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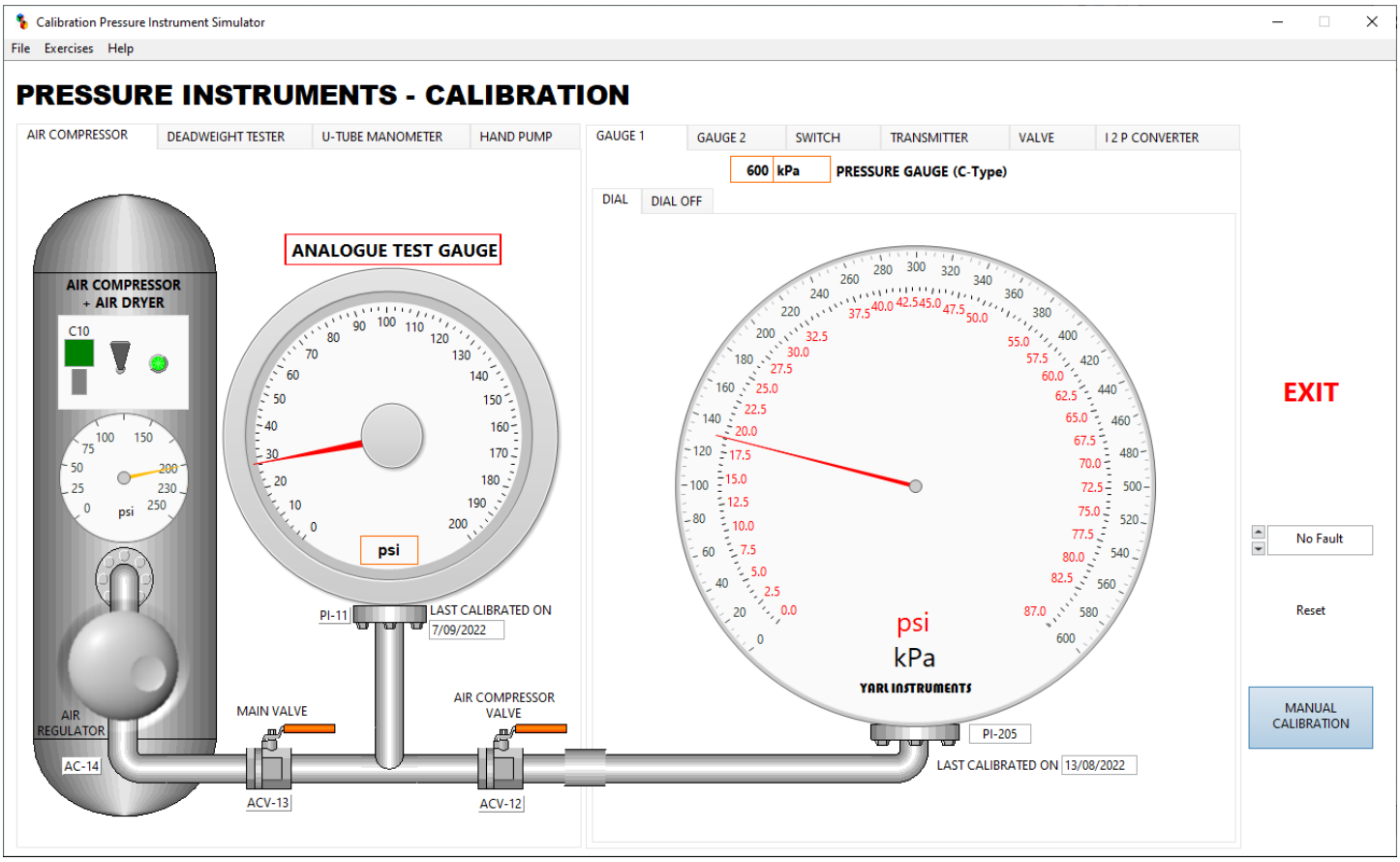
USER GUIDE

PRESSURE INSTRUMENT – CALIBRATION



LabVIEW Simulation Software

CONTENTS

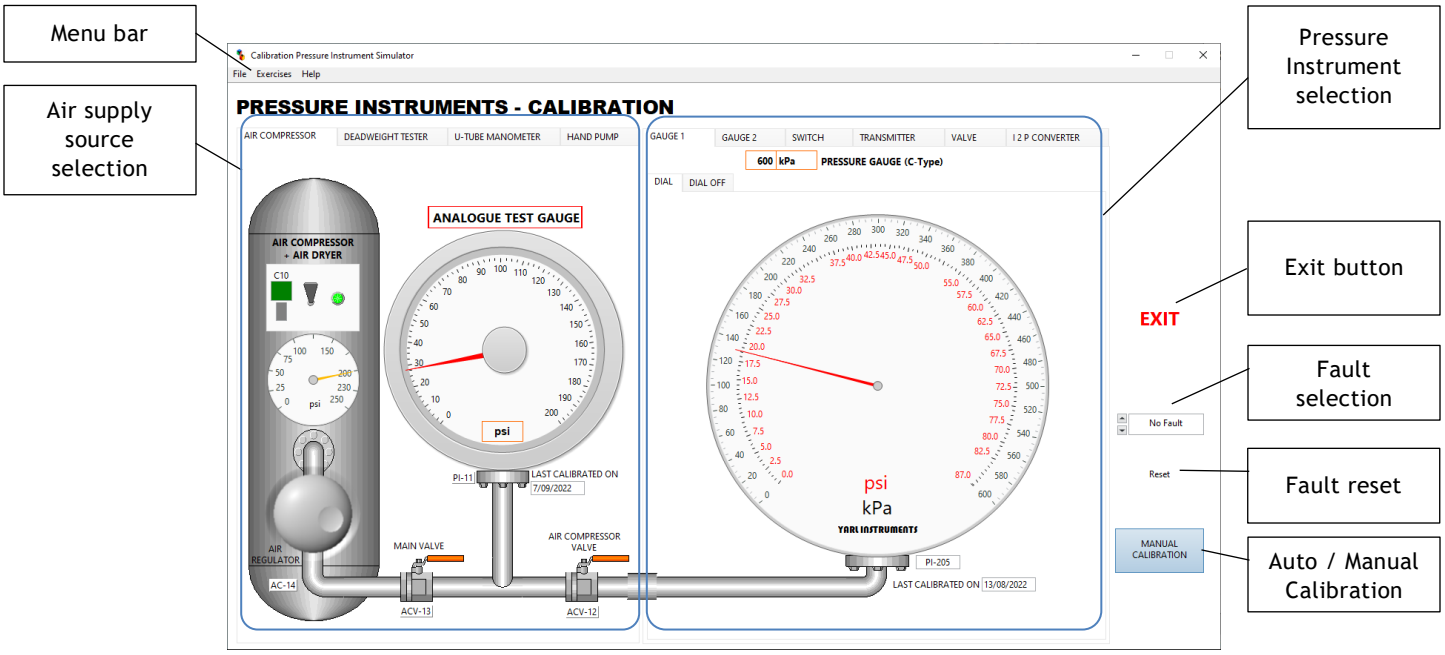
INTRODUCTION

Pressure instrument - Calibration is a software simulation application used for training and developing calibration skills of pressure instruments. This simulation application is developed using National Instrument's LabVIEW software. Intuitive controls and layout of components make this application very user friendly and easy to use. Instructions below will help you to get started.

This simulation software has four types of air supply source: Air Compressor, Deadweight Tester, U-Tube Manometer and Hand Pump. Each air pressure supply source comes with a selectable analogue or digital test gauge.

It has five types of pressure instruments for practicing and mastering the skills of calibrating pressure instruments. There are 36 pressure gauges, 16 pressure switches, 32 pressure transmitters, 16 pressure control valves and 9 current to pressure converter – in total of 109 pressure instruments!

CONTROLS AND DISPLAYS LAYOUT



Menu bar

File

- Print Window. Print a screenshot of the window
- Exit. Close this application

Exercises

- Student Exercises. Opens a student exercises document.
- Unit Conversion Pressure. Opens a pop-up window to convert from one pressure unit to the other.
- Calculator. Opens the standard windows calculator

Help

- Help on This VI. Opens this user guide document.
- Licence. Opens a pop-up window to show the licence information for this application. Here you can enter the licence key to activate this application.
- Calibration sheets. Opens a few samples of typical pressure calibration sheet document.
- About LabVIEW. Opens a pop-up window to show the LabVIEW software information.

CALIBRATION PROCEDURE

Pressure instrument calibration is a process of verifying the accuracy of a pressure instrument with a known test pressure gauge. Read and familiarise the air supply sources and types of pressure instrument avaibale in this simulation application before calibrating any instrument. Adjusting procedure to correct any error for pressure instrument will differ for each type and the adjusting procedure is explaind under each type of pressure instrument.

As a general rule of thumb, the calibration equipment (air supply source with test gauge) must be at least four time more accurate than the pressure instrument to be calibrated. Calibration equipment must have its calibration records with traceability.

To calibrate a pressure instrument:

Step 1. Select the type pressure instrument (available types are C-type Gauge, Spiral-type gauge, pressure switch, pressure transmitter, differential pressure transmitter, pressure-controlled valve, current to pressure converter).

Step 2. Select required pressure unit from the drop-down list.

Step 3. Select pressure range from the drop-down list.

Step 4. Record the pressure instrument details on a printed copy of the corresponding calibration sheet (sample calibration sheets can be printed from Help menu of this simulation application.

Step 5. Based on the selected pressure instrument range and unit, select the suitable type of air supply source.

AS FOUND RECORD

Step 6. While the air supply valve is closed, record the zero indication of the pressure instrument. In some pressure instruments, indication of zero may not be true as it may not indicate a negative zero-offset error. Positive zero-offset error is often obvious to note.

Step 7. Open air supply valve and gradually increase the applied pressure. If the pressure instrument has a negative zero-offset error, there will be a delayed indication of the pressure reading. In this case the pressure at which (test pressure gauge of the air supply) the instrument begins to indicate a change correspond to the negative zero offset error.

Step 8. Record the zero-offset error. Calculate the error% with the formula (measured value – reference value) / reference value *100

Step 9. Apply 50% of full-scale pressure and record pressure instrument reading. If the pressure instrument reading deviates from expected 50% mark, it corresponds to linearity error.

