



INSTRUCTION MANUAL  
FOR  
BATTERY TYPE DIGITAL PRESSURE GAUGE  
MODEL ZT64

# MANUAL FOR ACCURATE AND SAFE OPERATION

## SAFETY CHAPTER FOR DIGITAL PRESSURE GAUGE

To use these devices accurately and safely, carefully read this manual and the operation manual. Incorrect usage may cause malfunction and result in human injury, accidents, etc.

Be sure to keep this manual for reference after reading.

### WARNING

1. Do not apply more than the maximum allowable pressure.  
Human injury or damage to surroundings may result due to explosion or breakdown of the pressure elements.
2. Use with the unspecified power supply may cause fire hazard or electric shock.
3. Do not use these devices on measured objects which are corrosive to fluid or gas contacting areas.  
Human injury or damage to surroundings may result due to explosion or breakdown of the pressure elements and exposure of dangerous measured objects.
4. Do not apply excessive weight, vibration or shock.  
Human injury or damage to surroundings may result due to explosion or breakdown of these devices and exposure of dangerous measured objects.
5. This gauge does not have an explosion-proof construction.  
Do not use in dangerous places with flammable gas or fluid liable to cause ignition and explosion.
6. Connect wiring accurately according to the wiring drawings or instructions in the operation manual.  
Incorrect wiring may result in human injury or fire hazard.
7. Use with the instrument temperature range.  
Use outside the instrument temperature range may cause human injury or damage to surroundings due to explosion or breakdown of the devices.
8. If the measured object is oxygen, use devices with anti-oil treatment.  
Standard devices may possibly contain remaining oil, and there is danger of combustion and explosion if oil acts on oxygen.
9. Accurately install these devices according to the installation instructions in the operation manual.
10. Never attempt to reconstruct the main body of devices nor add any new function to the devices, etc. Contact us for repairs.
11. Accurately operate switches according to the operating method described in the operation manual. Incorrect operation may cause malfunction.
12. As this is a precise gauge, keep sources of noise as far away as possible.  
Suppress noise with a noise suppressor, etc. When supplying power to this gauge.

Note : Inform us in advance when using these devices in a way that may result in fatal or serious injury due to malfunction or incorrect operation.

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## 1. Outline

The industrial ZT64 battery-operated pressure gauge is a compact, digital display (3 digit LCD) pressure gauge to replace the conventional Bourdon pressure gauge used for measuring pressure-regulating valve at primary and secondary pressure.

Compared to a Bourdon pressure gauge, when equipped with a semiconductor strain gauge sensor, the amount of dead space is reduced. So this is an ultra clean method (UC grade) digital pressure gauge for high purity gas. In addition, selections can be made from a wide variety of UC and BA grade, and general use and gas type.

