FLUKE 721 PRESSURE CALIBRATOR COMPASS SETUP

1.0   PURPOSE & SCOPE

This document describes how to create Fluke 721 Pressure Calibrator device under test (DUT), associated Test Definitions and Test Macros using COMPASS for Pressure calibration software for adjustment and calibration of P1 and P2 pressure sensors.

2.0   REQUIREMENTS

The following items are required to implement this setup.

- COMPASS for Pressure Enhanced. This is an advanced DUT setup that requires the enhanced version of COMPASS.
- Fluke 721 Pressure Calibrator
- Fluke 721 Pressure Calibrator serial (RS232) cable.
- PC with available COM port(s).

3.0   DUT SETUP: P1 ADJUST

1. The setup database contains two DUTs. Each DUT has unique output(s) that can be viewed/edited when the applicable DUT is selected. The Fluke 721 [P1] 16 psig DUT will be selected for this example.
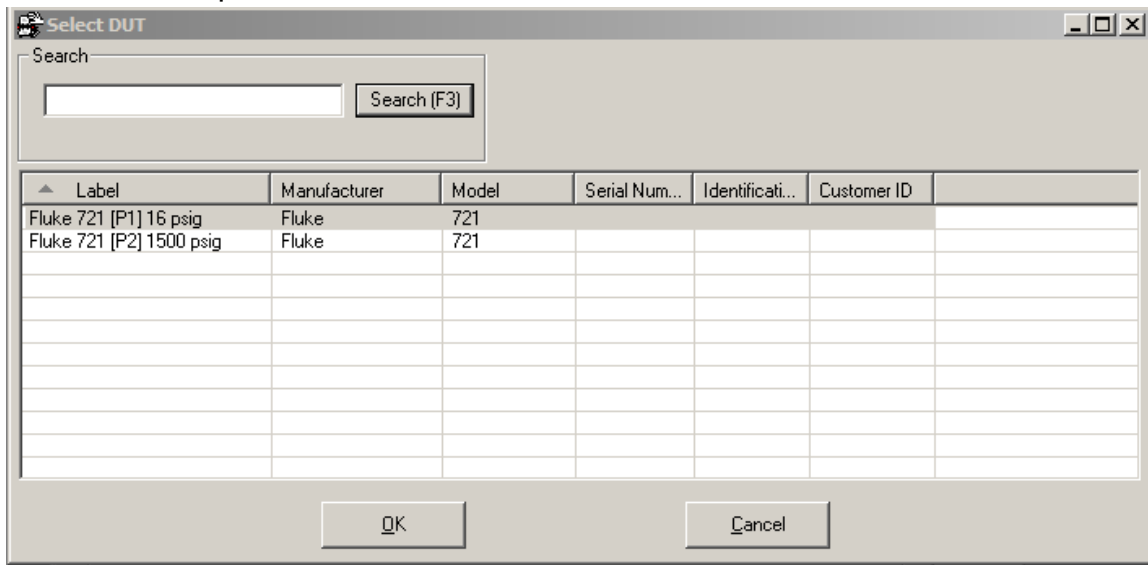

Figure 1. DUTs

2. **Header Tab**: General information about the DUT.
   a. **DUT Type**: This DUT has more than one output.
   b. **Record Type**: DUT is a profile with predefined range, units and resolution.
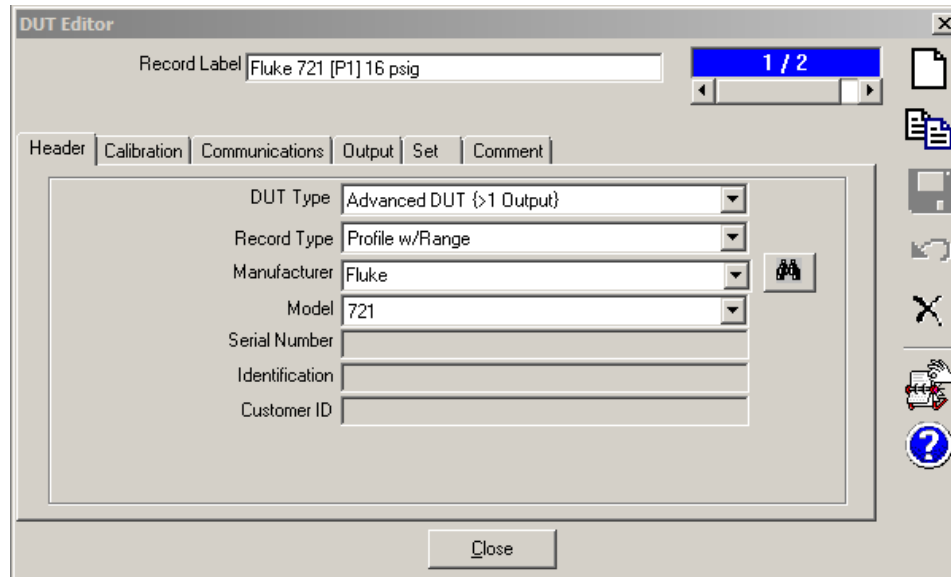   c. **Manufacturer**: Manufacturer of the DUT.

