



# CS31 Pressure & Differential Pressure Switch

## OUTLINE

This is a pressure and differential pressure switch mainly developed for air conditioning application, being able to applied to a pressure from 0.05 kPa, differential pressure or vacuum. This is small in size and light in weight.

## FEATURES

- This is a switch of which multiple stage setting range is from 0.05 kPa to 35 kPa. An appropriate switch including a pressure switch, a differential switch and a vacuum switch can be selected and applied.
- This gauge is of small and light weight type.
- The setting at low pressure can be possible.

\* In case of selecting pressure gauge, choose the pressure range which can be used in between 30 ~ 65% of full scale, so that the gauge can give its full capacity.

## SPECIFICATION 1

### Fluid:

Non-corrosive gas

### Operating condition:

Under the normal condition, where there is no inflammable gas or liquid which cause the ignition or explosion.

### Connection:

Rc1/4 (PT female)

### Gas contact parts material:

Diaphragm NBR contained nylon

Case Aluminium alloy die casting (ADC12)

### Pressure & differential pressure range:

0.05 ~ 0.4 → 15 ~ 35kPa (5 ~ 40 → 1500 ~ 3500mmH<sub>2</sub>O)

### Base pressure:

Differential pressure switch 150kPa

### One side proof-pressure:

20 ~ 50kPa (2000 ~ 5000mmH<sub>2</sub>O)

(Depending on range)

### Operating temperature:

0 ~ 40

### Accuracy:

1.5 ~ 7.5%max.P. (Depending on range)

### Temperature coefficient:

0.05%max.P./°C

### Dead band:

Fixed Within 0.04 ~ 2.1kPa (4 ~ 210mmH<sub>2</sub>O)  
(Depending on range)

### Switch:

Micro switch

### Number of contact:

One contact or two contact (Simultaneous operation)

### Outlet for electric wire:

Pressure switch one contact Gland JIS 10a

Pressure switch two contact Gland JIS 15c

Differential pressure switch Gland JIS 15c

### Case material-finishing:

Aluminium alloy die casting (ADC12)-Gray

### Construction:

Pressure switch Indoor-use (IP22)

Differential pressure switch Drip proof

(IP43 Connected to high pressure and low pressure port)

### Weight:

Approx. 1.6kg

## SPECIFICATION 2

Electric characteristics:

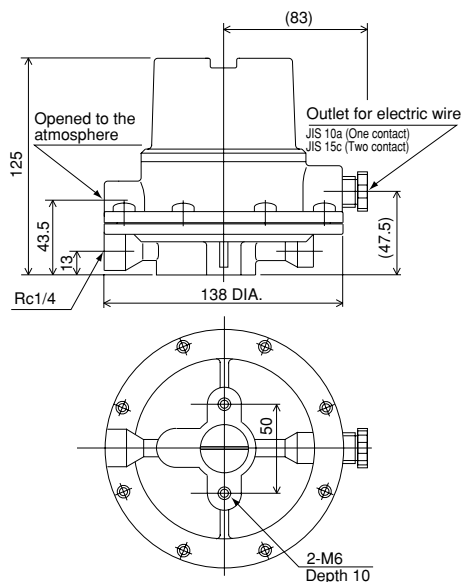
Rating			Withstand voltage	Insulation resistance
	Load resistance	Inductive load		
125V AC	5A	3A	1500V AC  Between terminal and case 1 minute	500V DC 100MΩ over  Between terminal and case
250V AC	5A	3A		
125V DC	0.5A	0.4A		
30V DC	5A	4A		
· Inductive load : Power factor more(AC) Time-constant 7ms or less (DC)				

Pressure range·Dead band·Accuracy and one side proof-pressure:

Pressure range kPa (mmH <sub>2</sub> O) (Pressure differential pressure setting range)	Dead band Within kPa (mmH <sub>2</sub> O)	Accuracy %max.P.	One side proof-pressure kPa(mmH <sub>2</sub> O)
0.05~0.4 ( 5~40)	0.04 (4)	7.5	20 (2000)
0.1 ~0.4 ( 10~40)	0.08 (8)		
0.35~1 ( 35~100)	0.08 (8)	4.0	20 (2000)
	0.1 (10)		
0.5 ~2 ( 50~200)	0.15 (15)	2.5	20 (2000)
1.5 ~4.5 (150~450)	0.25 (25)	1.5	30 (3000)
3 ~7 (300~700)	0.45 (45)	1.5	30 (3000)
5 ~12 (500~1200)	0.7 (70)	1.5	30 (3000)
10 ~25 (1000 ~2500)	1.4 (140)	1.5	50 (5000)
15 ~35 (1500 ~3500)	2.1 (210)	1.5	50 (5000)