## 2. Features

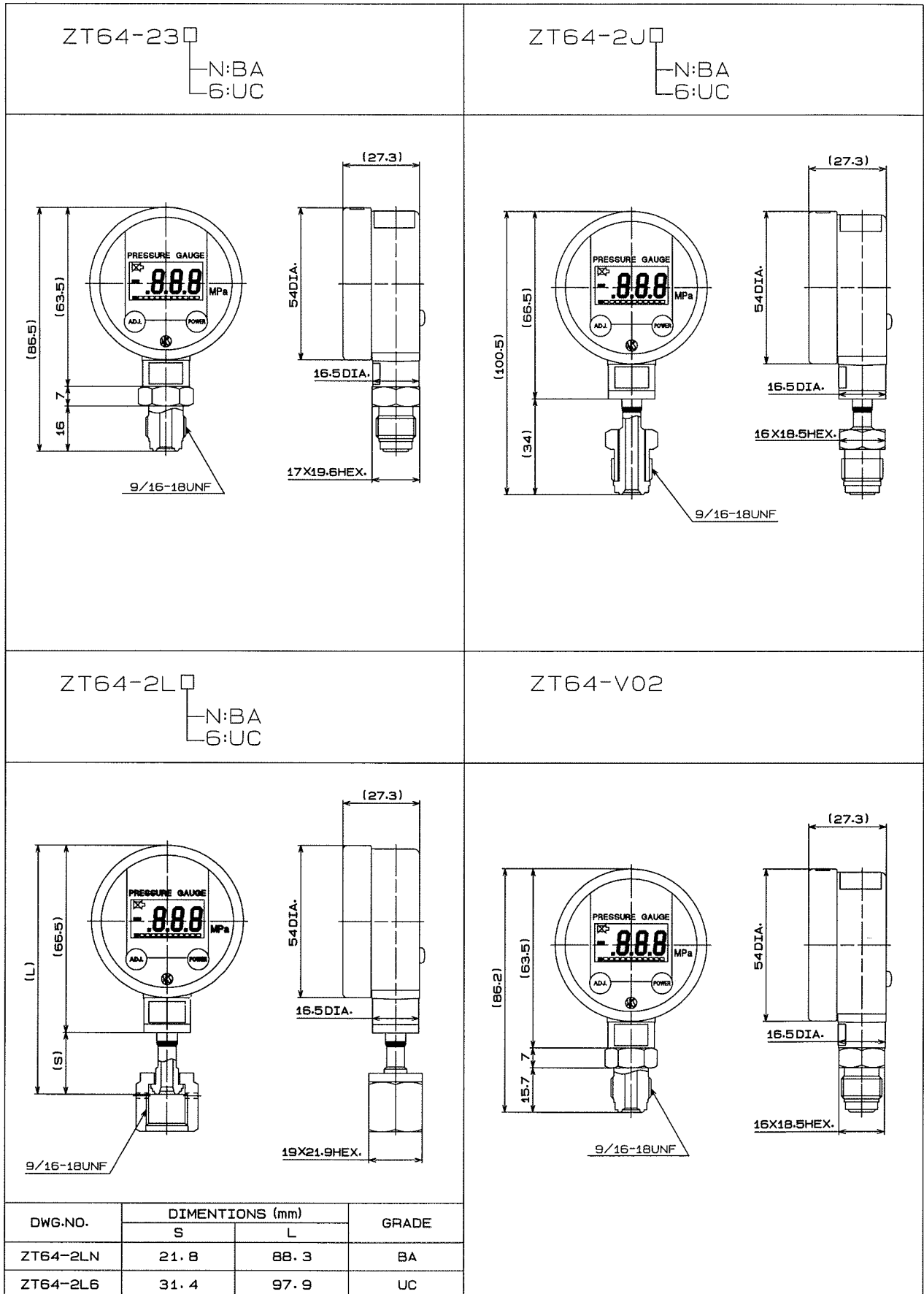
- (1) The UC and BA grade gauges use Co-Ni alloy sensors on their pressure sensing parts (diaphragm), so they are extremely corrosion resistant as well as having high safety and durability levels.
- (2) The gas-contacts surface of UC grade is flat to sub-microns, preventing the generation of particles.
- (3) BA grade gauges are an economy-type manufactured with surface roughness of  $2.5\mu\text{m}$  that lowers the cost of gas joint but does not affect the corrosion resistance or air tightness.
- (4) Gauges for general use are non-corrosive and are suitable for all process gases that do not specially require cleanliness.
- (5) 3-digit LCD display with a character height of 8.5 mm.
- (6) Battery operated so an external power source is unnecessary.
- (7) Display sampling can be switched between 0.5 sec, 2.0 sec or 10 sec.
- (8) Continuous use of approximately 7000 hours (when set to sample 10 sec).
- (9) Automatic power off (or not) can be selected.
- (10) Almost the same shape as the Bourdon pressure gauge (50 series), so it is replaceable.
- (11) The display area can be tilted  $30^\circ$  left or right against the joint.

### 3. Specifications

GRADE		UC	BA	General use
Applications		Corrosive gas High-purity gas	Bulk gas	Non-corrosive gas with no clean level required
Gas contact materials	Joint	SUS316L		SUS316
	Pressure sensor	Co-Ni alloy		SUS630 and equivalent
Gas contact treatment		Ultra clean (UC) treatment	Degreasing	Non water/oil treatment
Air tightness (He vacuum method)		Less than $5 \times 10^{-12} \text{Pa} \cdot \text{m}^3/\text{sec}$		Less than $1 \times 10^{-9} \text{Pa} \cdot \text{m}^3/\text{sec}$
Particle		No count above $0.1 \mu\text{m}$ (Our standard)	Not regulated	
Surface roughness		Less than $Ry0.7 \mu\text{m}$	$Ry 2.5 \mu\text{m}$ range	Not regulated