Step 10. Record the percentage linearity error.

Step 11. Apply full-scale pressure and record pressure instrument reading. If a positive span error, some pressure instrument may not indicate any value beyond the full-scale. In this case the pressure at which the instrument stop to indicate a change correspond to span error.

Step 12. Record the percentage span error.

If no error was detected or the percentage error for each is within the limits mentioned in the datasheet of the pressure instrument, then there is no need to calibrate the pressure instrument.

FIVE POINT CALIBRATION

Step 13. Apply 0% of full-scale pressure. Depending on the type of pressure instrument, follow the method to correct zero-offset error.

Step 14. Apply 25%, 50%, 75% and 100% of full-scale pressure and record the values.

Step 15. Apply in descending order, 100%, 75%, 50%, 25% and 0% of full-scale pressure and record the values.

Step 16. Depending on the type of pressure instrument, follow the method to correct span error.

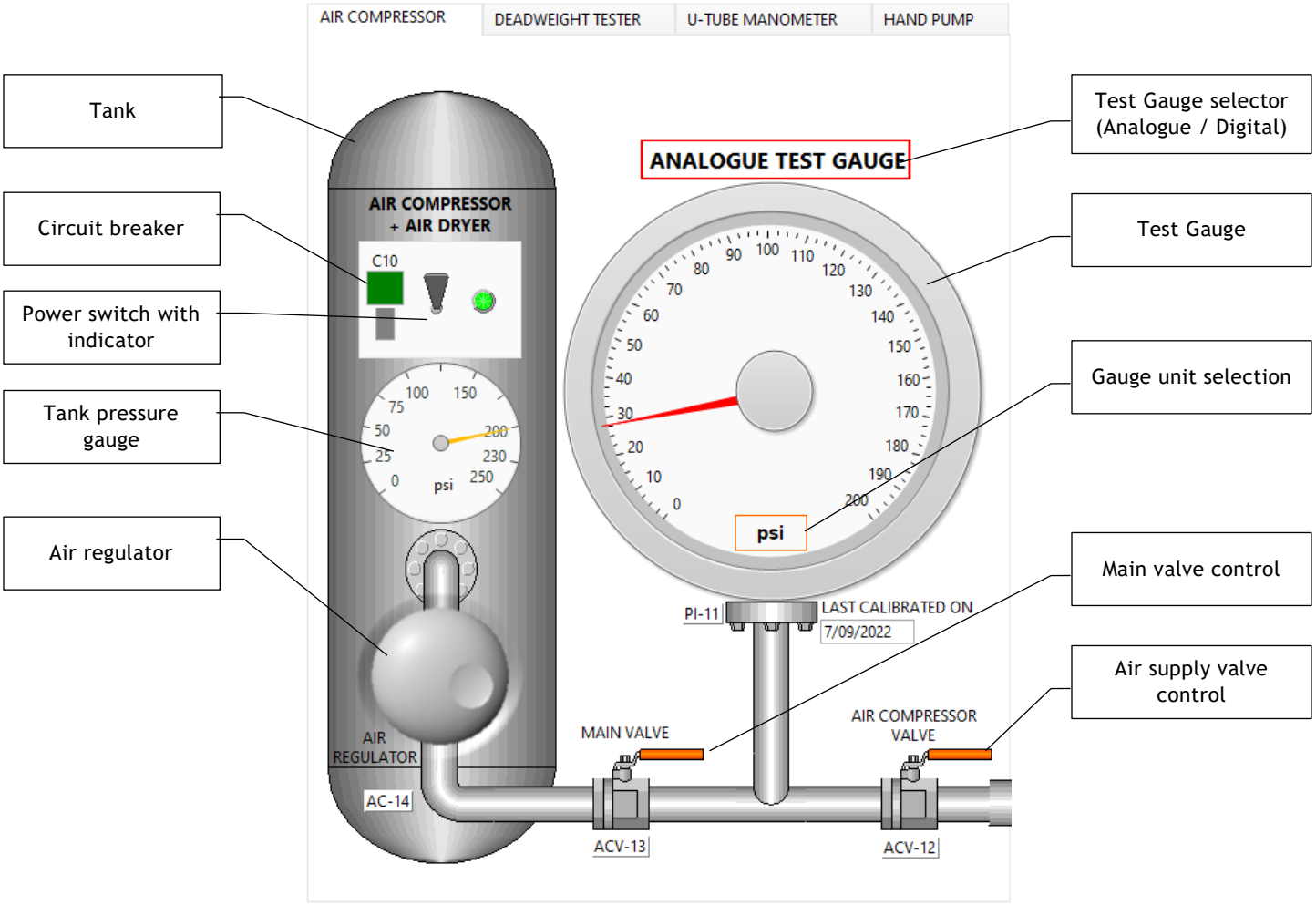
Step 17. Depending on the type of pressure instrument, follow the method to correct linearity error.

Step 18. Repeat the steps 13 to 17 and verify and complete calibration.

AIR SUPPLY SOURCES

Four air supply sources are available: Air compressor, Deadweight tester, U-tube manometer and Hand pump. Each source has its own pressure range and hence select the correct type of air supply source to suite the type of pressure instruments for calibration.

AIR COMPRESSOR WITH AIR DRYER



To operate the Air compressor:

Step 1. Turn power switch on, air compressor will run to maintain the pressure at 200 psi.

Step 2. Once full pressure is reached, open the Main valve.

Step 3. Select type of test gauge by pressing the Test Gauge selector button (analogue or digital).

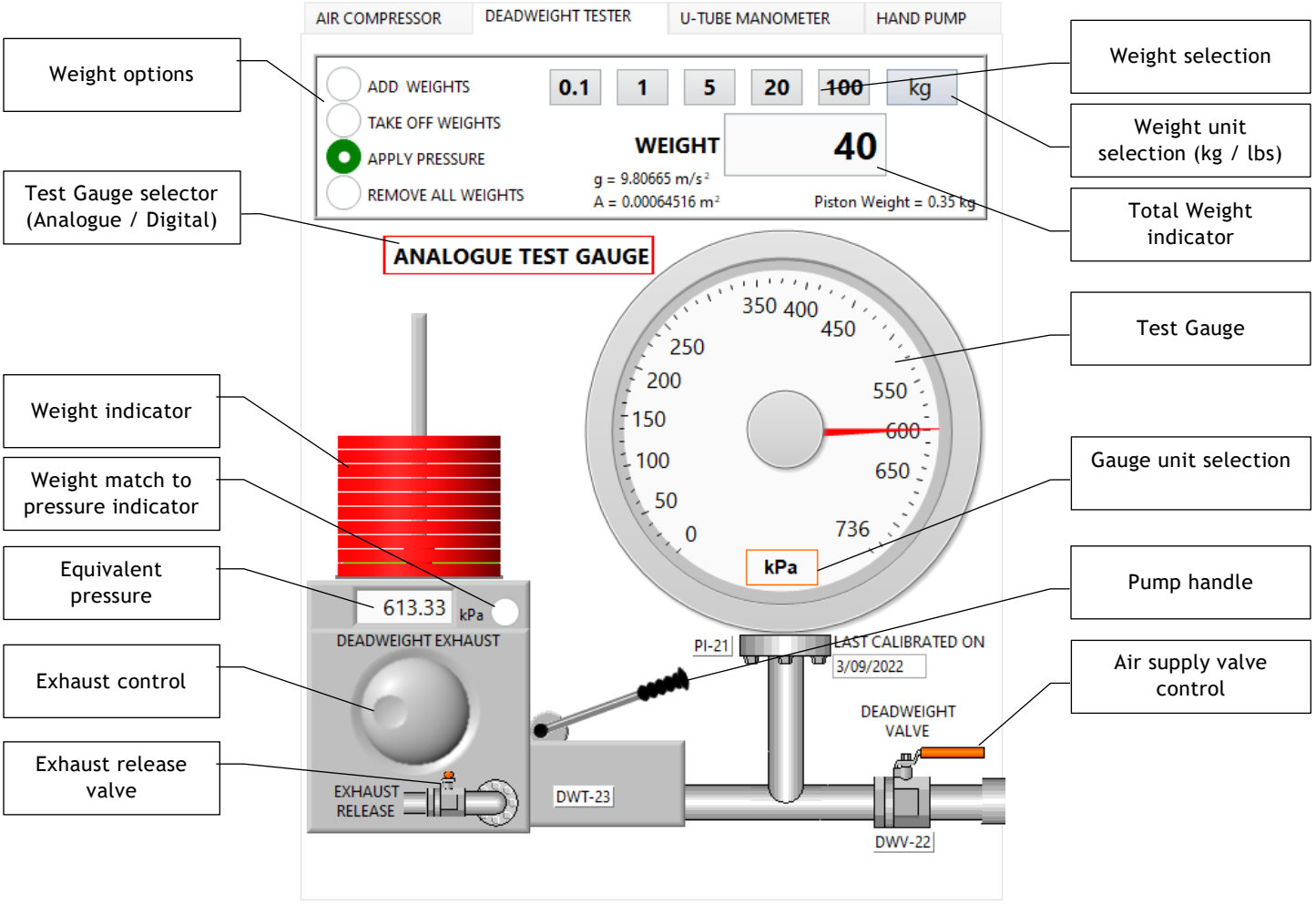
Step 4. Select required test gauge unit from the drop-down list (available units are: Atm, Bar, Pa, kPa, MPa, psi, mmHg, inH2O, torr).

Step 5. Adjust the air regulator to the required pressure.

Step 6. Open or close Air supply valve to supply dry air for pressure instrument calibration.

Test Gauge Accuracy Specifications (percentage of span)	
Accuracy class 0.25	± 0.11 % @ +20°C

DEADWEIGHT TESTER



To operate the Deadweight tester:

Step 1. Select the Add weight option and select the required weight unit (kg or lbs).

Step 2. Press the weight selection buttons until the required weight is reached. To reduce the weight, select the Take Off weight option and then press the weight selection buttons until the required weight is reached. Equivalent pressure reading will indicate the corresponding pressure in kPa.

