

PRESSCAL

FIELD CALIBRATION AND VALIDATION SOFTWARE

FOR

DSA3000/3200/3300 MODULES

DSA-PTP MODULES

DSA3016 MODULES

ZOC 17/22/23/33 MODULES

MPS4100 MODULES

V4.09

Scanivalve

PREFACE

WARNINGS, CAUTIONS AND NOTES



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.



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

Scanivalve Corporation, Liberty Lake, Washington, hereafter referred to as Seller, warrants to the Buyer and the first end user that its products will be free from defects in workmanship and material for a period of twelve (12) months from date of delivery. Written notice of any claimed defect must be received by Seller within thirty (30) days after such defect is first discovered. The claimed defective product must be returned by prepaid transportation to Seller within ninety (90) days after the defect is first discovered. Seller's obligations under this Warranty are limited to repairing or replacing, at its option, any product or component part thereof that is proven to be other than as herein warranted.

Surface transportation charges covering any repaired or replacement product or component part shall be at Seller's expense; however, inspection, testing and return transportation charges covering any product or component part returned and redelivered, which proves

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

This Warranty does not extend to any Seller product or component part thereof which has been subjected to misuse, accident or improper installation, maintenance or application; or to any product or component part thereof which has been repaired or altered outside of Seller's facilities unless authorized in writing by Seller, or unless such installation, repair or alteration is performed by Seller; or to any labor charges whatsoever, whether for removal and/or reinstallation of the defective product or component part or otherwise, except for Seller's labor charges for repair or replacement in accordance with the Warranty. Any repaired or replacement product or component part thereof provided by Seller under this Warranty shall, upon redelivery to Buyer, be warranted for the unexpired portion of the original product warranty.

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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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 ISO9001:2015 certified company.

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SECTION 1: INTRODUCTION

OVERVIEW

This software is used to re-calibrate most pressure scanners manufactured by Scanivalve Corp. These calibrations can be performed automatically or manually. The automatic calibrations will communicate with Scanivalve SPC3000, SPC4000, or SPC4050 pressure calibrators. Pressures will be applied without operator intervention. In manual mode, the user must use a high accuracy, non-Scanivalve pressure standards and manually control the standard to apply the appropriate pressures. The software will prompt the user to apply pressures and enter in the applied pressure.

PressCal is capable of calibrating multiple pressure ranges using multiple calibrators in a single test in both automatic and manual mode.

PressCal must be obtained from Scanivalve or downloaded from the Scanivalve website. This section covers the installation process in detail. If you encounter unexpected difficulties, contact your IT department or Scanivalve Technical Support.

SYSTEM REQUIREMENTS

Supported Operating System:

- Windows 7 SP1
- Windows 8
- Windows 8.1
- Windows 10

Minimum Hardware Requirements:

- 1 GHz or faster processor
- 512 MB of RAM
- 2.5 GB of available hard disk space

.NET Framework Version:

- 4 or higher

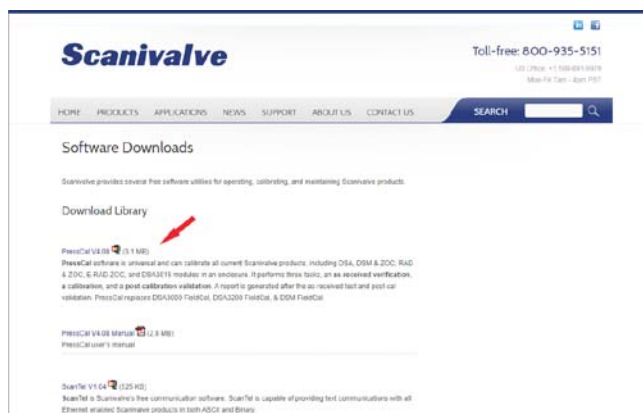
NOTE: For computers operating on Windows XP, you must use an earlier version of PressCal. PressCal version 4.08 is the last known version that can be used in Windows XP, or any operating system using .NET Framework 2. Please contact Technical Support for this version.

DOWNLOAD

PressCal can be downloaded from the Scanivalve website at no charge. Please visit:

www.scanivalve.com/support/software-downloads

Please use the link shown below to download PressCal. Depending on the internet browser used, the browser should prompt you to save or open the ScanTel folder. Save the folder in a known locations that can be easily accessed. The download should then begin automatically.



If you are unable to download the installation files from the website, please contact Scanivalve Technical Support for an alternate method of delivery or a physical copy of the installation files.

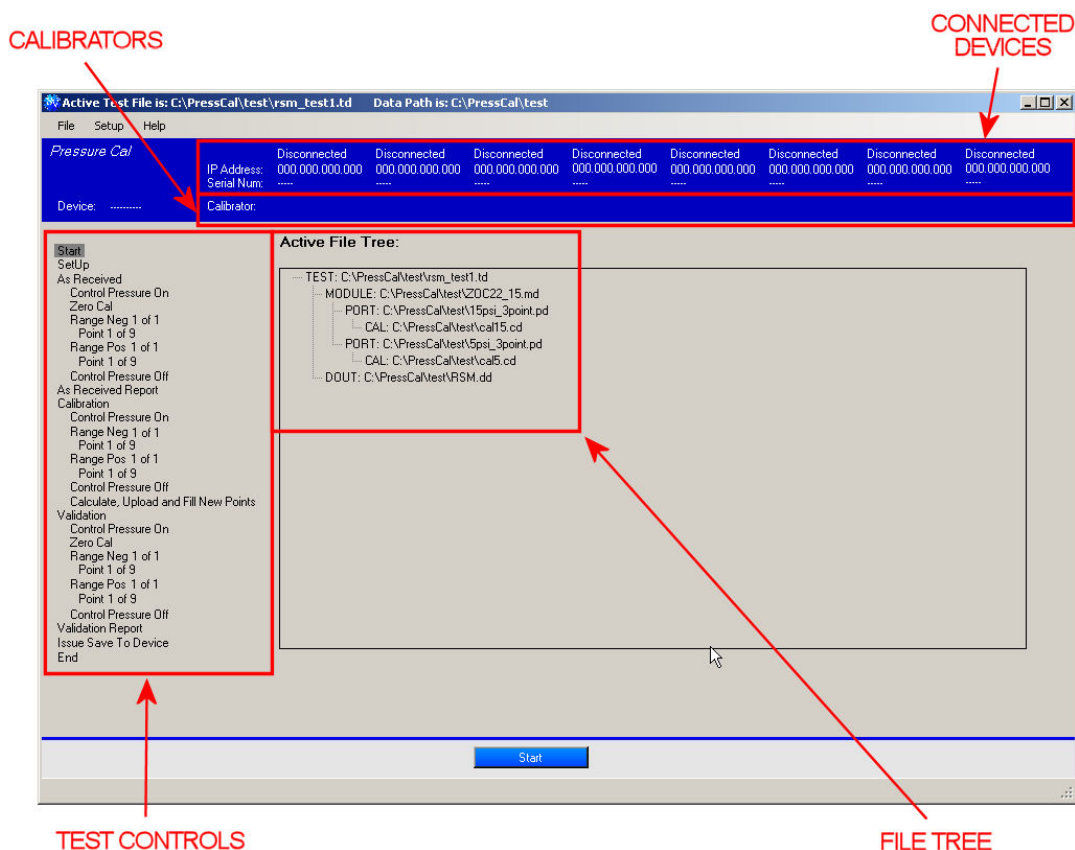
The installation files are contained in a compressed (.zip) folder that is titled PressCalxxx.zip (where xxx is the software version). Unzip this folder. The two files included in this folder are:

- setup.exe
- InstallFieldCal.msi

SOFTWARE INSTALLATION

Before installation, please ensure that all other versions of PressCal are un-installed from the computer.

Run the "Setup.exe" application included in the compressed folder. Follow the instructions in the setup Wizard. During this install, you may need to update the .NET Framework version used in your computer. The install wizard will prompt you if this update must be performed. Once the installation is successful, a shortcut will appear on the desktop and PressCal will be ready for use. Click on the desktop shortcut to open PressCal.

START UP PAGE

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

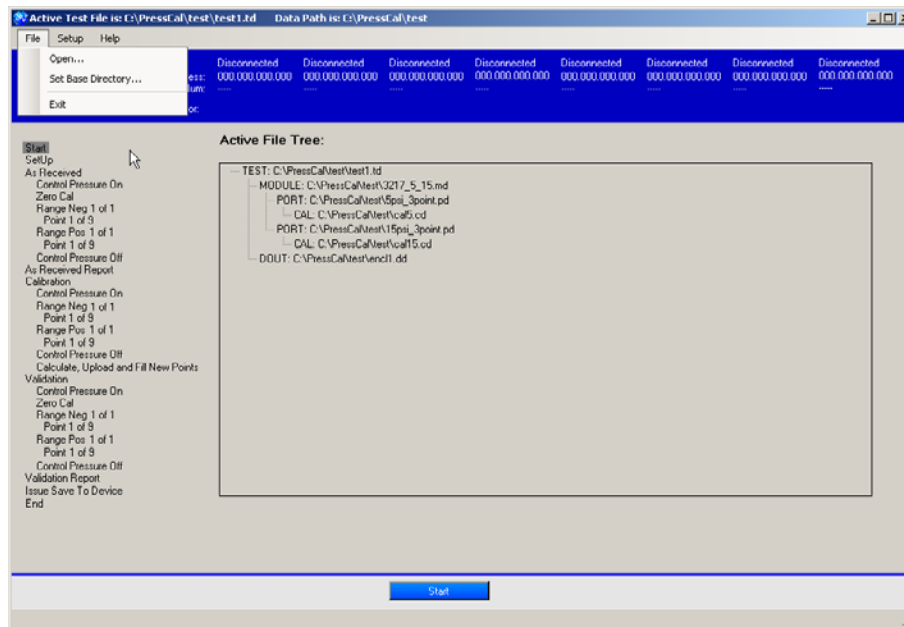
Calibrators: Lists the connected calibrators.

Test Controls: Allows the user to enable or disable test sections (As Received, Calibration, Validation). To enable or disable, simply click on the title of the section. Sections that are greyed out are disabled.

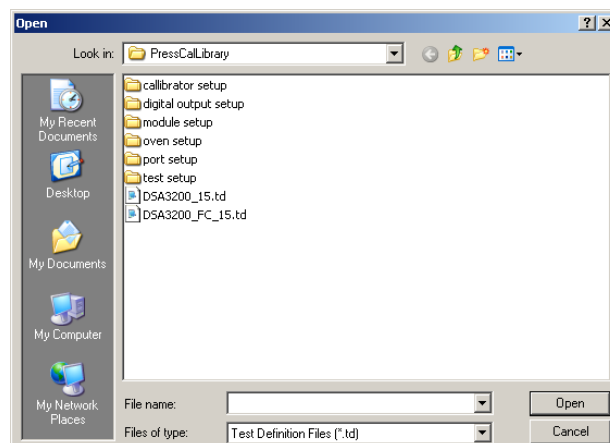
File Tree: Displays files used for the last saved test definition.

MAIN MENUS

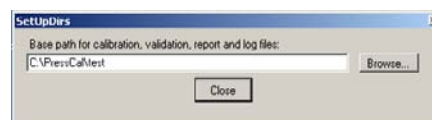
FILE



Open: Clicking this option will open the test selection window. You can use this option to load a completed Test Definition.



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.

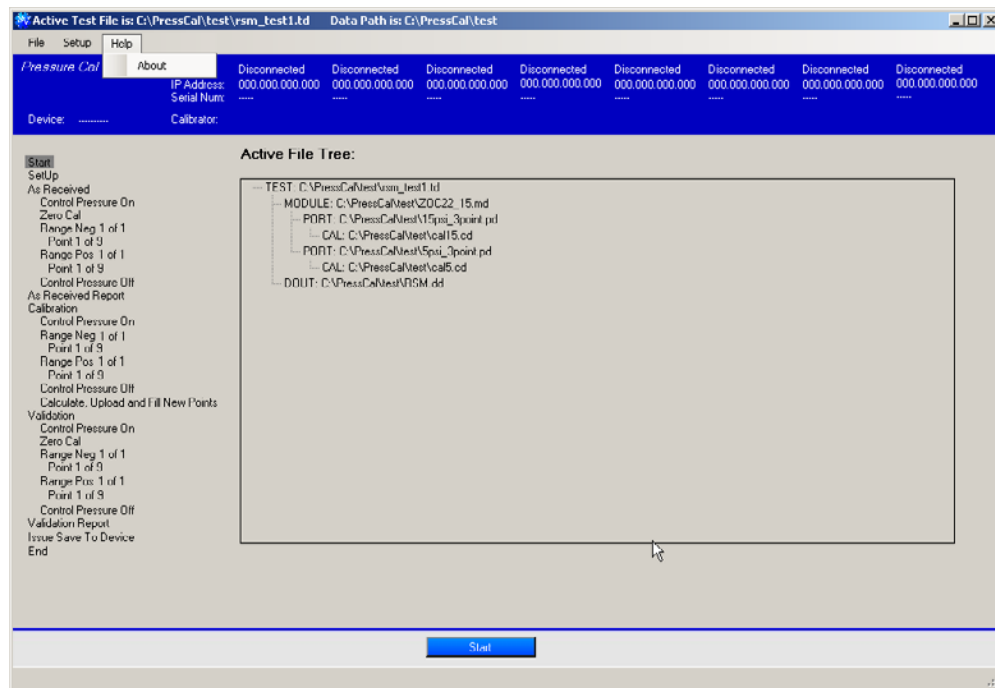


NOTE: The Base Directory should be set to a location that has read/write access. Windows commonly restricts programs from writing to some directories, such as the C:\ root. Scanivalve usually recommends that this directory is set to a folder on the desktop or in the local user's documents.

