ALIATEMP

Temperature Transmitter

ATT1000 Series

Operation Manual

CE

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1. Introduction

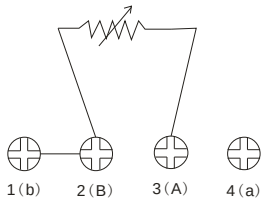
ATT1000 is applicable to hot resistance (RTD), thermocouple (TC) and linear resistance (Ω). It converts input signal into 4-20 mA output and equipped with HART communication function. The smart temperature transmitter is updated to compact transmitter as it's inside temperature sensor's junction box. It can be installed at site in the following ways: horizontal, vertical, wall mount, 2" bracket mount (If equipped with LCD, it can display in local indication).

2. Specifications

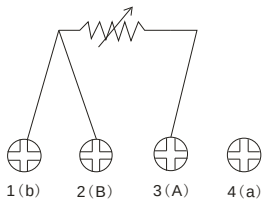
- Supply power: DC12V-32V
- Output signal 4-20 mA with HART protocol communication (2-Wire) ; HART communication won't influence 4-20 mA analog output
- Controlled remotely by operator and PC configuration software
- Signal stability: 0.01 °C (RTD), 0.1 °C (E J K N T), 0.2 °C (B R S)
- Output accuracy: 0.1 °C (RTD0), 0.5 °C (E J K N T), 1.0 °C (B R S)
- Cold junction compensation:
  Cold junction compensation type can be chosen from the circuit board that has HART function via software: disable cold junction compensation, enable internal cold junction compensation, enable external cold junction compensation. If "external cold junction compensation" is chosen, PT100 should be connected. So it's recommended to choose internal cold junction compensation. Default one is internal cold junction compensation.
  For common circuit board, cold junction compensation can be changed via special software. Generally it's defaulted, there is no need to change it.
- Damping: 0-32 s
- Data refresh rate: 2 times/s
- Stability: ±0.1%/year
- Working temperature: -40 °C~85 °C (LCD working temperature: -20 °C~70 °C)
- Mechanical vibration resisting: 10-60 Hz, 0.21 mm sine wave
- RF interference resisting: IEC61000-4-3, 20 V/M, 80-1000 MHz
- Alarm current: 3.9 mA or 22 mA