Figure 2. P1 Header Tab

3. **Calibration Tab**:
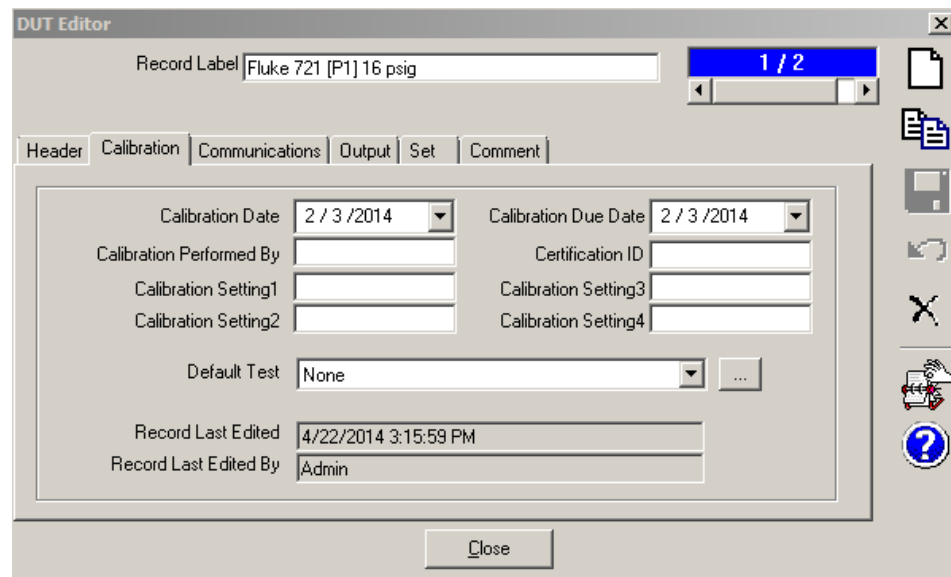   a. Calibration information about the DUT. *NOT APPLICABLE FOR THIS SETUP*

Figure 3. P1 Calibration Tab

4. **Communications Tab**:
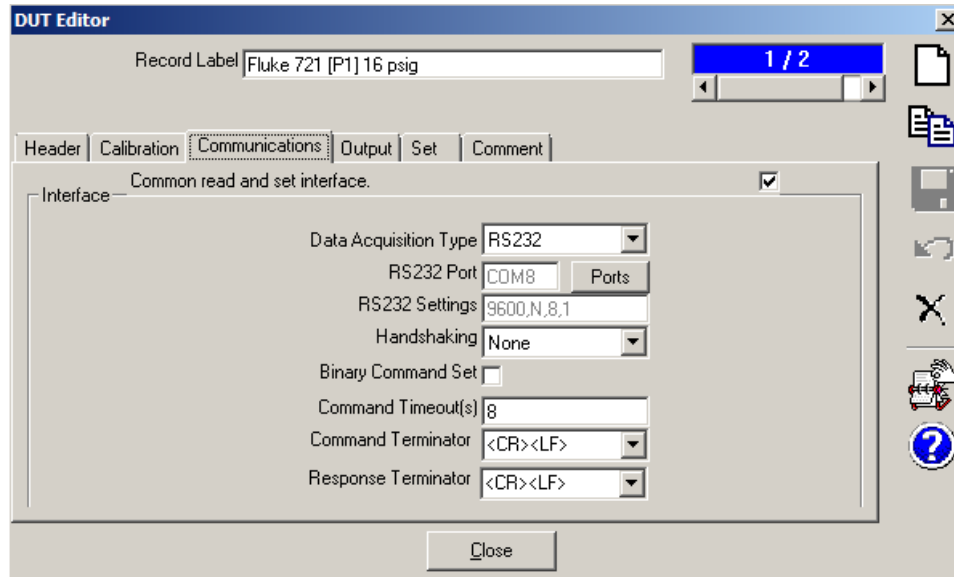   a. RS232 settings for the DUT.

