'. A red **4** is overlaid on the first table, and a red **6** is overlaid on the second table.
- Buttons at the bottom: Open Definition, Save Definition, Close, Cancel.

TEST DEFINITIONS

Click Setup, Test to open the Test Definition Window. This page determines which of the, Digital Output, and Module Definition files will be used for the complete test. The address(es) of the DSA Module(s) will be defined as well as test dwell and delay times. The Test Definition includes 3 tabs. The default definition will be the last saved test definition. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Test Definition files. Highlight the file to be used and click: Open. Only Test Definition files will be shown.

If the Test must be defined:

1. Enter a Description of the test. This is for reference only.
2. Start with the Test Description. If that page is not active, click the Test Description Tab.
3. Select the Number of Devices. PressCal can calibrate up to eight modules at one time. Each must have a unique IP address.
4. Highlight the Device Type. The Module Definition will adjust to the number entered.
5. Click the Box next to the Module Definition for M1 (Module 1). The box will be highlighted, and the Module Definition Files will be shown in another window. Select the Module Definition File for the Module under Test.
6. Enter the IP Address and Serial Number of the module in the respective windows
7. Click the Control Pressure Tab to open that window.
8. Enter the Digital Out Definition File(s) to be used for the test. Click Browse to select the file from the saved Digital Out Definitions.
9. Click the Test Control Tab to open the Test Control Window.
10. Check the Wait for OK to do Calibration box to stop the program after the As Received report is generated. This will give a user the opportunity to terminate the test if the data shows that there might be a problem with the setup or that the module is within specifications and does not require a Field Calibration.
11. Upload Dwell should be left at 35 ms unless there is problems uploading coefficients to the DSA Module.
12. Calibrator Vent is recommended to be set at 5 seconds, but this can be increased if CAL and REF lines are longer than 50 feet (15.24m).
13. If you do not want PressCal to perform a CALZ or CALB before the As Received or validation, check the box 'No CALZ During As Received.' This is not recommended.
14. It is recommended that Period be set to 500.
15. It is recommended that Average be set to 32. It is not recommended to set Average less than 16, nor greater than 64.
16. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.



SECTION 2: EXAMPLE AUTOMATIC CALIBRATIONS

DSA 3200 SERIES MODULES

CALIBRATOR DEFINITIONS

Click Setup, Calibrator to open the Calibrator Definition window. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Calibrator Definition files. Highlight the file to be used and click: Open. Only Calibrator Definition files will be shown. The setup described below is for a calibration with a 15 psi SPC4000.

If the calibrator must be defined:

1. Enter a Description. This is for reference only.
2. Highlight the calibrator type. Options are:
 - A. Automatic Gauge/Differential (SPC3000) - This should be selected if the Calibrator is a SPC3000 using a Digiquartz 202VG as the Secondary Standard.
 - B. Automatic Absolute (SPC3000) - Select this option for all other SPC3000 Calibrators.
 - C. Manual Gauge - This calibrator option is used for manual calibrations.
 - D. Manual Absolute - This calibrator option is used for manual absolute calibrations.
 - E. Automatic Gauge (SPC4000) - Select this option if using an SPC4000 Calibrator
 - F. Automatic Absolute (SPC4000)- Select this option if the calibrator being used is an SPC4000 with an Absolute type pressure standard.
3. Set the Calibrator Address
4. Highlight the full scale pressure range of the Pressure Standard.
5. Set the Max Module Pressure. This is the full scale value of the sensors in the module. This value will be used during the validation process to determine the errors of the sensors.
6. Set the Communication Type. Options are:
 - A. Serial - Select this if the Automatic Calibrator is an SPC3000 controlled by an enclosure, a DSM, or a direct serial connection.
 - B. Device - Select this option if the Automatic Calibrator is an SPC3000 installed in a SPC3200 Enclosure controlled by an Ethernet connection. The IP address of the enclosure must be entered. Also, the serial address of the calibrator must be correct.
 - C. Network - Select this if the Automatic Calibrator is an SPC4000 communicating via Ethernet connection. The IP address and the network port will also have to be defined.
7. If Calibrator Type is Automatic, the action of the calibrator must be defined.
 - A. Set the dwell time in seconds. This is the time delay to allow the calibration pressure to stabilize. Typically, 15 to 30 seconds is sufficient.
 - B. Set the Stability percentage. This is the value in percent of full scale to be used by the software to determine if the calibration pressure is stable enough to perform the calibration. Scanivalve recommends 0.02%.
 - C. Check the Trap Pressure box if the pressure is to be trapped after the dwell time has timed out. This should be checked for all calibrations at 5 psi Full Scale and lower when using an SPC3000 calibrator.
8. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

DIGITAL OUTPUT DEFINITIONS

Click Setup, Digital Output to open the Digital Output Definition Window. This will setup the control pressure logic for the test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Digital Output Definition Files. Highlight the file to be used and click: Open. Only Digital Output Definition Files will be shown.

If the Digital Outputs must be defined,

1. Enter a description. This is for reference only.
2. Click the radio buttons for the digital outputs that will switch the control pressures. SPC 3000 modules use Digital Outputs 8, 9, and 10. Digital Outputs 11 and 12 are generally used by a SPC3000 to switch valves on Pressure Distribution Panels. All Digital Outputs should be defined as: On, Off, or No Change. Reference "Appendix F: DOUT Configurations & Valve Logic States" on page 68 for more information.
3. Highlight the command target for the Digital Output control signals. For a SPC3000/CPM3000, highlight Calibrator.
4. Enter the Calibrator Definition Filename. Use the Browse button to set the path and file name.
5. The Zero Calibration Setting should not be enabled for this application. It can be left blank.
6. Set the Control Pressure Dwell time in seconds. 5 seconds is recommended for most tests unless the control pressure lines are very long. Consult Scanivalve for more information if control pressure lines are longer than 50 feet (15.24m).
7. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save. A sample definition of a SPC3000/CPM3000 calibrator setup is shown below.

PORT DEFINITIONS

Click Setup, Port to open the Port definition Window. This page determines the pressures that will be applied to each enabled port during the test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Port definition files. Highlight the file to be used and click: Open. Only port definition files will be shown. The setup described below is for the calibration and validation of a 15 psi DSA3200 series module.

If the ports must be defined:

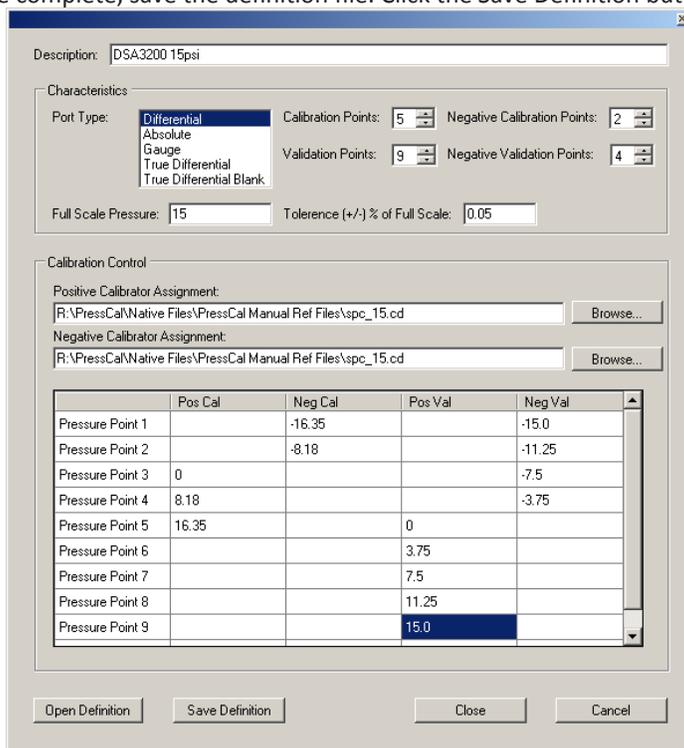
1. Enter a description. This is for reference only.
2. Highlight the port type. For standard DSA 3217/18 modules highlight: Differential.
3. Enter the total number of calibration points. This is the total number of calibration pressures to be applied, including zero. Scanivalve recommends five points for a 15 psi DSA3200 series module.
4. Enter the number of negative calibration points. Two is recommended for a 15 psi DSA3200 series modules.
5. Enter the total number of validation points. This is the total number of pressures to be applied, including zero. Nine is recommended for a 15 psi DSA3200 series module.
6. Enter the number of number of negative validation points. Four is recommended for a 15 psi DSA3200 series module.
7. Enter the full scale pressure range of the module (in PSI).
8. Enter the pass/fail tolerance desired (in % of full scale).
9. Enter the name of the Calibrator Setup files to be used for the Positive and Negative Calibrator Assignment. For 15 psi modules and lower, the Positive and Negative Calibrator Setup files will be the same. For modules with full scale pressure ranges greater than 15 psi:
 - A. The Positive Calibrator Assignment file will be the calibrator providing the positive pressures.
 - B. The Negative Calibrator Assignment file will usually be the 15 psi calibrator.

NOTE: The Calibrator connections in a system **MUST** be verified to prevent damage to the modules.

10. Enter the Calibration pressures. Pressure Point 1 is the lowest Negative point. Pressure Point 5 is the highest Positive point.

NOTE: Recommended Calibration and Validation pressures for all standard range modules may be found in "Appendix A: Recommended As Received/Validation Pressures" on page 61, however each individual calibration varies. If the recommended calibration points do not yield acceptable calibration results, contact Scanivalve for additional recommendations.

11. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

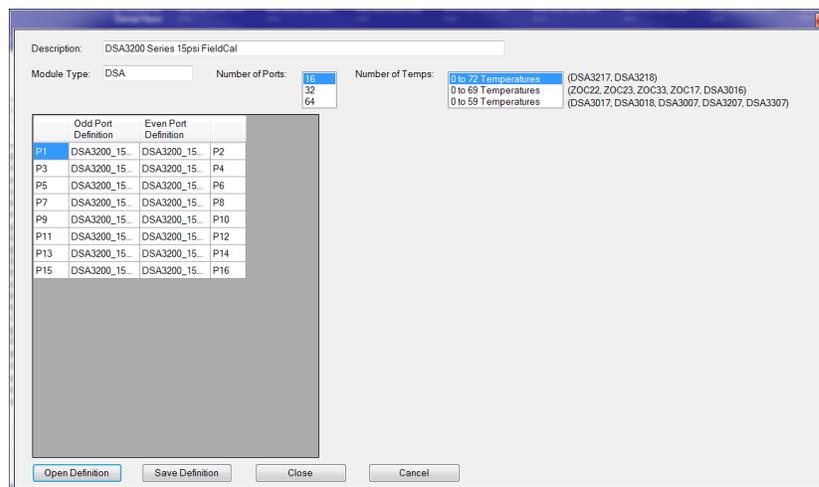


MODULE DEFINITIONS

Click Setup, Module to open the Module definition Window. This page determines the port definitions that will be used to apply pressures to each enabled port in the module under test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Module definition files. Highlight the file to be used and click: Open. Only Module definition files will be shown.

If the ports must be defined:

1. Enter a Description. This is for reference only.
2. Enter the Module Type (ie DSA3218 or DSA3307).
3. Highlight the Number of Ports. The number of ports shown in the window will be automatically adjusted.
4. Enter the name of the Port Definition file that will identify the pressures to be applied to that port in the box next to the port number. Clicking in the blank box next to the port number will open the file browser window. If all ports will use the same file, all boxes can be highlighted by:
 - A. Left clicking on the box for Port 1.
 - B. Slide the mouse arrow to the last even port while holding the left button down. All of the boxes will be highlighted. Release the left click.
 - C. The Port definition file window will open. Highlight on the file to be used and click: Open. This file name will be entered in each box.
5. Select a calibration temperature range associated with the individual module.
6. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

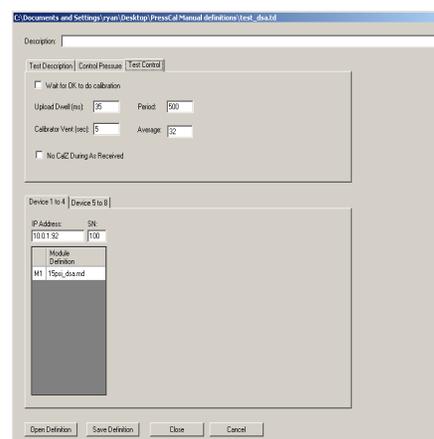
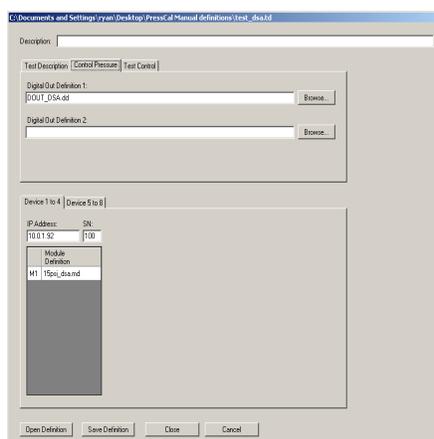
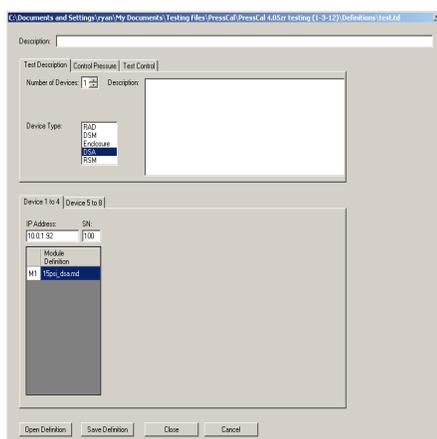


TEST DEFINITIONS

Click Setup, Test to open the Test Definition Window. This page determines which of the Calibrator, Digital Output, Port and Module Definition files will be used for the complete test. The address(es) of the DSA Module(s) will be defined as well as test dwell and delay times. The Test Definition is 3 pages of setup. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Test Definition files. Highlight the file to be used and click: Open. Only Test Definition files will be shown. The setup described below is for a FieldCal of a 15 psi DSA3200 series module.

If the Test must be defined:

1. Enter a Description of the test. This is for reference only.
2. Start with the Test Description. If that page is not active, click the Test Description Tab.
3. Select the Number of Devices. PressCal can calibrate up to eight DSA3200 Series modules at one time. Each must have a unique IP address. For the example in this manual, only one device is connected.
4. Highlight the Device Type. The Module Definition will adjust to the number entered.
5. Click the Box next to the Module Definition for M1 (Module 1). The box will be highlighted, and the Module Definition Files will be shown in another window. Select the Module Definition File for the Module under Test.
6. Enter the IP Address and Serial Number of the module in the respective windows
7. Click the Control Pressure Tab to open that window.
8. Enter the Digital Out Definition File(s) to be used for the test. Click Browse to select the file from the saved Digital Out Definitions. The second Digital Out Definition file is very rarely used and is normally reserved for turning a vacuum pump on and off or similar tasks.
9. Click the Test Control Tab to open the Test Control Window.
10. Check the Wait for OK to do Calibration box to stop the program after the As Received report is generated. This will give a user the opportunity to terminate the test if the data shows that there might be a problem with the setup or that the module is within specifications and does not require a Field Calibration.
11. Upload Dwell should be left at 35 ms unless there is problems uploading coefficients to the DSA module.
12. Calibrator Vent is recommended to be set at 5 seconds, but this can be increased if CAL and REF lines are longer than 50 feet (15.24m).
13. If you do not want PressCal to perform a CALZ or CALB before the As Received validation, check the box 'No CALZ During As Received.' This is generally not recommend.
14. It is recommended that Period be set to 500.
15. It is recommended that Average be set to 32. It is not recommended to set Average less than 16, nor greater than 64.
16. When the definition is completed, save the definition file. Click the Save Definition button. Name the file and click: Save.



DSA3016 MODULES INSTALLED IN A DSAENCL**CALIBRATOR DEFINITIONS**

Click Setup, Calibrator to open the Calibrator Definition window. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Calibrator Definition files. Highlight the file to be used and click: Open. Only Calibrator Definition files will be shown. The setup described below is for a calibration with a 15 psi SPC4000.

If the calibrator must be defined:

1. Enter a Description. This is for reference only.
2. Highlight the calibrator type. Options are:
 - A. Automatic Gauge/Differential (SPC3000) - This should be selected if the Calibrator is a SPC3000 using a Digiquartz 202VG as the Secondary Standard.
 - B. Automatic Absolute (SPC3000) - Select this option for all other SPC3000 Calibrators.
 - C. Manual Gauge - This calibrator option is used for manual calibrations.
 - D. Manual Absolute - This calibrator option is used for manual absolute calibrations.
 - E. Automatic Gauge (SPC4000) - Select this option if using an SPC4000 Calibrator
 - F. Automatic Absolute (SPC4000)- Select this option if the calibrator being used is an SPC4000 with an Absolute type pressure standard.
3. Set the Calibrator Address
4. Highlight the full scale pressure range of the Pressure Standard.
5. Set the Max Module Pressure. This is the full scale value of the sensors in the module. This value will be used during the validation process to determine the errors of the sensors.
6. Set the Communication Type. Options are:
 - A. Serial - Select this if the Automatic Calibrator is an SPC3000 controlled by an enclosure, a DSM, or a direct serial connection.
 - B. Device - Select this option if the Automatic Calibrator is an SPC3000 installed in a SPC3200 Enclosure controlled by an Ethernet connection. The IP address of the enclosure must be entered. Also, the serial address of the calibrator must be correct.
 - C. Network - Select this if the Automatic Calibrator is an SPC4000 communicating via Ethernet connection. The IP address and the network port will also have to be defined.
7. If Calibrator Type is Automatic, the action of the calibrator must be defined.
 - A. Set the dwell time in seconds. This is the time delay to allow the calibration pressure to stabilize. Typically, 15 to 30 seconds is sufficient.
 - B. Set the Stability percentage. This is the value in percent of full scale to be used by the software to determine if the calibration pressure is stable enough to perform the calibration. Scanivalve recommends 0.02%.
 - C. Check the Trap Pressure box if the pressure is to be trapped after the dwell time has timed out. This should be checked for all calibrations at 5 psi Full Scale and lower when using an SPC3000 calibrator.
8. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

The screenshot shows the 'Calibrator Definition' window with the following settings:

- Description:** 15PSI SPC4000 Calibrator
- Characteristics:**
 - Calibrator Type:** Automatic Gauge / Differential (SPC3000), Automatic Absolute (SPC3000), Manual Gauge, Manual Absolute, **Automatic Gauge (SPC4000)**, Automatic Absolute (SPC4000)
 - Nominal Pressure Range:** 1, 2.5, 5, **15**, 30, 50, 100, 200
 - Max Module Pressure:** 15
- Action:**
 - Dwell Time in Seconds:** 30
 - Stability Percentage:** 0.02
 - Trap Pressure:**
- Communication:**
 - Communication Type:** Serial Device, **Network**
 - Serial Comm Port:** [Empty]
 - Device IP Address:** [Empty]
 - Network IP Address:** 191.30.40.101
 - Network Port:** 1025
- Buttons:** Open Definition, **Save Definition**, Close, Cancel

DIGITAL OUTPUT DEFINITIONS

Click Setup, Digital Output to open the Digital Output Definition Window. This will setup the control pressure logic for the test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Digital Output Definition Files. Highlight the file to be used and click: Open. Only Digital Output Definition Files will be shown.

