Additel

Metrology Made Simple

ADT681A Calibration Manual

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1.0 – Scope

The Additel ADT681A series digital pressure gauges are durable IP67 rated devices which are easy to use and maintain, making them perfect for field work as well as laboratory use. Additional features include data logging, Bluetooth, and being intrinsically compliant. Please read this document carefully before attempting to perform any type of verification or adjustment. Also ensure that the operator has the metrological expertise and equipment to perform the work.

2.0 – References

- Additel 681A and 681AEx User Manual
- Additel 773, 783, and 793 User Manual
- Additel 151 Digital Pressure Module Datasheet
- Additel 161 Intelligent Digital Pressure Modules Datasheet

3.0 – Recommended Equipment and Specifications

Equipment	Specifications	Recommended Model
Pressure Controller	Applicable to the ADT681A ranges	ADT773, ADT783, ADT793
Reference Standard Modules	Applicable to the ADT681A ranges	ADT151, ADT161
Manifolds	Applicable to the ADT681A ranges	ADT121, ADT123
Hoses	Applicable to the ADT681A ranges	ADT100-HTK's, silicone tube, Festo tube, etc.
Connection Cables	USB cable type A to type C	9052

NOTE: Please ensure that all equipment is rated to handle the maximum pressure of the unit under test.

4.0 – Environmental Conditions

- Ideal Temperature and Humidity Conditions:
  - 23 ± 5°C with less than 80% relative humidity

5.0 – Diagrams and Descriptions

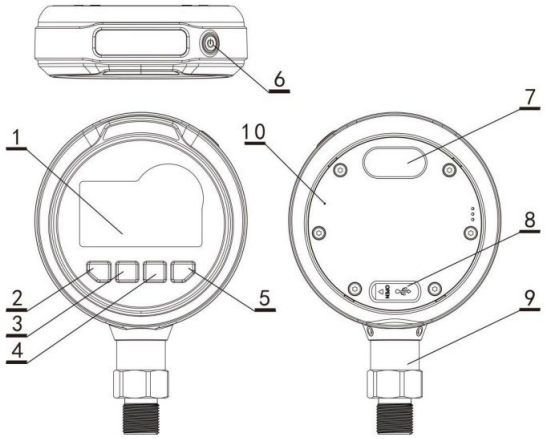

Diagram 5.1
(see chart below)

Diagram 5.2
(10 - Barometer Port)

No.	Part Name	Icon	Description
1	Display	/	Show pressure, menu……
2	Log button		Short press: Enter data log menu in main display or return to previous menu in non-main display.
			Long press: go to Settings in main display.
3	Unit button		Short press: Switch units in main display ormove to right in non-main display.
			Long press: view parameters in main display, or switch the features of fan-shape display
4	Backlight button		Short press: Backlight on/off in main display or move downward in non-main display.
			Long press: view peak values in in main display
5	Zero button		Short press: pressure zero in main display, or “Confirm” in non-main display
			Long press: Bluetooth On/Off in main display
6	Power button		Long press to power On/Off, short press to lock/unlock
			Long press to power On/Off, short press to lock/unlock
7	Communication module	/	RS232
8	USB TYPE-C	/	Communication and power supply
9	Pressure module	/	/
10	Barometer port	/	Visible after removing the back cover (with ATM mark), for barometer calibration connection

6.0 – Calibration Procedure

6.1 – Date & Time

1) Turn on the gauge by pressing the button  located at the top of the unit.
2) Press and hold the  button to open up the settings options.
3) Press the  button twice to navigate to the Date & Time row.
4) Ensure that the time is correct (titled 3-1).
    - If the time is not correct, edit the number by pressing the  button and adjusting the time using the  and  buttons. After inputting the correct value, press the  button to confirm.
5) Then press the  button and ensure that the day and month are correct (titled 3-2).
    - If the day and/or month are not correct, follow the previous sub step 4 to edit and confirm the correct values.
6) Press the  button again and ensure that the year is correct (titled 3-3).
    - If the year is not correct, follow the previous sub step 4 to edit and confirm the correct value.
7) Press the  button one more time to check the time format (titled 3-4).
    - The time format is indicated by a 12 hour (12H) or 24 hour (24H) time period, which is personal preference. Follow the previous sub step 4 to edit and confirm the preferred time format.
8) Once the Date & Time are confirmed to be correct, press the  button to return to the main pressure display.

6.2 – Gauge Exercise & Zero

6.2.1 – Exercise

1) Connect the gauge to the appropriate pressure system and ensure that all connections are sealed to prevent any pressure leakage.
2) Pressurize the system to the lower limit range of the gauge and allow it to stabilize for a sufficient amount of time.
    - NOTE: Additel typically allows 60 seconds of stabilization time.
3) Then pressurize the system to the upper limit range of the gauge and allow it to stabilize for a sufficient amount of time.
4) Repeat the lower and upper limit exercise for a recommended two cycles then vent the system when done.

6.2.2 – Zero

1) Vent the system for a sufficient amount of time to allow any trapped gas to escape.
2) Press the 

button to manually zero the gauge before pressure verification.
    - The gauge should not be zeroed when in absolute pressure mode.

