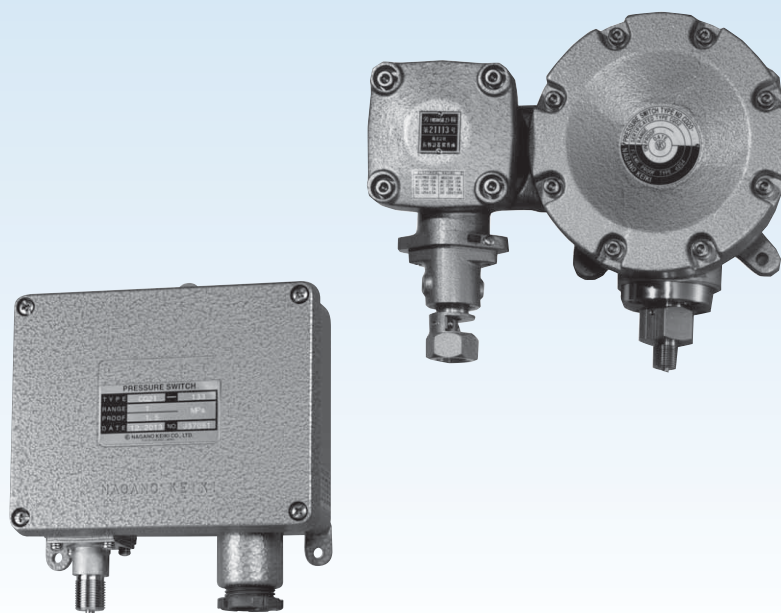


CQ21 Pressure Switch

CD20 Explosion-proof Construction Pressure Switch



Outline

This is a pressure switch with simple construction in which a Bourdon tube is applied to the pressure sensing element and its move directly functions the microswitch. A lot of these pressure switches have been manufactured for the warning and control of process industry, and a lot of these switches have application results in power and chemical plants.

Features

- According to the construction by which a Bourdon tube move directly functions the microswitch, the number of constituent parts is small and excellent durability is demonstrated.
- The pressure range extends extensively from low pressure to high pressure: 0.1 MPa to 70 MPa, complying with extensive ranges.
- This pressure switch has been developed mainly for thermal power stations, equipped with a large wiring space, assuring easy maintenance work.

Range of recommended pressure setting

Upper limit type: (10%max.P.+Dead band)~90%max.P.

Lower limit type: 10%max.P.~(90%max.P.-Dead band)

Compound: %max.P. → %F.S.

* When selecting pressure switches, Please select a pressure range with normal operation pressure within 30 to 65% of full span to get full performance. Also check whether wetted parts material could be used for gases or liquids to be measured.

Specifications 1

Item	Description
Model	CQ21: Water-proof construction CD20: Explosion-proof construction (d2G4)
Fluid	Gas or Liquid (No freezing)
Operating environment	CQ21: Places where there are no inflammable liquids or gases which may cause ignition or explosion under normal conditions. CD20: Hazardous area (Refer to the explanation column of the explosion-proof construction for details.)
Mounting	Panel mounting
Connection	G3/8B, G1/2B, R3/8, R1/2, 3/8NPT, 1/2NPT Please contact us about connection without the description.
Wetted parts material	Bourdon tube: SUS316 Socket: CQ21; CAC203 or SCS14 CD20; SUS316
Pressure range	0 to 0.1 → 0 to 70 MPa -0.1 to 0 → -0.1 to 2 MPa *20~100 kPa (receiver) also available. Contact NKS for details.
Proofpressure	1.5 times the pressure range
Operating temperature	CQ21: -20 to 60 °C CD20: -5 to 40 °C
Accuracy	±1%max.P. (Compound: ±1%F.S.)
Setting accuracy	±3%max.P. (Compound: ±3%F.S.)
Temperature coefficient	0.05%max.P./°C (Compound: 0.05%F.S./°C)
Dead band	Specification 2 references.
Switch	Micro switch
Quantity of switch	1 Contact
Setting system	Internal adjustment type, with setting scale and setting lock (The set adjustment axis is locked at the set value specification.)
Outlet for electric wire	CQ21: Conduit type: G3/4 female (Standard), Others Gland: JIS 20b (Standard), Others CD20: Conduit or proof pressure gasket
Case material, finishing	CQ21: ADC12, gray crystal painting CD20: AC7A, gray crystal painting
Case structure	CQ21: Water-proof type (IP66) CD20: Outdoor type (IP54)
Weight	CQ21: Approx. 1.5 kg CD20: Approx. 8 kg