Step 3. Select Apply pressure option. (Select Remove all weights option to reset at once.)

Step 4. Select type of test gauge by pressing the Test Gauge Selector button (analogue or digital).

Step 5. Select required test gauge unit from the drop-down list (available units are: Atm, Bar, Pa, kPa, MPa, psi, mmHg, inH2O, torr).

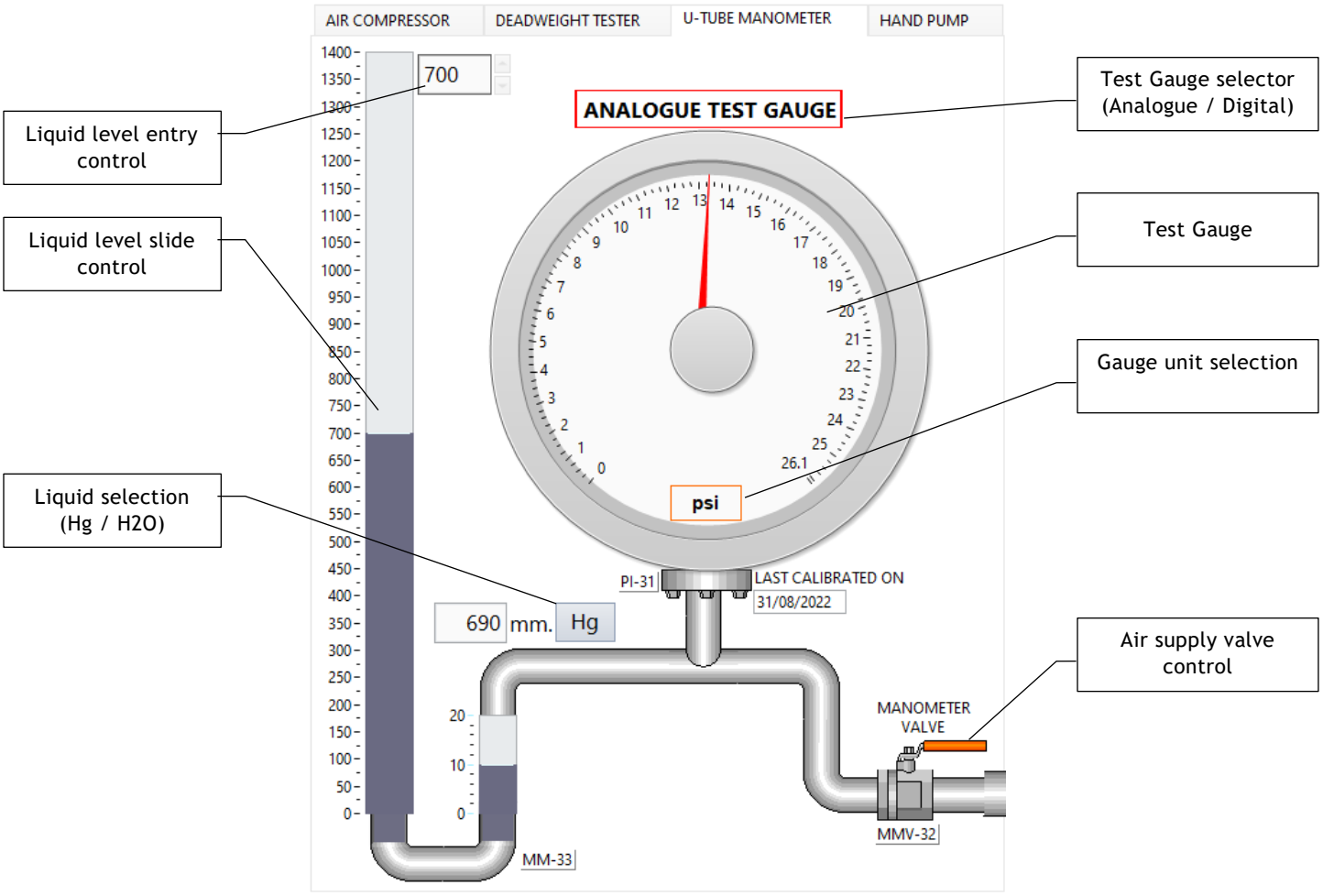
Step 6. Apply strokes on pump handle to reach the required air pressure. Weight match to pressure indicator will turn green colour to indicate the air pressure is very close to corresponding weight and the weights will start to lift. Gently stroke on pump handle to required pressure.

Step 7. Adjust the Exhaust control knob to reduce pressure or open the Exhaust release valve to completely remove pressure quickly.

Step 8. Open or close Air supply valve to supply dry air for pressure instrument calibration.

Test Gauge Accuracy Specifications (percentage of span)	
Accuracy class 0.1	± 0.05 % @ +20°C

U-TUBE MANOMETER



To operate the U-Tube manometer:

Step 1. Select the Liquid type mercury or water (Hg or H2O).

Step 2. Select type of test gauge by pressing the Test Gauge Selector button (analogue or digital).

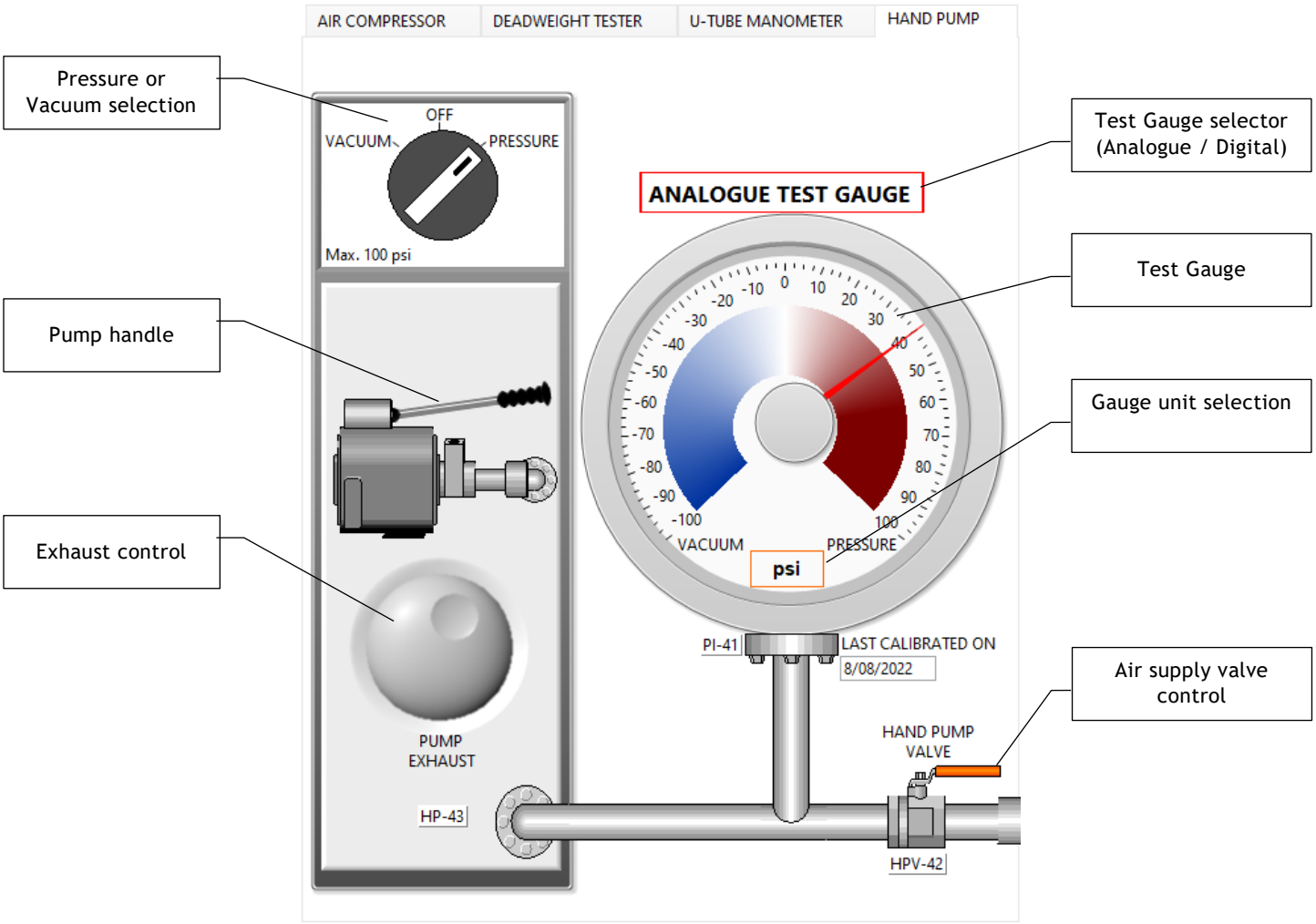
Step 3. Select required test gauge unit from the drop-down list (available units are: Atm, Bar, Pa, kPa, MPa, psi, mmHg, inH2O, torr).

Step 4. Move the liquid level slide control or enter a liquid level in Liquid level entry control and press Enter button on computer keyboard to apply required pressure.

Step 5. Open or close Air supply valve to supply dry air for pressure instrument calibration.

Test Gauge Accuracy Specifications (percentage of span)	
Accuracy class 0.25	± 0.14 % @ +20°C

HAND PUMP



To operate the Hand pump:

Step 1. Select Pressure or Vacuum.

Step 2. Select type of test gauge by pressing the Test Gauge selector button (analogue or digital).

Step 3. Select required test gauge unit from the drop-down list (available units are: Atm, Bar, Pa, kPa, MPa, psi, mmHg, inH2O, torr).

Step 4. Apply strokes on pump handle to reach the required air pressure. To release pressure, adjust the Exhaust control.

Step 5. Open or close Air supply valve to supply dry air for pressure instrument calibration.