If the Digital Outputs must be defined,

1. Enter a description. This is for reference only.
2. Click the radio buttons for the digital outputs that will switch the control pressures. DSAENCL modules use Digital Outputs 6, 7 and 8. All Digital Outputs should be defined as: On, Off, or No Change. Reference "Appendix F: DOUT Configurations & Valve Logic States" on page 68 for more information.
3. Highlight the command target for the Digital Output control signals. For a DSAENCL, highlight RAD/Enclosure/DSM.
4. The Zero Calibration Setting should not be enabled for most DSAENCL applications. It can be left blank.
5. Set the Control Pressure Dwell time in seconds. 5 seconds is recommended for most tests unless the control pressure lines are very long. Consult Scanivalve for more information if control pressure lines are longer than 50 feet (15.24m).
6. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

Description: DSA3016 DOUT configuration

Digital Out Settings:

Calibrate Mode			Power Up Mode		
On	Off	NC	On	Off	NC
1	<input type="radio"/>	<input type="radio"/>	1	<input type="radio"/>	<input type="radio"/>
2	<input type="radio"/>	<input type="radio"/>	2	<input type="radio"/>	<input type="radio"/>
3	<input type="radio"/>	<input type="radio"/>	3	<input type="radio"/>	<input type="radio"/>
4	<input type="radio"/>	<input type="radio"/>	4	<input type="radio"/>	<input type="radio"/>
5	<input type="radio"/>	<input type="radio"/>	5	<input type="radio"/>	<input type="radio"/>
6	<input type="radio"/>	<input type="radio"/>	6	<input type="radio"/>	<input type="radio"/>
7	<input type="radio"/>	<input type="radio"/>	7	<input type="radio"/>	<input type="radio"/>
8	<input type="radio"/>	<input type="radio"/>	8	<input type="radio"/>	<input type="radio"/>
9	<input type="radio"/>	<input type="radio"/>	9	<input type="radio"/>	<input type="radio"/>
10	<input type="radio"/>	<input type="radio"/>	10	<input type="radio"/>	<input type="radio"/>
11	<input type="radio"/>	<input type="radio"/>	11	<input type="radio"/>	<input type="radio"/>
12	<input type="radio"/>	<input type="radio"/>	12	<input type="radio"/>	<input type="radio"/>

Note: NC - No Change

Zero Calibration Setting
 Use Special Setting
 Setting (hex):

Control Dwell Time
 Seconds

Ethernet CPM - Calibrate Mode Commands
 Step 1 Sequence:
 Dwell (in seconds):
 Step 2 Sequence:
 Dwell (in seconds):

Ethernet CPM - Calibrate Power Up Mode Commands
 Step 1 Sequence:
 Dwell (in seconds):
 Step 2 Sequence:
 Dwell (in seconds):

Command Target Control
 Command Target: **RAD/Enclosure/DSM**
 Ethernet CPM IP Address:

Calibrator Definition:

PORT DEFINITIONS

Click Setup, Port to open the Port definition Window. This page determines the pressures that will be applied to each enabled port during the test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Port definition files. Highlight the file to be used and click: Open. Only port definition files will be shown. The setup described below is for the calibration of 15 psi DSA3016 Modules installed in a DSAENCL Enclosure.

If the ports must be defined:

1. Enter a description. This is for reference only.
2. Highlight the port type. For standard DSA3016 modules highlight: Differential.
3. Enter the total number of calibration points. This is the total number of calibration pressures to be applied, including zero. Scanivalve recommends five points for a 15 psi DSA3016 series module.
4. Enter the number of negative calibration points. Two is recommended for a 15 psi DSA3016 series modules.
5. Enter the total number of validation points. This is the total number of pressures to be applied, including zero. Nine is recommended for a 15 psi DSA3016 series module.
6. Enter the number of number of negative validation points. Four is recommended for a 15 psi DSA3016 series module.
7. Enter the full scale pressure range of the module (in PSI).
8. Enter the pass/fail tolerance desired (in % of full scale).
9. Enter the name of the Calibrator Setup files to be used for the Positive and Negative Calibrator Assignment. For 15 psi modules and lower, the Positive and Negative Calibrator Setup files will be the same. For modules with full scale pressure ranges greater than 15 psi:
 - A. The Positive Calibrator Assignment file will be the calibrator providing the positive pressures.
 - B. The Negative Calibrator Assignment file will usually be the 15 psi calibrator.

NOTE: The Calibrator connections in a system **MUST** be verified to prevent damage to the modules.

10. Enter the Calibration pressures. Pressure Point 1 is the lowest Negative point. Pressure Point 5 is the highest Positive point.

NOTE: Recommended Calibration and Validation pressures for all standard range modules may be found in "Appendix A: Recommended As Received/Validation Pressures" on page 61, however each individual calibration varies. If the recommended calibration points do not yield acceptable calibration results, contact Scanivalve for additional recommendations.

11. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

Description: 15psi DSA3016 module

Characteristics

Port Type: Differential
 Absolute
 Gauge
 True Differential
 True Differential Blank

Calibration Points: 5 Negative Calibration Points: 2
 Validation Points: 9 Negative Validation Points: 4

Full Scale Pressure: 15 Tolerance (+/-) % of Full Scale: 0.05

Calibration Control

Positive Calibrator Assignment:
 R:\PressCal\Native Files\PressCal Manual Ref Files\spc_15.cd Browse...

Negative Calibrator Assignment:
 R:\PressCal\Native Files\PressCal Manual Ref Files\spc_5.cd Browse...

	Pos Cal	Neg Cal	Pos Val	Neg Val
Pressure Point 1		-16.35		-15
Pressure Point 2		-8.18		-11.25
Pressure Point 3	0			-7.5
Pressure Point 4	8.18			-3.75
Pressure Point 5	16.35		0	
Pressure Point 6			3.75	
Pressure Point 7			7.5	
Pressure Point 8			11.25	
Pressure Point 9			15	

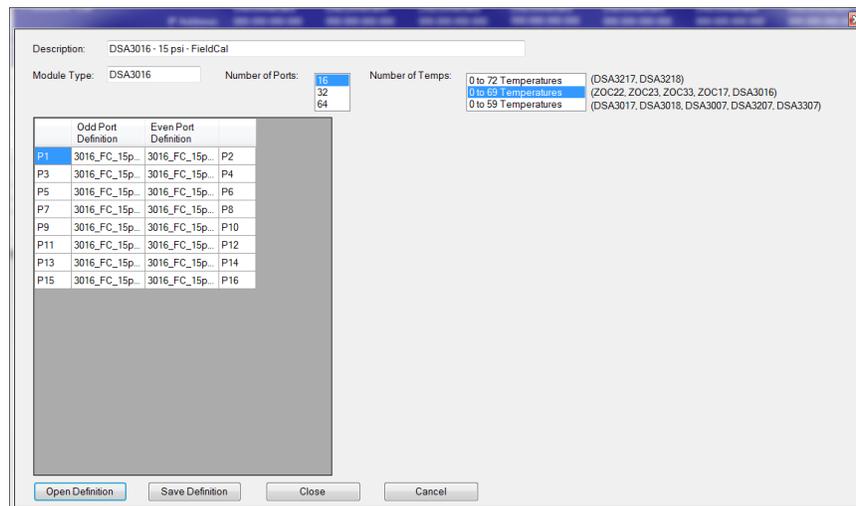
Open Definition Save Definition Close Cancel

MODULE DEFINITIONS

Click Setup, Module to open the Module definition Window. This page determines the port definitions that will be used to apply pressures to each enabled port in the module under test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Module definition files. Highlight the file to be used and click: Open. Only Module definition files will be shown. The setup described below is for the calibration of 15 psi DSA3016 Modules installed in a DSAENCL Enclosure.

If the module(s) must be defined:

1. Enter a Description. This is for reference only.
2. Enter the Module Type, DSA3016.
3. Highlight the Number of Ports, 16. The number of ports shown in the window will be automatically adjusted to the size highlighted in this box.
4. Enter the name of the Port Definition file that will identify the pressures to be applied to that port in the box next to the port number. Clicking in the blank box next to the port number will open the file browser window. If all ports will use the same file, all boxes can be highlighted by:
 - A. Left clicking on the box for Port 1.
 - B. Slide the mouse arrow to the last even port while holding the left button down. All of the boxes will be highlighted. Release the left click.
 - C. The Port definition file window will open. Highlight on the file to be used and click: Open. This file name will be entered in each box.
5. Select a calibration temperature range associated with the individual module.
6. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

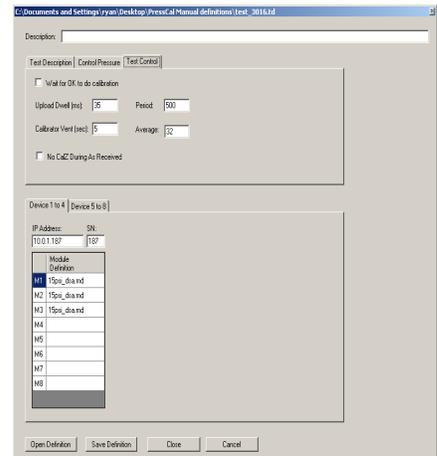
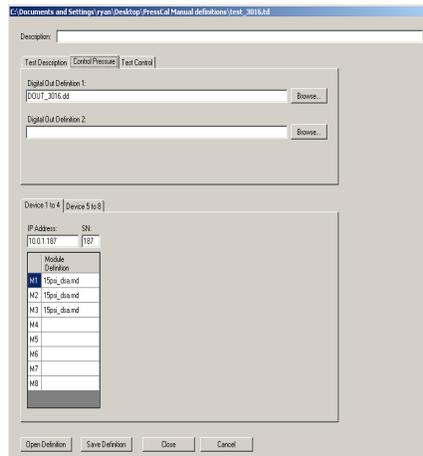
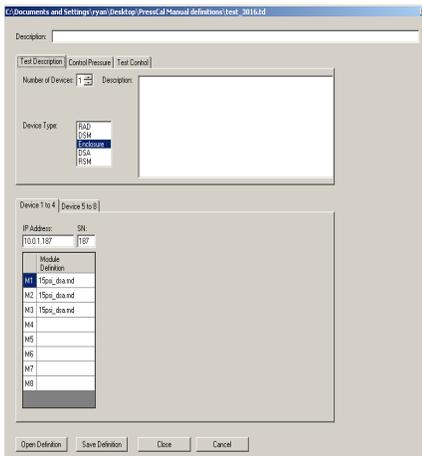


TEST DEFINITIONS

Click Setup, Test to open the Test Definition Window. This page determines which of the Calibrator, Digital Output, Port and Module Definition files will be used for the complete test. The address(es) of the DSAENCLs will be defined as well as test dwell. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Test Definition files. Highlight the file to be used and click: Open. Only Test Definition files will be shown. The setup described below is for the calibration of three 15 psi DSA3016 Modules installed in a DSAENCL.

If the Test must be defined:

1. Enter a Description of the test. This is for reference only.
2. Start with the Test Description page. If that page is not active, click the Test Description Tab.
3. Select the Number of Devices. PressCal can calibrate DSA3016 modules in as many as 8 DSAENCL Enclosures at one time. Each enclosure must have a unique IP address. For the example in this manual, three DSA3016 Modules are installed in one DSAENCL.
4. Highlight the Device Type. The Module Definition will adjust to the number entered.
5. Click the Box next to the Module Definition for M1 (Module 1). The box will be highlighted, and the Module Definition Files will be shown in another window. Select the Module Definition File for the Module under Test.
6. Enter the IP Address and Serial Number of the module in the respective windows
7. Click the Control Pressure Tab to open that window.
8. Enter the Digital Out Definition File(s) to be used for the test. Click Browse to select the file from the saved Digital Out Definitions.
9. Click the Test Control Tab to open the Test Control Window.
10. Check the Wait for OK to do Calibration box to stop the program after the As Received report is generated. This will give a user the opportunity to terminate the test if the data shows that there might be a problem with the setup or that the module is within specifications and does not require a Field Calibration.
11. Upload Dwell should be left at 35 ms unless there is problems uploading coefficients to the DSA module.
12. Calibrator Vent is recommended to be set at 5 seconds, but this can be increased if CAL and REF lines are longer than 50 feet (15.24m).
13. If you do not want PressCal to perform a CALZ or CALB before the As Received validation, check the box 'No CALZ During As Received.'
14. It is recommended that Period be set to 500.
15. It is recommended that Average be set to 32. It is not recommended to set Average less than 16, nor greater than 64.
16. When the definition is completed, save the definition file. Click the Save Definition button. Name the file and click: Save.



ZOC17/22/23/33 MODULES CONNECTED TO A DSM 3000/3200/3400/4000**CALIBRATOR DEFINITIONS**

Click Setup, Calibrator to open the Calibrator Definition window. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Calibrator Definition Files. Highlight the file to be used and click: Open. Only Calibrator Output Definition Files will be shown. The setup described below is for a calibration with a 15 psi SPC4000.

If the calibrator must be defined:

1. Enter a Description. This is for reference only.
2. Highlight the calibrator type. Options are:
 - A. Automatic Gauge/Differential (SPC3000) - This should be selected if the Calibrator is a SPC3000 using a Digiquartz 202VG as the Secondary Standard.
 - B. Automatic Absolute (SPC3000) - Select this option for all other SPC3000 Calibrators.
 - C. Manual Gauge - This calibrator option is used for manual calibrations.
 - D. Manual Absolute - This calibrator option is used for manual absolute calibrations.
 - E. Automatic Gauge (SPC4000) - Select this option if using an SPC4000 Calibrator
 - F. Automatic Absolute (SPC4000)- Select this option if the calibrator being used is an SPC4000 with an Absolute type pressure standard.
3. Set the Calibrator Address
4. Highlight the full scale pressure range of the Pressure Standard.
5. Set the Max Module Pressure. This is the full scale value of the sensors in the module. This value will be used during the validation process to determine the errors of the sensors.
6. Set the Communication Type. Options are:
 - A. Serial - Select this if the Automatic Calibrator is an SPC3000 controlled by an enclosure, a DSM, or a direct serial connection.
 - B. Device - Select this option if the Automatic Calibrator is an SPC3000 installed in a SPC3200 Enclosure controlled by an Ethernet connection. The IP address of the enclosure must be entered. Also, the serial address of the calibrator must be correct.
 - C. Network - Select this if the Automatic Calibrator is an SPC4000 communicating via Ethernet connection. The IP address and the network port will also have to be defined.
7. If Calibrator Type is Automatic, the action of the calibrator must be defined.
 - A. Set the dwell time in seconds. This is the time delay to allow the calibration pressure to stabilize. Typically, 15 to 30 seconds is sufficient.
 - B. Set the Stability percentage. This is the value in percent of full scale to be used by the software to determine if the calibration pressure is stable enough to perform the calibration. Scanivalve recommends 0.02%. Check the Trap Pressure box if the pressure is to be trapped after the dwell time has timed out. This should be checked for all calibrations at 5 psi Full Scale and lower.
8. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

The screenshot shows the 'Calibrator Definition' window with the following settings:

- Description:** 15PSI SPC4000 Calibration
- Characteristics:**
 - Calibrator Type:** Automatic Gauge / Differential (SPC3000), Automatic Absolute (SPC3000), Manual Gauge, Manual Absolute, **Automatic Gauge (SPC4000)** (highlighted), Automatic Absolute (SPC4000)
 - Nominal Pressure Range:** 1, 2.5, 5, **15**, 30, 50, 100, 200
 - Max Module Pressure:** 15
- Action:**
 - Dwell Time in Seconds:** 30
 - Stability Percentage:** 0.02
 - Trap Pressure
- Communication:**
 - Communication Type:** Serial, **Device**, Network
 - Serial Comm Port:** [Empty]
 - Device IP Address:** [Empty]
 - Network IP Address:** 191.30.40.101
 - Network Port:** 1025
- Buttons:** Open Definition, **Save Definition**, Close, Cancel

DIGITAL OUTPUT DEFINITIONS

Click Setup, Digital Output to open the Digital Output Definition Window. This will setup the control pressure logic for the test. If a pre-defined definition exists, click: Open Definition. A window will open that will list the existing Digital Output Definition Files. Highlight the file to be used and click: Open. Only Digital Output Definition Files will be shown.

If the Digital Outputs must be defined,

1. Enter a description. This is for reference only.
2. Click the radio buttons for the digital outputs that will switch the control pressures. Digital Outputs 1 through 5 are used by DSM Series Modules. All Digital Outputs should be defined as: On, Off, or No Change. Reference "Appendix F: DOUT Configurations & Valve Logic States" on page 68 for more information.
3. Highlight the Command Target for the Digital Output control signal, For a DSM communicating with an SPC3000, highlight: RAD/Enclosure/DSM.
4. The Calibrator Definition File option will be grayed out.
5. The Zero Calibration Setting should not be modified.
6. Set the Control Pressure Dwell time in seconds. 5 seconds is recommended for most tests unless the control pressure lines are very long. Consult Scanivalve for more information if control pressure lines are longer than 50 feet (15.24m).
7. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

Description: DOUTS for a ZOC module connected to a DSM

Digital Out Settings:

Calibrate Mode			Power Up Mode		
On	Off	NC	On	Off	NC
1	<input checked="" type="radio"/>	<input type="radio"/>	1	<input checked="" type="radio"/>	<input type="radio"/>
2	<input checked="" type="radio"/>	<input type="radio"/>	2	<input checked="" type="radio"/>	<input type="radio"/>
3	<input checked="" type="radio"/>	<input type="radio"/>	3	<input checked="" type="radio"/>	<input type="radio"/>
4	<input checked="" type="radio"/>	<input type="radio"/>	4	<input checked="" type="radio"/>	<input type="radio"/>
5	<input checked="" type="radio"/>	<input type="radio"/>	5	<input checked="" type="radio"/>	<input type="radio"/>
6	<input checked="" type="radio"/>	<input type="radio"/>	6	<input checked="" type="radio"/>	<input type="radio"/>
7	<input checked="" type="radio"/>	<input type="radio"/>	7	<input checked="" type="radio"/>	<input type="radio"/>
8	<input checked="" type="radio"/>	<input type="radio"/>	8	<input checked="" type="radio"/>	<input type="radio"/>
9	<input checked="" type="radio"/>	<input type="radio"/>	9	<input checked="" type="radio"/>	<input type="radio"/>
10	<input checked="" type="radio"/>	<input type="radio"/>	10	<input checked="" type="radio"/>	<input type="radio"/>
11	<input checked="" type="radio"/>	<input type="radio"/>	11	<input checked="" type="radio"/>	<input type="radio"/>
12	<input checked="" type="radio"/>	<input type="radio"/>	12	<input checked="" type="radio"/>	<input type="radio"/>

Note: NC - No Change

Zero Calibration Setting
 Use Special Setting
 Setting (hex):

Control Dwell Time
 Seconds

Ethernet CPM - Calibrate Mode Commands
 Step 1 Sequence:
 Dwell (in seconds):
 Step 2 Sequence:
 Dwell (in seconds):

Ethernet CPM - Calibrate Power Up Mode Commands
 Step 1 Sequence:
 Dwell (in seconds):
 Step 2 Sequence:
 Dwell (in seconds):

Command Target Control
 Command Target: **RAD/Enclosure/DSM**
 Ethernet CPM IP Address:
 Calibrator Definition: Browse...

Open Definition Save Definition Close Cancel

PORT DEFINITIONS

Click Setup, Port to open the Port definition Window. This page determines the pressures that will be applied to each enabled port during the test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Port definition files. Highlight the file to be used and click: Open. Only port definition files will be shown.

If the ports must be defined:

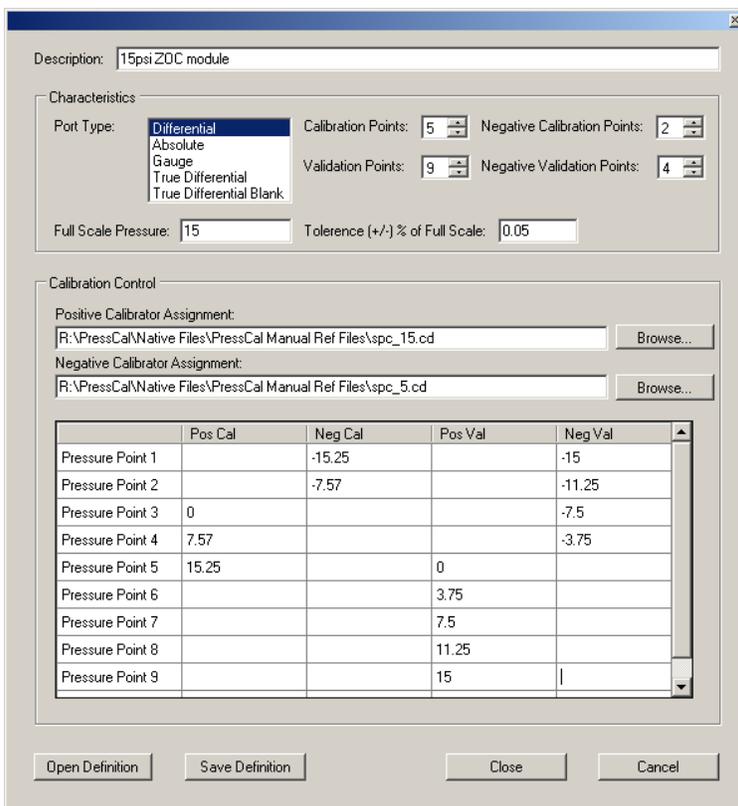
1. Enter a description. This is for reference only.
2. Highlight the port type. For standard ZOC22/23/33 modules highlight: Differential.
3. Enter the total number of calibration points. This is the total number of calibration pressures to be applied, including zero. Scanivalve recommends 5 points for the calibration of 15 psi ZOC22/23/33 modules.
4. Enter the number of negative calibration points. Two is recommended for the calibration of 15 psi ZOC22/23/33.
5. Enter the total number of validation points. This is the total number of pressures to be applied, including zero. Nine is recommended for the validation of 15 psi ZOC22/23/33 modules.
6. Enter the number of negative validation points. Four is recommended for the validation of 15 psi ZOC22/23/33 modules.
7. Enter the name of the Calibrator Setup files to be used for the Positive and Negative Calibrator Assignment. For 15 psi modules and lower, the Positive and Negative Calibrator Setup files will be the same. For modules with full scale pressure ranges greater than 15 psi:
 - A. The Positive Calibrator Assignment file will be the calibrator providing the positive pressures.
 - B. The Negative Calibrator Assignment file will usually be the 15 psi calibrator.

