

TY-CB-004A	1/7	REV.0
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INSTRUCTION MANUAL FOR PRESSURE SWITCH  
MODEL CB14 (Bellows type)

NAGANO KEIKI CO., LTD.

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1. Introduction

Before using Model CB14 pressure switch(Bellows type), read this manual carefully to understand how to use it correctly and effectively.

2. Applications

Applicable to high-purity gas line for processing semiconductors.

3. Features

- (1) Small in size and light in weight, thus suitable for a narrow place.
- (2) High airtightness, Leakage checked by a helium leak test is only  $1.01 \times 10^{-9}$  Pa·m<sup>3</sup>/sec ( $1 \times 10^{-8}$  atm·cc/sec) maximum.
- (3) The parts of this switch are washed and assembled in a clean room (Class 10000). They are perfectly degreased by ultrasonic cleaning and protected from oil and water. The completed switch is sealed in a non-dust polyethylene bag.
- (4) The operating pressure can be set easily.

4. Specifications and Outline Dimensions

(1) Specifications

Pressure range MPa (kgf/cm <sup>2</sup> )	Withstand pressure MPa (kgf/cm <sup>2</sup> )	Dead band MPa (kgf/cm <sup>2</sup> )	Accuracy (Repeatability)
0.02 ~0.35 (0.2 ~3.5)	0.53 (5.3)	0.021 (0.21) max.	1% of MAX. PRESS.
0.035 ~0.7 (0.35~ 7 )	1 (10)	0.021 (0.21) max.	
0.1 ~2.1 (1.0 ~21 )	2.5 (25)	0.042 (0.42) max.	

Electrical rating: 125, 250 V AC, 15 A

Withstand voltage: 1500 V AC for 1 min (Between case and terminal)

Insulation resistance: 100 M Ω min. when measured at 500 V DC (Between case and terminal)

Ambient temperature: -5 ~ 40°C

Pressure element: Bellows

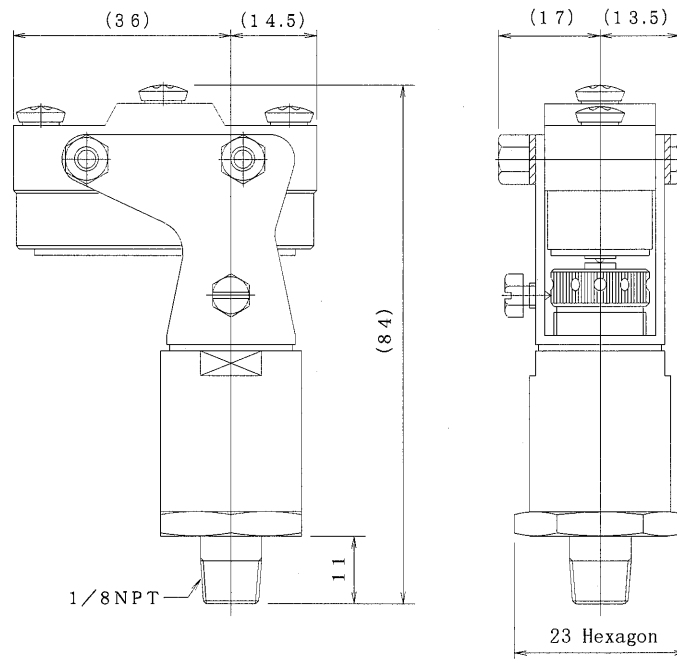
Material to be in contact with measurement medium: SUS316 (Bellows is made of SUS316L, however)

Case construction: Indoor open type

Outside parts: Plated with nickel

Mass: About 160 g

(2) Outline dimensions



The above figure indicate the connection of 1/8 NPT.

5. Cautions for Transportations, Storage and Unpacking

(1) Cautions for transportations

Since this switch is worked, assembled and adjusted precisely, if it drops or receives an impact, it cannot be used in the worst case. Accordingly, take care in transportations.

(2) Cautions for storage

Store this switch in a place where the temperature does not exceed the specified range (-5 ~ 40°C) and the humidity is low (80% maximum).

After it is taken out of the sealed bag, store it in a clean room (Class 10000 minimum).

