



INSTRUCTION MANUAL  
FOR  
ULTRA-LOW DIFFERENTIAL PRESSURE TRANSMITTER  
MODEL KL12

NAGANO KEIKI CO., LTD.

May.'2004

# MANUAL FOR ACCURATE AND SAFE OPERATION

## SAFETY CHAPTER FOR PRESSURE TRANSMITTER PRESSURE TRANSDUCER AND ELECTRONIC PRESSURE SWITCH

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. 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.
3. Do not apply excessive weight, vibration or shock.  
Human injury or damage to surroundings may result due to explosion or breakdown of the pressure elements and exposure of dangerous measured objects.
4. Use with the unspecified power supply may cause fire hazard or electric shock.
5. 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.
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 devices with an explosion-proof construction when operating in place liable to have explosive gas.  
Danger of ignition and explosion.
8. If the measured object is oxygen, use devices with "Use No 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.

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.

### 1. Description

This is high performance ultra-low differential pressure transmitter with a built-in ultra-thin small silicone diaphragm which is precisely processed by micro-machining technology.

It detects ultra-low differential pressure and converts it into current signal (4 to 20mA DC).

### 2. Specific Features

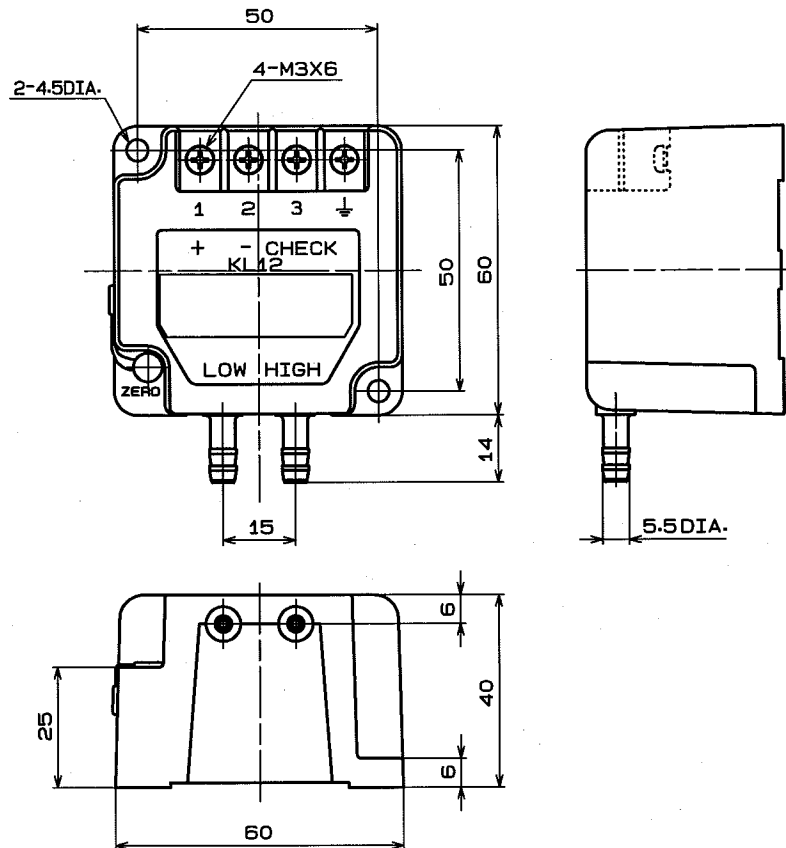
The sensor used is of capacitance type, which is capable of detecting ultra-low pressure with high sensitivity and accuracy.

Being encapsulated, the sensor is shock-proof and has excellent durability. Error caused by fixing position is almost nil.

### 3. Specifications

Diff. Press. Range (kPa)	Accuracy	Output	Power supply	Specifications
0 to 0.05	±2.0%F.S.	4 to 20mA DC (2-wire system)	14 to 27 V DC 20mA max.	Working Pressure Range: - 50 to 50kPa
0 to 0.1				Working Temperature Range: - 10 to 60°C
0 to 0.2				Temperature Coefficient: ±0.2%F.S./°C(Zero)
0 to 0.5				0 to 0.3%F.S./°C(Span)
0 to 1.0				Working Humidity Range: 30 to 90%RH
0 to 2.0				(But No Condensation)
0 to 5.0				Diaphragm Material: Silicone, Aluminum
0 to 10				Measuring Subject: Air or Inert Gas
0 to 20				Pressure end Connection: 5.5 DIA.
-0.05 to 0.05				Connection pipe
-0.1 to 0.1				Load resistance: 500Ω max.
-0.2 to 0.2				(Power supply 24V DC)
-0.5 to 0.5				Weight: Approx.0.08kg
-1.0 to 1.0				
-2.0 to 2.0				
-5.0 to 5.0				
-10 to 10				

#### 4. Dimensional Outline Drawing



#### 5. Precautions on Transportation, Storage and Unpacking

##### (1) Precautions on Transportation.

This instrument is a precision made unit, which may be made useless if dropped or given a shock. Exercise caution when handling it.

##### (2) Precautions on Storage.

Store the instrument in a place free from moisture, vibration and dust. Stack them within such a degree that causes no deformation of packages and provide means to prevent them from dropping.

##### (3) Precautions on Unpacking.

Do not handle packing roughly when unpacking. Unpacking in a place spacious enough to prevent the unpacked instrument from being dropped accidentally.