NOTE: The calibrator connections in a system MUST be verified to prevent damage to the modules.

8. Enter the calibration pressures. Pressure Point 1 is the lowest Negative point. Pressure Point 5 is the highest Positive point.

NOTE: Recommended Calibration and Validation pressures for all standard range modules may be found in "Appendix A: Recommended As Received/Validation Pressures" on page 61, however each individual calibration varies. If the recommended calibration points do not yield acceptable calibration results, contact Scanivalve for additional recommendations.

9. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

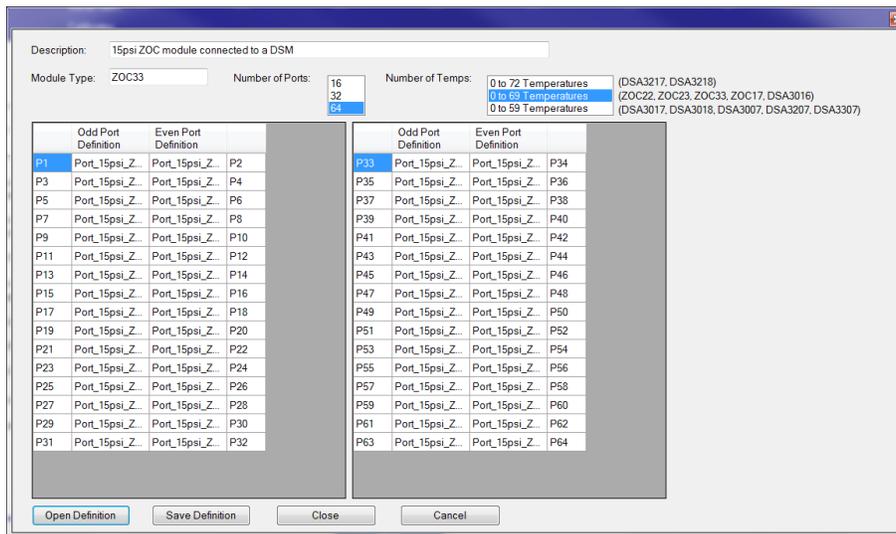


MODULE DEFINITIONS

Click Setup, Module to open the Module definition Window. This page determines the port definitions that will be used to apply pressures to each enabled port in the module under test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Module definition files. Highlight the file to be used and click: Open. Only Module definition files will be shown.

If the module(s) must be defined:

1. Enter a Description. This is for reference only.
2. Enter the Module Type, ZOC33.
3. Highlight the Number of Ports, 64. The number of ports shown in the window will be automatically adjusted to the size highlighted in this box.
4. Enter the name of the Port Definition file that will identify the pressures to be applied to that port in the box next to the port number. If all ports will use the same file, all boxes can be highlighted by:
 - A. Left clicking on the box for Port 1.
 - B. Slide the mouse arrow to the last even port while holding the left button down. All of the boxes will be highlighted. Release the left click.
 - C. The Port definition file window will open. Highlight on the file to be used and click: Open. This file name will be entered in each box.
5. Select a calibration temperature range associated with the individual module.
6. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

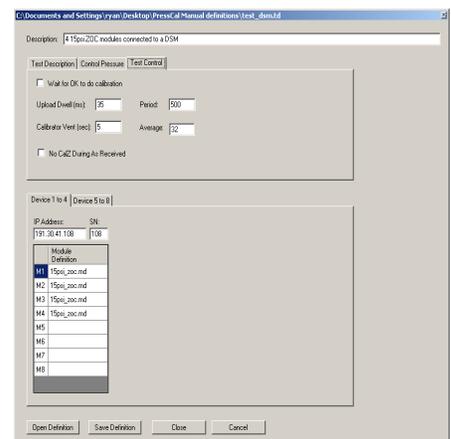
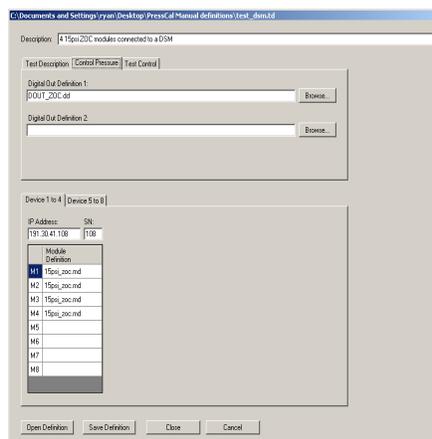
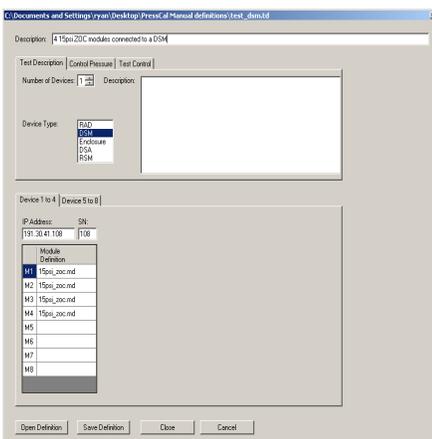


TEST DEFINITIONS

Click Setup, Test to open the Test Definition Window. This page determines which of the Calibrator, Digital Output, Port and Module Definition files will be used for the complete test. The address(es) of the DSM modules will be defined as well as test dwell. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Test Definition files. Highlight the file to be used and click: Open. Only Test Definition files will be shown.

If the Test must be defined:

1. Enter a Description of the test. This is for reference only.
2. Start with the Test Description page. If that page is not active, click the Test Description Tab.
3. Select the Number of Devices. Select one (1) for one DSM. Select the Number of Devices. Select one (1) for one DSM. PressCal can calibrate up to eight (8) DSM modules, each with up to eight ZOC connected to each DSM at one time.
4. Highlight the Device Type. The Module Definition will adjust to the number entered.
5. Click the Box next to the Module Definition for M1 (Module 1). The box will be highlighted, and the Module Definition Files will be shown in another window. Select the Module Definition File for the Module under Test.
6. Enter the IP Address and Serial Number of the DSM in the respective windows
7. Click the Control Pressure Tab to open that window.
8. Enter the Digital Out Definition File(s) to be used for the test. Click Browse to select the file from the saved Digital Out Definitions.
9. Click the Test Control Tab to open the Test Control Window.
10. Check the Wait for OK to do Calibration box to stop the program after the As Received report is generated. This will give a user the opportunity to terminate the test if the data shows that there might be a problem with the setup or that the module is within specifications and does not require a Field Calibration.
11. Upload Dwell should be left at 35 ms unless there is problems uploading coefficients to the module.
12. Calibrator Vent is recommended to be set at 5 seconds, but this can be increased if CAL and REF lines are longer than 50 feet (15.24m).
13. If you do not want PressCal to perform a CALZ or CALB before the As Received validation, check the box 'No CALZ During As Received.'
14. It is recommended that Period be set to 500.
15. It is recommended that Average be set to 32. It is not recommended to set Average less than 16, nor greater than 64.
16. When the definition is completed, save the definition file. Click the Save Definition button. Name the file and click: Save.



ZOC17/22/23/33 MODULES CONNECTED TO A RAD3200 OR RAD4000**CALIBRATOR DEFINITIONS**

Click Setup, Calibrator to open the Calibrator Definition window. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Calibrator Definition files. Highlight the file to be used and click: Open. Only Calibrator Definition files will be shown. The setup described below is for a calibration with a 15 psi SPC4000.

If the calibrator must be defined:

1. Enter a Description. This is for reference only.
2. Highlight the calibrator type. Options are:
 - A. Automatic Gauge/Differential (SPC3000) - This should be selected if the Calibrator is a SPC3000 using a Digiquartz 202VG as the Secondary Standard.
 - B. Automatic Absolute (SPC3000) - Select this option for all other SPC3000 Calibrators.
 - C. Manual Gauge - This calibrator option is used for manual calibrations.
 - D. Manual Absolute - This calibrator option is used for manual absolute calibrations.
 - E. Automatic Gauge (SPC4000) - Select this option if using an SPC4000 Calibrator
 - F. Automatic Absolute (SPC4000)- Select this option if the calibrator being used is an SPC4000 with an Absolute type pressure standard.
3. Set the Calibrator Address
4. Highlight the full scale pressure range of the Pressure Standard.
5. Set the Max Module Pressure. This is the full scale value of the sensors in the module. This value will be used during the validation process to determine the errors of the sensors.
6. Set the Communication Type. Options are:
 - A. Serial - Select this if the Automatic Calibrator is an SPC3000 controlled by an enclosure, a DSM, or a direct serial connection.
 - B. Device - Select this option if the Automatic Calibrator is an SPC3000 installed in a SPC3200 Enclosure controlled by an Ethernet connection. The IP address of the enclosure must be entered. Also, the serial address of the calibrator must be correct.
 - C. Network - Select this if the Automatic Calibrator is an SPC4000 communicating via Ethernet connection. The IP address and the network port will also have to be defined.
7. If Calibrator Type is Automatic, the action of the calibrator must be defined.
 - A. Set the dwell time in seconds. This is the time delay to allow the calibration pressure to stabilize. Typically, 15 to 30 seconds is sufficient.
 - B. Set the Stability percentage. This is the value in percent of full scale to be used by the software to determine if the calibration pressure is stable enough to perform the calibration. Scanivalve recommends 0.02%. Check the Trap Pressure box if the pressure is to be trapped after the dwell time has timed out. This should be checked for all calibrations at 5 psi Full Scale and lower when using an SPC3000 calibrator.
8. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

The screenshot shows the 'Calibrator Definition' window with the following settings:

- Description:** 15PSI SPC4000 Calibration
- Characteristics:**
 - Calibrator Type:** Automatic Absolute (SPC4000) (highlighted)
 - Calibrator Address:** 2
 - Nominal Pressure Range:** 15 (highlighted)
 - Max Module Pressure:** 15
- Action:**
 - Dwell Time in Seconds:** 30
 - Stability Percentage:** 0.02
 - Trap Pressure:**
- Communication:**
 - Communication Type:** Network (highlighted)
 - Serial Comm Port:** (empty)
 - Device IP Address:** (empty)
 - Network IP Address:** 191.30.40.101
 - Network Port:** 1025

Buttons at the bottom: Open Definition, Save Definition, Close, Cancel.

DIGITAL OUTPUT DEFINITIONS

Click Setup, Digital Output to open the Digital Output Definition Window. This will setup the control pressure logic for the test. If a pre-defined definition exists, click: Open Definition. A window will open that will list the existing Digital Output Definition Files. Highlight the file to be used and click: Open. Only Digital Output Definition Files will be shown.

If the Digital Outputs must be defined,

1. Enter a description. This is for reference only.
2. Click the radio buttons for the digital outputs that will switch the control pressures. Digital Outputs 1 through 3 are used by RAD modules with an RDS3200. All Digital Outputs should be defined as: On, Off, or No Change. Reference "Appendix F: DOUT Configurations & Valve Logic States" on page 68 for more information.
3. Highlight the Command Target for the Digital Output control signal, For a DSM communicating with an SPC3000, highlight: RAD/Enclosure/DSM.
4. The Calibrator Definition File option will be grayed out.
5. The Zero Calibration Setting should not be modified.
6. Set the Control Pressure Dwell time in seconds. 5 seconds is recommended for most tests unless the control pressure lines are very long. Consult Scanivalve for more information if control pressure lines are longer than 50 feet (15.24m).
7. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

PORT DEFINITIONS

Click Setup, Port to open the Port definition Window. This page determines the pressures that will be applied to each enabled port during the test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Port definition files. Highlight the file to be used and click: Open. Only port definition files will be shown.

If the ports must be defined:

1. Enter a description. This is for reference only.
2. Highlight the port type. For standard ZOC22/23/33 modules highlight: Differential.
3. Enter the total number of calibration points. This is the total number of calibration pressures to be applied, including zero. Scanivalve recommends 5 points for the calibration of 15 psi ZOC22/23/33 modules.
4. Enter the number of negative calibration points. Two is recommended for the calibration of 15 psi ZOC22/23/33.
5. Enter the total number of validation points. This is the total number of pressures to be applied, including zero. Nine is recommended for the validation of 15 psi ZOC22/23/33 modules.
6. Enter the number of negative validation points. Four is recommended for the validation of 15 psi ZOC22/23/33 modules.
7. Enter the name of the Calibrator Setup files to be used for the Positive and Negative Calibrator Assignment. For 15 psi modules and lower, the Positive and Negative Calibrator Setup files will be the same. For modules with full scale pressure ranges greater than 15 psi:

A. The Positive Calibrator Assignment file will be the calibrator providing the positive pressures.

B. The Negative Calibrator Assignment file will usually be the 15 psi calibrator.

NOTE: The Calibrator connections in a system **MUST** be verified to prevent damage to the modules.

8. Enter the Calibration pressures. Pressure Point 1 is the lowest Negative point. Pressure Point 5 is the highest Positive point.

NOTE: Recommended Calibration and Validation pressures for all standard range modules may be found in "Appendix A: Recommended As Received/Validation Pressures" on page 61, however each individual calibration varies. If the recommended calibration points do not yield acceptable calibration results, contact Scanivalve for additional recommendations.

9. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

Description: 15psi ZOC module

Characteristics

Port Type: **Differential**
 Absolute
 Gauge
 True Differential
 True Differential Blank

Calibration Points: 5 Negative Calibration Points: 2

Validation Points: 9 Negative Validation Points: 4

Full Scale Pressure: 15 Tolerance (+/-) % of Full Scale: 0.05

Calibration Control

Positive Calibrator Assignment:
 R:\PressCal\Native Files\PressCal Manual Ref Files\spc_15.cd Browse...

Negative Calibrator Assignment:
 R:\PressCal\Native Files\PressCal Manual Ref Files\spc_5.cd Browse...

	Pos Cal	Neg Cal	Pos Val	Neg Val
Pressure Point 1		-15.25		-15
Pressure Point 2		-7.57		-11.25
Pressure Point 3	0			-7.5
Pressure Point 4	7.57			-3.75
Pressure Point 5	15.25		0	
Pressure Point 6			3.75	
Pressure Point 7			7.5	
Pressure Point 8			11.25	
Pressure Point 9			15	

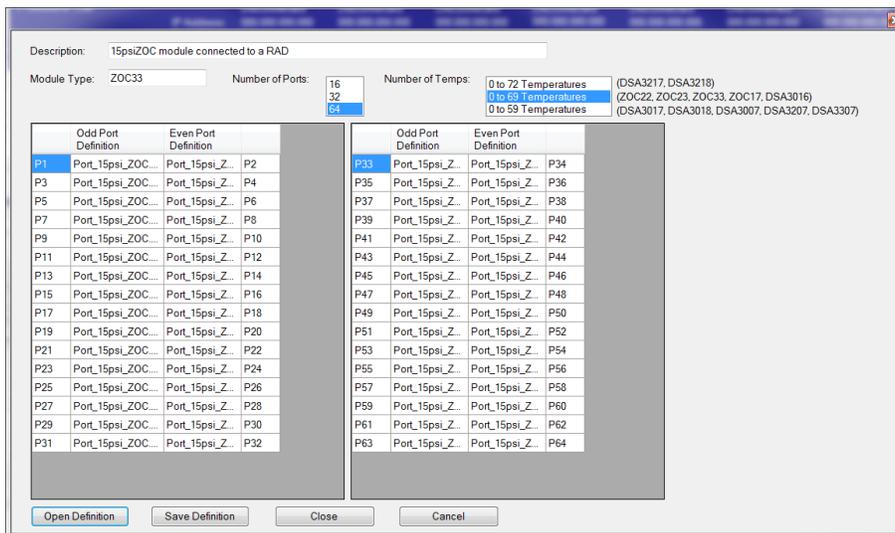
Open Definition Save Definition Close Cancel

MODULE DEFINITIONS

Click Setup, Module to open the Module definition Window. This page determines the port definitions that will be used to apply pressures to each enabled port in the module under test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Module definition files. Highlight the file to be used and click: Open. Only Module definition files will be shown.

If the module(s) must be defined:

1. Enter a Description. This is for reference only.
2. Enter the Module Type, ZOC33.
3. Highlight the Number of Ports, 64. The number of ports shown in the window will be automatically adjusted to the size highlighted in this box.
4. Enter the name of the Port Definition file that will identify the pressures to be applied to that port in the box next to the port number. If all ports will use the same file, all boxes can be highlighted by:
 - A. Left clicking on the box for Port 1.
 - B. Slide the mouse arrow to the last even port while holding the left button down. All of the boxes will be highlighted. Release the left click.
 - C. The Port definition file window will open. Highlight on the file to be used and click: Open. This file name will be entered in each box.
5. Select a calibration temperature range associated with the individual module.
6. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

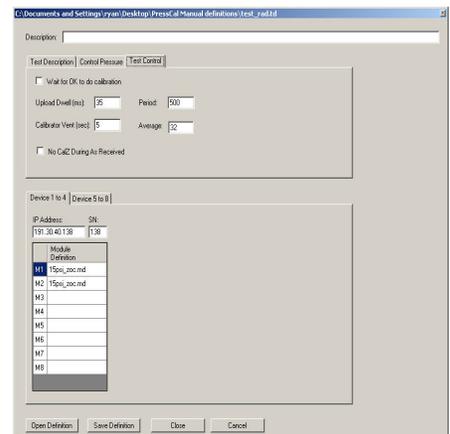
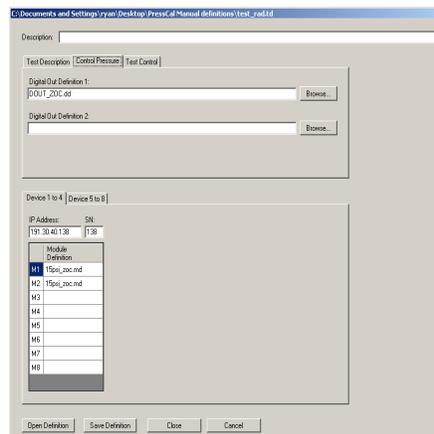
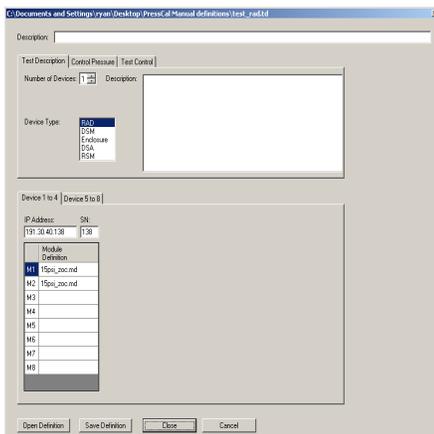


TEST DEFINITIONS

Click Setup, Test to open the Test Definition Window. This page determines which of the Calibrator, Digital Output, Port and Module Definition files will be used for the complete test. The address(es) of the RAD modules will be defined as well as test dwell. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Test Definition files. Highlight the file to be used and click: Open. Only Test Definition files will be shown.