Exit: Clicking this option will close the PressCal program.

HELP

The Help feature provides information on the PressCal software.



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

DEFINITIONS OVERVIEW

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 (.cd) 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:
 - Automatic Gauge/Differential (SPC3000)** - This should be selected if the calibrator is a SPC3000 using a Digiquartz 202VG as the Secondary Standard.
 - Automatic Absolute (SPC3000)** - Select this option for all other SPC3000 Calibrators.
 - Manual Gauge** - Select this option for any non-Scanivalve Gauge type pressure standard.
 - Manual Absolute** - Select this option for any non-Scanivalve Absolute type pressure standard.
 - Automatic Gauge (SPC4000/SPC4050)** - Select this option if the calibrator being used is a SPC4000 or SPC4050
 - Automatic Absolute (SPC4000/SPC4050)** - Select this option if the calibrator being used is an SPC4000 or SPC4050 with an Absolute type pressure standard.
3. Set the **Calibrator Address**. This will only be used for Automatic Calibrators (SPC). For SPC4000/4050, it is the address of the transducer (1 through 4).
4. Set the **Nominal Pressure Range**. Highlight the full scale pressure range of the pressure standard being used for the calibration (or closest value).
5. Set the **Max Module Pressure**. This is the full scale value of the sensors in the module being calibrated e.g, DSA, MPS, ZOC. This value will be used during the validation calculations to determine the full scale errors of the sensors.
6. Set the **Communication Type**. This will only be used for Automatic Calibrators (SPC). 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 or SPC4050 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 or SPC4050 communicating via Ethernet connection. The IP address and Network port must be defined.
7. If Calibrator Type is Automatic, the action of the calibrator must be defined.
 - Set the **Dwell Time in seconds** - This is the time delay to allow the calibration pressure to stabilize. A dwell time of 0 can be input if using an SPC4000 or SPC4050 calibrator to query the calibrator for stable.
 - 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.
 - Check the **Trap Pressure** box if the pressure is to be trapped after the dwell time has timed out. This should only be checked when using an SPC3000 at 5psi 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. It has several sections:

- 1 Description:** A text field at the top.
- 2 Characteristics:** A list box containing six 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 list box with values: 1, 2.5, 5, 15, 30, 50, 100, 200.
- 5 Max Module Pressure:** A numeric input field.
- 6 Communication:** A section with a 'Communication Type' list box (options: Serial, Device, Network), a 'Serial Comm Port' text field, a 'Device IP Address' text field, a 'Network IP Address' text field, and a 'Network Port' text field.
- 7 Action:** A section with 'Dwell Time in Seconds' and 'Stability Percentage' text fields, and a 'Trap Pressure' checkbox.
- 8 Buttons:** At the bottom 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 (.dd) 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 and ERAD systems, in conjunction with a DSMCPM, MSCP, or other external solenoids.
 Digital Outputs 6, 7, and 8 are used by DSA Enclosures.
 SPC3000/CPM 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" for more information.

3. Highlight the **Command Target** for the Digital Output control signals.
 For a SPC3000/CPM3000, highlight Calibrator.
 For any RAD, Enclosure, DSM, or manual control, select RAD/Enclosure/DSM.
 For ENETCPM, select Ethernet CPM. If this is entered, the Ethernet CPM command section will become available.
4. Enter the **Calibrator Definition** File name, if applicable (if Calibrator is selected). Use the Browse button to set the path and file name.
5. The **Zero Calibration Setting** should not be modified unless otherwise specified by a Scanivalve representative.
6. Set the **Control Pressure Dwell Time** in seconds. 5 to 15 seconds is recommended for most tests, depending on the total module count unless the control pressure lines are very long. Control time should be increased with length. 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 12 rows of radio buttons labeled 1 through 12. Below the table is a note: 'Note: NC - No Change'.
- 3** Command Target Control: A dropdown menu currently showing 'RAD/Enclosure/DSM'. Other options are 'Ethernet CPM' and 'Calibrator'.
- 4** Calibrator Definition: A text input field with a 'Browse...' button next to it.
- 5** Zero Calibration Setting: A checkbox labeled 'Use Special Setting' and a 'Setting (hex):' input field.
- 6** Control Dwell Time: A text input field followed by 'Seconds'.
- 7** Ethernet CPM - Calibrate Mode Commands: Two sections, each with 'Step 1 Sequence:', 'Dwell (in seconds):', and 'Step 2 Sequence:' labels and corresponding input fields.
- Buttons at the bottom: 'Open Definition', 'Save Definition', 'Close', and 'Cancel'.

NOTE: If manual "muscle" pressure will be applied to place modules into calibration mode before PressCal is started (constant pressure with no switching ability), a blank definition with as few selections as possible can be used in place. Blank definitions are typically all digital outs are set to NC, Command Target is left as RAD/Enclosure/DSM, and Dwell time is 5.

PORT DEFINITIONS

Click Setup > Port to open the Port definition Window. This page determines what pressures will be applied to each enabled port (channel) 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 (.pd) 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, MPS, and ZOC modules highlight: Differential. Absolute, Gauge and True Differential options are only typically applicable for DSA modules.
3. Enter the total number of **Calibration Points**. This is the total number of calibration pressures to be applied, including positive, negative, and 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 positive, negative, and zero.
6. Enter the number of number of **Negative Validation** points.
7. Enter the **Full Scale Pressure** range of the module (in PSI only). This is typically listed on the modules label.
8. Enter the **Pass/Fail Tolerance** desired (in % of full scale). For Scanivalve accuracy tolerances, please refer to the modules data sheet or manual. Otherwise enter a desired tolerance.
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:

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

The Negative Calibrator Assignment file will usually be the 15 psi calibrator for any module with a full scale range that is 15psi or higher. All lower ranges will use the same calibrator assignment as the positive assignment.

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

10. Enter the Calibration Pressures (**Pos Cal/Neg Cal**). Pressure Point 1 is the lowest Negative point. Pressure Point 9 is the highest Positive point. Recommended Calibration pressures for different pressure ranges can be found in "Appendix B: Recommended Calibration Pressures."

Repeat this for the Validation Pressures (**Pos Val/Neg Val**). Remember that Calibration and Validation are different processes and typically use different points. Pressure point 1 is the lowest Negative point. Pressure point 9 is the highest positive point. Recommended Validation pressures for all standard range modules may be found in "Appendix A: Recommended As Received/Validation Pressures."

NOTE: 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.

Remember: Port definitions are created for each channel/sensor/port. If you have a dual range module, a port definition must be made for each range in the module. Port definitions are assigned to a module channels in the Module Definition.

The screenshot shows the Port Definition Window with the following elements 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, set to 0]
- 4** Negative Calibration Points: [Spin Box, set to 0]
- 5** Validation Points: [Spin Box, set to 0]
- 6** Negative Validation Points: [Spin Box, set to 0]
- 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 Pressures 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				

- 11** Save Definition [Button]
- Open Definition [Button]
- Close [Button]
- Cancel [Button]

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 (.md) files will be shown.

If the module must be defined:

1. Enter a **Description**. This is for reference only.
2. Enter the **Module Type**. This can be any value that describes the module e.g., ZOC33, MPS4164, DSA3217PTP.
3. Highlight the **Number of Ports**. The number of ports shown in the window will be automatically adjusted. This represents the total amount of channels available in the module e.g., DSA3217 = 16, ZOC22 = 32, MPS4164/ZOC33 = 64.
4. Insert 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 click and hold 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 (do not double click on the file). This file name will be entered in each box.
 - D. Repeat for all applicable channels.
5. Select a Calibration Temperature (**Number of Temps**) range associated with the individual module. Example modules are listed to the right of the selection, however a more accurate, updated table in "Appendix C: Standard Temperature Planes" is available and should be referenced prior to this selection. This table will provide the typical temperature range of all modules that can be calibrated with PressCal. Please choose the range that most accurately reflects your pressure scanner.
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. At the top, there is a 'Description' field. Below it, 'Module Type' is a text box. To the right, 'Number of Ports' has a dropdown menu with options 16, 32, and 64. Further right, 'Number of Temps' has a dropdown menu with three options: '0 to 72 Temperatures' (listing DSA3217, DSA3218), '0 to 69 Temperatures' (listing ZOC22, ZOC23, ZOC33, ZOC17, DSA3016), and '0 to 59 Temperatures' (listing DSA3017, DSA3018, DSA3007, DSA3207, DSA3307). Below these are two large tables, each with columns for 'Odd Port Definition' and 'Even Port Definition'. At the bottom, there are four buttons: 'Open Definition', 'Save Definition', 'Close', and 'Cancel'.

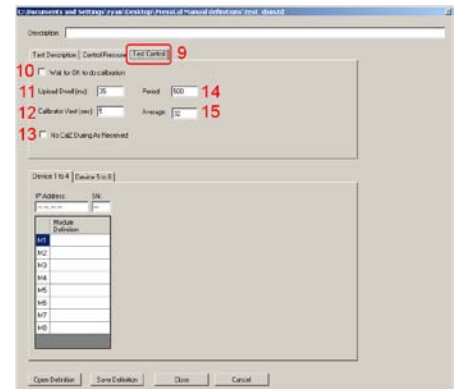
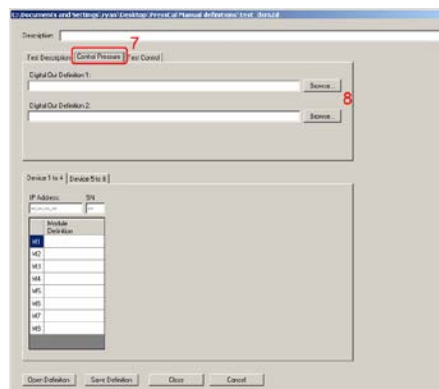
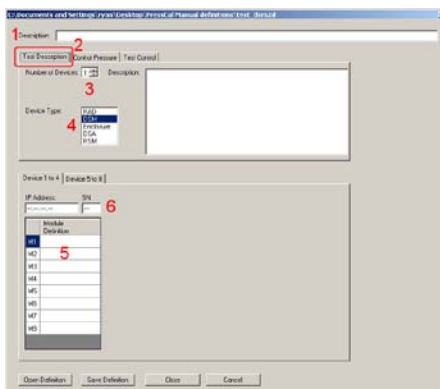
TEST DEFINITIONS

Click Setup, Test to open the Test Definition Window. This page determines which Digital Output and Module Definition files will be used for the complete test. The address(es) of the module(s) will be defined as well as settings for test dwell, scan rates, and delay times. The Test Definition includes 3 tabs for these configurations.

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 (.td) 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. Devices references DSA, DSM, RAD, or ENCL modules and does not relate to the number of analog pressure scanners (ZOC, MPS and DSA3016).
4. Highlight the **Device Type**. The Module Definition columns will adjust to the selection made.
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 device in the respective windows (no ZOC, MPS or DSA3016 serial numbers).
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 As Received 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** is the line delay when coefficients are uploaded to the devices. This should be left with a value around 30ms unless there is problems uploading coefficients to legacy modules.
12. **Calibrator Vent** is the total time PressCal will wait after a "vent" command is sent to the calibrator. It is recommended to be set at 5 seconds, but can be increased if CAL, REF, Static or Vent 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 **No CALZ During As Received** box. This is not typically not recommended.
14. It is recommended that **Period** be set to 500.
15. It is recommended that **Average** be set to 32 or 64. 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 in the selected directory. Navigate to the desired directory then highlight the file to be used and click: Open. Only Calibrator Definition (.cd) files will be shown. This definition will include an SPC4000 with a 15psi transducer and a 15psi DSA3217/16Px.