Joint type	Connecting screws	Range		LCD display digits
		Max.	Min.	MPa
Vertical mounting S type	1/4" -Compatible with VCR Male	-0.1 to 0.5MPa		-.100 to .500
		-0.1 to 1MPa		-0.10 to 1.00
		-0.1 to 2MPa		-0.10 to 2.00
		0 to 0.5MPa		.000 to .500
	-VCR male nut -VCR female nut	0 to 1MPa		0.00 to 1.00
		0 to 2MPa		0.00 to 2.00
		0 to 5MPa		0.00 to 5.00
		0 to 10MPa		0.0 to 10.0
		0 to 20MPa		0.0 to 20.0
Max. allowable pressure	Twice the rated pressure			
Display accuracy	$\pm (1\% \text{F. S.} + 1 \text{digit.})$ (at 23°C)			
Temp. coefficient	$\pm 0.1\% \text{F. S.} / ^\circ\text{C}$ (zero/and span)			
Power source	1 X CR2032 (3V) Lithium battery			
Battery life (with battery voltage monitor) (with auto power off)	Continuous use: Approx. 2500 hours (display cycle 0.5 sec/time) Approx. 5000 hours (display cycle 2 sec/time) Approx. 7000 hours (display cycle 10 sec/time) Power off: Over 1 year			
Display system	3-digit LCD (character height 8.5mm)			
Display cycle (User settings)	0.5 sec 2 sec 10 sec			
Operating temp. range	-10 to 50 °C (non freezing)			
Operating humidity range	35 to 85%RH (non condensing)			
Storage temp. range	-20 to 60 °C (non freezing, non condensing)			
Case structure	Indoor installation			
Case material	Zinc die casting alloy (ZDC2) chrome plated			
Panel material	Polycarbonate			
Weight	Approx. 150g (including battery)			

4. Drawing



## 5. Installation outline


### (1) Precautions for installation

- ① Before unpacking check the packing material.
- ② Unpack the box in a clean atmosphere immediately before piping to minimize the time the unit is exposed to the atmosphere.
- ③ Take care not to touch or breathe on the gas contact parts.
- ④ After unpacking, confirm that there are no scratches, and that the product matches the one ordered.
- ⑤ Model ZT64 digital pressure gauge is designed for union connection such as VCR. Do not fail use the specified gaskets for connection. When installing the unit on the pressure line, do not tighten the case with a pipe wrench, etc. Do not fail use the hexagonal part of the connecting joint or the rectangular (hexagonal) part of the body when installing.

### (2) Precautions for handling

- ① This is a finely adjusted instrument. It may become unusable if dropped or if it is subjected to extreme vibration.
- ② Do not snoop test the sensor because it may deteriorate.
- ③ A thorough inert gas purge is recommended before putting the unit into practical use to remove atmospheric components, particles and other foreign matter from inside the pipe.
- ④ After using the unit for corrosive gas, do not fail to purge it with nitrogen gas, etc. before removing the unit. If it is removed and left as it is with corrosive gas inside, the water content and oxygen in the air will generate strong acid and alkaline substances, which accelerate corrosion of the internal parts of the unit.
- ⑤ Do not use with pressures higher than displayed on the faceplate.