If the Test must be defined:

1. Enter a Description of the test. This is for reference only.
2. Start with the Test Description page. If that page is not active, click the Test Description Tab.
3. Select the Number of Devices. Select one (1) for one RAD. Select the Number of Devices. Select one (1) for one RAD. PressCal can calibrate up to eight (8) RAD modules, each with up to eight ZOC connected to each RAD at one time.
4. Highlight the Device Type. The Module Definition will adjust to the number entered.
5. Click the Box next to the Module Definition for M1 (Module 1). The box will be highlighted, and the Module Definition Files will be shown in another window. Select the Module Definition File for the Module under Test.
6. Enter the IP Address and Serial Number of the RAD in the respective windows (for RAD3200 systems use the simulated IP address of 127.0.0.1)
7. Click the Control Pressure Tab to open that window.
8. Enter the Digital Out Definition File(s) to be used for the test. Click Browse to select the file from the saved Digital Out Definitions.
9. Click the Test Control Tab to open the Test Control Window.
10. Check the Wait for OK to do Calibration box to stop the program after the As Received report is generated. This will give a user the opportunity to terminate the test if the data shows that there might be a problem with the setup or that the module is within specifications and does not require a Field Calibration.
11. Upload Dwell should be left at 35 ms unless there is problems uploading coefficients to the module.
12. Calibrator Vent is recommended to be set at 5 seconds, but this can be increased if CAL and REF lines are longer than 50 feet (15.24m).
13. If you do not want PressCal to perform a CALZ or CALB before the As Received validation, check the box 'No CALZ During As Received.'
14. It is recommended that Period be set to 500.
15. It is recommended that Average be set to 32. It is not recommended to set Average less than 16, nor greater than 64.
16. When the definition is completed, save the definition file. Click the Save Definition button. Name the file and click: Save.



SECTION 3: EXAMPLE MANUAL CALIBRATIONS

DSA 3200 SERIES MODULES

CALIBRATOR DEFINITIONS

Click Setup, Calibrator to open the Calibrator Definition window. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Calibrator Definition Files. Highlight the file to be used and click: Open. Only Calibrator Output Definition Files will be shown.

If the Calibrator must be defined:

1. Enter a description. This is for reference only
2. Highlight the calibrator type. Select:
 - A. Manual Gauge - Select this option for a Gauge type pressure standard.
 - B. Manual Absolute - Select this option for an Absolute type pressure standard.
3. Set the Nominal Pressure Range. This is the full scale pressure range of the calibrator.
4. Set the Max Module Pressure. This is the full scale value of the sensors in the module. This value will be used during the validation process to determine the errors of the sensors.
5. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

The screenshot shows a software window titled "Manual 15psi Calibrator". The window is divided into several sections:

- Description:** Manual 15psi Calibrator
- Characteristics:**
 - Calibrator Type:** A list box containing "Automatic Gauge / Differential (SPC3000)", "Automatic Absolute (SPC3000)", "Manual Gauge", "Manual Absolute", "Automatic Gauge (SPC4000)", and "Automatic Absolute (SPC4000)". "Manual Gauge" is selected.
 - Calibrator Address:** 0
- Nominal Pressure Range:** A list box with values 1, 2.5, 5, 15, 30, 50, 100, and 200. "15" is selected.
- Max Module Pressure:** 15
- Action:**
 - Dwell Time in Seconds:** [Empty text box]
 - Stability Percentage:** [Empty text box]
 - Trap Pressure
- Communication:**
 - Communication Type:** Radio buttons for "Serial Device" and "Network". "Network" is selected.
 - Serial Comm Port:** [Empty text box]
 - Device IP Address:** [Empty text box]
 - Network IP Address:** 191.30.40.101
 - Network Port:** 1025

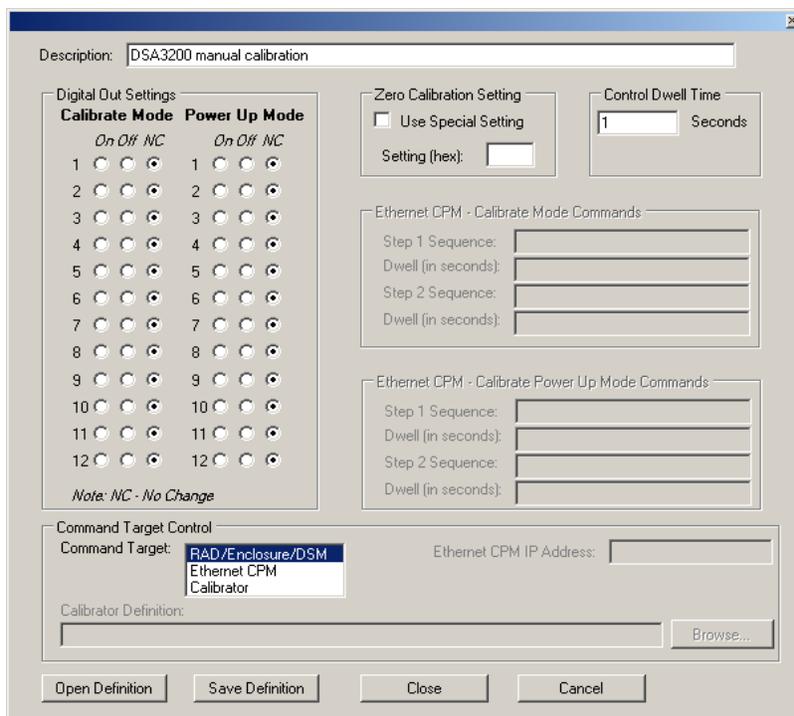
At the bottom of the window are four buttons: "Open Definition", "Save Definition", "Close", and "Cancel".

DIGITAL OUTPUT DEFINITIONS

Click Setup, Digital Output to open the Digital Output Definition Window. This will setup the control pressure control for the test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Digital Output Definition Files. Highlight the file to be used and click: Open. Only Digital Output Definition Files will be shown.

If the Digital Outputs must be defined,

1. Enter a description. This is for reference only.
2. If you are manually putting the DSA into calibration mode (CTL1 and CTL2 applied) before running PressCal, set the radio buttons to set all digital outputs to NC (No Change).
3. Set the Command Target to "RAD/Enclosure/DSM."
4. No calibrator definition needs to be defined.
5. The Zero Calibration Setting does not apply to DSA modules.
6. Set the Control Pressure Dwell time to one second.
7. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.



PORT DEFINITIONS

Click Setup, Port to open the Port definition Window. This page determines the pressures that will be applied to each enabled port during the test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Port definition files. Highlight the file to be used and click: Open. Only port definition files will be shown. The setup described below is for the calibration and validation of a 15 psi DSA3200 series module.

If the ports must be defined:

1. Enter a description. This is for reference only.
2. Highlight the port type. For standard DSA 3217/18 modules highlight: Differential.
3. Enter the total number of calibration points. This is the total number of calibration pressures to be applied, including zero. Scanivalve recommends five points for a 15 psi DSA3200 series module.
4. Enter the number of negative calibration points. Two is recommended for a 15 psi DSA3200 series modules.
5. Enter the total number of validation points. This is the total number of pressures to be applied, including zero. Nine is recommended for a 15 psi DSA3200 series module.
6. Enter the number of number of negative validation points. Four is recommended for a 15 psi DSA3200 series module.
7. Enter the full scale pressure range of the module (in PSI).
8. Enter the pass/fail tolerance desired (in % of full scale).
9. Enter the name of the Calibrator Setup files to be used for the Positive and Negative Calibrator Assignment. For 15 psi modules and lower, the Positive and Negative Calibrator Setup files will be the same. For modules with full scale pressure ranges greater than 15 psi:
 - A. The Positive Calibrator Assignment file will be the calibrator providing the positive pressures.
 - B. The Negative Calibrator Assignment file will usually be the 15 psi calibrator.

NOTE: The Calibrator connections in a system **MUST** be verified to prevent damage to the modules.

10. Enter the Calibration pressures. Pressure Point 1 is the lowest Negative point. Pressure Point 5 is the highest Positive point.

NOTE: Recommended Calibration and Validation pressures for all standard range modules may be found in "Appendix A: Recommended As Received/Validation Pressures" on page 61, however each individual calibration varies. If the recommended calibration points do not yield acceptable calibration results, contact Scanivalve for additional recommendations.

11. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

Description: 15psi DSA manual calibration

Characteristics

Port Type: **Differential**
 Absolute
 Gauge
 True Differential
 True Differential Blank

Calibration Points: 5
 Negative Calibration Points: 2
 Validation Points: 9
 Negative Validation Points: 4

Full Scale Pressure: 15
 Tolerance (+/-) % of Full Scale: 0.05

Calibration Control

Positive Calibrator Assignment:
 C:\Documents and Settings\ryan\Desktop\15psi_manual_calibrator.cd [Browse...]

Negative Calibrator Assignment:
 C:\Documents and Settings\ryan\Desktop\15psi_manual_calibrator.cd [Browse...]

	Pos Cal	Neg Cal	Pos Val	Neg Val
Pressure Point 1		-16.35		-15
Pressure Point 2		-8.18		-11.25
Pressure Point 3	0			-7.5
Pressure Point 4	8.18			-3.75
Pressure Point 5	16.35		0	
Pressure Point 6			3.75	
Pressure Point 7			7.5	
Pressure Point 8			11.25	
Pressure Point 9			15	

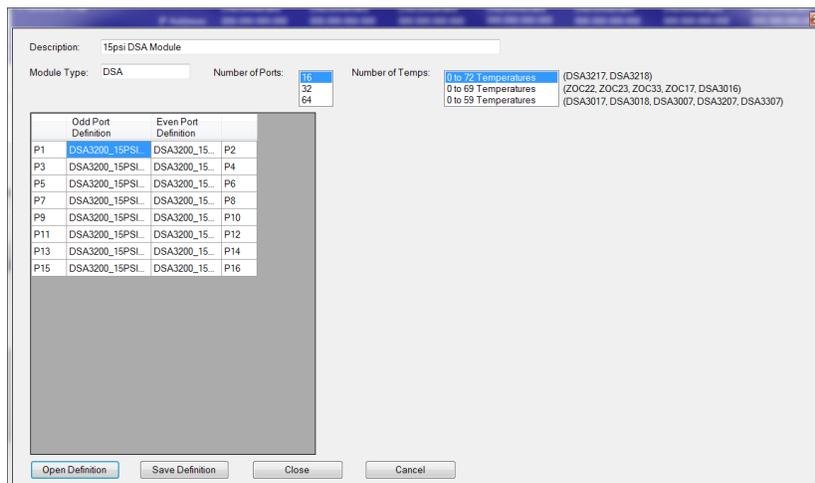
Open Definition Save Definition Close Cancel

MODULE DEFINITIONS

Click Setup, Module to open the Module definition Window. This page determines the port definitions that will be used to apply pressures to each enabled port in the module under test.

If the ports must be defined:

1. Enter a Description. This is for reference only.
2. Enter the Module Type (ie DSA3218 or DSA3307).
3. Highlight the Number of Ports. The number of ports shown in the window will be automatically adjusted.
4. Enter the name of the Port Definition file that will identify the pressures to be applied to that port in the box next to the port number. Clicking in the blank box next to the port number will open the file browser window. If all ports will use the same file, all boxes can be highlighted by:
 - A. Left clicking on the box for Port 1.
 - B. Slide the mouse arrow to the last even port while holding the left button down. All of the boxes will be highlighted. Release the left click.
 - C. The Port definition file window will open. Highlight on the file to be used and click: Open. This file name will be entered in each box.
5. Select a calibration temperature range associated with the individual module.
6. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

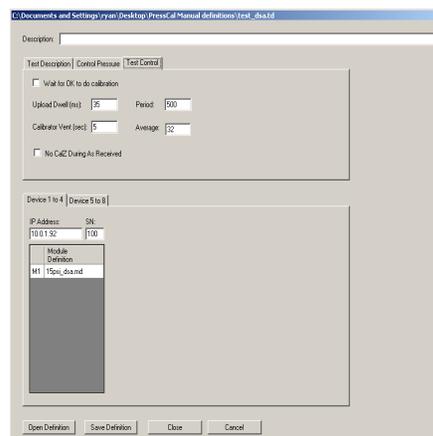
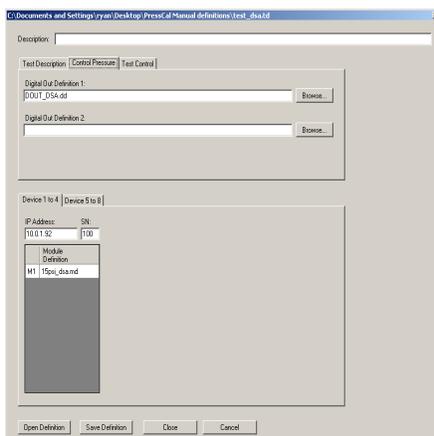
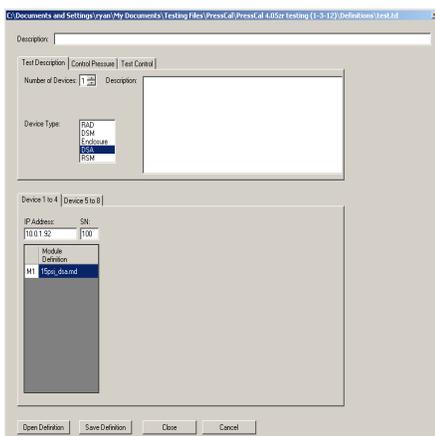


TEST DEFINITIONS

Click Setup, Test to open the Test Definition Window. This page determines which of the Calibrator, Digital Output, Port and Module Definition files will be used for the complete test. The address(es) of the DSA Module(s) will be defined as well as test dwell and delay times. The Test Definition is 3 pages of setup. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Test Definition files. Highlight the file to be used and click: Open. Only Test Definition files will be shown. The setup described below is for a calibration of a 15 psi DSA3200 series module.

If the Test must be defined:

1. Enter a Description of the test. This is for reference only.
2. Start with the Test Description. If that page is not active, click the Test Description Tab.
3. Select the Number of Devices. PressCal can calibrate up to eight DSA3200 Series modules at one time. Each must have a unique IP address. For the example in this manual, only one device is connected.
4. Highlight the Device Type. The Module Definition will adjust to the number entered.
5. Click the Box next to the Module Definition for M1 (Module 1). The box will be highlighted, and the Module Definition Files will be shown in another window. Select the Module Definition File for the Module under Test.
6. Enter the IP Address and Serial Number of the module in the respective windows
7. Click the Control Pressure Tab to open that window.
8. Enter the Digital Out Definition File(s) to be used for the test. Click Browse to select the file from the saved Digital Out Definitions. The second Digital Out Definition file is very rarely used and is normally reserved for turning a vacuum pump on and off or similar tasks.
9. Click the Test Control Tab to open the Test Control Window.
10. Check the Wait for OK to do Calibration box to stop the program after the As Received report is generated. This will give a user the opportunity to terminate the test if the data shows that there might be a problem with the setup or that the module is within specifications and does not require a Field Calibration.
11. Upload Dwell should be left at 35 ms unless there is problems uploading coefficients to the DSA module.
12. Calibrator Vent is recommended to be set at 5 seconds, but this can be increased if CAL and REF lines are longer than 50 feet (15.24m).
13. If you do not want PressCal to perform a CALZ or CALB before the As Received validation, check the box 'No CALZ During As Received.' This is generally not recommend.
14. It is recommended that Period be set to 500.
15. It is recommended that Average be set to 32. It is not recommended to set Average less than 16, nor greater than 64.
16. When the definition is completed, save the definition file. Click the Save Definition button. Name the file and click: Save.



DSA3016 MODULES INSTALLED IN A DSAENCL

CALIBRATOR DEFINITIONS

Click Setup, Calibrator to open the Calibrator Definition window. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Calibrator Definition Files. Highlight the file to be used and click: Open. Only Calibrator Output Definition Files will be shown.

If the Calibrator must be defined:

1. Enter a description. This is for reference only
2. Highlight the calibrator type. Select:
 - A. Manual Gauge - Select this option for a Gauge type pressure standard.
 - B. Manual Absolute - Select this option for an Absolute type pressure standard.
3. Set the Nominal Pressure Range. This is the full scale pressure range of the calibrator.
4. Set the Max Module Pressure. This is the full scale value of the sensors in the module. This value will be used during the validation process to determine the errors of the sensors.
5. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

The screenshot shows a software window titled "Manual 15psi Calibrator". The window is divided into several sections:

- Description:** Manual 15psi Calibrator
- Characteristics:**
 - Calibrator Type:** A list box with options: Automatic Gauge / Differential (SPC3000), Automatic Absolute (SPC3000), **Manual Gauge** (highlighted), Manual Absolute, Automatic Gauge (SPC4000), and Automatic Absolute (SPC4000).
 - Calibrator Address:** 0
- Action:**
 - Dwell Time in Seconds:** []
 - Stability Percentage:** []
 - Trap Pressure
- Nominal Pressure Range:** A list box with options: 1, 2.5, 5, **15** (highlighted), 30, 50, 100, 200.
- Max Module Pressure:** 15
- Communication:**
 - Communication Type:** Serial Device, **Network** (selected)
 - Serial Comm Port:** []
 - Device IP Address:** []
 - Network IP Address:** 191.30.40.101
 - Network Port:** 1025

At the bottom of the window are four buttons: Open Definition, Save Definition, Close, and Cancel.

DIGITAL OUTPUT DEFINITIONS

Click Setup, Digital Output to open the Digital Output Definition Window. This will setup the control pressure logic for the test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Digital Output Definition Files. Highlight the file to be used and click: Open. Only Digital Output Definition Files will be shown.

If the Digital Outputs must be defined,

1. Enter a description. This is for reference only.
2. Click the radio buttons for the digital outputs that will switch the control pressures. DSAENCL modules use Digital Outputs 6, 7 and 8. All Digital Outputs should be defined as: On, Off, or No Change. Reference “Appendix F: DOUT Configurations & Valve Logic States” on page 68 for more information.
3. Highlight the command target for the Digital Output control signals. For a DSAENCL, highlight RAD/Enclosure/DSM.
4. The Zero Calibration Setting should not be enabled for most DSAENCL applications. It can be left blank.
5. Set the Control Pressure Dwell time in seconds. 5 seconds is recommended for most tests unless the control pressure lines are very long. Consult Scanivalve for more information if control pressure lines are longer than 50 feet (15.24m).
6. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

PORT DEFINITIONS

Click Setup, Port to open the Port definition Window. This page determines the pressures that will be applied to each enabled port during the test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Port definition files. Highlight the file to be used and click: Open. Only port definition files will be shown. The setup described below is for the calibration of 15 psi DSA3016 Modules installed in a DSAENCL Enclosure.

If the ports must be defined:

1. Enter a description. This is for reference only.
2. Highlight the port type. For standard DSA3016 modules highlight: Differential.
3. Enter the total number of calibration points. This is the total number of calibration pressures to be applied, including zero. Scanivalve recommends five points for a 15 psi DSA3016 series module.
4. Enter the number of negative calibration points. Two is recommended for a 15 psi DSA3016 series modules.
5. Enter the total number of validation points. This is the total number of pressures to be applied, including zero. Nine is recommended for a 15 psi DSA3016 series module.
6. Enter the number of number of negative validation points. Four is recommended for a 15 psi DSA3016 series module.
7. Enter the full scale pressure range of the module (in PSI).
8. Enter the pass/fail tolerance desired (in % of full scale).
9. Enter the name of the Calibrator Setup files to be used for the Positive and Negative Calibrator Assignment. For 15 psi modules and lower, the Positive and Negative Calibrator Setup files will be the same. For modules with full scale pressure ranges greater than 15 psi:
 - A. The Positive Calibrator Assignment file will be the calibrator providing the positive pressures.
 - B. The Negative Calibrator Assignment file will usually be the 15 psi calibrator.

NOTE: The Calibrator connections in a system **MUST** be verified to prevent damage to the modules.

10. Enter the Calibration pressures. Pressure Point 1 is the lowest Negative point. Pressure Point 5 is the highest Positive point.

NOTE: Recommended Calibration and Validation pressures for all standard range modules may be found in "Appendix A: Recommended As Received/Validation Pressures" on page 61, however each individual calibration varies. If the recommended calibration points do not yield acceptable calibration results, contact Scanivalve for additional recommendations.

11. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

Description: 15psi DSA manual calibration

Characteristics

Port Type: **Differential**
 Absolute
 Gauge
 True Differential
 True Differential Blank

Calibration Points: 5
 Negative Calibration Points: 2
 Validation Points: 9
 Negative Validation Points: 4

Full Scale Pressure: 15
 Tolerance (+/-) % of Full Scale: 0.05

Calibration Control

Positive Calibrator Assignment:
 C:\Documents and Settings\ryan\Desktop\15psi_manual_calibrator.cd

Negative Calibrator Assignment:
 C:\Documents and Settings\ryan\Desktop\15psi_manual_calibrator.cd

	Pos Cal	Neg Cal	Pos Val	Neg Val
Pressure Point 1		-16.35		-15
Pressure Point 2		-8.18		-11.25
Pressure Point 3	0			-7.5
Pressure Point 4	8.18			-3.75
Pressure Point 5	16.35		0	
Pressure Point 6			3.75	
Pressure Point 7			7.5	
Pressure Point 8			11.25	
Pressure Point 9			15	

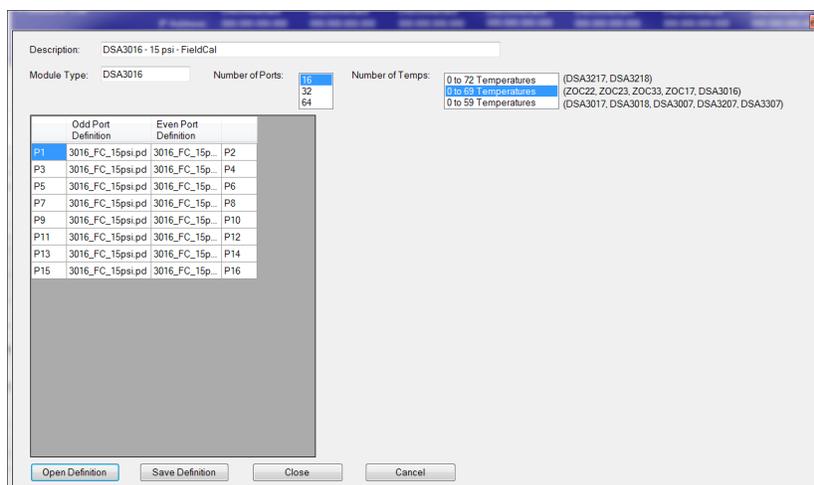
Buttons: Open Definition, Save Definition, Close, Cancel

MODULE DEFINITIONS

Click Setup, Module to open the Module definition Window. This page determines the port definitions that will be used to apply pressures to each enabled port in the module under test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Module definition files. Highlight the file to be used and click: Open. Only Module definition files will be shown. The setup described below is for the calibration of 15 psi DSA3016 Modules installed in a DSAENCL Enclosure.

If the module(s) must be defined:

1. Enter a Description. This is for reference only.
2. Enter the Module Type, DSA3016.
3. Highlight the Number of Ports, 16. The number of ports shown in the window will be automatically adjusted to the size highlighted in this box.
4. Enter the name of the Port Definition file that will identify the pressures to be applied to that port in the box next to the port number. Clicking in the blank box next to the port number will open the file browser window. If all ports will use the same file, all boxes can be highlighted by:
 - A. Left clicking on the box for Port 1.
 - B. Slide the mouse arrow to the last even port while holding the left button down. All of the boxes will be highlighted. Release the left click.
 - C. The Port definition file window will open. Highlight on the file to be used and click: Open. This file name will be entered in each box.
5. Select a calibration temperature range associated with the individual module.
6. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

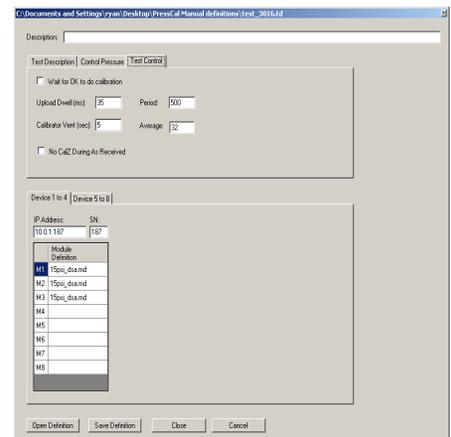
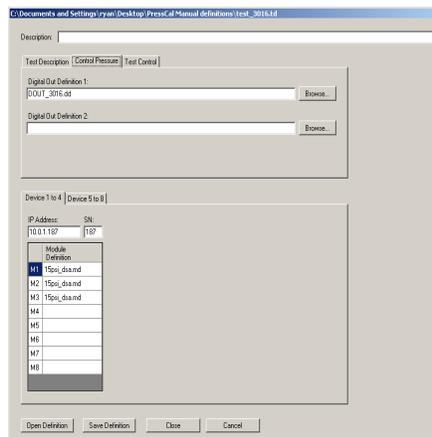
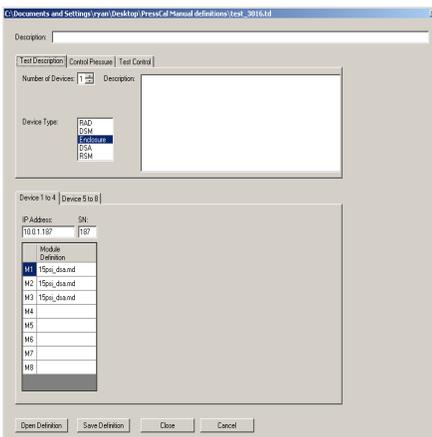


TEST DEFINITIONS

Click Setup, Test to open the Test Definition Window. This page determines which of the Calibrator, Digital Output, Port and Module Definition files will be used for the complete test. The address(es) of the DSAENCLs will be defined as well as test dwell. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Test Definition files. Highlight the file to be used and click: Open. Only Test Definition files will be shown. The setup described below is for the calibration of three 15 psi DSA3016 Modules installed in a DSAENCL.

If the Test must be defined:

1. Enter a Description of the test. This is for reference only.
2. Start with the Test Description page. If that page is not active, click the Test Description Tab.
3. Select the Number of Devices. PressCal can calibrate DSA3016 modules in as many as 8 DSAENCL Enclosures at one time. Each enclosure must have a unique IP address. For the example in this manual, three DSA3016 modules are installed in one DSAENCL.
4. Highlight the Device Type. The Module Definition will adjust to the number entered.
5. Click the Box next to the Module Definition for M1 (Module 1). The box will be highlighted, and the Module Definition Files will be shown in another window. Select the Module Definition File for the Module under Test.
6. Enter the IP Address and Serial Number of the module in the respective windows
7. Click the Control Pressure Tab to open that window.
8. Enter the Digital Out Definition File(s) to be used for the test. Click Browse to select the file from the saved Digital Out Definitions.
9. Click the Test Control Tab to open the Test Control Window.
10. Check the Wait for OK to do Calibration box to stop the program after the As Received report is generated. This will give a user the opportunity to terminate the test if the data shows that there might be a problem with the setup or that the module is within specifications and does not require a Field Calibration.
11. Upload Dwell should be left at 35 ms unless there is problems uploading coefficients to the DSA module.
12. Calibrator Vent is recommended to be set at 5 seconds, but this can be increased if CAL and REF lines are longer than 50 feet (15.24m).
13. If you do not want PressCal to perform a CALZ or CALB before the As Received validation, check the box 'No CALZ During As Received.'
14. It is recommended that Period be set to 500.
15. It is recommended that Average be set to 32. It is not recommended to set Average less than 16, nor greater than 64.
16. When the definition is completed, save the definition file. Click the Save Definition button. Name the file and click: Save.



ZOC17/22/23/33 MODULES CONNECTED TO A DSM 3000/3200/3400/4000**CALIBRATOR DEFINITIONS**

Click Setup, Calibrator to open the Calibrator Definition window. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Calibrator Definition Files. Highlight the file to be used and click: Open. Only Calibrator Output Definition Files will be shown.

If the Calibrator must be defined:

1. Enter a description. This is for reference only
2. Highlight the calibrator type. Select:
 - A. Manual Gauge - Select this option for a Gauge type pressure standard.
 - B. Manual Absolute - Select this option for an Absolute type pressure standard.
3. Set the Nominal Pressure Range. This is the full scale pressure range of the calibrator.
4. Set the Max Module Pressure. This is the full scale value of the sensors in the module. This value will be used during the validation process to determine the errors of the sensors.
5. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save..

The screenshot shows the 'Manual 15psi Calibrator' definition window. The 'Description' field contains 'Manual 15psi Calibrator'. Under 'Characteristics', the 'Calibrator Type' dropdown is set to 'Manual Gauge', and the 'Calibrator Address' is '0'. The 'Nominal Pressure Range' dropdown is set to '15', and the 'Max Module Pressure' is '15'. The 'Action' section includes 'Dwell Time in Seconds' and 'Stability Percentage' fields, and a 'Trap Pressure' checkbox. The 'Communication' section shows 'Communication Type' set to 'Network', with 'Serial Comm Port', 'Device IP Address', 'Network IP Address' (191.30.40.101), and 'Network Port' (1025) fields. At the bottom are 'Open Definition', 'Save Definition', 'Close', and 'Cancel' buttons.

DIGITAL OUTPUT DEFINITIONS

Click Setup, Digital Output to open the Digital Output Definition Window. This will setup the control pressure logic for the test. If a pre-defined definition exists, click: Open Definition. A window will open that will list the existing Digital Output Definition Files. Highlight the file to be used and click: Open. Only Digital Output Definition Files will be shown.

If the Digital Outputs must be defined,

1. Enter a description. This is for reference only.
2. Click the radio buttons for the digital outputs that will switch the control pressures. Digital Outputs 1 through 5 are used by DSM Series Modules. All Digital Outputs should be defined as: On, Off, or No Change. Reference "Appendix F: DOUT Configurations & Valve Logic States" on page 68 for more information.
3. Highlight the Command Target for the Digital Output control signal, For a DSM communicating with an SPC3000, highlight: RAD/Enclosure/DSM.
4. The Calibrator Definition File option will be grayed out.
5. The Zero Calibration Setting should not be modified.
6. Set the Control Pressure Dwell time in seconds. 5 seconds is recommended for most tests unless the control pressure lines are very long. Consult Scanivalve for more information if control pressure lines are longer than 50 feet (15.24m).
7. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

Description: DOUTS for a ZOC module connected to a DSM

Digital Out Settings

Calibrate Mode			Power Up Mode		
On	Off	NC	On	Off	NC
1	<input checked="" type="radio"/>	<input type="radio"/>	1	<input checked="" type="radio"/>	<input type="radio"/>
2	<input checked="" type="radio"/>	<input type="radio"/>	2	<input type="radio"/>	<input type="radio"/>
3	<input type="radio"/>	<input checked="" type="radio"/>	3	<input type="radio"/>	<input type="radio"/>
4	<input type="radio"/>	<input type="radio"/>	4	<input type="radio"/>	<input checked="" type="radio"/>
5	<input type="radio"/>	<input checked="" type="radio"/>	5	<input type="radio"/>	<input checked="" type="radio"/>
6	<input type="radio"/>	<input checked="" type="radio"/>	6	<input type="radio"/>	<input type="radio"/>
7	<input type="radio"/>	<input type="radio"/>	7	<input type="radio"/>	<input checked="" type="radio"/>
8	<input type="radio"/>	<input type="radio"/>	8	<input type="radio"/>	<input checked="" type="radio"/>
9	<input type="radio"/>	<input type="radio"/>	9	<input type="radio"/>	<input checked="" type="radio"/>
10	<input type="radio"/>	<input type="radio"/>	10	<input type="radio"/>	<input checked="" type="radio"/>
11	<input type="radio"/>	<input type="radio"/>	11	<input type="radio"/>	<input checked="" type="radio"/>
12	<input type="radio"/>	<input type="radio"/>	12	<input type="radio"/>	<input checked="" type="radio"/>

Note: NC - No Change

Zero Calibration Setting

Use Special Setting

Setting (hex):

Control Dwell Time

5 Seconds

Ethernet CPM - Calibrate Mode Commands

Step 1 Sequence:

Dwell (in seconds):

Step 2 Sequence:

Dwell (in seconds):

Ethernet CPM - Calibrate Power Up Mode Commands

Step 1 Sequence:

Dwell (in seconds):

Step 2 Sequence:

Dwell (in seconds):

Command Target Control

Command Target: RAD/Enclosure/DSM
Ethernet CPM
Calibrator

Ethernet CPM IP Address:

Calibrator Definition:

Browse...

Open Definition Save Definition Close Cancel

PORT DEFINITIONS

Click Setup, Port to open the Port definition Window. This page determines the pressures that will be applied to each enabled port during the test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Port definition files. Highlight the file to be used and click: Open. Only port definition files will be shown.

If the ports must be defined:

1. Enter a description. This is for reference only.
2. Highlight the port type. For standard ZOC22/23/33 modules highlight: Differential.
3. Enter the total number of calibration points. This is the total number of calibration pressures to be applied, including zero. Scanivalve recommends 5 points for the calibration of 15 psi ZOC22/23/33 modules.
4. Enter the number of negative calibration points. Two is recommended for the calibration of 15 psi ZOC22/23/33.
5. Enter the total number of validation points. This is the total number of pressures to be applied, including zero. Nine is recommended for the validation of 15 psi ZOC22/23/33 modules.
6. Enter the number of negative validation points. Four is recommended for the validation of 15 psi ZOC22/23/33 modules.
7. Enter the name of the Calibrator Setup files to be used for the Positive and Negative Calibrator Assignment. For 15 psi modules and lower, the Positive and Negative Calibrator Setup files will be the same. For modules with full scale pressure ranges greater than 15 psi:

A. The Positive Calibrator Assignment file will be the calibrator providing the positive pressures.

B. The Negative Calibrator Assignment file will usually be the 15 psi calibrator.

NOTE: The Calibrator connections in a system **MUST** be verified to prevent damage to the modules.

8. Enter the Calibration pressures. Pressure Point 1 is the lowest Negative point. Pressure Point 5 is the highest Positive point.

NOTE: Recommended Calibration and Validation pressures for all standard range modules may be found in "Appendix A: Recommended As Received/Validation Pressures" on page 61, however each individual calibration varies. If the recommended calibration points do not yield acceptable calibration results, contact Scanivalve for additional recommendations.

9. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

Description: 15psi ZOC manual calibration

Characteristics

Port Type: **Differential** (selected), Absolute, Gauge, True Differential, True Differential Blank

Calibration Points: 5, Negative Calibration Points: 2

Validation Points: 9, Negative Validation Points: 4

Full Scale Pressure: 15, Tolerance (+/-) % of Full Scale: 0.08

Calibration Control

Positive Calibrator Assignment: C:\Documents and Settings\vyar\Desktop\15psi_manual_calibrator.cd [Browse...]

Negative Calibrator Assignment: C:\Documents and Settings\vyar\Desktop\15psi_manual_calibrator.cd [Browse...]

	Pos Cal	Neg Cal	Pos Val	Neg Val
Pressure Point 1		-15.25		-15
Pressure Point 2		-7.57		-11.25
Pressure Point 3	0			-7.5
Pressure Point 4	7.57			-3.75
Pressure Point 5	15.25		0	
Pressure Point 6			3.75	
Pressure Point 7			7.5	
Pressure Point 8			11.25	
Pressure Point 9			15	

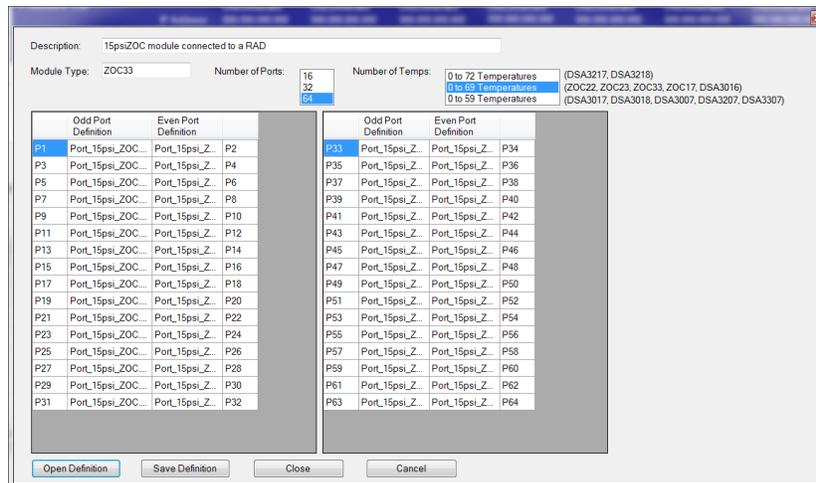
Buttons: Open Definition, Save Definition, Close, Cancel

MODULE DEFINITIONS

Click Setup, Module to open the Module definition Window. This page determines the port definitions that will be used to apply pressures to each enabled port in the module under test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Module definition files. Highlight the file to be used and click: Open. Only Module definition files will be shown.

If the module(s) must be defined:

1. Enter a Description. This is for reference only.
2. Enter the Module Type, ZOC33.
3. Highlight the Number of Ports, 64. The number of ports shown in the window will be automatically adjusted to the size highlighted in this box.
4. Enter the name of the Port Definition file that will identify the pressures to be applied to that port in the box next to the port number. If all ports will use the same file, all boxes can be highlighted by:
 - A. Left clicking on the box for Port 1.
 - B. Slide the mouse arrow to the last even port while holding the left button down. All of the boxes will be highlighted. Release the left click.
 - C. The Port definition file window will open. Highlight on the file to be used and click: Open. This file name will be entered in each box.
5. Select a calibration temperature range associated with the individual module.
6. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

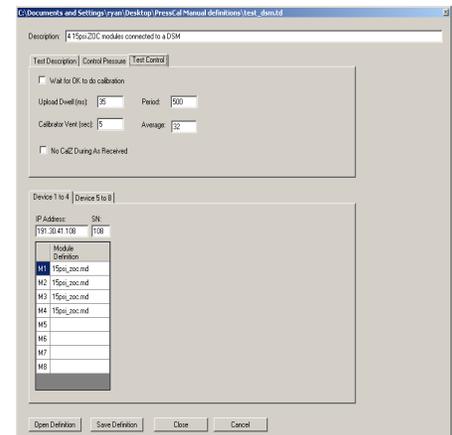
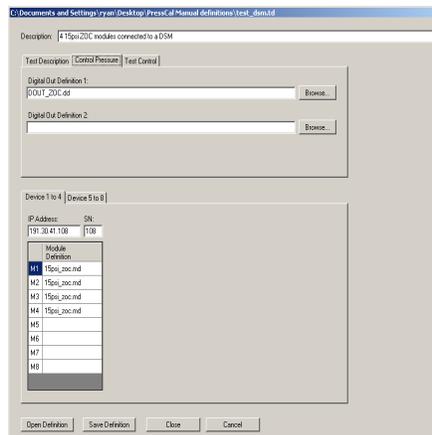
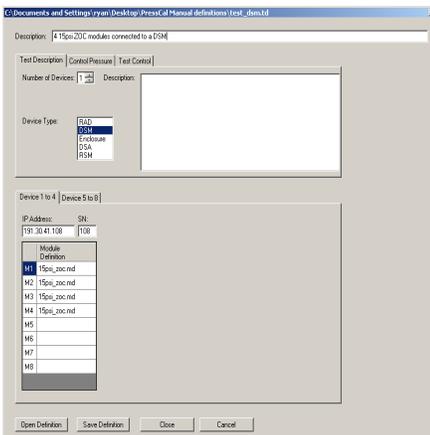


TEST DEFINITIONS

Click Setup, Test to open the Test Definition Window. This page determines which of the Calibrator, Digital Output, Port and Module Definition files will be used for the complete test. The address(es) of the DSM modules will be defined as well as test dwell. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Test Definition files. Highlight the file to be used and click: Open. Only Test Definition files will be shown.