If the calibrator must be defined:

1. Enter a **Description**. This example has used "15PSI SPC4000 Calibrator."
2. Set the **Calibrator Type** to Automatic Gauge (SPC4000). Other options are:
 - Automatic Gauge/Differential (SPC3000)** - This should be selected if the calibrator is a SPC3000 using a Digiquartz 202VG as the Secondary Standard.
 - Automatic Absolute (SPC3000)** - Select this option for all other SPC3000 Calibrators.
 - Manual Gauge** - Select this option for any non-Scanivalve Gauge type pressure standard.
 - Manual Absolute** - Select this option for any non-Scanivalve Absolute type pressure standard.
 - Automatic Gauge (SPC4000/SPC4050)** - Select this option if the calibrator being used is a SPC4000 or SPC4050
 - Automatic Absolute (SPC4000/SPC4050)** - Select this option if the calibrator being used is an SPC4000 or SPC4050 with an Absolute type pressure standard.
3. Set the **Calibrator's Address** - which in this case, the 15psi transducer is in address 2 of the SPC.
4. Set the **Nominal Pressure Range**. Highlight the full scale pressure range of the pressure standard being used - 15psi.
5. Set the **Max Module Pressure**. This is the full scale value of the sensors in the DSA3217 - 15psi. This value will be used during the validation calculations to determine the full scale errors of the sensors.
6. Set the **Communication Type** to Network as the example is an SPC4000. Other options include:
 - Serial** - Select this if the Automatic Calibrator is an SPC3000 controlled by an enclosure, a DSM, or a direct serial connection. A SPC4000 or SPC4050 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 or SPC4050 communicating via Ethernet connection. The IP address and Network port must be defined (shown).
7. If Calibrator Type is Automatic, the action of the calibrator must be defined.

Set the **Dwell Time in seconds** - This is the time delay to allow the calibration pressure to stabilize. A dwell time of 0 can be input if using an SPC4000 or SPC4050 calibrator to query the calibrator for stable. Otherwise a manual time around 30 seconds may be acceptable.

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 only be checked when using an SPC3000 at 5psi Full Scale and lower.

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 (.dd) Files will be shown. This example is using an SPC3000/CPM3000 to operate the valve state of the DSA3217.

If the Digital Outputs must be defined:

1. Enter a **Description**. This examples uses "SCP3000/CPM3000."
2. Click the radio buttons for the **Digital Outputs** that will switch the control pressures. Since this example uses the CPM3000, changes are made to Digital outs 8 - 10. Other options may be:
 - Digital Outputs 1 through 5 are generally used by DSM and ERAD systems, in conjunction with a DSMCPM, MSCP, or other external solenoids.
 - Digital Outputs 6, 7, and 8 are used by DSA Enclosures.
 - SPC3000/CPM 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" for more information on specific module type.

3. Highlight the **Command Target** for the Digital Output control signals. For a SPC3000/CPM3000, highlight Calibrator.
4. Enter the **Calibrator Definition** File name of the calibrator definition when using the Calibrator Setting (for SPC3000). Use the Browse button to set the path and file name.
5. The **Zero Calibration Setting** should not be modified unless otherwise specified by a Scanivalve representative.
6. Set the **Control Pressure Dwell Time** in seconds. 10-15 seconds is recommended for most tests unless the control pressure lines are very long. This example uses 5 second, under the impression that there is only one DSA3217. Control time should be increased with length. 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 'cpm3000.dd' window with the following settings:

- Description:** SPC3000/CPM3000
- Digital Out Settings:**
 - Calibrate Mode:** On Off NC (Outputs 1-12)
 - Power Up Mode:** On Off NC (Outputs 1-12)
 - Note:** NC - No Change
- Zero Calibration Setting:**
 - ☐ Use Special Setting
 - Setting (hex):** 60
- Control Dwell Time:** 5 Seconds
- Ethernet CPM - Calibrate Mode Commands:**
 - Step 1 Sequence: []
 - Dwell (in seconds): 0
 - Step 2 Sequence: []
 - Dwell (in seconds): 0
- Ethernet CPM - Calibrate Power Up Mode Commands:**
 - Step 1 Sequence: []
 - Dwell (in seconds): 0
 - Step 2 Sequence: []
 - Dwell (in seconds): 0
- Command Target Control:**
 - Command Target:** RAD/Enclosure/DSM, Ethernet CPM, **Calibrator** (selected)
 - Ethernet CPM IP Address:** 000.000.000.000
- Calibrator Definition:** spc_15.cd
- Buttons:** Open Definition, Save Definition, Close, Cancel

NOTE: If manual "muscle" pressure will be applied to place modules into calibration mode before PressCal is started (constant pressure with no switching ability), a blank definition with as few selections as possible can be used in place. Blank definitions are typically all digital outs are set to NC, Command Target is left as RAD/Enclosure/DSM, and Dwell time is 5.

PORT DEFINITIONS

Click Setup > Port to open the Port definition Window. This page determines what pressures will be applied to each enabled port (channel) 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 (.pd) files will be shown.

If the ports must be defined:

1. Enter a **Description**. This example uses “DSA3200 15psi.”
2. Highlight the **Port Type**. For standard DSA3217, highlight Differential (true differential or absolute modules can be found later in the Special Configurations section).
3. Enter the total number of **Calibration Points**. This is the total number of calibration pressures to be applied, including positive, negative, and zero. For a DSA3217, 5 is recommended.
4. Enter the number of **Negative Calibration** points. This example uses 2.
5. Enter the total number of **Validation Points**. This is the total number of pressures to be applied, including positive, negative, and zero. 9 points are recommended.
6. Enter the number of number of **Negative Validation** points. This example uses 4.
7. Enter the **Full Scale Pressure** range of the module (in PSI only). This DSA3217 is 15psi.
8. Enter the **Pass/Fail Tolerance** desired (in % of full scale). For Scanivalve accuracy tolerances, please refer to the modules data sheet or manual and find the desired Full Scale Pressure range. DSA3217's at 15psi are listed at 0.05% FS.
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:


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

The Negative Calibrator Assignment file will usually be the 15 psi calibrator for any module with a full scale range that is 15psi or higher. All lower ranges will use the same calibrator assignment as the positive.

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

10. Enter the Calibration Pressures (**Pos Cal/Neg Cal**). Pressure Point 1 is the lowest Negative point. Pressure Point 9 is the highest Positive point. Recommended Calibration pressures for different pressure ranges can be found in “Appendix B: Recommended Calibration Pressures.”

Repeat this for the Validation Pressure (**Pos Val/Neg Val**). Remember that the Calibration and Validation are different processes and typically use different points. Pressure point 1 is the lowest Negative point. Pressure point 9 is the highest positive point. Recommended Validation pressures for all standard range modules may be found in "Appendix A: Recommended As Received/Validation Pressures"



The screenshot shows the configuration interface for a DSA3200 15psi module. The 'Description' field is populated with 'DSA3200 15psi'. Under the 'Characteristics' section, the 'Port Type' is set to 'Differential'. The 'Calibration Points' are set to 5, 'Negative Calibration Points' to 2, 'Validation Points' to 9, and 'Negative Validation Points' to 4. Each of these numerical fields has a small up/down arrow icon next to it.

NOTE: 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.

Remember: Port definitions are created for each channel/sensor/port. If you have a dual range module, a port definition must be made for each range in the module. Port definitions are assigned to a module channels in the Module Definition.

Description:

Characteristics

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

Calibration Points: Negative Calibration Points:

Validation Points: Negative Validation Points:

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

Calibration Control

Positive Calibrator Assignment:

Negative Calibrator Assignment:

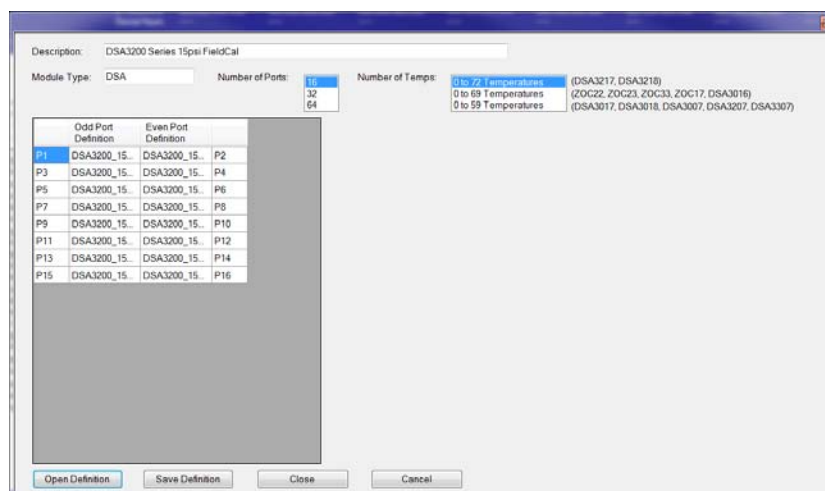
	Pos Cal	Neg Cal	Pos Val	Neg Val
Pressure Point 1		-16.35		-15.0
Pressure Point 2		-8.18		-11.25
Pressure Point 3	0			-7.5
Pressure Point 4	8.18			-3.75
Pressure Point 5	16.35		0	
Pressure Point 6			3.75	
Pressure Point 7			7.5	
Pressure Point 8			11.25	
Pressure Point 9			15.0	

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 (.md) files will be shown.

If the module must be defined:

1. Enter a **Description**. This examples uses “DSA3200 Series 15psi FieldCal.”
2. Enter the **Module Type**. This can be any value that describes the module e.g. DSA3217.
3. Highlight the **Number of Ports**. The number of ports shown in the window will be automatically adjusted. This represents the total amount of channels available in the module e.g., DSA3217 = 16, ZOC22 = 32, MPS4164/ZOC33 = 64.
4. Insert 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 click and hold 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 (do not double click on the file). This file name will be entered in each box.
 - D. Repeat for all applicable channels.
5. Select a Calibration Temperature (**Number of Temps**) range associated with the individual module. Example modules are listed to the right of the selection, however a more accurate, updated table in “Appendix C: Standard Temperature Planes” is available and should be referenced prior to this selection. This table will provide the typical temperature range of all modules that can be calibrated with PressCal. Please choose the range that most accurately reflects your pressure scanner. This particular DSA is ranged from 0 - 72C.
6. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.



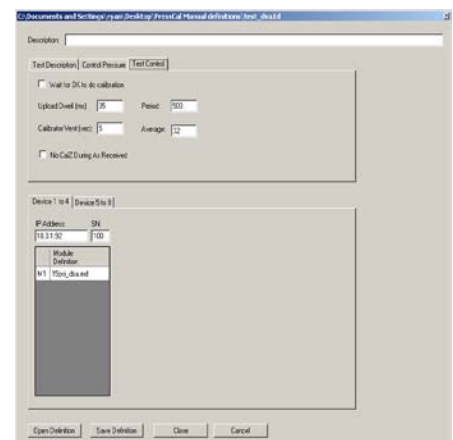
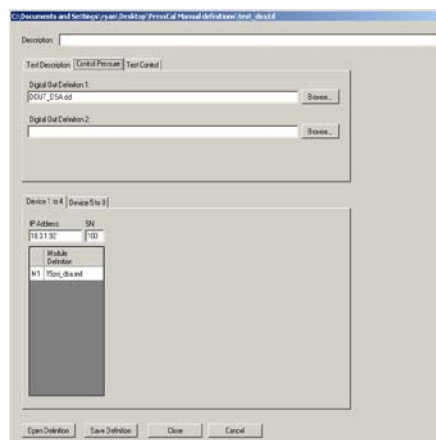
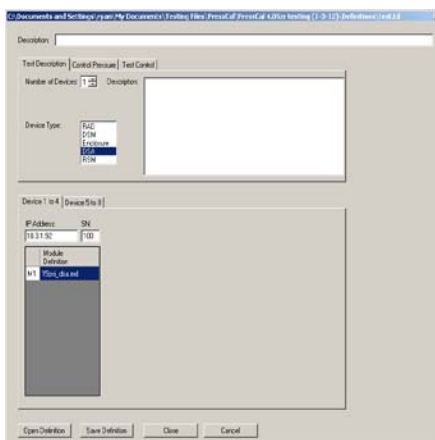
TEST DEFINITIONS

Click Setup, Test to open the Test Definition Window. This page determines which Digital Output and Module Definition files will be used for the complete test. The address(es) of the module(s) will be defined as well as test dwell, scan rates, and delay times. The Test Definition includes 3 tabs for these configurations.

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 (.td) 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. Devices references DSA, DSM, RAD, or ENCL modules and does not relate to the number of analog pressure scanners (ZOC , MPS, DSA3016). A single DSA3217 is to be calibrated in this test.
4. Highlight the **Device Type**. DSA is selected.
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 DSA3217 Module.
6. Enter the **IP Address** and **Serial Number** of the device in the respective window.
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 (whether automated or manual).
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** is the line delay when coefficients are uploaded to the devices. This should be left with a value around 30ms unless there is problems uploading coefficients to legacy DSA Modules.
12. **Calibrator Vent** is the total time PressCal will wait after a “vent” command is sent to the calibrator. It is recommended to be set at 5 seconds, but can be increased if CAL, REF, Static or Vent 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 **No CALZ During As Received** box. This is not typically not recommended.
14. It is recommended that **Period** be set to 500.
15. It is recommended that **Average** be set to 32 or 64. 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.