3. Wiring Diagram

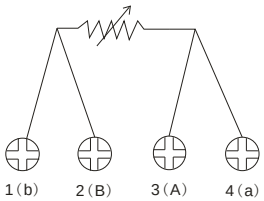
3.1 Type B / C / D



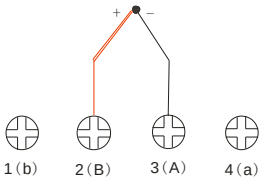
RTD 2 Wires



RTD 3 Wires



RTD 4 Wires



TC

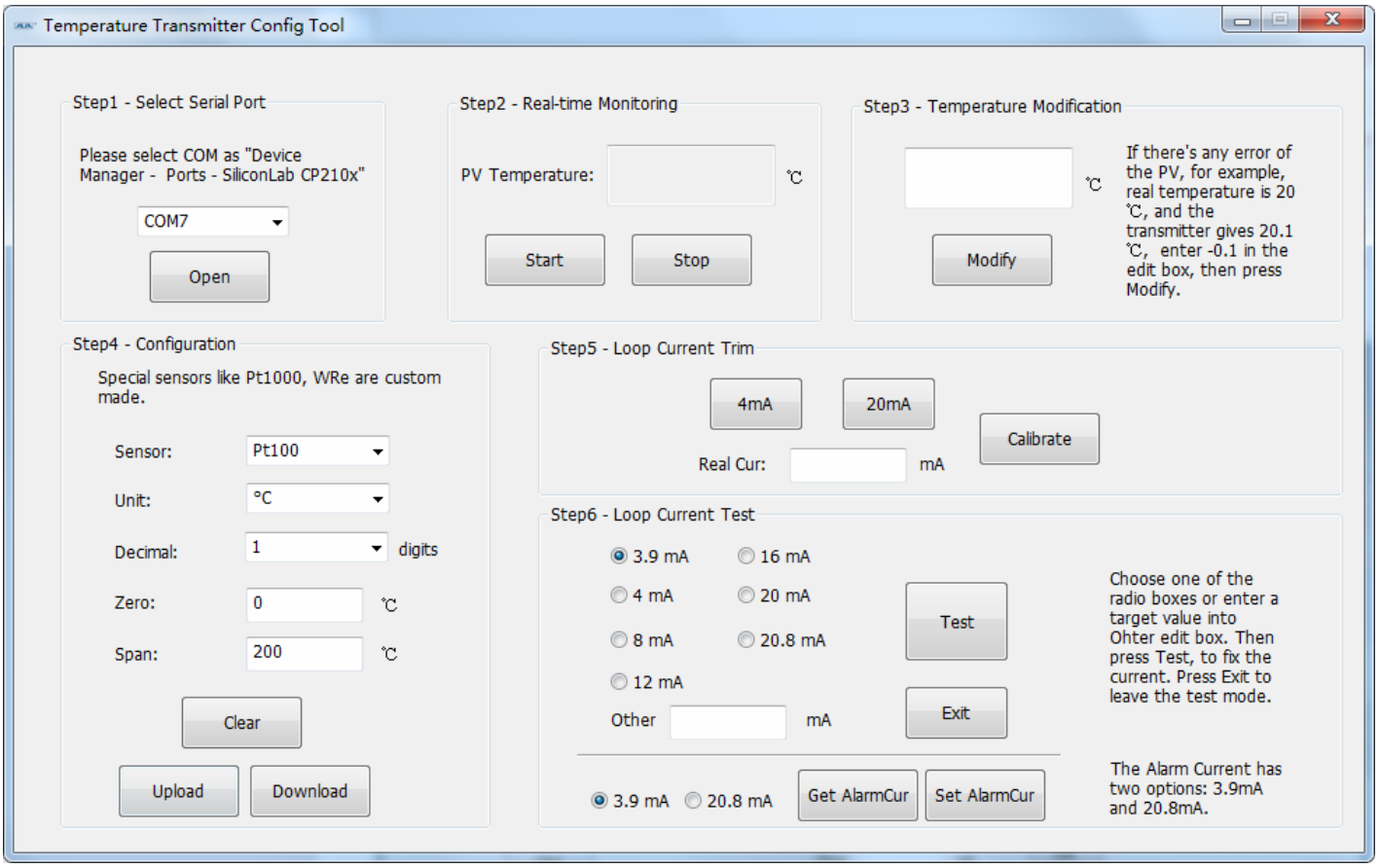
4. Parameters & Calibration

There are two kinds of circuit boards for ATT1000: one is equipped with HART function (but no display) and configured by ALIA Unique software; the other one is equipped with HART function (either display / no display) and configured by HART software. The following is to introduce parameter settings of there two circuit boards.

4.1 Converter parameters (setting by ALIA software)

If ALIA software and driver are installed, connect temperature transmitter and computer with USB cable, and supply 24 VDC to temperature transmitter. Upon opening the software, select the correct com port in option **Step 1** and click OPEN.

Configuration software main interface



Click Start in **Step 2** to achieve real-time monitoring. PV temperature can be displayed on line.