Specifications 2

Electrical characteristics: (Standard specification)

	Rating		Withstand voltage	Insulation resistance
	Resistance load	Inductive load		
125V AC	15 A	15 A	1500V AC Between terminals and case for 1 minute	500V DC 100MΩ or over Between terminals and case
250V AC	15 A	15 A		
30V DC	2 A	1 A		
125V DC	0.5 A	0.05 A		
· Inductive load: Power factor 0.4 or over (AC) Time constant 7ms or less (DC)				

Specifications 2

Pressure range, dead band and proofpressure:

Pressure range MPa	Dead band MPa	Proofpressure MPa	Approval Number* for labor ministry inspection (In case of CD20)
-0.1~0.1	0.016 or less	0.15	No.T21107
~0.2	0.024 or less	0.3	
~0.3	0.024 or less	0.45	
~0.4	0.033 or less	0.6	
~0.6	0.046 or less	0.9	
~1	0.06 or less	1.5	No.T21113
~1.5	0.068 or less	2.25	No.T20911
~2	0.08 or less	3	No.T20912
-0.1~0	0.01 or less	0.15	No.T21107
0~0.1	0.01 or less	0.15	
~0.2	0.016 or less	0.3	
~0.3	0.024 or less	0.45	
~0.4	0.024 or less	0.6	
~0.6	0.039 or less	0.9	
~1	0.06 or less	1.5	
~1.5	0.068 or less	2.25	No.T20911
~2	0.08 or less	3	No.T20912
~2.5	0.15 or less	3.75	No.T20913
~3.5	0.14 or less	5.25	No.T20915
~5	0.175 or less	7.5	No.T20916
~7	0.24 or less	10.5	No.T20917
~10	0.65 or less	15	No.T20918
~15	0.52 or less	22.5	No.T20919
~25	1.25 or less	37.5	No.T20921
~35	1.05 or less	52.5	No.T20922
~50	2.2 or less	75	No.T20923
~70	3.1 or less	105	No.T20924

How to choose pressure

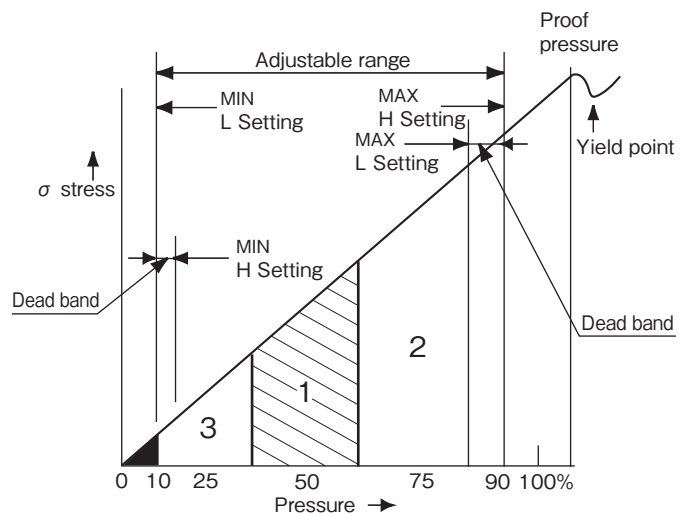
- Set value is steady, accurately: 30%max.P. or over
- Longevity is good: 65%max.P. or less
- Accuracy, Longevity is good [Ideal]:
About 30 to 65% of the adjustable ranges

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: (10%max.P.+Dead band)~90%max.P.
- Lower limit type: 10%max.P.~(90%max.P.-Dead band)
- Compound: %max.P. → %F.S.