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 in the selected directory. Navigate to the desired directory then highlight the file to be used and click: Open. Only Calibrator Definition (.cd) files will be shown. This definition will include an SPC4000 with a 15psi transducer and a 15psi DSA3016 in a DSAENCL.

If the calibrator must be defined:

1. Enter a **Description**. This example has used "15PSI SPC4000 Calibrator."
2. Set the **Calibrator Type** to Automatic Gauge (SPC4000). Other options are:
 - Automatic Gauge/Differential (SPC3000)** - This should be selected if the calibrator is a SPC3000 using a Digiquartz 202VG as the Secondary Standard.
 - Automatic Absolute (SPC3000)** - Select this option for all other SPC3000 Calibrators.
 - Manual Gauge** - Select this option for any non-Scanivalve Gauge type pressure standard.
 - Manual Absolute** - Select this option for any non-Scanivalve Absolute type pressure standard.
 - Automatic Gauge (SPC4000/SPC4050)** - Select this option if the calibrator being used is a SPC4000 or SPC4050
 - Automatic Absolute (SPC4000/SPC4050)** - Select this option if the calibrator being used is an SPC4000 or SPC4050 with an Absolute type pressure standard.
3. Set the **Calibrators Address** - which in this case, the 15psi transducer is in address 2 of the SPC.
4. Set the **Nominal Pressure Range**. Highlight the full scale pressure range of the pressure standard being used - 15psi.
5. Set the **Max Module Pressure**. This is the full scale value of the sensors in the DSA3016 - 15psi. This value will be used during the validation calculations to determine the full scale errors of the sensors.
6. Set the **Communication Type** to Network as the example is an SPC4000. Other options include:
 - Serial** - Select this if the Automatic Calibrator is an SPC3000 controlled by an enclosure, a DSM, or a direct serial connection. A SPC4000 or SPC4050 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 or SPC4050 communicating via Ethernet connection. The IP address and Network port must be defined (shown).
7. If Calibrator Type is Automatic, the action of the calibrator must be defined.
 - Set the **Dwell Time in seconds** - This is the time delay to allow the calibration pressure to stabilize. A dwell time of 0 can be input if using an SPC4000 or SPC4050 calibrator to query the calibrator for stable. Otherwise a manual time around 30 seconds is acceptable.
 - 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 only be checked when using an SPC3000 at 5psi Full Scale and lower.

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 for a '15PSI SPC4000 Calibration'. The window is divided into several sections:

- Description:** 15PSI SPC4000 Calibration
- Characteristics:**
 - Calibrator Type:** A list box with options: Automatic Gauge / Differential (SPC3000), Automatic Absolute (SPC3000), Manual Gauge, Manual Absolute, Automatic Gauge (SPC4000), and Automatic Absolute (SPC4000). 'Automatic Gauge (SPC4000)' is selected.
 - Calibrator Address:** 2
 - Nominal Pressure Range:** A list box with options: 1, 2.5, 5, 15, 30, 50, 100, 200. '15' is selected.
 - Max Module Pressure:** 15
- Communication:**
 - Communication Type:** A list box with options: Serial Device and Network. 'Network' is selected.
 - Serial Comm Port:** (Empty)
 - Device IP Address:** (Empty)
 - Network IP Address:** 191.30.40.101
 - Network Port:** 1025
- Action:**
 - Dwell Time in Seconds:** 30
 - Stability Percentage:** 0.02
 - Trap Pressure:** (Unchecked checkbox)

At the bottom, there 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 (.dd) Files will be shown.

If the Digital Outputs must be defined:

1. Enter a **Description**. This example uses “DSA3016 DOUT configuration.”
2. Click the radio buttons for the **Digital Outputs 6 - 8** that will switch the control pressures on the DSAENCL. Other options include:

Digital Outputs 1 through 5 are generally used by DSM and ERAD systems, in conjunction with a DSMCPM, MSCP, or other external solenoids.

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” for more information.

3. Highlight the **Command Target** for the Digital Output control signals. For a DSAENCL, select RAD/Enclosure/DSM
4. **Calibrator Definition** is not applicable.
5. The **Zero Calibration Setting** should not be modified unless otherwise specified by a Scanivalve representative.
6. Set the **Control Pressure Dwell Time** in seconds. 10-15 seconds is recommended for most tests unless the control pressure lines are very long. This examples uses 5 seconds, assuming there is only a single DSA3016. Control time should be increased with length. 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: DSA3016 DOUT configuration

Digital Out Settings		
Calibrate Mode	Power Up Mode	
On	Off	NC
1	<input type="radio"/>	<input type="radio"/>
2	<input type="radio"/>	<input type="radio"/>
3	<input type="radio"/>	<input type="radio"/>
4	<input type="radio"/>	<input type="radio"/>
5	<input type="radio"/>	<input type="radio"/>
6	<input checked="" type="radio"/>	<input type="radio"/>
7	<input checked="" type="radio"/>	<input type="radio"/>
8	<input checked="" type="radio"/>	<input type="radio"/>
9	<input type="radio"/>	<input type="radio"/>
10	<input type="radio"/>	<input type="radio"/>
11	<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
 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 IP Address:
 Calibrator Definition: Browse...

Open Definition Save Definition Close Cancel

NOTE: If manual “muscle” pressure will be applied to place modules into calibration mode before PressCal is started (digital outputs are activated manually), a blank definition with as few selections as possible can be used in place. Blank definitions are typically all digital outs are set to NC, Command Target is left as RAD/Enclosure/DSM, and Dwell time is 5.

PORT DEFINITIONS

Click Setup > Port to open the Port definition Window. This page determines what pressures will be applied to each enabled port (channel) 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 (.pd) files will be shown.

If the ports must be defined:

1. Enter a **Description**. This example uses "15psi DSA3016 module."
2. Highlight the **Port Type**. For standard DSA3016, highlight Differential (true differential or absolute modules can be found later in the Special Configurations section).
3. Enter the total number of **Calibration Points**. This is the total number of calibration pressures to be applied, including positive, negative, and zero. For a DSA3016, 5 is recommended.
4. Enter the number of **Negative Calibration** points. This example uses 2.
5. Enter the total number of **Validation Points**. This is the total number of pressures to be applied, including positive, negative, and zero. 9 points are recommended.
6. Enter the number of number of **Negative Validation** points. This example uses 4.
7. Enter the **Full Scale Pressure** range of the module (in PSI only). This DSA3016 is 15psi.
8. Enter the **Pass/Fail Tolerance** desired (in % of full scale). For Scanivalve accuracy tolerances, please refer to the modules data sheet or manual and find the desired Full Scale Pressure range. DSA3016s at 15psi are listed at 0.05% FS.
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:

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

The Negative Calibrator Assignment file will usually be the 15 psi calibrator for any module with a full scale range that is 15psi or higher. All lower ranges will use the same calibrator assignment as the positive assignment.

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

10. Enter the Calibration Pressures (**Pos Cal/Neg Cal**). Pressure Point 1 is the lowest Negative point. Pressure Point 9 is the highest Positive point. Recommended Calibration pressures for different pressure ranges can be found in "Appendix B: Recommended Calibration Pressures."

Repeat this for the Validation Pressure (**Pos Val/Neg Val**). Remember that the Calibration and Validation are different processes and typically use different points. Pressure point 1 is the lowest Negative point. Pressure point 9 is the highest positive point. Recommended Validation pressures for all standard range modules may be found in "Appendix A: Recommended As Received/ Validation Pressures."

NOTE: 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.

Remember: Port definitions are created for each channel/sensor/port. If you have a dual range module, a port definition must be made for each range in the module. Port definitions are assigned to a module channels in the Module Definition.

	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	

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 (.md) files will be shown.

If the module must be defined:

1. Enter a **Description**. This example uses “DSA3016 - 15 psi - FieldCal.”
2. Enter the **Module Type**. This can be any value that describes the module e.g., DSA3016.
3. Highlight the **Number of Ports**. The number of ports shown in the window will be automatically adjusted. This represents the total amount of channels available in the module e.g., DSA3016 = 16.
4. Insert 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 click and hold 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 (do not double click on the file). This file name will be entered in each box.
 - D. Repeat for all applicable channels.
5. Select a Calibration Temperature (**Number of Temps**) range associated with the individual module. Example modules are listed to the right of the selection, however a more accurate, updated table in “Appendix C: Standard Temperature Planes” is available and should be referenced prior to this selection. This table will provide the typical temperature range of all modules that can be calibrated with PressCal. Please choose the range that most accurately reflects your pressure scanner.
6. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

Description: DSA3016 - 15 psi - FieldCal

Module Type: DSA3016

Number of Ports: 16

Number of Temps: 0 to 72 Temperatures (DSA3217, DSA3218)
0 to 59 Temperatures (DSA3017, DSA3018, DSA3007, DSA3207, DSA3307)

Port Definition	Odd Port Definition	Even Port Definition
P1	3016_FC_15p...	3016_FC_15p... P2
P3	3016_FC_15p...	3016_FC_15p... P4
P5	3016_FC_15p...	3016_FC_15p... P6
P7	3016_FC_15p...	3016_FC_15p... P8
P9	3016_FC_15p...	3016_FC_15p... P10
P11	3016_FC_15p...	3016_FC_15p... P12
P13	3016_FC_15p...	3016_FC_15p... P14
P15	3016_FC_15p...	3016_FC_15p... P16

Open Definition Save Definition Close Cancel

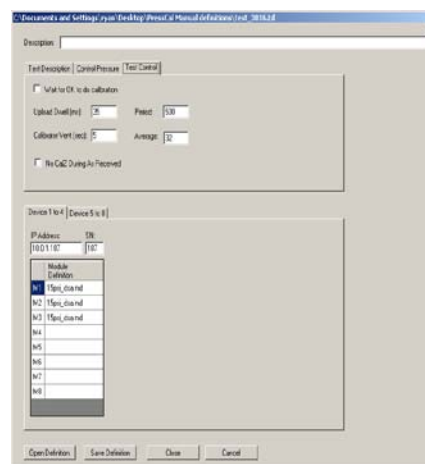
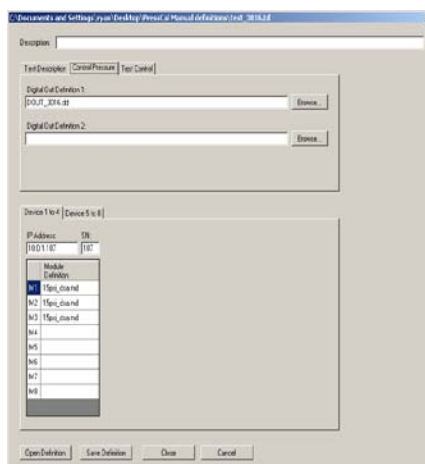
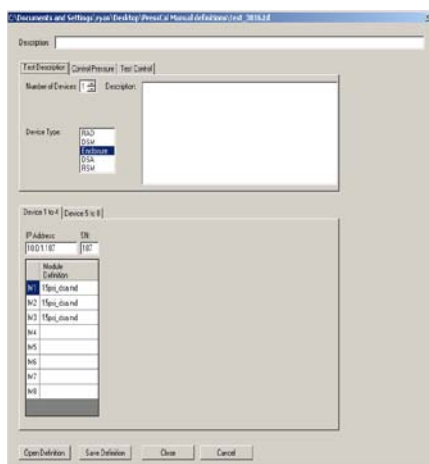
TEST DEFINITIONS

Click Setup, Test to open the Test Definition Window. This page determines which Digital Output and Module Definition files will be used for the complete test. The address(es) of the module(s) will be defined as well as test dwell, scan rates, and delay times. The Test Definition includes 3 tabs for these configurations.

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 (.td) 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. Devices references DSA, DSM, RAD, or ENCL modules and does not relate to the number of analog pressure scanners (ZOC, MPS, DSA3016). In this example, there is one DSAENCL.
4. Highlight the **Device Type**. Enclosure is selected.
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. Repeat for any additional DSA3016s (3 shown below).
6. Enter the **IP Address** and **Serial Number** of the ENCL in the respective window.
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** is the line delay when coefficients are uploaded to the devices. This should be left with a value around 30ms unless there is problems uploading coefficients to legacy modules.
12. **Calibrator Vent** is the total time PressCal will wait after a "vent" command is sent to the calibrator. It is recommended to be set at 5 seconds, but can be increased if CAL, REF, Static or Vent 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 **No CALZ During As Received** box. This is not typically not recommended.
14. It is recommended that **Period** be set to 500.
15. It is recommended that **Average** be set to 32 or 64. 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.



ZOC17/22/23/33 OR MPS4164 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 in the selected directory. Navigate to the desired directory then highlight the file to be used and click: Open. Only Calibrator Definition (.cd) files will be shown. This definition will include an SPC4000 with a 15psi transducer and a 15psi ZOC33 connected to a DSM.