(3) Cautions for unpacking

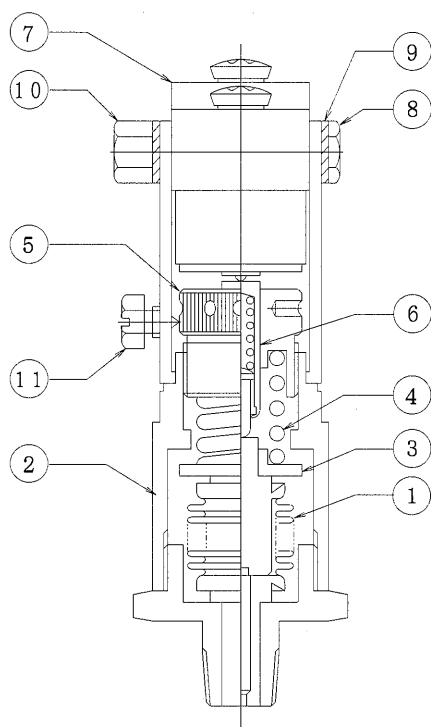
When unpacking this switch, handle it carefully. Take it out of the sealed bag in a clean room (Class 10000 minimum).

## 6. Principle of Operation

As shown the following figure, the pressure stored in the element (bellows) ① is applied against the spring ④. Then, it is transferred through the rod ⑥ at the top of the element (below) ① to the microswitch ⑦ to operate the latter.

The operating pressure is changed by turned the adjustment screw ⑤ to change the force of the spring ④.

The rod is so designed for the safety that the microswitch will not overtravel.



No.	Name
1	Element assembly
2	Body assembly
3	Spring seat
4	Spring
5	Adjustment screw
6	Rod assembly
7	Microswitch
8	Screw
9	Lock washer
10	Nut
11	Set screw

## 7. Adjustment of Operating Pressure

Loosen the set screw ⑪ in the above figure. If the adjustment screw ⑤ is turned to the right, seeing from the microswitch side, the operating pressure is heightened. If the former is turned to the left, the latter is lowered (Use the adjustment screw or a rod 1.9 mm in diameter).

After setting the operating pressure, tighten the set screw ⑪.

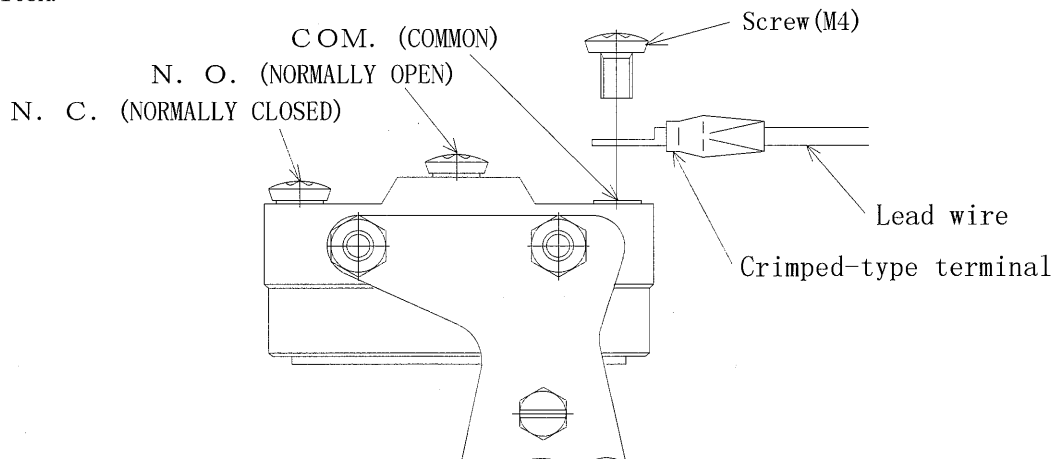
Since the operating pressure may change a little after the set screw ⑪ is tightened, check it again after the latter is tightened.

## 8. Installation

- (1) Install this switch to a place where there is less moisture, vibration, dust, corrosive gas, etc.. Do not install it in a place where the ambient temperature exceeds the value specified in this manual (-5 ~ 40°C).
- (2) Take care that an extreme force will not be applied to the pressure switch.
- (3) When piping the switch, be sure to apply a spanner to the hexagon part of its adapter.