If the Test must be defined:

1. Enter a Description of the test. This is for reference only.
2. Start with the Test Description page. If that page is not active, click the Test Description Tab.
3. Select the Number of Devices. Select one (1) for one DSM. Select the Number of Devices. Select one (1) for one DSM. PressCal can calibrate up to eight (8) DSM modules, each with up to eight ZOC connected to each DSM at one time.
4. Highlight the Device Type. The Module Definition will adjust to the number entered.
5. Click the Box next to the Module Definition for M1 (Module 1). The box will be highlighted, and the Module Definition Files will be shown in another window. Select the Module Definition File for the Module under Test.
6. Enter the IP Address and Serial Number of the DSM in the respective windows
7. Click the Control Pressure Tab to open that window.
8. Enter the Digital Out Definition File(s) to be used for the test. Click Browse to select the file from the saved Digital Out Definitions.
9. Click the Test Control Tab to open the Test Control Window.
10. Check the Wait for OK to do Calibration box to stop the program after the As Received report is generated. This will give a user the opportunity to terminate the test if the data shows that there might be a problem with the setup or that the module is within specifications and does not require a Field Calibration.
11. Upload Dwell should be left at 35 ms unless there is problems uploading coefficients to the module.
12. Calibrator Vent is recommended to be set at 5 seconds, but this can be increased if CAL and REF lines are longer than 50 feet (15.24m).
13. If you do not want PressCal to perform a CALZ or CALB before the As Received validation, check the box 'No CALZ During As Received.'
14. It is recommended that Period be set to 500.
15. It is recommended that Average be set to 32. It is not recommended to set Average less than 16, nor greater than 64.
16. When the definition is completed, save the definition file. Click the Save Definition button. Name the file and click: Save.



ZOC17/22/23/33 MODULES CONNECTED TO A RAD3200 OR RAD4000**CALIBRATOR DEFINITIONS**

Click Setup, Calibrator to open the Calibrator Definition window. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Calibrator Definition Files. Highlight the file to be used and click: Open. Only Calibrator Output Definition Files will be shown.

If the Calibrator must be defined:

1. Enter a description. This is for reference only
2. Highlight the calibrator type. Select:
 - A. Manual Gauge - Select this option for a Gauge type pressure standard.
 - B. Manual Absolute - Select this option for an Absolute type pressure standard.
3. Set the Nominal Pressure Range. This is the full scale pressure range of the calibrator.
4. Set the Max Module Pressure. This is the full scale value of the sensors in the module. This value will be used during the validation process to determine the errors of the sensors.
5. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

The screenshot shows the 'Manual 15psi Calibrator' definition window. The 'Description' field contains 'Manual 15psi Calibrator'. Under 'Characteristics', the 'Calibrator Type' dropdown is set to 'Manual Gauge'. The 'Calibrator Address' is set to '0'. The 'Nominal Pressure Range' is set to '15' from a list of options (1, 2.5, 5, 15, 30, 50, 100, 200). The 'Max Module Pressure' is set to '15'. Under 'Action', 'Dwell Time in Seconds' and 'Stability Percentage' are empty, and the 'Trap Pressure' checkbox is unchecked. Under 'Communication', the 'Communication Type' is 'Network', 'Serial Comm Port' is empty, 'Device IP Address' is empty, 'Network IP Address' is '191.30.40.101', and 'Network Port' is '1025'. At the bottom, there are buttons for 'Open Definition', 'Save Definition', 'Close', and 'Cancel'.

DIGITAL OUTPUT DEFINITIONS

Click Setup, Digital Output to open the Digital Output Definition Window. This will setup the control pressure logic for the test. If a pre-defined definition exists, click: Open Definition. A window will open that will list the existing Digital Output Definition Files. Highlight the file to be used and click: Open. Only Digital Output Definition Files will be shown.

If the Digital Outputs must be defined,

1. Enter a description. This is for reference only.
2. Click the radio buttons for the digital outputs that will switch the control pressures. Digital Outputs 1 through 3 are used by RAD modules with an RDS3200. All Digital Outputs should be defined as: On, Off, or No Change. Reference "Appendix F: DOUT Configurations & Valve Logic States" on page 68 for more information.
3. Highlight the Command Target for the Digital Output control signal, For a DSM communicating with an SPC3000, highlight: RAD/Enclosure/DSM.
4. The Calibrator Definition File option will be grayed out.
5. The Zero Calibration Setting should not be modified.
6. Set the Control Pressure Dwell time in seconds. 5 seconds is recommended for most tests unless the control pressure lines are very long. Consult Scanivalve for more information if control pressure lines are longer than 50 feet (15.24m).
7. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

PORT DEFINITIONS

Click Setup, Port to open the Port definition Window. This page determines the pressures that will be applied to each enabled port during the test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Port definition files. Highlight the file to be used and click: Open. Only port definition files will be shown.

If the ports must be defined:

1. Enter a description. This is for reference only.
2. Highlight the port type. For standard ZOC22/23/33 modules highlight: Differential.
3. Enter the total number of calibration points. This is the total number of calibration pressures to be applied, including zero. Scanivalve recommends 5 points for the calibration of 15 psi ZOC22/23/33 modules.
4. Enter the number of negative calibration points. Two is recommended for the calibration of 15 psi ZOC22/23/33.
5. Enter the total number of validation points. This is the total number of pressures to be applied, including zero. Nine is recommended for the validation of 15 psi ZOC22/23/33 modules.
6. Enter the number of negative validation points. Four is recommended for the validation of 15 psi ZOC22/23/33 modules.
7. Enter the name of the Calibrator Setup files to be used for the Positive and Negative Calibrator Assignment. For 15 psi modules and lower, the Positive and Negative Calibrator Setup files will be the same. For modules with full scale pressure ranges greater than 15 psi:

A. The Positive Calibrator Assignment file will be the calibrator providing the positive pressures.

B. The Negative Calibrator Assignment file will usually be the 15 psi calibrator.

NOTE: The Calibrator connections in a system **MUST** be verified to prevent damage to the modules.

8. Enter the Calibration pressures. Pressure Point 1 is the lowest Negative point. Pressure Point 5 is the highest Positive point.

NOTE: Recommended Calibration and Validation pressures for all standard range modules may be found in "Appendix A: Recommended As Received/Validation Pressures" on page 61, however each individual calibration varies. If the recommended calibration points do not yield acceptable calibration results, contact Scanivalve for additional recommendations.

9. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

The screenshot shows a software window titled "Port Definition" with the following fields and controls:

- Description:** 15psi ZOC manual calibration
- Characteristics:**
 - Port Type: Differential (selected)
 - Calibration Points: 5
 - Negative Calibration Points: 2
 - Validation Points: 9
 - Negative Validation Points: 4
 - Full Scale Pressure: 15
 - Tolerance (+/-) % of Full Scale: 0.08
- Calibration Control:**
 - Positive Calibrator Assignment: C:\Documents and Settings\ryan\Desktop\15psi_manual_calibrator.cd
 - Negative Calibrator Assignment: C:\Documents and Settings\ryan\Desktop\15psi_manual_calibrator.cd
- Table:**

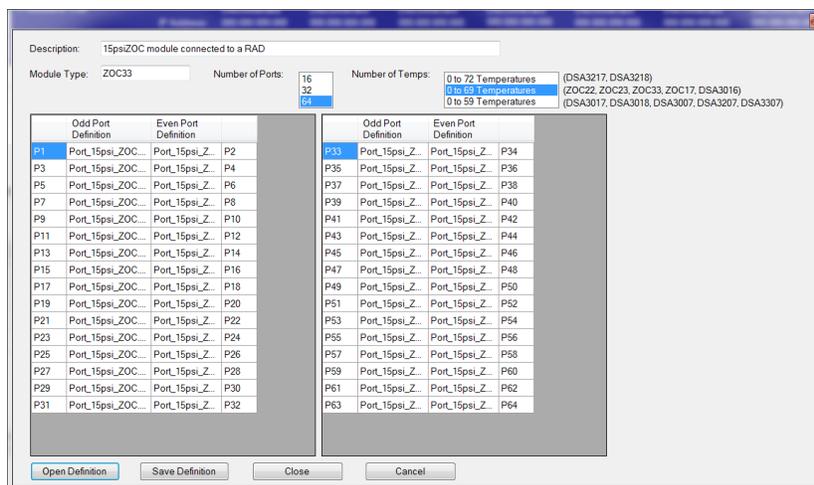
	Pos Cal	Neg Cal	Pos Val	Neg Val
Pressure Point 1		-15.25		-15
Pressure Point 2		-7.57		-11.25
Pressure Point 3	0			-7.5
Pressure Point 4	7.57			-3.75
Pressure Point 5	15.25		0	
Pressure Point 6			3.75	
Pressure Point 7			7.5	
Pressure Point 8			11.25	
Pressure Point 9			15	
- Buttons:** Open Definition, Save Definition, Close, Cancel

MODULE DEFINITIONS

Click Setup, Module to open the Module definition Window. This page determines the port definitions that will be used to apply pressures to each enabled port in the module under test. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Module definition files. Highlight the file to be used and click: Open. Only Module definition files will be shown.

If the module(s) must be defined:

1. Enter a Description. This is for reference only.
2. Enter the Module Type, ZOC33.
3. Highlight the Number of Ports, 64. The number of ports shown in the window will be automatically adjusted to the size highlighted in this box.
4. Enter the name of the Port Definition file that will identify the pressures to be applied to that port in the box next to the port number. If all ports will use the same file, all boxes can be highlighted by:
 - A. Left clicking on the box for Port 1.
 - B. Slide the mouse arrow to the last even port while holding the left button down. All of the boxes will be highlighted. Release the left click.
 - C. The Port definition file window will open. Highlight on the file to be used and click: Open. This file name will be entered in each box.
5. Select a calibration temperature range associated with the individual module.
6. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

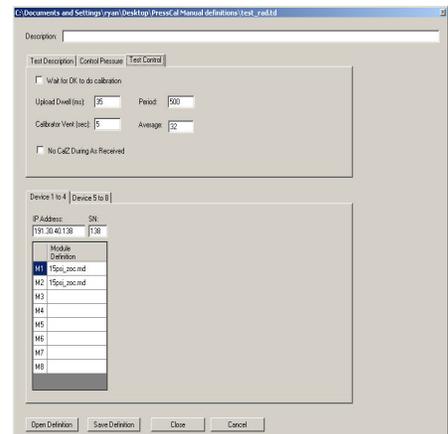
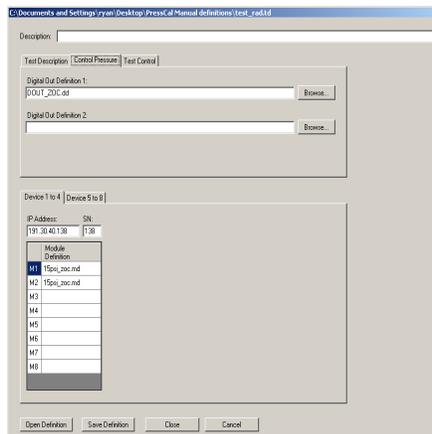
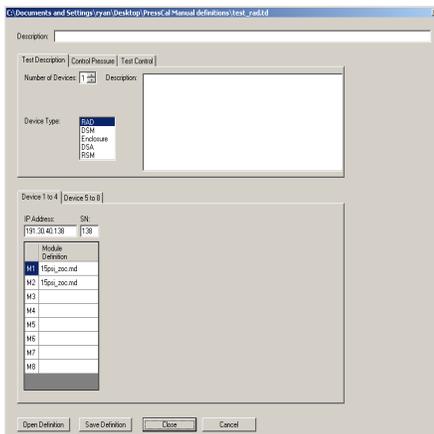


TEST DEFINITIONS

Click Setup, Test to open the Test Definition Window. This page determines which of the Calibrator, Digital Output, Port and Module Definition files will be used for the complete test. The address(es) of the RAD modules will be defined as well as test dwell. If a pre-defined definition exists, click the Open Definition button. A window will open that will list the existing Test Definition files. Highlight the file to be used and click: Open. Only Test Definition files will be shown.

If the Test must be defined:

1. Enter a Description of the test. This is for reference only.
2. Start with the Test Description page. If that page is not active, click the Test Description Tab.
3. Select the Number of Devices. Select one (1) for one RAD. PressCal can calibrate up to eight (8) RAD modules, each with up to eight ZOC connected to each RAD at one time.
4. Highlight the Device Type. The Module Definition will adjust to the number entered.
5. Click the Box next to the Module Definition for M1 (Module 1). The box will be highlighted, and the Module Definition Files will be shown in another window. Select the Module Definition File for the Module under Test.
6. Enter the IP Address and Serial Number of the RAD in the respective windows (for RAD3200 systems use the simulated IP address of 127.0.0.1).
7. Click the Control Pressure Tab to open that window.
8. Enter the Digital Out Definition File(s) to be used for the test. Click Browse to select the file from the saved Digital Out Definitions.
9. Click the Test Control Tab to open the Test Control Window.
10. Check the Wait for OK to do Calibration box to stop the program after the As Received report is generated. This will give a user the opportunity to terminate the test if the data shows that there might be a problem with the setup or that the module is within specifications and does not require a Field Calibration.
11. Upload Dwell should be left at 35 ms unless there is problems uploading coefficients to the module.
12. Calibrator Vent is recommended to be set at 5 seconds, but this can be increased if CAL and REF lines are longer than 50 feet (15.24m).
13. If you do not want PressCal to perform a CALZ or CALB before the As Received validation, check the box 'No CALZ During As Received.'
14. It is recommended that Period be set to 500.
15. It is recommended that Average be set to 32. It is not recommended to set Average less than 16, nor greater than 64.
16. When the definition is completed, save the definition file. Click the Save Definition button. Name the file and click: Save.



SECTION 4: SPECIAL CONFIGURATIONS

SPCENCL3200 CALIBRATOR DEFINITIONS

When SPC3000 Calibrators are installed in SPCENCL3200 Rack Mount Enclosures, the setup for the calibrator definition is slightly different.

1. Highlight the calibrator type. Options are:
 - A. Automatic Gauge/Differential - This should be selected if the Calibrator is a SPC3000 using a Digiquartz 202VG as the Secondary Standard.
 - B. Automatic Absolute - Select this option for all other SPC3000 Calibrators.
2. Highlight the full scale pressure range of the calibrator.
3. Set the Max Module Pressure. This is the full scale value of the sensors in the module(s). This value will be used during the validation process to determine the errors of the sensors.
4. Set the Calibrator Address (the location in the SPCENCL3200.)
5. Set the Communication Type. Select: Device
6. Enter the IP Address of the SPCENCL3200.
7. Define the Action of the calibrator:
 - A. Set the dwell time in seconds. This is the time delay to allow the calibration pressure to stabilize.
 - B. Set the Stability percentage. This is the value in percent of full scale to be used by the software to determine if the calibration pressure is stable enough to perform the calibration.
 - C. Check the Trap Pressure box if the pressure is to be trapped after the dwell time has timed out. This should be checked for all calibrations at 5 psi Full Scale and lower.
8. Save the definition file. Click the Save Definition button. Name the file and click: Save.

Description: SPC3000 installed in a SPCENCL3200

Characteristics

Calibrator Type: Automatic Gauge / Differential (SPC3000) Calibrator Address: 1

Nominal Pressure Range: 1, 2.5, 5, 15, 30, 50, 100, 200 Max Module Pressure: 15

Action

Dwell Time in Seconds: 60

Stability Percentage: 0.02

Trap Pressure

Communication

Communication Type: Serial, Device, Network

Serial Comm Port: []

Device IP Address: 191.30.xx.yyy

Network IP Address: 191.30.40.101

Network Port: 1025

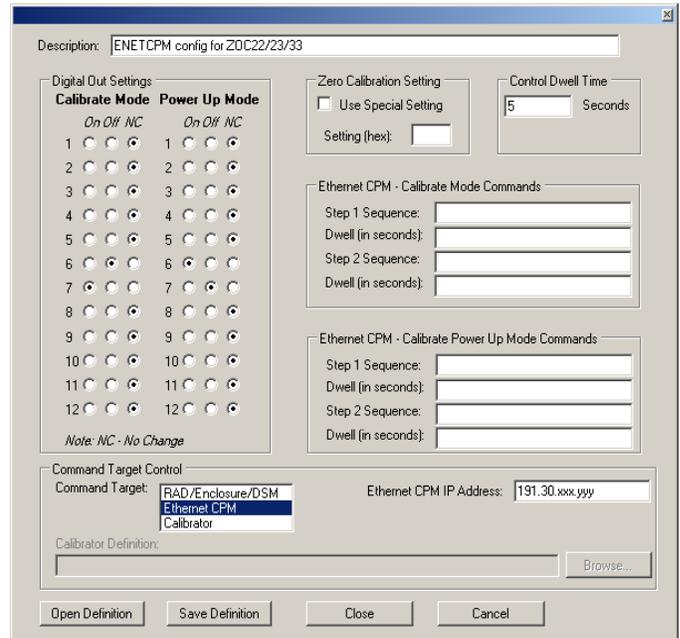
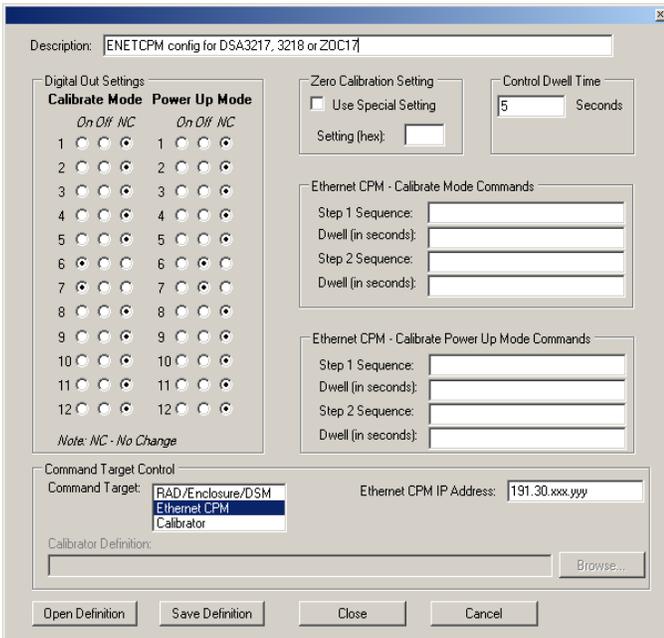
Open Definition Save Definition Close Cancel

ENETCPM DIGITAL OUTPUT DEFINITIONS

Click Setup, Digital Output to open the Digital Output Definition Window. This will setup the control pressure logic for the test. If a pre-defined definition exists, click: Open Definition. A window will open that will list the existing Digital Output Definition Files. Highlight the file to be used and click: Open. Only Digital Output Definition Files will be shown.

If the Digital Outputs must be defined,

1. Enter a description. This is for reference only.
2. Click the radio buttons for the digital outputs that will switch the control pressures. Digital Outputs 6 and 7 are used with the CPM. All Digital Outputs should be defined as: On, Off, or No Change. Reference "Appendix F: DOUT Configurations & Valve Logic States" on page 68 for more information.
3. Highlight the Command Target for the Digital Output control signal. When communicating with an Ethernet CPM, highlight: Ethernet CPM.
4. The Calibrator Definition File option will be grayed out.
5. The Zero Calibration Setting should not be modified.
6. Set the Control Pressure Dwell time in seconds. 5 seconds is recommended for most CPM systems unless the control pressure lines are very long. Consult Scanivalve for more information if control pressure lines are longer than 50 feet (15.24m).
7. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save. A sample definition of the Ethernet CPM Digital Output setup for ZOC22/23/33x1 Modules as well as a setup for ZOC17,DSA3217 or DSA3218 is shown below.



ENETCPM DIGITAL OUTPUT DEFINITIONS FOR DUPLEX MODULES

Click Setup, Digital Output to open the Digital Output Definition Window. This will setup the control pressure logic for the test. If a pre-defined definition exists, click: Open Definition. A window will open that will list the existing Digital Output Definition Files. Highlight the file to be used and click: Open. Only Digital Output Definition Files will be shown.

If the Digital Outputs must be defined,

1. Enter a description. This is for reference only.
2. Click the radio buttons for the digital outputs that will switch the control pressures. Digital Outputs , 7 and 8 are used with the CPM and duplex modules. All Digital Outputs should be defined as: On, Off, or No Change. Reference “Appendix F: DOUT Configurations & Valve Logic States” on page 68 for more information.
3. Highlight the Command Target for the Digital Output control signal. When communicating with an EthernetCPM, highlight: Ethernet CPM.
4. The Calibrator Definition File option will be grayed out.
5. The Zero Calibration Setting should not be modified.
6. Set the Control Pressure Dwell time in seconds. 5 seconds is recommended for most CPM systems unless the control pressure lines are very long. Consult Scanivalve for more information if control pressure lines are longer than 50 feet (15.24m).
7. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save. A sample definition of the Ethernet CPM Digital Output setup for ZOC22/23/33x2 (duplex) modules is shown below.