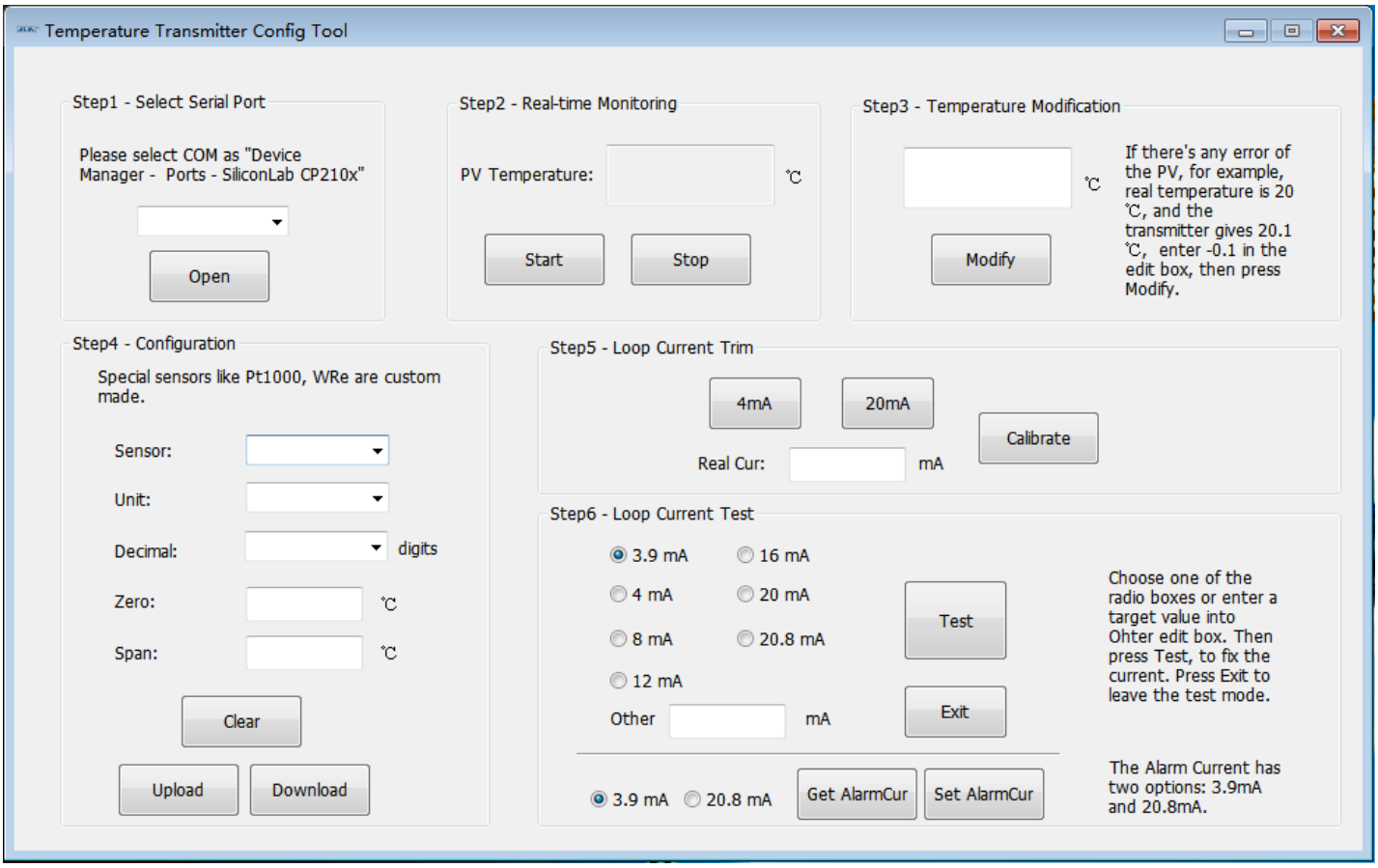
If there is a slight error between the displayed temperature value and the actual temperature value, please enter the error into **Step 3** and click Modify to complete the temperature calibration.

For example:

If there's any error of the PV, for example, real temperature is 20 °C, and the transmitter gives 20.1 °C, enter-0.1 in the edit box, then press modify.

Click Upload in **Step 4** to read transmitter's parameter settings. If parameters such as sensor type, range, decimal, zero and span settings are to be modified, it can be achieved by clicking Download after the modification.

Configuration software main interface



Step 5 is Loop current trim. Select 4 mA or 20 mA and connect a standard ammeter with 24V circuit in series. 4 mA or 20 mA current calibration can be completed by entering the actual current value which displayed on the standard ammeter into Real Cur and clicking Calibrate.

For example:

When calibrating 4 mA current, the current value measured by standard ammeter is 3.9 mA. 4 mA current calibration can be done by entering 3.9 mA into Real Cur and clicking Calibrate.