Figure 4. P1 Communications Tab

5. **Output Tab**:

The [P1] 16 psi transducer has three related outputs.

Output 1: "Adjust (psi)" would be the DUT to select when performing the automated OFFSET and GAIN adjust Test Definition. Range: 0 to 16 psig. Specific tolerance based on this output (±0.0125% FS).

Output 2: "Pressure (psi)" would be the DUT to select when performing a calibration (only reading the device). Range: 0 to 16 psig. Specific tolerance based on this output (±0.025% FS).

Output 3: "Vacuum (psi)" would be the DUT to select when performing a calibration (only reading the device). Range: 0 to -14 psig. Specific tolerance based on this output. (±0.004 psi).
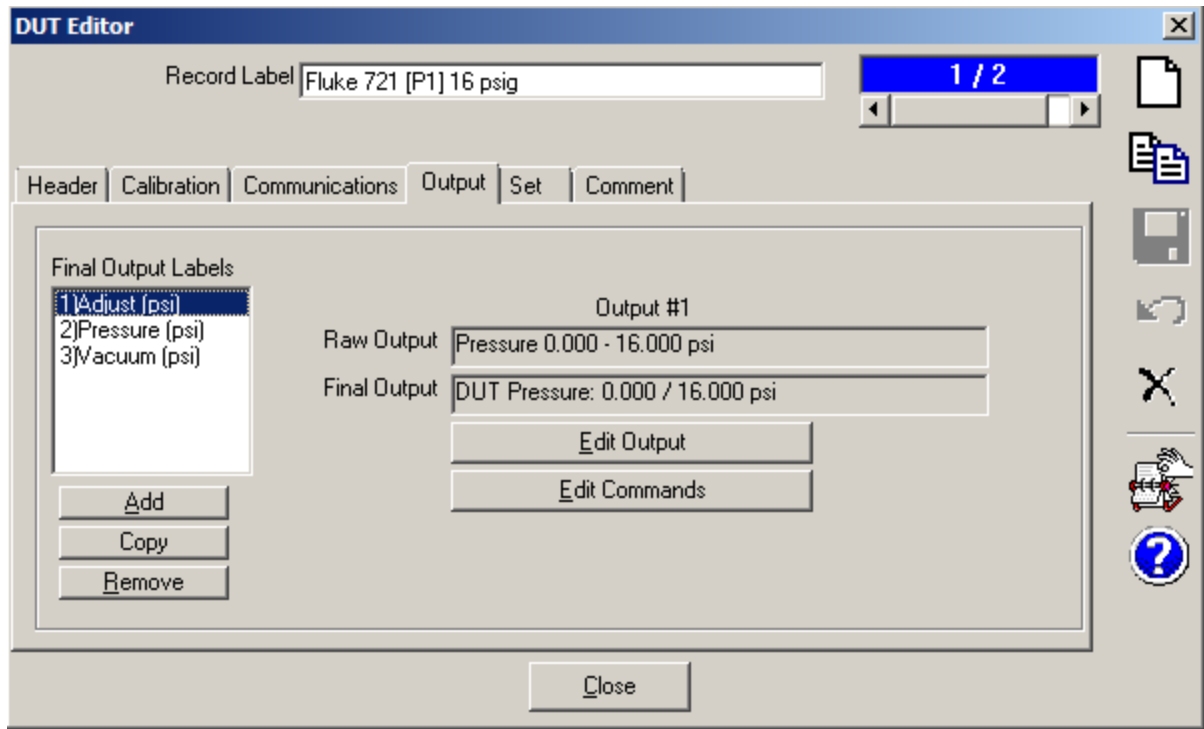
Figure 5. P1 Output Tab