* Registered model for labor ministry inspection and approval number:

Registered model for labor ministry inspection: CQD2 Approval number for labor ministry inspection: Depends on range	It is official approval number to represent that explosion-proof construction pressure switch conformed to explosion proof standard. It is national official approval which is examined and authorized by technology institution of industrial safety.
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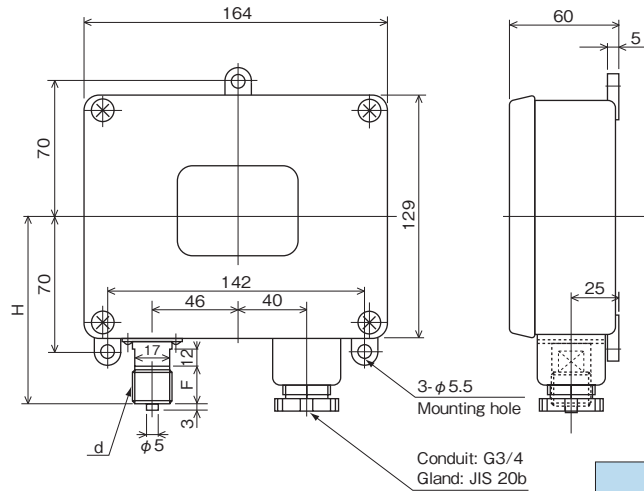
CQ21・CD20

Pressure Switch / Explosion-proof Construction Pressure Switch

Dimensions

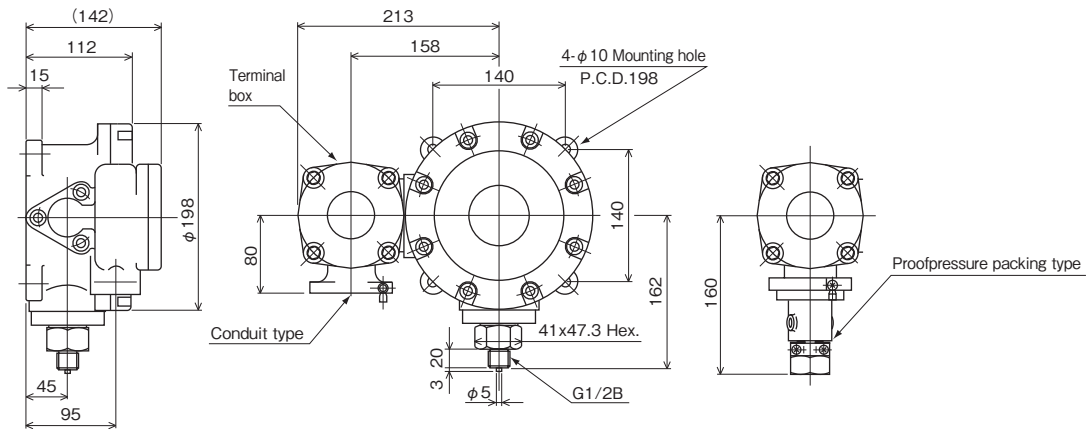
Unit: mm

CQ21



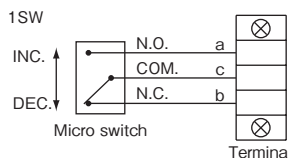
d	F	H
G3/8B	18	100
G1/2B	20	102

CD20



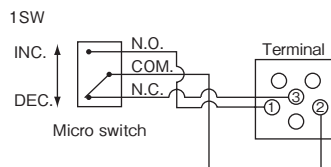
Wiring

CQ21



Terminal division
a: N.O.
b: N.C.
c: COM.

CD20



Terminal division
① N.O.
② COM.
③ N.C.

Remarks

1. As a sequencer input

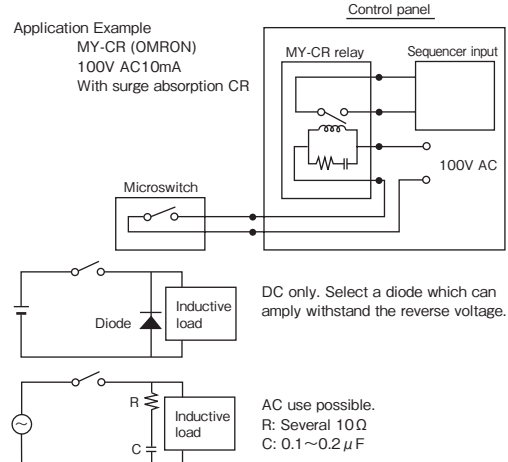
The contact resistance of the microswitch increases gradually as time passes. When used in an atmosphere, especially atmospheres containing Si, SiO₂ accumulates at the contact part as the switch is operated and the contact resistance increases in a short time. Therefore, use the gauge in a clean and 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.

2. 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.

3. flame propagation prevention joint

The pressure connection part of these pressure switches is equipped with a flame propagation prevention joint to satisfy explosion-proof performance. Therefore, pressure response may be slow, depending on the viscosity of the liquid being measured.