If the calibrator must be defined:

1. Enter a **Description**. This example has used "15PSI SPC4000 Calibrator."
2. Set the **Calibrator Type** to Automatic Gauge (SPC4000). Other options are:
 - Automatic Gauge/Differential (SPC3000)** - This should be selected if the calibrator is a SPC3000 using a Digiquartz 202VG as the Secondary Standard.
 - Automatic Absolute (SPC3000)** - Select this option for all other SPC3000 Calibrators.
 - Manual Gauge** - Select this option for any non-Scanivalve Gauge type pressure standard.
 - Manual Absolute** - Select this option for any non-Scanivalve Absolute type pressure standard.
 - Automatic Gauge (SPC4000/SPC4050)** - Select this option if the calibrator being used is a SPC4000 or SPC4050
 - Automatic Absolute (SPC4000/SPC4050)** - Select this option if the calibrator being used is an SPC4000 or SPC4050 with an Absolute type pressure standard.
3. Set the **Calibrators Address** - in this example, the 15psi transducer is in address 2 of the SPC.
4. Set the **Nominal Pressure Range**. Highlight the full scale pressure range of the pressure standard being used - 15psi.
5. Set the **Max Module Pressure**. This is the full scale value of the sensors in the ZOC33 - 15psi. This value will be used during the validation calculations to determine the full scale errors of the sensors.
6. Set the **Communication Type** to Network as the example is an SPC4000. Other options include:
 - Serial** - Select this if the Automatic Calibrator is an SPC3000 controlled by an enclosure, a DSM, or a direct serial connection. A SPC4000 or SPC4050 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 or SPC4050 communicating via Ethernet connection. The IP address and Network port must be defined (shown).
7. If Calibrator Type is Automatic, the action of the calibrator must be defined.
 - Set the **Dwell Time in seconds** - This is the time delay to allow the calibration pressure to stabilize. A dwell time of 0 can be input if using an SPC4000 or SPC4050 calibrator to query the calibrator for stable. Otherwise a manual time around 30 seconds is acceptable.
 - 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 only be checked when using an SPC3000 at 5psi Full Scale and lower.

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 for a '15PSI SPC4000 Calibration'. The window is divided into several sections:

- Description:** 15PSI SPC4000 Calibration
- Characteristics:**
 - Calibrator Type:** A list box with options: Automatic Gauge / Differential (SPC3000), Automatic Absolute (SPC3000), Manual Gauge, Manual Absolute, Automatic Gauge (SPC4000), and Automatic Absolute (SPC4000). 'Automatic Gauge (SPC4000)' is selected.
 - Calibrator Address:** 2
 - Nominal Pressure Range:** A list box with options: 1, 2.5, 5, 15, 30, 50, 100, 200. '15' is selected.
 - Max Module Pressure:** 15
- Communication:**
 - Communication Type:** A list box with options: Serial, Device, and Network. 'Network' is selected.
 - Serial Comm Port:** (Empty)
 - Device IP Address:** (Empty)
 - Network IP Address:** 191.30.40.101
 - Network Port:** 1025
- Action:**
 - Dwell Time in Seconds:** 30
 - Stability Percentage:** 0.02
 - Trap Pressure:** (Checked)

At the bottom, there are 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 (.dd) Files will be shown.

If the Digital Outputs must be defined:

1. Enter a **Description**. This example uses "DOUTS for a ZOC module connected to a DSM"
2. Click the radio buttons for the **Digital Outputs** used for a ZOC module that will switch the control pressures.
 Digital Outputs 1 through 5 are generally used by DSM and ERAD systems, in conjunction with a DSMCPM, MSCP, or other external solenoids. DOUTs 1 - 3 are typically used on ZOC33 modules.
 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.
3. Highlight the **Command Target** for the Digital Output control signals. For a DSM, highlight RAD/Enclosure/DSM.
4. The **Calibrator Definition** is not applicable.
5. The **Zero Calibration Setting** should not be modified unless otherwise specified by a Scanivalve representative.
6. Set the **Control Pressure Dwell Time** in seconds. 10-15 seconds is recommended for most tests unless the control pressure lines are very long. In this situation, we set the time for 5 seconds assuming there is only a single module. Control time should be increased with length. 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 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

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 IP Address:

Calibrator Definition:

Browse...

Open Definition Save Definition Close Cancel

NOTE: If manual "muscle" pressure will be applied to place modules into calibration mode before PressCal is started (constant pressure with no switching ability), a blank definition with as few selections as possible can be used in place. Blank definitions are typically all digital outs are set to NC, Command Target is left as RAD/Enclosure/DSM, and Dwell time is 5.

PORT DEFINITIONS

Click Setup > Port to open the Port definition Window. This page determines what pressures will be applied to each enabled port (channel) 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 (.pd) files will be shown.

If the ports must be defined:

1. Enter a **Description**. This example uses "15psiZOC module."
2. Highlight the **Port Type**. For standard ZOC and MPS modules highlight: Differential.
3. Enter the total number of **Calibration Points**. This is the total number of calibration pressures to be applied, including positive, negative, and zero. For ZOC and MPS modules, 7 points are recommended.
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 positive, negative, and zero. For ZOC and MPS modules, 9 points are recommended.
6. Enter the number of number of **Negative Validation** points.
7. Enter the **Full Scale Pressure** range of the module (in PSI only). The ZOC module is 15psi.
8. Enter the **Pass/Fail Tolerance** desired (in % of full scale). For Scanivalve accuracy tolerances, please refer to the modules data sheet or manual and find the desired Full Scale Pressure range.
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:

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

The Negative Calibrator Assignment file will usually be the 15 psi calibrator for any module with a full scale range that is 15psi or higher. All lower ranges will use the same calibrator as the positive.

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

10. Enter the Calibration Pressures (**Pos Cal/Neg Cal**). Pressure Point 1 is the lowest Negative point. Pressure Point 9 is the highest Positive point. Recommended Calibration pressures for different pressure ranges can be found in "Appendix B: Recommended Calibration Pressures."

Repeat this for the Validation Pressure (**Pos Val/Neg Val**). Remember that the Calibration and Validation are different processes and typically use different points. Pressure point 1 is the lowest Negative point. Pressure point 9 is the highest positive point. Recommended Validation pressures for all standard range modules may be found in "Appendix A: Recommended As Received/Validation Pressures."

NOTE: 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.

Remember: Port definitions are created for each channel/sensor/port. If you have a dual range module, a port definition must be made for each range in the module. Port definitions are assigned to a module channels in the Module Definition.

	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	

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 (.md) files will be shown.

If the module must be defined:

1. Enter a **Description**. This example uses “15psi ZOC module connected to a DSM.”
2. Enter the **Module Type**. This can be any value that describes the module e.g., ZOC33.
3. Highlight the **Number of Ports**. The number of ports shown in the window will be automatically adjusted. This represents the total amount of channels available in the module e.g., ZOC17 = 16, ZOC22 = 32, MPS4164/ZOC33 = 64.
4. Insert 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 click and hold 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 (do not double click on the file). This file name will be entered in each box.
 - D. Repeat for all applicable channels.
5. Select a Calibration Temperature (**Number of Temps**) range associated with the individual module. Example modules are listed to the right of the selection, however a more accurate, updated table in “Appendix C: Standard Temperature Planes” is available and should be referenced prior to this selection. This table will provide the typical temperature range of all modules that can be calibrated with PressCal. Please choose the range that most accurately reflects your pressure scanner.
6. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

Description: 15psi ZOC module connected to a DSM

Module Type: ZOC33

Number of Ports: 64

Number of Temps: 0 to 59 Temperatures (DSA3017, DSA3018, DSA3007, DSA3027, DSA3307)

Port	Port Definition
P1	Port_15psi_Z
P3	Port_15psi_Z
P5	Port_15psi_Z
P7	Port_15psi_Z
P9	Port_15psi_Z
P11	Port_15psi_Z
P13	Port_15psi_Z
P15	Port_15psi_Z
P17	Port_15psi_Z
P19	Port_15psi_Z
P21	Port_15psi_Z
P23	Port_15psi_Z
P25	Port_15psi_Z
P27	Port_15psi_Z
P29	Port_15psi_Z
P31	Port_15psi_Z
P33	Port_15psi_Z
P35	Port_15psi_Z
P37	Port_15psi_Z
P39	Port_15psi_Z
P41	Port_15psi_Z
P43	Port_15psi_Z
P45	Port_15psi_Z
P47	Port_15psi_Z
P49	Port_15psi_Z
P51	Port_15psi_Z
P53	Port_15psi_Z
P55	Port_15psi_Z
P57	Port_15psi_Z
P59	Port_15psi_Z
P61	Port_15psi_Z
P63	Port_15psi_Z

Buttons: Open Definition, Save Definition, Close, Cancel

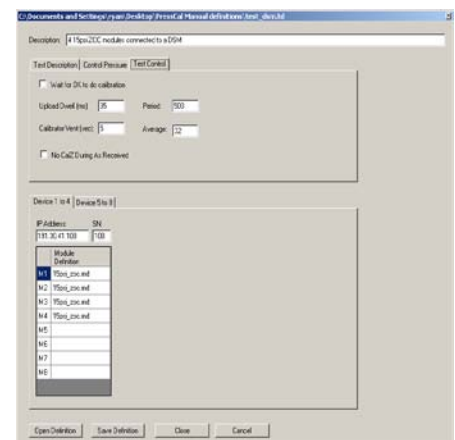
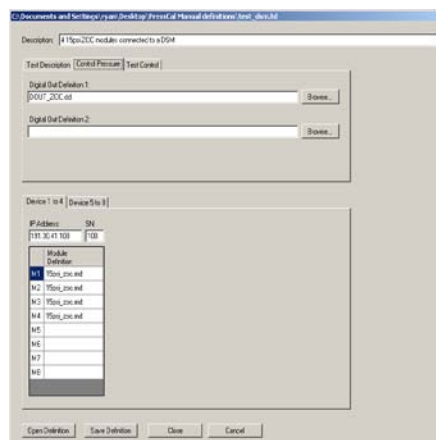
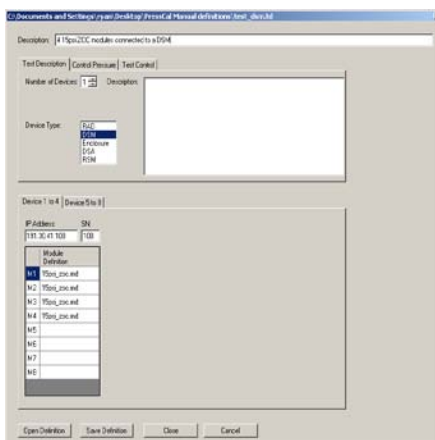
TEST DEFINITIONS

Click Setup, Test to open the Test Definition Window. This page determines which Digital Output and Module Definition files will be used for the complete test. The address(es) of the module(s) will be defined as well as test dwell, scan rates, and delay times. The Test Definition includes 3 tabs for these configurations.

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 (.td) 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 devices at one time. Each must have a unique IP address. Devices references DSA, DSM, RAD, or ENCL modules and does not relate to the number of analog pressure scanners (ZOC and MPS). One DSM device is connected in this case.
4. Highlight the **Device Type** DSM. The module section will update to provide 8 positions for the DSM.
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. In this case, we have connected 4x ZOC33 15psi modules to the DSM.
6. Enter the **IP Address** and **Serial Number** of the DSM in the respective windows (no ZOC or MPS serial numbers).
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** is the line delay when coefficients are uploaded to the devices. This should be left with a value around 30ms unless there is problems uploading coefficients to legacy DSM modules.
12. **Calibrator Vent** is the total time PressCal will wait after a the "vent" command is sent to the calibrator. It is recommended to be set at 5 seconds, but can be increased if CAL, REF, Static or Vent 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 **No CALZ During As Received** box. This is not typically not recommended.
14. It is recommended that **Period** be set to 500.
15. It is recommended that **Average** be set to 32 or 64. 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.



ZOC17/22/23/33 OR MPS4164 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 in the selected directory. Navigate to the desired directory then highlight the file to be used and click: Open. Only Calibrator Definition (.cd) files will be shown. This definition will include an SPC4000 with a 15psi transducer and a 15psi ZOC33 connected to a DSM.