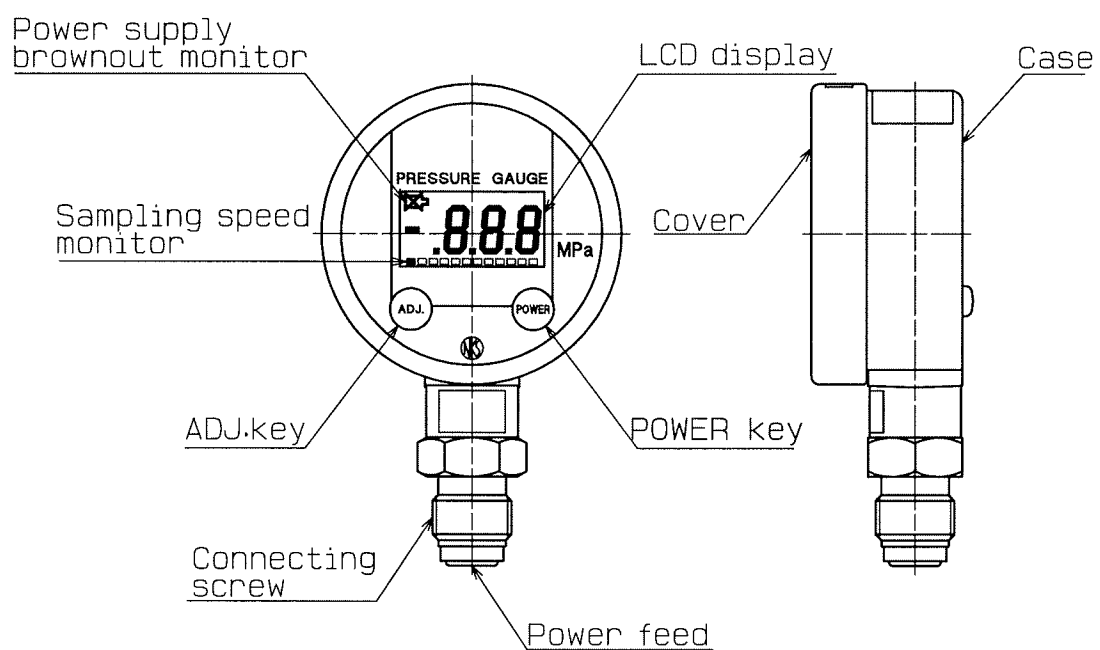
### (3) Precautions for storage

 <b>Caution</b>	<p>Do not store in the following places as damage ca result.</p> <ul style="list-style-type: none"> <li>● Any place that water can reach.</li> <li>● Any place where there can be a negative influence of atmosphere, temperature, humidity, poor ventilation, sunlight, dust, salty or sulfuric air.</li> <li>● Any places where there is vibration or shock (including during transportation).</li> <li>● Any place where chemicals are stored or where there are releases of gas.</li> <li>● In direct sunlight or inside a hot vehicle.</li> </ul> <p>When the battery installed, even though the device is turned OFF a very small amount of current is consumed. Life of a new battery with the power OFF is approximately 1 year. When the device will not be used for a prolonged period of time, remove the battery for storage.</p>
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## 6. Directions for use

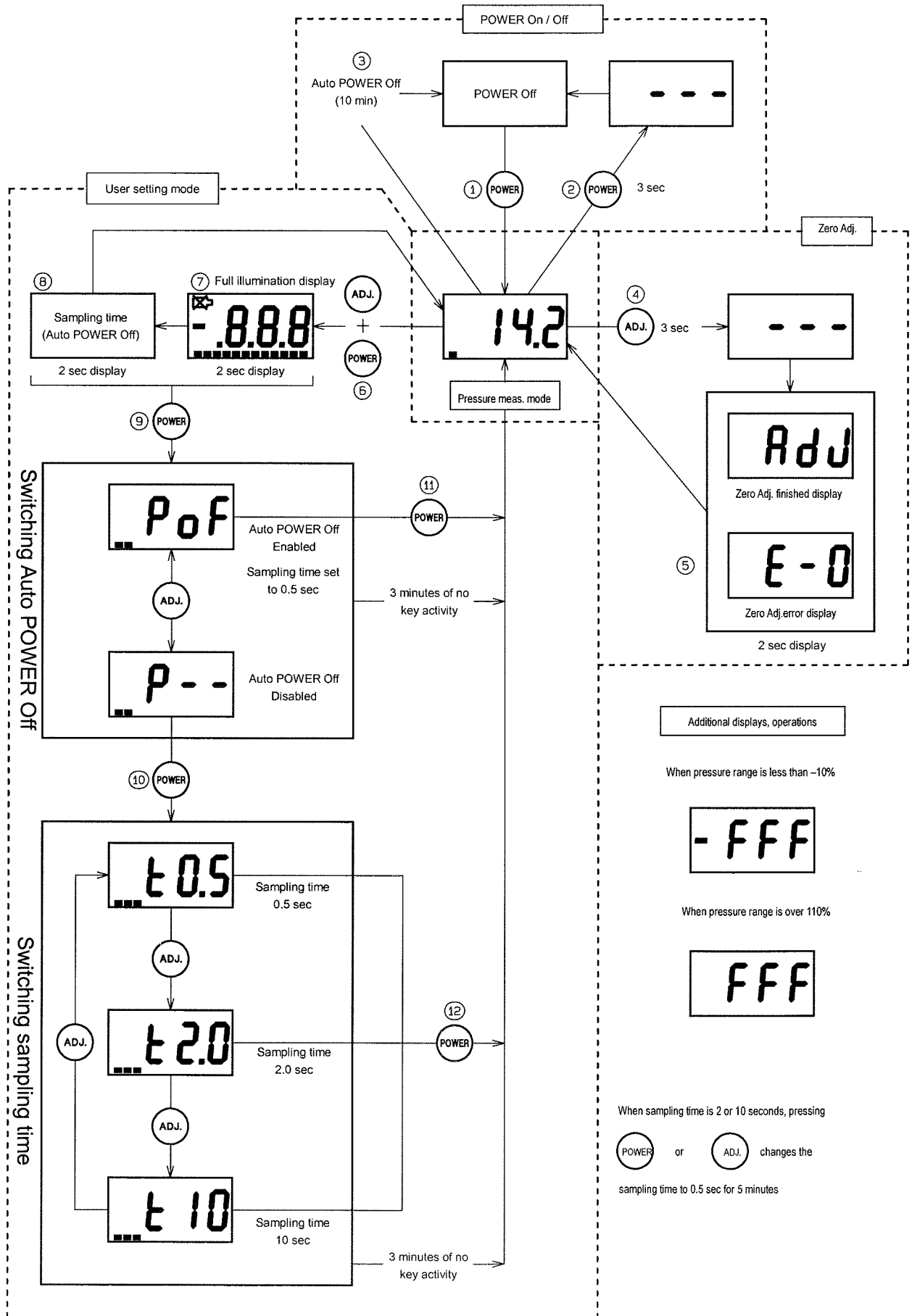
- Before using, confirm that it operates safely and normally. Particularly, confirm after long periods of non-use.
- Applying excessive pressure to the case or twisting the case can cause damage or malfunction.