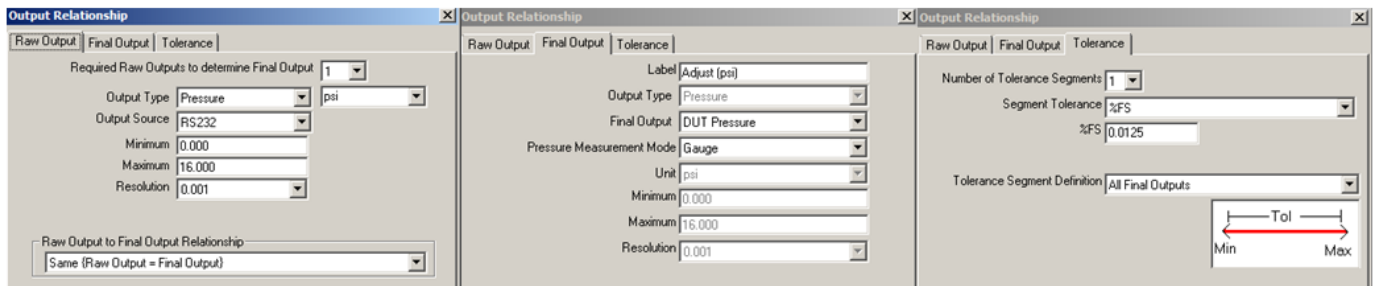6. Adjust (psi) Output (Raw/Final/Tolerance)

Figure 6. P1 Outputs

7. **Adjust (psi)** Remote Commands:
    a. INIT = initialization command. These commands will initialize the 721 in order to properly communicate with the device.
        i. "HC_GASUI_OFF": Enables the full command set.
        ii. "FUNC UPPER, P1": Sets the upper display to indicate P1 pressure sensor.
        iii. "FUNC MIDDLE, P1": Sets the middle display to indicate P1 pressure sensor.
        iv. "FUNC LOWER, P1": Sets the lower display to indicate P1 pressure sensor.
        v. "PRES_UNIT LOWER, PSI": Sets the pressure units to psi.
    b. Read = read or query command. Used to query the output of the applicable 721 function.
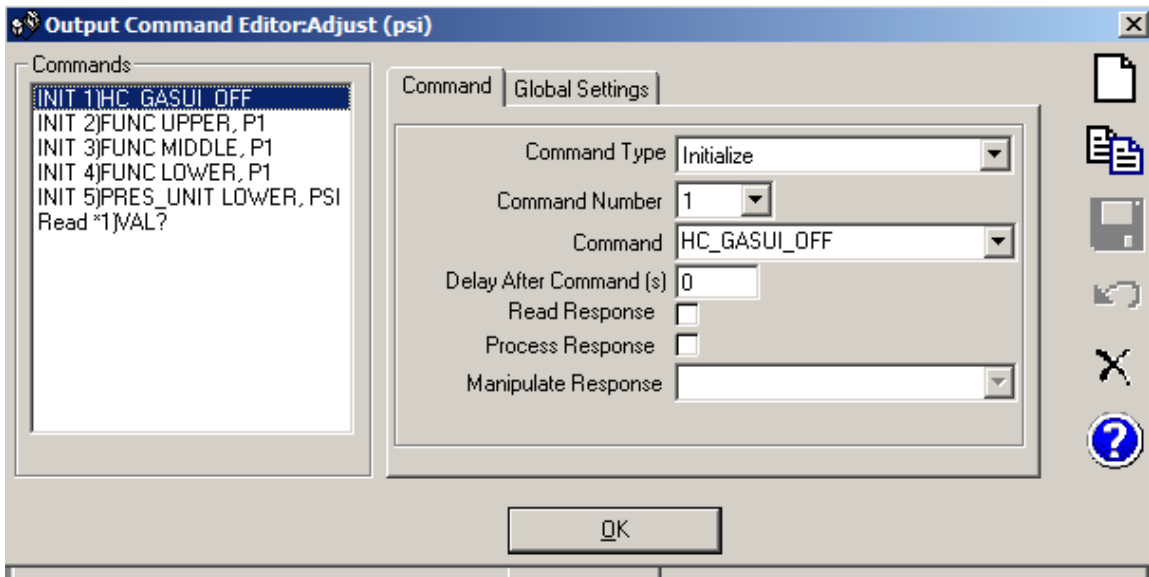   i. "VAL?": Returns the measured value of the applicable function that was setup.