Test Gauge Accuracy Specifications (percentage of span)	
Accuracy class 0.6	± 0.28 % @ +20°C

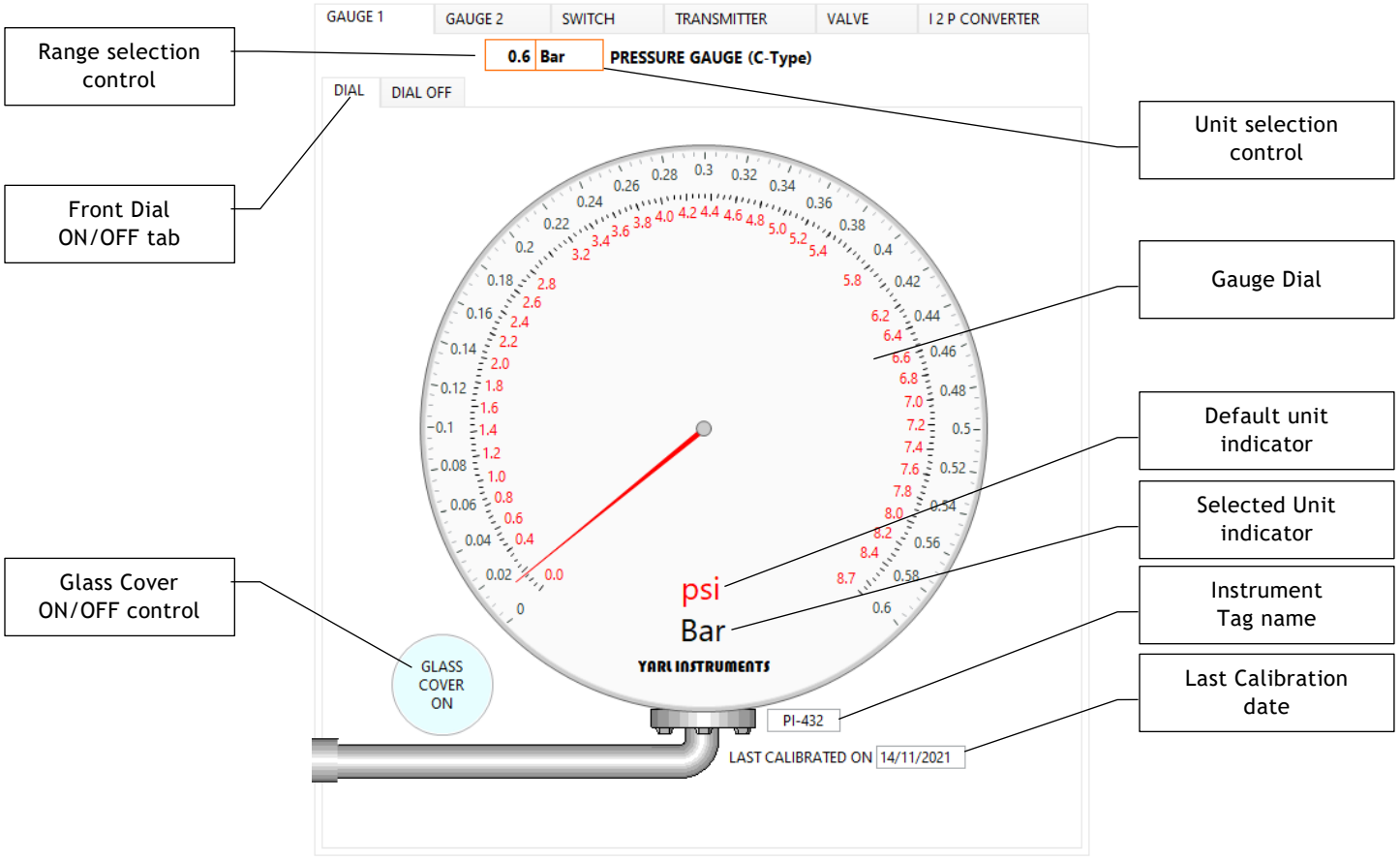
PRESSURE INSTRUMENTS

Six pressure instrument types are available for practicing and mastering the skills of calibrating pressure instruments: Pressure Gauges, Pressure Switches, Pressure Transmitters, Pressure control valves, and Current to Pressure converters. Each type has its own pressure unit and range and hence select the correct air supply source to suite the type of pressure instruments for calibration.

PRESSURE GAUGE 1

Pressure Gauge 1 instruments are of C-Type Bourdon Tube gauges available for practicing and mastering the skills of calibrating pressure gauge instruments.

Pressure Gauge Accuracy Specifications (percentage of span)	
Accuracy class 2.5	Permissible error ± 2.5 % @ +20°C



To calibrate a pressure gauge:

Step 1. Open a sample calibration worksheet pdf file from Help menu and print to record details of the calibration.

Step 2. Select the pressure unit with the Unit selection control drop-down list (available units are: Bar, kPa, MPa, psi).

Step 3. Select the pressure range with the Range selection control drop-down list (available ranges depend on the unit selected).

Step 4. Setup the Air supply source pressure as required for this gauge calibration.

Step 5. Make sure the Air Supply Control valve is closed.

AS FOUND RECORD

Step 6. While the air supply valve is closed, record the zero indication of the pressure gauge instrument. In some pressure gauge instruments, indication of zero may not be true as it may not indicate a negative zero-offset error. Positive zero-offset error is often obvious to note.

Step 7. Open air supply valve and gradually increase the applied pressure. If the pressure gauge instrument has a negative zero-offset error, there will be a delayed indication of the pressure gauge reading. In this case the pressure at which (test pressure gauge of the air supply) the instrument begins to indicate a change correspond to the negative zero offset error.

Step 8. Record the zero-offset error. Calculate the error% with the formula (measured value – reference value) / reference value *100

Step 9. Apply 50% of full-scale pressure and record pressure gauge instrument reading. If the pressure gauge instrument reading deviates from expected 50% mark, it corresponds to linearity error.

Step 10. Record the linearity error.

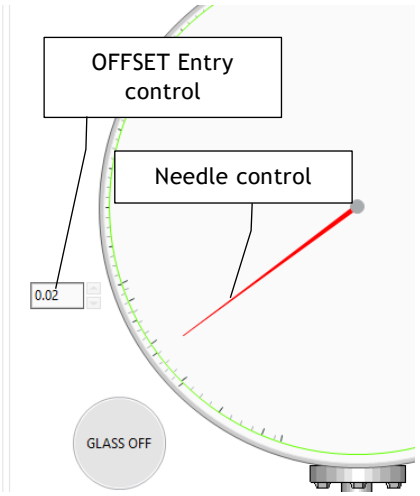
Step 11. Apply full-scale pressure and record pressure gauge instrument reading. If a positive span error, some pressure gauge instrument may not indicate any value beyond the full-scale. In this case the pressure at which the instrument stop to indicate a change correspond to span error.

Step 12. Record the span error.

If no error was detected or the percentage error for each is within the limits mentioned in the datasheet of the pressure gauge instrument, then there is no need to calibrate the pressure gauge instrument.

FIVE POINT CALIBRATION

Step 13. Apply 0% of full-scale pressure by turning off the air supply valve. If no zero-offset error detected or within acceptable limits, skip to step 17.



ZERO-OFFSET ERROR CORRECTION

Step 14. Click on Glass cover ON/OFF button to remove glass cover of the gauge.

Step 15. Move the needle to estimated zero position or enter zero in OFFSET entry control and press enter button on PC keyboard.

Step 16. Click on Glass cover ON/OFF button to replace glass cover of the gauge.

SPAN ERROR CORRECTION

Step 17. Apply 25%, 50%, 75% and 100% of full-scale pressure and record the values.

Step 18. Apply in descending order, 100%, 75%, 50%, 25% and 0% of full-scale pressure and record the values.

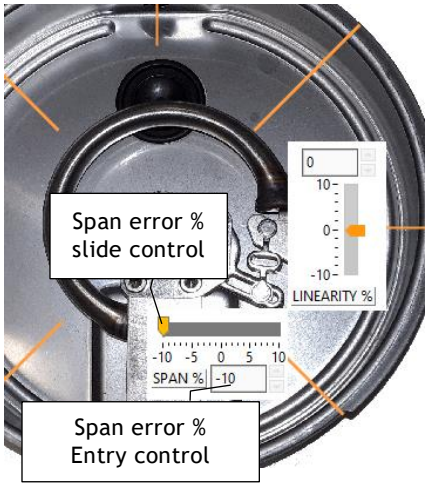
Step 19. If no span error detected or within acceptable limits, skip to step 24

Step 20. Click on Front DIAL OFF tab to open the Dial Off tab.

Step 21. Move the span error slide to compensate for the estimated span correction or enter a value in Span error entry control and press enter button on PC keyboard.

Step 22. Repeat Step 17 to Step 21 a few iterations until span error is corrected.

Step 23. Click on Front DIAL tab to replace the front dial.



LINEARITY ERROR CORRECTION

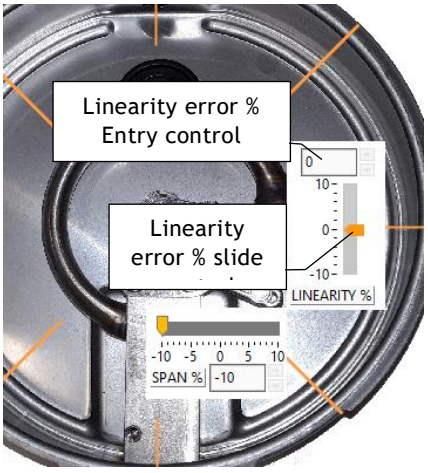
Step 24. Apply 25%, 50%, 75% and 100% of full-scale pressure and record the values.

Step 25. Apply in descending order, 100%, 75%, 50%, 25% and 0% of full-scale pressure and record the values.

Step 26. If no linearity error detected or within acceptable limits, skip the following steps.

Step 27. Click on Front DIAL OFF tab to open the Dial Off tab.

Step 28. Move the linearity error % slide to compensate for the estimated linearity correction or enter a value in linearity error % entry control and press enter button on PC keyboard.



