Electronic pressure switch for air

(Pressure switch)

■ **Sensors / Pressure sensor**

Overview

Air pressure is electrically detected, displayed and outputted.

Overview

Various sort

Wide variation is available from compact sensor to indicator.

CONTENTS

Electronic pressure switch

Model no.		Type		Pressure range (kPa)							Degree of protection	
		Sensor, amplifier integrated type	Sensor, amplifier separate type	0 to 980 (1000)	0 to 98 (100)	0 to -100 (-101.3)	−100 to 980 (1000)	−100 to 300	−100 to 100	−101 to 500		
PPX	Digital pressure sensor with twin display of current and set pressure values confirmed simultaneously, a tricolor indicator, setting detail copy function, and 3 mode settings. This sensor provides to ease of use and high functionality.	●	-	-	-	-	● (1000)	-	●	-	IP40	
PPD3	Optimum digital indicator pressure switch for pneumatic lines. Due to various port options, adsorption confirmation / contact confirmation, etc. can be flexibly operated.	●	-	-	-	-	●	●	●	-	IP65	
		-	●								IP65 (IP 40 for indicator section)	
PPD3-S	Pressure switch with digital display stainless steel diaphragm is used for sensor section.	●	-	-	-	-	●	●	●	-	IP65	
		-	●								IP65 (IP 40 for indicator section)	
PPD	28 mm square miniature switch with digital pressure display for pneumatic/vacuum circuits.	●	-	●	●	●	-	-	-	-	IP40	
PPD-S	Pressure switch with digital display stainless steel diaphragm is used for sensor section. For products for vacuum, the proof pressure is enhanced by three times of the conventional products.	●	-	●	●	●	-	-	-	-	IP40	
PPD-A	Equivalent to degree of protection IP67, pressure switch with digital display in protective box allowing operation by a wet hand.	●	-	●	●	●	-	-	-	-	IP67	
PPE	Trimmer setting type semiconductor pressure switch developed for pneumatic/ vacuum circuits. Usage is flexible due to compact and 3 types of pipe connection.	●	-	● (1000)	● (100)	● (-101.3)	-	-	-	-	IP65	
PPE-□A	Semiconductor pressure sensor developed for pneumatic/vacuum circuits. 1 to 5 V output (analog output) is proportional to impressed pressure.	●	-	● (1000)	● (100)	●	-	-	-	-	IP65	
PSW	Reliable pressure switch developed for pneumatics/vacuum circuits. Semiconductor sensor is used, high precision / high speed response.	●	-	● (1000)	● (100)	●	-	-	-	-	IP40	
PPS2	Digital measurement display detecting air pressure/vacuum precisely. 4 point switch output allows wide applications.	●	-	● (1000)	● (100)	● (-101.3)	-	-	-	●	None (IP 66 for option (*1))	
		-	●								Body: none (IP 66 for option (*1)) Sensor:IP67	

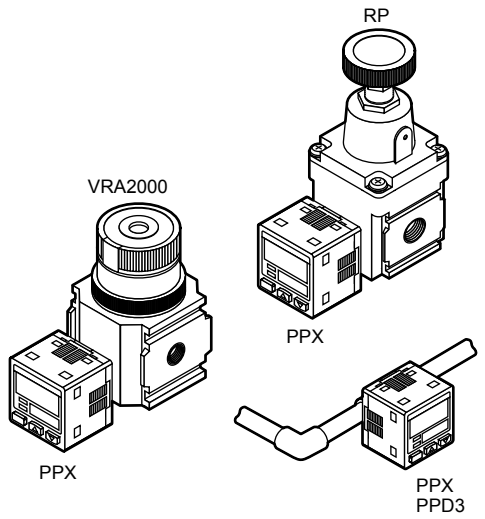
● =Available in lineup
— = Not available in lineup

*1: Main unit front operation section only *2: Custom order *3: Select with model no.

Switch output (number of points) *3		Analog	Applicable fluid	Mounting method										Display		Page
							Piping connection									
NPN	PNP			F.R installation	Panel mount	Others (mounting bracket, etc.)	Rc1/8	R1/8	Push-in	Plug	M-5 female thread	NPT1/8	G1/8	Digital display	Output light only	
● (2)	● (2)	-	Air Non-corrosive gas	● Attached	●	●	-	●	-	-	●	●	●	●	-	1088
● (1)	● (1)	● (1)														
● (2)	● (2)	-	Air Non-corrosive gas	-	●	●	●	-	●	-	-	-	-	●	-	1114
● (1)	● (1)	● (1)														
● (2)	● (2)	● (1)		-	●	●	-	●	●	●	-	-	-	●	-	
● (2)	● (2)	-	Air/non-corrosive gas (Including drain and oil) Compressed air	-	●	●	●	-	●	-	-	-	-	●	-	1114
● (1)	● (1)	● (1)														
● (2)	● (2)	● (1)		-	●	●	●	-	-	-	-	-	-	●	-	
● (1)	● (1)	-	Air Non-corrosive gas	●	●	●	●	●	●	-	-	-	-	●	-	1130
● (1)	● (1)	-	Air/non-corrosive gas (Including drain and oil) Compressed air	-	●	●	●	-	●	-	-	-	-	●	-	1134
● (1)	● (1)	-	Air Non-corrosive gas	-	-	●	-	-	●	-	-	-	-	●	-	1136
● (2 wire) (1)	-	-	Air Non-corrosive gas	-	-	-	-	●	●	●	-	-	-	-	●	1140
-	-	● (1)	Air Non-corrosive gas	-	-	-	-	●	●	●	-	-	-	-	● (display of energized state only)	1143
● (1)	-	● (1)	Air Non-corrosive gas	-	-	●	-	-	-	-	●	-	-	-	●	1146
● (no polarity) (4)		● (1)	Air Non-corrosive gas	-	●	-	●	-	-	-	-	-	-	●	-	1148
				-	●	-	●	-	-	-	-	-	-	●	-	

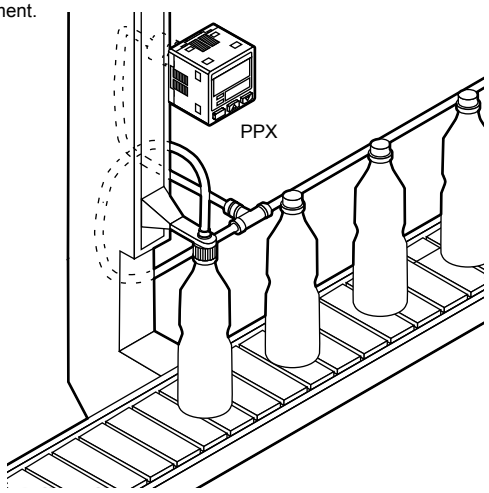
Electronic pressure switch Applications of pressure switch

● Positive pressure/vacuum confirmation and interlock

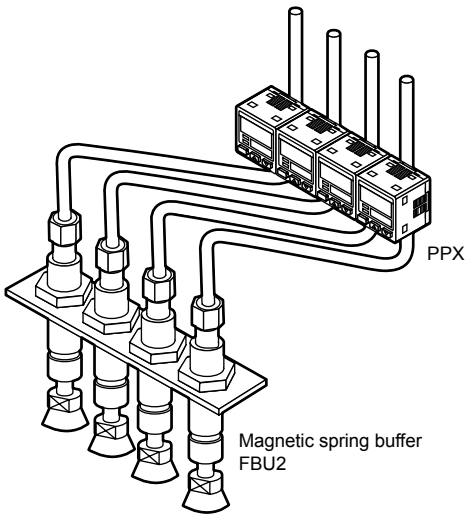


● High-function type

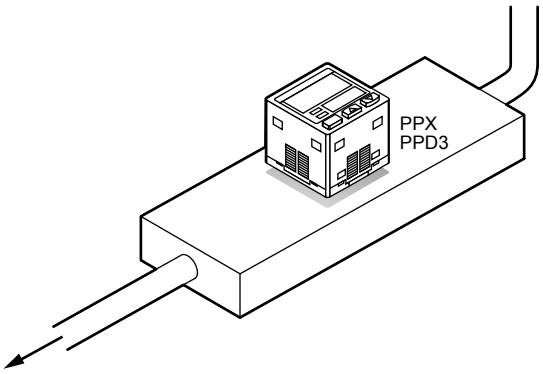
· Settings are made easy with automatic reference and remote zero adjustment.



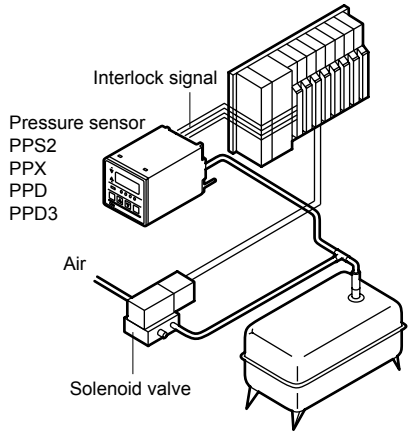
● Manifold



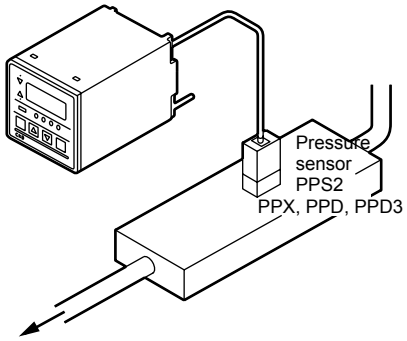
● Attain vacuum and break pressure with one unit



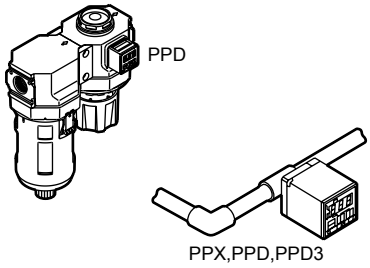
● Tank leak test



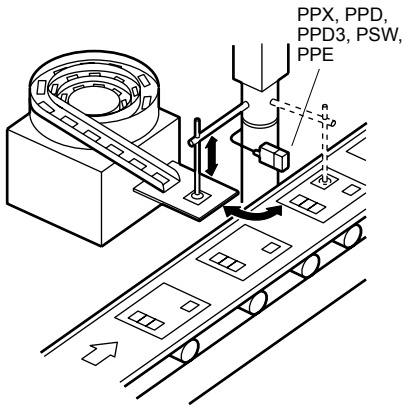
● Filling monitor / filling by vacuum treatment



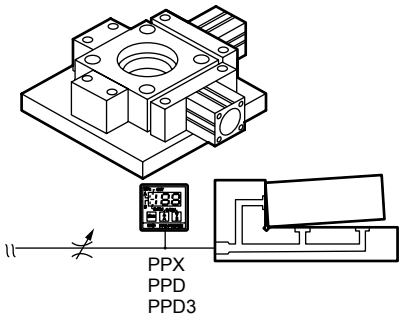
● Checking source / line pressure



● Confirming vacuum suction of parts



● Contact confirmation



Operability is improved with

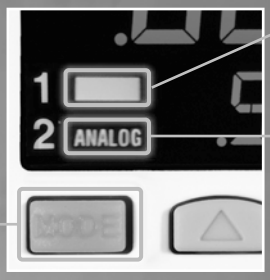
This product is improved with 3 new functions.

Increased visibility

The digital display is widened to increase the visibility.
The display pressure range and the setting pressure range are enlarged.

Analog current output is added to the high-function type

Instead of providing another comparison output, the high-function type which can select the analog voltage output, analog current output or external input, is prepared, making this device ideal for multiple applications.



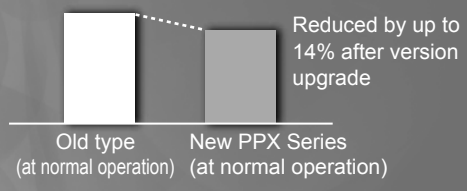
Switches the analog current and analog voltage

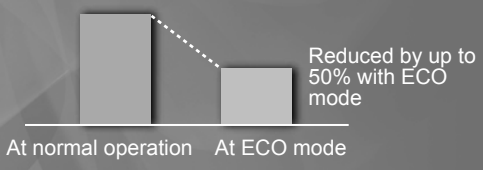
Selection

- Comparison output
- Analog voltage output
  Low pressure type: 1 to 5 V,
  High pressure type: 0.6 to 5 V
- Analog current output
  Low pressure type: 4 to 20 mA,
  High pressure type: 2.4 to 20 mA
- External input
  Auto-reference/
  remote zero adjustment

Power consumption is further reduced

- The reduced power by up to 14% compared to the conventional products at normal operation
- The reduced power by up to 30% to 50% with ECO mode





Digital pressure sensor

PPX Series

2-screen display!

Direct setting with 2-screen display

Comparison output 1
Operational indicator light

Comparison output 2
Operational indicator light
(High-function type has the analog voltage output operational indicator light)

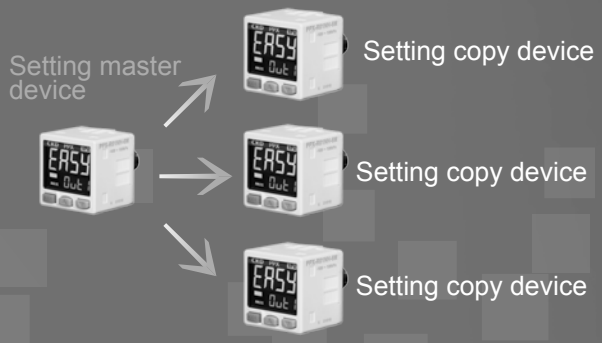
Present value (Main display section)
3-color display (red/green/orange)
Main display section changes green/red in conjunction with ON/OFF of the output and remains orange during the setting.

Setting value (Sub-display section)
Capable of customizing sub-display section
Arbitrary alphanumeric characters other than setting values can be displayed.

Mode switching key

RUN Mode	Controls to be performed during operation, such as setting value adjustment and key locking, are possible.
Menu setting Mode	Basic settings, such as output mode setting and NO/NC switching, are possible.
PRO Mode	High-function settings, such as copy function and sub-display section change, are possible.

Copy function helpful for reducing man-hours and preventing false operation



Equipped with 2 independent outputs (standard type)

This device is equipped with 2 independent comparison outputs and a different detection mode can be selected for each output.

3 types of detection modes can be selected

- EASY mode…Performing ON/OFF control of the comparison output
- Hysteresis mode…Performing ON/OFF control of the comparison output with hysteresis setting
- Window comparator…Performing ON/OFF control of the comparison output within the setting pressure range

Strengthened output circuit

- The transistor output circuit is equipped with a reverse connection protection circuit

More convenient functions

- Easy-to-read alphanumeric display

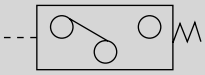
- Peak/bottom hold function
  The max. value and the min. value of changing pressures are displayed on 2 screens.
- The response time can be changed in 10 steps (2.5 ms to 5000 ms)
- The setting descriptions can be displayed with code number

Space saving
Contacting mounting is possible.

Digital pressure sensor

PPX Series

JIS symbol



Specifications

Descriptions		Standard type		High-function type	
		For low pressure PPX-R01*	For high pressure PPX-R10*	For low pressure PPX-R01*H	For high pressure PPX-R10*H
Kind of pressure		Gauge pressure			
Rated pressure		-100.0 to +100.0 kPa	−0.100 to +1.000 MPa	-100.0 to +100.0 kPa	-0.100 to +1.000 MPa
Set pressure		-101.0 to +101.0 kPa	-0.101 to +1.010 MPa	-101.0 to +101.0 kPa	-0.101 to +1.010 MPa
Proof pressure		500 kPa	1.5 MPa	500 kPa	1.5 MPa
Applicable fluid		Air/non-corrosive gas			
Power supply voltage		12 to 24 VDC ±10% Ripple P−P 10% or less			
Power consumption		Normal: 720 mW or less (current consumption 30 mA or less at 24 V power supply voltage) ECO mode: 480 mW of less at STD (current consumption 20 mA or less at power supply voltage 24 V), 360 mW or less at FULL (current consumption 15 mA or less at power supply voltage 24 V)			
Comparison output (Comparison output 1, comparison output 2)		<NPN output type> NPN transistor/open collector • Max. inrush current: 100 mA • Applied voltage: 30 VDC or less (comparison output–0 V interval) • Residual voltage: 2 V or less (at inrush current 100 mA)		<PNP output type> PNP transistor/open collector • Max. output current: 100 mA • Applied voltage: 30 VDC or less (comparison output– +V interval) • Residual voltage: 2 V or less (at output current 100 mA)	
	Output operation	Select NO/NC with the key operation			
	Output mode	EASY MODE/hysteresis mode/window comparator mode			
	Hysteresis	Min.1 digit (variable)			
	Repeatability	±0.1% F.S. (within ±2 digits)	±0.2% F.S. (within ±2 digits)	±0.1% F.S. (within ±2 digits)	±0.2% F.S. (within ±2 digits)
	Response time	2.5 ms, 5 ms, 10 ms, 25 ms, 50 ms, 100 ms, 250 ms, 500 ms, 1000 ms, 5000 ms select by the key operation			
	Short circuit protection	Equipped			
External input (auto reference/remote zero adjusting)		—		<NPN output type> ON voltage: 0.4 VDC or less OFF voltage: 5 to 30 VDC or release Input impedance: 10 kΩ Input time: 1 ms and over	<PNP output type> ON voltage: 5 V to + VDC OFF voltage: 0.6 VDC or less or release Input impedance: 10 kΩ Input time: 1 ms and over
Analog voltage output		—		Output voltage: 1 to 5 V Zero point: Within 3 V ±5% F.S. Span: Within 4 V ±5% F.S. Linearity: Within ±1% F.S. Output impedance: Approx. 1 kΩ	Output voltage: 0.6 to 5 V Zero point: Within 1 V ±5% F.S. Span: Within 4.4 V ±5% F.S. Linearity: Within ±1% F.S. Output impedance: Approx. 1 kΩ
Analog current output		—		Output current: 4 to 20 mA Zero point: Within 12 mA ±5% F.S. Span: Within 16 mA ±5% F.S. Linearity: Within ±1% F.S. Load resistance: 250 Ω (max.)	Output voltage: 2.4 to 20 mA Zero point: Within 4 mA ±5% F.S. Span: Within 17.6 mA ±5% F.S. Linearity: Within ±1% F.S. Load resistance: 250 Ω (max.)
Display		4-digit + 4-digit 3-color LCD display (display updating cycle: 250 ms, 500 ms, 1000 ms select by the key operation)			
	Display pressure range	-101.0 to +101.0 kPa	-0.101 to +1.010 MPa	-101.0 to +101.0 kPa	-0.101 to +1.010 MPa
Indicator light		Orange LED (comparison output 1 operation indication light, comparison output 2 operation indication light: Light ON when comparison output is ON)		Orange LED (comparison output 1 operation indication light: Light ON when comparison output is ON, analog voltage output operation indication light: Light ON at the time of setup)	
Environment conditions	Degree of protection	IP40 (IEC)			
	Ambient temperature	-10 to +50°C, at the time of storage: -10 to +60°C			
	Ambient humidity	35 to 85% RH (no dew condensation, freezing), store: 35 to 85% RH			
	Withstand voltage	1000 VAC for 1 minute applied to all charged sections/between cases			
	Insulation resistance	50 MΩ and over with 500 VDC mega overall charging section/between cases			
	Vibration resistance	Durability 10 to 500 Hz double amplitude 3 mm 2 hours each in XYZ directions (when mounted on panel: durability 10 to 150 Hz double amplitude 0.75 mm 2 hours each in XYZ directions)			
	Shock resistance	Durability 100 m/S² (approx. 10 G) 3 times each in XYZ directions			
Temperature characteristics (characteristics at +20°C is taken as standard)		Within ±0.5% F.S.	Within ±1% F.S.	Within ±0.5% F.S.	Within ±1% F.S.
Port size Note 1		M5 famale thread + R (PT) 1/8 male thread			
Material		Case: PBT (glass fiber included), LCD display section: acrylic resin, pressure port: SUS 303, amounting screw section: brass (nickeling), switch section: silicon rubber			
Connection		Connector			
Wire length		When wire is extended, up to 100 m permissible with 0.3 mm² and over cable (less than 30 m when CE Mark-compliant)			
Unit change function		Only supported for overseas (−KA) (MPa, kPa, kgf/cm², bar, psi, mmHg, inchHg)			
Weight		Product weight: approx. 40 g, weight including package: 130 g			
Accessory Note 2		PPX-C2 (2 m cable with connector): 1 pc. Unit seal label (KA with unit change function): MPa, kPa, kgf/cm², bar, psi, mmHg, inchHg			

Note 1: Refer to Table 1 on the next page for export use.
Note 2: For (- J), connector cable is not attached.

How to order

(How to order for domestic market)

PPX - R01 N - 6M - ○

Ⓐ Pressure range
Ⓑ Output type
Ⓒ Piping shape
Ⓓ Connector cable

Symbol	Descriptions
Ⓐ Pressure range	
R01	-100.0 to 100.0 kPa
R10	-0.100 to 1.000 MPa
Ⓑ Output type	
N	NPN transistor output 2 point (standard type)
P	PNP transistor output 2 point (standard type)
NH	NPN transistor output 1 point + analog voltage output or external input (high-function type)
PH	PNP transistor output 1 point + analog voltage output or external input (high-function type)
Ⓒ Piping shape	
6M	R1/8, M5 female thread
Ⓓ Connector cable	
Blank	2 m connector cable attached
J Note 1	Without connector cable

Note 1: Only "N" or "P" can be selected for item Ⓑ Output.

(How to order for foreign market)

PPX - R01 N - 6M - ○ - KA

Ⓐ Pressure range
Ⓑ Output type
Ⓒ Piping shape
Ⓓ Connector cable
Ⓔ Unit change

In compliance with new Measurement Laws, export models with unit select function cannot be used in Japan.

Symbol	Descriptions
Ⓐ Pressure range	
R01	-100.0 to 100.0 kPa
R10	-0.100 to 1.000 MPa
Ⓑ Output type	
N	NPN transistor output 2 point (standard type)
P	PNP transistor output 2 point (standard type)
NH	NPN transistor output 1 point + analog voltage output or external input (high-function type)
PH	PNP transistor output 1 point + analog voltage output or external input (high-function type)
Ⓒ Piping shape	
6M Note 1	R1/8, M5 female thread
6N	NPT1/8, M5 female thread
6G Note 2	G1/8, M5 female thread
Ⓓ Connector cable	
Blank	2 m connector cable attached
J Note 3	Without connector cable
Ⓔ Unit change	
KA	With unit change function

Note 1: Only "N" or "NH" can be selected for item Ⓑ Output.
Note 2: Only "P" or "PH" can be selected for item Ⓑ Output.
Note 3: Selectable only when "N" or "P" is selected for item Ⓑ Output type.