### (1) Part names



(2) Mode (Each numbers corresponds to instructions)

The power and Adj. keys are displayed as [POWER] and [ADJ.].



## (3) Instruction for each mode

## ● Pressure setting mode

## ① Power on

When the power is turned on by pressing [POWER] the device is in pressure measurement mode.

While in pressure measurement mode, a measurement value like this is displayed 14.2.

When sampling has finished the mark in the lower left disappears for 0.5 seconds. (When sampling is set for 0.5 seconds it does not light up).

Pressure measurement mode displays the current pressure. The pressure displays a pressure range of -10~110%, and when there is an impressed pressure displaying outside the pressure range it is displayed as follows:

- F F F Pressure range of lower than -10%

F F F Pressure range over 110%

## ② Power off

When [POWER] is pressed for more than 3 seconds, - - - is displayed and the power turns off.

## ③ Automatic power off

When the automatic power off setting is enabled (refer to Setting Mode – page 7/14) the device will automatically turn off 10 minutes after power is turned on.

## ● Zero point adjustment

④ When opened to the air (within  $\pm 5\%$  F.S.), and [ADJ.] is pressed for over 3 seconds,

- - - is displayed and then A d J displays for 2 seconds and a zero point adjustment occurs.

⑤ When E - 0 displays during a zero point adjustment it has not been adjusted.

● Full illumination, sampling speed confirmation.

⑥⑦⑧ When in any mode, if [POWER] and [ADJ.] are pushed simultaneously, full illumination can be confirmed. **8.8.8** will display for 2 seconds, then sampling time **t 0.5** will display for 2 seconds at which point pressure measurement mode will return. When automatic off is enabled sampling time will not be displayed.

● Setting mode

⑨ Pressing [POWER] during the display of full illumination or sampling time changes to setting mode. When in setting mode ⑩, pressing [POWER] switches between various modes.

· Auto power off switch

Pressing [ADJ.] switches between auto power off enabled **P o F** and disabled **P - -**.

· Sampling time switch

Pressing [ADJ.] switches between sampling times of 0.5 sec **t 0.5**, 2.0 sec **t 2.0**, and 10 sec **t 10**.

When sampling time is set for 2.0 or 10 seconds and either [POWER] or [ADJ.] is pressed, sampling time changes to 0.5 seconds.

