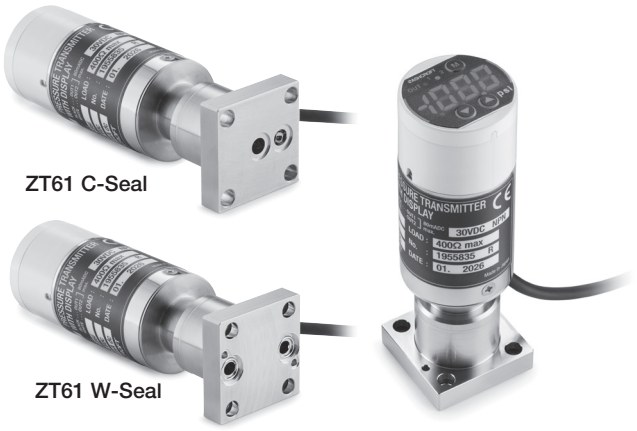
Installation and Maintenance Instructions for ZT61 High Purity, Surface Mount Pressure Transmitter with Display



ZT61 C-Seal

ZT61 W-Seal

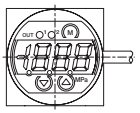
Table of contents:

1. GENERAL DESCRIPTION

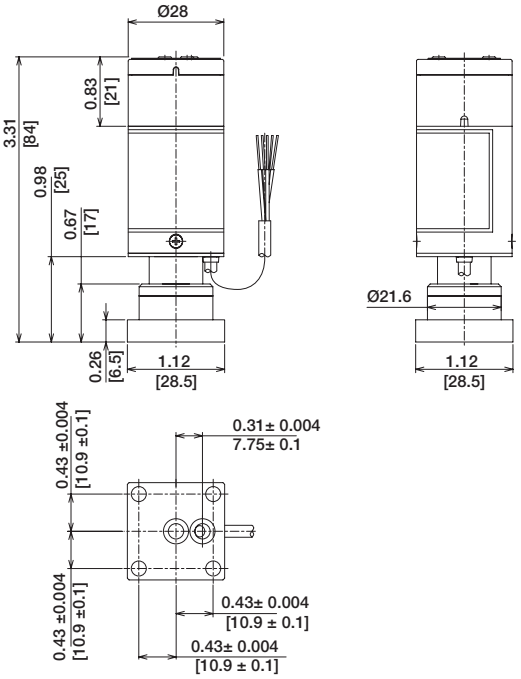
The ZT61 pressure transmitter is an ultra-compact pressure transmitter designed for the semiconductor industry. The ZT61 uses a Polysilcone strain gauge to translate pressure into an electrical signal. Certified to EN standards, the ZT61 offers excellent reliability and repeatability, while its all welded design provides protection from leakage.

2. PRODUCT DRAWINGS

ZT61 C-Seal

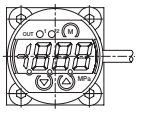


1.125 C-Seal

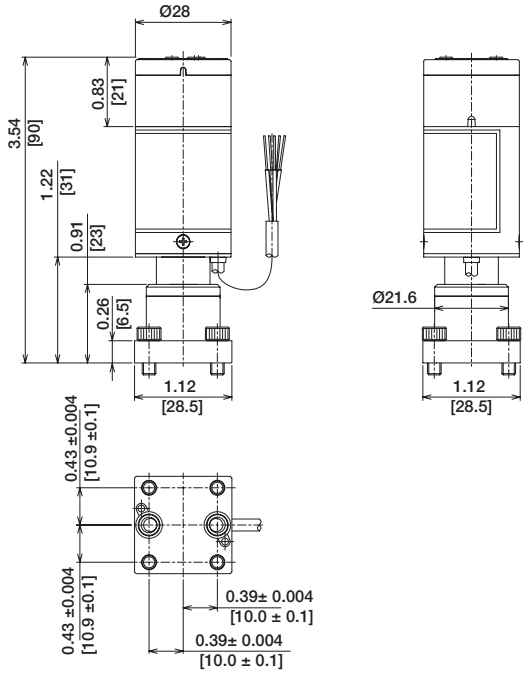


2. PRODUCT DRAWINGS (continued)

ZT61 W-Seal



1.125 W-Seal



3. INSTALLATION AND STORAGE

3.1 Installation

Open sealed bag in clean environment.
Do not expose wetted parts to moisture or dust.
Only use specified electrical output and gaskets for installation.
Take the following precautions when transporting and installing product:

⚠ PRECAUTION:

- Do not drop instrument or subject to extreme shock and vibration.
- Do not install in direct sunlight or areas subject to dust or surface particles.
- Do not to touch or breathe on the wetted parts as this may result in damage to the sealing surface.
- Do not use excessive force when installing the mating connector.
- Do not conduct snoop test to the sensor as this may deteriorate insulation resistance.
- It is recommended to purge the device with inert gas to remove atmospheric compositions, particles or foreign materials.
- Instrument for indoor use only.

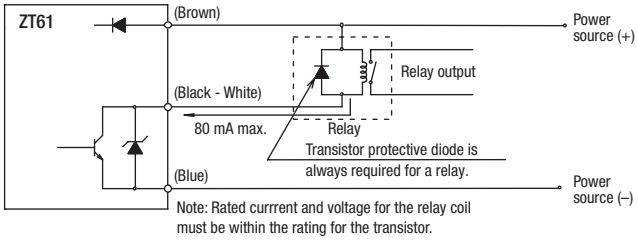
3.2 Wiring

- Connection of external instruments
  The comparator output comprises open collector output. Either “4 to 20 mA dc current output”, “1 to 5 Vdc voltage output”, or “0 to 10 Vdc voltage output” can be used as analog output (a choice when the device is ordered/a setting made at the factory).
  Open collector means that the collector of output transistor is open to users. It allows users various applications. Thus, it is user’s discretion as to how to use the open collector output. However, 3 main usage examples are shown below.

⚠ The rating of output transistor is 30 Vdc, 80 mA Vdc Please be sure never to exceed this rating. ⚠

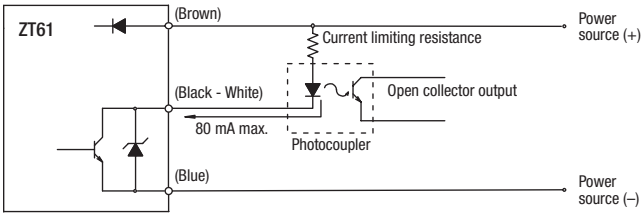
(1) An example of the wiring for NPN open collector

(A) Relay connection

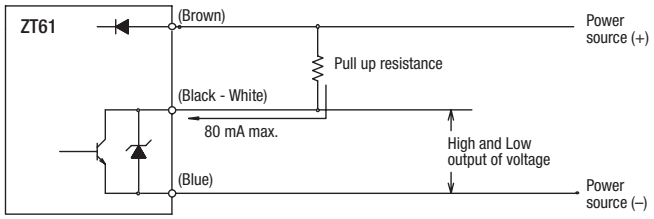


Note: Rated currrent and voltage for the relay coil must be within the rating for the transistor.