● Discrete option model no.

PPX - C1

Symbol	Descriptions
C1	Cable with connector 1 m
C2	Cable with connector 2 m
C3	Cable with connector 3 m
C5	Cable with connector 5 m
CN	Connector set (10 pcs. per set)
KL	Mounting bracket (set screw attached)
KHS	Panel bracket
KCB	Front protective cover (when using panel bracket)

Destination	Switch output		Unit	Unit change function	Unit seal label Attached Note 1	Piping port
	NPN	PNP				
Domestic	○	○	kPa/MPa	–	–	R1/8 (M5)
Asia	○	–	kPa/MPa	○	○	R1/8 (M5)
Europe	–	○	kPa/MPa	○	○	G1/8 (M5)
North America	○	○	kPa/MPa	○	○	NPT1/8 (M5)

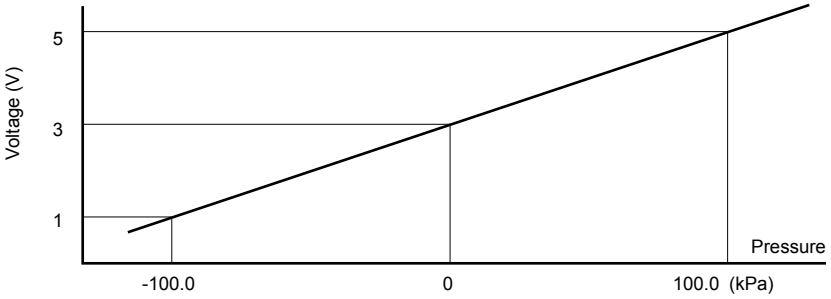
Note 1: Refer to page 1168 for the enclosed unit sealant.

<Table 1>

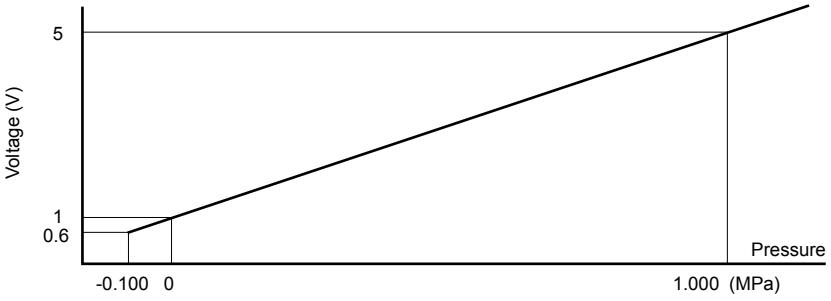
Type	Model no.	Port size	Output type	Remarks
Standard type	PPX-R01N-6M-(J)-KA	M5 female thread + R (PT) 1/8 male thread	NPN transistor/open collector	For Asia
	PPX-R10N-6M-(J)-KA			
High-function type	PPX-R01NH-6M-KA			
	PPX-R10NH-6M-KA			
Standard type	PPX-R01P-6G-(J)-KA	M5 female thread + G1/8 male thread	PNP transistor/open collector	For Europe
	PPX-R10P-6G-(J)-KA			
High-function type	PPX-R01PH-6G-KA			
	PPX-R10PH-6G-KA			
Standard type	PPX-R01N-6N-(J)-KA	M5 female thread + NPT1/8 male thread	NPN transistor/open collector	For North America
	PPX-R01P-6N-(J)-KA		PNP transistor/open collector	
	PPX-R10N-6N-(J)-KA		NPN transistor/open collector	
	PPX-R10P-6N-(J)-KA		PNP transistor/open collector	
High-function type	PPX-R01NH-6N-KA		NPN transistor/open collector	
	PPX-R01PH-6N-KA		PNP transistor/open collector	
	PPX-R10NH-6N-KA		NPN transistor/open collector	
	PPX-R10PH-6N-KA		PNP transistor/open collector	

Analog output voltage - pressure characteristics

● PPX-R01NH
R01PH

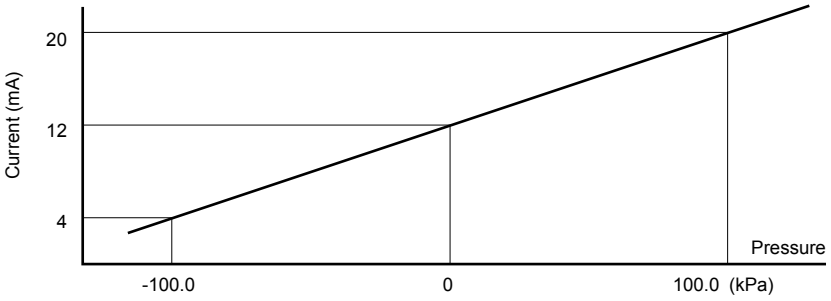


● PPX-R10NH
R10PH

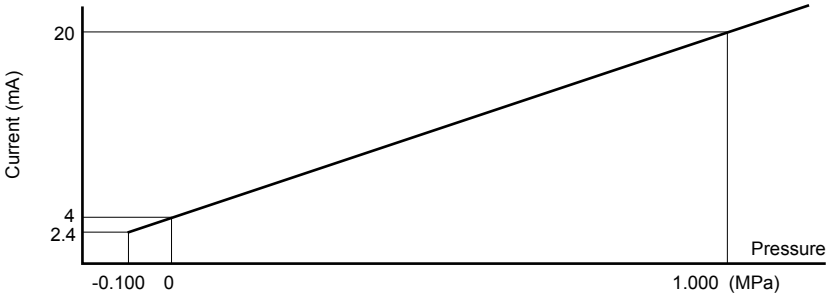


Analog output current - pressure characteristics

● PPX-R01NH
R01PH

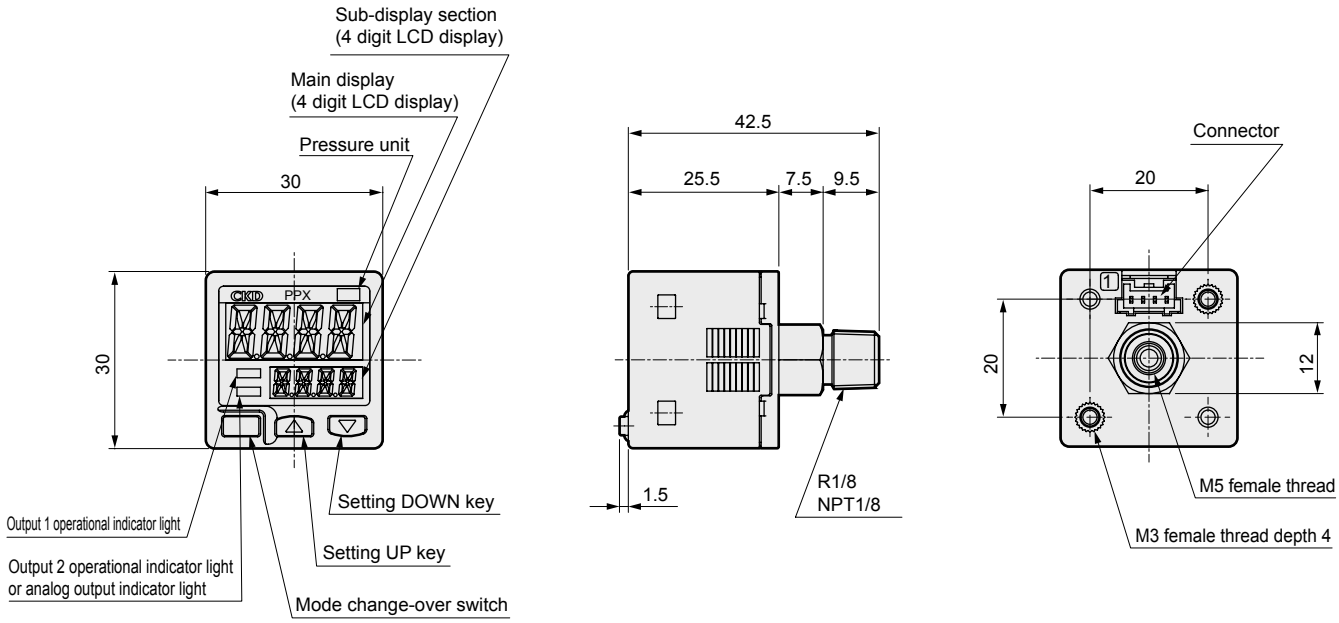


● PPX-R10NH
R10PH

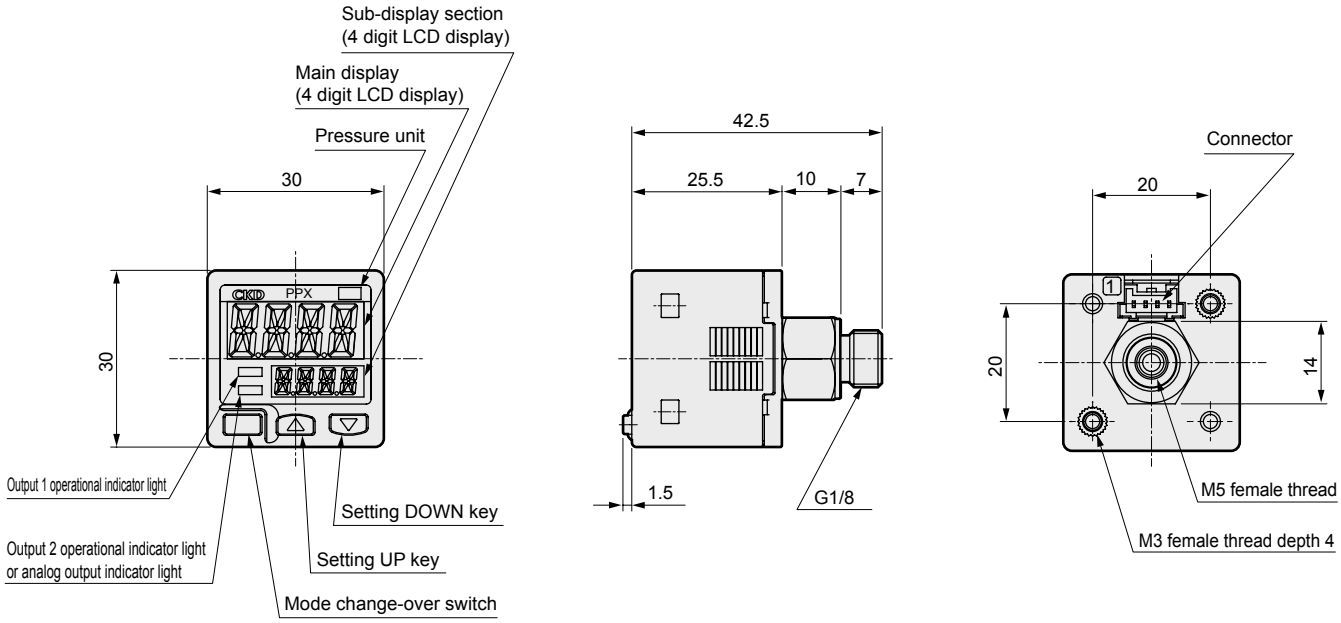


Dimensions

● PPX-R**-6M/6N (R thread/NPT thread)

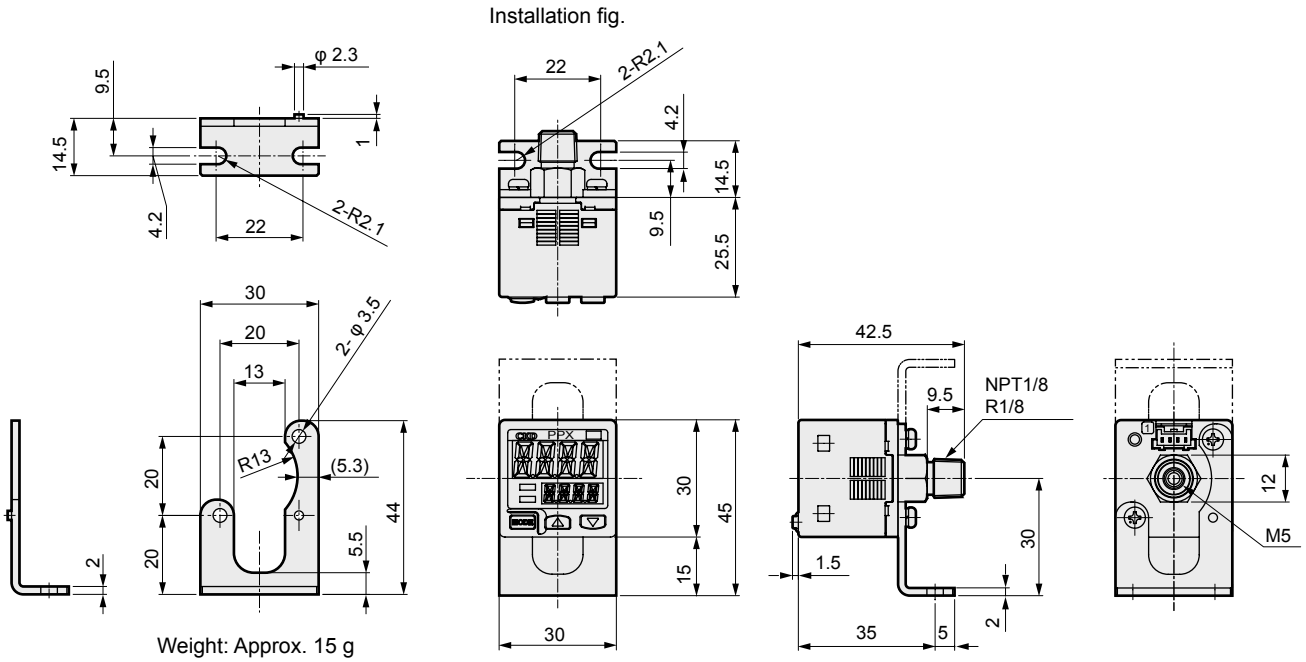


● PPX-R**-6G (G thread)



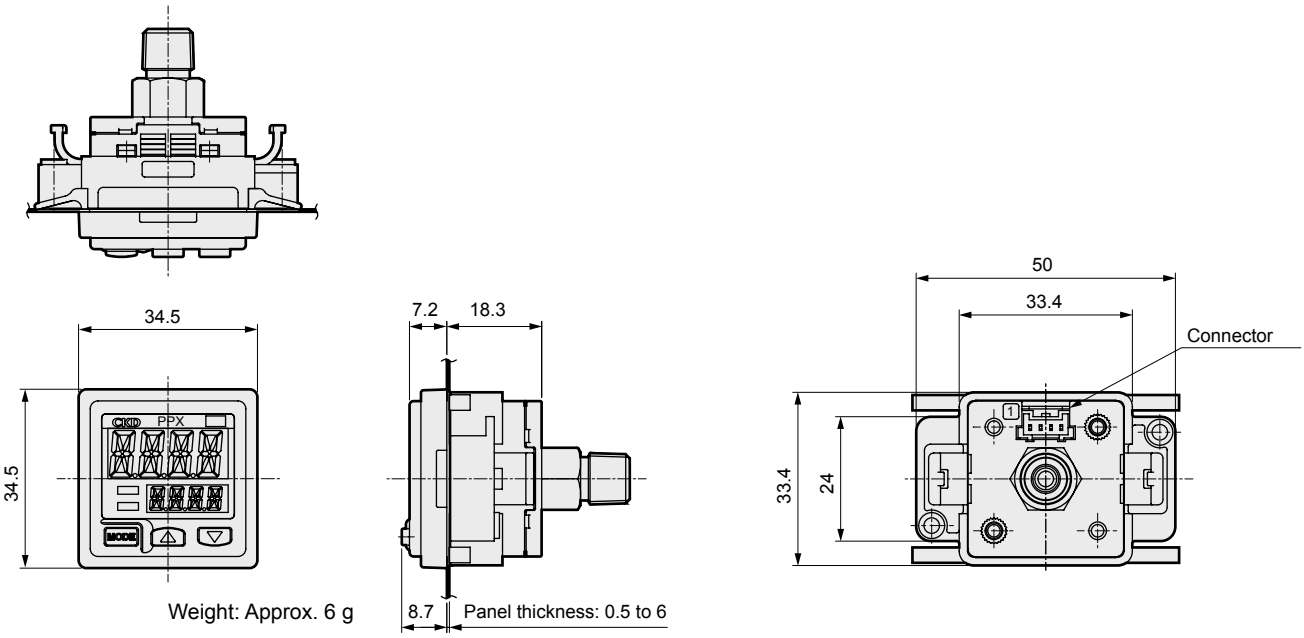
Dimensions with options

● Mounting bracket (PPX-KL)



Weight: Approx. 15 g

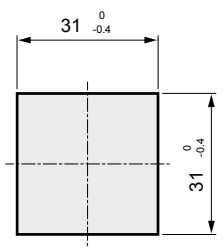
● Panel bracket (PPX-KHS) installation fig.



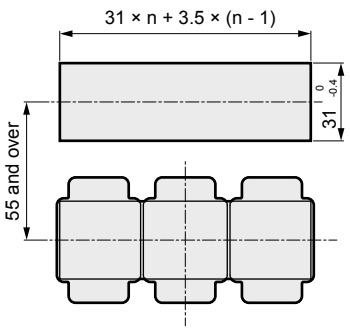
Weight: Approx. 6 g

Panel cut dimension

Installing 1 pc.

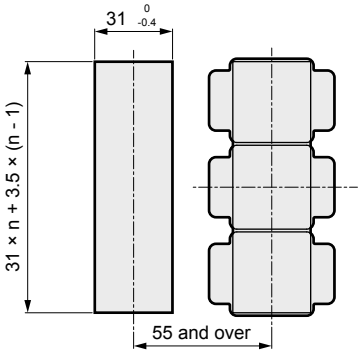


Installing consecutive n pcs. horizontally



(Note 1): Panel thickness must be 0.5 to 6 mm.

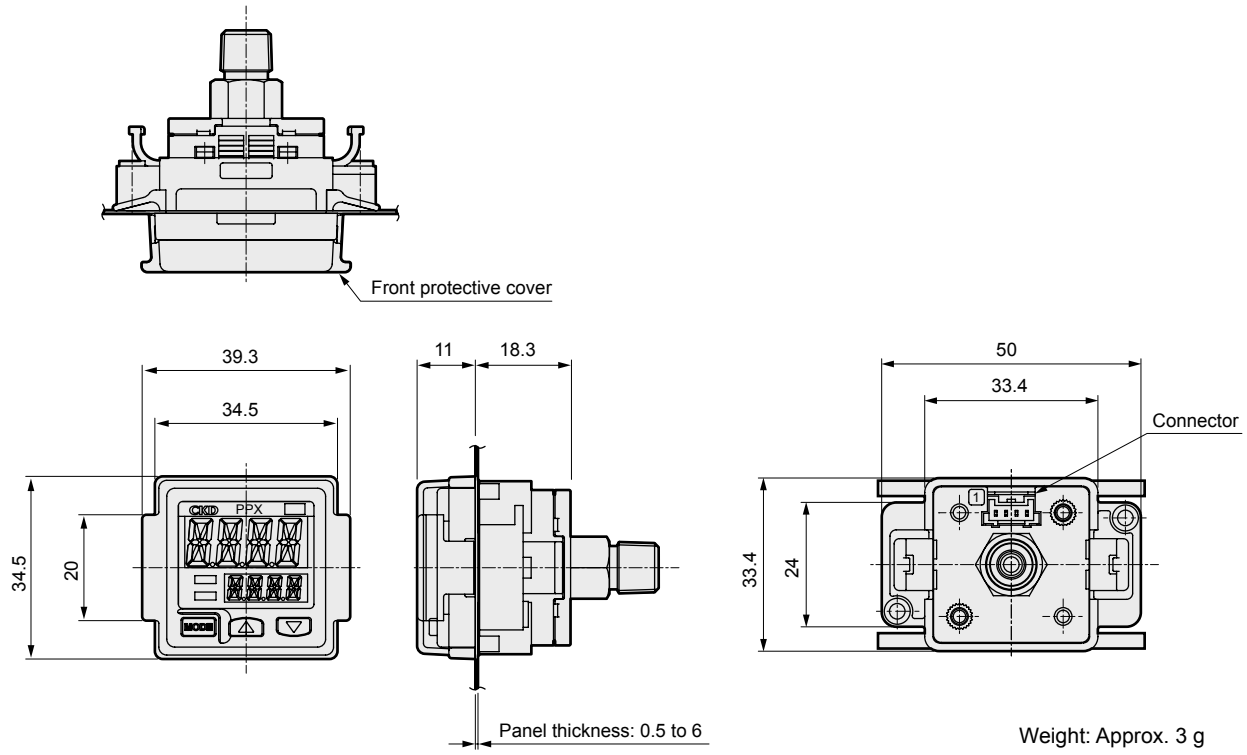
Installing consecutive n pcs. vertically



(Note 1): Panel thickness must be 0.5 to 6 mm.

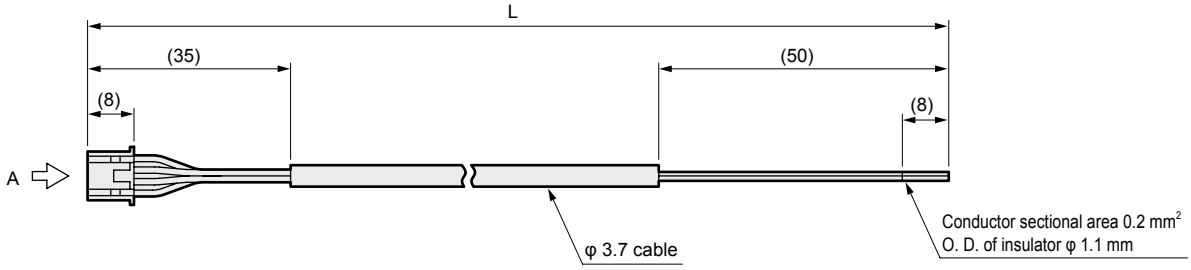
Dimensions with options

● Front protective cover (PPX-KCB) installation fig.