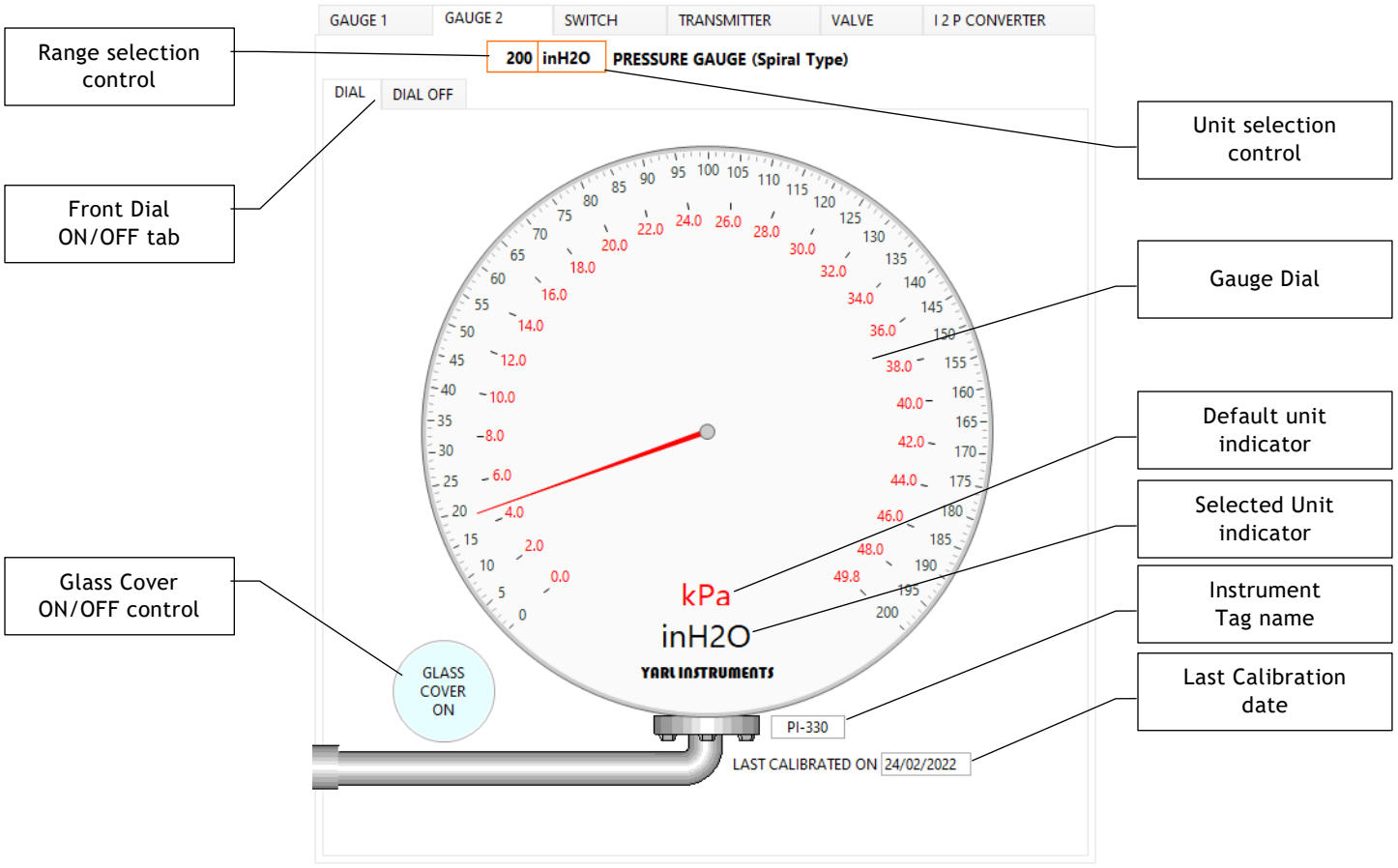
Step 29. Repeat Step 24 to Step 28 a few iterations until linearity error is corrected.

Step 30. Click on Front DIAL tab to replace the front dial.

PRESSURE GAUGE 2

Pressure Gauge 2 instruments includes 4 vacuum gauges and 32 pressure gauges that are of Spiral Type Bourdon tube gauges available for practicing and mastering the skills of calibrating pressure and vacuum gauge instruments.

Pressure Gauge Accuracy Specifications (percentage of span)	
Accuracy class 1	Permissible error ± 1.0 % @ +20°C

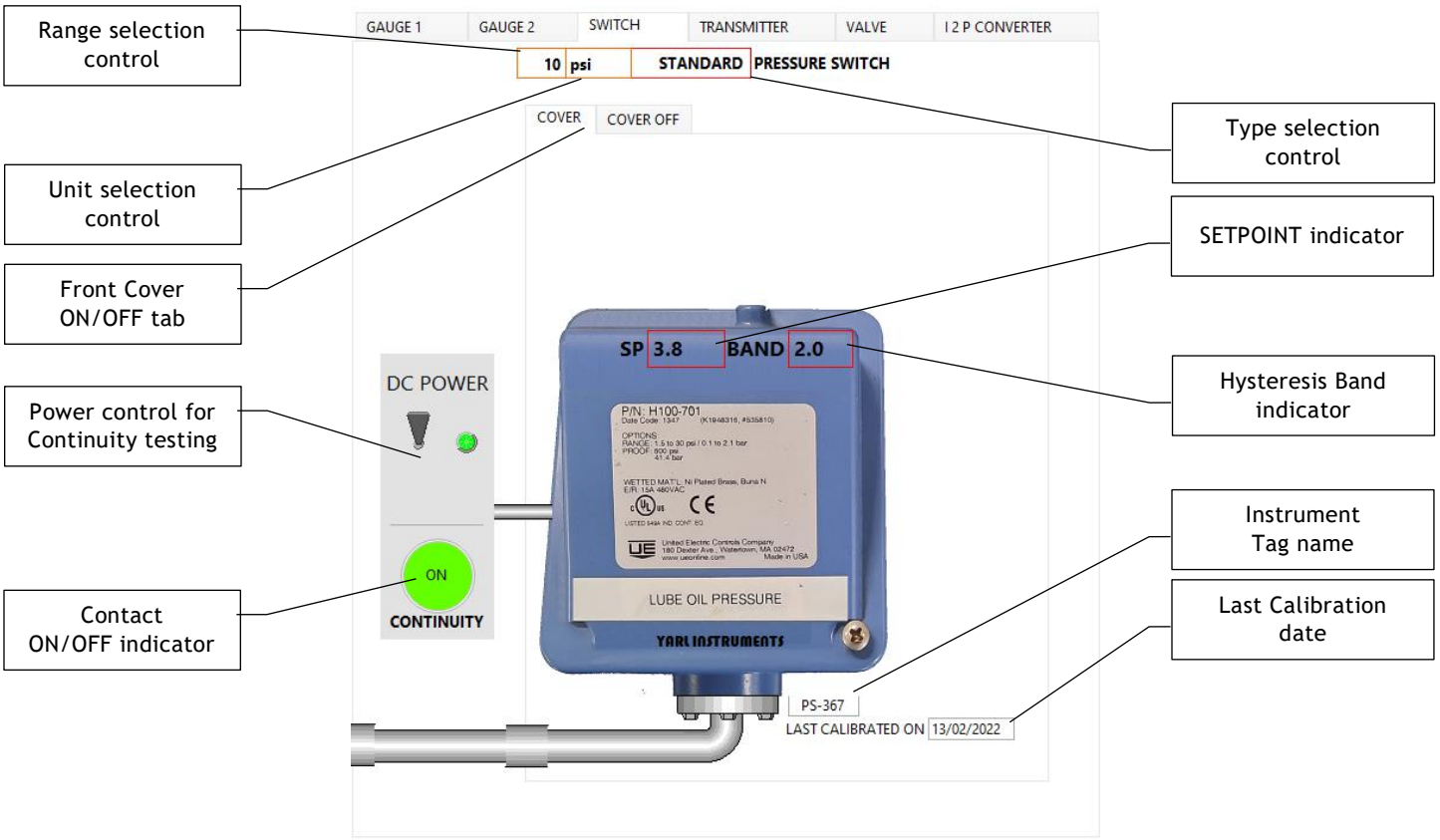


To calibrate a pressure gauge, follow the same steps as above for pressure Gauge 1. Only Hand Pump air supply source can provide vacuum of up to 100 psi.

PRESSURE SWITCH

Pressure Switch instruments are of Standard or Differential Type available for practicing and mastering the skills of calibrating pressure switch instruments. Standard type has a fixed hysteresis band and cannot be adjusted, whereas the Differential type has an adjustable hysteresis band.

Pressure Switch Accuracy Specifications (percentage of span)	
Accuracy class 4	Permissible error ± 4.0 % @ +20°C



To calibrate a pressure switch:

Step 1. Open a sample calibration worksheet pdf file from Help menu and print to record details of the calibration.

Step 2. Select the pressure unit with the Unit selection control drop-down list (available units are: Bar, kPa, MPa, psi).

Step 3. Select the pressure range with the Range selection control drop-down list (available ranges depend on the unit selected).

Step 4. Select pressure switch type with Type selection control button (available options are: Standard, Differential).

Step 5. Setup the Air supply source pressure as required for this pressure switch calibration.

Step 6. Turn on the DC power switch to test the continuity of pressure switch contact.

Step 7. Record the setpoint and hysteresis band indicated on the pressure switch.

Step 8. Make sure the Air Supply Control valve is closed.

AS FOUND RECORD

Step 9. Open air supply valve.

Step 10. Gradually increase the applied pressure.

Step 11. Record the applied pressure at which the pressure switch contact closes. Closing of the contact is indicated by the continuity indicator.

Step 12. Gradually decrease the applied pressure and record the applied pressure at which the pressure switch contact opens.

SETPOINT CALIBRATION

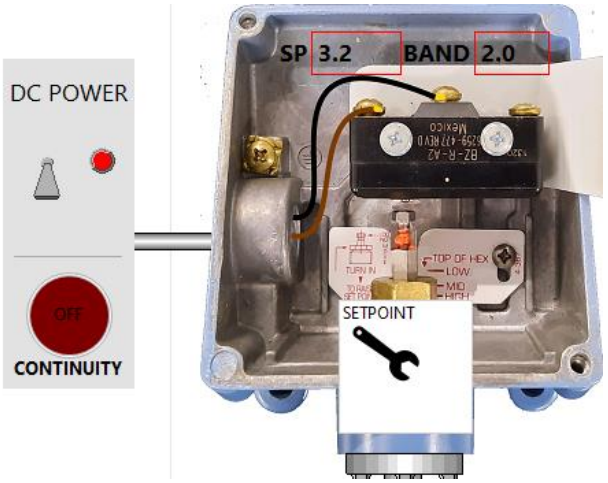
Compare the pressure switch setpoint and hysteresis band indicated on the pressure switch with AS FOUND readings. If no error was detected or the percentage error for each is within the limits mentioned in the datasheet of the pressure switch instrument, then there is no need to calibrate the pressure switch instrument.