(B) Photo coupler connection

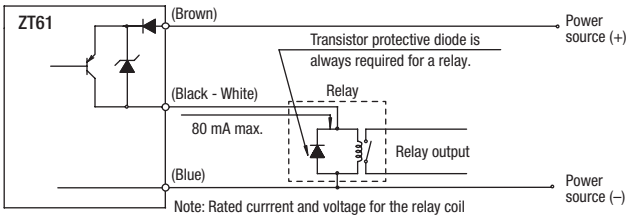


(C) Voltage output



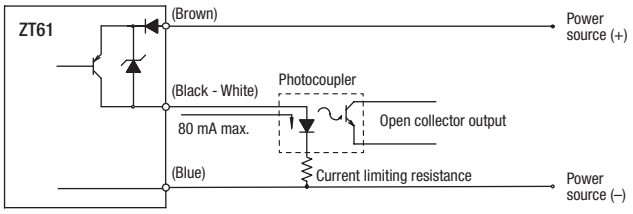
(2) An example of the wiring for PNP open collector

(A) Relay connection

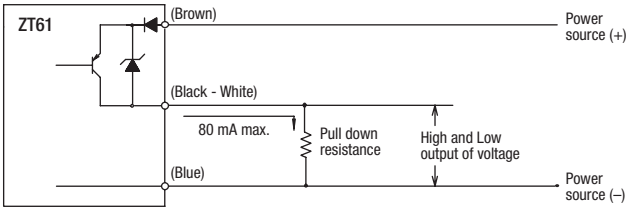


Note: Rated currrent and voltage for the relay coil must be within the rating for the transistor.

(B) Photo coupler connection

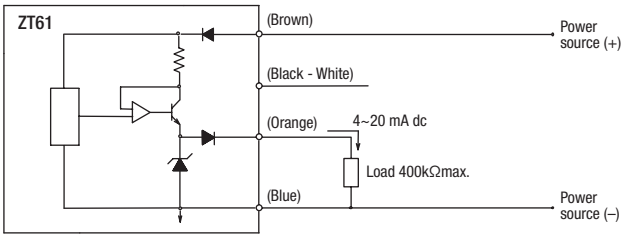


(C) Voltage output

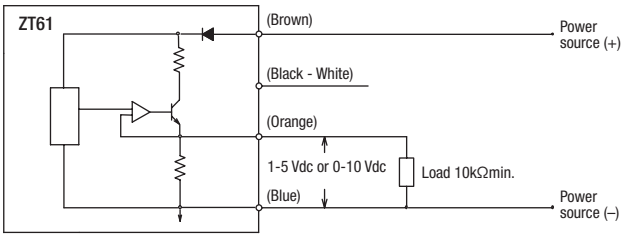


(3) An example of wiring for analog output
(A choice when the device is ordered/a setting made at the factory)

(A) 4 to 20 mA Dc
This is exclusively used as source. Never connect to the power source (+).



(B) 1 to 5 VDC or 0 to 10 VDC



⚠ PRECAUTION:

- Do not pull or bend cable with excessive force.
- Use a regulated Power Supply. Note the Load Resistance is 400 ohm Max and 10 kOhm Min.
- When soldering, take care that the soldering iron does not touch the sheath of the case or cable.

3.3 Cable Specifications

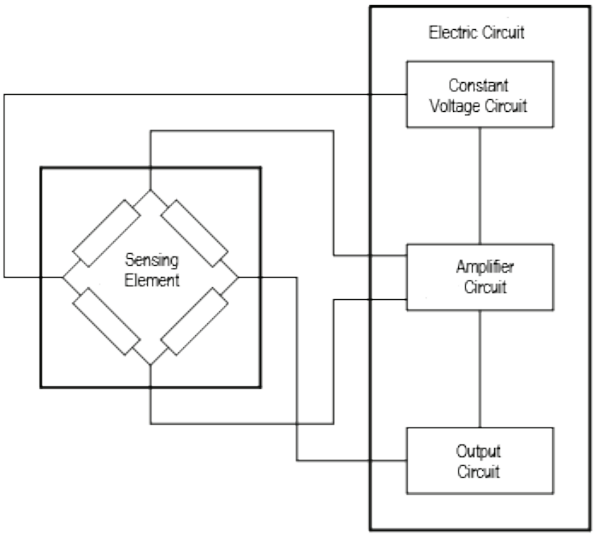
Specifications for connecting cables are as follows:
Use connectors which conform to the specification below.
[Cable specifications]

- Conductor OD:
  Approx. 0.54 mm (25AWG)·
- Insulator OD:
  Wire sheaths (Brown, Blue, Orange, Black, White)*…Approx. 0.84 mm / Coat/Jacket…Approx. 3.5 mm

*Where the cable sheath is peeled off, please note that the cable consists of 5 wires (Brown, Blue, Orange, Black, White)

3.4 Principal of Operation

The transmitter's sensing diaphragm converts pressure to an electrical signal by use of strain gages. The circuit is a full-bridge system where the strain gages are positioned on all four sides bridge and are used to detect the amount of strain. An electrical signal, proportional to the amount of strain, is then amplified to a specific value by the electrical circuit and transmitted as direct current or voltage output.



3.5 Storage Precautions

⚠CAUTION:

Do not store the transmitter under the following conditions:

- Exposed to water.
- Susceptible to adverse effects due to air pressure, temperature, humidity, ventilation, sunlight, particles, salt or sulfur in the air.
- Exposed to inclination, vibration or shock (including transportation time).
- Exposed to chemicals (chemicals' storage area) or gas.
- Exposed to direct sunlight or high temperature.
- Deformation and discoloration of resin parts may occur when product is stored in a sealed bag under high temperature and high humidity.

3.6 Operations

Before powering on the device, make sure the wire connection is correct and confirm voltage rating and current rating of power source device, and that the inner electrical resistance of externally connected devices do not exceed load resistance. Power on, and after **15 minutes or more warm-ups** in current-carrying status, perform offset (zero) adjustment then start main operation. Follow these cautions during operation.

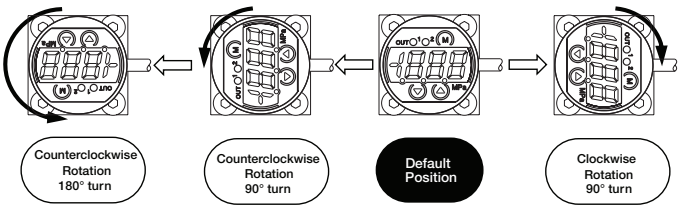
⚠ PRECAUTION:

- Do not apply pressure exceeding the rated pressure listed on the instrument's faceplate label.
- If used with corrosive gas, it is highly recommended that the pressure transmitter be fully purged with nitrogen gas prior to being removed for maintenance or other servicing. Leaving corrosive gas within a device will accelerate corrosion by forming strong acid or alkaline substance generated internally by moisture or oxygen within the atmosphere.