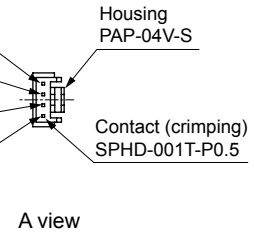
Weight: Approx. 3 g

● Cable with connector (PPX-C*)



(JST MFG CO. LTD.)

Terminal name	Insulator color	Terminal no.
0 V	Blue	4
Standard type: comparison output 2 High-function type: Analog voltage output or external input	White	3
Comparison output 1	Black	2
+ V	Brown	1



A view

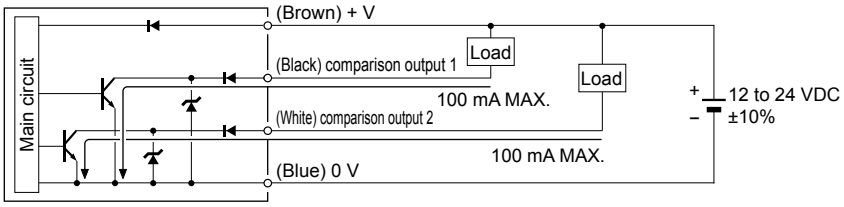
Model no.	Cable length	Weight g
PPX-C1	1 m	Approx. 20 g
PPX-C2	2 m	Approx. 40 g
PPX-C3	3 m	Approx. 60 g
PPX-C5	5 m	Approx. 100 g

● Connector set (PPX-CN)
- Housing: JST MFG CO. LTD. PAP-04V-S
- Contact: JST MFG CO. LTD. SPHD-001T-P0.5

Circuit and connection method

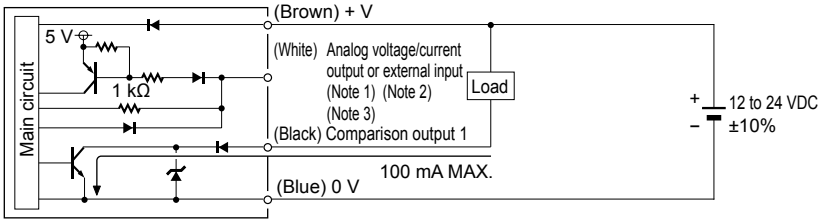
NPN output type

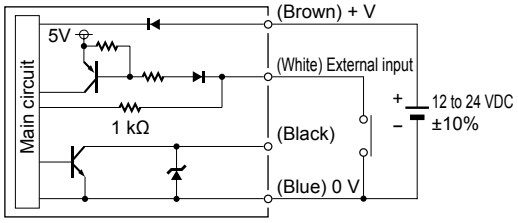
● Standard type



● High-function type

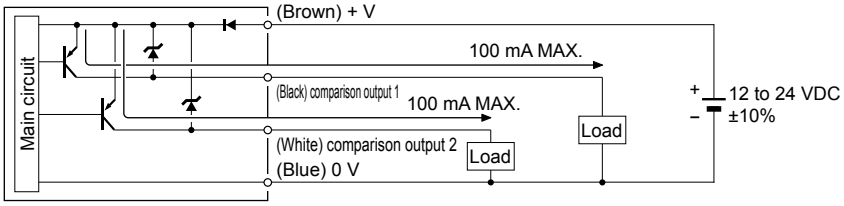
(Example of external input connection)





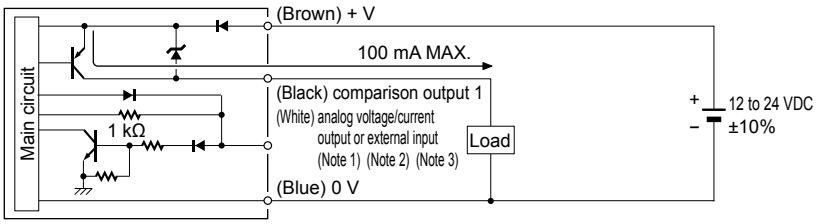
PNP output type

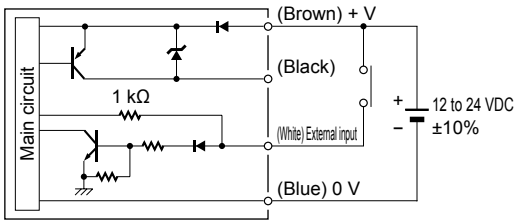
● Standard type



● High-function type

(Example of external input connection)





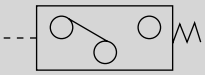
(Note 1): Use 250 Ω (max.) for output load resistance at the time of analog current output.
(Note 2): Be careful that the voltage of 5 V and over is generated at the time of analog current output.
(Note 3): Be careful for input impedance of the connection device when using analog current output.
In addition, be careful that the voltage is reduced by the resistance of cable at the time of cable extension.

MEMO

Digital pressure sensor Oil-prohibition type

PPX-P12 Series

JIS symbol



Overview

- Oil-prohibited treatment (degreasing) at gas contact areas (piping ports, etc.)
- Silicone grease-free at gas contact areas (Grease is not used on the wetted sections)

Features

- Ideal for applications susceptible to grease, including liquid crystals, semiconductors, foodstuffs, medicines, and electronic parts.
- Because grease is not used, this type is suitable for pressure detection of paint lines.

Specifications

Specifications are the same as standard type.
Refer to page 1 for details.

How to order

PPX - R01 N - 6M - P12

- A Pressure range
- B Output type
- C Piping shape
- D Oil-prohibited specifications

Symbol	Descriptions
A Pressure range	
R01	-100.0 to 100.0 kPa
R10	-0.100 to 1.000 MPa
B Output type	
N	NPN transistor output 2 point
NH	NPN transistor output 1 point + analog voltage output or external input
C Piping shape	
6M	R1/8, M5 female thread
D Oil-prohibited specifications	
P12	Oil-prohibition type

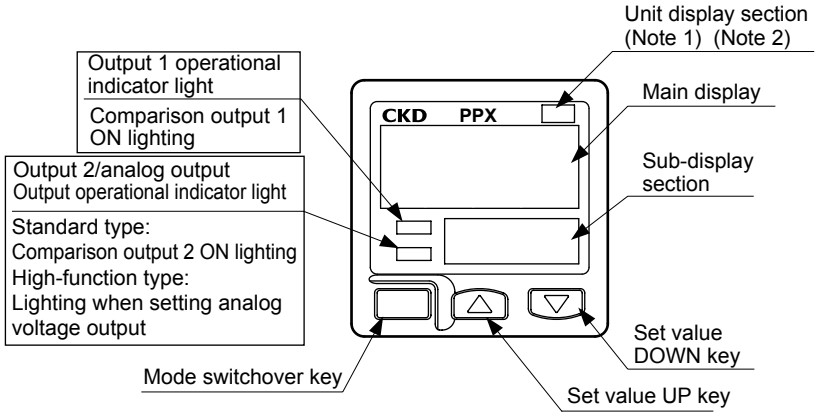
* 2 m connector cable attached.

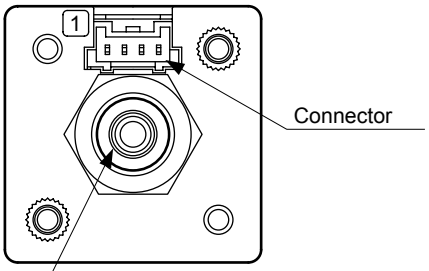
Dimensions

Dimensions are the same as standard type. Refer to page 1090 for details.

MEMO

Names of display/operation section





Pressure port
6M type: $R^1/_8$ + M5 female thread
6G type: $G^1/_8$ + M5 female thread
6N type: $NPT^1/_8$ + M5 female thread

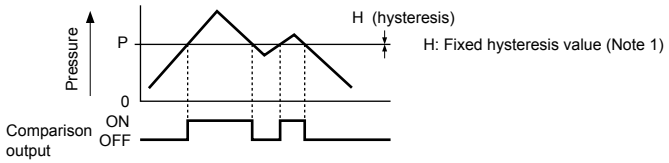
(Note 1): For outside Japan, attach the accompanying unit switching plate corresponding to the set pressure unit.
(Note 2): For outside Japan, the pressure unit can be set only to "MPa" or "kPa".

Operation mode and output operation

● The output mode can be selected from EASY mode, hysteresis mode, or window comparator mode for comparison output 1 and comparison output 2.
Refer to <comparison output 1/2 output mode setting> in "Menu setting mode" (page 11) for details.

EASY MODE

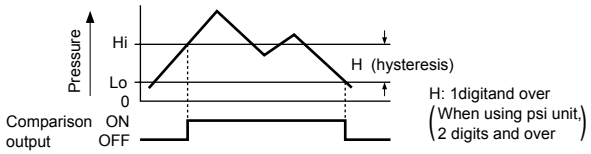
● This mode is used to turn comparison output ON or OFF.



(Note 1): Hysteresis can be set to eight stages.
Refer to "PRO mode" (page 13), Changing fixed hysteresis, for details on setting.
(Note 2): "P- 1" for comparison output and "P-2" for comparison output 2 will be displayed on the sub-display section.

Hysteresis mode

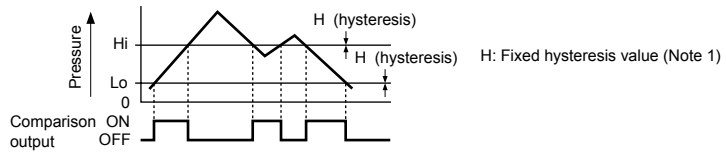
● In this mode, the comparison output hysteresis is randomly set to control the ON and OFF settings.



(Note 1): "Hi -1", "Lo-1" for comparison output and "Hi -2", "Lo-2" for comparison output 2 will be displayed on the sub-display section.

Window comparator mode

● This mode is used to turn comparison output ON or OFF within the setting range.

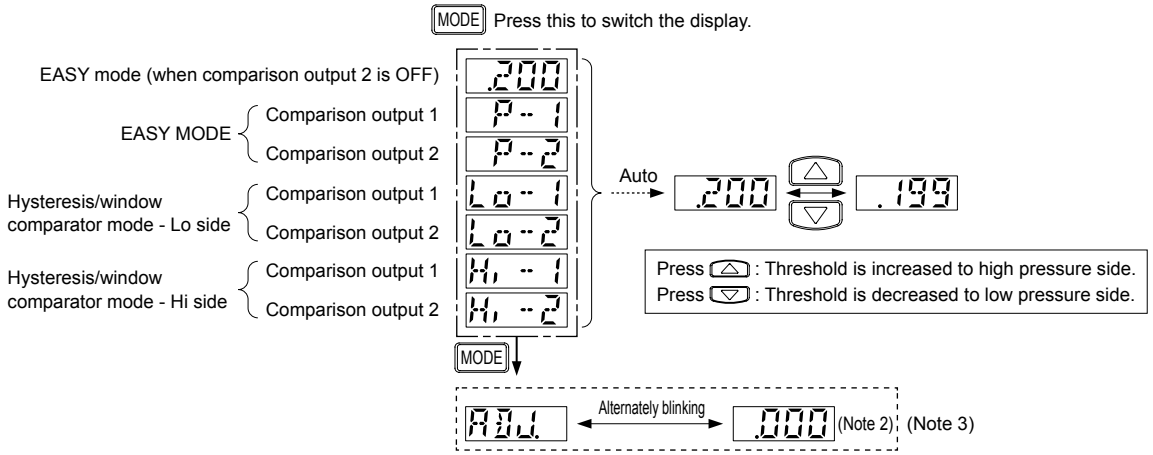


(Note 1): Hysteresis can be set to eight stages.
Refer to "PRO mode" (page 13), Changing fixed hysteresis, for details on setting.
(Note 2): "Hi -1", "Lo-1" for comparison output and "Hi -2", "Lo-2" for comparison output 2 will be displayed on the sub-display section.
(Note 3): Set the setting intervals at Lo side and Hi side to the hysteresis fixed value and over.

About RUN Mode

Threshold setting

- Refer to "Menu setting mode", <comparison output 1/2 output mode setting>, <analog voltage/current output/external input switching> for setting method of setting conditions.
- Threshold is set on the sub-display section. The main-display section is not switched.



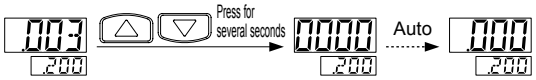
(Note 1): When pressure exceeding the set pressure is applied, "UP" (exceeding the upper limit) or "DOWN" (exceeding the lower limit) is displayed by lighting on the sub-display section.
In addition, "DOWN" is displayed when the threshold at Hi side falls below the threshold at Lo side at the time of threshold setting of "Hysteresis/window comparator mode".

(Note 2): Auto-reference and remote zero adjusting value are shown.
Refer to "Auto reference function" or "Remote zero adjusting function" for details.

(Note 3): The area inside the broken line is not displayed unless either of "ZERO" or "AREF" is set when switching the external input.
Refer to "Menu setting mode", analog voltage/current output/external input switching, for setting method.

Zero adjustment

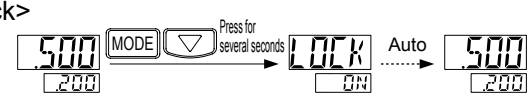
- The zero adjustment function forcibly sets the pressure display to "zero" when the pressure port is released to atmospheric pressure.



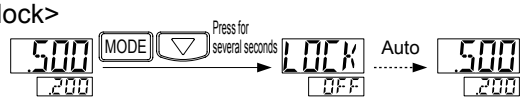
Key lock

- The key lock function disables key operations so that conditions set for setting modes cannot be mistakenly changed.

<Setting key lock>



<Releasing key lock>

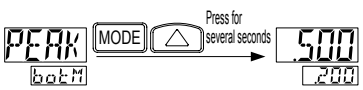


Peak/bottom hold

- The peak and bottom hold function is to display the peak and bottom values of varying pressure.
- The peak value is displayed on the main display, and the lowest value is displayed on the sub display.
- The value at the high pressure side is the peak value, and the value at the low pressure side is the lowest value.

<Setting peak/bottom hold>

<Releasing peak/bottom hold>



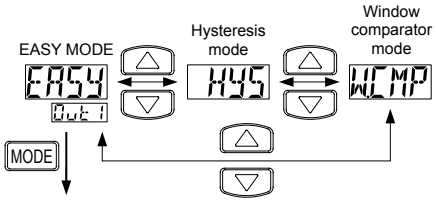
Menu setting mode

● If the mode select key is long pressed during setting the RUN mode opens and changed items are set.

RUN Mode

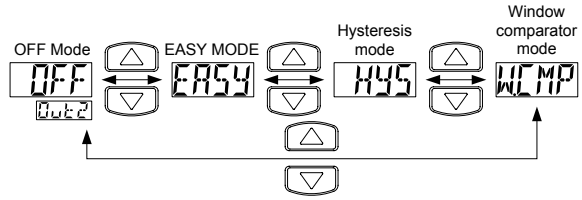
MODE Pressed 2 seconds

<Setting comparison output 1 output mode>



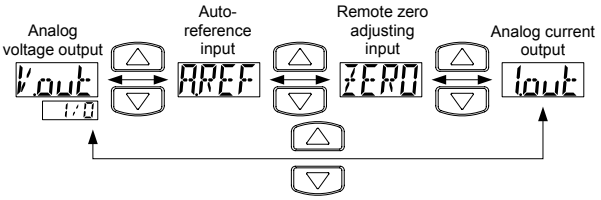
● Standard type

<Setting comparison output 2 output mode> (Note 1)



● High-function type

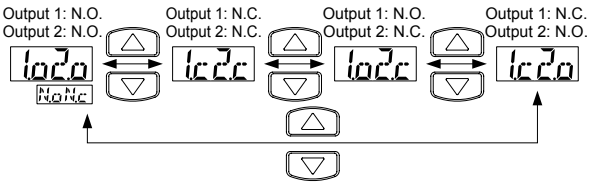
<Switching analog voltage output / external input>



MODE

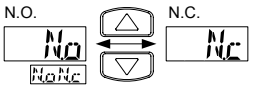
● Standard type

<Switching N.O./N.C.> (Note 1)



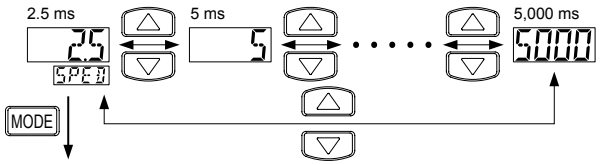
● High-function type

<Switching N.O./N.C.>

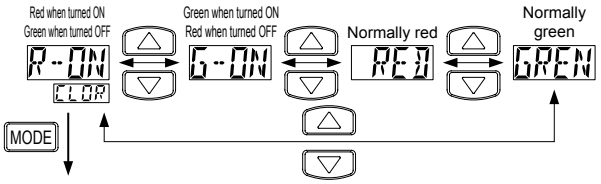


MODE

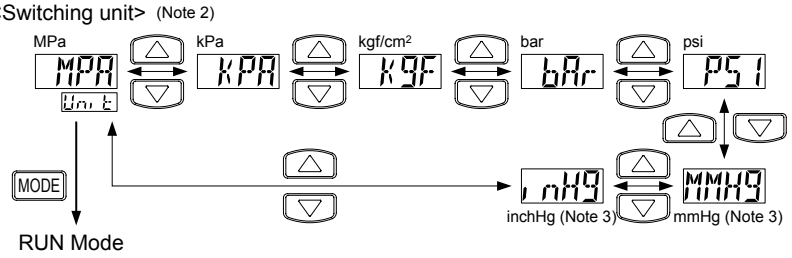
<Setting response time>



<Switching main display section display color>



<Switching unit> (Note 2)



RUN Mode

(Note 1): If the comparison output 2 output mode setting is set to "OFF", the display at N.O./N.C. changeover is the same as for the high-function type.

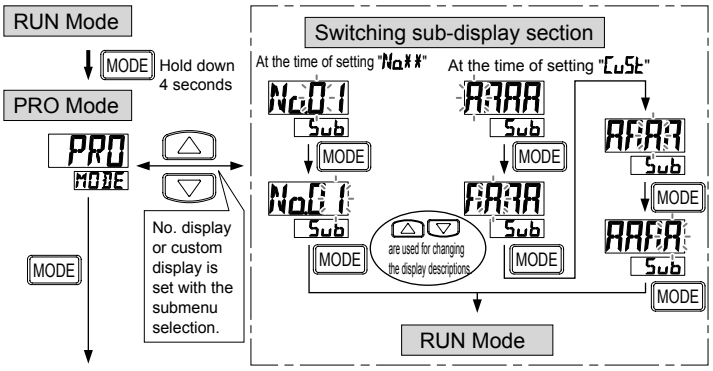
(Note 2): For inside Japan, the pressure unit can be set only to "MPa" or "kPa". For the low pressure type, the setting descriptions of unit switching are not displayed.

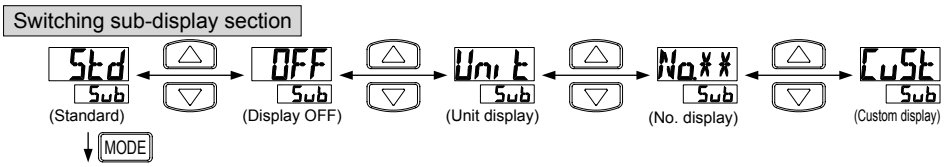
(Note 3): For the high pressure type, they are not displayed.

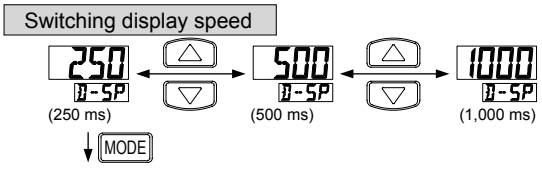
Setting items	Initial state	Descriptions
Setting comparison output 1 output mode	EASY	Set comparison output 1 output mode.
Setting comparison output 2 output mode (Only standard type)	OFF	Set comparison output 2 output mode.
Switching analog voltage output / external input (Only high-function type)	Vout	The item can be selected from analog voltage output, automatic reference input, or remote zero adjustment input.
Switching N.O./N.C.	Low pressure type: Nc High pressure type: No	Set normally open (N.O.) or normally closed (N.C.).
Setting response time	25	Set the response time. Response time can be selected from 2.5 ms, 5 ms, 10 ms, 25 ms, 50 ms, 100 ms, 250 ms, 500 ms, 1,000 ms, or 5,000 ms.
Switching main display section display color	R-ON	Colors on the main display can be changed.
Switching unit	Low pressure type: kPA High pressure type: MPA	The pressure unit can be changed.

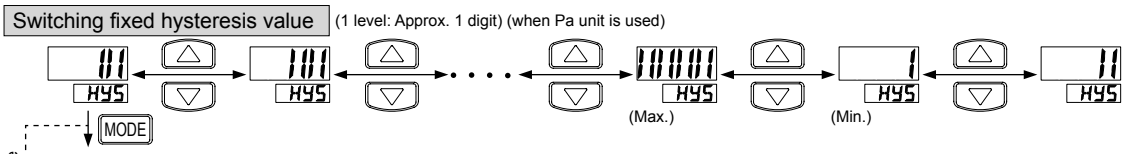
PRO MODE

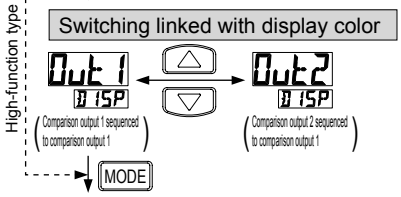
- If the mode select key is held down for four seconds during the RUN mode, the PRO mode opens.
- If the mode select key is long pressed during setting the RUN mode opens and changed items are set.
- The display at the left end shows defaults (factory default).

