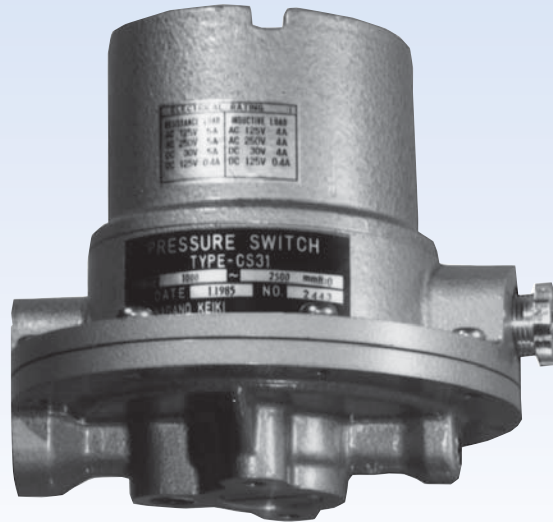


CS31

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 0.05kPa, 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 0.05kPa to 35kPa. 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.

Range of recommended pressure setting

Upper limit type: (Lowest pressure range+Deadband) to 100%max.P.
Lower limit type: Lowest pressure range to (100%max.P.-Deadband)

* When selecting pressure switches, Please select a pressure range with normal operation pressure within 30 to 65% of full span to get full performance. Please confirm that material in contact with gas is suitable for it.

Specifications 1

Item	Description
Fluid	Clean gas without causticity (It is not possible to use it for the gas including moisture.)
Operating environment	Places where there are no inflammable gases which may cause ignition or explosion under normal conditions.
Connection	Rc1/4
Gas contact material	Diaphragm: NBR contained nylon Case: ADC12
Pressure & differential pressure range	0.05 to 0.4 → 15 to 35 kPa
Base pressure	Differential pressure switch 150 kPa or less
Operation proofpressure	Specification 2 references.
Airtight proofpressure	200 kPa
Operating temperature	0 to 40 °C
Accuracy	±1.5 to ±7.5%max.P. (Depends on range) The simultaneity of a mutual, set value is 0.5%max.P. or less for two contact.
Temperature coefficient	0.05%max.P./°C
Deadband	Specification 2 references.
Switch	Micro switch
Quantity of switch	One contact or two contact (Simultaneous operation)
Setting system	Internal adjustment type, with setting lock (The set adjustment axis is locked at the set value specification.)
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	ADC12, Gray
Enclosure	Pressure switch: Indoor-use (Equivalent to IP22), Differential pressure switch: Drip proof (Equivalent to IP43 Connected to high pressure and low pressure port)
Weight	Approx. 1.6 kg

Specifications 2

Electrical characteristics: (Standard specification)

	Rating		Withstand voltage	Insulation resistance
	Resistance load	Inductive load		
125V AC	5 A	4 A	1500V AC Between terminals and case for 1 minute	500V DC 100MΩ or over Between terminals and case
30V DC	5 A	4 A		
125V DC	0.4 A	0.4 A		
250V DC	0.3 A	0.2 A		
· Inductive load: Power factor 0.4 or over (AC) Time constant 7ms or less (DC)				

*Electrical characteristics are subject to change as shown above for productions starting from March 2017.

Specifications 2

Pressure range, Deadband, Accuracy and one side proofpressure:

Pressure range kPa	Deadband kPa or less	Accuracy %max.P.	Operating proofpressure kPa	Number of contact
0.05 to 0.4	0.05	±7.5	20	1
0.1 to 0.4	0.08			2
0.35 to 1	0.05	±4.0	20	1
	0.08			2
0.5 to 2	0.09	±2.5	20	1
	0.11			2
1.5 to 4.5	0.14	±1.5	30	1
	0.18			2
3 to 7	0.18	±1.5	30	1
	0.27			2
5 to 12	0.35	±1.5	30	1
	0.53			2
10 to 25	0.85	±1.5	50	1
	1.05			2
15 to 35	1.2	±1.5	50	1
	1.8			2

*Deadband is subject to change as shown for productions starting from March 2017.

How to choose pressure

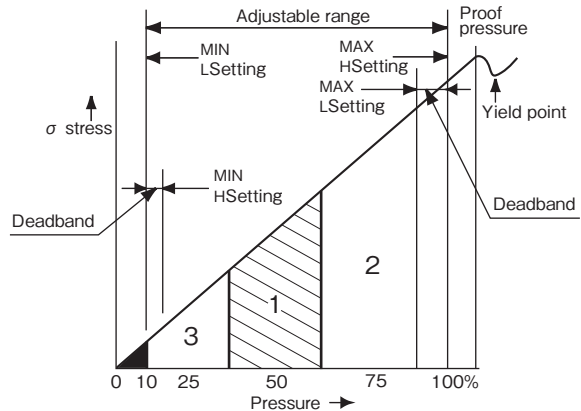
- Set value is steady, accurately: 30%max.P. or over
- Longevity is good: 65%max.P. or less
- Accuracy, Longevity is good [Ideal]:
About 30 to 65% of the adjustable ranges