If the calibrator must be defined:

1. Enter a **Description**. This example has used "15PSI SPC4000 Calibrator."
2. Set the **Calibrator Type** to Automatic Gauge (SPC4000). Other options are:
 - Automatic Gauge/Differential (SPC3000)** - This should be selected if the calibrator is a SPC3000 using a Digiquartz 202VG as the Secondary Standard.
 - Automatic Absolute (SPC3000)** - Select this option for all other SPC3000 Calibrators.
 - Manual Gauge** - Select this option for any non-Scanivalve Gauge type pressure standard.
 - Manual Absolute** - Select this option for any non-Scanivalve Absolute type pressure standard.
 - Automatic Gauge (SPC4000/SPC4050)** - Select this option if the calibrator being used is a SPC4000 or SPC4050
 - Automatic Absolute (SPC4000/SPC4050)** - Select this option if the calibrator being used is an SPC4000 or SPC4050 with an Absolute type pressure standard.
3. Set the **Calibrators Address** - in this example, the 15psi transducer is in address 2 of the SPC.
4. Set the **Nominal Pressure Range**. Highlight the full scale pressure range of the pressure standard being used - 15psi.
5. Set the **Max Module Pressure**. This is the full scale value of the sensors in the ZOC33 - 15psi. This value will be used during the validation calculations to determine the full scale errors of the sensors.
6. Set the **Communication Type** to Network as the example is an SPC4000. Other options include:
 - Serial** - Select this if the Automatic Calibrator is an SPC3000 controlled by an enclosure, a DSM, or a direct serial connection. A SPC4000 or SPC4050 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 or SPC4050 communicating via Ethernet connection. The IP address and Network port must be defined (shown).
7. If Calibrator Type is Automatic, the action of the calibrator must be defined.
 - Set the **Dwell Time in seconds** - This is the time delay to allow the calibration pressure to stabilize. A dwell time of 0 can be input if using an SPC4000 or SPC4050 calibrator to query the calibrator for stable. Otherwise a manual time around 30 seconds is acceptable.
 - 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 only be checked when using an SPC3000 at 5psi Full Scale and lower.

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

The screenshot shows the "15PSI SPC4000 Calibration" window. The "Description" field contains "15PSI SPC4000 Calibration". Under "Characteristics", the "Calibrator Type" is set to "Automatic Gauge (SPC4000)". The "Calibrator Address" is set to "2". The "Nominal Pressure Range" is set to "15" and the "Max Module Pressure" is set to "15". Under "Communication", the "Communication Type" is set to "Network". The "Network IP Address" is set to "191.30.40.101" and the "Network Port" is set to "1025". Under "Action", the "Dwell Time in Seconds" is set to "30" and the "Stability Percentage" is set to "0.02". The "Trap Pressure" checkbox is unchecked. 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 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 (.dd) Files will be shown.

If the Digital Outputs must be defined:

1. Enter a **Description**. This example uses "DOUTS for a ZOC module connected to a RAD"
2. Click the radio buttons for the **Digital Outputs** used for a ZOC module that will switch the control pressures.
 Digital Outputs 1 through 5 are generally used by DSM and ERAD systems, in conjunction with a DSMCPM, MSCP, or other external solenoids. DOUTs 1 - 3 are typically used on ZOC33 modules.
 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" for more information.

3. Highlight the **Command Target** for the Digital Output control signals. For a RAD, highlight RAD/Enclosure/DSM.
4. The **Calibrator Definition** is not applicable.
5. The **Zero Calibration Setting** should not be modified unless otherwise specified by a Scanivalve representative.
6. Set the **Control Pressure Dwell Time** in seconds. 10-15 seconds is recommended for most tests unless the control pressure lines are very long. In this situation, we set the time for 5 seconds assuming there is only a single module. Control time should be increased with length. 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.

NOTE: If manual "muscle" pressure will be applied to place modules into calibration mode before PressCal is started (constant pressure with no switching ability), a blank definition with as few selections as possible can be used in place. Blank definitions are typically all digital outs are set to NC, Command Target is left as RAD/Enclosure/DSM, and Dwell time is 5.

PORT DEFINITIONS

Click Setup > Port to open the Port definition Window. This page determines what pressures will be applied to each enabled port (channel) 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 (.pd) files will be shown.

If the ports must be defined:

1. Enter a **Description**. This example uses "15psiZOC module."
2. Highlight the **Port Type**. For standard ZOC and MPS modules highlight: Differential.
3. Enter the total number of **Calibration Points**. This is the total number of calibration pressures to be applied, including positive, negative, and zero. For ZOC and MPS modules, 7 points are recommended.
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 positive, negative, and zero. For ZOC and MPS modules, 9 points are recommended.
6. Enter the number of number of **Negative Validation** points.
7. Enter the **Full Scale Pressure** range of the module (in PSI only). The ZOC module is 15psi.
8. Enter the **Pass/Fail Tolerance** desired (in % of full scale). For Scanivalve accuracy tolerances, please refer to the modules data sheet or manual and find the desired Full Scale Pressure range.
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:

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

The Negative Calibrator Assignment file will usually be the 15 psi calibrator for any module with a full scale range that is 15psi or higher. All lower ranges will use the same calibrator as the positive.

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

10. Enter the Calibration Pressures (**Pos Cal/Neg Cal**). Pressure Point 1 is the lowest Negative point. Pressure Point 9 is the highest Positive point. Recommended Calibration pressures for different pressure ranges can be found in "Appendix B: Recommended Calibration Pressures."

Repeat this for the Validation Pressure (**Pos Val/Neg Val**). Remember that the Calibration and Validation are different processes and typically use different points. Pressure point 1 is the lowest Negative point. Pressure point 9 is the highest positive point. Recommended Validation pressures for all standard range modules may be found in "Appendix A: Recommended As Received/ Validation Pressures."

NOTE: If the recommended calibration points do not yield acceptable calibration results, contact Scanivalve for additional recommendations.

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

Remember: Port definitions are created for each channel/sensor/port. If you have a dual range module, a port definition must be made for each range in the module. Port definitions are assigned to a module channels in the Module Definition.

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 (.md) files will be shown.

If the module must be defined:

1. Enter a **Description**. This is for reference only.
2. Enter the **Module Type**. This can be any value that describes the module e.g., ZOC33.
3. Highlight the **Number of Ports**. The number of ports shown in the window will be automatically adjusted. This represents the total amount of channels available in the module e.g., ZOC17 = 16, ZOC22 = 32, MPS4164/ZOC33 = 64.
4. Insert 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 click and hold 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 (do not double click on the file). This file name will be entered in each box.
 - D. Repeat for all applicable channels.
5. Select a Calibration Temperature (**Number of Temps**) range associated with the individual module. Example modules are listed to the right of the selection, however a more accurate, updated table in "Appendix C: Standard Temperature Planes" is available and should be referenced prior to this selection. This table will provide the typical temperature range of all modules that can be calibrated with PressCal. Please choose the range that most accurately reflects your pressure scanner.
6. When the definitions are complete, save the definition file. Click the Save Definition button. Name the file and click: Save.

Description: 15psiZOC module connected to a RAD

Module Type: ZOC33 Number of Ports: 64 Number of Temps: 0 to 59 Temperatures

0 to 72 Temperatures (DSA3217, DSA3218)
 0 to 65 Temperatures (ZOC22, ZOC23, ZOC33, ZOC17, DSA3016)
 0 to 59 Temperatures (DSA3017, DSA3018, DSA3007, DSA3207, DSA3307)

Odd Port Definition	Even Port Definition	Port
P1	Port_15psi_ZOC	P2
P3	Port_15psi_ZOC	P4
P5	Port_15psi_ZOC	P6
P7	Port_15psi_ZOC	P8
P9	Port_15psi_ZOC	P10
P11	Port_15psi_ZOC	P12
P13	Port_15psi_ZOC	P14
P15	Port_15psi_ZOC	P16
P17	Port_15psi_ZOC	P18
P19	Port_15psi_ZOC	P20
P21	Port_15psi_ZOC	P22
P23	Port_15psi_ZOC	P24
P25	Port_15psi_ZOC	P26
P27	Port_15psi_ZOC	P28
P29	Port_15psi_ZOC	P30
P31	Port_15psi_ZOC	P32

Odd Port Definition	Even Port Definition	Port
P33	Port_15psi_Z	P34
P35	Port_15psi_Z	P36
P37	Port_15psi_Z	P38
P39	Port_15psi_Z	P40
P41	Port_15psi_Z	P42
P43	Port_15psi_Z	P44
P45	Port_15psi_Z	P46
P47	Port_15psi_Z	P48
P49	Port_15psi_Z	P50
P51	Port_15psi_Z	P52
P53	Port_15psi_Z	P54
P55	Port_15psi_Z	P56
P57	Port_15psi_Z	P58
P59	Port_15psi_Z	P60
P61	Port_15psi_Z	P62
P63	Port_15psi_Z	P64

Open Definition Save Definition Close Cancel

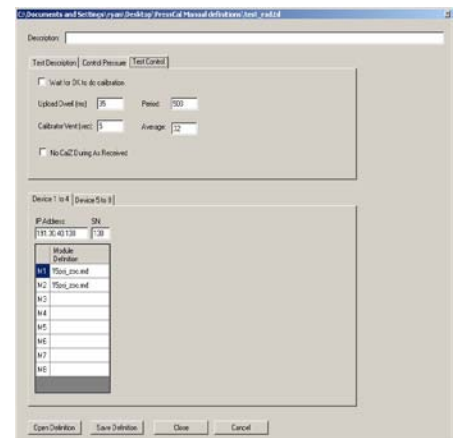
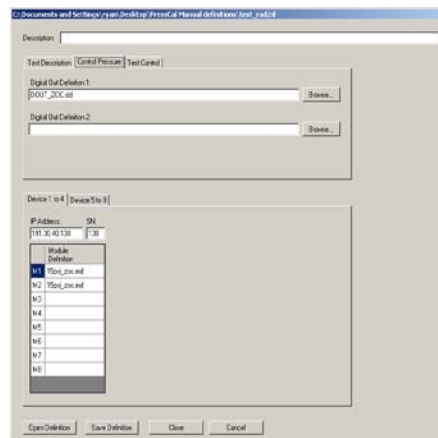
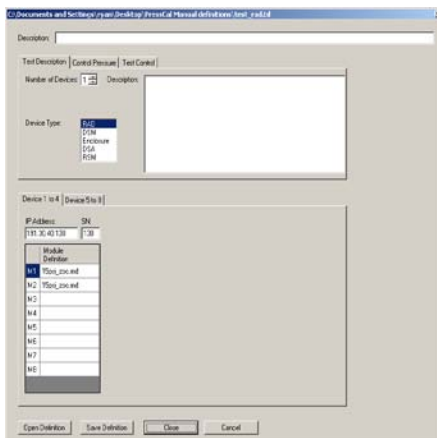
TEST DEFINITIONS

Click Setup, Test to open the Test Definition Window. This page determines which Digital Output and Module Definition files will be used for the complete test. The address(es) of the module(s) will be defined as well as test dwell, scan rates, and delay times. The Test Definition includes 3 tabs for these configurations.

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 (.td) 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 devices at one time. Each must have a unique IP address. Devices references DSA, DSM, RAD, or ENCL modules and does not relate to the number of analog pressure scanners (ZOC and MPS). One RAD device is connected in this case.
4. Highlight the **Device Type** DSM. The module section will update to provide 8 positions for the DSM.
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. In this case, we have connected 2x ZOC33 15psi modules to the DSM.
6. Enter the **IP Address** and **Serial Number** of the DSM in the respective windows (no ZOC or MPS serial numbers).
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** is the line delay when coefficients are uploaded to the devices. This should be left with a value around 30ms unless there is problems uploading coefficients to legacy DSM modules.
12. **Calibrator Vent** is the total time PressCal will wait after a the "vent" command is sent to the calibrator. It is recommended to be set at 5 seconds, but can be increased if CAL, REF, Static or Vent 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 **No CALZ During As Received** box. This is not typically not recommended.
14. It is recommended that **Period** be set to 500.
15. It is recommended that **Average** be set to 32 or 64. 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 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.

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.

Description: DSA3200 manual calibration

Digital Out Settings

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

Note: NC - No Change

Zero Calibration Setting

☐ Use Special Setting

Setting (hex):

Control Dwell Time

1 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. 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	

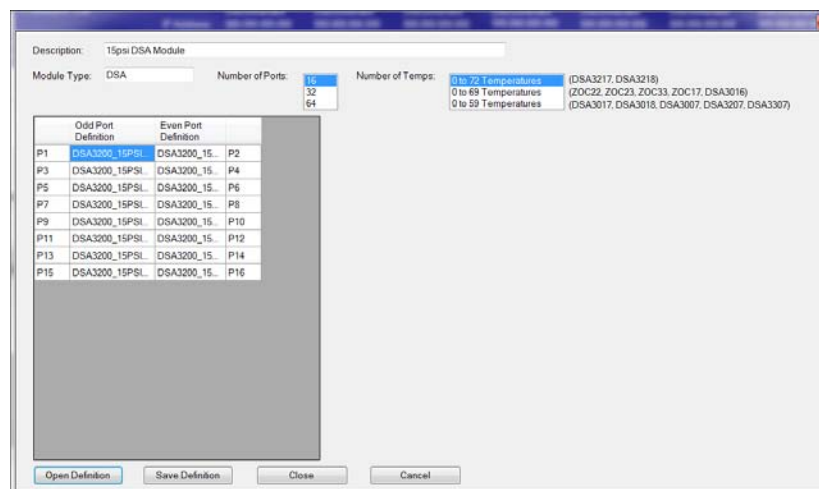
[Open Definition] [Save Definition] [Close] [Cancel]

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 e.g., DSA3217.
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.