## 6. Installation

### 6-1 Place to Install

- ① It must be installed indoors. Ambient temperature range should be  $-10$  to  $60^{\circ}\text{C}$ , and humidity 90% RH or below.
- ② Select a vibration-free place.
- ③ If the one side of the pressure end is open to the atmosphere, do not select a place where the open pressure fluctuates (such as where wind blows on the unit directly).
- ④ Provide enough space for maintenance and adjustment.
- ⑤ Check to be sure that no corrosive gas is present

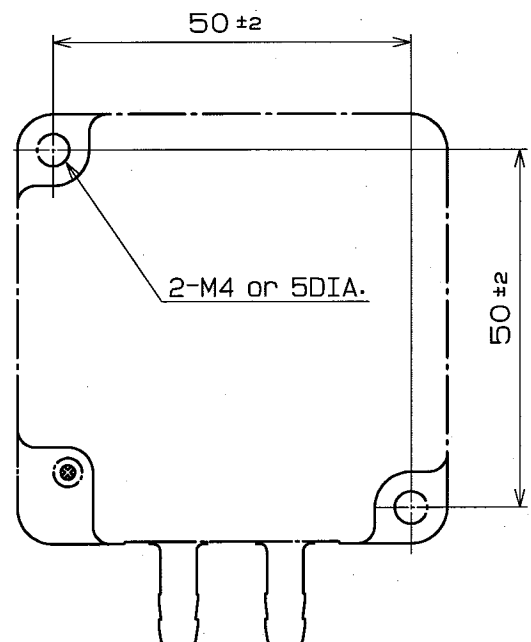
### 6-2 Substance to be measured

The diaphragm in the sensor is coated with a thin aluminum film which serves as an electrode. The customer should use a substance to be measured that does not corrode aluminum.

When the substance to be measured is very moist and the ambient temperature drops suddenly, the water content of the substance condenses, forming dews. Water attached to the electrode is a cause of defects. Do not use the unit in an environment where dew formation is likely. Avoid use of the unit in humid places.

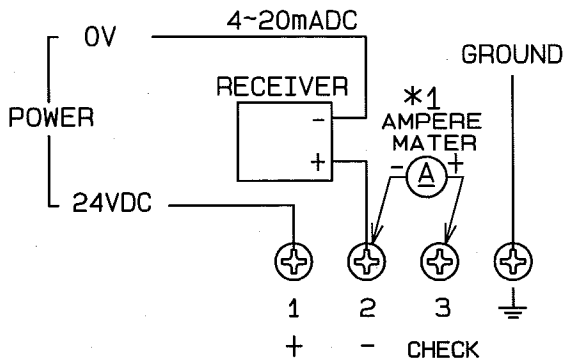
### 6-3 Mounting Procedures

- ① Provide a hole(5mm) that matches the fixture, or an M4 screw, on the install place.
- ② Fix the transmitter body on the mounting place.
- ③ Connect the pressure transfer pipe.  
Too long a tube will delay the response.



### 7. Connection

At an output current of 4 to 20mA DC



\* 1 You can easily make an output check without opening the output circuit. (Load resistance 10Ω max.)

If there should be possibilities that noise may mix through an external wiring path, employ a shielded cable. And locate the wiring at a certain distance from any large-capacity power cable.

### 8. Operation

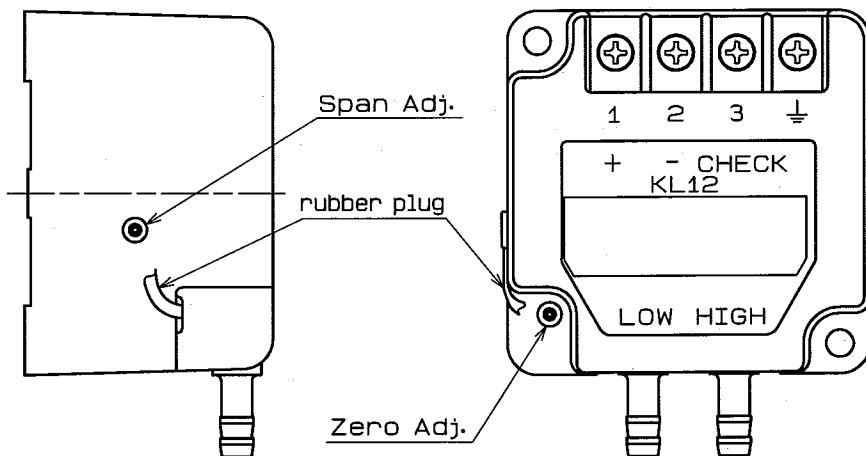
Make certain that wiring is properly connected.

Then, supply a power of 24V DC. If the transmitter is open to the atmosphere, a signal of 4mA DC will be outputted under either high or low pressure. When a differential pressure is set in the ± range, a signal of 12mA DC will be outputted.

### 9. Adjustment

To adjust the span to zero, remove the rubber plug at the center on the label, first of all. Then, use the ZERO ADJUST trimmer. If the range is set to a lower limit of 0 Pa, connect the high pressure side to the lower pressure side with a tube. And then make a zero adjustment.

Subsequently, apply the upper limit of pressure within the range. And use the span adjust trimmer to carry out the adjustment.



## 10. Troubleshooting

	Cause	Action
No output. Output does not change when pressure changes.	Broken power cable.	Replace
	Wrong wiring connection	Connect correctly
	Source voltage not output correctly.	Repair or replace power supply.
	Input resistance of the connected receiving meter is too large, or receiving meter is broken (when inputting 4 to 20mA DC)	Check the specifications for the receiving meter.
Output too high. Output does not change when pressure changes.	Short-circuit of power line with signal output line.	Repair short circuit.
	Wrong wiring connection	Connect correctly.
Output does not change when pressure changes, or slow response.	Leaking pipes.	Repair.
Output increases in reverse direction.	Pipes are connected in reverse	Re-connect.
Output decreases sharply when static pressure is applied.	High-pressure pipe is clogged or leaking.	Repair the pipe.
Output increases sharply when static pressure is applied.	Low-pressure pipe is clogged or leaking.	Repair the pipe.