In the right figure

- Range 1: Selection of both accuracy and longevity
- Range 2: Selection of valuing accuracy
- Range 3: Selection of valuing longevity

Range of recommended pressure adjustment

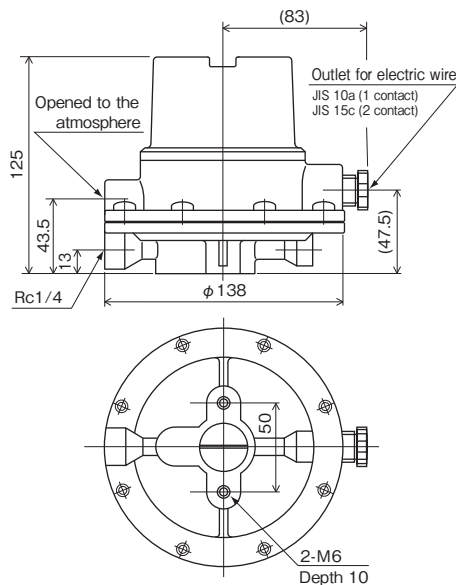
- Upper limit type: (Lowest pressure range+Deadband) to 100%max.P.
- Lower limit type: Lowest pressure range to (100%max.P.-Deadband)



Dimensions

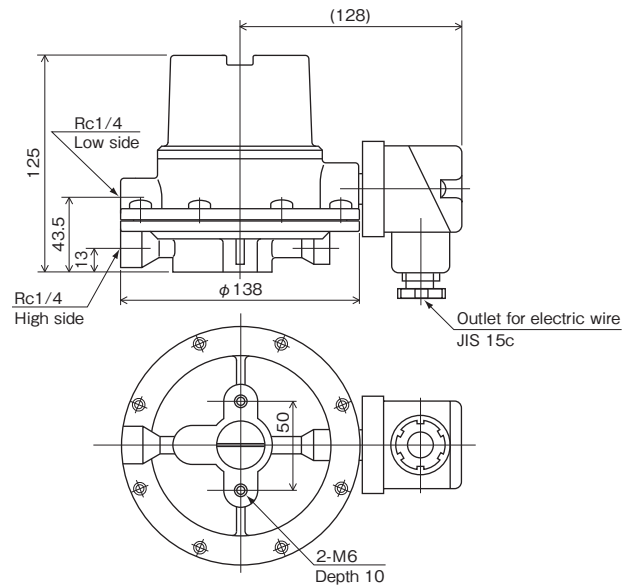
Unit: mm

Pressure switch



CS31-371
-471

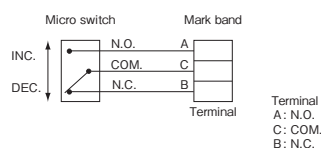
Differential pressure switch, Vacuum switch



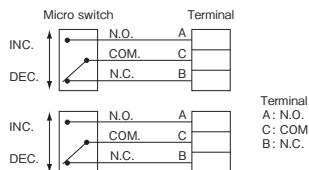
CS31-571
-671

Wiring

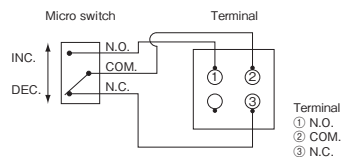
1SW Pressure switch



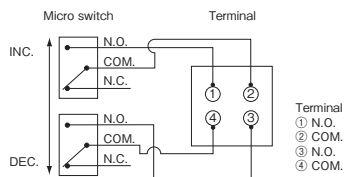
2SW Pressure switch



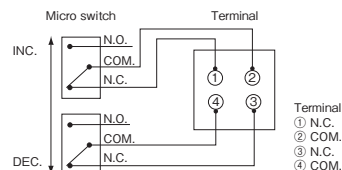
1SW Differential pressure switch



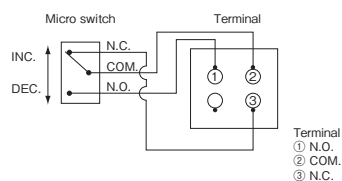
2SW Differential pressure switch



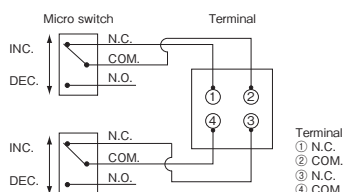
2SW Differential pressure switch



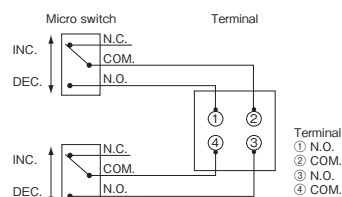
1SW Vacuum switch



2SW Vacuum switch



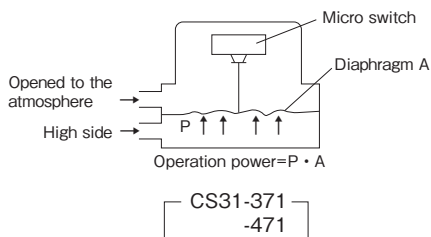
2SW Vacuum switch (WL)



Operation principle

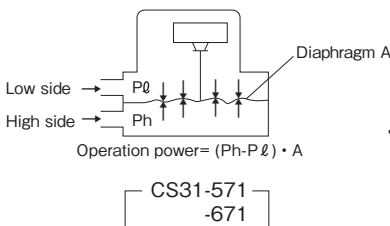
Pressure switch

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



Differential Pressure Switch and Vacuum Switch

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



• 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.

