Additel

Metrology Made Simple

ICS SCHNEIDER MESSTECHNIK

ADT685
Calibration Manual

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ADT685 Calibration Manual

1.0 – Scope

The Additel ADT685 series are modern digital pressure gauges with an easy to read/use touchscreen display. These gauges are fully temperature compensated, have a built-in barometer sensor, and are durable IP67 rated devices. They excel in all aspects of performance, durability and reliability. Additional features include data logging, being intrinsically compliant, and having various communication ports. 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 685 User Manual
- Additel 773, 783, and 793 User Manual
- Additel 151 Digital Pressure Module Datasheet
- Additel 161 Intelligent Digital Pressure Modules Datasheet
- Additel 761A User Manual
- Additel 286 Multifunction Reference Thermometer Readout User Manual

3.0 – Recommended Equipment and Specifications

Equipment	Specifications	Recommended Model/ Item Number/Description
Pressure Controller	Applicable to the ADT685 pressure ranges	ADT773, ADT783, ADT793
Reference Standard Modules	Applicable to the ADT685 pressure ranges	ADT151, ADT161
Manifolds	Applicable to the ADT685 pressure ranges	ADT121, ADT123
Hoses	Applicable to the ADT685 pressure ranges	ADT100-HTK's, silicone tube, Festo tube, etc.
Connection Cables	USB cable type A to type C USB cable type C to RS232 4-20 mA cable	9052 9050 13110000034
Electrical Power Source	Applicable to the ADT685 electrical ranges	ADT761A
Readout Device / Multimeter	Applicable to the ADT685 electrical ranges	ADT286

4.0 – Environmental Conditions

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

5.0 – Diagrams and Descriptions

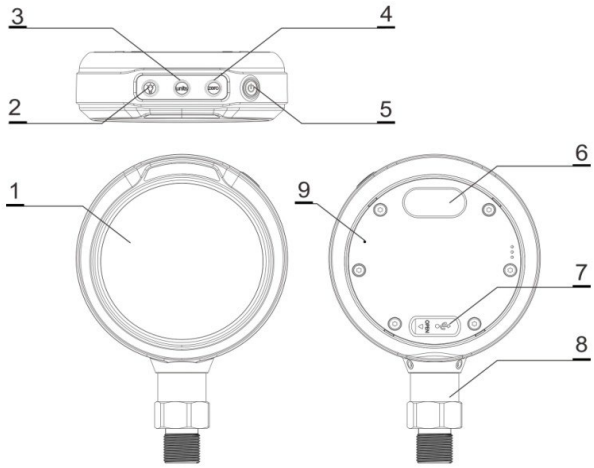

Diagram 5.1
(see chart below)

Diagram 5.2
(9 – BP inlet port)

No.	Part Name	Function
1	LCD Display	
2	Back Light Button	Turn on/off the back light
3	Units Button	Switch the pressure engineering units
4	Zeroing/Clear Button	Readings zeroing or to clear the number in number editing interface
5	Power On/Off / Reset Button	Long press to power on/off the gauge, short pressure to return to previous interface
6	Switchable Communication Module	Optional RS232, RS485, 2-wire (4~20) mA module and SWITCH
7	USB-Type C Port	Communication and power supply
8	Pressure module	
9	Barometric pressure inlet port	Visible after removing the back cover (with ATM logo), it is used for barometer sensor calibration

Diagram 5.3
(Main Display)