Test Definition Window - Test Description Tab

Test Description: [Empty field]

Number of Devices: 1

Device Type: DSA3200

Module Definition List:

Module	Definition
M1	15psi_dsa3200

Buttons: Open Definition, Save Definition, Close, Cancel

Test Definition Window - Control Pressure Tab

Digital Out Definition 1: [Browse]

Digital Out Definition 2: [Browse]

Device 1 tab active

IP Address: 192.168.1.100

SN: 100

Buttons: Open Definition, Save Definition, Close, Cancel

Test Definition Window - Test Control Tab

Wait for OK to do calibration: [Checked]

Upload Dwell (ms): 35

Period: 500

Calibrator Vent (sec): 5

Average: 32

No CALZ During As Received: [Checked]

Device 1 tab active

IP Address: 192.168.1.100

SN: 100

Buttons: Open Definition, Save Definition, Close, Cancel

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.

Description: Manual 15psi Calibrator

Characteristics

Calibrator Type: Automatic Gauge / Differential (SPC3000)
Automatic Absolute (SPC3000)
Manual Gauge
Manual Absolute
Automatic Gauge (SPC4000)
Automatic Absolute (SPC4000)

Calibrator Address: 0

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

Max Module Pressure: 15

Communication

Communication Type: Serial Device
Network

Serial Comm Port:

Device IP Address:

Network IP Address: 191.30.40.101

Network Port: 1025

Action

Dwell Time in Seconds:

Stability Percentage:

☐ Trap Pressure

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
 Calibrator

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 DSA manual calibration

Characteristics

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

Calibration Points: 5 (spin box)

Negative Calibration Points: 2 (spin box)

Validation Points: 9 (spin box)

Negative Validation Points: 4 (spin box)

Full Scale Pressure: 15

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

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		-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.

Description: DSA3016 - 15psi - FieldCal

Module Type: DSA3016

Number of Ports: 16 (32, 64)

Number of Temps: 0 to 72 Temperatures (DSA3217, DSA3218), 0 to 50 Temperatures (ZOC22, ZOC23, ZOC33, ZOC17, DSA3016), 0 to 50 Temperatures (DSA3017, DSA3018, DSA3007, DSA3207, DSA3307)

Port	Odd Port Definition	Even Port Definition
P1	3016_FC_15psi.pd	3016_FC_15p..
P3	3016_FC_15psi.pd	3016_FC_15p..
P5	3016_FC_15psi.pd	3016_FC_15p..
P7	3016_FC_15psi.pd	3016_FC_15p..
P9	3016_FC_15psi.pd	3016_FC_15p..
P11	3016_FC_15psi.pd	3016_FC_15p..
P13	3016_FC_15psi.pd	3016_FC_15p..
P15	3016_FC_15psi.pd	3016_FC_15p..
P2		
P4		
P6		
P8		
P10		
P12		
P14		
P16		

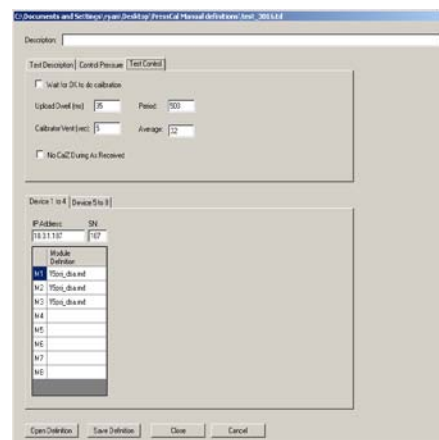
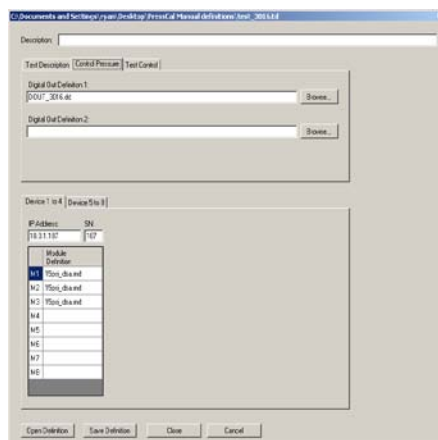
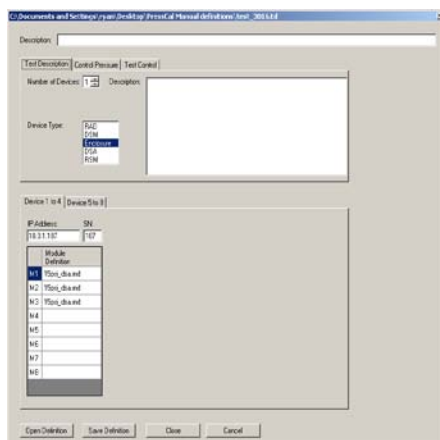
Buttons: Open Definition, Save Definition, Close, Cancel

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.' This is generally 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 definition is completed, save the definition file. Click the Save Definition button. Name the file and click: Save.



ZOC17/22/23/33 OR MPS4164 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..

Description: Manual 15psi Calibrator

Characteristics

Calibrator Type: Automatic Gauge / Differential (SPC3000)
Automatic Absolute (SPC3000)
Manual Gauge
Manual Absolute
Automatic Gauge (SPC4000)
Automatic Absolute (SPC4000)

Calibrator Address: 0

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

Max Module Pressure: 15

Action

Dwell Time in Seconds:

Stability Percentage:

☐ Trap Pressure

Communication

Communication Type: Serial Device
Network

Serial Comm Port:

Device IP Address:

Network IP Address: 191.30.40.101

Network Port: 1025

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 type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	1	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
2	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	2	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
3	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	3	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
4	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	4	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
5	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	5	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
6	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	6	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
7	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	7	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
8	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	8	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
9	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	9	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
10	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	10	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
11	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	11	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
12	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	12	<input type="radio"/>	<input checked="" type="radio"/>	<input 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 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 ZOC and MPS 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 7 points for the calibration of ZOC and MPS modules.
4. Enter the number of negative calibration points. 3 is recommended for the calibration of 15 psi ZOC and MPS 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 the validation of 15 psi ZOC and MPS modules.
6. Enter the number of negative validation points. Four is recommended for the validation of 15 psi ZOC and MPS 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
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\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		-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.

The screenshot shows the 'Module Definition' window for a '15psiZOC module connected to a RAD'. The 'Module Type' is set to 'ZOC33'. The 'Number of Ports' is set to 64, and the 'Number of Temps' is set to '0 to 59 Temperatures'. The window displays two columns of port definitions, 'Odd Port Definition' and 'Even Port Definition', each with a list of ports from P1 to P32. The 'Port Definition' column for each port is currently empty. At the bottom, there are buttons for 'Open Definition', 'Save Definition', 'Close', and 'Cancel'.

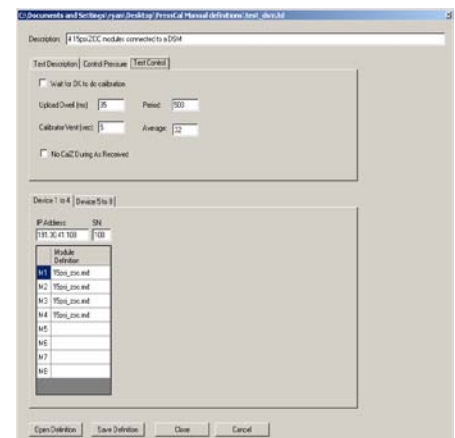
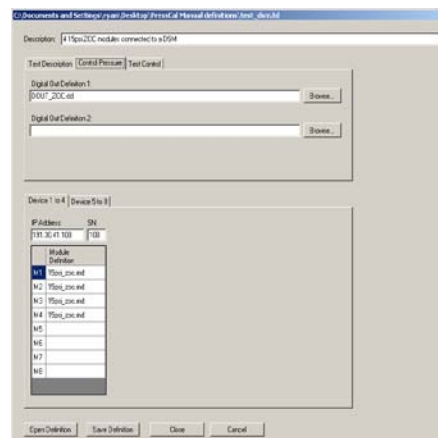
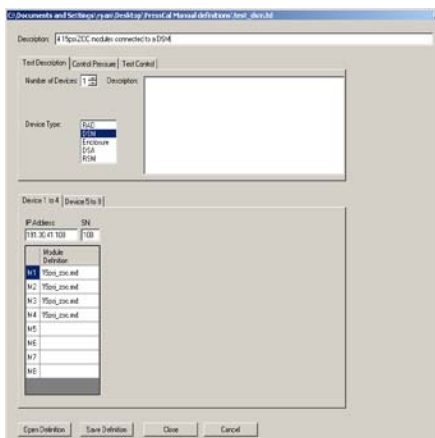
Port	Port Definition
P1	
P2	
P3	
P4	
P5	
P6	
P7	
P8	
P9	
P10	
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	
P21	
P22	
P23	
P24	
P25	
P26	
P27	
P28	
P29	
P30	
P31	
P32	

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 OR MPS4164 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.

Description: Manual 15psi 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

Communication

Communication Type:

- Serial Device
- Network

Serial Comm Port:

Device IP Address:

Network IP Address: 191.30.40.101

Network Port: 1025

Action

Dwell Time in Seconds:

Stability Percentage:

☐ Trap Pressure

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 ZOC and MPS 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 7 points for the calibration of 15 psi ZOC or MPS modules.
4. Enter the number of negative calibration points. 3 is recommended for the calibration of 15 psi ZOC or MPS 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 the validation of 15 psi ZOC or MPS modules.
6. Enter the number of negative validation points. Four is recommended for the validation of 15 psi ZOC or MPS 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 9 is the highest Positive point. Repeat for all validation points. **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**
 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\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		-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	

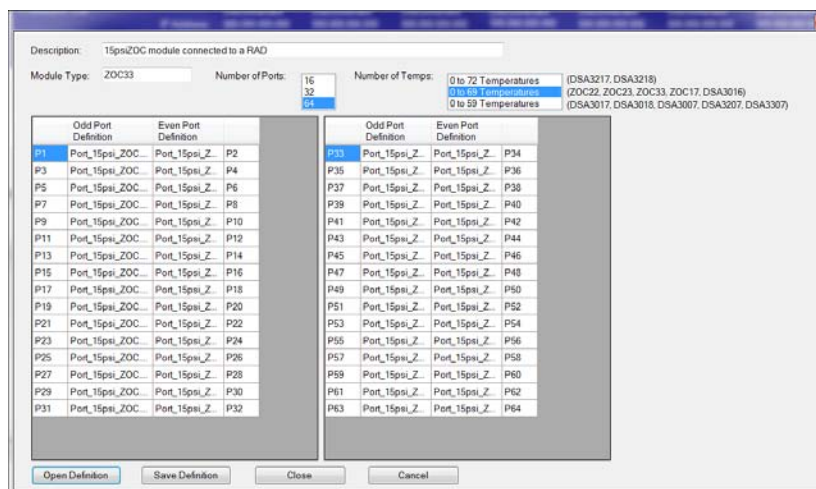
[Open Definition] [Save Definition] [Close] [Cancel]

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.

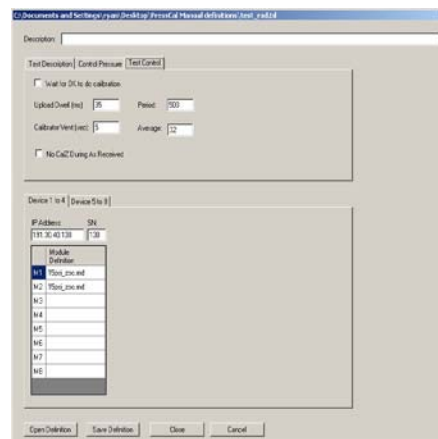
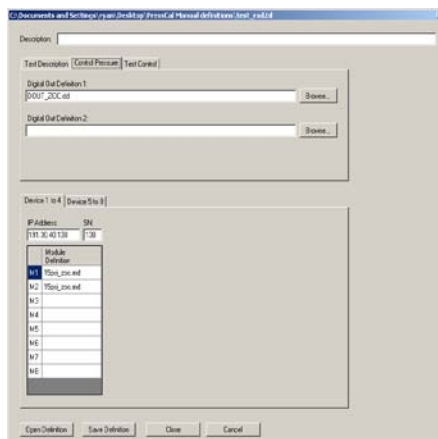
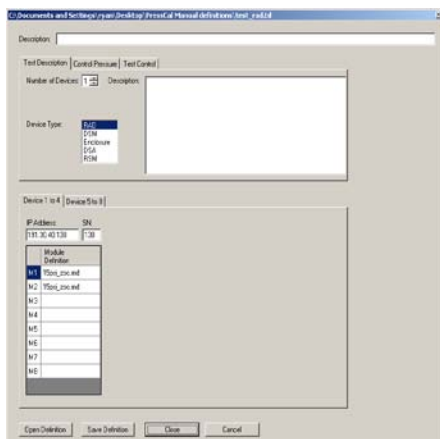


TEST DEFINITIONS

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. 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.' This is generally 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 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)
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

Calibrator Address: 1

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 (right photo) as well as a setup for ZOC17, DSA3217, or DSA3218 is shown below (left photo).