Remarks

1. Pressure on the rate of change

- 1) If the pressure change speed, you may follow without delay the operation of the diaphragm switch.
- 2) For slow changes in pressure and allowable operating speed off micro switch operation may become unstable. To achieve stable operation, please change to less than 2 minutes from zero to the maximum range.
- 3) Differential pressure switch so the switch may malfunction rate of variation in the reference pressure, please use the operating range shown in the figure-1.

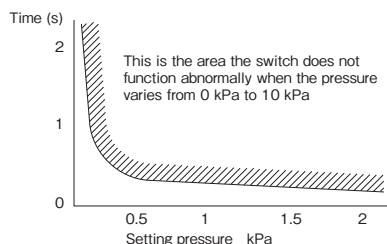


Figure-1

2. As a sequencer input

The contact resistance of the microswitch increases gradually as time passes. When used in an atmosphere, especially atmospheres containing Si, SiO₂ accumulates at the contact part as the switch is operated and the contact resistance increases in a short time. Therefore, use the gauge in a clean and well-ventilated atmosphere. When the gauge is used as sequencer input for control use, input it through a 100V AC relay, because the contacts may be fail for these reasons. (Figure-2 references)

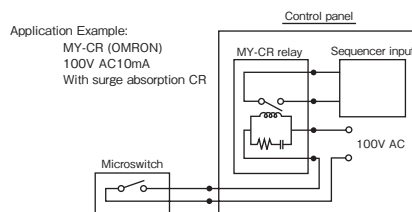


Figure-2

3. Insertion of contact protection circuit

With an inductive load switching circuit, insert a protection circuit to protect the contacts. When using a relay, select the type with a built-in contact protection circuit. (Figure-3 references)

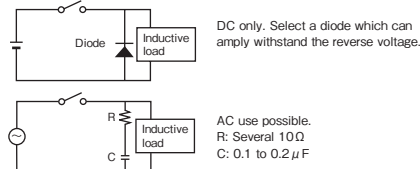


Figure-3

Model number configuration

For ordering, please specify the model number, each specs and the range.

Model **C S 3 1** — **7 1** — **0** × × × × × × × ×

Pressure & Differential Pressure Switch

Model number: [1-3] [4-5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15]

Model number		Selective spec.	Additional spec. (Option)
① Mounting	3	Pressure switch 1 contact	
	4	Pressure switch 2 contacts	
	5	Differential pressure switch 1 contact	
	6	Differential pressure switch 2 contacts	
② Connection	7	Rc1/4	
③ Wetted parts	1	Diaphragm: In nylon NBR Case: ADC12	
④ Pressure (Differential pressure) range (kPa)	1	0.05 to 0.4	1 contact only
	2	0.1 to 0.4	2 contacts only
	3	0.35 to 1	
	4	0.5 to 2	
	5	1.5 to 4.5	
	6	3 to 7	
	7	5 to 12	
	8	10 to 25	
	9	15 to 35	
⑤ Type of contacts	A	H: Upper limit type with 1 contact	
	B	L: Lower limit type with 1 contact	
	T	WH: Simultaneous operation upper limit type with 2 contacts	
	U	WL: Simultaneous operation lower limit type with 2 contacts	
		Others	
⑥ Switch	0	Standard type	
⑦ Outlet for electric wire	1	Gland JIS 10a, At the time of pressure 1 contact (CS31-371)	
	5	Gland JIS 15c, At the time of pressure 2 contacts, differential pressure (CS31-471, CS31-571, CS31-671)	
		Others	
⑨ Additional specifications	0	Nil	
	1	Coating specification	
⑮ Documents	0	Nil	
	1	Required (Please specify the desired documents separately.) Submission drawings, instruction manual, inspection procedure, test report (1 pc 1 copy), inspection / traceability certificate, attended inspection	

Please specify the differential and pressure range and units separately besides selection of range code.

Range of recommended pressure setting
 Upper limit type: (Lowest pressure range+Deadband) to 100%max.P.
 Lower limit type: Lowest pressure range to (100%max.P.-Deadband)

Manufacturing range

- Accuracy: ± 1.5 to $\pm 7.5\%$ max.P.
- Vacuum range: -0.4 to -0.05kPa \rightarrow -35 to -15kPa
- Setting system: Internal adjustment type, with setting lock

○Please set it compared with the master gauge and the standard pressure gauge when setting.
 Please make low-pressure side atmospheric opening, and pressurize from high-pressure side when set the differential pressure switch or the vacuum switch.

※Specify "X" if there is no specification item.