4. SETUP

4.1 Rotation mechanism of display part

This container can support all piping directions (as for every 90°) by turning only display part



⚠ PRECAUTION:

Rotation of the display should take place at time of installation. Rotation can be implemented up to 90 degrees for clockwise direction, up to 180 degrees for counterclockwise direction (by 90 degrees). Do not pose excessive force. Do not repeat rotation once direction is set.

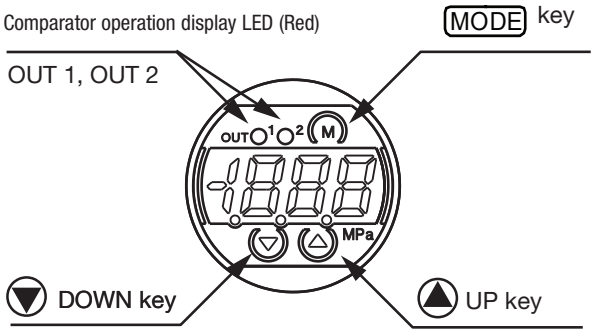
It is recommended that units undergo regular inspection once every 6 months. Calibration method or calibration standards should be determined and performed by qualified personnel.

[Inspection Checklist]

- External appearance.
- Insulation between each terminal and case (measure with 50 Vdc or less).
- Leak test of piping connection part.
- Output check with calibrated pressure standard.

4.2 Various mode changes (additional functions)

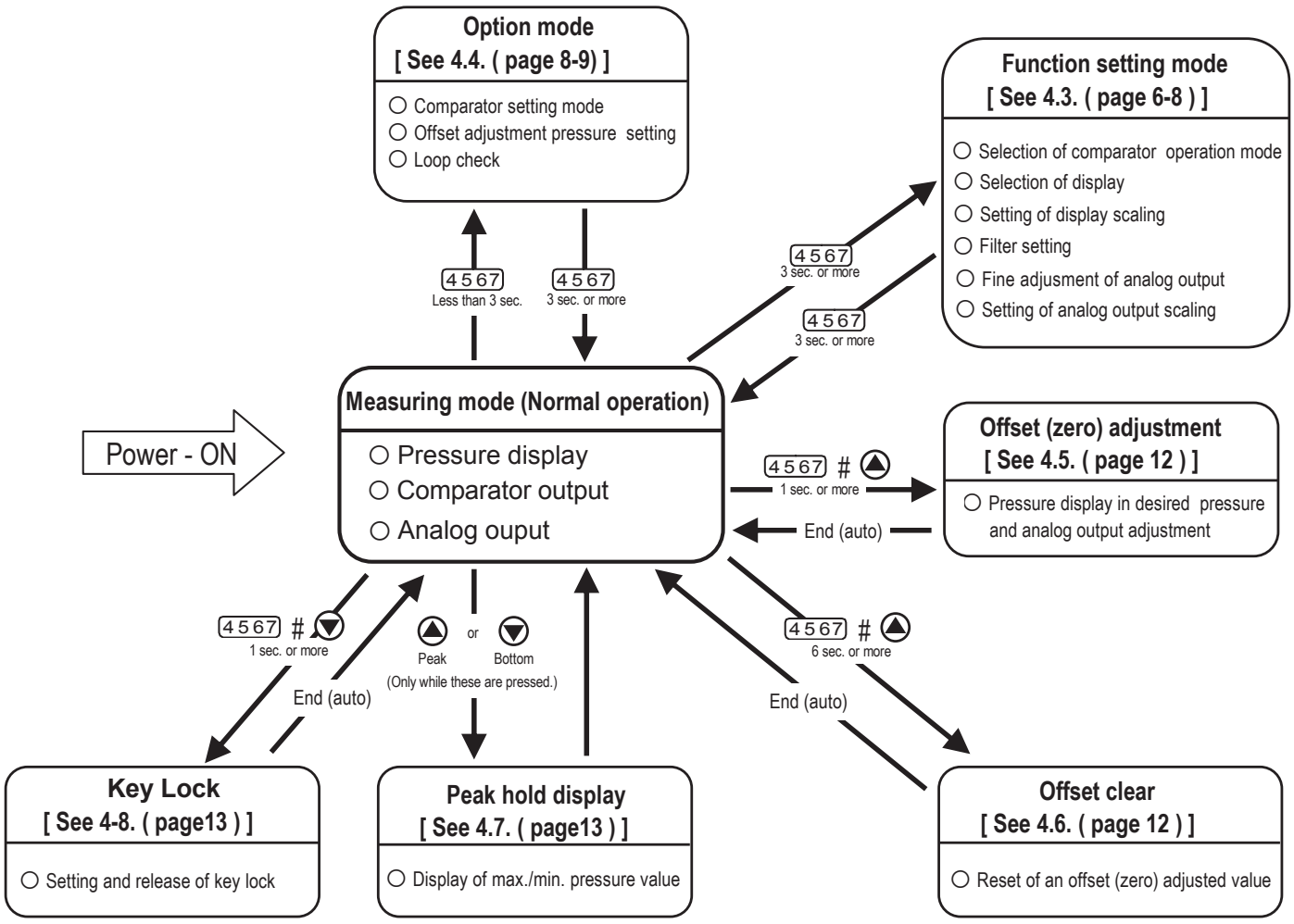
Keys on the panel



⚠ PRECAUTION:

To avoid making a hole on the panel make sure not to pose excessive force or to press keys with edged tools.