Description: ENETCPM configured for ZOC33x2

Digital Out Settings		Zero Calibration Setting	Control Dwell Time
Calibrate Mode	Power Up Mode	<input type="checkbox"/> Use Special Setting	Seconds
On Off NC	On Off NC	Setting (hex):	
1 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>	1 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>		5
2 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>	2 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>		
3 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>	3 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>		
4 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>	4 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>		
5 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>	5 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>		
6 <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>	6 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>		
7 <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>	7 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>		
8 <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>	8 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>		
9 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>	9 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>		
10 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>	10 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>		
11 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>	11 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>		
12 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>	12 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>		

Note: NC - No Change

Ethernet CPM - Calibrate Mode Commands

Step 1 Sequence: _____
Dwell (in seconds): _____

Step 2 Sequence: _____
Dwell (in seconds): _____

Ethernet CPM - Calibrate Power Up Mode Commands

Step 1 Sequence: _____
Dwell (in seconds): _____

Step 2 Sequence: _____
Dwell (in seconds): _____

Command Target Control

Command Target:
 Ethernet CPM
 Calibrator

Ethernet CPM IP Address:

Calibrator Definition:

ABSOLUTE DSA DEFINITIONS

The calibration and/or validation of absolute DSA module requires unique calibrator and port definition files.

SETTING THE CALIBRATOR DEFINITIONS

If the calibrator must be defined:

1. Enter a Description. This is for reference only.
2. Highlight the calibrator type. Options are:
 - A. Automatic Absolute (SPC3000) - Select this option for all other SPC3000 Calibrators.
 - B. Manual Absolute - This calibrator option is used for manual absolute calibrations.
 - C. Automatic Absolute (SPC4000)- Select this option if the calibrator being used is an SPC4000 with an Absolute type pressure standard.
3. Set the Calibrator Address
4. Set the Nominal Pressure Range. This is the full scale pressure range of the calibrator in PSIA.
5. Set the Max Module Pressure. This is the full scale value of the sensors in the module in PSIA. This value will be used during the validation process to determine the errors of the sensors.
6. Set the Communication Type. Options are:
 - A. Serial - Select this if the Automatic Calibrator is an SPC3000 controlled by an enclosure, a DSM, or a direct serial connection.
 - B. Device - Select this option if the Automatic Calibrator is an SPC3000 installed in a SPC3200 Enclosure controlled by an Ethernet connection. The IP address of the enclosure must be entered. Also, the serial address of the calibrator must be correct.
 - C. Network - Select this if the Automatic Calibrator is an SPC4000 communicating via Ethernet connection. The IP address and the network port will also have to be defined.
7. If Calibrator Type is Automatic, the action of the calibrator must be defined.
 - A. Set the dwell time in seconds. This is the time delay to allow the calibration pressure to stabilize. Typically, 15 to 30 seconds is sufficient.
 - B. Set the Stability percentage. This is the value in percent of full scale to be used by the software to determine if the calibration pressure is stable enough to perform the calibration. Scanivalve recommends 0.02%. Check the Trap Pressure box if the pressure is to be trapped after the dwell time has timed out. This should be checked for all calibrations at 5 psi Full Scale and lower when using an SPC3000 calibrator.
 - C. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

The screenshot shows a configuration window for a "50psia Automatic Calibrator". The window is organized into several sections:

- Description:** 50psia Automatic Calibrator
- Characteristics:**
 - Calibrator Type: A dropdown menu is open, showing options: Automatic Gauge / Differential (SPC3000), **Automatic Absolute (SPC3000)** (highlighted), Manual Gauge, Manual Absolute, Automatic Gauge (SPC4000), and Automatic Absolute (SPC4000).
 - Calibrator Address: 1
- Nominal Pressure Range:** A dropdown menu is open, showing options: 1, 2.5, 5, 15, 30, **50** (highlighted), 100, and 200.
- Max Module Pressure:** 50
- Action:**
 - Dwell Time in Seconds: 45
 - Stability Percentage: 0.02
 - Trap Pressure:
- Communication:**
 - Communication Type: A dropdown menu is open, showing options: Serial, **Device** (highlighted), and Network.
 - Serial Comm Port: [Empty field]
 - Device IP Address: 191.30.xx.yyy
 - Network IP Address: [Empty field]
 - Network Port: [Empty field]

At the bottom of the window, there are four buttons: "Open Definition", "Save Definition", "Close", and "Cancel".

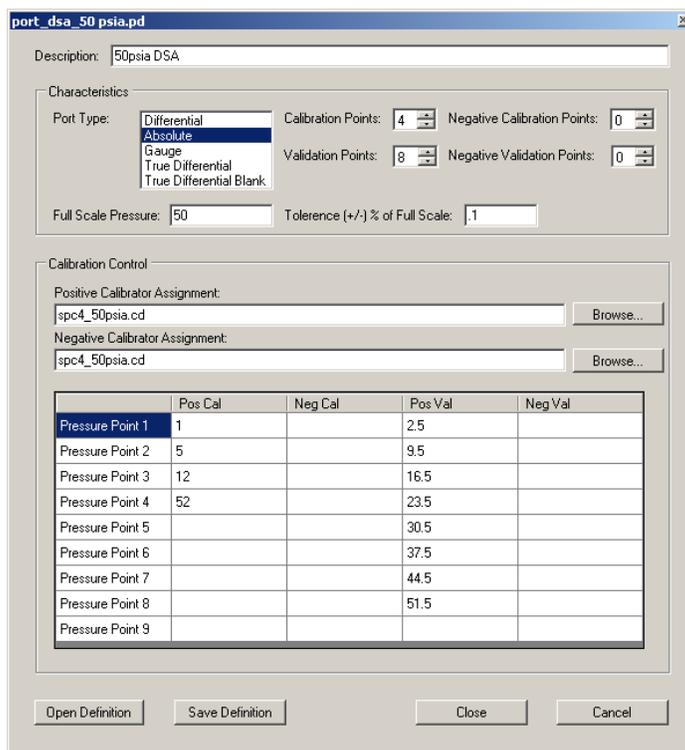
SETTING THE PORT DEFINITIONS

If the Port definition must be defined:

1. Enter a description. This is for reference only.
2. Highlight the port type. For an absolute DSA 3217/18 or DSA3016 modules highlight: Absolute.
3. Enter the total number of calibration points. This is the total number of calibration pressures to be applied, including zero. Scanivalve recommends four points for a 50psia DSA3200 series module.
4. Enter zero negative calibration points.
5. Enter the total number of validation points. This is the total number of pressures to be applied, including zero. Eight is recommended for a 50psia DSA3200 series module.
6. Enter zero negative validation points.
7. Enter the full scale pressure range of the module (in PSIA).
8. Enter the pass/fail tolerance desired (in % of full scale).
9. Enter the name of the Calibrator Setup files to be used for the positive and negative calibrator assignment. The negative calibrator is not used, but does need to be assigned. Use the same calibrator definition as the positive calibrator.

NOTE: The Calibrator connections in a system **MUST** be verified to prevent damage to the modules.

10. Enter the Calibration pressures. Pressure Point 1 is the lowest point. Pressure Point 4 is the highest point.
NOTE: Recommended Calibration and Validation pressures for all standard range modules may be found in "Appendix A: Recommended As Received/Validation Pressures" on page 61, however each individual calibration varies. If the recommended calibration points do not yield acceptable calibration results, contact Scanivalve for additional recommendations.
11. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.



TRUE DIFFERENTIAL DSA DEFINITIONS

The calibrator and/or validation of “True Differential” DSA modules requires unique port and module definition files.

SETTING THE PORT DEFINITIONS

True Differential DSA modules require that two port definitions be created. One port definition will be for the 8 sensors in the module, and the other port definition will be for the 8 ‘dummy’ sensors in the module.

Creating the port definition:

1. Enter a description. This is for reference only.
2. Highlight the port type. For true differential DSA 3217/18 and DSA3016 modules highlight: True Differential.
3. Enter the total number of calibration points. This is the total number of calibration pressures to be applied, including zero. Scanivalve recommends five points for a 15 psi DSA3200 series module.
4. Enter the number of negative calibration points. Two is recommended for a 15 psi DSA3200 series modules.
5. Enter the total number of validation points. This is the total number of pressures to be applied, including zero. Nine is recommended for a 15 psi DSA3200 series module.
6. Enter the number of number of negative validation points. Four is recommended for a 15 psi DSA3200 series module.
7. Enter the full scale pressure range of the module (in PSI).
8. Enter the pass/fail tolerance desired (in % of full scale).
9. Enter the name of the Calibrator Setup files to be used for the Positive and Negative Calibrator Assignment. For 15 psi modules and lower, the Positive and Negative Calibrator Setup files will be the same. For modules with full scale pressure ranges greater than 15 psi:
 - A. The Positive Calibrator Assignment file will be the calibrator providing the positive pressures.
 - B. The Negative Calibrator Assignment file will usually be the 15 psi calibrator.

NOTE: The Calibrator connections in a system **MUST** be verified to prevent damage to the modules.

10. Enter the Calibration pressures. Pressure Point 1 is the lowest Negative point. Pressure Point 5 is the highest Positive point.

NOTE: Recommended Calibration and Validation pressures for all standard range modules may be found in “Appendix A: Recommended As Received/Validation Pressures” on page 61, however each individual calibration varies. If the recommended calibration points do not yield acceptable calibration results, contact Scanivalve for additional recommendations.

11. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

Creating the blank port definition:

1. Enter a description. This is for reference only.
2. Highlight the port type. Select: True Differential Blank. All other field will be grayed out.
3. When the definition is complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

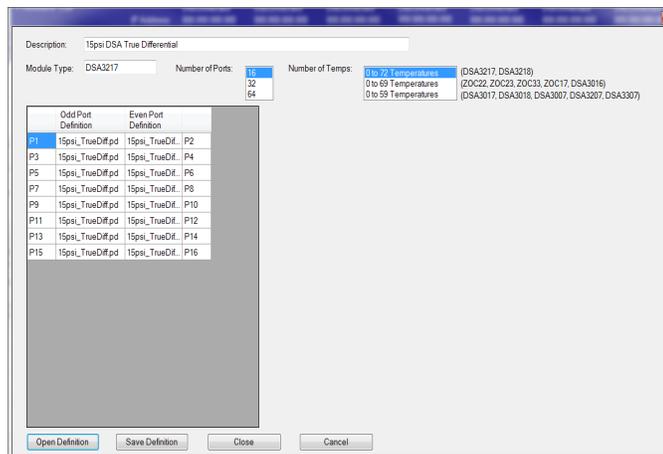
	Pos Cal	Neg Cal	Pos Val	Neg Val
Pressure Point 1		-16.35		-15.0
Pressure Point 2		-8.18		-11.25
Pressure Point 3	0			-7.5
Pressure Point 4	8.18			-3.75
Pressure Point 5	16.35		0	
Pressure Point 6			3.75	
Pressure Point 7			7.5	
Pressure Point 8			11.25	
Pressure Point 9			15.0	

	Pos Cal	Neg Cal	Pos Val	Neg Val
Pressure Point 1				
Pressure Point 2				
Pressure Point 3				
Pressure Point 4				
Pressure Point 5				
Pressure Point 6				
Pressure Point 7				
Pressure Point 8				
Pressure Point 9				

SETTING THE MODULE DEFINITION

If the module(s) must be defined:

1. Enter a Description. This is for reference only.
2. Enter the Module Type, DSA3217/18 or DSA3016.
3. Highlight the Number of Ports, 16. The number of ports shown in the window will be automatically adjusted to the size highlighted in this box.
4. Enter the name of the Port Definition file that will identify the pressures to be applied to that port in the box next to the port number. Clicking in the blank box next to the port number will open the file browser window. True Differential DSA modules are configured with 8 true differential transducers in channels 1-4 and 9-12. Blank or “dummy” modules are located in channels 5-8 and 13-16. Enter the true differential port definition files in channels 1-4 and 9-12, and enter the true differential blank port definitions in channels 5-8 and 13-16.
5. Select a calibration temperature range associated with the individual module.
6. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.



[INTENTIONALLY LEFT BLANK]

SECTION 6: TEST OPERATION

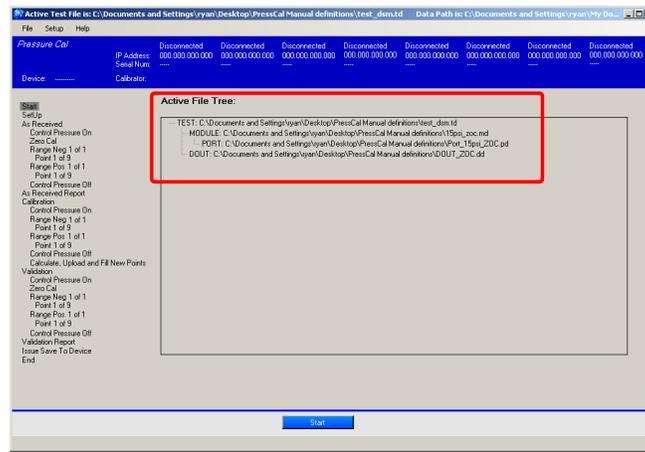
A test is set up by defining the Calibrator, Digital Output, Port and Module File to be used in the test. This information may be found in the Test Setup section of this manual. Once a test has been defined, this definition may be saved. This section explains the operation of a test that has been previously saved.

1. From the Start Page:

- Select: File
- Select: Open

A window will open with a list of saved test definitions. Highlight the test definition to be executed and click: Open.

2. The test file name and path will be shown on the header of the main page. The file tree will be displayed in the center of the box.



3. The steps of the test will be shown on the left side of this page. All of these steps do not have to be executed. A section may be skipped by clicking on the section heading (As Received, Calibration, Validation). This will gray out that section to indicate that part of the software will be skipped. The progress of the test will be shown in this list.

4. The main sections of each test are:

- A. Start: This initiates the test.
- B. Setup: In this section the individual definition files are read, connections to IP devices are made, control pressures are applied and the test commences.
- C. As Received: This section will set the calibrator through the pressures defined in the Port Definition file. A report will be generated after all of the pressures have been applied. This report will show the error for each channel at each pressure. If the As Received Report shows that all channels are within specifications, the rest of the steps, including Issue Save to Device may be omitted.
- D. Calibration: This section will set the calibrator through the pressures defined in the Port Definition file, generate a revised coefficient file and upload the revised coefficient file to the unit(s).
- E. Validation: This section will set the calibrator through the pressures defined in the Port Definition file. A report will be generated after all of the pressures have been applied showing the error for each channel at each pressure.
- F. Issue Save to Device: This is a simple step that will save the new coefficients. This step should only be completed if the Validation Report shows that all channels are within specifications.

5. It is very important that the Port Definition file is correct. For most tests, the As Received and Validation sections will use nine (9) pressures to generate the reports. Most Calibrations will use five (5) pressures.

6. The As Received, Calibration, and Validation sections may be executed independently. For example, if a user is aware that a pressure point taken during a Validation was not correct, the Validation portion of the test could be repeated without having to run the As Received and Calibration sections.

OUTPUT FILES

During a typical test, PressCal will generate several files. Depending on your setup, an 'As Received' validation file and/or a 'Validation' file will be created for each module tested. If a calibration is performed, PressCal will generate new calibration coefficient files (either .dat or .mpf files) for the calibrated modules. Three sets of .MPF files will be created for each module.

MBAKxxx.MPF - This is a backup of the original coefficients before calibration.

NMxxx.MPF - This is a copy of the new coefficients created during the calibration.

Mxxx.MPF - This is a copy of the final coefficients that are uploaded to the modules. Depending on the user's response to the "Save" option at the end of the test, these will either be original or new coefficients.

The As Received and Validation reports are created as .CSV (Comma Separated Variable) files. These files can be opened and reviewed using any program capable of opening .CSV files (Microsoft Excel recommended.) As an option, the module reports can be formatted for a more pleasant appearance using a .xls macro file included on the PressCal installation CD or available as a separate download on the Scanivalve website. Each As Received or Validation that is run will create a .csv file for each module included in the test, and an all-inclusive file that combines all data from all module for that portion of the test. These files will be located in a date-stamped directory created in the location defined in the "Set Base Directory" field. Sample report files can be see in "Appendix D: Sample "As Received" Report" on page 64 and "Appendix E: Sample "Validation" Report" on page 66.

Additionally, PressCal creates two diagnostic files:

presscal.log

error.log

These two files can be used to troubleshoot any problems encountered in the test. Presscal.log is a list of every step PressCal took during the test and error.log is a simple error list.

APPENDIX

APPENDIX A: RECOMMENDED AS RECEIVED/VALIDATION PRESSURES

TABLE 1: RECOMMENDED "AS RECEIVED/VALIDATION" PRESSURES FOR ALL DSA AND ZOC MODULES

	Pressure 1	Pressure 2	Pressure 3	Pressure 4	Pressure 5	Pressure 6	Pressure 7	Pressure 8	Pressure 9
10" H2O	-0.36	-0.27	-0.18	-0.09	0.00	0.09	0.18	0.27	0.36
20" H2O	-0.72	-0.54	-0.36	-0.18	0.00	0.18	0.36	0.54	0.72
1 psid	-1.00	-0.75	-.050	-0.25	0.00	0.25	0.50	0.75	1.00
2.5 psid	-2.50	-1.87	-1.25	-.62	0.00	0.62	1.25	1.87	2.50
5 psid	-5.00	-3.75	-2.50	-1.25	0.00	1.25	2.50	3.75	5.00
15 psid	-15.0	-11.25	-7.50	-3.75	0.00	3.75	7.50	11.25	15.0
30 psid	-15.0	-7.50	0.00	5.00	10.0	15.0	20.0	25.0	30.0
50 psid	-15.0	-7.50	0.00	8.33	16.7	25.0	33.3	41.7	50.0
100 psid	-15.0	0.00	20.0	40.0	60.0	80.0	100.0		
250 psid	-15.0	0.00	50.0	100.0	150.0	200.0	250.0		
500 psid	-15.0	0.00	100.0	200.0	300.0	400.0	500.0		
750 psid	-15.0	0.00	150.0	300.0	450.0	600.0	750.0		
850 psid	-15.0	0.00	170.0	340.0	510.0	680.0	850.0		

APPENDIX B: RECOMMENDED CALIBRATION PRESSURES**TABLE 2: RECOMMENDED CALIBRATION PRESSURES FOR STANDARD DSA MODULES**

	Pressure 1	Pressure 2	Pressure 3	Pressure 4	Pressure 5
10" H2O	-0.39	-0.19	0.00	0.19	0.39
20" H2O	-0.79	-0.39	0.00	0.39	0.79
1 psid	-1.09	-0.55	0.00	0.55	1.09
2.5 psid	-2.73	-1.37	0.00	1.37	2.73
5 psid	-5.45	-2.73	0.00	2.73	5.45
15 psid	-16.35	-8.18	0.00	8.18	16.35
30 psid	-16.35	0.00	10.9	21.8	32.7
50 psid	-16.35	0.00	18.2	36.4	54.5
100 psid	-16.35	0.00	36.3	72.7	109.0
250 psid	-16.35	0.00	90.8	181.7	272.5
500 psid	-16.35	0.00	181.7	363.3	545.0
750 psid	-16.35	0.00	237.5	475.0	754.0
850 psid	-16.35	0.00	285.0	570.0	854.0

TABLE 3: RECOMMENDED CALIBRATION PRESSURES FOR ABSOLUTE DSA MODULES

	Pressure 1	Pressure 2	Pressure 3	Pressure 4	Pressure 5
15 psia	6.50	8.90	11.3	13.6	16.0
30 psia	6.50	12.5	18.6	24.6	31.6
50 psia	6.50	18.0	29.5	41.0	52.5
100 psia	6.50	31.1	55.8	80.4	105.0
250 psia	6.50	68.4	130.3	192.2	254.0
500 psia	6.50	131.9	257.3	382.7	508.0