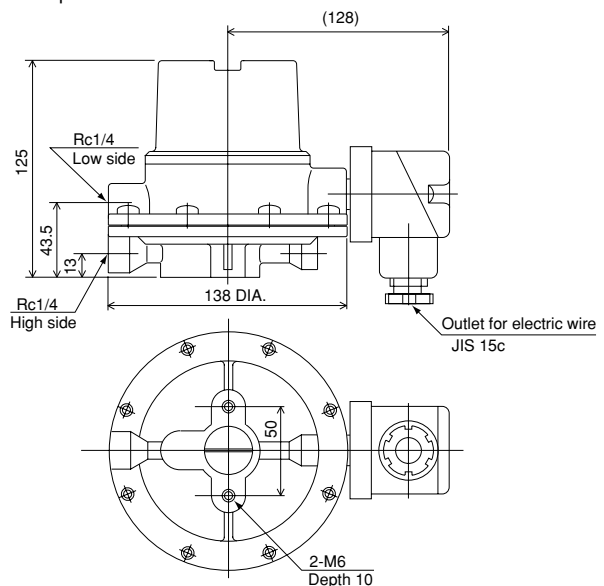
## DIMENSIONS

Pressure switch



CS31-371  
-471

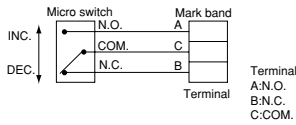
Differential pressure switch-Vacuum switch



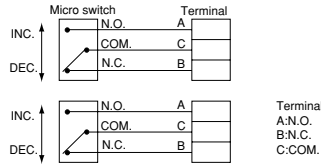
CS31-571  
-671

## WIRING

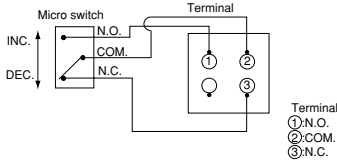
### 1SW Pressure switch



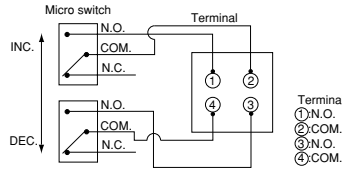
### 2SW Pressure switch



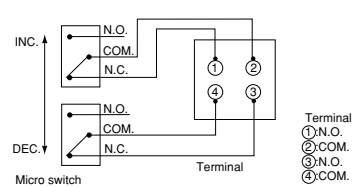
### 1SW Differential pressure switch



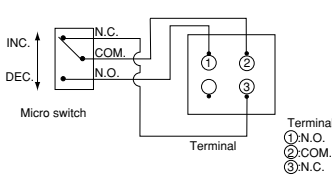
### 2SW Differential pressure switch (2H)



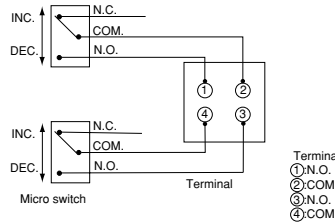
### 2SW Differential pressure switch (2L)



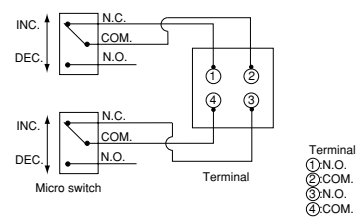
### 1SW Vacuum switch



### 2SW Vacuum switch (2H)



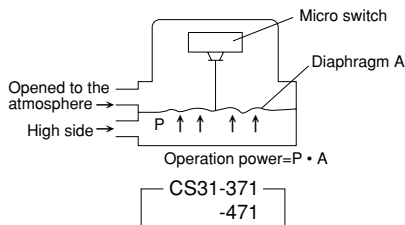
### 2SW Vacuum switch (2L)



## PRINCIPLE OF FUNCTIONING

### 1) Pressure switch

This pressure switch receives pressure P from the high pressure side, and diaphragm A is moved by pressure A, and the microswitch



### 2) Differential Pressure Switch and Vacuum Switch

The diaphragm is moved by pressure Ph from the high pressure side and Pℓ from the low pressure side. The microswitch activates at the set point.