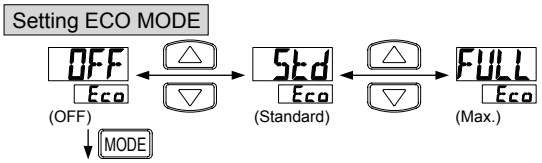


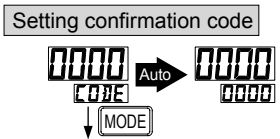


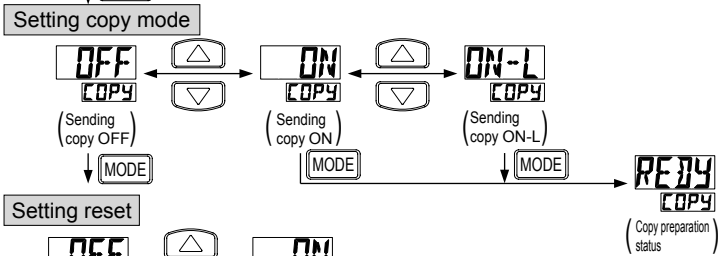








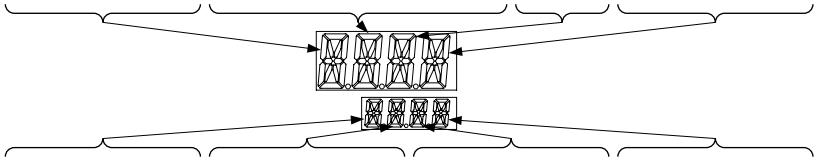




Setting items	Initial state	Descriptions
Switching sub-display section	Std	Set the sub display for the RUN mode "OFF": Nothing is displayed. "Unit": Displays the current pressure unit. "No**": Displays a random number. "CuSt": Displays a random number, alphabetic character (some characters cannot be displayed), and symbol.
Switching display speed	250	Set the speed of the pressure displayed on the main display.
Switching fixed hysteresis value	111	Set hysteresis for the EASY mode and window comparator mode. (8 stages)
Switching linked with display color (Only standard type)	Out1	Whether to sequence comparison output 1 or comparison output 2 to details set when the main display's color changes in the menu setting mode can be selected.
Setting ECO MODE	OFF	Power consumption can be reduced. "OFF": Normal (ECO MODE off) "Std": Display is dimmed if no key is pressed for 5 seconds in RUN mode. "FULL": Display is turned off if no key is pressed for 5 seconds in RUN mode. The normal display appears temporarily if any key is pressed.
Setting confirmation code	0000	Currently set details can be confirmed. Check codes in the List of Codes.
Setting copy mode	OFF	Details set for the master sensor can be copied to the slave sensor. Refer to "Setting copy function" for details. " ON": Set details are copied. "ON-L": Set details are copied and slave side slave sensor keys are locked.
Setting reset	OFF	Settings are returned to defaults. When pressing the mode switching key at the time of "ON", settings are returned to defaults.

Code list

Cord	1st digit		2nd digit			3rd digit	4th digit	
			Standard type		High-function type			Only standard type
	Comparison output 1 output mode	Switching N.O./N.C.	Comparison output 2 output mode	Switching N.O./N.C.	Analog voltage output/external input	Threshold display	Main display section display color	Display color interlock
0	EASY	N.O.	OFF	OFF	Analog voltage output	P-1, Lo-1	Red when turned ON	Comparison output 1
1		N.C.	EASY	N.O.	Auto-reference	Hi-1		Comparison output 2
2	Hysteresis	N.O.		N.C.	Remote zero adjustment	P-2, Lo-2	Green when turned ON	Comparison output 1
3		N.C.	Hysteresis	N.O.	Analog current output	Hi-2		Comparison output 2
4	Window comparator	N.O.		N.C.	–	ADJ.	Normally red	Comparison output 1
5		N.C.	Window comparator	N.O.	–	–		Comparison output 2
6	–	–		N.C.	–	–	Normally green	Comparison output 1
7	–	–	–	–	–	–		Comparison output 2



Cord	5th digit	6th digit	7th digit	8th digit
	Response time	Switching unit	Display speed	Eco mode
0	2.5 ms	MPa	250 ms	OFF
1	5 ms	kPa	500 ms	Std
2	10 ms	kgf/cm^2	1,000 ms	Full
3	25 ms	bar	–	–
4	50 ms	psi	–	–
5	100 ms	mmHg	–	–
6	250 ms	inchHg	–	–
7	500 ms	–	–	–
8	1,000 ms	–	–	–
9	5,000 ms	–	–	–

Limited to export models with unit select functions.

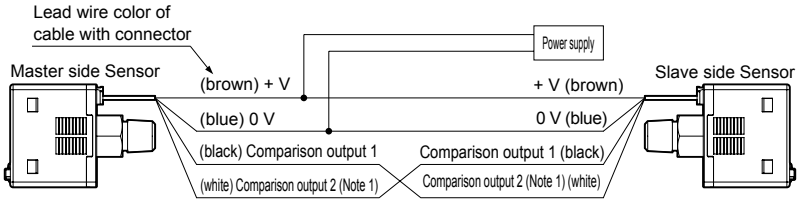
Setting copy function

● This function copies settings from the master sensor to the slave sensor.

● Settings can be copied only between the same models.
Data cannot be copied between different models.
● The setting copy function can copy settings for one master sensor to one slave sensor.

<Installation procedure>

(1) Set the master sensor setting copy mode to Copy ON or ON-L, and press the mode select key to prepare for copying.
Refer to "PRO mode" (page 13), <Setting copy mode>, for details.
(2) Turn master sensor power off.
(3) Connect the master sensor to the slave sensor as shown below.



(Note 1): Analog voltage output and external input are connected for the high-function type.

(4) Turn the power for the master sensor and slave sensor ON simultaneously. (Note 2) (Note 3)
(5) Setting details are encoded in 16-bit code and displayed in orange on the main sensor display. Copying begins.
(6) The same code as step (5) is displayed in green on the slave sensor's display. "Ok" is displayed on the sub display when copying finishes.
(7) Turn master sensor and slave sensor power off, and disconnect wires.
* To continue copying settings for a different sensor, repeat steps (3) to (6).

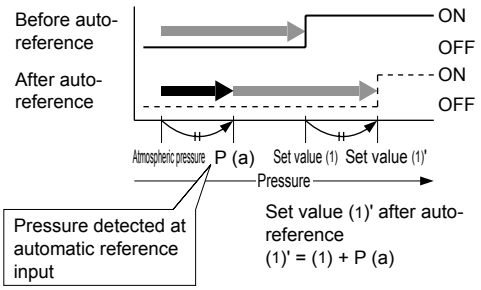
(Note 2): Set details may not be copied if sensor power is not turned on simultaneously.
(Note 3): Pulse output is output to comparison output 1 when power is turned on.

<Canceling master sensor setting copy mode>

(1) Turn master sensor power on. With slave sensor wiring disconnected.
(2) Press the mode select key for 2 seconds.

Automatic reference function (high-function type only)

● The automatic reference function compensates for the set value using the pressure detected at automatic reference input as the reference pressure.
● Setting value (1)' is automatically compensated for as "set value (1) + P (a)" using pressure value P (a) detected at automatic reference input as the reference.



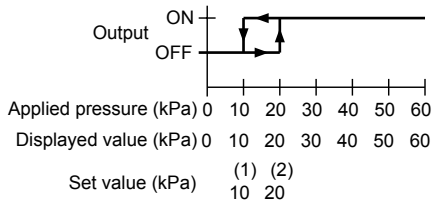
Valid setting range and set pressure after compensation

● The set pressure is wider than the rated pressure to comply with the automatic reference function.

When using automatic reference input, if the compensated-for setting exceeds the set pressure, the set value is automatically compensated for in the set pressure.
Check that the set pressure is not exceeded.

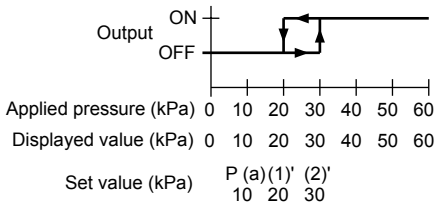
Operation chart

<Normal (N.O. setting for each comparison output)>



〈 Auto-reference input (N.O. setting for each comparison output) 〉

· Detection pressure when auto-reference input: 10 kPa
· Output mode: hysteresis mode



(Note 1): The set value shifts the same in EASY and window comparator modes.

- The pressure detected at automatic reference input is set to zero when the setting for the analog voltage output/external input select function is set or power is turned on again.
- The automatic reference input can be confirmed when the RUN mode threshold is set. Refer to setting the threshold in "RUN mode" (page 10) for details.

Remote zero adjusting (only high-function type)

- The remote zero adjustment function forcibly sets the pressure to zero when the external signal is input.

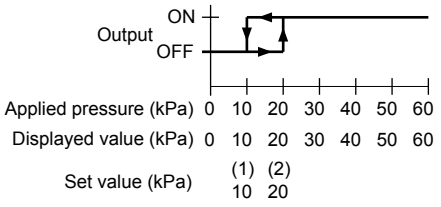
The set value is not compensated for when remote zero adjustment is input. Check that pressure and set value for the remote zero adjustment function do not exceed the set pressure.

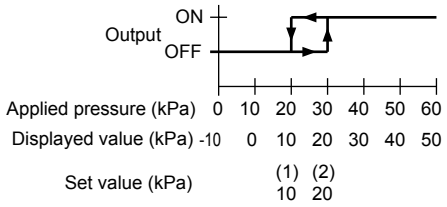
Operation chart

<Normal (N.O. setting for each comparison output)>

〈 Remote zero adjusting input (N.O. setting for each comparison output) 〉

· Pressure for remote zero adjusting input: 10 kPa
· Output mode: hysteresis mode





(Note 1): The set value shifts the same in EASY and window comparator modes.

- The remote zero adjustment function is cleared to zero when the setting for the analog voltage output/external input select function is set or power is turned on again, and operation returns to normal using atmospheric pressure as a reference. The remote zero adjustment can be confirmed when RUN mode threshold is set. Refer to setting the threshold in "RUN mode" (page 11) for details.

Error display

Error display	Descriptions	Treatment
E-1	The load was short-circuited and overcurrent flowed.	Turn power off and check the load.
E-3	Pressure was applied during zero point adjustment.	Release pressure applied to the pressure port to atmospheric pressure and adjust the zero point again.
E-4	External input was made outside the rated pressure.	Return applied pressure to within the rated pressure.
E-5	Communication error (disconnection, connection fault, etc.)	When using the copy function, check wiring.
E-6	Communication error (different models)	When using the copy function, confirm that the same models are used.
101.0	Applied pressure exceeds the max. display pressure range.	Return applied pressure to within the rated pressure.
-101.0	Applied pressure exceeds the min. (reverse pressure) display pressure range.	

Setting operation example EASY MODE

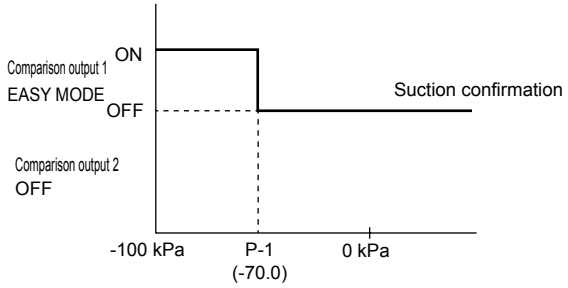
(Note 1): This is an example of settings from the default when purchased (factory default).
(Note 2): If setting conditions are unclear, conduct resetting of the settings in PRO mode, reset to default mode, then start use.

● Suction confirmation

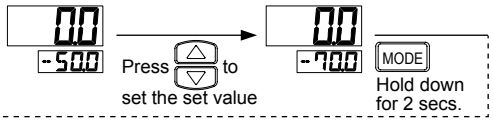
- EASY MODE

R01 type (-100.0 to 100.0 kPa)

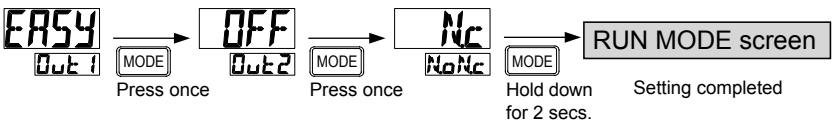
• Start from the mode (RUN mode) when power is turned on.
• In a mode other than the RUN mode, hold down the "MODE" key, and enter the RUN mode.



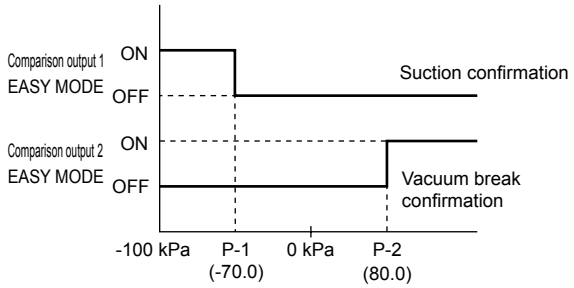
RUN MODE screen



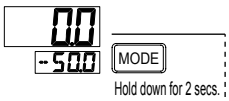
Menu setting mode screen



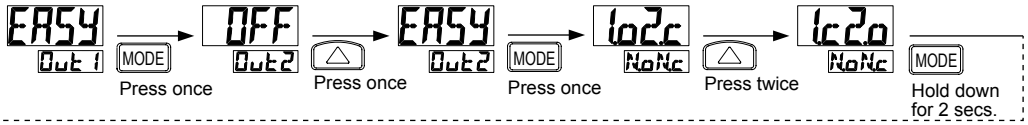
● Suction confirmation + vacuum break confirmation



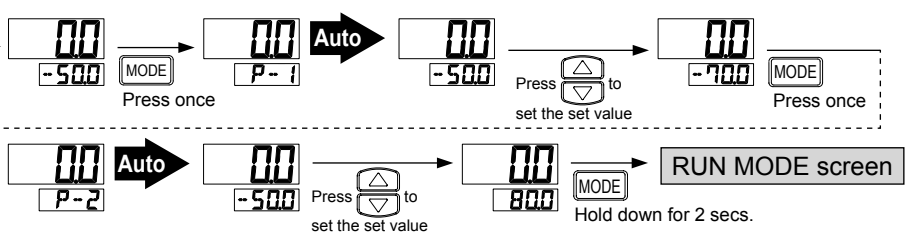
RUN MODE screen



Menu setting mode screen



RUN MODE screen



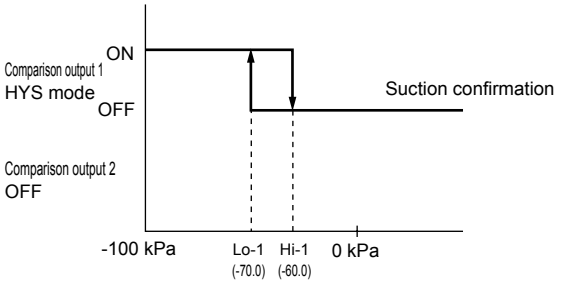
Setting operation example HYS mode (hysteresis mode)

(Note 1): This is an example of settings from the default when purchased (factory default).
(Note 2): If setting conditions are unclear, conduct resetting of the settings in PRO mode, reset to default mode, then start use.

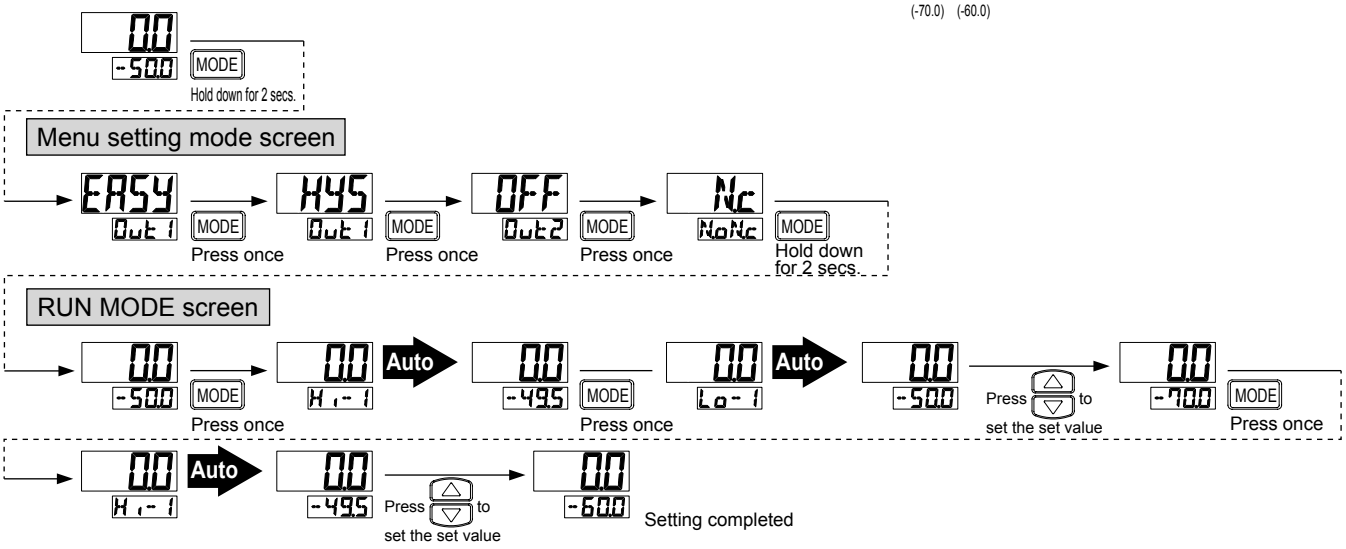
● Suction confirmation

- HYS mode (hysteresis mode)
R01 type (-100.0 to 100.0 kPa)

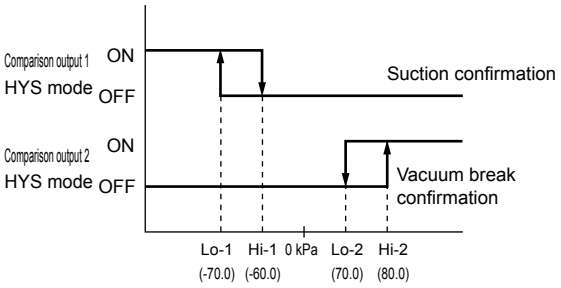
• Start from the mode (RUN mode) when power is turned on.
• In a mode other than the RUN mode, hold down the "MODE" key, and enter the RUN mode.



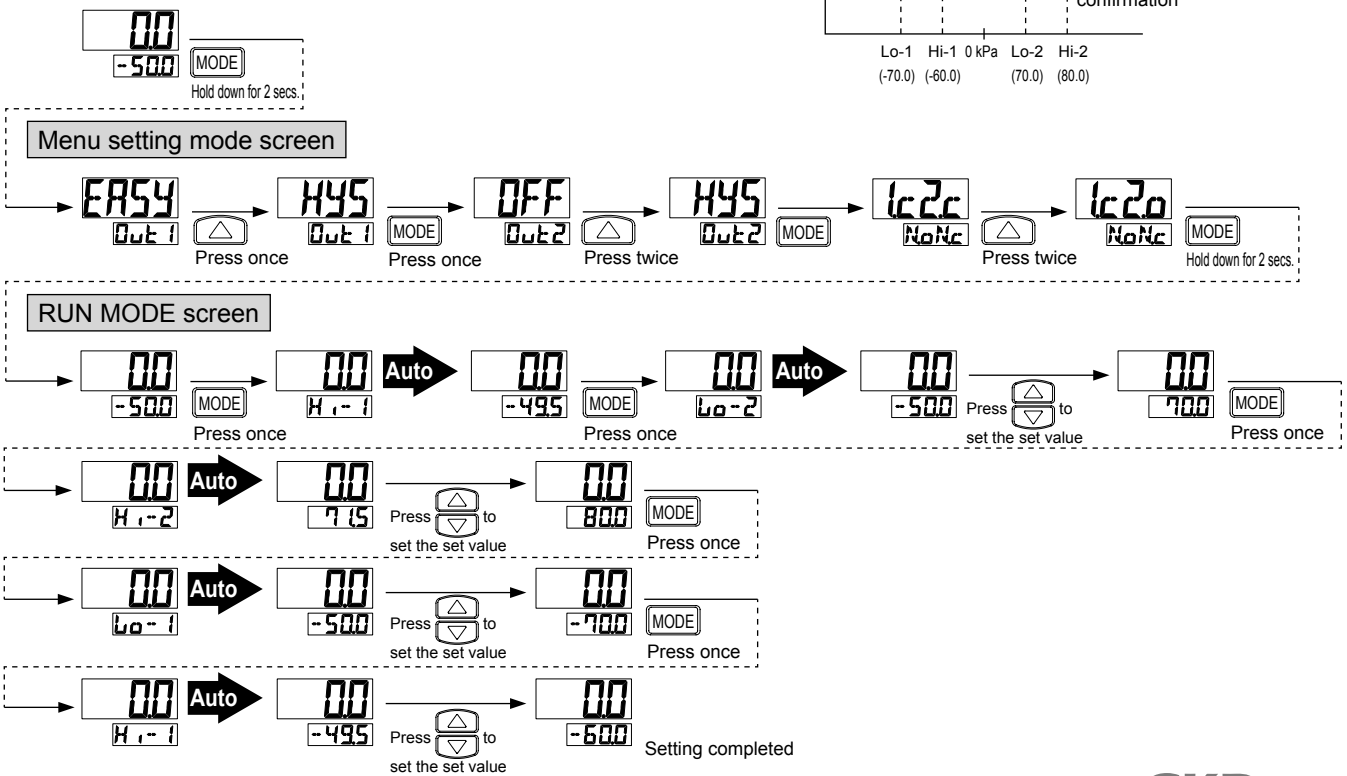
RUN MODE screen



● Suction confirmation + vacuum break confirmation



RUN MODE screen



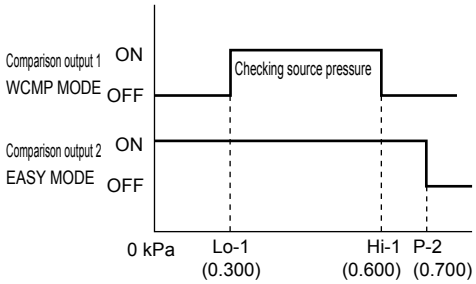
Setting operation example WCMP MODE (window comparator mode)

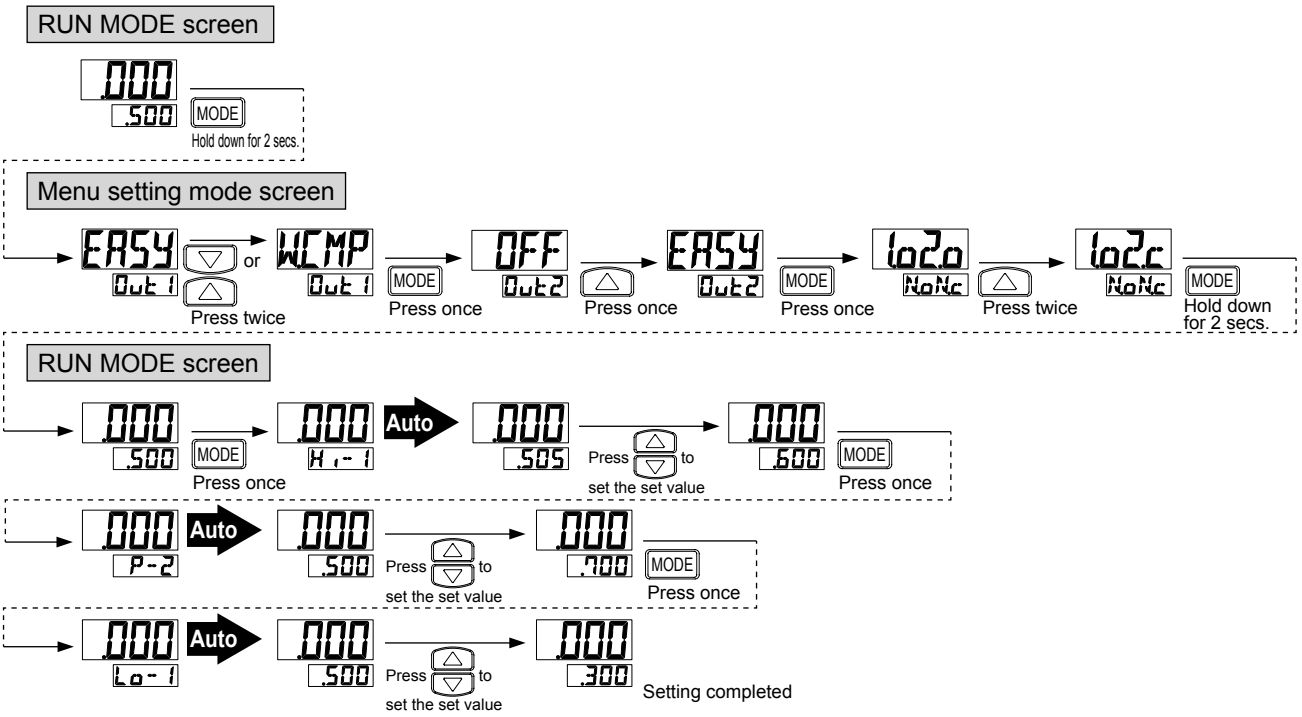
(Note 1): This is an example of settings from the default when purchased (factory default).
(Note 2): If setting conditions are unclear, conduct resetting of the settings in PRO mode, reset to default mode, then start use.