Figure 7. P1 Commands

4.0   TEST DEFINITION SETUP: P1 ADJUST

1. The P1 Adjust Test Definition consists of two pressure points required to set the OFFSET and GAIN.

2. Pre-Test Tab:
    An automated exercise that is built into COMPASS is selected and recommended.

Figure 8. Test Definition: Pre-Test

3. Pressure Tab:
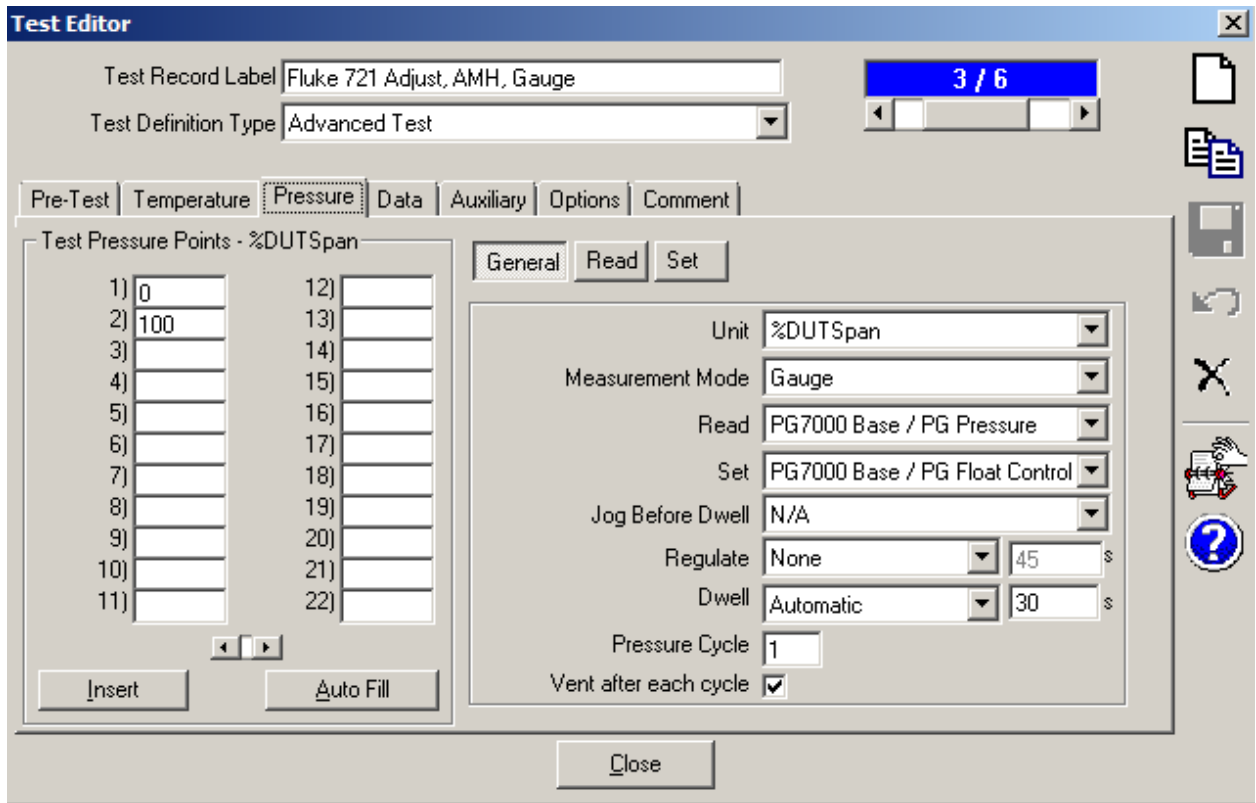   a. Contains the pressure point matrix listed in "% of DUT Span".