Step 6 is Loop current test. The transmitter can be forced to output the corresponding current value by selecting different current values or inputting the desired value (3.9-20.8 mA) in Other and click Test. This interface is mainly used to verify the accuracy of 4-20 mA output of the transmitter. Click Exit to exit current simulation function.

There are also alarm options. You can set to 3.9 mA or 20.8 mA, but the lower limit is fixed to 3.9 mA.

Notes:

1. Store and use it in a suitable location, the temperature ranges between -25 °C~85 °C and humidity should be less than 80%.
2. The USB communication cable used by the host computer is customized by ALIA. Do not use other communication cables to connect the module.
3. Since this product does not have display, the unit defaults to °C.
4. Real-time monitoring in Step 2 has to be stopped if do step3 to Step6.

4.2 Converter parameters (HART communication)

4.2.1 HART settings

For the circuit board with HART function, parameters can be set remotely by operator and PC configuration software

Procedures:

1) Sensor type:

   There are 14 kinds of RTD: PT50 a=391, PT100 a=385, PT100 a=391, PT100 a=392, PT1000 a=385

   Note: a=385 means 0.385 Ω/°C, the others are the same. “a=385” is commonly used.

   There are 12 kinds of thermocouples: E, J, B, K, N, R, S, T……

2) RTD wire

   If sensor type is chosen as RTD, you may have three options: 2-wire, 3-wire, 4-wire. Connection of sensor and circuit board will vary if RTD wire changes.

3) TC cold junction compensation

   If sensor is chosen as TC, cold junction compensation should be set: No Cold Comp., Ext Cold Comp., Int Cold Comp. usually it’s Int Cold Comp..

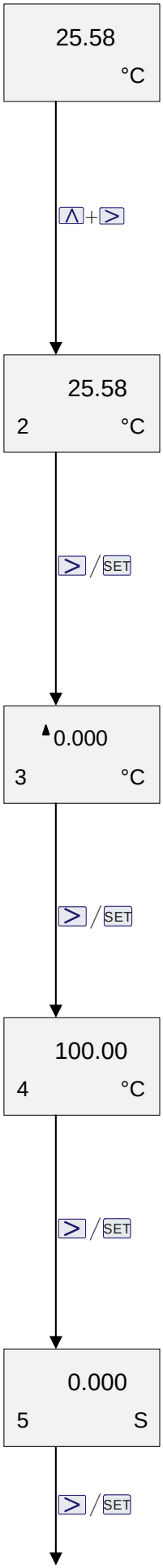
4) Set display unit and range of 4-20 mA

5) Damping (0-32 s)

4.2.2 Keypad

Name	Button	Function
SET		Enter interface; save parameters; shift to next menu
MOVE		Move cursor to the right
UP		Increase numerical value and change decimal point’s position

5. Operational Flowchart



Normal Interface

Hold ∧ to check shift of current, main variables and percent. They will shift every 3 s. Release the key until you confirm the display content.

Unit Settings (Code 2)

Under normal interface, hold ∧ and > keys at the same time for 3s to enter Code 2 directly. Press ∧ key to choose unit: Ohm, °C, °F, °R, K, mV. Press SET key to save setting and system will shift to Range Lower Limit window automatically.

Range Lower Limit (Code 3)

Press ∧ key once, the arrow in the left will flash. Press ∧ again to choose positive/negative. And press > key to move cursor.

Press ∧ key to change number. When the right point flashes, press > key to choose decimal point. Then press SET key to save setting and system will shift to Range Upper Limit window automatically.