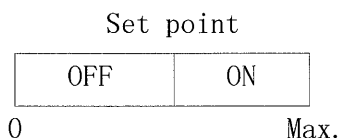
## 9. Wiring

Fix crimped-type terminals to the lead wires in advance, then connect them directly to the microswitch.

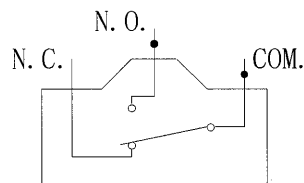


### (1) Upper limit setting (H) and reverse lower limit setting (LR)

A switch of this kind turns on its circuit when the pressure rises above the set point (Upper limit setting) or turns off its circuit when the pressure drops below the set point (Reverse lower limit setting).



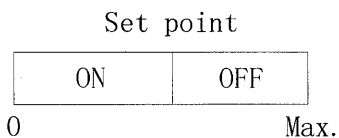
Connect wires to N. O. and COM.



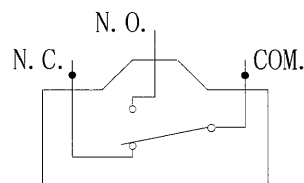
Condition below set pressure

### (2) Lower limit setting (L) and reverse upper limit setting (HR)

A switch of this kind turns on its circuit when the pressure drops below the set point (Lower limit setting) or turns off its circuit when the pressure rises above the set point (Reverse upper limit setting).



Connect wires to N. C. and COM.



Condition below set pressure

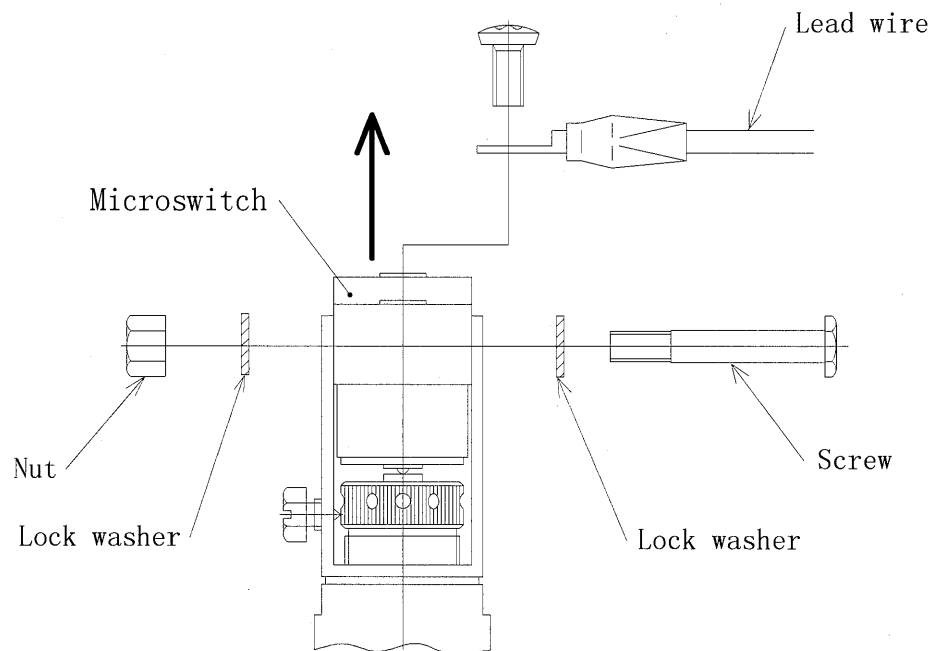
#### 10. Cautions for Maintenance and Operation

- (1) Do not apply pressure exceeding the specified range.
- (2) Do not heighten or drop the pressure suddenly.
- (3) Confirm the operation of the contacts once in six months ~ one year.
- (4) If the set value of the switch has changed largely, remove and check the switch.

The possible causes of this trouble are wear and rusting of each part and shifting of it by vibration or external impacts. In this case, remove the cause, and adjust or replace the switch.

#### 11. Replacing Method of Microswitch

If the microswitch has a trouble, replace it according to the following procedure.



- (1) Remove the lead wires from the microswitch.
- (2) Remove the mounting screw and nut of the microswitch.
- (3) Remove the microswitch from the body, then install new one.
- (4) Fix the new microswitch with the screw and nut. (Tightening torque: 10 ~ 12 kg·cm)
- (5) Connect the lead wires to the specified terminals.