Figure 9. Test Definition: Pressure

4. Data Tab:
   a. This Test Definition contains a Test Event Macro and a Post Test Macro.
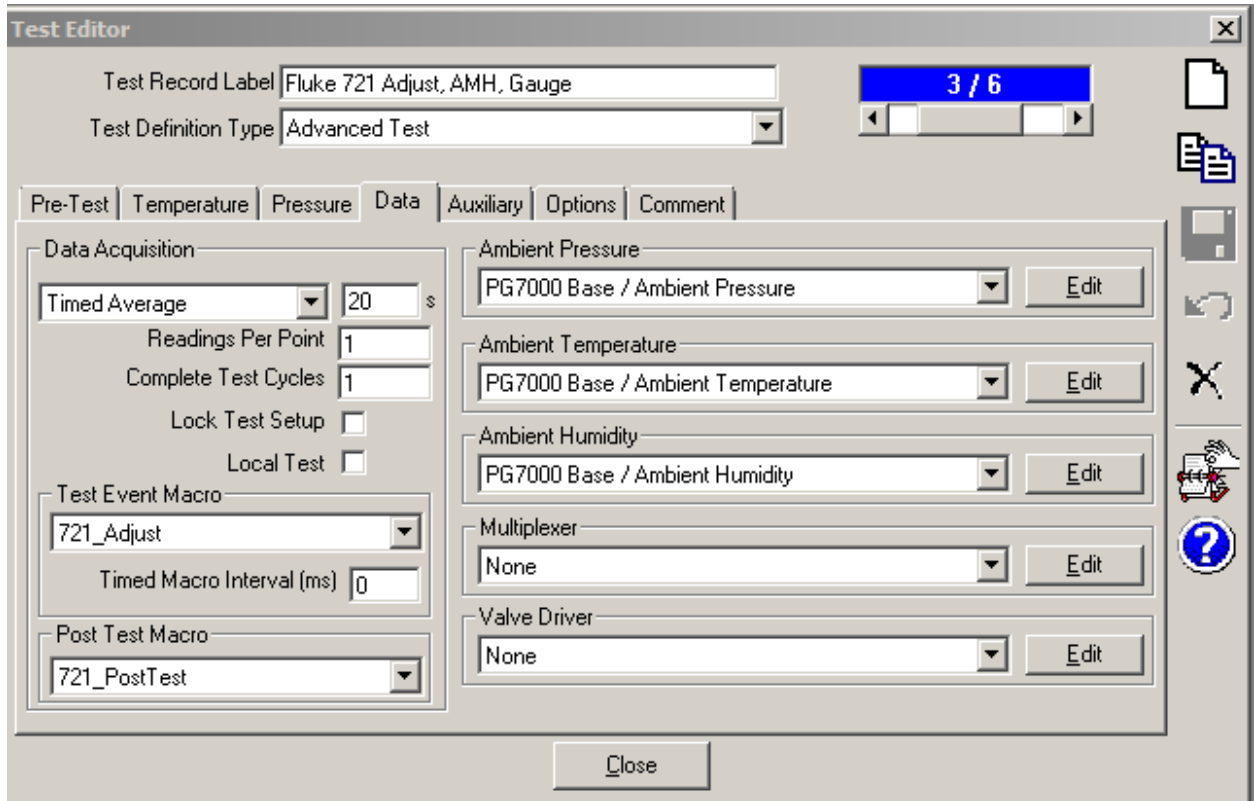
Figure 10. Test Definition: Data

5.0   TEST DEFINITION: CALIBRATION (Fluke 721, AMH, Gauge)

1. The Fluke 721, AMH, Gauge Test Definition consists of the pressure points desired for calibration.

2. In this example, the test definition will perform a calibration from 0% to 100% of DUT span (0 to 16 psi) ascending and descending.
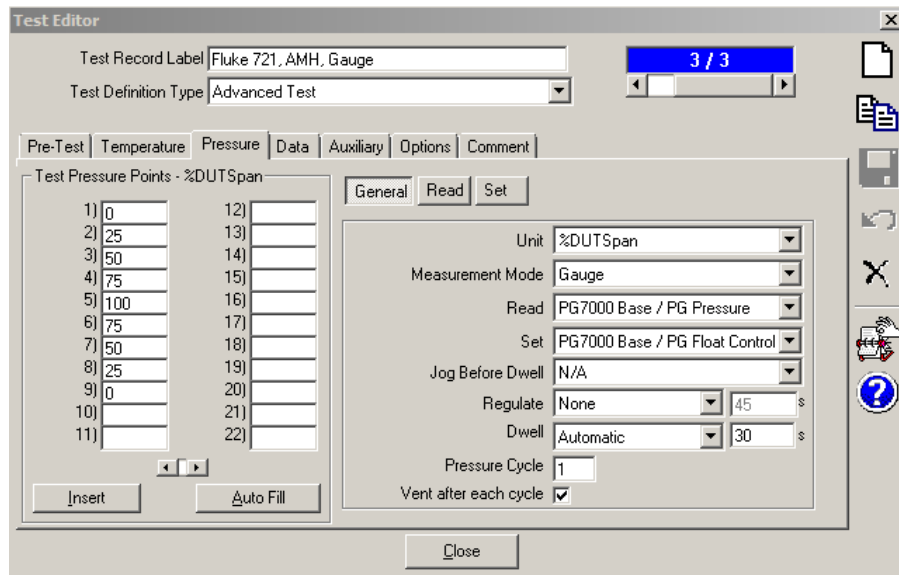
Figure 11. Test Definition Pressure Points