Range Upper Limit (Code 4)

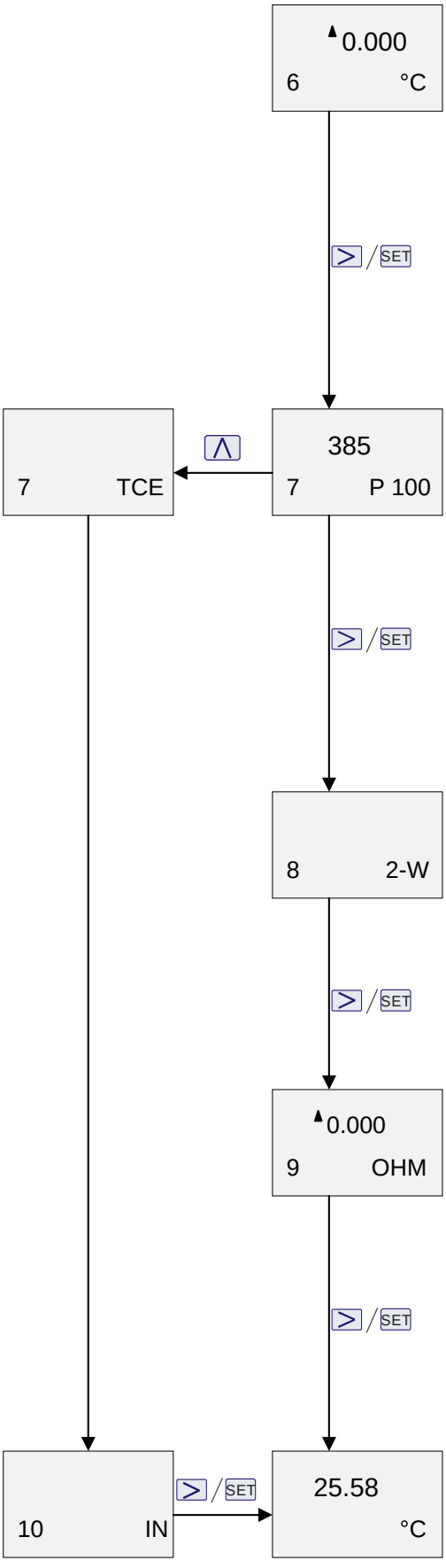
Operation is the same as those in code 3.

Note: value in code 3 is corresponding to 4mA output, value in Code 4 is corresponding to 20 mA output.

Damping (Code 5)

Press ∧ and > keys to change damping (0-32 s). If damping is low, the display will be more sensitive. If high, display will be slow but stable. Please set as what you needs. Default damping: 2s.

After value is set, press SET to save data. System will shift to zero elevation window automatically.



Abitrary Point Elevation (Code 6)

Transmitter will be calibrated before shipped out factory. But if user believe display value and actual are different, user can trim it in this window. Press ∧ and > to change value. If no need, press SET to enter next menu.

Suppose display is 25 °C while actual value is 30 °C, user just need to input 30 in this window. Then press SET key to save settings and system will shift to Sensor Type window automatically.
Note: do not change it unless necessary.

Sensor Type (Code 7)

Press ∧ key to choose sensor type:
16 RTDs: 385 PT50, 391 PT50, 385 PT100, 391 PT100, 392 PT100, 385 PT500, 385 PT1000 ……

Note: 385 means 0.385 Ω/°C, the others are the same. “385” is commonly used.

14 TCs: E J B K N R S T ……
Press SET to save settings. If sensor type is chosen as RTD, system will shift to window 8 or 9; if chosen as TC, system will shift to window 10.

RTD Connection (Code 8)

Press ∧ key to choose connection: 2_Wire, 3_Wire, 4_Wire.

Press SET key to save settings. If you choose “2__W”, system will shift to Code 9 automatically. For the other, system will shift to normal interface.

2-wire Linear Resistance (Code 9)