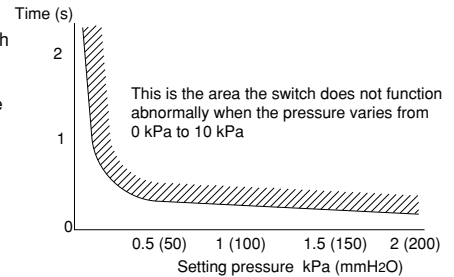
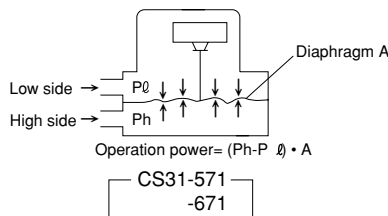
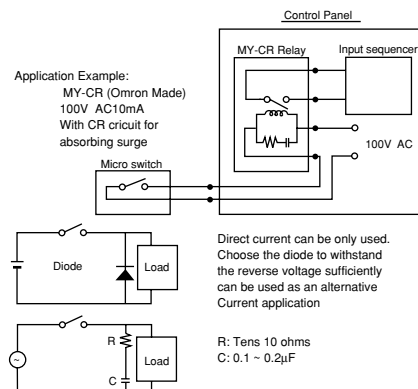


Figure-1

- When the pressure change speed is excessively large, the diaphragm cannot catch up with the change, delaying the function of the microswitch.
- When the pressure change speed is excessively small, the unstable function can occur because the pressure change speed is outside of the permissible microswitch operation speed range. This switch demonstrates stable function when the pressure change speed from zero to the maximum is 2 minutes or shorter.
- When this pressure switch is applied to negative pressure, the negative pressure shall be connected to the low pressure side and the high pressure side shall be opened to the atmosphere.
- The differential pressure switch can function abnormally according to the changing speed of the standard pressure. The relation between the changing speed and the setting pressure is explained in Fig. 1.

## REMARKS

- As a sequencer input;  
Use this switch gauge in the ventilated condition.  
Otherwise the following might be caused.  
The contact resistance of the microswitch increases gradually as time passes.  
For the application in the atmosphere, especially including Si, SiO<sub>2</sub> will be accumulated on the contact part as switch operated. Then the contact resistance will be increased, so that switch may be not operated.  
Therefore, above is suggested for the application condition, including Si atmosphere.  
When you use this switch gauge as sequencer input for controlling, input or connect through 100V AC Relay.
- Installation of protection circuit for contact  
In the inductive load open and close circuit, install the protection circuit to protect the contact.  
When you use the relay, choose the built-in protection circuit for the contact.



# Type No. constitution

Please specify Type No., each specification and range when ordering.

Note:For this Model, there is no applicable item for the figures X, but please specify X when ordering.

Pressure & Differential pressure switch

Selection spec.

Additional spec.(Option)

C S 3 1 — 1 7 1 — 4 5 6 0 0 X 9 10 X 11 X 12 X 13 X 14 X 15

Type No.

1 Mounting

3	Pressure switch One contact
4	Pressure switch Two contact
5	Differential pressure switch One contact
6	Differential pressure switch Two contact

2 Connection

7	Rc 1/4
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3 Wetted parts material

1	Diaphragm:In nylon NBR Case:Aluminium alloy die casting (ADC12)
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4 Pressure (Differential pressure) range (kPa)  
(When ordering, Please specify pressure range & unit.)

1	0.05 ~ 0.4 One contact only Accuracy:7.5%max.P.
2	0.1 ~ 0.4 Two contact only Accuracy:7.5%max.P.
3	0.35 ~ 1 Accuracy:4.0%max.P.
4	0.5 ~ 2 Accuracy:2.5%max.P.
5	1.5 ~ 4.5 Accuracy:1.5%max.P.
6	3 ~ 7 Accuracy:1.5%max.P.
7	5 ~ 12 Accuracy:1.5%max.P.
8	10 ~ 25 Accuracy:1.5%max.P.
9	15 ~ 35 Accuracy:1.5%max.P.

5 Type of contact point

1	H : Upper limit type with one contact
2	L : Lower limit type with one contact
I	WH : Simultaneous operation Upper limit type with two contact
J	WL : Simultaneous operation Upper limit type with two contact

6 Switch

0	Standard type
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7 Outlet for electric wire

0	Gland JIS 10a At the time of pressure one contact Gland JIS 15c At the time of pressure two contact, differential pressure
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9 Other additional spec.

0	Nil
1	Prease specify your requirement Case finishing

15 Document

0	Nil
1	Prease specify your requirement Drawing one sheet, Instruction manual, Inspection procedure, Mill sheet, Test report

The contents in the catalogue are subject to change without notice.

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