3. The Test Event Macro "721_Zero" is used to zero the 721 at the first test point if the reference pressure is 0.
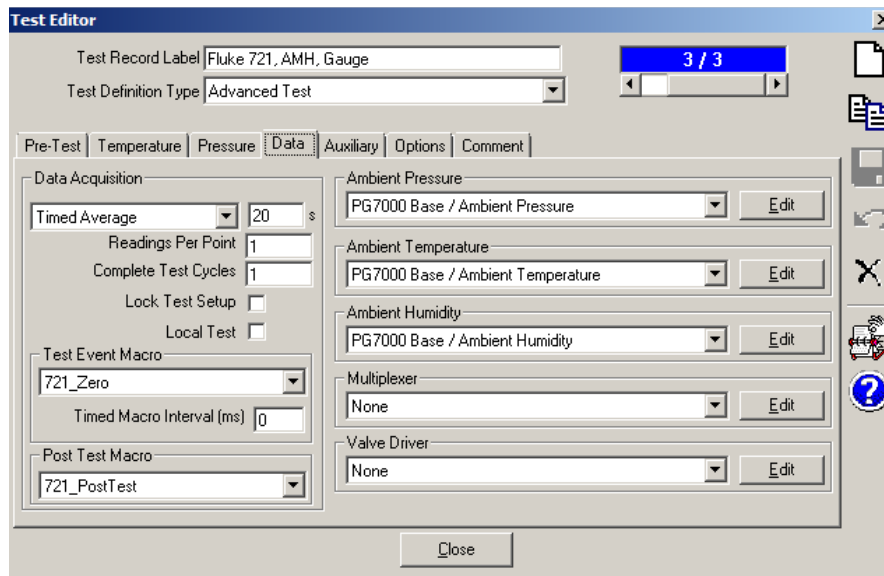
Figure 12. Test Definition Data Tab

6.0   721_Adjust MACRO
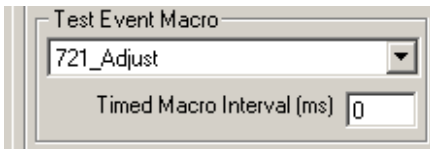

```
Function Adjust721(iT, iL, iC, iP, cTest, cConfig)
'Josh Biggar, 20140416
'This macro only valid w/ a two point test definition w point 1 = 0% and point 2 = 100%.

cmd = ""
      'Query the reference pressure...
      RefPrs = cConfig.RefPrs(1).FinalOutput
      cdebug.LogStatus "Reference Pressure: " & RefPrs

Select Case cCompass.CurrentTestStep

Case 300 ' Set Test Pressure
      If IP = 1 Then


          'reduce dwell time for target 0 point
      dwell = cTest.TestPrsDwellTime 'remember original dwell time
        avg = cTest.AvgTime 'remember original avg time

              cConfig.DUTPrs(1).SetParamData 10,CDbl(dwell)
              cConfig.DUTPrs(1).SetParamData 20,CDbl(avg)

              cTest.TestPrsDwellTime = 5'reduce dwell time
                    cTest.AvgTime = 5'reduce avg time

      End If


Case 310 'Pressure Dwell

      If iP = 1 And cTest.PointP(CInt(ip)).Target = 0 Then
          cmd = "OFFSET_ADJ 0"

      'Added this delay To buffer the surge In pressure When the controller vents.
      StatusDisplay "20s Vent Delay..."
      TimeDelay 20 'Wait for Pressure to settle

      End If


Case 325 'Averaging Is complete and the results are In the Test Data Class but not
written to data file.
      If cTest.PointP(CInt(ip)).Target = 0 Then

                'get and set oriignal dwell time after average
                dwell = cConfig.DUTPrs(1).GetParamData(10)
          avg = cConfig.DUTPrs(1).GetParamData(20)

          cTest.TestPrsDwellTime = dwell
          cTest.AvgTime = avg
      Else
          cmd = "GAIN_ADJ " & RefPrs
      End If

Case 330 'Averaging Is complete and the results are In the Test Data Class and are
written to data file.
      If IP = 2 Then
          cmd = "HC_GASUI_ON" 'Turn ON the "Fluke Interface"
```

```vba
            End If

End Select

With cCompass.cConfig

        For i = 1 To .DUTPrs.Count
                If cmd <> "" Then
                cdebug.LogStatus "Command: " & cmd
                StatusDisplay "Sending Command: " & cmd
                reply = ccompass.cConfig.DUTPrs(i).IoSendCommand(CStr(cmd),True,0)
                cdebug.LogStatus "Reply: " & Reply
                TimeDelay 5
                End If
                        Next
        End With

End Function
```