● Checking source pressure

- WCMP MODE (window comparator mode)
R10 type (-0.100 to 1.000 MPa)

• Start from the mode (RUN mode) when power is turned on.
• In a mode other than the RUN mode, hold down the "MODE" key, and enter the RUN mode.





MEMO

Easy use with wide variations!!

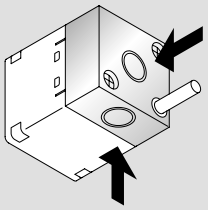
Common operations for both the sensor integrated type and separated type to help users.
IP65 drip-proof structure provides outstanding reliability even in adverse environment.
Full-range coupling pressure lets pressure from vacuum to positive pressure be measured.

Sensor Integrated type

* PPD3-KL installation state

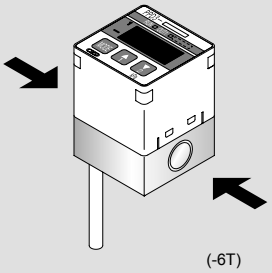
- Semiconductor and stainless steel diaphragm sensors are available in a series with a common mounting structure.
- A wide selection of port shape

● Rc1/8 2 direction port (Rear side/down direction)



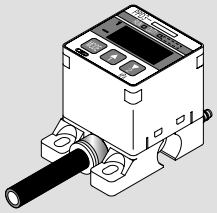
(Port type) (-6B)

● Rc1/8 through port (Horizontal direction)



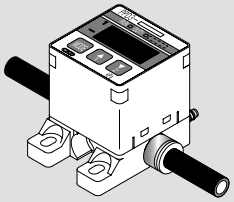
(-6T)

● φ 6 push-in fitting (Down direction)



(-6HD)

● φ 6 push-in fitting through port (Horizontal direction)



(-6HT)

Sensor separate type

*PPD3-KHS-D mounted state

Freely combined indicators and sensors!!

Just insert into the terminal block to connect!!

Semiconductor sensor

Stainless steel diaphragm sensor

● R1/8

(Port type) (-6)

● φ 6 push-in fitting

(-H6)

● φ 6 plug

(-H6-B)

● Rc1/8

(-6B)

● Select by application

Both sensor Integrated types and sensor separated types are available.

- Pressure can be adjusted and confirmed at hand (sensor Integrated type).
- Remote processing is possible (sensor separated type).

● Use general air with stainless steel diaphragm sensor.

Stainless steel diaphragm and semiconductor sensors are available.

- Sensors can be used based on air line quality.
- All sensors have IP65-compliant drip-proof structures.

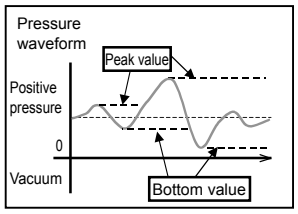
● Easy-to-use pressure port lineup

- Resin ports with push-in fittings (6HD, 6HT, H6) are available.
  These lightweight ports help save space.
- Through-port types (6T, 6HT, H6) are available.
  Ideal for suction and seating confirmation.
  Only min. piping space is required.

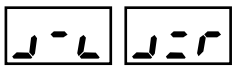
● Ample functions

Convenient functions, including peak hold function, switch waveform display, forced switch, and pressure reading, enable efficient installation and setting.

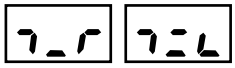
● Peak hold function



● Switch waveform display



Window mode Hysteresis mode

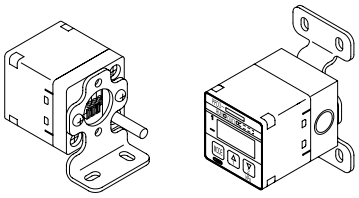


Window mode Hysteresis mode

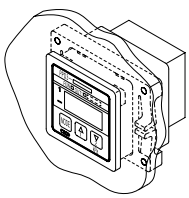
● Different mounting bracket options! Sold separately

Install it anywhere.

● L shaped mounting ● Parallel mounting



● Panel mounting

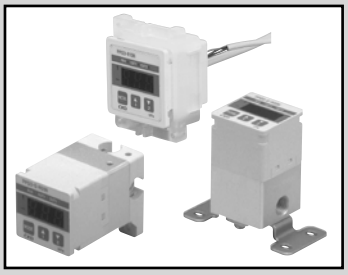


● Operation protective cover

Use this cover to protect the display panel and prevent incorrect input.

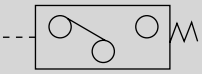
● Friendly to the global environment

Helps conserve air pressure energy.



Electronic pressure switch with digital display (pressure switch)

PPD3/PPD3-S Series



Overview

Pressure switch PPD3 Series is appropriate for pneumatic lines. Due to various port options, in addition to source pressure confirmation, suction confirmation and contact confirmation, etc., are possible.

Features

- Semiconductor pressure sensor and stainless steel diaphragm pressure sensor series are available with common coupling structure. Model can be easily replaced according to air line conditions to improve.
- Push-in fitting resin port (6HD/6HT/H6) is available. These lightweight ports help save space.
- Through type ports (6T/6HT/H6) are available. Ideal for suction and seating confirmation. The product can be installed in min. space.
- Efficient installation setting by convenience functions; peak hold, forcible switching, pressure reading functions, etc.
- CE marking as standard.

Sensor integrated type/sensor separate type Specifications

Descriptions	PPD3			PPD3-S		
	R10	R03	R01	R10	R03	R01
Pressure sensitive element	Diffused semiconductor pressure sensor			Single stainless steel diaphragm pressure sensor		
Applicable fluid	Air/non-corrosive gas			Air/non-corrosive gas/compressed air (including water and drain)		
Rated pressure	-100 to 980 kPa	-100 to 300 kPa	-100 to 100 kPa	-100 to 980 kPa	-100 to 300 kPa	-100 to 100 kPa
Display unit	kPa	kPa	kPa	kPa	kPa	kPa
Min. display unit Note 1	1 kPa					
Proof pressure	1.5 MPa	0.6 MPa	0.2 MPa Note 2	2 MPa	0.6 MPa	0.6 MPa
Indicator accuracy (25°C)	±2% F.S.					±3% F.S.
Temperature characteristics (0 to 50°C)	±4% F.S.					±5% F.S.
Leak rate	1 cm^3/min (ANR) or less					
Display	3 digit orange LED display character height 8 mm					
Power supply voltage	12 to 24 VDC ±10% (ripple rate 1% or less)					
Current consumption	50 mA or less (60 mA or less for sensor separate type)					
Switch output type	Sensor integrated type: N : NPN transistor open collector output 2 points P : PNP transistor open collector output 2 point NA : NPN transistor open collector output 1 point + analog output 1 point PA : PNP transistor open collector output 1 point + analog output 1 point Separate type: NA: NPN transistor open collector output 2 points + analog output 1 point PA: PNP transistor open collector output 2 points + analog output 1 point					
Switch output current	50 mA or less					
Switch output voltage drop	2.4 V or less					
Switch output response time	Approximately 5 msec					
Analog output	1 to 5 ±0.1 VDC load impedance: 10 kΩ and over					
Set point holding	EEPROM					
Lead wire	Body: oil resistance vinyl cable 4-conductor (0.3 mm^2 insulator O. D. φ 1.1) 1 m (for sensor separate type, 5-conductor 0.2 mm^2 insulator O. D. φ 1.0) sensor section of sensor separate type: oil resistance vinyl cable 3-conductor (0.15 mm^2 insulator O. D. φ 1.0) 3 m					
Ambient temperature	0 to 50°C					
Ambient humidity	0 to 85%RH (no dew condensation)					
Vibration resistance	10 to 55 Hz double amplitude 1.5 mm 2 hours per X, Y, Z direction					
Degree of protection	IP65 or equivalent Note 3 (IP 40 or equivalent only for indicator section of sensor separate type)					
Protection circuit Note 4	Power reverse connection protection switch output reverse connection protection, switch output load short-circuit protection					
Weight	PPD3-R□-6B: Approx. 85 g			PPD3-S-R□-6B: Approx. 105 g		

Note 1: This indicates min. display unit, and does not guarantee indicator accuracy.
Note 2: Sensor separated is 0.3 MPa.
Note 3: When an atmosphere introduction port is processed. (Refer to page 1170.)
Note 4: This product's protection circuit is effective only for specific misconnections and load short-circuits. It does not provide protection for all misconnections.

Clean room specifications (Catalog no. CB-033SA)

- Dust generation preventing structure for use in cleanrooms

PPD3-.....**-P7***

PPD3-.....**-P8***

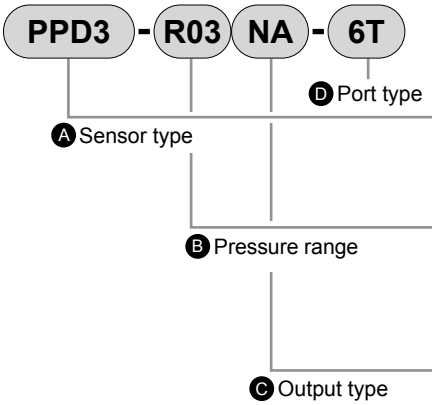
PPD3-.....**-P9***

Circuit diagram and connection method

Refer to page 1125.

How to order

● Sensor integrated type

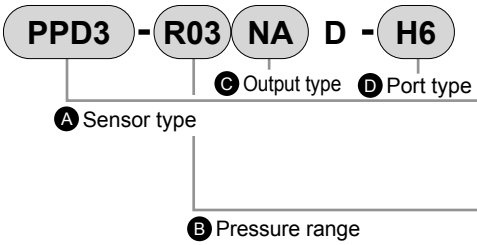


Symbol	Descriptions
A Sensor type	
PPD3	Semiconductor sensor
PPD3-S	Stainless steel diaphragm sensor
B Pressure range	
R10	-100 to 980 kPa
R03	-100 to 300 kPa
R01	-100 to 100 kPa
C Output type	
N	NPN transistor output 2 point
P	PNP transistor output 2 point
NA	NPN transistor output 1 point + analog output 1 point
PA	PNP transistor output 1 point + analog output 1 point
D Port type	
6B	Rc1/8, 2 direction port rear side, lower outlet
6T	Axial Rc1/8, through port both sides outlet
6HD	Lightweight port with 6 mm push-in fitting (downward)
6HT	Lightweight through port with two 6 mm push-in fittings (horizontal both sides)

⚠ Note on selection guide

Mounting brackets and kits are not enclosed with the product.
Refer to the following "Mounting bracket and kit" model no. information for the optional mounting bracket and kits.

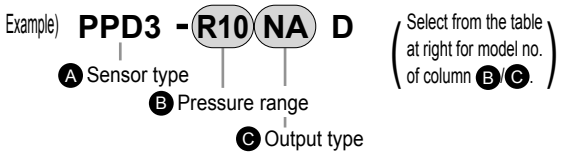
● Sensor separate type



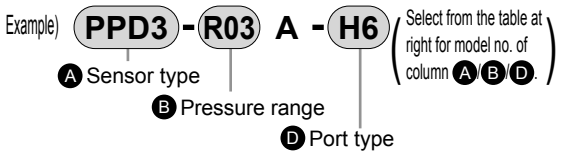
Symbol	Descriptions
A Sensor type	
PPD3	Semiconductor sensor
PPD3-S	Stainless steel diaphragm sensor
B Pressure range	
R10	-100 to 980 kPa
R03	-100 to 300 kPa
R01	-100 to 100 kPa
C Output type	
NA	NPN transistor output 2 point + analog output 1 point
PA	PNP transistor output 2 point + analog output 1 point
D Port type	
6	R1/8
H6	6mm push-in fitting
H6-B	6 mm plug
6B	Rc1/8

PPD3 (semiconductor sensor)
PPD3-S (stainless steel diaphragm sensor)

● Model no. of single indicator



● Discrete sensor model no.



⚠ Note on selection guide

Mounting brackets and kits are not enclosed with the product.
Refer to the following "Mounting bracket and kit" model no. information for the optional mounting bracket and kits.

● Mounting bracket and kit
Refer to the following page.

● Mounting bracket and kit

PPD3 - KL - D

Ⓐ Model no.

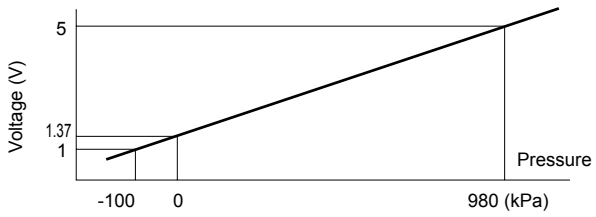
Ⓑ Shape

Symbol	Descriptions
Ⓐ Model no.	
PPD3-KL	One side mounting foot (L shaped mounting)(set screw attached)
PPD3-KD	Both sides mounting foot (parallel mounting)(set screw attached)
PPD3-KHS	Panel mounting bracket set, with guard (φ 6 Push-in fitting attached for Integrated type)
PPD3-KC	Operation protective cover *1
Ⓑ Shape	
Blank	Sensor Integrated type * 2
D	Sensor separate type

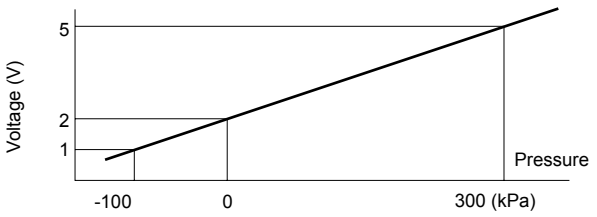
*1 PPD3-KC is common for sensors integrated and separated so when selecting PPD3-KC for the sensor separated type, do not indicate a symbol for item Ⓑ shape.
*2 This panel mounting method applies for port "6B". It cannot be used with other ports.

Analog output voltage - pressure characteristics

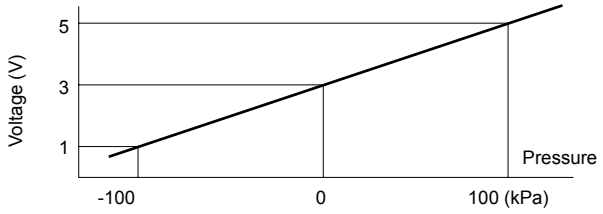
● PPD3 (-S) -R10NA
R10PA
R10A



● PPD3 (-S) -R03NA
R03PA
R03A



● PPD3 (-S) -R01NA
R01PA
R01A

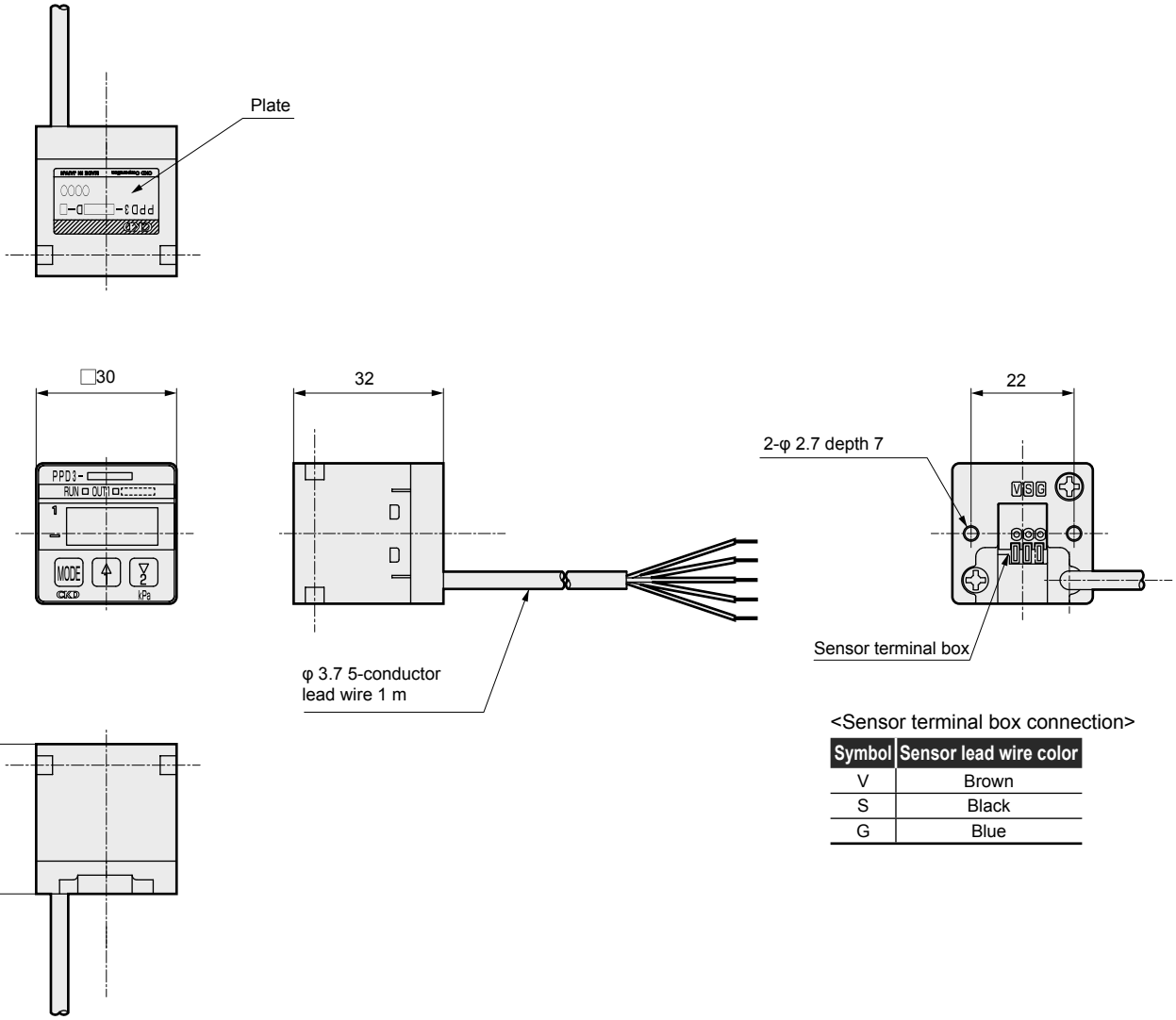


<caution>
● Analog output accuracy is also affected by self-exoergic at energized other than temperature characteristics. Be sure to provide a standby time of 5 minutes and over after power is turned on when using.

Dimensions

Sensor separate type (display)

● PPD3-*****-D (display)



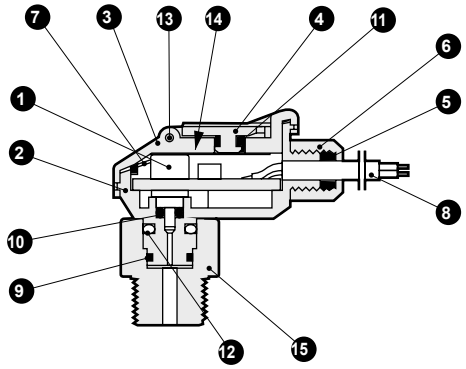
<Sensor terminal box connection>

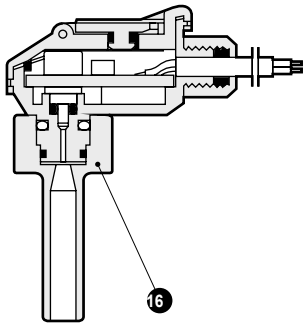
Symbol	Sensor lead wire color
V	Brown
S	Black
G	Blue

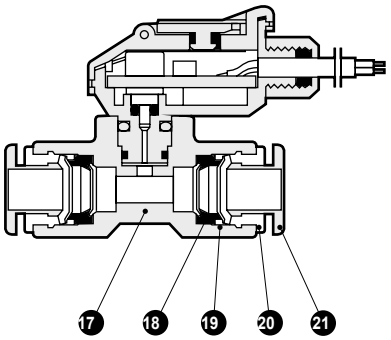
Internal structure and parts list

Sensor separate type (semiconductor sensor)

- PPD3-R**D-6
- PPD3-R**A-6 (discrete sensor model no.)
- PPD3-R**D-H6-B
- PPD3-R**A-H6-B (discrete sensor model no.)
- PPD3-R**D-H6
- PPD3-R**A-H6 (discrete sensor model no.)