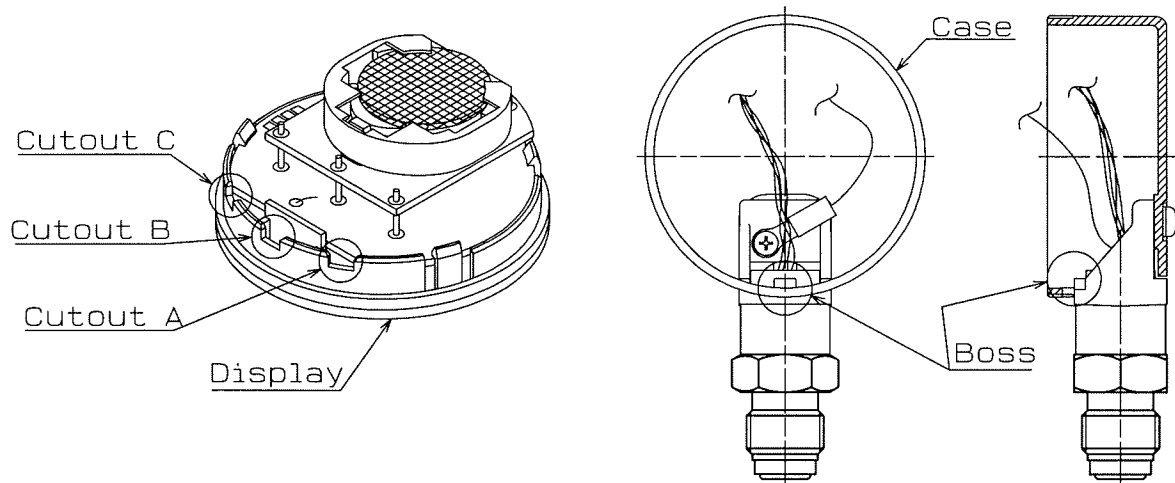
⑩⑫ switching is carried out by pressing the [POWER] button.

⑪ When auto power off is enabled, sampling time is set to 0.5 seconds.

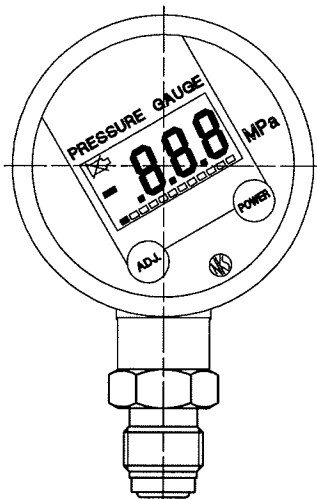
- If no keys are pressed for 3 minutes, the device returns to pressure measurement mode.
- Settings made in the setting mode must be reset after a battery replacement.

#### (4) How to tilt the display unit

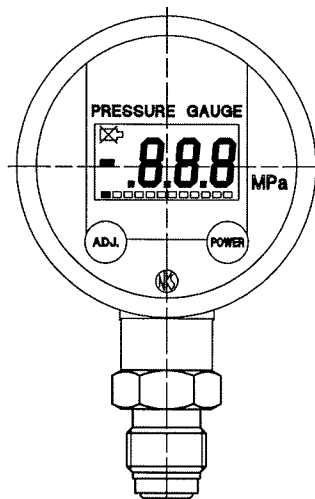
By lining up the projection inside the case and the cutouts on the back side of the display the angle of the display panel can be changed as shown below.



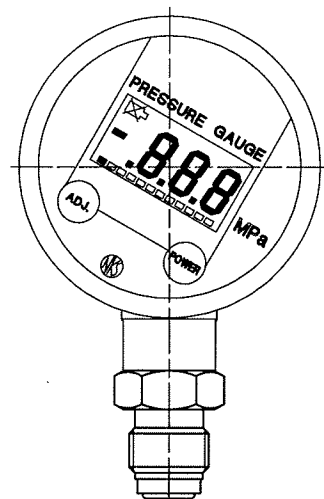
Using Cutout A tilts 30° left, B is straight up and C tilts 30° to the right.