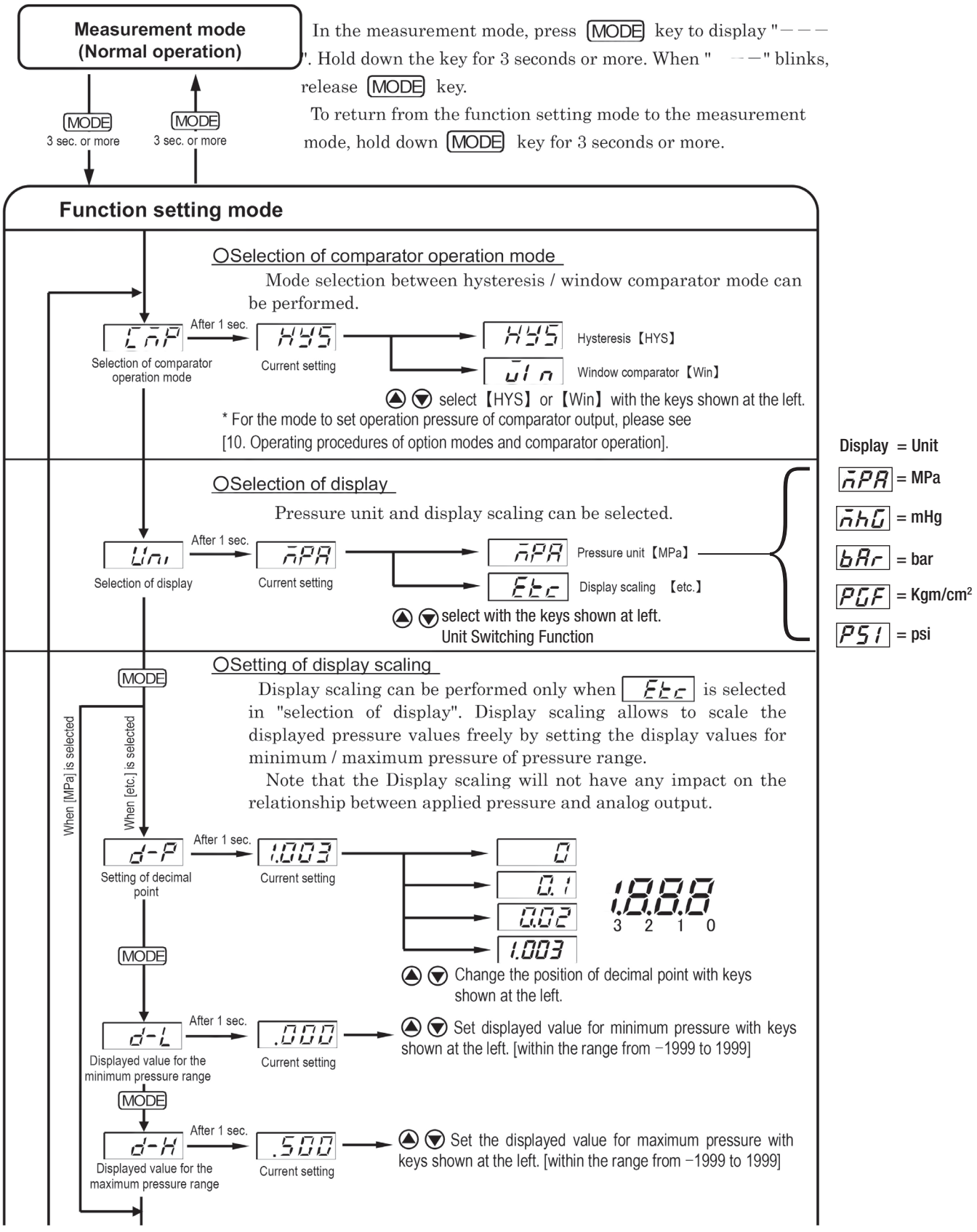
Mode and their functions



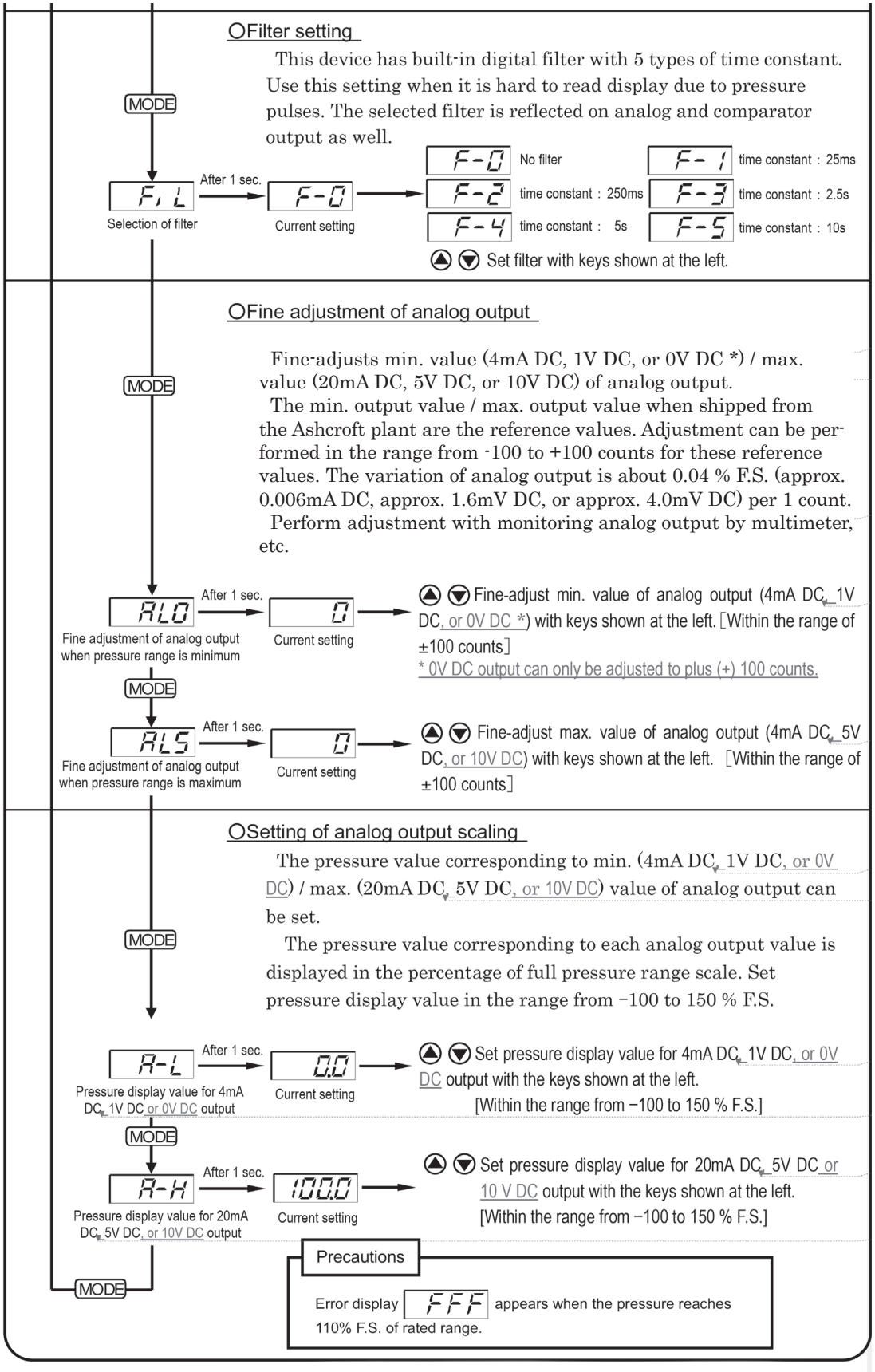
Basic key operations

Basically, various mode changes are performed with MODE key. Use ▲▼ key to set numeric values. Numeric value is incremented by ▲ key and decremented by ▼ key. Holding ▲▼ key down for 3 seconds or more results in repeat status and numeric value increments / decrements in 3 levels of speed.