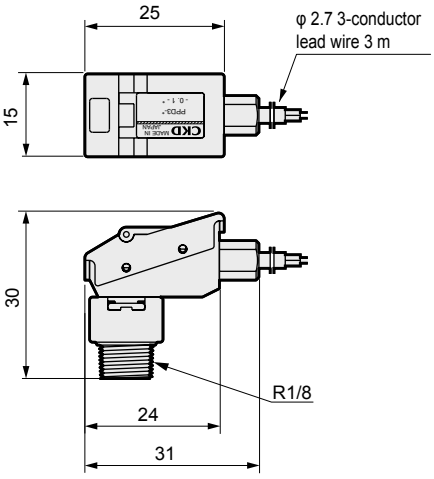


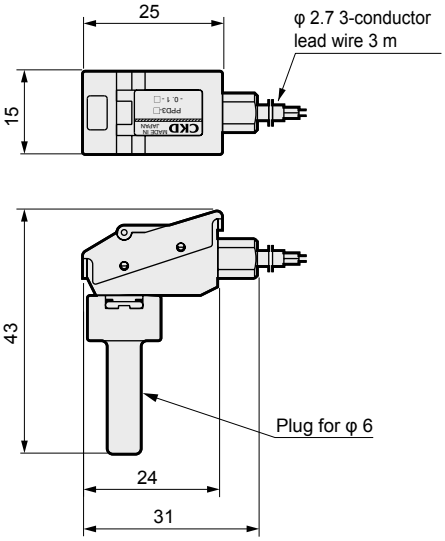
No.	Parts name	Material	No.	Parts name	Material
1	Pressure sensor	Diffusion type semiconductor strain gauge	12	Stopper	Stainless steel
2	Body	PBT (glass fiber 30%)	13	Spring pin	Stainless steel
3	Cover	Polycarbonate	14	Shield sheet	Aluminum
4	Trimmer guard	Polycarbonate	15	R1/8	PBT (glass fiber 30%)
5	Bush	Nitrile rubber	16	Plug	PBT (glass fiber 30%)
6	Bush holder	Aluminum	17	Push-in fitting	PBT
7	Cover gasket	Silicon rubber	18	Packing	Nitrile rubber
8	Lead wire (3 m)	Polyvinyl chloride	19	Chuck	Brass (electroless nickeling)
9	O-ring	Nitrile rubber	20	Outer ring	Brass (electroless nickeling)
10	O-ring	Nitrile rubber	21	Push ring	Polyacetal
11	O-ring	Nitrile rubber			

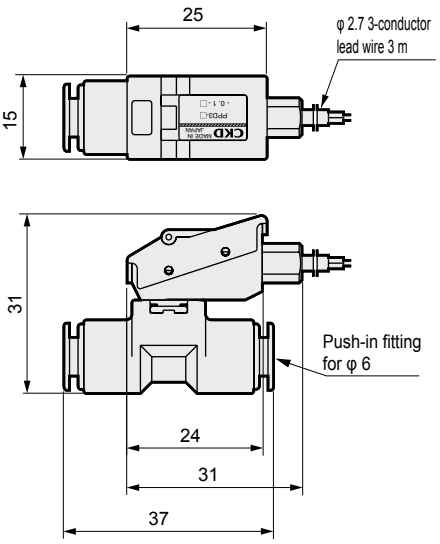
Dimensions

Sensor separate type (semiconductor sensor)

- PPD3-R**D-6
- PPD3-R**A-6 (discrete sensor model no.)
- PPD3-R**D-H6-B
- PPD3-R**A-H6-B (discrete sensor model no.)
- PPD3-R**D-H6
- PPD3-R**A-H6 (discrete sensor model no.)



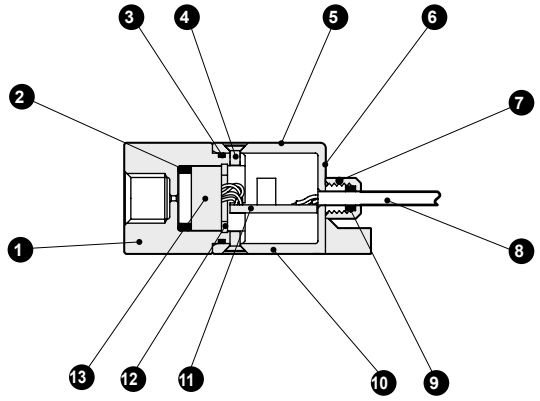




Internal structure and parts list

Sensor separate type (stainless steel diaphragm sensor)

- PPD3-S-R**D-6B
- PPD3-S-R**A-6B (discrete sensor model no.)

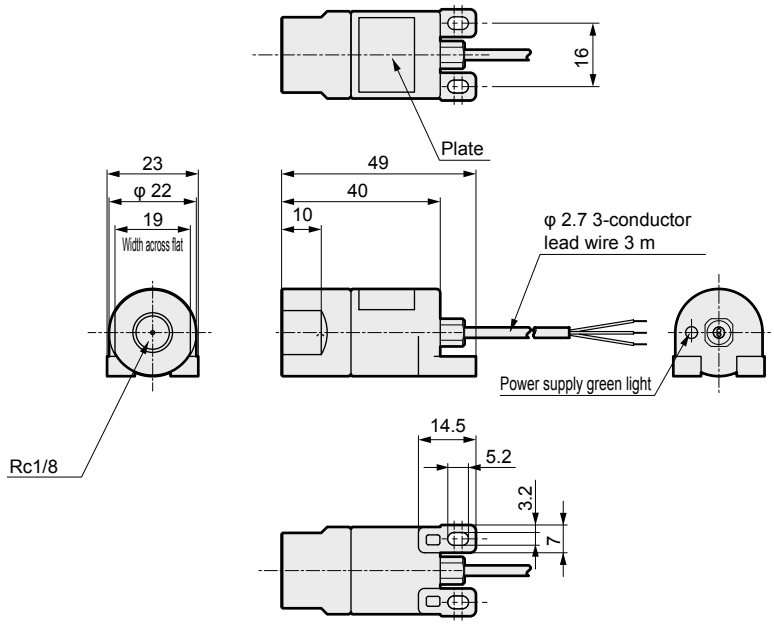


No.	Parts name	Material	No.	Parts name	Material
1	Pressure port	Aluminum	8	Lead wire (3 m)	Polyvinyl chloride
2	O-ring	Fluoro rubber	9	Bush	Nitrile rubber
3	O-ring	Nitrile rubber	10	Sensor body	PBT (glass fiber 30%)
4	Flat head screw	SUSXM7	11	Amplifier board	Glass epoxy resin
5	Plate	Polyester film	12	C ring for hole	Stainless steel
6	Light sheet	Polyester film	13	Pressure sensor	Stainless steel diaphragm strain gauge
7	Bush holder	Aluminum			

Dimensions

Sensor separate type (stainless steel diaphragm sensor)

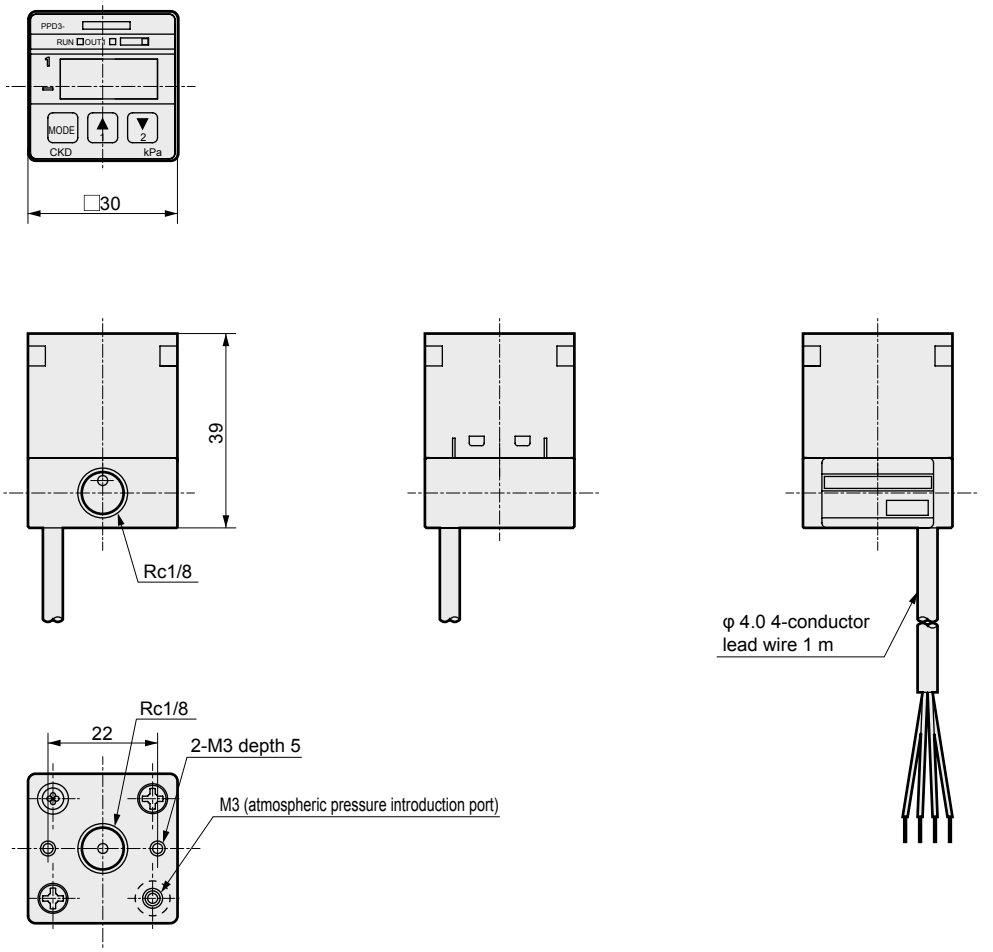
- PPD3-S-R**D-6B
- PPD3-S-R**A-6B (discrete sensor model no.)



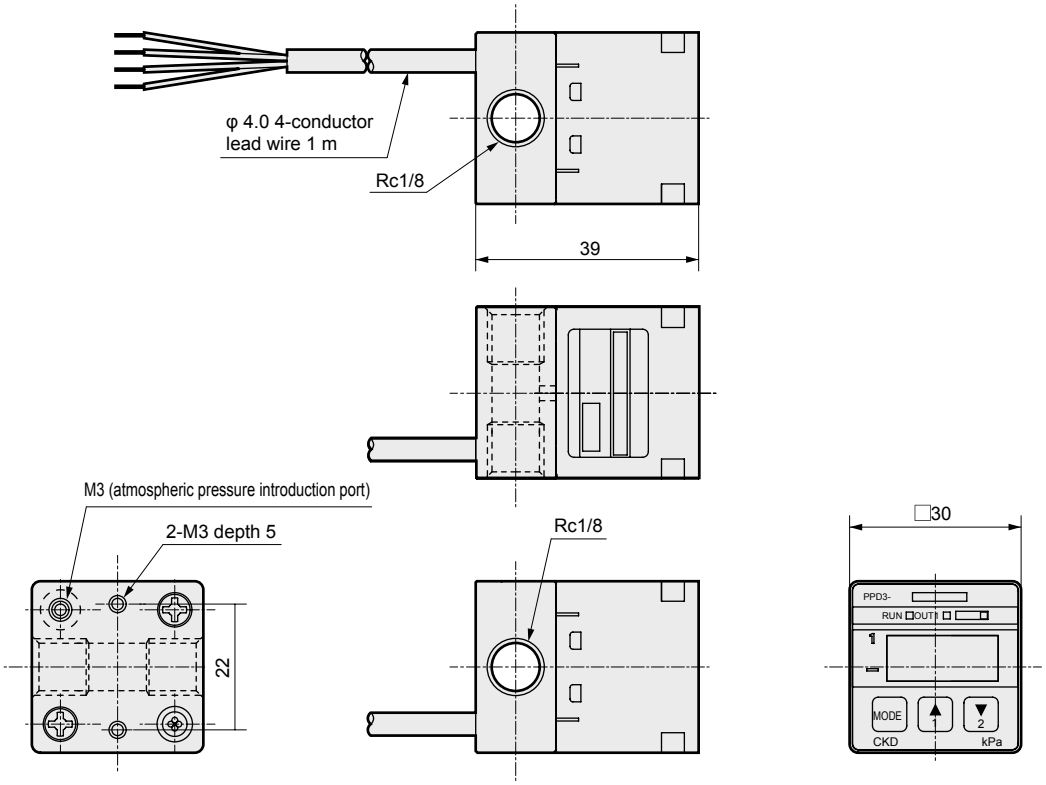
Dimensions: PPD3

Sensor integrated type (semiconductor sensor)

● PPD3- ***** -6B



● PPD3- ***** -6T

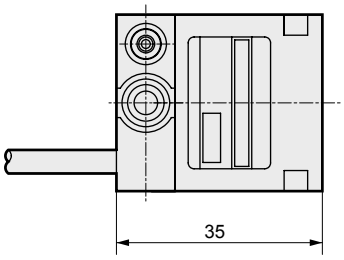


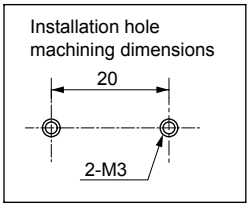
Refer to Safety precautions of PPD3 (-S) Series on pages 1169 to 1171 for wiring method and precautions.

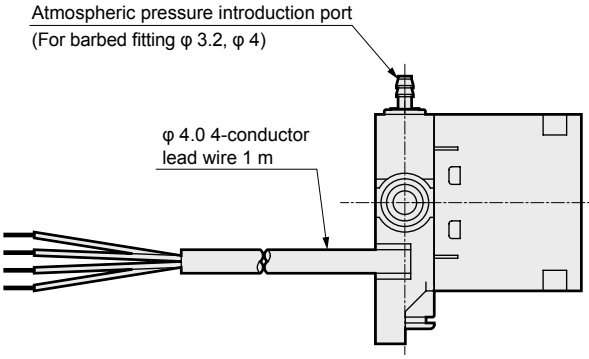
Dimensions: PPD3

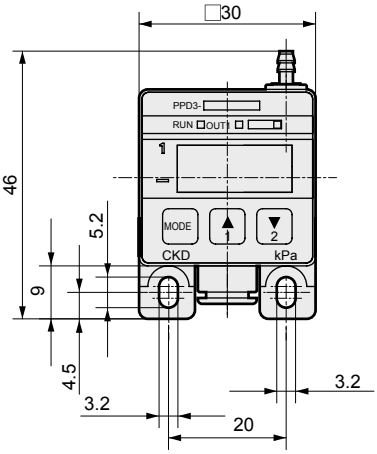
Sensor integrated type (semiconductor sensor)

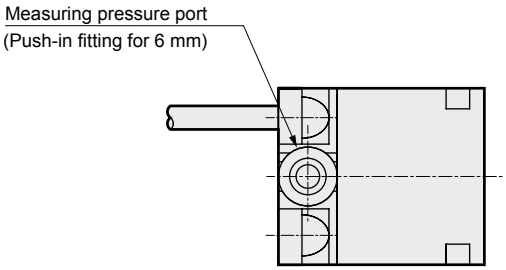
● PPD3- ***** -6HD



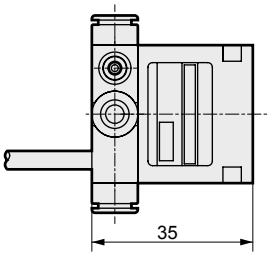


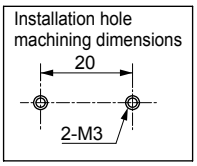


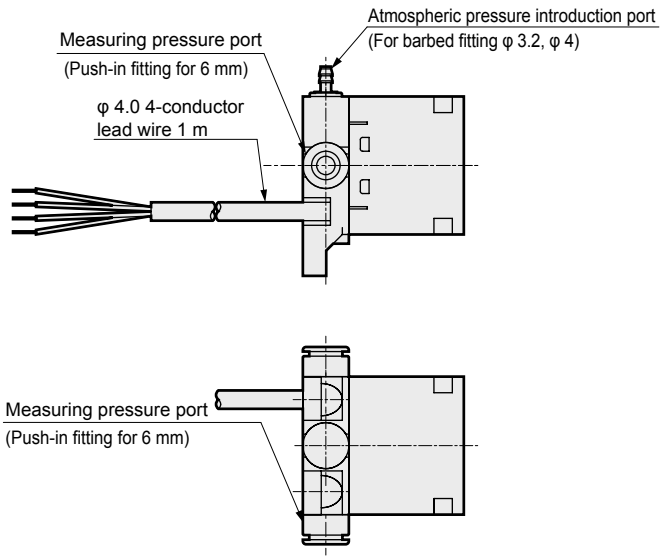


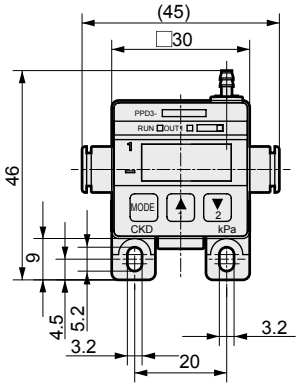


● PPD3- ***** -6HT







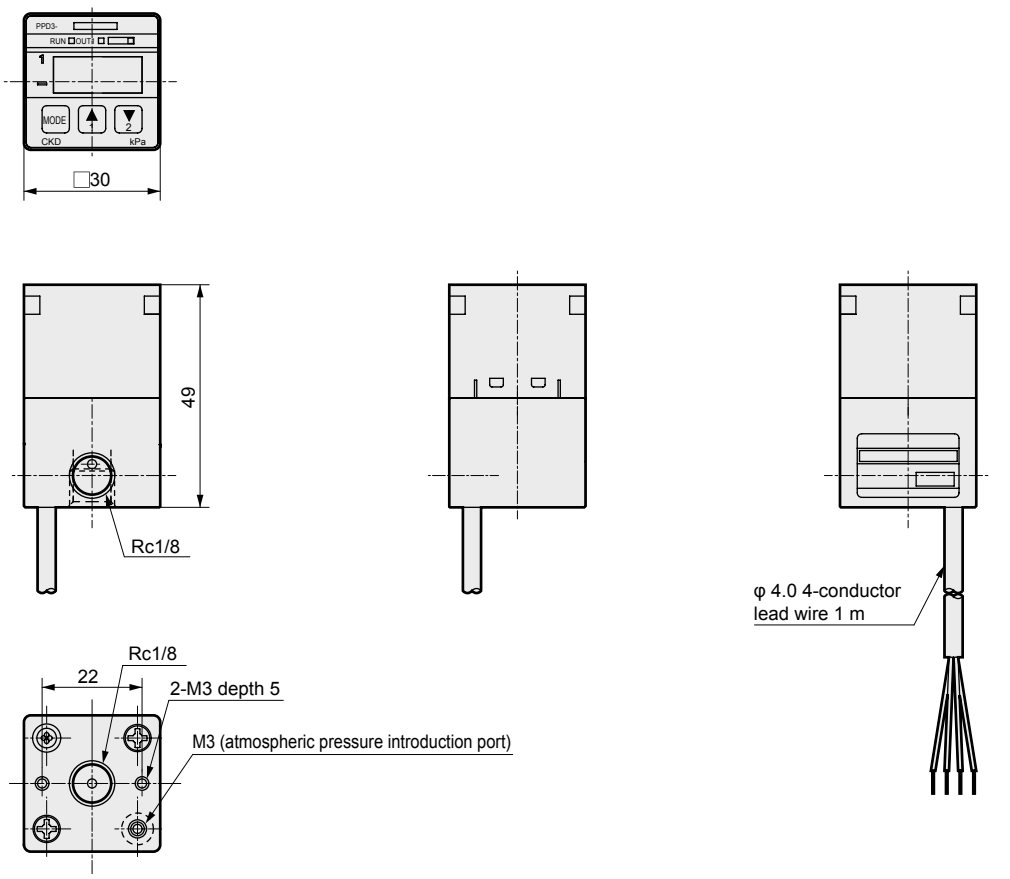


Refer to Safety precautions of PPD3 (-S) Series on pages 1169 to 1171 for wiring method and precautions.