6.3 – Pressure Verification

1) Connect the Unit Under Test - UUT (ADT681A) to the appropriate pressure system.
2) Ensure that the correct reference standards are being used and the system is sealed properly.
    - Using the correct standards will ensure that the Test Uncertainty Ratio - TUR is acceptable and proper system sealing prevents any pressure leakage from occurring during testing.
3) Determine the test points for the appropriate range.
    - Gauge pressure – GP typically has 9 test points:

      (0%, 25%, 50%, 75%, 100%, 75%, 50%, 25%, 0%)max range,

      Example: GP100 test points are (0, 25, 50, 75, 100, 75, 50, 25, 0)psi
    - Compound Pressure – CP typically has 11 test points:

      (-13psi, -7.25psi, 0%, 25%, 50%, 75%, 100%, 75%, 50%, 25%, 0%)max range,

      Example: CP100 test points are (-13, -7.25, 0, 25, 50, 75, 100, 75, 50, 25, 0)psi
    - Differential pressure – DP typically has 9 test points:

      (-100%, -75%, -50%, -25%, 0%, 25%, 50%, 75%, 100%)max range

      Example: DP100 test points are (-100, -75, -50, -25, 0, 25, 50, 75, 100)inH20
4) Source the correct amount of pressure for each test point.
5) Allow appropriate time for each test point to stabilize and record each measured value.
6) If the error % of tolerance is within the acceptable limit, the gauge has completed pressure verification.
    - NOTE: Additel recommends maintaining less than a 50% error of tolerance limit.
    - If the error % of tolerance exceeds the acceptable limit, the gauge must undergo calibration adjustment.

6.4 – Calibration Adjustment

1) Hold the 

button to access the settings menu.
2) Press the 

button three times until the display shows P-CAL (titled 4-1).
3) Press the 

button and the unit will ask for the password.
4) Use the 

and 

buttons to input the password to P1234 then press 

to confirm.
5) The display will now show either CAL-0 or CAL-1.
    - CAL-0 indicates that a customer calibration has yet to be performed on this unit while CAL-1 indicates that a customer calibration has been previously performed.
6) Press the 

button to begin the calibration adjustment.
7) The unit has either 3 or 2 calibration points depending on the range.
    - CP and DP ranges have 3 calibration points: lower limit, zero, and upper limit
    - GP ranges have 2 calibration points: lower limit and upper limit
8) Set the lower limit using the 

and 

buttons then press 

to confirm the value.
9) Source pressure for the lower limit value and allow sufficient enough time to stabilize. Press 

to confirm the lower limit calibration.
10) Set the upper limit using the 

and 

buttons then press 

to confirm the value.
11) Source pressure the upper limit value and allow sufficient enough time to stabilize. Press 

to confirm the upper limit calibration.
12) The display will now show CAL-1, indicating that the calibration adjustment was successful.
13) Press the 

button twice to return to the main pressure display.
14) Repeat the pressure verification.

6.5 – Barometer Verification (NOTE: BP is an optional feature for the ADT681A)

1) Press the 

button repeatedly to change the units to kPa.
2) Remove the gauge back panel and connect the gauge's atmosphere - ATM port to the appropriate barometer pressure system using a blue festo hose (4mm).
    - If necessary, refer to Diagram 5.2 above for the BP set up.
3) Determine the test points for barometric pressure – BP testing.
    - NOTE: Additel typically uses the 4 test points for BP testing: (60, 80, 100, 110)kPa.a
4) Source the correct amount of pressure for each test point.
5) Allow appropriate time for each test point to stabilize and record each measured value.
    - NOTE: Additel sets the barometric test tolerance at ± 55Pa.
6) If the error % of tolerance is within the acceptable limit, the gauge has completed barometer verification.
    - If the error % of tolerance exceeds the acceptable limit, the gauge must undergo barometer calibration adjustment.

6.6 – Barometer Calibration

1) Press and hold the 

button on the UUT (ADT681A).
2) Press the 

button three times to until the display shows P-CAL (titled 4-1).
3) Press the 

button to navigate to A-CAL (titled 4-2) then press 

to input the password.
4) Using the 

and 

buttons, input the correct password to P1234 then press 

to confirm.
5) The display will now show either CAL-0 or CAL-1.
    - CAL-0 indicates that a customer barometer calibration has yet to be performed on this unit while CAL-1 indicates that a customer barometer calibration has been previously performed.
6) Press 

to begin the barometer calibration.
7) Set the lower limit using the 

and 

buttons then press 

to confirm the value.
    - Typically, the lower limit for the barometer calibration is 60kPa.a.
8) Source pressure for the lower limit value and allow sufficient enough time to stabilize. Press 

to confirm the lower limit barometer calibration.
9) Set the upper limit using the 

and 

buttons then press 

to confirm the value.
    - Typically, the upper limit value for barometer calibration is 110kPa.a.
10) Source pressure for the upper limit value and allow sufficient enough time to stabilize. Press 

to confirm the upper limit barometer calibration.
11) The display will now show CAL-1, indicating that the barometer calibration was successful.
12) Press the 

button twice to return to the main pressure display.
13) Repeat the barometer verification.