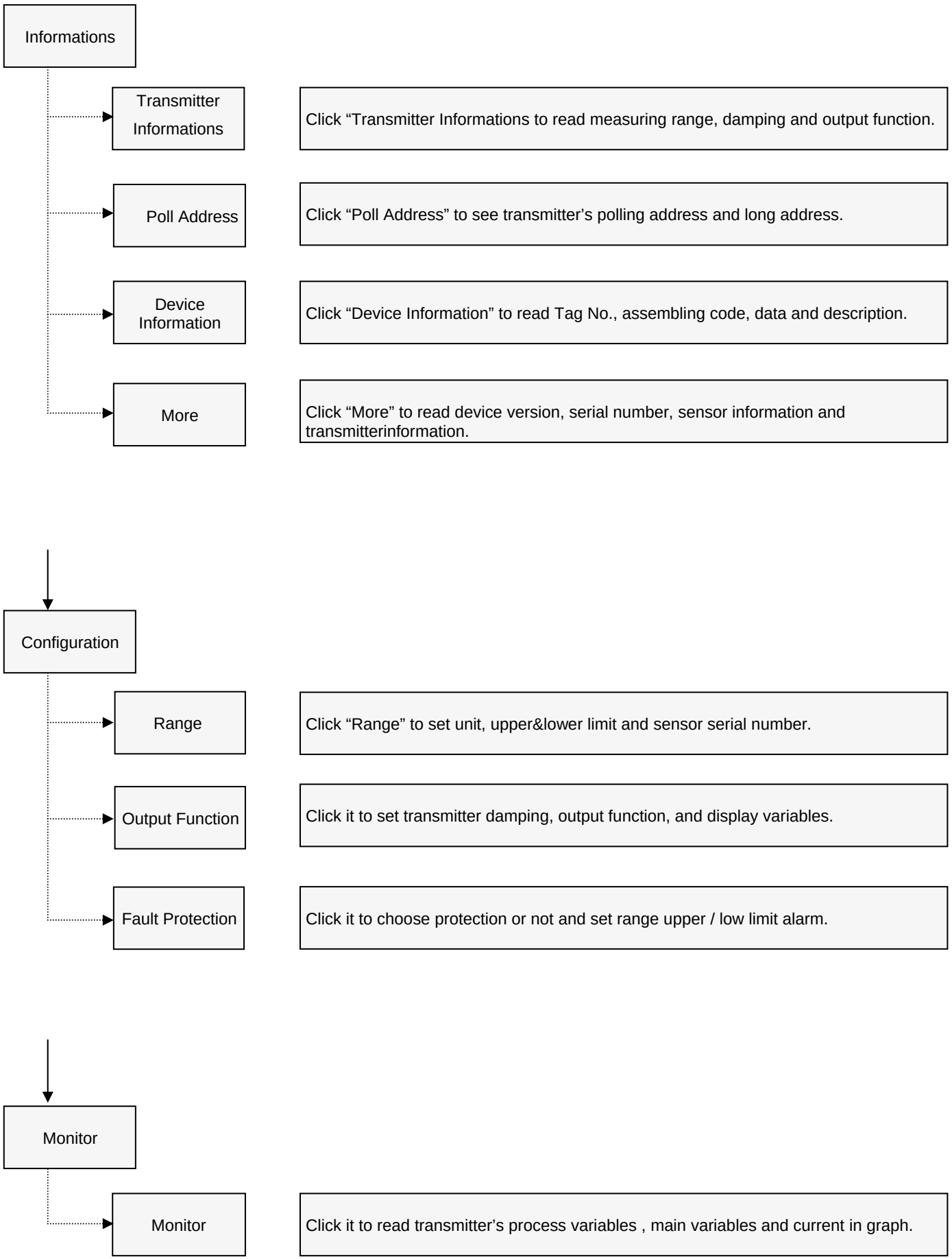
If Code 7 is chosen as “RTD”and Code 8 as “2__W”, press SET key to save settings to enter Code 9 menu. Measurement will be more accurate if 2-wire linear resistance is set.