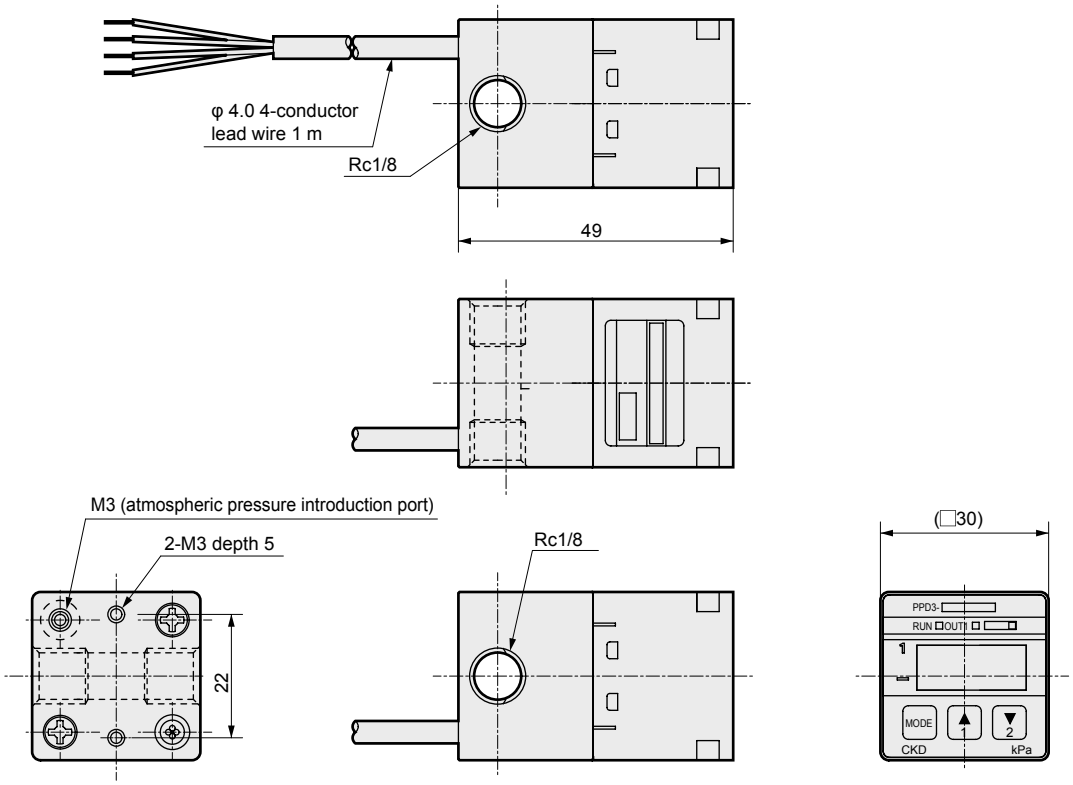
Dimensions: PPD3-S

Sensor integrated type (stainless steel diaphragm sensor)

● PPD3-S-*****-6B



● PPD3-S-*****-6T

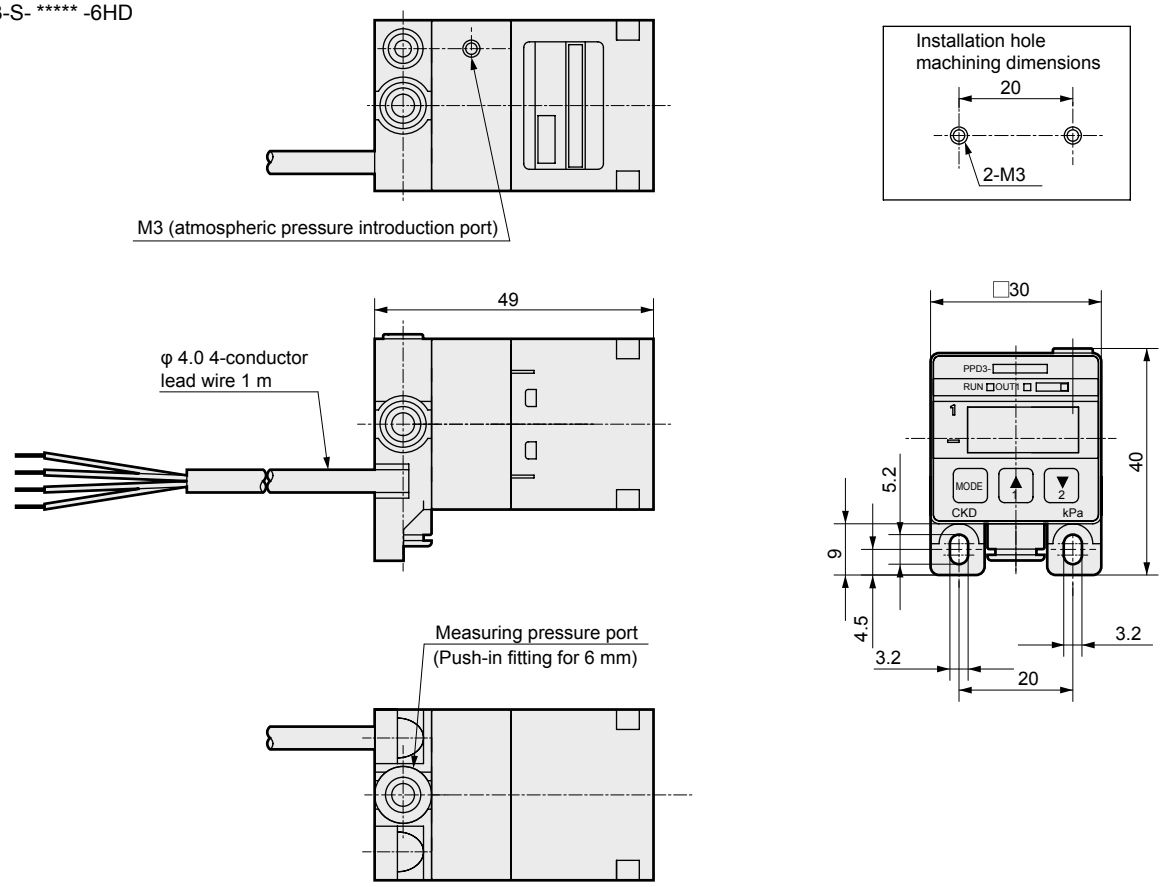


Refer to Safety precautions of PPD3 (-S) Series on pages 1169 to1171 for wiring method and precautions.

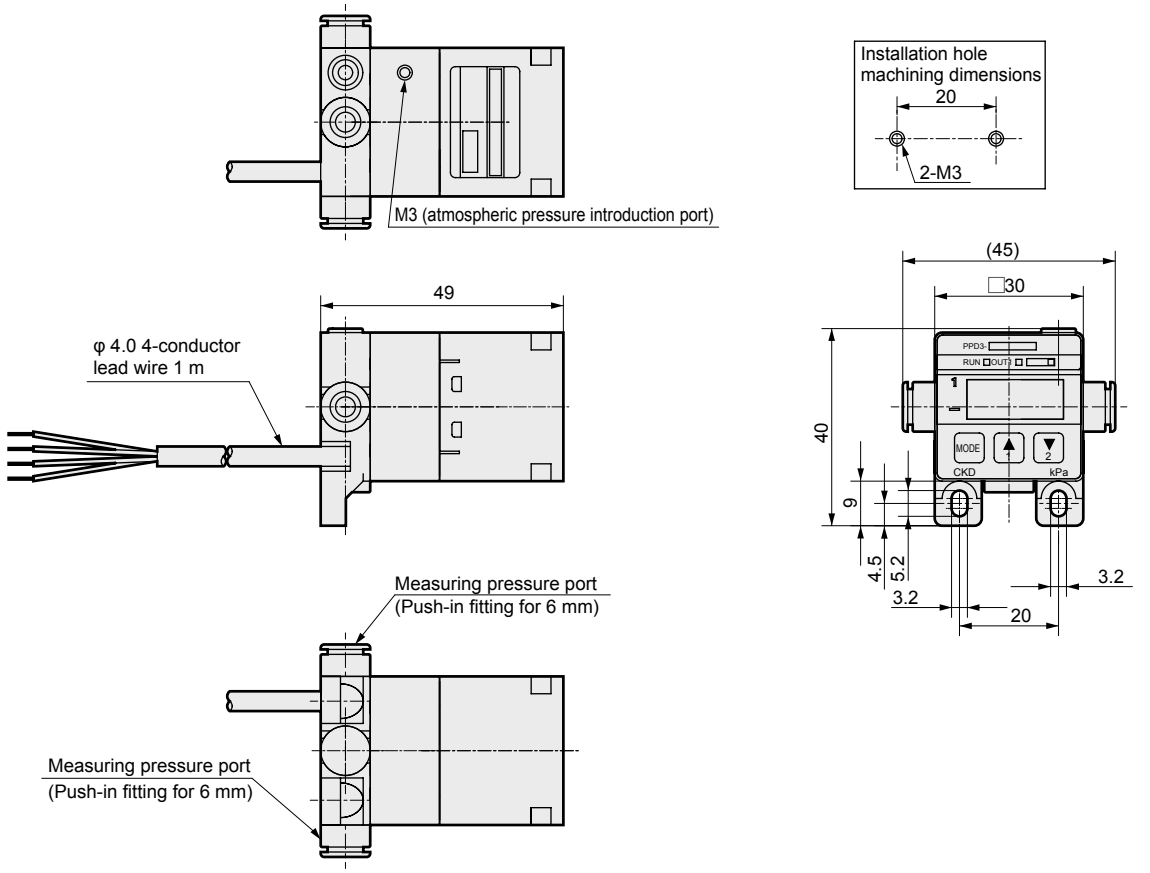
Dimensions: PPD3-S

Sensor integrated type (stainless steel diaphragm sensor)

● PPD3-S- ***** -6HD



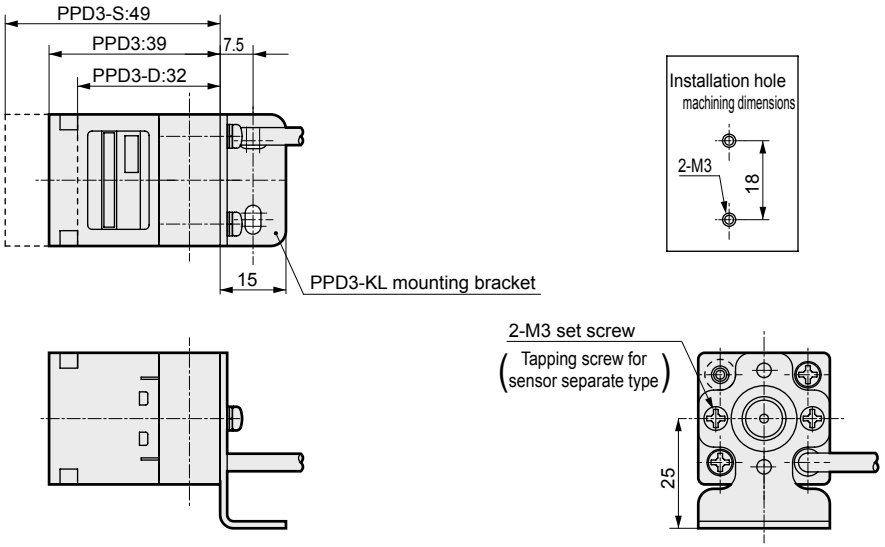
● PPD3-S- ***** -6HT



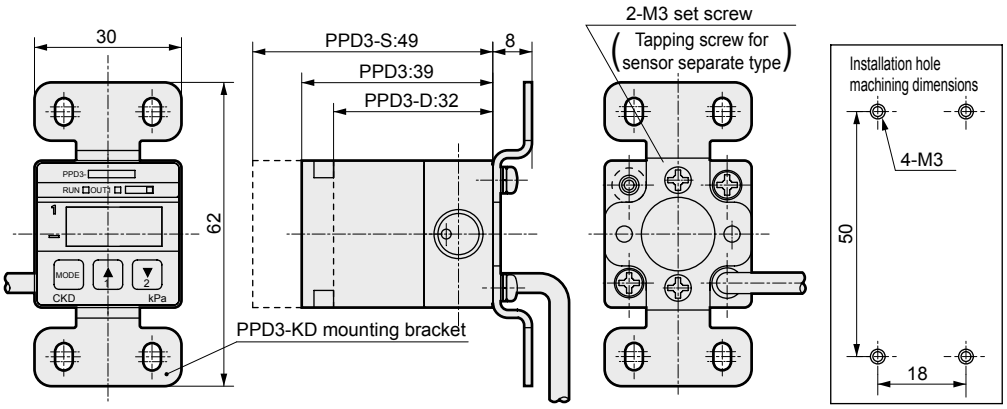
Refer to Safety precautions of PPD3 (-S) Series on pages 1169 to 1171 for wiring method and precautions.

Dimensions: Mounting bracket

● PPD3-KL (-D) assembly drawing

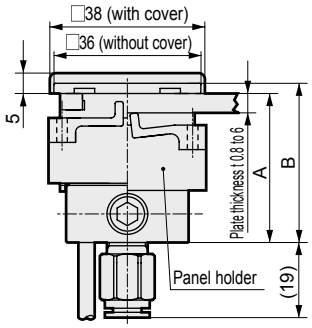


● PPD3-KD (-D) assembly drawing Note: For this installation, use CKD miniature fitting FTL4-M3 for atmospheric release port. (Only sensor integrated type)



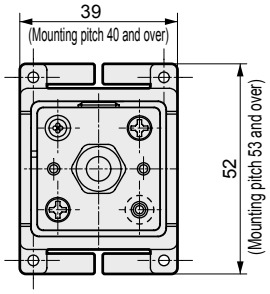
● PPD3-KHS (-D) assembly drawing Note: Push-in fitting is not attached to PPD3-KHS-D.

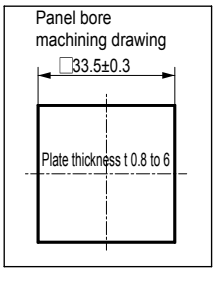
Combinations with PPD3-R****-6B



Mounting dimensions for each model

Model no.	A	B
PPD3	36.5	39
PPD3-S	46.5	49
PPD3-D	29.5	32





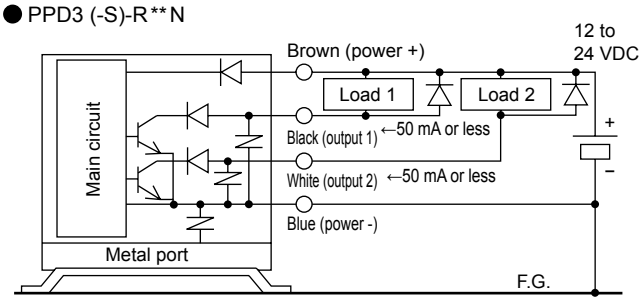
Refer to Safety precautions of PPD3 (-S) Series on pages 1169 to 1171 for wiring method and precautions.

Internal circuit / connection method

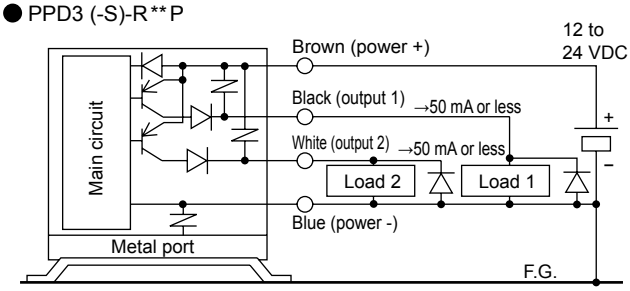
<Circuit and connection method>

PPD3 (-S) Series (sensor integrated type)

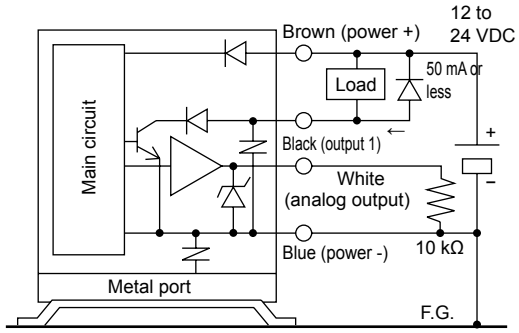
● PPD3 (-S)-R**N



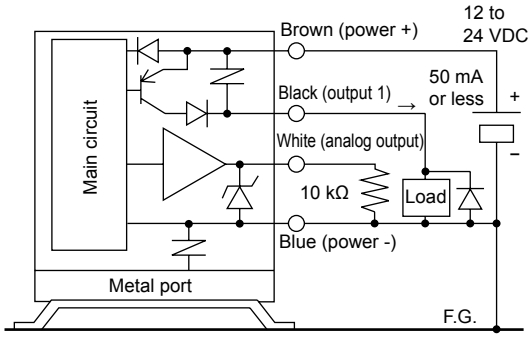
● PPD3 (-S)-R**P



● PPD3 (-S)-R**NA



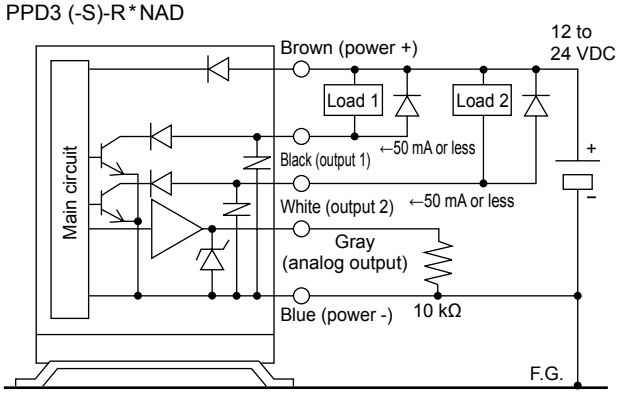
● PPD3 (-S)-R**PA



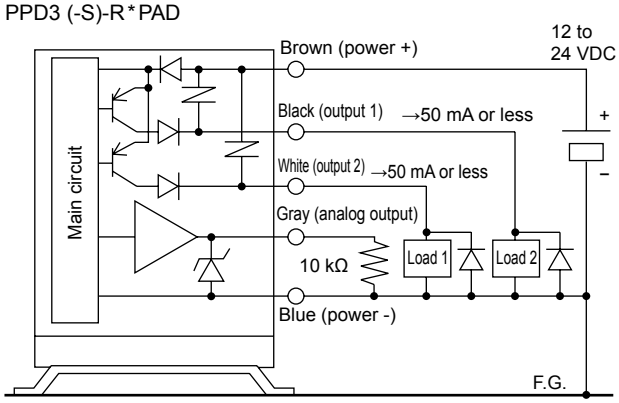
<Circuit and connection method>

PPD3 (-S)-D Series (sensor separated type)

● PPD3 (-S)-R*NAD

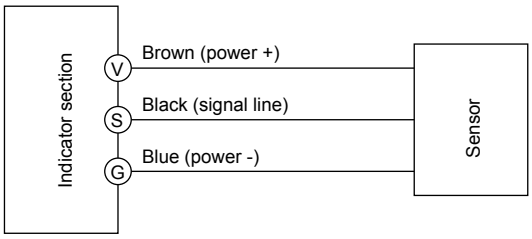


● PPD3 (-S)-R*PAD

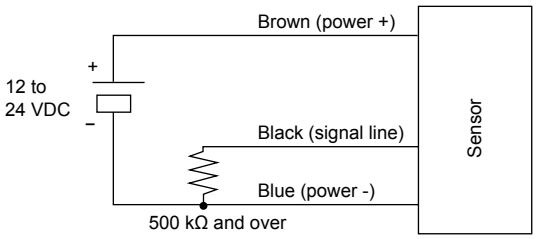


Sensor section connection method

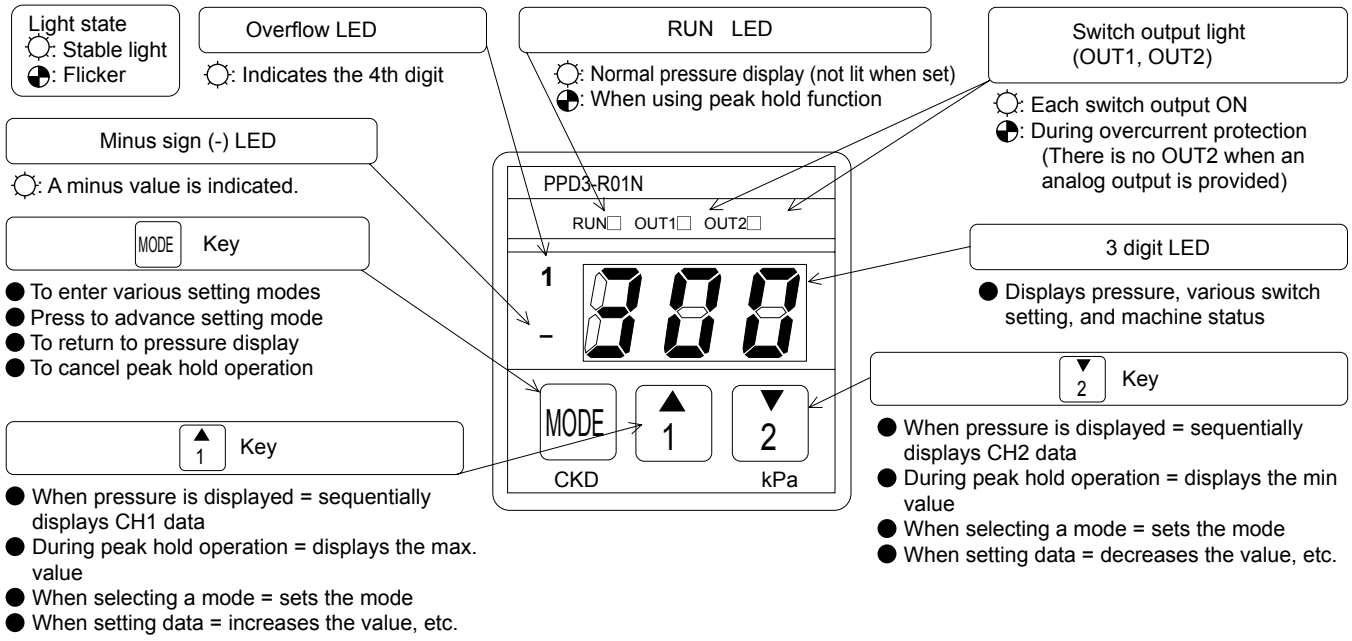
● PPD3 (-S)-R*D



● PPD3 (-S)-R*A connection method when single sensor is used



Display and function



LED display

Numbers and alphabetic characters are displayed with a combination of LED displays.

Numeral	0	1	2	3	4	5	6	7	8	9
Display	0	1	2	3	4	5	6	7	8	9

Character	A	B (b)	C	D (d)	H	I (i)	J	L	N (n)	O (o)	P
Display	A	b	C	d	H	i	J	L	n	o	P

Rated pressure	980 kPa	300 kPa	100 kPa
Model no.	R10	R03	R01
Pressure symbol	JO	LO	HO

Model no. display

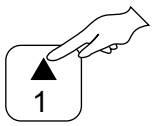
Output type	NPN output	PNP output
Model no.	N, NA	P, PA
Output type symbol	N	P

Confirming setting values

By pressing each key during pressure display, the switch data ON setting/OFF setting/operation waveform, zero point adjustment value, pressure range, and output type can be confirmed. Switch operation is not affected during the following operations.