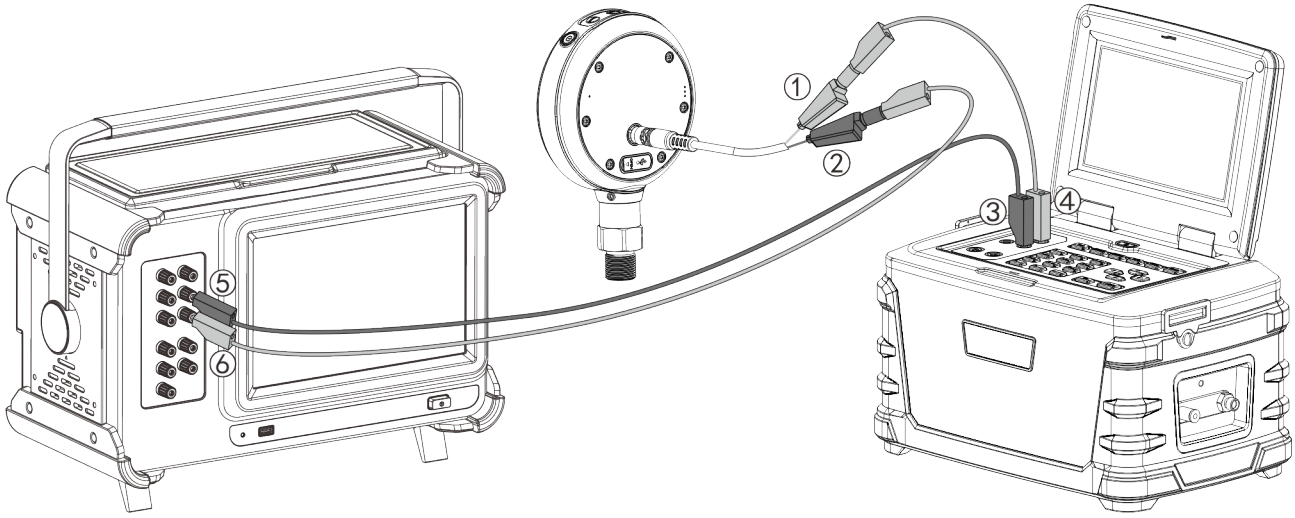

Diagram 5.4
(Set Up for 685-20MA)

6.0 – Calibration Procedure

6.1 – Date & Time

1) Turn on the gauge by pressing the **POWER** button located at the top of the gauge.
2) Press **Time** at the right of display to view the **TIME**. If necessary, edit the time by pressing the numbers and adjust it by pressing above to increase (or below to decrease) the digit. Press **OK** to confirm.
3) Press **TIME** to view the **DATE**. If necessary, adjust the date.
4) Press **DATE** to view the **TI-FMT**. The time format is set at either 12H or 24H and is personal preference. If necessary, adjust the format.
5) Press **TI-FMT** to view the **DA-FMT**. The date format displays the month (nnnn), day (dd) and year (YYYY) in a particular order, which is personal preference. If necessary, adjust the format.
6) **Only for a 12H TI-FMT** Press **DA-FMT** to view the **12H-FMT**. This format designated AM as a number 1 and PM as a number 2. If necessary, adjust the format.
7) Press **MENU** at the bottom of the display 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.
    - NOTE: Please ensure that all equipment is rated to handle the maximum pressure of the unit under test.
2) Pressurize the system to the lower limit range of the gauge and allow it to stabilize for a sufficient amount of time. Additel typically allows 60 seconds of stabilization time.
3) 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 an additional 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 **ZERO** button (top of the gauge or on the display) to manually zero the gauge before pressure verification.
    - The gauge should not be zeroed when in absolute pressure mode because doing so will add an offset to the test values.

6.3 – Pressure Verification

1) Connect the Unit Under Test - UUT (ADT685) to the appropriate pressure system.
2) Ensure that the correct reference standards are being used for an acceptable TUR and the system is sealed properly in order to prevent any leakage.
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) Compare the reference and UUT test values. Additel recommends maintaining less than 50% tolerance limit.

6.4 – Calibration Adjustment

1) Press **MENU** on the display to view the SETUP options.
2) Press **Cal** at the bottom-left of the display and input the password (PWD) as 123456 using the touch display. Press **OK** to confirm.
3) The display will now show IPM (internal pressure module calibration) near the top, the number of calibration points in the middle, and a calibration date (if any) at the bottom.
4) 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
5) Press **OK** to begin the calibration.
6) The display will show two sets of numbers: the pressure applied to the gauge (in the middle) and the lower limit point (displayed next to P1 near the bottom). To set the lower limit, press the number next to P1 and use the touch display to adjust it. Press **OK** to confirm.
7) Source the lower limit pressure and allow enough time to stabilize. Press **OK** to confirm the lower limit calibration.
8) The display will now show two sets of numbers again: the pressure applied to the gauge (in the middle) and the upper limit point (displayed next to P2 near the bottom). Set and confirm the upper limit.
9) Source the upper limit pressure and allow enough time to stabilize. Press **OK** to confirm the upper limit calibration.
10) The display will return to the IPM screen and will now show a calibration date near the bottom of the screen.
11) Press **MENU** twice to return to the main pressure display.