Description: ENETCPM config for DSA3217, 3218 or ZOC17

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: 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: 191.30.xxx.yyy

Calibrator Definition:

Browse...

Open Definition Save Definition Close Cancel

Description: ENETCPM config for ZOC22/23/33

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: 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: 191.30.xxx.yyy

Calibrator Definition:

Browse...

Open Definition Save Definition Close Cancel

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.

The screenshot shows the 'Digital Output Definition' window for 'ENETCPM configured for ZOC33x2'. The window is divided into several sections:

- Description:** A text field containing 'ENETCPM configured for ZOC33x2'.
- 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'. The 'On' radio button for output 7 is selected. Below the table is a note: 'Note: NC - No Change'.
- Zero Calibration Setting:** A section with a checkbox 'Use Special Setting' (unchecked) and a 'Setting (hex):' text field.
- Control Dwell Time:** A section with a text field containing '5' and the label 'Seconds'.
- Ethernet CPM - Calibrate Mode Commands:** A section with two rows of settings: 'Step 1 Sequence:' and 'Dwell (in seconds):'.
- Ethernet CPM - Calibrate Power Up Mode Commands:** A section with two rows of settings: 'Step 1 Sequence:' and 'Dwell (in seconds):'.
- Command Target Control:** A section with a 'Command Target:' dropdown menu showing 'RAD/Enclosure/DSM', 'Ethernet CPM' (selected), and 'Calibrator'. Below it is a 'Calibrator Definition:' text field and a 'Browse...' button.
- Ethernet CPM IP Address:** A text field.
- Buttons:** At the bottom are four buttons: 'Open Definition', 'Save Definition', 'Close', and 'Cancel'.

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/SPC4050)- Select this option if the calibrator being used is an SPC4000 or SPC4050 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 or SPC4050 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.

Description: 50psia Automatic Calibrator

Characteristics

Calibrator Type: Automatic Gauge / Differential (SPC3000)
 Automatic Absolute (SPC3000)
 Manual Gauge
 Manual Absolute
 Automatic Gauge (SPC4000)
 Automatic Absolute (SPC4000)

Calibrator Address: 1

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

Max Module Pressure: 50

Action

Dwell Time in Seconds: 45

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:

Network Port:

Open Definition Save Definition Close 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.

port_dsa_50psia.pd

Description: 50psia DSA

Characteristics

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

Calibration Points: 4 Negative Calibration Points: 0
 Validation Points: 8 Negative Validation Points: 0

Full Scale Pressure: 50 Tolerance (+/-) % of Full Scale: .1

Calibration Control

Positive Calibrator Assignment: spc4_50psia.cd Browse...

Negative Calibrator Assignment: spc4_50psia.cd Browse...

	Pos Cal	Neg Cal	Pos Val	Neg Val
Pressure Point 1	1		2.5	
Pressure Point 2	5		9.5	
Pressure Point 3	12		16.5	
Pressure Point 4	52		23.5	
Pressure Point 5			30.5	
Pressure Point 6			37.5	
Pressure Point 7			44.5	
Pressure Point 8			51.5	
Pressure Point 9				

Open Definition Save Definition Close Cancel

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.

15psi TrueDiff.pd

Description: 15psi DSA True Differential

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

Calibration Points: 5 Negative Calibration Points: 2

Validation Points: 9 Negative Validation Points: 5

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

Calibration Control

Positive Calibrator Assignment: 15psi_manual_calibrator.od

Negative Calibrator Assignment: 15psi_manual_calibrator.od

	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	

Open Definition Save Definition Close Cancel

TrueDiff Blank.pd

Description: True Differential Blank

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

Calibration Points: 0 Negative Calibration Points: 0

Validation Points: 0 Negative Validation Points: 0

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

Calibration Control

Positive Calibrator Assignment:

Negative Calibrator Assignment:

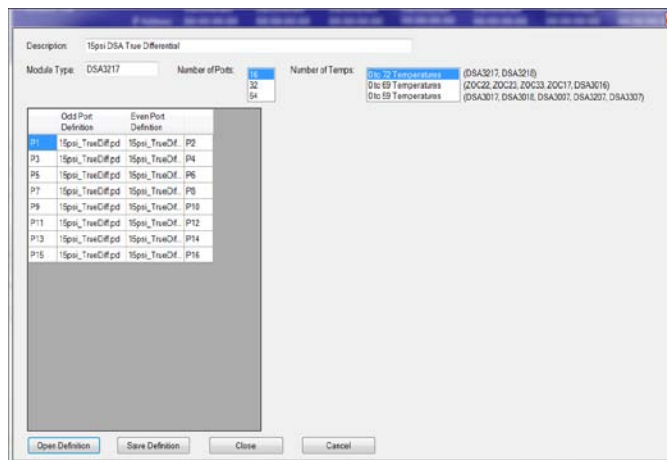
	Pos Cal	Neg Cal	Pos Val	Neg Val
Pressure Point 1				
Pressure Point 2				
Pressure Point 3				
Pressure Point 4				
Pressure Point 5				
Pressure Point 6				
Pressure Point 7				
Pressure Point 8				
Pressure Point 9				

Open Definition Save Definition Close Cancel

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.

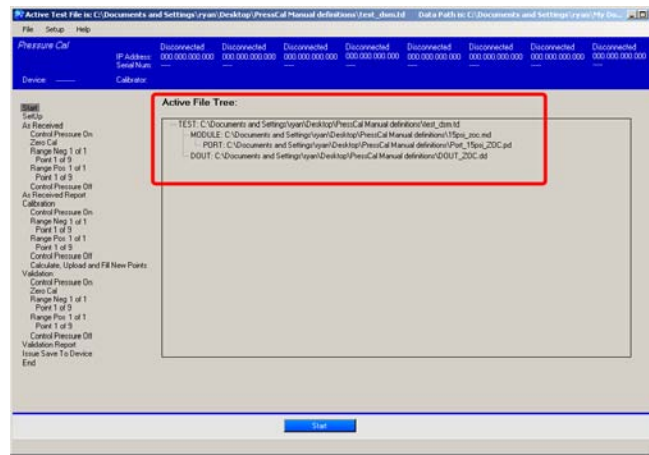


[INTENTIONALLY LEFT BLANK]

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 to seven (5-7) 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 into a single time-stamped folder. The folder is started in saved according to File > Set Base Directory.

Note: The selected base directory should not be the root C:\ drive on a Windows OS as Windows will not always allow write access directly to the C: drive. Please select a folder location that allows for user-write permissions (such as the Desktop or User directories).

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.

Where xxx in the file name will be the serial number of the module.

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 the time-stamped folder. Sample report files can be seen in "Appendix D: Sample "As Received" Report" on page 64 and "Appendix E: Sample "Validation" Report" on page 66.

Additionally, PressCal will create diagnostic files that are useful for troubleshooting. Two of the most useful files are:

Presscal.log

Error.log

These two files can be used to troubleshoot any problems encountered during testing, including Unical errors or program crashes. Presscal.log is a list of every step PressCal took during the test and error.log is a simple error-only list.

If you experience issues with PressCal, please take the last known Time-Stamped folder (with all included files), compress the file into a .ZIP or similar file type and email this folder along with the current used Definition files (Calibrator, Digital Out, Port, Module and Test) to techsupport@scanivalve.com for analysis.

APPENDIX

APPENDIX A: RECOMMENDED AS RECEIVED/VALIDATION PRESSURES

The following table can be used when populating the Validation Pressure Points in the Port definition. The example in this table are created for typical pressure ranges for many Scanivalve Modules including the DSA, MPS, and ZOC family scanners.

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

Full Scale Range	Pressure 1	Pressure 2	Pressure 3	Pressure 4	Pressure 5	Pressure 6	Pressure 7	Pressure 8	Pressure 9
4" H2O	-0.144	-0.110	-0.073	-0.037	0	0.037	0.073	0.110	0.144
5" H2O	-0.18	-0.135	-0.09	-0.045	0	0.045	0.09	0.135	0.18
8" H2O	-0.289	-0.216	-0.145	-0.072	0	0.072	0.145	0.216	0.289
10" H2O	-0.36	-0.27	-0.18	-0.09	0	0.09	0.18	0.27	0.36
20" H2O	-0.72	-0.54	-0.36	-0.18	0	0.18	0.36	0.54	0.72
1 psid	-1.00	-0.75	-0.50	-0.25	0	0.25	0.50	0.75	1.00
2.5 psid	-2.50	-1.87	-1.25	-0.62	0	0.62	1.25	1.87	2.50
5 psid	-5.00	-3.75	-2.50	-1.25	0	1.25	2.50	3.75	5.00
15 psid	-15.0	-11.25	-7.50	-3.75	0	3.75	7.50	11.25	15.0
30 psid	-15.0	-7.50	0	5.00	10.0	15.0	20.0	25.0	30.0
50 psid	-15.0	-7.50	0	8.33	16.7	25.0	33.3	41.7	50.0
100 psid	-15.0	0	20.0	40.0	60.0	80.0	100.0		
250 psid	-15.0	0	50.0	100.0	150.0	200.0	250.0		
500 psid	-15.0	0	100.0	200.0	300.0	400.0	500.0		
750 psid	-15.0	0	150.0	300.0	450.0	600.0	750.0		
850 psid	-15.0	0	170.0	340.0	510.0	680.0	850.0		

APPENDIX B: RECOMMENDED CALIBRATION PRESSURES

The following tables can be used when populating the Calibration Pressure Points in the Port definition. The examples listed here are created for typical pressure ranges for many Scanivalve Modules including the DSA, MPS, and ZOC family scanners. If you have a module with a full scale pressure range not listed, custom points must be created. Do not use a different pressure range example that does not match the module you intend to calibrate. Modules cannot be re-calibrated to a different full-scale range.

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 FIELD-CALIBRATION PRESSURES FOR ZOC/MPS MODULES

Full Scale Range	Pressure 1	Pressure 2	Pressure 3	Pressure 4	Pressure 5	Pressure 6	Pressure 7
4" H2O*	-0.156	-0.104	-0.052	0	0.052	0.104	0.156
5" H2O	-0.182	-0.121	-0.61	0	0.061	0.121	0.182
8" H2O*	-0.3	-0.2	-0.1	0	0.1	0.2	0.3
10" H2O	-0.363	-0.242	-0.121	0	0.121	0.242	0.363
20" H2O	-0.76	-0.506	-0.253	0	0.253	0.506	0.76
1 psid	-1.15	-0.766	-0.383	0	0.383	0.766	1.15
2.5 psid	-2.56	-1.706	-0.853	0	0.853	1.706	2.56
5 psid	-5.09	-3.393	-1.697	0	1.697	3.393	5.09
15 psid	-15.25	-10.166	-5.083	0	5.083	10.166	15.25
30 psid	-15.25	-7.5	0	7.87	15.75	23.62	31.5
50 psid	-15.25	-7.5	0	12.69	25.375	38.065	50.75

* Range only available in MPS4164 modules

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

	All DSA3217-PTP, All DSA3218-PTP, DSA3217/3218 w/ Firmware 1.20+, MPS4164	DSA 3000, DSA3207/3307, DSA3207/3307-PTP	DSA 3200 series w/ Firmware up to 1.19	ZOC 17/22/23/33 (typical)	DSA 3016
Temperatures	0	0	0	5	0
	9	5	5	15	5
	18	15	15	25	15
	27	25	25	30	25
	36	35	35	35	35
	45	45	45	40	45
	54	59	59	45	59
	63		64	55	
	72		69		
Total Number of Temp. Planes	9	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

FAIL: -1.429

Time 12:01 PM

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	CTLSUPPLY*	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	CAL CTL (DOUT 1)	Px CTL (DOUT 2)	PxB CTL (DOUT 3)
Operate	65psi	X	Not Used
Calibrate	X	65psi	
Purge	X	X	
Isolate	65psi	65psi	

ZOC22/23/33/64PxX2 VALVE LOGIC†

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

MPS4164/CPX VALVE LOGIC†

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

* Requires quick-zero jumper and can not be used for Calibrations (only CALZ - Quick-Zero Offsets)

† DOUTs typical when using MSCP or DSMCPM with RAD/DSM

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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

Version 4.08 - Released December 2017

- Added support for the Stable query using an SPC4000 or SPC4050 Calibrator
- Resolved a bug involving Gauge Port definitions
- Added support for ModBUS oven controllers

Version 4.09 - Released September 2020

- Added support for DSA-PTP
- Resolved a bug involving Gauge and Absolute Calibrators
- Added error checking when fields are left blank in definitions
- Changed the CALZ routine on modules to query for STATUS:READY instead of using an definite time
- Updated PressCal to work with .NET Framework 4.0

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
SEPTEMBER 2, 2020**