TABLE 4: RECOMMENDED CALIBRATION PRESSURES FOR ZOC MODULES

	Pressure 1	Pressure 2	Pressure 3	Pressure 4	Pressure 5
10" H2O	-0.368	-0.180	0.000	0.180	0.369
20" H2O	-0.756	-0.370	0.000	0.370	0.768
1 psid	-1.02	-0.50	0.00	0.50	1.02
2.5 psid	-2.54	-1.26	0.00	1.26	2.56
5 psid	-5.09	-2.53	0.00	2.53	5.09
15 psid	-15.25	-7.57	0.00	7.57	15.35
30 psid	-15.25	0.00	10.10	21.20	30.30
50 psid	-15.25	0.00	16.38	33.67	52.50

APPENDIX C: STANDARD TEMPERATURE PLANES**TABLE 5: STANDARD TEMPERATURE PLANES**

	DSA 3000 series, DSA 3207	DSA 3200 series	ZOC 17/22/23/33	DSA 3016
Temperatures	0	0	5	0
	5	9	15	5
	15	18	25	15
	25	27	30	25
	35	36	35	35
	45	45	40	45
	59	54	45	59
	X	63	55	X
	X	72	X	X
Number of Temperature planes	7	9	8	7

APPENDIX D: SAMPLE "AS RECEIVED" REPORT

SAMPLE FORMATTED "AS RECEIVED" REPORT

(only page 1 shown)

Scanivalve Corp.
Validation Report
Date 2/3/2012
Time 12:01 PM

FAIL:	-1.429	%ERROR
CHAN 4	-0.99955	PSI

Module	Chan	Max Pressure	Source Pressure	Device Pressure	Delta	Percent Error	Tolerance
7068	1	1	-0.9995	-1.0003	0.0008	0.078	0.12
7068	1	1	-0.7496	-0.7501	0.0005	0.053	0.12
7068	1	1	-0.4994	-0.4999	0.0005	0.049	0.12
7068	1	1	-0.2495	-0.2494	-0.0001	-0.005	0.12
7068	1	1	0	0	0	0	0.12
7068	1	1	0.2495	0.2491	0.0005	0.048	0.12
7068	1	1	0.4995	0.499	0.0005	0.053	0.12
7068	1	1	0.7494	0.7495	-0.0001	-0.01	0.12
7068	1	1	0.9993	0.9999	-0.0006	-0.059	0.12
7068	2	1	-0.9995	-0.9996	0.0001	0.009	0.12
7068	2	1	-0.7496	-0.7496	0.0001	0.005	0.12
7068	2	1	-0.4994	-0.4997	0.0003	0.031	0.12
7068	2	1	-0.2495	-0.2493	-0.0002	-0.019	0.12
7068	2	1	0	-0.0001	0.0001	0.008	0.12
7068	2	1	0.2495	0.249	0.0005	0.053	0.12
7068	2	1	0.4995	0.4989	0.0006	0.061	0.12
7068	2	1	0.7494	0.7495	0	-0.005	0.12
7068	2	1	0.9993	0.9998	-0.0005	-0.05	0.12
7068	3	1	-0.9995	-0.9996	0	0.001	0.12
7068	3	1	-0.7496	-0.7495	-0.0001	-0.011	0.12
7068	3	1	-0.4994	-0.4996	0.0001	0.015	0.12
7068	3	1	-0.2495	-0.2491	-0.0003	-0.034	0.12
7068	3	1	0	0	0	0	0.12
7068	3	1	0.2495	0.249	0.0005	0.053	0.12
7068	3	1	0.4995	0.499	0.0006	0.055	0.12
7068	3	1	0.7494	0.7495	-0.0001	-0.013	0.12
7068	3	1	0.9993	0.9998	-0.0005	-0.048	0.12
7068	4	1	-0.9995	-0.9853	-0.0143	-1.429	0.12
7068	4	1	-0.7496	-0.7421	-0.0075	-0.75	0.12
7068	4	1	-0.4994	-0.4966	-0.0029	-0.289	0.12
7068	4	1	-0.2495	-0.2496	0.0001	0.01	0.12
7068	4	1	0	-0.002	0.002	0.196	0.12
7068	4	1	0.2495	0.2434	0.0062	0.615	0.12
7068	4	1	0.4995	0.4905	0.0091	0.908	0.12
7068	4	1	0.7494	0.7387	0.0107	1.067	0.12
7068	4	1	0.9993	0.9869	0.0124	1.24	0.12
7068	5	1	-0.9995	-0.9998	0.0002	0.022	0.12
7068	5	1	-0.7496	-0.7496	0.0001	0.009	0.12
7068	5	1	-0.4994	-0.4997	0.0003	0.029	0.12
7068	5	1	-0.2495	-0.2493	-0.0002	-0.019	0.12
7068	5	1	0	0	0	0	0.12
7068	5	1	0.2495	0.2491	0.0005	0.046	0.12
7068	5	1	0.4995	0.499	0.0006	0.056	0.12
7068	5	1	0.7494	0.7497	-0.0003	-0.027	0.12

SAMPLE UNFORMATTED "AS RECEIVED" REPORT

(only page 1 shown)

Scanivalve Corp.

Validation Report

Date 2/3/2012

Time 12:01 PM

FAIL: -1.429

CHAN 4 -0.99955

Module	Chan	Max Pressure	Source Pressure	Device Pressure	Delta	Percent Error	Tolerance	Failed
7068	1	1	-0.9995	-1.0003	0.0008	0.078	0.12	
7068	1	1	-0.7496	-0.7501	0.0005	0.053	0.12	
7068	1	1	-0.4994	-0.4999	0.0005	0.049	0.12	
7068	1	1	-0.2495	-0.2494	-0.0001	-0.005	0.12	
7068	1	1	0	0	0	0	0.12	
7068	1	1	0.2495	0.2491	0.0005	0.048	0.12	
7068	1	1	0.4995	0.499	0.0005	0.053	0.12	
7068	1	1	0.7494	0.7495	-0.0001	-0.01	0.12	
7068	1	1	0.9993	0.9999	-0.0006	-0.059	0.12	
7068	2	1	-0.9995	-0.9996	0.0001	0.009	0.12	
7068	2	1	-0.7496	-0.7496	0.0001	0.005	0.12	
7068	2	1	-0.4994	-0.4997	0.0003	0.031	0.12	
7068	2	1	-0.2495	-0.2493	-0.0002	-0.019	0.12	
7068	2	1	0	-0.0001	0.0001	0.008	0.12	
7068	2	1	0.2495	0.249	0.0005	0.053	0.12	
7068	2	1	0.4995	0.4989	0.0006	0.061	0.12	
7068	2	1	0.7494	0.7495	0	-0.005	0.12	
7068	2	1	0.9993	0.9998	-0.0005	-0.05	0.12	
7068	3	1	-0.9995	-0.9996	0	0.001	0.12	
7068	3	1	-0.7496	-0.7495	-0.0001	-0.011	0.12	
7068	3	1	-0.4994	-0.4996	0.0001	0.015	0.12	
7068	3	1	-0.2495	-0.2491	-0.0003	-0.034	0.12	
7068	3	1	0	0	0	0	0.12	
7068	3	1	0.2495	0.249	0.0005	0.053	0.12	
7068	3	1	0.4995	0.499	0.0006	0.055	0.12	
7068	3	1	0.7494	0.7495	-0.0001	-0.013	0.12	
7068	3	1	0.9993	0.9998	-0.0005	-0.048	0.12	
7068	4	1	-0.9995	-0.9853	-0.0143	-1.429	0.12	****
7068	4	1	-0.7496	-0.7421	-0.0075	-0.75	0.12	****
7068	4	1	-0.4994	-0.4966	-0.0029	-0.289	0.12	****
7068	4	1	-0.2495	-0.2496	0.0001	0.01	0.12	
7068	4	1	0	-0.002	0.002	0.196	0.12	****
7068	4	1	0.2495	0.2434	0.0062	0.615	0.12	****
7068	4	1	0.4995	0.4905	0.0091	0.908	0.12	****
7068	4	1	0.7494	0.7387	0.0107	1.067	0.12	****
7068	4	1	0.9993	0.9869	0.0124	1.24	0.12	****
7068	5	1	-0.9995	-0.9998	0.0002	0.022	0.12	
7068	5	1	-0.7496	-0.7496	0.0001	0.009	0.12	
7068	5	1	-0.4994	-0.4997	0.0003	0.029	0.12	
7068	5	1	-0.2495	-0.2493	-0.0002	-0.019	0.12	

APPENDIX E: SAMPLE "VALIDATION" REPORT

SAMPLE FORMATTED "VALIDATION" REPORT

(only page 1 shown)

Scanivalve Corp.
Validation Report
Date 2/14/2012
Time 12:54 PM

PASSED:	-0.088	%ERROR
CHAN 10	-4.99987	PSI

Module	Chan	Max Pressure	Source Pressure	Device Pressure	Delta	Percent Error	Tolerance
7068	1	1	-1.0003	-1	-0.0002	-0.024	0.12
7068	1	1	-0.7503	-0.7501	-0.0001	-0.013	0.12
7068	1	1	-0.5003	-0.5003	0	0.001	0.12
7068	1	1	-0.2503	-0.2502	-0.0001	-0.011	0.12
7068	1	1	0	-0.0001	0.0001	0.008	0.12
7068	1	1	0.2503	0.2503	0	0.003	0.12
7068	1	1	0.5003	0.5004	-0.0001	-0.013	0.12
7068	1	1	0.7503	0.7504	-0.0001	-0.008	0.12
7068	1	1	1.0003	1.0005	-0.0002	-0.022	0.12
7068	2	1	-1.0003	-1.0001	-0.0002	-0.02	0.12
7068	2	1	-0.7503	-0.7501	-0.0002	-0.02	0.12
7068	2	1	-0.5003	-0.5002	-0.0001	-0.007	0.12
7068	2	1	-0.2503	-0.2502	-0.0001	-0.008	0.12
7068	2	1	0	-0.0001	0.0001	0.008	0.12
7068	2	1	0.2503	0.2505	-0.0002	-0.016	0.12
7068	2	1	0.5003	0.5005	-0.0002	-0.018	0.12
7068	2	1	0.7503	0.7504	-0.0001	-0.009	0.12
7068	2	1	1.0003	1.0005	-0.0002	-0.02	0.12
7068	3	1	-1.0003	-0.9999	-0.0003	-0.035	0.12
7068	3	1	-0.7503	-0.75	-0.0002	-0.025	0.12
7068	3	1	-0.5003	-0.5002	-0.0001	-0.011	0.12
7068	3	1	-0.2503	-0.2501	-0.0002	-0.017	0.12
7068	3	1	0	0	0	0	0.12
7068	3	1	0.2503	0.2505	-0.0002	-0.02	0.12
7068	3	1	0.5003	0.5004	-0.0001	-0.015	0.12
7068	3	1	0.7503	0.7505	-0.0002	-0.019	0.12
7068	3	1	1.0003	1.0005	-0.0002	-0.019	0.12
7068	4	1	-1.0003	-0.9999	-0.0004	-0.036	0.12
7068	4	1	-0.7503	-0.75	-0.0003	-0.03	0.12
7068	4	1	-0.5003	-0.5002	-0.0001	-0.012	0.12
7068	4	1	-0.2503	-0.2501	-0.0002	-0.022	0.12
7068	4	1	0	0	0	0	0.12
7068	4	1	0.2503	0.2504	-0.0001	-0.01	0.12
7068	4	1	0.5003	0.5005	-0.0002	-0.024	0.12
7068	4	1	0.7503	0.7505	-0.0001	-0.015	0.12
7068	4	1	1.0003	1.0006	-0.0003	-0.029	0.12
7068	5	1	-1.0003	-1	-0.0003	-0.028	0.12
7068	5	1	-0.7503	-0.7501	-0.0002	-0.022	0.12
7068	5	1	-0.5003	-0.5002	-0.0001	-0.012	0.12
7068	5	1	-0.2503	-0.2502	-0.0001	-0.011	0.12
7068	5	1	0	0	0	0	0.12
7068	5	1	0.2503	0.2505	-0.0002	-0.021	0.12
7068	5	1	0.5003	0.5005	-0.0002	-0.021	0.12
7068	5	1	0.7503	0.7504	-0.0001	-0.011	0.12

SAMPLE UNFORMATTED "VALIDATION" REPORT

(only page 1 shown)

Scanivalve Corp.

Validation Report

Date 2/14/2012

PASSED: -0.088

Time 12:54 PM

CHAN 10 -4.99987

Module	Chan	Max Pressure	Source Pressure	Device Pressure	Delta	Percent Error	Tolerance	Failed
7068	1	1	-1.0003	-1	-0.0002	-0.024	0.12	
7068	1	1	-0.7503	-0.7501	-0.0001	-0.013	0.12	
7068	1	1	-0.5003	-0.5003	0	0.001	0.12	
7068	1	1	-0.2503	-0.2502	-0.0001	-0.011	0.12	
7068	1	1	0	-0.0001	0.0001	0.008	0.12	
7068	1	1	0.2503	0.2503	0	0.003	0.12	
7068	1	1	0.5003	0.5004	-0.0001	-0.013	0.12	
7068	1	1	0.7503	0.7504	-0.0001	-0.008	0.12	
7068	1	1	1.0003	1.0005	-0.0002	-0.022	0.12	
7068	2	1	-1.0003	-1.0001	-0.0002	-0.02	0.12	
7068	2	1	-0.7503	-0.7501	-0.0002	-0.02	0.12	
7068	2	1	-0.5003	-0.5002	-0.0001	-0.007	0.12	
7068	2	1	-0.2503	-0.2502	-0.0001	-0.008	0.12	
7068	2	1	0	-0.0001	0.0001	0.008	0.12	
7068	2	1	0.2503	0.2505	-0.0002	-0.016	0.12	
7068	2	1	0.5003	0.5005	-0.0002	-0.018	0.12	
7068	2	1	0.7503	0.7504	-0.0001	-0.009	0.12	
7068	2	1	1.0003	1.0005	-0.0002	-0.02	0.12	
7068	3	1	-1.0003	-0.9999	-0.0003	-0.035	0.12	
7068	3	1	-0.7503	-0.75	-0.0002	-0.025	0.12	
7068	3	1	-0.5003	-0.5002	-0.0001	-0.011	0.12	
7068	3	1	-0.2503	-0.2501	-0.0002	-0.017	0.12	
7068	3	1	0	0	0	0	0.12	
7068	3	1	0.2503	0.2505	-0.0002	-0.02	0.12	
7068	3	1	0.5003	0.5004	-0.0001	-0.015	0.12	
7068	3	1	0.7503	0.7505	-0.0002	-0.019	0.12	
7068	3	1	1.0003	1.0005	-0.0002	-0.019	0.12	
7068	4	1	-1.0003	-0.9999	-0.0004	-0.036	0.12	
7068	4	1	-0.7503	-0.75	-0.0003	-0.03	0.12	
7068	4	1	-0.5003	-0.5002	-0.0001	-0.012	0.12	
7068	4	1	-0.2503	-0.2501	-0.0002	-0.022	0.12	
7068	4	1	0	0	0	0	0.12	
7068	4	1	0.2503	0.2504	-0.0001	-0.01	0.12	
7068	4	1	0.5003	0.5005	-0.0002	-0.024	0.12	
7068	4	1	0.7503	0.7505	-0.0001	-0.015	0.12	
7068	4	1	1.0003	1.0006	-0.0003	-0.029	0.12	
7068	5	1	-1.0003	-1	-0.0003	-0.028	0.12	
7068	5	1	-0.7503	-0.7501	-0.0002	-0.022	0.12	
7068	5	1	-0.5003	-0.5002	-0.0001	-0.012	0.12	
7068	5	1	-0.2503	-0.2502	-0.0001	-0.011	0.12	

APPENDIX F: DOUT CONFIGURATIONS & VALVE LOGIC STATES

STANDARD DSA CALIBRATION VALVE CONFIGURATIONS

Mode	CTL1	CTL2	CLT*	CTLPRG
Operate	X	X	X	X
Calibrate	90-120psi	90-120psi	X	X
Quick Zero	90-120psi	90-120psi	90-120psi	X
Purge	90-120psi	90-120psi	X	90-120psi
Isolate	90-120psi	X	X	X

ABSOLUTE DSA CALIBRATION VALVE CONFIGURATIONS

Mode	CTL1	CTL2	CTLPRG
Operate	X	X	X
Calibrate	90-120psi	90-120psi	X
Purge	90-120psi	90-120psi	90-120psi
Isolate	90-120psi	X	X

ZOC17 CALIBRATION VALVE CONFIGURATIONS

Mode	CTL1	CTL2	CLT*	CTLPRG
Operate	X	X	X	X
Calibrate	90-120psi	90-120psi	X	X
Quick Zero	90-120psi	90-120psi	90-120psi	X
Purge	90-120psi	90-120psi	X	90-120psi
Isolate	90-120psi	X	X	X

ZOC22/23/33/64Px VALVE LOGIC

Mode	Px CTL (DOUT 1)	CAL CTL (DOUT 2)
Operate	X	65psi
Calibrate	65psi	X
Purge	X	X
Isolate	65psi	65psi

ZOC22/23/33/64Px2 VALVE LOGIC

Mode	PxA CTL (DOUT 1)	PxB CTL (DOUT 2)	CAL CTL (DOUT 3)
Operate (PxA)	X	65psi	65psi
Operate (PxB)	65psi	X	65psi
Calibrate	65psi	65psi	X
Purge	X	X	X
Isolate	65psi	65psi	65psi

APPENDIX G: SOFTWARE CHANGE LOG

Version 4.00 - First Release August 2008

Version 4.01 - Released August 2008

Corrected a bug in the calculation of the target pressure when using a Scanivalve 1.0 PSID SPC3000. This bug might cause a problem if the calibrator has a negative offset.

Version 4.02 - Released April 2009

Modified the timing of the calibrator pressure read when a SPC3000 is used as an automatic calibrator. This prevents a possible error in the reading when low pressure modules are calibrated. This affects all calibration ranges 5 psi and below.

Version 4.03 - Released November 2009

Modified the process of recording barometric pressure. To prevent unnecessary barometric recording time, barometric pressure is sampled before every pressure reading when calibrating modules less than or equal to 15PSI full scale, but only before the first negative and the first positive point for modules over 15PSI full scale. The algorithm for calculating stability error was updated to calculate the average before the scan for outliers in order to provide more accurate stability measure. The read pressure time delay was decreased from 1000ms to 500ms when communicating through an enclosure. Finally, updates were made to the user interface of the port definition page, it no longer requires you to fill any undefined pressure points and updates were made to resolve the DOUT 11 and DOUT 12 retention issues.

Version 4.04 - Released July 2010

Updated to include support for SPC4000 calibrator. Also MPF and presscal.log files are now generated and saved progressively throughout the course of the As Received, Calibration and Validations. Additional features added to allow for individual module 'saves' after Calibration and the ability to disable the CALZ/B before the As Received portion of the test.

Version 4.05 - Released August 2010

Updated to include pressure unit and cvtunit configuration in the reconfigure step of a calibration. Also problems with calibration of DSA3017/3018 modules resolved.

Version 4.06 - Released March 2012

Updated support for SPC4000 calibrator, including the use of measurement mode for zero offset measurement

Updated to be fully functional in Windows 7

Updated report generation. Reports are now generated as .csv files and no longer .xls

Added support for True Differential DSA modules

Resolved a bug in calculating the TempM and TempB terms for DSA calibration coefficients

Resolved a bug reading the barometric pressure from an absolute SPC3000 when calibrating absolute DSA modules.

Version 4.07- Released April 2016

Added support for SPC4000 absolute calibrations

Added support for improved "segmented temperature" calculations of the DSA3217/3218 modules

Added support for 0-72°C calibrations of DSA modules

Added support for "negative gauges" calibration points

Decreased the delay between reads of the SPC4000 calibrator pressures.

Updated the formula used to calculate the %FS errors, resolved a bug that could label negative errors as positive errors.

Updated the syntax of several SPC4000 calibrator commands to ensure reliable communications

Resolved a bug which generated unnecessary "IO.Exception" errors

Resolved a bug that was not allowing PressCal to properly switch between "0-59" and "0-69" temperature planes

Resolved a bug that could prevent a SAVE command from being issued to a DSA module after a calibration

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Scanivalve

**1722 N. MADSON ST.
LIBERTY LAKE, WA 99019**

**PHONE: 1-800-935-5151
1-509-891-9970
FAX: 1-509-891-9481**

**SCANCO@SCANIVALVE.COM
WWW.SCANIVALVE.COM**

**PRESSCAL SOFTWARE MANUAL
APRIL, 2016**