SETPOINT ERROR CORRECTION –STANDARD PRESSURE SWITCH

Step 13. Click on Front cover ON/OFF tab to select Cover OFF.

Step 14. Close Air supply valve and adjust the Setpoint with the spanner tool until the required setpoint.

Step 15. Repeat Step 9 to Step 12, a few iterations until correct setpoint is achieved.



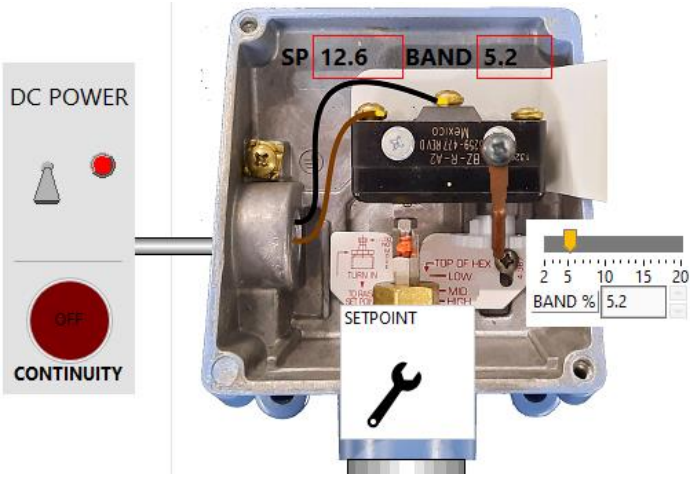
SETPOINT, HYSTERESIS BAND ERROR CORRECTION – DIFFERENTIAL PRESSURE SWITCH

Step 16. Click on Front cover ON/OFF tab to select Cover OFF.

Step 17. Close Air supply valve and adjust the Setpoint with the spanner tool until the required setpoint.

Step 18. Adjust the required hysteresis band for pressure switch contact.

Step 19. Repeat Step 9 to Step 12, a few iterations until correct setpoint is achieved.

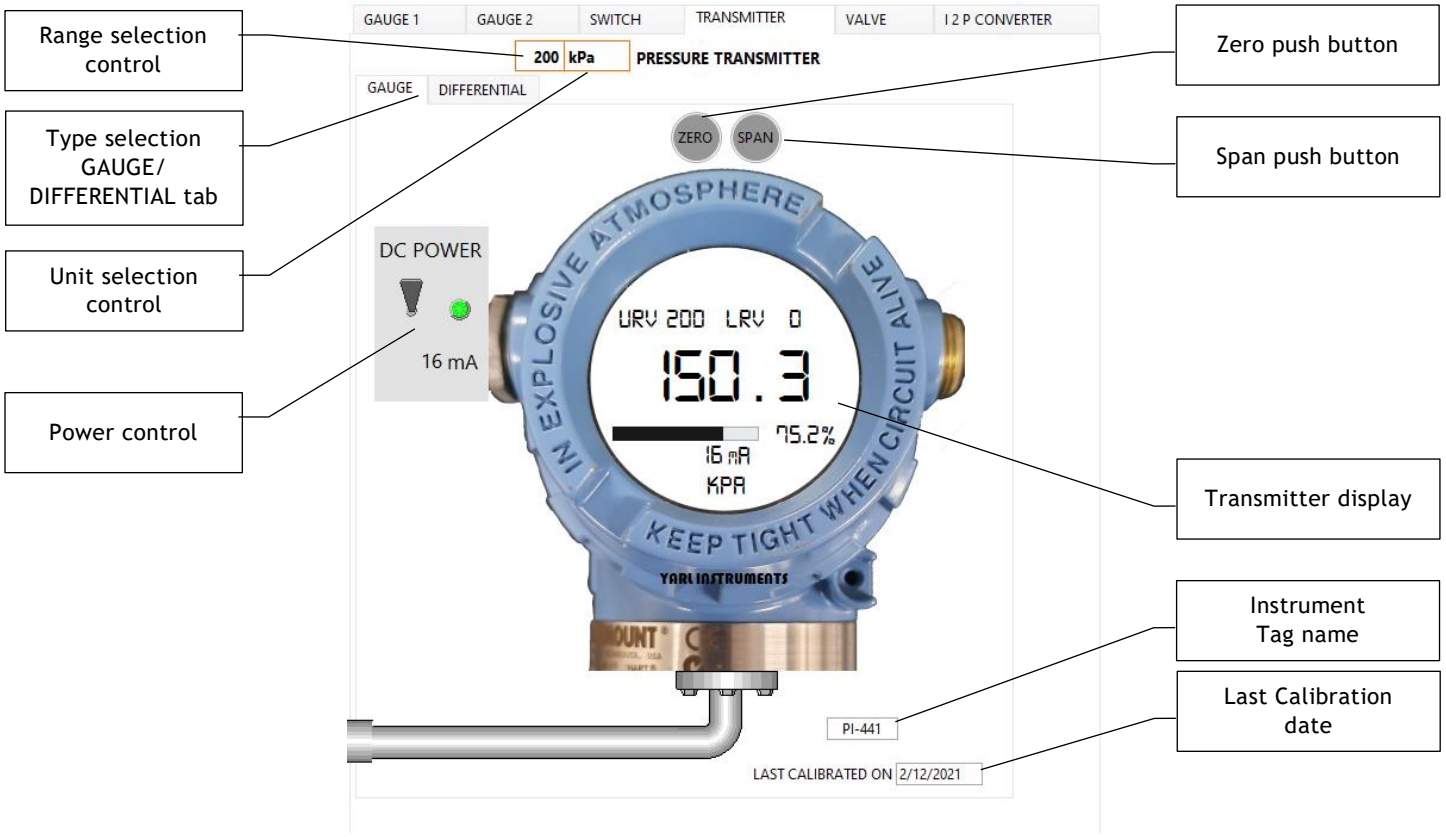


PRESSURE TRANSMITTER

Pressure Transmitter are of Gague or Differential Gague Type available for practicing and mastering the skills of calibrating pressure transmitter. Transmitter has two push buttons to calibrate the instrument to required range.

PRESSURE GAUGE

Pressure Gauge Accuracy Specifications (percentage of span)	
Accuracy class 1	Permissible error ± 1.0 % @ +20°C



To calibrate a pressure gauge transmitter:

Step 1. Open a sample calibration worksheet pdf file from Help menu and print to record details of the calibration.

Step 2. Select the pressure unit with the Unit selection control drop-down list (available units are: Bar, kPa, MPa, psi).

Step 3. Select the pressure range with the Range selection control drop-down list (available ranges depend on the unit selected).

Step 4. Setup the Air supply source pressure as required for this gauge calibration.

Step 5. Turn power on to the transmitter.

Step 6. Make sure the Air Supply Control valve is closed.

AS FOUND RECORD

Step 7. While the air supply valve is closed, record the zero indication of the pressure gauge instrument. In some pressure gauge instruments, indication of zero may not be true as it may not indicate a negative zero-offset error. Positive zero-offset error is often obvious to note. Transmitter display may indicate the current URV (Upper Range Value) and LRV (Low Range Value).

Step 8. Open air supply valve and gradually increase the applied pressure. If the pressure gauge instrument has a negative zero-offset error, there will be a delayed indication of the pressure gauge reading. In this case the pressure at which (test pressure gauge of the air supply) the instrument begins to indicate a change correspond to the negative zero offset error.

Step 9. Record the zero-offset error. Calculate the error% with the formula (measured value – reference value) / reference value *100

Step 10. Apply full-scale pressure and record pressure gauge instrument reading. If a positive span error, some pressure gauge instrument may not indicate any value beyond the full-scale. In this case the pressure at which the instrument stop to indicate a change correspond to span error.

Step 11. Record the span error.

If no error was detected or the percentage error for each is within the limits mentioned in the datasheet of the pressure gauge instrument, then there is no need to calibrate the pressure gauge instrument.

TWO POINT PRESSURE GAUGE CALIBRATION

Step 12. Apply 0% of full-scale pressure by turning off the air supply valve. If no zero-offset error detected or within acceptable limits, skip to step 14.

ZERO-OFFSET ERROR CORRECTION

Step 13. Click on ZERO push button to set the LRV to 0% applied pressure.

SPAN ERROR CORRECTION

Step 14. Apply 100% of full-scale pressure.

Step 15. If no span error detected or within acceptable limits, skip following step.