Using cutout A





Using cutout B



Using cutout C

## 7. Maintenance

 <p>Warning</p>	<ul style="list-style-type: none"><li>● Incorrect handling of the battery can cause a fire or explosion. Do not charge, short, take apart, modify, heat up or put the battery in a fire.</li><li>● When disposing of used batteries, prevent the - and + from shorting by wrapping them in tape.</li><li>● Do not replace the battery in an area with gas or other flammables present. Replacing the battery in a dangerous location can result in a spark that can trigger an explosion causing injury or damage to the equipment.</li><li>● Leakage can result in hazardous conditions so before measuring gases check that the coupling with the main unit is free of leaks. Do not take apart or modify the pressure gauge in any way.</li></ul>
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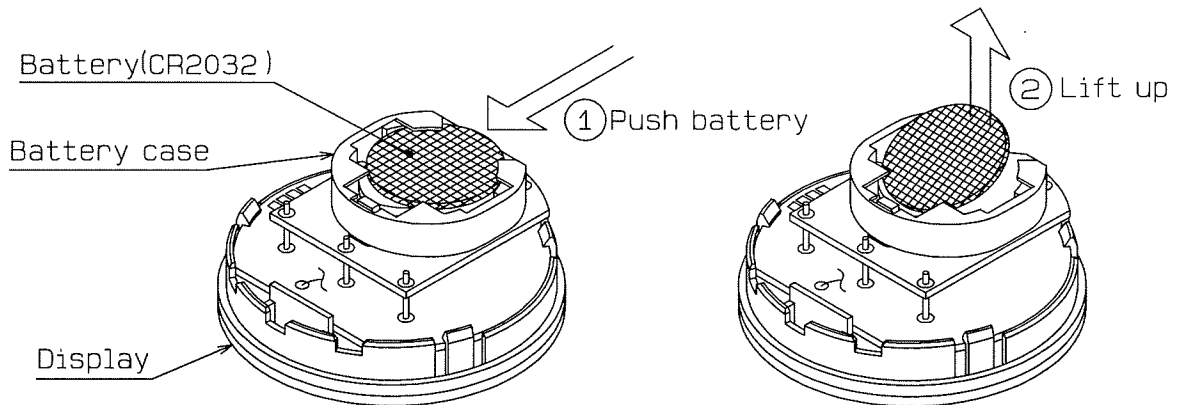
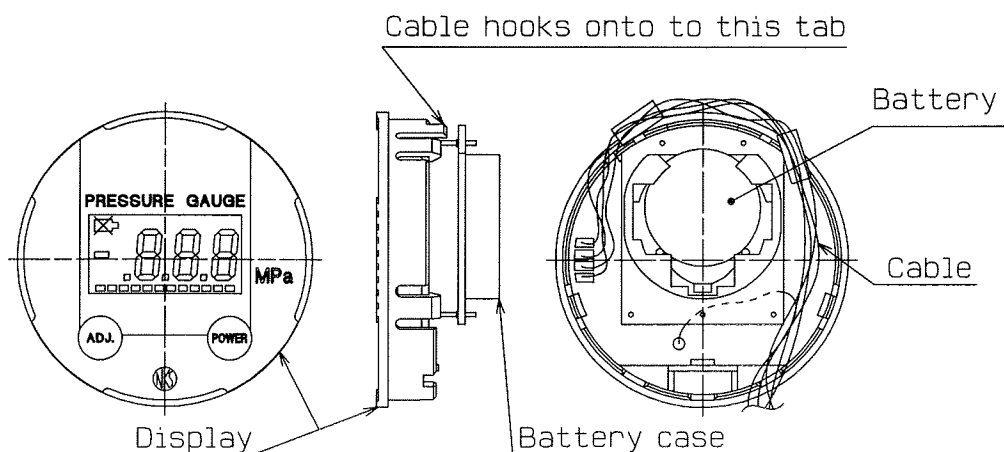
 <p>Caution</p>	<ul style="list-style-type: none"><li>● Use only the designated CR2032 for battery replacement. Use of other batteries can cause malfunction or damage.</li><li>● Do not take apart or modify the pressure gauge in any way.</li></ul>
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## (1) Battery replacement

Replace the batter as follows.


- A. Remove the lid and pull out the display unit, being careful not to snag the cable.
- B. Holding the display unit firmly, replace the battery. (Refer to the diagram below)
- C. Insert the battery with the + visible, put the display unit back and close the lid.
- D. With the new battery installed, press [POWER] and [ADJ.] simultaneously and confirm that the display is operating normally.