7.0   721_PostTest MACRO


```
Function PostTest721(iT, iL, iC, iP, cTest, cConfig)
'Josh Biggar, 20140416

cmd = "HC_GASUI_ON" 'Turn ON the "Fluke Interface"

With cCompass.cConfig

    For i = 1 To .DUTPrs.Count

        cdebug.LogStatus "Command: " & cmd
        StatusDisplay "Sending Command: " & cmd
        reply = ccompass.cConfig.DUTPrs(i).IoSendCommand(CStr(cmd),True,0)
        cdebug.LogStatus "Reply: " & Reply
        TimeDelay 5

            Next
    End With

End Function
```
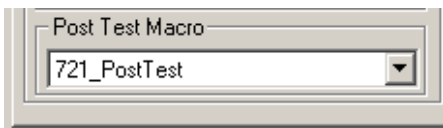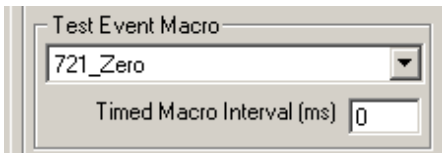
7.0 721_Zero MACRO


```vb
Function Zero721(iT, iL, iC, iP, cTest, cConfig)

'Josh Biggar, 20140416. Used as a test event macro.

cmd = ""

Select Case cCompass.CurrentTestStep

Case 300 'Set Test Pressure

If cTest.PointP(CInt(ip)).Target = 0 Then

        'reduce dwell time for target 0 point
    dwell = cTest.TestPrsDwellTime 'remember original dwell time
      avg = cTest.AvgTime 'remember original avg time

            cConfig.DUTPrs(1).SetParamData 10,CDbl(dwell)
            cConfig.DUTPrs(1).SetParamData 11,CDbl(avg)

            cTest.TestPrsDwellTime = 20'reduce dwell time
                cTest.AvgTime = 5'reduce avg time
        End If

Case 310 'Pressure Dwell

    If iP = 1 And cTest.PointP(CInt(ip)).Target = 0 Then
        cmd = "ZERO_MEAS LOWER" 'Zero_Meas has no argument for native gauge
721s.

    'Added this delay To buffer the surge In pressure When the controller vents.
    StatusDisplay "20s Stability Delay..."
    TimeDelay 20 'Wait for Pressure to settle

    End If

Case 325 'Averaging Is complete and the results are In the Test Data Class but
not written to data file.
    If cTest.PointP(CInt(ip)).Target = 0 Then

        'get and set oriignal dwell time after average
            dwell = cConfig.DUTPrs(1).GetParamData(10)
        avg = cConfig.DUTPrs(1).GetParamData(11)

        cTest.TestPrsDwellTime = dwell
        cTest.AvgTime = avg
    End If
```

```vba
End Select

With cCompass.cConfig

    For i = 1 To .DUTPrs.Count
        If cmd <> "" Then
        StatusDisplay "Sending Command: " & cmd
        cdebug.LogStatus "Command: " & cmd
        reply = ccompass.cConfig.DUTPrs(i).IoSendCommand(CStr(cmd),True,0)
        cdebug.LogStatus "Reply: " & Reply
        TimeDelay 5
        End If
            Next
                End With

End Function
```