Explosion-proof

Explosion-proof construction:

Explosion-proof construction is a totally-enclosed construction such that even if an explosive gas explodes inside the container, the container will withstand the force of the explosion and there is no danger of ignition by external explosive gases. Our pressure switches manufactured under this policy are widely used in measurement, alarm, and pressure control in factories and business offices where inflammable gases or the vapor of inflammable liquids having a flash point of 40°C or less may exist.

Application range: d2G4

Explosion-proof construction: d

Explosion class: 2 (Minimum gap which permits flame propagation at a gap depth of 25mm is 0.4mm to 0.6mm)

Ignitability: G4 (Container with an ignition point of 135 to 200°C and whose outside surface temperature rise limit is 70deg)

Hazardous areas: Zone 1 or Zone 2

Objective industries: Petrochemical, chemical fiber, ethylene, ethanol, methanol, dielectric products manufacturing, liquefied gas, electric furnace, pharmaceuticals, paints, ammonium sulfate, soda, other measurement medium or industries in which there is the danger of explosion.

Classification of hazardous area:

Hazardous area	Contents
Zone 0	Areas where a hazardous atmosphere is continuously present or present for a long period under ordinary circumstances
Zone 1	Areas where hazardous atmosphere is likely to occur under ordinary circumstances
Zone 2	Areas where hazardous atmosphere is likely to occur under abnormal circumstances

Approval Number for labor ministry inspection:

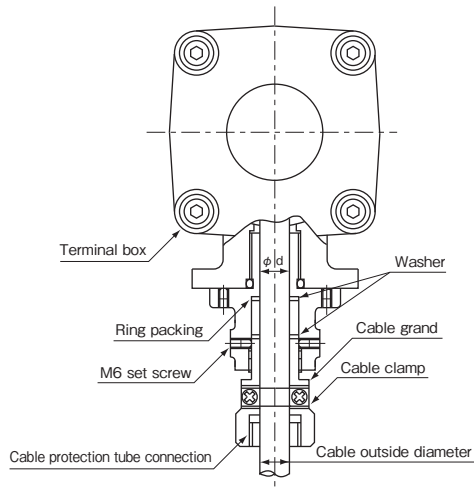
Please refer to Pressure range, dead band and proofpressure column of Specifications 2.

Method of leading external conductors and cable into a terminal box

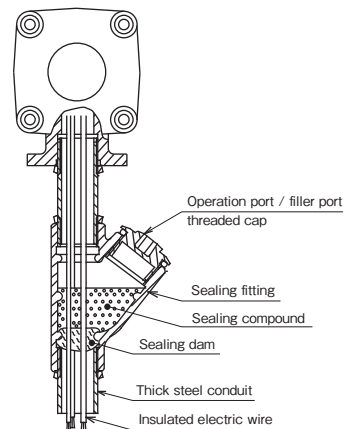
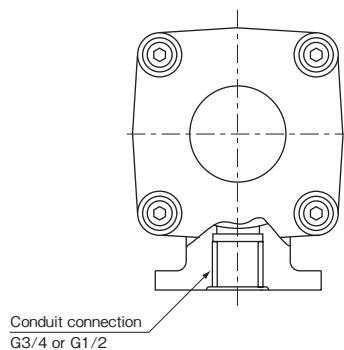
When wiring cable, select the proofpressure packing type and when performing metal conduit wiring with insulated electric wire, select the conduit proof pressure threads type.

Proofpressure packing type

Gasket inside diameter (d) DIA.	Applicable cable outside diameter DIA.	Protection tube connection
10.5	9.4	G $\frac{1}{2}$ G $\frac{3}{4}$
	9.9	
	10.1	
12	10.5	
	11.0	
	11.5	
14	11.9	
	12.0	
	12.5	
15.5	12.6	
	13.1	
	13.5	
16.5	13.6	G $\frac{3}{4}$ G 1
	14.5	
	15.6	



Conduit proofpressure threads connection type



When performing conduit wiring, the terminal box and conduit connection section must be sealed as shown at the left.

Note) Use the 600V polyvinyl chloride insulated wire specified in JIS C 3307 or equivalent or better insulated electric wire as the conduit wiring. Do not use cable or cabtyre cable.