4.3 Function setting mode



4.3 Function setting mode (continued)



4.3 Function setting mode (continued)

【Scaling examples of display and analog output】

○Display scaling

In the pressure range from 0 to 0.5MPa of ZT61, change the pressure display value from ".000 to .500" to "0.00 to 5.10".

- d-P Decimal point setting : 1.003 ⇒ 0.02
- d-L Display value of minimum pressure range : .000 ⇒ 0.00
- d-H Display value of maximum pressure range : .500 ⇒ 5.10

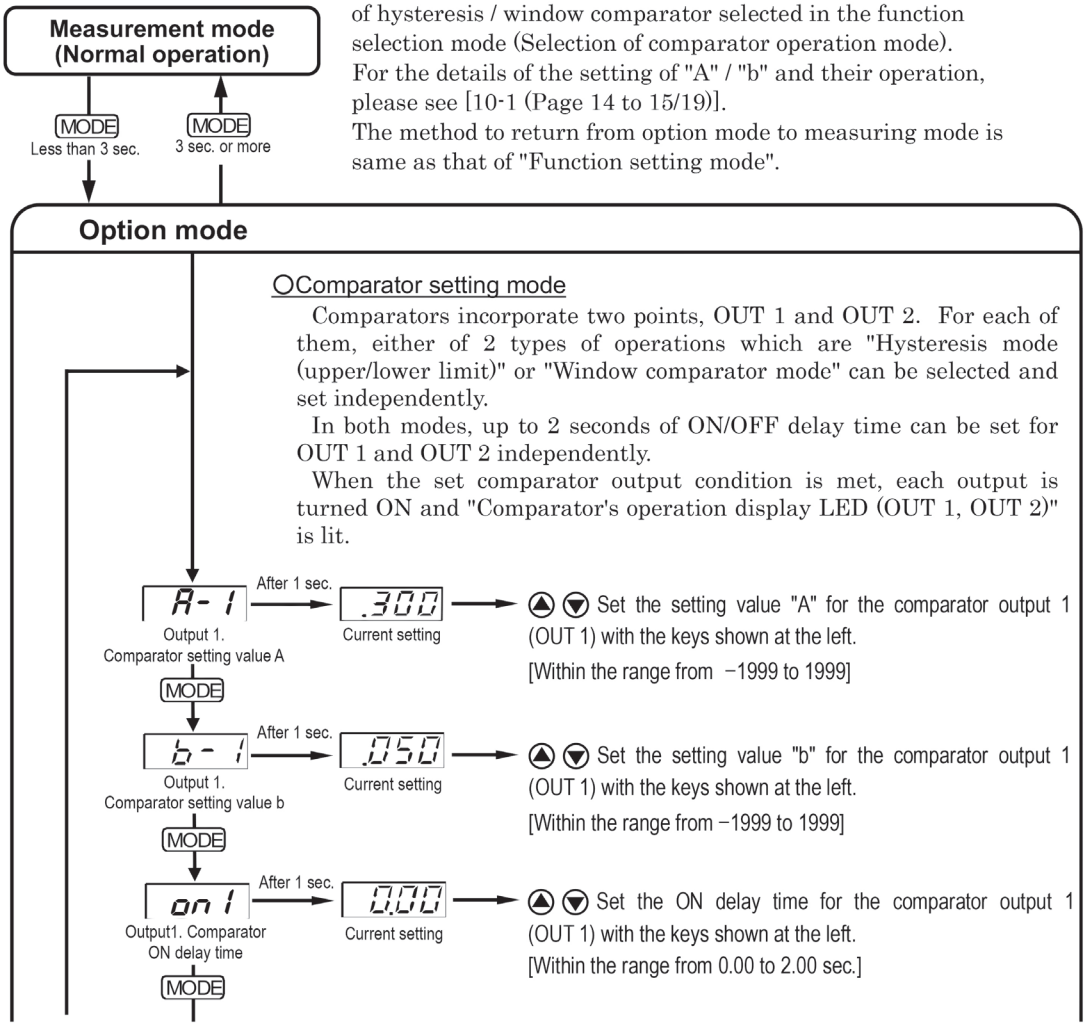
○Analog output scaling

In the pressure range from 0 to 0.5MPa of ZT61, set value so that 4 to 20mA DC, 1 to 5V DC, or 0 to 10V DC is output when the pressure is "0 to 0.490 MPa".