- Do not apply excessive force to the cable that connects the case and the display unit.
- Refer to the diagram below in order to avoid pinching the cable when inserting it in the case.
- When removing and installing the lid, hold the case firmly and do not apply excessive force to the coupling.

How to remove batteryHow to put cable in

## (2) Regular check

Inspect the following points before using.

- Press the switches simultaneously to display full illumination.
- Confirm that the battery symbol  does not display
- Confirm that there are no scratches or alterations on the main unit. Also check the tightness of the lid and make sure that no measurement fluids have leaked.

In the event of an abnormality, confirm whether the battery is depleted, installed correctly or that it is making correct contact with the electrodes.

## 8. Trouble shooting

Condition	Cause	What to do
1. Press switches but nothing displays	<ol style="list-style-type: none"> <li>1. Depleted battery</li> <li>2. Battery's polarity is reversed.</li> <li>3. Battery is not touching electrode.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace with a new battery.</li> <li>2. Check polarity of battery.</li> <li>3. Check that the battery is touching the electrode.</li> </ol>
2. The displayed value does not change.  [Vacuum display stays zero]	<ol style="list-style-type: none"> <li>1. No pressure reduction.</li> <li>2. Long sampling time.</li> <li>3. Sensor cable malfunction.</li> <li>4. In needle clamp mode.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm the existence of pressure in the pressure sensitive measurement fluid.</li> <li>2. Confirm the sampling time and then shorten it.</li> <li>3. Remove lid, check the sensor cable for breaks or bends and the solder connection.</li> <li>4. Confirm if there is change with positive pressure.</li> </ol>
3. Abnormal display. (FFF display) (-FFF display) (Abnormal value)	<ol style="list-style-type: none"> <li>1. Sensor cable malfunction.</li> <li>2. Sensor has been damaged by excessive pressure or impact.</li> <li>3. Wiring has been damaged by excessive voltage or impact.</li> </ol>	<ol style="list-style-type: none"> <li>1. Same as above.</li> <li>2. 3. Contact our sales department or the distributor regarding repairs.</li> </ol>
4. Display value is not constant.  (Display gradually declines)  (Display goes on and off, or the display value changes.)	<ol style="list-style-type: none"> <li>1. Due to pressure changes.</li> <li>2. Due to noise.</li> <li>3. Due to heat or humidity.</li> <li>4. Due to pressure leak.</li> <li>5. Due to a loose connections.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm the pressure of the measurement fluid with another pressure gauge.</li> <li>2. Shut out any nearby noise sources.</li> <li>3. Control any temperature changes that can occur in the sensor.</li> <li>4. Confirm whether there are any leaks or not.</li> <li>5. Confirm whether the cable is bent, and also the battery's connection.</li> </ol>

## 9. Other information

This manual cannot cover all details of the instrument or all other variations; Nor does it aim to explain all details of installation, maintenance and all other subjects. If you need more information, please feel to contact us.

The contents of these instructions are subject to change without notice.

## 10. Memorandum

The battery in this device requires replacement. With reference to the life of the battery, please use the chart below to avoid battery shutoff.

S/N \_\_\_\_\_ Date of manufacture: \_\_\_\_\_

Date of purchase: / /					
Record of battery replacement					
Replacement date	Location	S/N	Display cycle	Auto power off	Next replacement date
/ /			0.5 2 10	Yes No	/ /
/ /			0.5 2 10	Yes No	/ /
/ /			0.5 2 10	Yes No	/ /
/ /			0.5 2 10	Yes No	/ /
/ /			0.5 2 10	Yes No	/ /
/ /			0.5 2 10	Yes No	/ /
/ /			0.5 2 10	Yes No	/ /
/ /			0.5 2 10	Yes No	/ /
/ /			0.5 2 10	Yes No	/ /
/ /			0.5 2 10	Yes No	/ /
/ /			0.5 2 10	Yes No	/ /
/ /			0.5 2 10	Yes No	/ /
/ /			0.5 2 10	Yes No	/ /
/ /			0.5 2 10	Yes No	/ /
/ /			0.5 2 10	Yes No	/ /
/ /			0.5 2 10	Yes No	/ /

### Battery life criterion

Display cycle	0.5 sec	2 sec	10 sec	Off
Battery life	2500 hours 3.4 months	5000 hours 6.9 months	7000 hours 9.7 months	Approx. 1 year