Model number configuration

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

Model

C	Q	2	1	1							X	X	X	X	X			
Pressure Switch				①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮

Model number

① Mounting		1	Panel mounting, Water-proof type (IP66)	
② Connection	3	G3/8B		
	4	G1/2B		
	G	R3/8		
	H	R1/2		
	L	3/8NPT		
	M	1/2NPT		
		Others		
③ Wetted parts materials	1	Socket: CAC203, Bourdon tube: SUS316 (Available up to 35MPa range)		
	3	Socket: SCS14, Bourdon tube: SUS316		
④ Pressure range (MPa)	1	-0.1~0.1, 0.2, 0.3, 0.4, 0.6, 1, 1.5, 2		
	2	-0.1~0		
	3	20~100kPa (Receiver)		
	4	0~0.1, 0.2, 0.3, 0.4		
	5	0~0.6, 1, 1.5, 2, 2.5, 3.5, 5, 7		
	6	0~10, 15, 25, 35		
	7	0~50, 70		
⑤ Type of contacts	A	H: Upper limit type with 1 contact		
	B	L: Lower limit type with 1 contact		
		Others		
⑥ Switch	0	Standard		
	1	Ultra high sensitivity type		
	3	Standard + gold plated		
	4	Ultra high sensitivity type + gold plated		
⑦ Outlet for electric wire	Conduit type			
	C	G3/4 female (Standard)		
		Others		
	Gland type			
7	JIS 20b (Standard)			
	Others			
⑧ Treatment	0	Nil		
	1	Use no oil		
	2	Use no water		
	3	Use no oil & water		
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, mill sheet, test report (1 pc 1 copy), inspection / traceability certificate, attended inspection		

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

Range of recommended pressure setting
Upper limit type: (10%max.P.+Dead band)~90%max.P.
Lower limit type: 10%max.P.~(90%max.P.-Dead band)
Compound: %max.P. → %F.S.

Manufacturing range
·Accuracy: ±1% max.P. (Compound: ±1%F.S.)
·Setting accuracy: ±3% max.P. (Compound: ±3%F.S.)
·Setting system: Internal adjustment type, with setting scale and setting lock
·Treatment: Available up to 50MPa (Use no water for up to 70MPa)

○Setting dial includes the setting error. Therefore, for accurate adjustment, always compare with a master gauge and base pressure gauge and set.

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

Model number configuration

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

Model

C D 2 0

①

②

③

3

④

⑤

⑥

⑦

⑧

⑨

⑩

⑪

⑫

⑬

⑭

⑮

×

×

×

×

×

Explosion-proof Construction Pressure Switch

Model number

Selective spec.

Additional spec. (Option)

① Mounting

1

Panel mounting, Conduit type

3

Panel mounting, Proofpressure packing type

② Connection

4

G1/2B

H

R1/2

M

1/2NPT

Others

③ Wetted parts

3

SUS316

④ Pressure range (MPa)

1

-0.1~0.1, 0.2, 0.3, 0.4, 0.6, 1, 1.5, 2

2

-0.1~0

3

20~100kPa (Receiver)

4

0~0.1, 0.2, 0.3, 0.4

5

0~0.6, 1, 1.5, 2, 2.5, 3.5, 5, 7

6

0~10, 15, 25, 35

7

0~50, 70

⑤ Type of contacts

A

H: Upper limit type with 1 contact

B

L: Lower limit type with 1 contact

Others

⑥ Switch

0

Standard

1

Ultra high sensitivity type

3

Standard + gold plated

4

Ultra high sensitivity type + gold plated

Others

⑦ Outlet for electric wire

B

Conduit type, G1/2

C

Conduit type, G3/4 (Standard)

力

Proofpressure packing type, G3/4 × 12 (Standard)

キ

Proofpressure packing type, G3/4 × 10.5

コ

Proofpressure packing type, G3/4 × 14

Others (With joint)

⑧ Treatment

0

Nil

1

Use no oil

2

Use no water

3

Use no oil & water (Within 50MPa)

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, mill sheet, test report (1 pc 1 copy), inspection / traceability certificate, attended inspection

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

→

Range of recommended pressure setting

Upper limit type: (10%max.P.+Dead band)~90%max.P.

Lower limit type: 10%max.P.~(90%max.P.-Dead band)

Compound: %max.P. → %F.S.

Manufacturing range

- Setting system: Internal adjustment type, with setting scale and setting lock

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