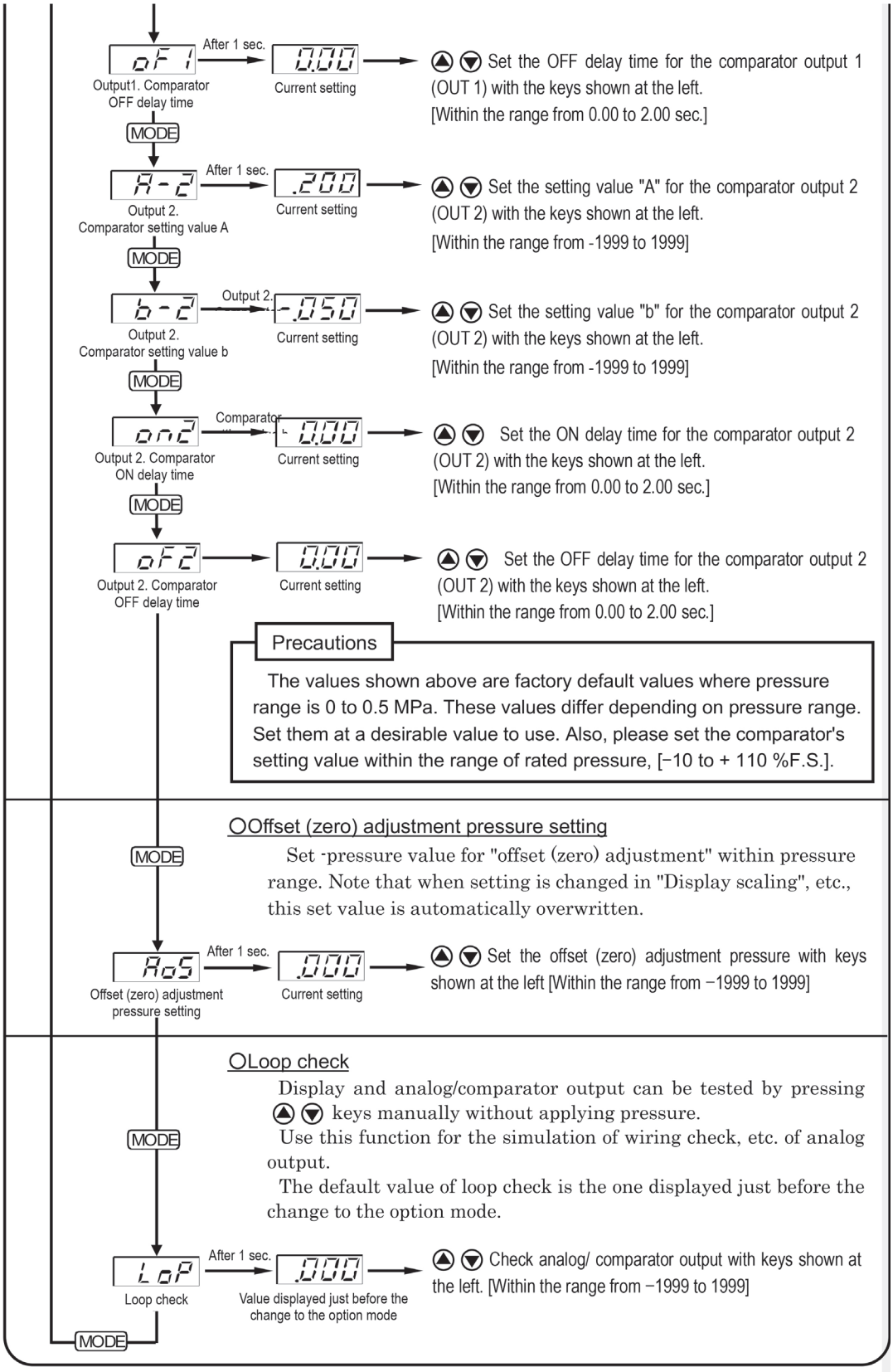
- A-L Pressure when output is 4mA DC, 1V DC, or 0V DC : 0.0 0.0% F.S. ⇒ 0.0 0.0% F.S.
- A-H Pressure when output is 20mA DC, 5V DC, or 10V DC : 100.0 100.0% F.S. ⇒ 98.0 98.0% F.S.

4.4 Operating procedures of option modes and comparator operation

In the measuring mode, press MODE key to display "_ _ _ ". Release MODE key within 3 seconds.
Within this option mode, the figures to be input in operation pressure setting mode for comparator output are to be "A" / "b" of hysteresis / window comparator selected in the function selection mode (Selection of comparator operation mode).
For the details of the setting of "A" / "b" and their operation, please see [10-1 (Page 14 to 15/19)].
The method to return from option mode to measuring mode is same as that of "Function setting mode".



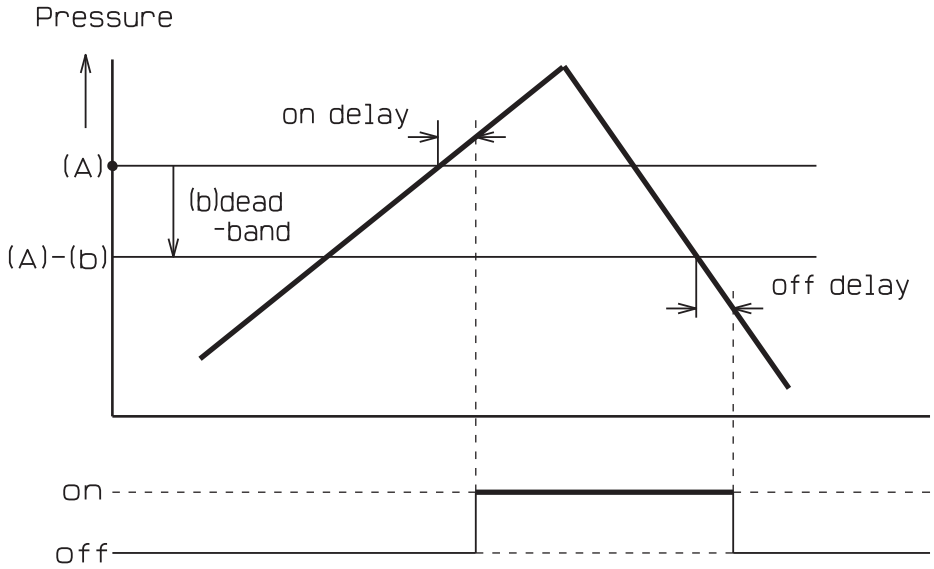
4.4 Operating procedures of option modes and comparator operation (continued)



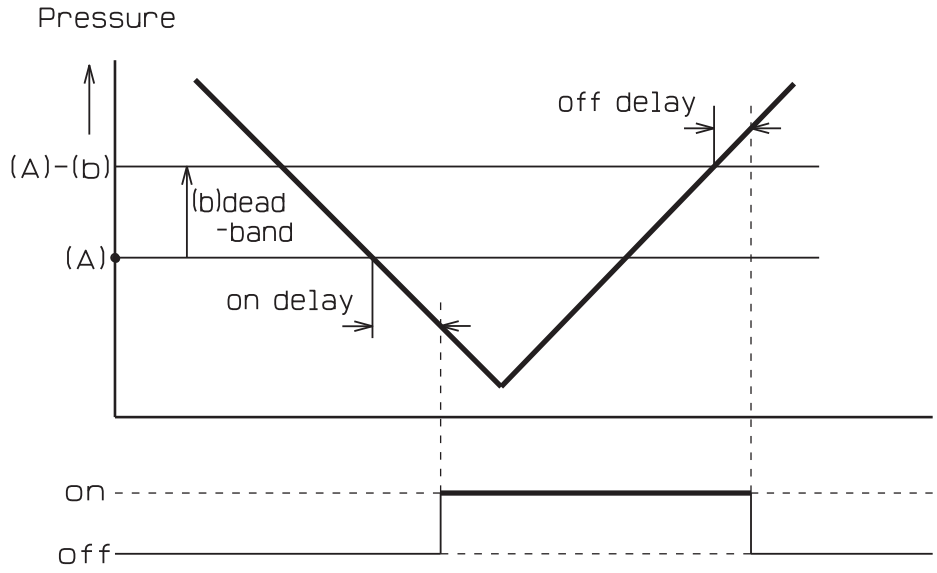
4.4 Comparator Operation

(1) Operation of hysteresis mode

• Setting the upper limit.
This is the mode in which the comparator operates with the setting item (A) as the upper limit.
The upper limit setting is determined when you select a positive figure (including 0) for setting item (b).



• Setting the lower limit
This is the mode in which the comparator operates with the setting item (A) as the lower limit.
The lower limit setting is determined when you select a negative figure for setting item (b).