12) Repeat the Zero procedure (6.2.2).

13) Repeat the Pressure Verification (6.3).

6.5 – Barometer Verification

1) Press the **Unit** button (top of the gauge or at the top-right of the display) 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).
3) Determine the test points for barometric pressure – BP testing. Additel typically uses 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. Additel sets the barometric test tolerance at ± 55Pa.
6) Compare the reference and UUT test values. Additel recommends maintaining less than 50% tolerance limit.

6.6 – Barometer Calibration

1) Press **MENU** to view the SETUP options.
2) Press **Cal** and input the password as 123456 using the touch display. Press **OK** to confirm.
3) Press **IPM** to navigate to **ATM** (barometer calibration).
4) The display will show the title ATM near the top, the number of calibration points in the middle, and a calibration date (if any) near the bottom.
5) Barometer typically has two calibration points: 60kPa.a for the lower limit and 110kPa.a for the upper limit. Ensure that the number of calibration points is set at 2.
6) Press **OK** to begin the calibration.
7) The display will show two sets of numbers: the pressure applied to the gauge (in the middle) and the lower limit point (displayed as P1 near the bottom). To set the lower limit, press the number next to the P1 and use the touch display to adjust the limit. Press **OK** to confirm.
8) Source the lower limit pressure and allow enough time to stabilize. Press **OK** to confirm the lower limit calibration.
9) The display will now show two sets of numbers again: the pressure applied to the gauge (in the middle) and the upper limit point (displayed as P2 near the bottom). Set and confirm the upper limit.
10) Source the upper limit pressure and allow enough time to stabilize. Press **OK** to confirm the upper limit calibration.
11) The display will return to the ATM screen and will now show a calibration date near the bottom of the screen.
12) Press **MENU** twice to return to the main pressure display.
13) Vent the system and repeat the Barometer verification (6.5).

6.7 – 4-20mA Verification (NOTE: only for optional 20MA models)

1. Connect the gauge to the appropriate electrical system (see Diagram 5.4 above for the 685-20MA set up). Ensure that the electrical power source is outputting 24V, the readout device is set to measuring current, the bare wires of the cables are not touching, and the back panel of the gauge is secured tightly.
2. Press **MENU** on the display to open up the SETUP options.
3. Press **Comm** near the top right of the display.
4. Press the title **BLE** to navigate to the next option.
5. Press the title **4-20mA** to navigate to the next option again.
6. The display is now titled mATESt. Press the "**-----**" in the middle of the display to begin the mA test.
7. Determine the test points for the electrical test. Additel typically uses five test points for the 20MA test: (4, 8, 12, 16, 20)mA.
8. Source each test point. Edit the value of mA using the touchscreen display and press **OK** to confirm each individual test point.
9. Allow appropriate time for each test point to stabilize and record each measured value.
10. Compare the reference and UUT test values. Additel recommends maintaining less than 50% tolerance limit.

6.8 – 4-20mA Calibration

1. From the main pressure display, press **MENU** to open up the SETUP options.
2. Press **Cal** and input the password as 123456 using the touch display. Press **OK** to confirm.
3. Press the title **IPM** to navigate to **ATM**.
4. Press the title **ATM** to navigate to **mA** (mA calibration).
5. The display will show the title mA near the top, the number of calibration points in the middle, and a calibration date (if any) near the bottom.
6. The test for mA typically has two calibration points: about 4mA for the lower limit and about 20mA for the upper limit.
7. Press **OK** to begin the calibration.
8. The display will show two sets of numbers: the mA value applied to the gauge (in the middle) and the lower limit point (displayed as P1 near the bottom). Using the touchscreen display, adjust the lower limit point of P1 to match the mA value on the electrical readout device.
9. Allow enough time to stabilize. Press **OK** to confirm the lower limit calibration.
10. The display will not show two sets of numbers again: the mA value applied to the gauge (in the middle) and the upper limit point (displayed as P2 near the bottom). Using the touchscreen display, adjust the upper limit point of P2 to match the mA value on the electrical readout device.
11. Allow enough time to stabilize. Press **OK** to confirm the upper limit calibration.
12. The display will return to the mA screen and will now show a calibration date near the bottom of the screen.
13. Press **MENU** twice to return to the main pressure display.
14. Repeat the 4-20mA Verification (6.7).