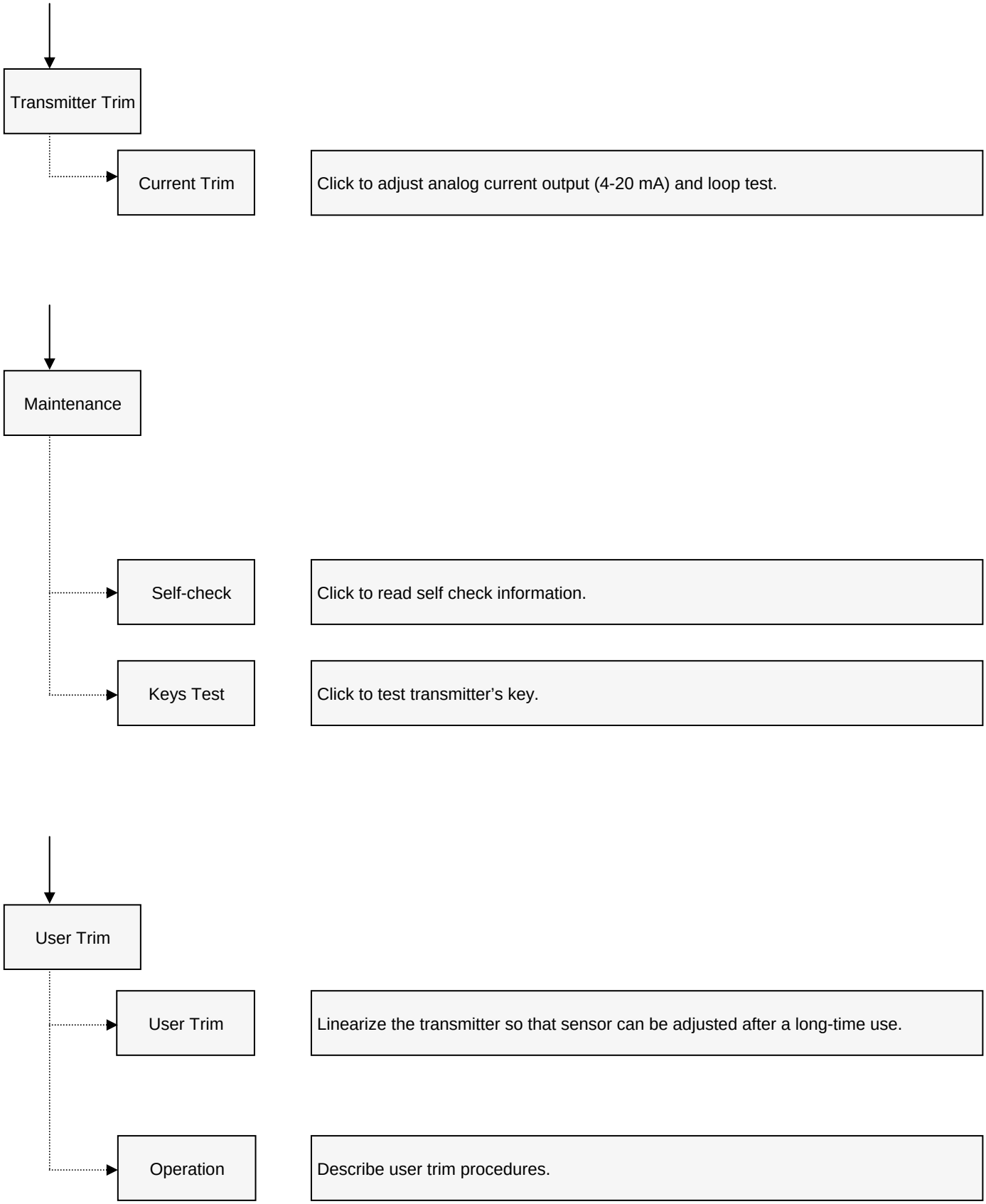
Press SET key to shift to normal interface.