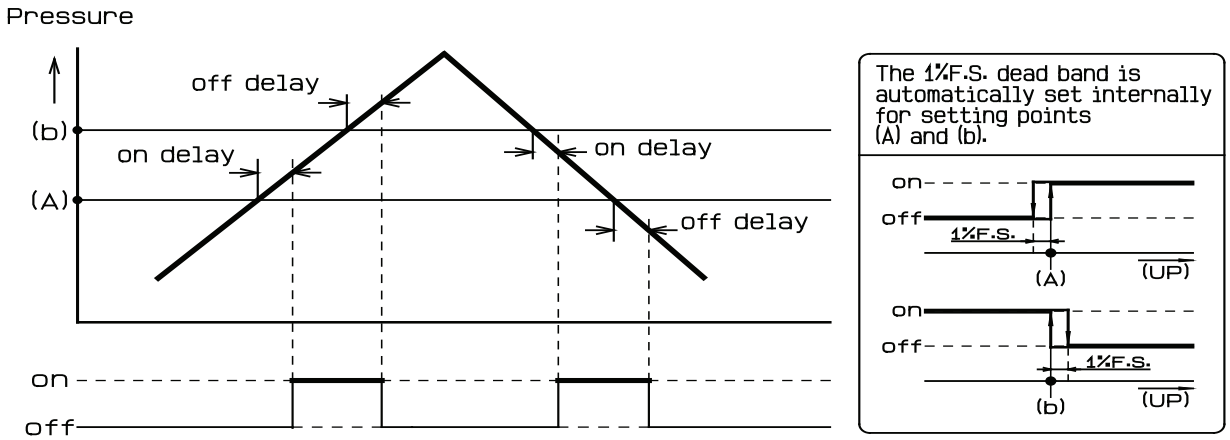


⚠ PRECAUTION:
The comparator might start chattering when the pressure is showing unstable condition such as pulsation, and also when the setting of dead-band is small. In such case, take the system safety measures as well as using the filter function and the delay timer (on, off delay) function. When dead-band is set zero, the operation could get unstable. It is recommended to set the hysteresis more than 1%F.S.

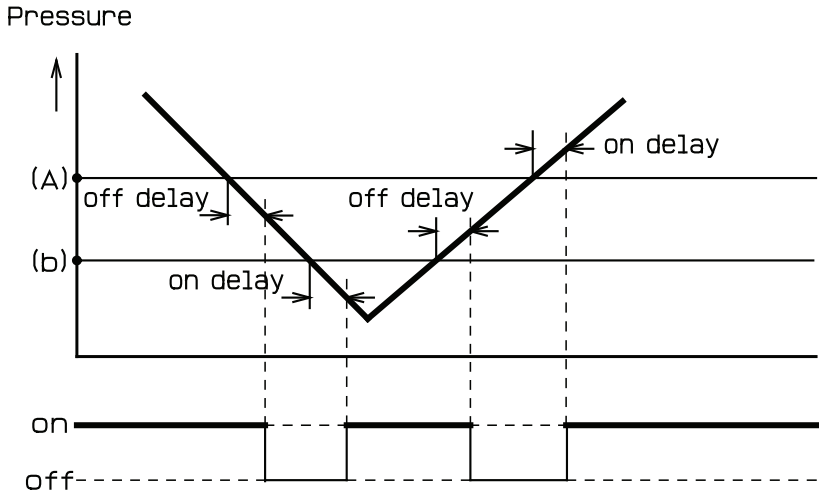
4.4 Comparator Operation (continued)

(2) Operation of window comparator mode

For (A) < (b)

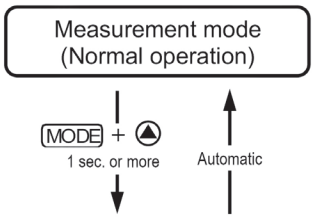


For (A) > (b)



When the ON and OFF delay time is set, the delay time counting starts from where 1%F.S. of initial setting is exceed.
Accordingly, the delay time will be 1%F.S. + setting delay time.

4.5 Offset (zero) adjustments



In the measuring mode, suppose applied pressure is the one set in "Offset (zero) adjustment pressure setting". Keep the pressure in this status and when MODE and ▲ key is pressed, "———" is displayed.
Hold down these keys 1 second or more and when " " blinks, release the keys. 1 second after these keys are released, the pressure display and analog output value are adjusted to the set value. When ▲ key is pressed after MODE key, make sure to press ▲ key within 3 seconds after MODE key is pressed.

Offset (zero) adjustment

After 1 sec.

○Pressure display in desired pressure and analog output adjustment

Offset adjustment is the function which allows to translate the pressure display value and analog output value into logical value in the pressure set in the ″Offset (zero) adjustment pressure setting″.

AdJ → AdJ is displayed when offset (zero) adjustment is successfully performed.

E-0 → E-0 is displayed when there is pressure difference of ±5.0% F.S. or more between displayed pressure and pressure set in "Offset (zero) adjustment pressure setting". (In this case, offset adjustment is not performed.)

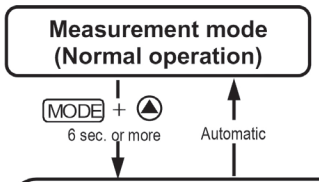
When conducting offset (zero) adjustment, note the followings:

Precautions

- ○ Before conducting offset (zero) adjustment, first power on the device and warm up for 15 minutes or more with current applied.
- ○ Make sure to confirm the pressure value set in "Offset (zero) adjustment pressure setting" before performing this function.
- ○ When conducting offset (zero) adjustment in other than air-ventilated status, make sure to apply exact pressure.
- ○ The offset (zero) adjustment pressure when factory default value is set at 0.000 MPa (in air-ventilated status).
- ○ If set values are changed in "Function setting mode", the set value of offset (zero) adjustment pressure is re-calculated and overwritten. If this re-calculated set value is out of display range, it will be converted to upper or lower limit value that can be processed by the device.

4.6 Offset clear

Offset clear



In the measuring mode, hold down MODE and ▲ key for 6 seconds or more.
When ▲ key is pressed after MODE key, make sure to press ▲ key within 3 seconds after MODE key is pressed.