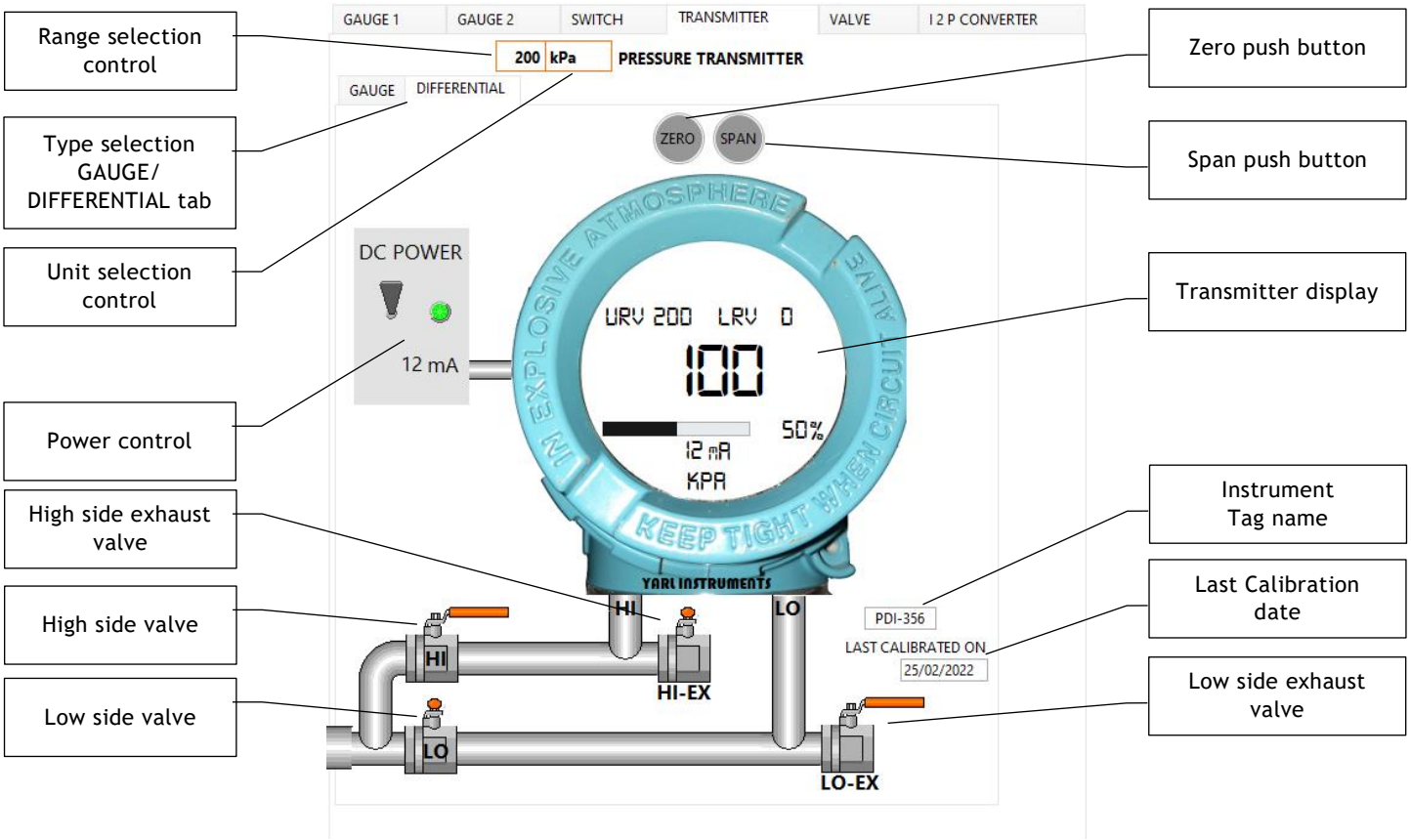
Step 16. Click on SPAN push button to set the URV to 100% applied pressure.

Step 17. Apply 0% and 100% of full-scale pressure values to verify pressure gauge instrument.

DIFFERENTIAL PRESSURE GAUGE

Differential pressure gauge can be calibrated to measure positive or negative pressure. Positive pressure measurement can be made by opening High side valve and closing all other valve (Low side exhaust valve can be left open to atmosphere). Vacuum or negative pressure measurement can be made by opening Low side valve and closing all other valves (High side exhaust valve can be left open to atmosphere).

Pressure Gauge Accuracy Specifications (percentage of span)	
Accuracy class 0.6	Permissible error ± 0.6 % @ +20°C



To calibrate a differential pressure gauge transmitter:

Step 1. Open a sample calibration worksheet pdf file from Help menu and print to record details of the calibration.

Step 2. Select the pressure unit with the Unit selection control drop-down list (available units are: Bar, kPa, MPa, psi).

Step 3. Select the pressure range with the Range selection control drop-down list (available ranges depend on the unit selected).

Step 4. Setup the Air supply source pressure as required for this differential pressure gauge calibration.

Step 5. Turn power on to the transmitter.

Step 6. Make sure the Air Supply Control valve is closed.

AS FOUND RECORD

Step 7. While the air supply valve is closed, record the zero indication of the differential pressure gauge instrument. Transmitter display may indicate the current URV (Upper Range Value) and LRV (Low Range Value).

If LRV and URV values indicate the selected values, no error is detected or the percentage error for each is within the limits mentioned in the datasheet of the differential pressure gauge instrument, then there is no need to calibrate the pressure gauge instrument.

TWO POINT DIFFERENTIAL PRESSURE GAUGE CALIBRATION

Step 8. Close Low side valve, close High side exhaust valve, close Low side exhaust valve and open High side valve.

Step 9. Apply 0% of full-scale pressure by turning off the air supply valve. If no zero-offset error detected or within acceptable limits, skip to step 11.

ZERO-OFFSET ERROR CORRECTION

Step 10. Click on ZERO push button to set the LRV to 0% applied pressure.

SPAN ERROR CORRECTION

Step 11. Apply 100% of full-scale pressure.

Step 12. Click on SPAN push button to set the URV to 100% applied pressure.

Step 13. Apply 0% and 100% of full-scale pressure values to verify differential pressure gauge instrument.

TWO POINT VACUUM DIFFERENTIAL PRESSURE GAUGE CALIBRATION

Step 14. Close High side valve, close High side exhaust valve, close Low side exhaust valve and open Low side valve.

ZERO-OFFSET ERROR CORRECTION

Step 15. Open air supply valve.

Step 16. Apply positive required pressure for new LRV value (example for vacuum of 100kPa apply 100kPa to Low side).

Step 17. Click on ZERO push button to set the LRV to vacuum.

NOTE: Hand Pump can create vacuum up to 100psi and if using hand pump, then open high side valve and close all other valves.

SPAN ERROR CORRECTION

Step 18. Apply required pressure for URV value.

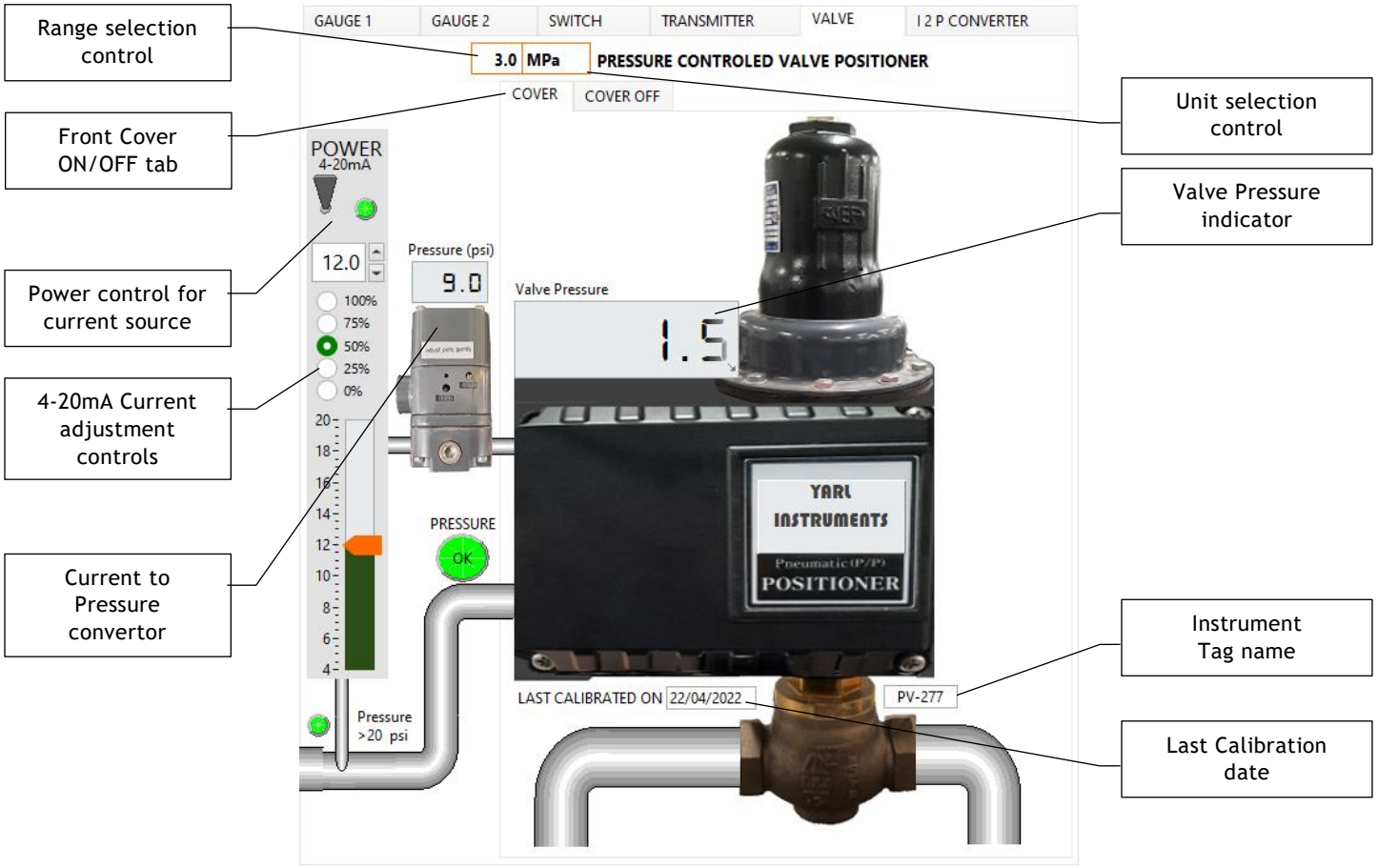
Step 19. Click on SPAN push button to set the URV to required pressure value.

Step 20. Apply 0% and 100% of full-scale vacuum values to verify differential pressure gauge instrument.

PRESSURE CONTROLLED VALVE POSITIONER

Pressure controlled valve positioner instruments are used for opening and closing large valves.

Pressure Accuracy Specifications (percentage of span)	
Accuracy class 2.5	Permissible error ± 2.5 % @ +20°C



To calibrate a pressure switch:

Step 1. Open a sample calibration worksheet pdf file from Help menu and print to record details of the calibration.

Step 2. Select the pressure unit with the Unit selection control drop-down list (available units are: Bar, kPa, MPa, psi).

Step 3. Select the pressure range with the Range selection control drop-down list (available ranges depend on the unit selected).

Step 4. Setup the Air supply source pressure as required for this valve calibration.

Step 5. Adjust the air supply pressure value to more than the selected Range value.

Step 6. Open Air Supply control valve.