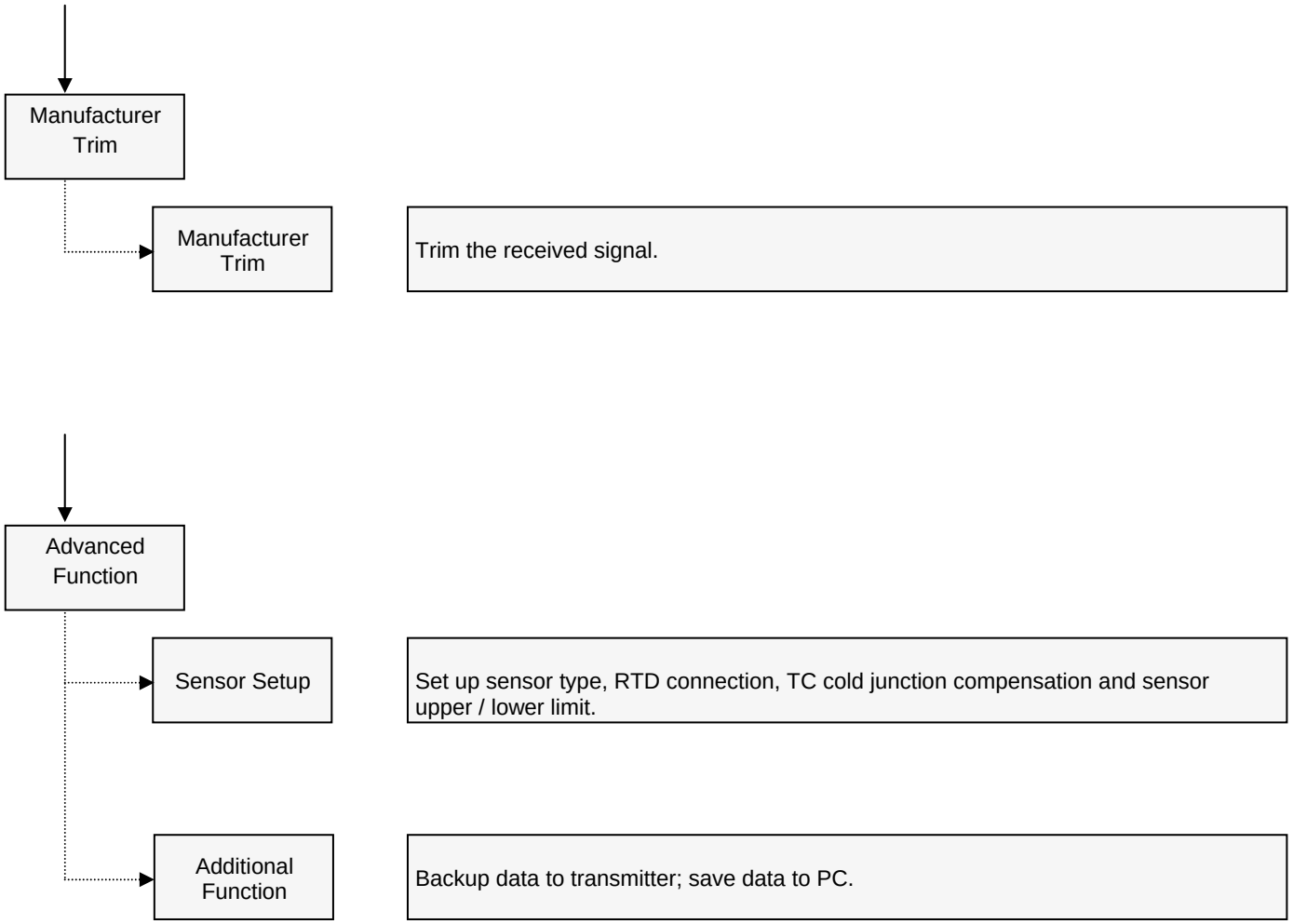
Cold Junction Compensation (Code 10)

If Code 7 is chosen as “TC”, press Set key to enter Code 10. Press ∧ key to circularly display IN, NO and EXT. IN means enable internal cold junction compensation, NO means disable cold junction compensation while EXT means enable external cold junction compensation.

6. Appendix 1 ALIA HART Flowchart




Transmitter Trim
Current Trim
Click to adjust analog current output (4-20 mA) and loop test.
Maintenance
Self-check
Click to read self check information.
Keys Test
Click to test transmitter's key.
User Trim
User Trim
Linearize the transmitter so that sensor can be adjusted after a long-time use.
Operation
Describe user trim procedures.


Manufacturer Trim
Manufacturer Trim
Trim the received signal.
Advanced Function
Sensor Setup
Set up sensor type, RTD connection, TC cold junction compensation and sensor upper / lower limit.
Additional Function
Backup data to transmitter; save data to PC.