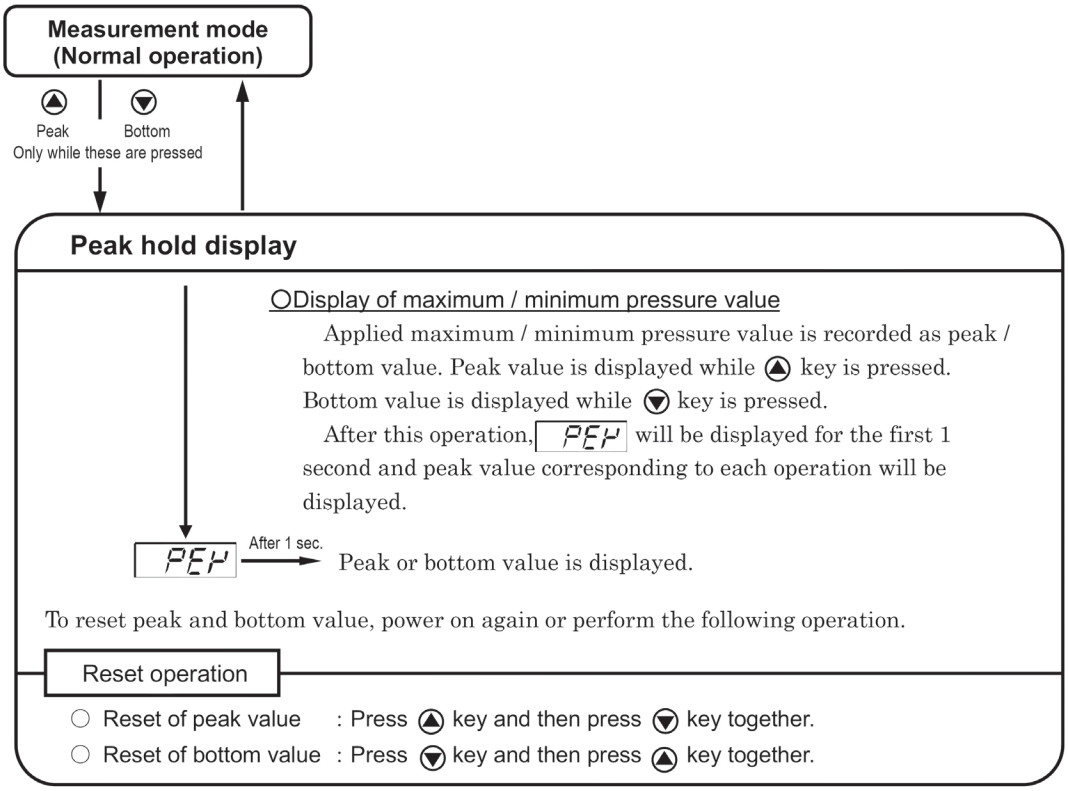
Offset clear

rES

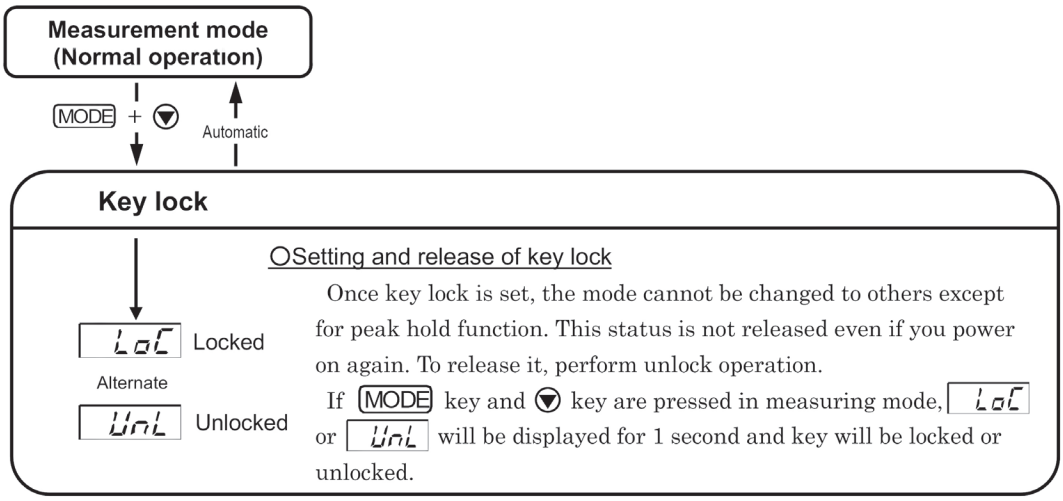
○Reset of an offset (zero) adjusted value

The pressure value and analog output value adjusted in "Offset (zero) adjustment" can be reset to the factory default value.
The pressure value set in "Offset (zero) adjustment pressure setting" is not changed.

4.7 Peak hold display



4.8 Key lock



4.9 Setting value back-ups

This device has built-in EEP ROM. Main set value and operation status are maintained while power is off.

【Maintained contents while power is off】

- ○ Stored set value : All set values of function and comparator setting modes and offset (zero) adjustment pressure.
- ○ Stored status : Key lock, and unlock status.

4.10 Error display

When any of errors shown below occurs, an error message and pressure is displayed alternately or only an error message is displayed.

【Various malfunction display】

Error display	Content	Procedure
FFF	Occurs when the pressure range modulates over 110% or the display passes 1999.	Adjust the applied pressure within the rated pressure.
-FFF	Occurs when the pressure range modulates below −10% or the display goes below −1999.	
E-0	There is pressure difference of ±5.0% or more between the displayed pressure value and the pressure value set in the "Offset (zero) adjustment pressure setting".	Apply correct pressure using standard pressure instrument.
E 1-	Compalator 1 is overloaded.	Please limit load current up to 80mA DC to use. To recover from an error, check the wire connections and rating of the connected instruments then turn on the power again.
E-2	Compalator 2 is overloaded.	
E 12	Both compalator 1 and 2 are overloaded.	
E-3	Investigation at Ashcroft is required.	Contact Ashcroft

5. MAINTENANCE

5.1 Maintenance

It is recommended to perform a periodic inspection of the device every six months, or at an interval that is preferred by the user.

5.2 Zero and span adjustments

Note that a zero offset adjustment is done through the display. This will adjust the LED display and the analog output to both reflect their individual zero value.

Refer following checklist for periodic inspection.

- External appearance.
- Insulation between each terminal and case (measure with 50 Vdc or less).
- Leak test of piping connection part.
- Output check with calibrated pressure standard.

6. WARRANTY

If the delivered products within the warranty period (one year from the date of manufacture) are determined to be non-conforming products according to “Defects due to the design or manufacturing”, they will be repaired or replaced with conforming products free of charge.

However note the following are excluded:

(1) Where the delivered products are disassembled, altered or if its parts are replaced or a new function is added by the user or any third party.

(2) Where directions described in the instruction manual are not followed.

(3) Where the non-conformance is caused by deterioration due to use, natural disaster, fire or other force majeure events.

(4) The secondary damage caused by the non-conformance of the products including the above.

Returned units are subject to evaluation by Ashcroft prior to determining warranty.

7. OTHERS

This instruction manual is not intended to cover all equipment and/or installation and maintenance details. Please contact Ashcroft if additional detail is sought, or in the event that the instrument does not adequately serve your company’s intentions.

Additionally, this instruction manual may be changed, at anytime, without prior notice for the purposes of version upgrades, revisions etc.

Thank you for your understanding and cooperation.