Step 7. Turn on the DC power to apply 4-20 mA current to the current to pressure converter that will supply the required 3 – 15 psi for controlling the valve positioner. (Note: Power supply will not turn on if the air supply pressure is below 20psi)

AS FOUND RECORD

Step 8. Apply 4mA which will deliver 3psi to the valve positioner.

Step 9. Record valve pressure readings for corresponding increasing steps of 0%, 25%, 50%, 75% and 100% of full-scale value. In some pressure gauge instruments, indication of zero may not be true as it may not indicate a negative zero-offset error. Positive zero-offset error is often obvious to note.

Step 10. Record valve pressure readings for corresponding decreasing steps of 100%, 75%, 50%, 25% and 0% of full-scale value.

Step 11. Record the zero-offset error. Calculate the error% with the formula (measured value – reference value) / reference value *100

Step 12. Record the span error.

TWO POINT CALIBRATION

If no error was detected or the percentage error for each is within the limits mentioned in the datasheet of the valve positioner, then there is no need to calibrate the valve positioner.

ZERO-OFFSET ERROR CORRECTION

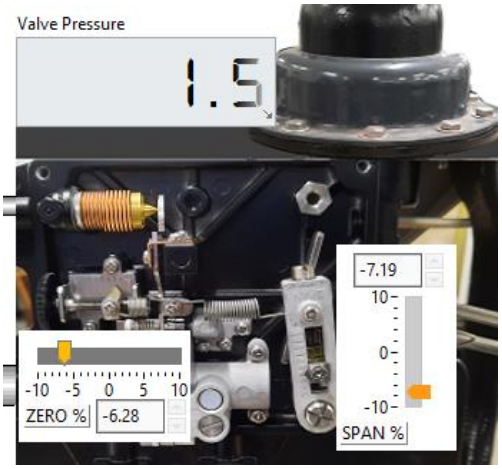
Step 13. Close the air control valve.

Step 14. Move the zero % slide to compensate for the estimated zero-offset correction or enter a value in zero % entry control and press enter button on PC keyboard.

Step 15. Open the air control valve.

Step 16. Apply 4mA which will deliver 3psi to the valve positioner.

Step 17. Repeat Step 13 to Step 16 a few iterations until zero-offset error is corrected.



SPAN ERROR CORRECTION

Step 18. Close the air control valve.

Step 19. Move the span % slide to compensate for the estimated span correction or enter a value in span % entry control and press enter button on PC keyboard.

Step 20. Open the air control valve.

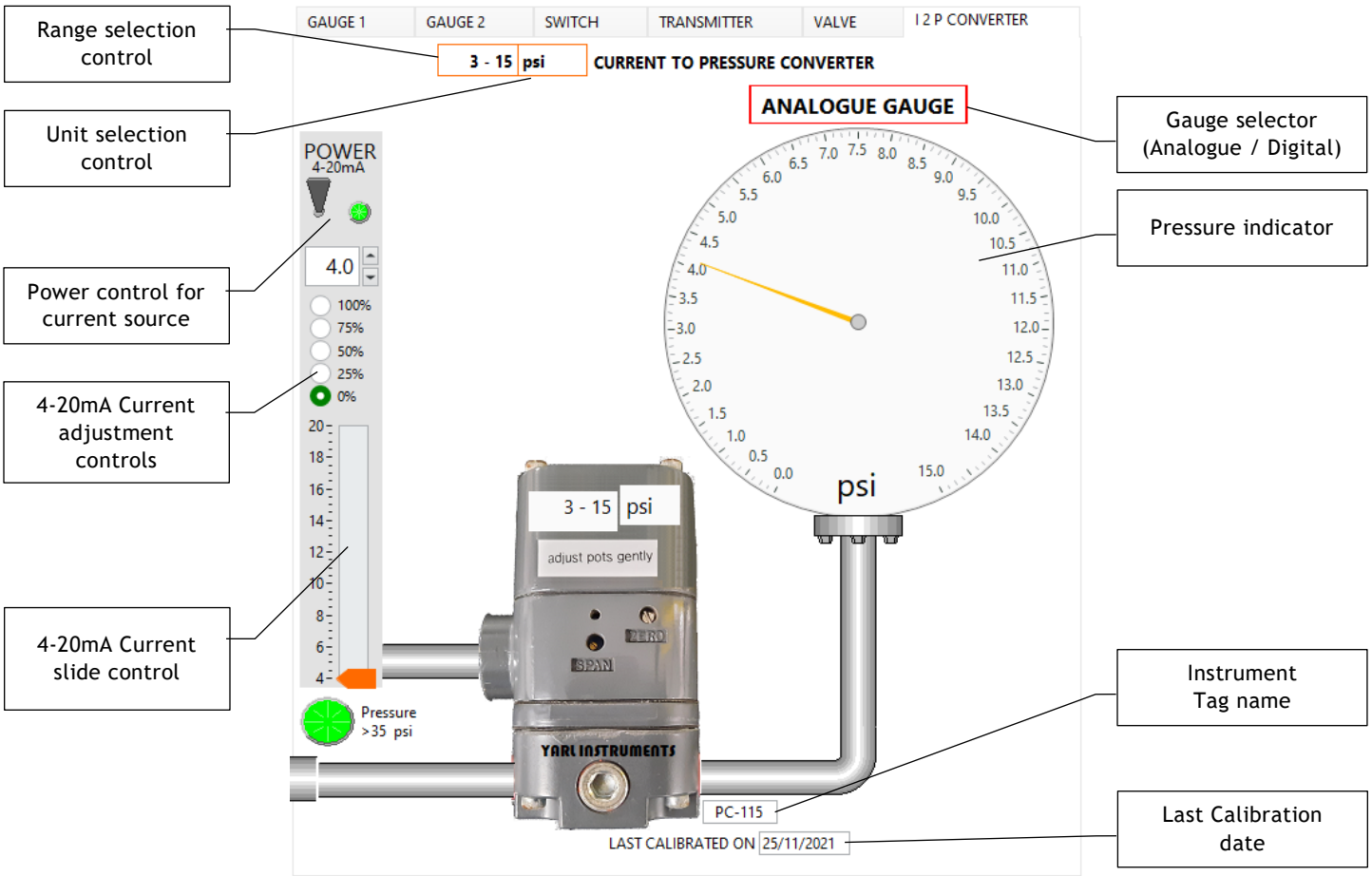
Step 21. Apply 20mA which will deliver 15psi to the valve positioner.

Step 22. Repeat Step 18 to Step 21 a few iterations until span error is corrected.

CURRENT TO PRESSURE CONVERTER

Current to pressure converters are used for controlling valves, actuators, dampers and vanes.

Pressure Accuracy Specifications (percentage of span)	
Accuracy class 1	Permissible error ± 1.0 % @ +20°C



To calibrate a current to pressure converter:

Step 1. Open a sample calibration worksheet pdf file from Help menu and print to record details of the calibration.

Step 2. Select the pressure unit with the Unit selection control drop-down list (available units are: Bar, kPa, psi).

Step 3. Select the pressure range with the Range selection control drop-down list (available ranges depend on the unit selected).

Step 4. Setup the Air supply source pressure as required for this I2P converter calibration.

Step 5. Adjust the air supply pressure value to more than the selected Range value.

Step 6. Open Air Supply control valve.

Step 7. Turn on the DC power to apply 4-20 mA current to the current to pressure converter that will supply the required 3 – 15 psi for controlling the valve positioner. (Note: Power supply will not turn on if the air supply pressure is below 35psi)

AS FOUND RECORD

Step 8. Apply 4mA which will deliver 3psi to the valve positioner.

Step 9. Record valve pressure readings for corresponding increasing steps of 0%, 25%, 50%, 75% and 100% of full-scale value. In some pressure gauge instruments, indication of zero may not be true as it may not indicate a negative zero-offset error. Positive zero-offset error is often obvious to note.

Step 10. Record valve pressure readings for corresponding decreasing steps of 100%, 75%, 50%, 25% and 0% of full-scale value.

Step 11. Record the zero-offset error. Calculate the error% with the formula (measured value – reference value) / reference value *100

Step 12. Record the span error.

TWO POINT CALIBRATION

If no error was detected or the percentage error for each is within the limits mentioned in the datasheet of the valve positioner, then there is no need to calibrate the valve positioner.

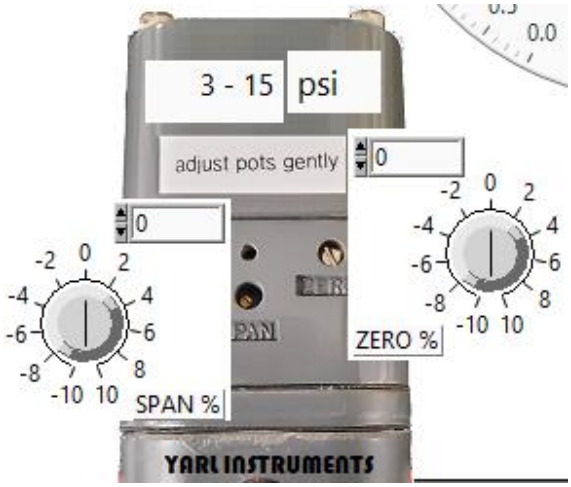
ZERO-OFFSET ERROR CORRECTION

Step 13. Close the air control valve.

Step 14. Turn the zero % knob to compensate for the estimated zero-offset correction or enter a value in zero % entry control and press enter button on PC keyboard.

Step 15. Open the air control valve.

Step 16. Apply 4mA which will deliver 3psi to the gauge. (NOTE: the pressure output values will correspond to the selected unit and range values).



Step 17. Repeat Step 13 to Step 16 a few iterations until zero-offset error is corrected.

SPAN ERROR CORRECTION

Step 18. Close the air control valve.

Step 19. Turn the span % knob to compensate for the estimated span correction or enter a value in span % entry control and press enter button on PC keyboard.

Step 20. Open the air control valve.

Step 21. Apply 20mA which will deliver 15psi to the gauge. (NOTE: the pressure output values will correspond to the selected unit and range values).

Step 22. Repeat Step 18 to Step 21 a few iterations until span error is corrected.

Enjoy calibrating pressure instruments!

YARL TECHNOLOGIES

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