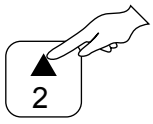
CH1 data display

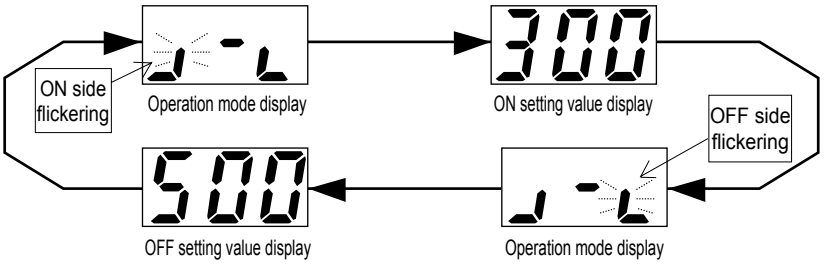
Hold down



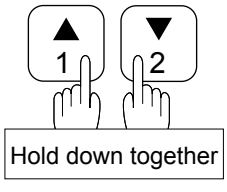
CH2 data display

Hold down

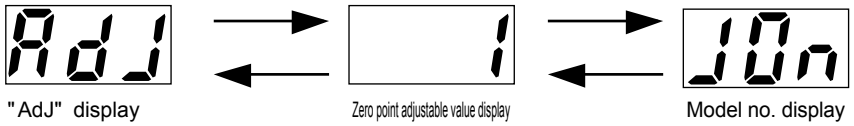




Zero point adjustment value/model no. display



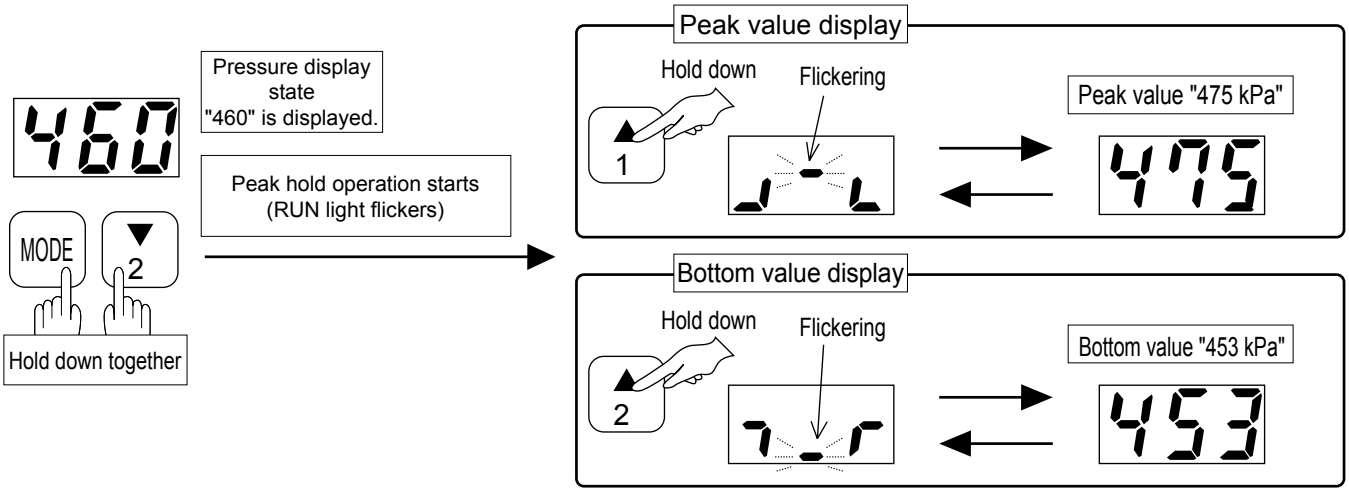
The zero point adjustment value and model no. are displayed alternately. Switch operation is not affected even during operation.



Using each function

Peak hold function

The pressure value for a set period is displayed to see the max. and min. values.
Use this to check the stability of main pressure and working pressure etc. Peak holding does not affect this product's basic functions such as switch operations or pressure display.



Switch output function

Refer to following page for operation method.

PPD3 (-S) has a 2-point or 1-point switch output, and operates in 4 operation modes and stopping operation. The switch is started by setting the required operation mode (refer to the switch operation mode on page 1129) and by making 2 settings, ON and OFF, that specify the operation pressure.

Determine the required operation mode and ON and OFF setting values before settings.
Select and set the following data to operate the switch.

CH1: operation mode	CH1: ON setting value	CH1: OFF setting value
CH2: operation mode	CH2: ON setting value	CH2: OFF setting value

(CH2 is not used with analog output . Nothing can be output even if set.)

Switch output test

Refer to following page for operation method.

Use this function to forcibly turn the switch output ON and confirm the wiring connection or initial operation of the input device.

Note 1: Use this test function to check the wiring connection and input device operation. Avoid using this function instead of actual signals when executing the sequence program while the machinery and equipment are operating.
(Refer to Precautions of caution "when used/when performing maintenance" on page 1160.)

Zero point adjustment

Refer to following page for operation method.

Deviation of the display from zero point is compensated in the atmospheric pressure pressurized state.

Note 2: The above settings and test greatly affect the output signal and display. Before this operation, stop the machinery and equipment using this product and confirm that safety can be ensured in case of problems or incorrect display. Using this function could cause problems or incorrect display while the machinery and equipment are operating.

Note 3: To avoid incorrect operation, all keys must be pressed down for a set time to select the mode.

Operation chart for switch output function, forced output function, zero point adjustment function

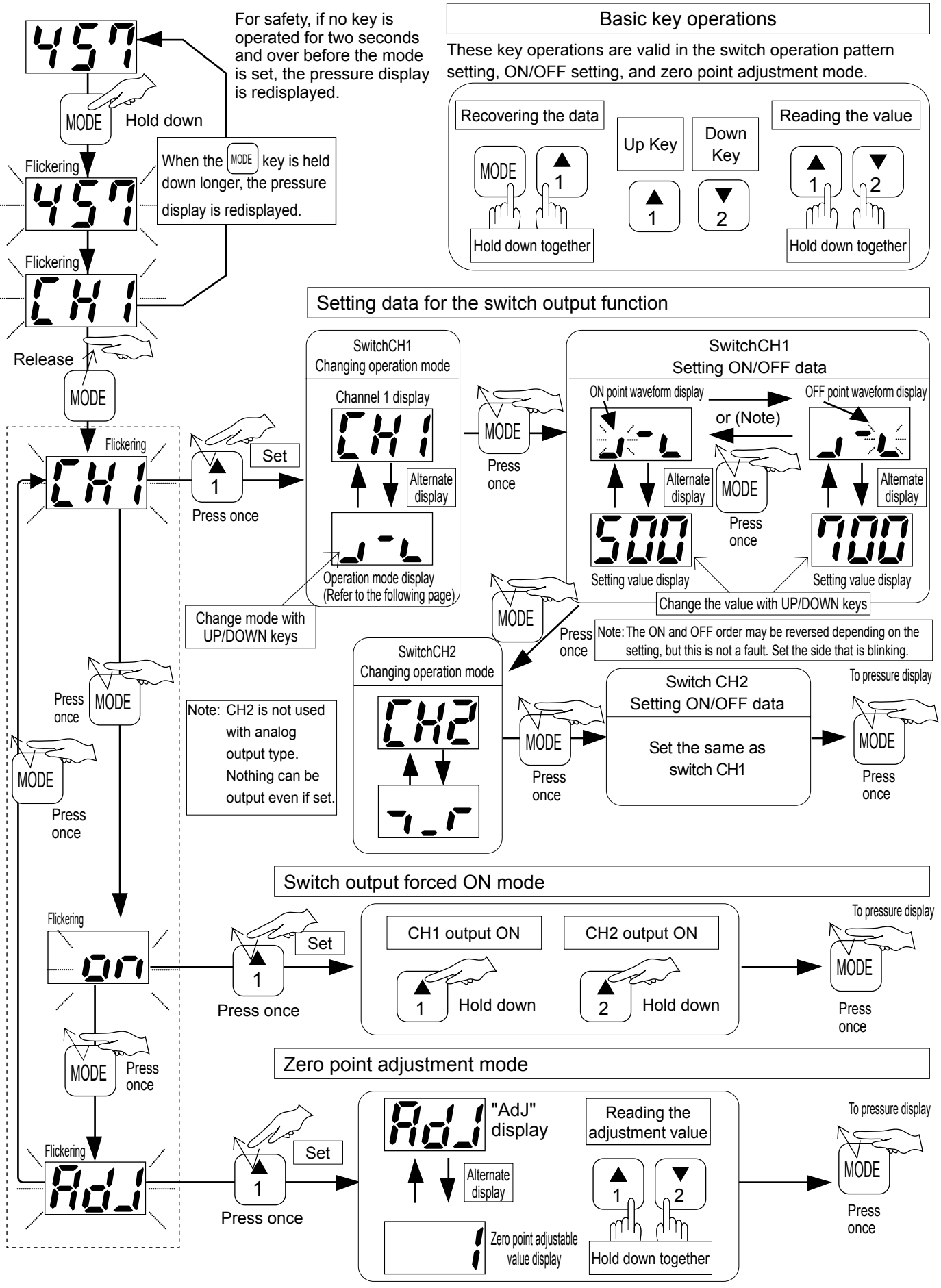
For safety, if no key is operated for two seconds and over before the mode is set, the pressure display is redisplayed.

When the MODE key is held down longer, the pressure display is redisplayed.

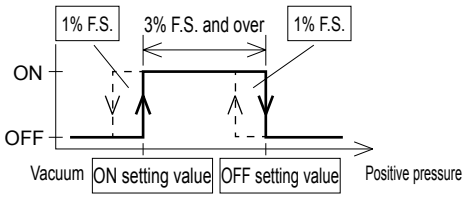
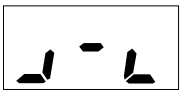
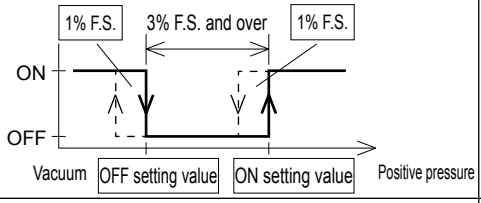
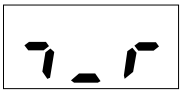
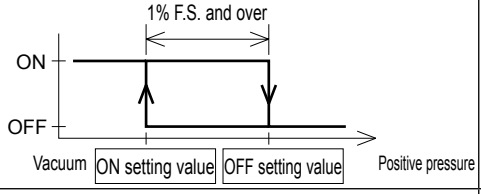
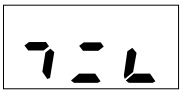
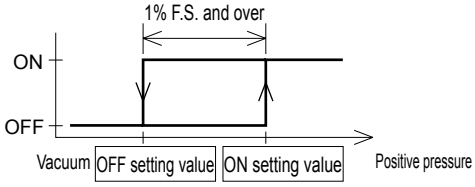
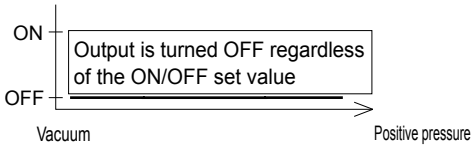
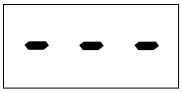
Basic key operations

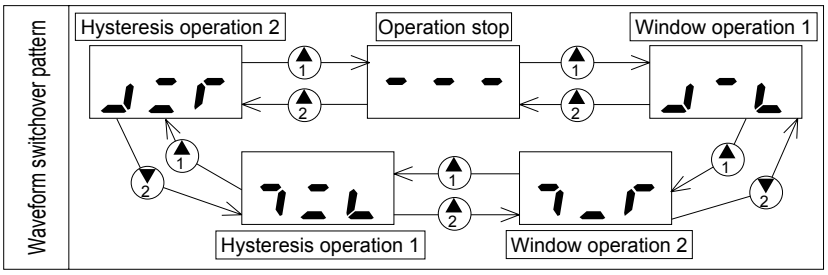
These key operations are valid in the switch operation pattern setting, ON/OFF setting, and zero point adjustment mode.

Setting data for the switch output function



Switch operation mode

Operation mode name	Operation waveform	LED operation waveform display	Applications
1 Window operation 1 (ON when inside range)			When used to confirm main pressure, the ON signal is output as the normal signal if main pressure is within the appropriate range.
2 Window operation 2 (ON when outside range)			When used to confirm main pressure, the ON signal will be output as the error signal if main pressure is abnormal.
3 Hysteresis operation 1 (ON at low pressure)			When used to confirm suction, the ON signal will be output if suction pressure for picking up the workpiece has sufficiently dropped.
4 Hysteresis operation 2 (ON at high pressure)			When used to confirm contact, the ON signal is output if the workpiece is held and pressure is sufficiently increased.
5 Operation stop			When not using the switch output, stop operation to prevent damage and accidents.



Note 1: When using for a winding operation, provide an interval of 3% F.S. and over between the 2 set values. A 1% F.S. hysteresis is automatically added to the ON side and OFF side.

Note 2: When using for a hysteresis operation, provide an interval of 1% F.S. and over between the 2 set values. If the 2 settings are the same, operation may not take place or may be unstable.

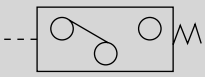
Note 3: The left side of the operation waveform indicates negative pressure, and the right side indicates positive pressure.

Note 4: The magnitude relation of the ON set value and OFF set value is determined when the operation mode is determined, and a reverse magnitude relation cannot be attained. As this product gives priority to the specified operation mode, it automatically judges the magnitude relationship of two setting values when they are input and assigns them as ON and OFF setting values accordingly. Thus, even if ON and OFF setting values input are switched by mistake, they will be corrected and the specified operation mode will be performed.

Electronic pressure switch (pressure switch)

PPD Series

Miniature pressure switch 28 mm square × 30 mm
Upgraded



Overview

Pressure switch PPD Series is upgraded miniature digital display pressure switch for pneumatic and vacuum systems compared with conventional products. Newly, ISO unit display is provided as standard to shift measurement unit smoothly. Due to EEPROM data-hold, maintenance of battery is eliminated. Replacement from old type is also easy, meeting high accuracy requirement and international needs.

Features

- Two types of switch operation
  2 types of a window and hysteresis operations are available to match size of set value.
- When installing in inside of machine, easily confirmed by LED display
  Easy to read LED display when installed at dark place under machine or inside.
- Wide pressure range
- Compatible with CKD regulator
  CKD's regulator
  R1000/R3000/R4000/R8000
  Filter regulator
  Can be mounted on the analog pressure gauge mounting section of W1000/W3000/W4000/W8000
- 5 types of installation attitude
  5 mounting types enable a variety of mounting methods.
- 0 adjust function
  Simple zero set of display
- Switch operating pressure can be set easily
  Easy and certain operation by up-down key.
- EEPROM data-hold
  Eliminating anxiety for charging time of battery and maintenance.
- Overcurrent protection from circuit provided to switch output
  Output element protection from accident by short circuit of load.

Specifications

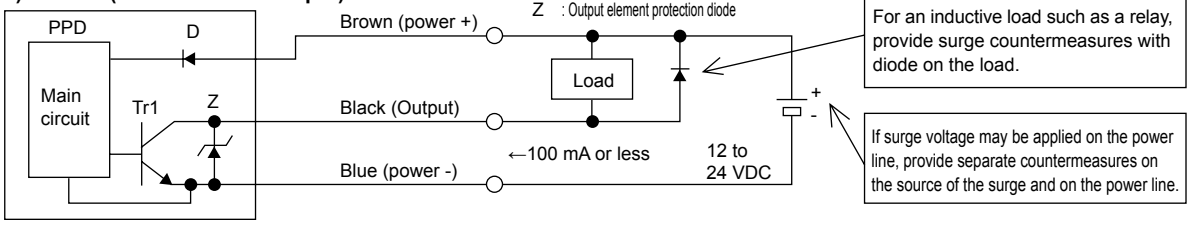
Descriptions	PPD-P10PKN/P	PPD-P01AKN/P	PPD-V01AHN/P
Pressure sensitive element	Diffusion type semiconductor pressure sensor		
Applicable fluid	Air, non-corrosive gas		
Kind of pressure	Gauge pressure		
Rated pressure	0 to 0.98 MPa	0 to 98 kPa	0 to -100 kPa
Min. indication figure	0.01 MPa	1 kPa	
Proof pressure	1.47 MPa	196 kPa	196 kPa
Leak rate	1 cm^3/min (ANR) or less		
Display	2 1/ 2 digit red LED display, character height 8 mm		
Repeatability	1% F.S. or less		
Indicator accuracy	±2% F.S. (25°C)		
Temperature characteristics	±4% F.S. (0 to 50°C)		
Power supply voltage	12 to 24 VDC ± 10% (ripple rate 1% or less)		
Current consumption	50 mA or less		
Output response time	Approximately 5 msec		
Output type	N: NPN transistor open collector output 1 point P: PNP transistor open collector output 1 point		
Output rated	NPN: MAX 30 VDC 100 mA PNP: MAX 26.4 VDC 50 mA (Note1)		
Voltage drop	NPN: 1.2 V or less/PNP: 2.4 V or less (Note 1)		
Set point holding	EEPROM		
Lead wire	Oil resistance vinyl cable 3-conductor (0.2 mm^2 insulator O. D. φ 1.1) 1 m		
Ambient temperature	0 to 50°C		
Ambient humidity	0 to 85% RH (no dew condensation)		
Vibration resistance	10 to 55 Hz double amplitude 1.5 mm 2 hours per X, Y, Z direction		
Degree of protection	IP40 equiv.		
Weight	6B: approx. 65 g, 6P: approx. 75 g, 6M: approx. 65 g, 6D: approx. 80 g, 1F: approx. 45 g, HS: approx. 95 g		
Option kit weight	PPD-K1F/K1F-1: approx. 1 g, PPD-K1F-2: approx. 1.3 g		

Note 1: Note that the output rating and voltage drop values are different for NPN and PNP.
Note 2: CE-compatible parts are available as custom orders. Contact CKD for details.

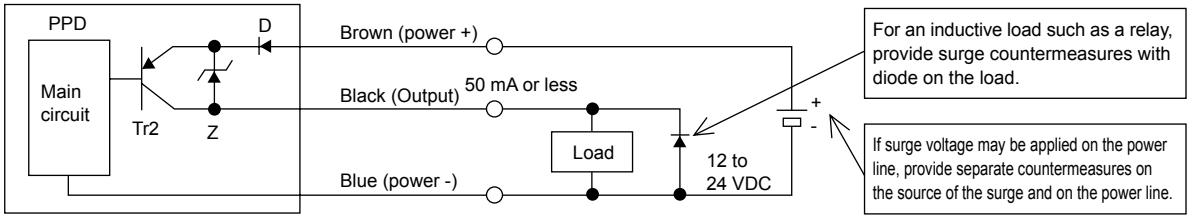
<Internal circuit and connection method>

Tr1: NPN output transistor
Tr2: PNP output transistor
D : Power supply reverse connection protection diode
Z : Output element protection diode

1) PPD-*N (NPN transistor output)



2) PPD-*P (PNP transistor output)



How to order

PPD - V01AH N - 6B -

Ⓐ Pressure range and unit
Ⓑ Output type
Ⓒ Installation attitude
Ⓓ Option

Symbol	Descriptions
Ⓐ Pressure range and unit	
P10PK	0 to 0.98 MPa
P01AK	0 to 98 kPa
V01AH	0 to -100 kPa
Ⓑ Output type	
N	NPN transistor open collector output 1 point
P	PNP transistor open collector output 1 point
Ⓒ Installation attitude	
6B	Back surface Rc1/8, with bracket
6P	Panel mount Rear side Rc1/8, with screw
6M	Rear side R1/8
6D	Bottom Rc1/8
1F	Direct mount O-ring/with screw
HS	Panel mount With push-in fitting 6 mm
Ⓓ Option	**Note 1**
Blank	M3 thread for mounting 2 pieces attached
1	R1000/R1100 W1000/W1100 2 tapping screws for mounting attached
2	R2000/R2100/R3000/R4000/R6000/R8000/ R3100/R4100/R6100/R8100/W3000/W4000/ W8000/W3100/W4100/W8100 2 tapping screws for mounting attached

Note 1: Select an option only when installation attitude is 1F.

<Example of model number>

PPD-V01AHN-6B

Indicates bracket mounted type with rated pressure 0 to -100 kPA, NPN transistor output type output, rear pressure port Rc1/8, and a bracket is provided.

PPD option kit model no.

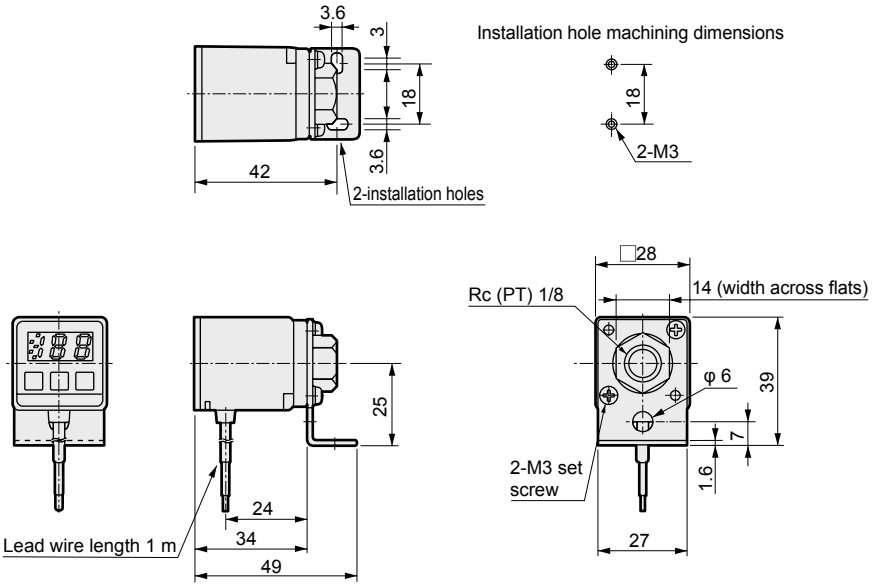
PPD – K1F

Ⓐ Option kit

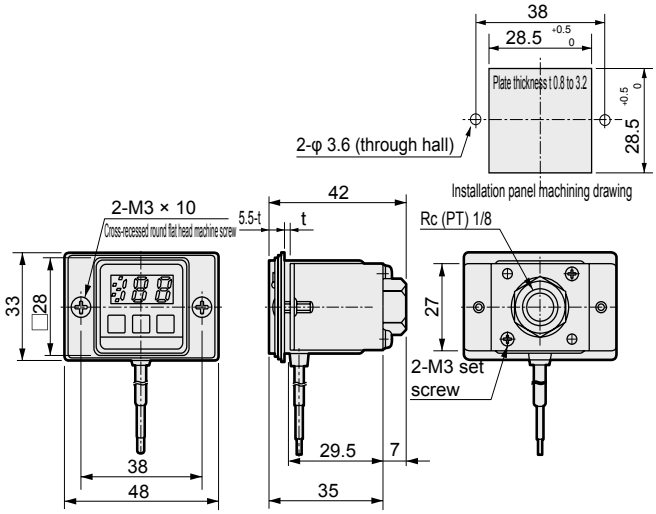
Symbol	Descriptions	
Ⓐ Option kit		
K1F	Key (2 pcs.) O-ring Installation screw (2 pcs.)	1F (replacement parts for changing position/direction)
K1F-1	Key (2 pcs.) O-ring Installation screw (2 pcs.)	1F-1 (replacement parts for changing position/direction)
K1F-2	Key (2 pcs.) O-ring Installation screw (2 pcs.)	1F-2 (replacement parts for changing position/direction)

Dimensions

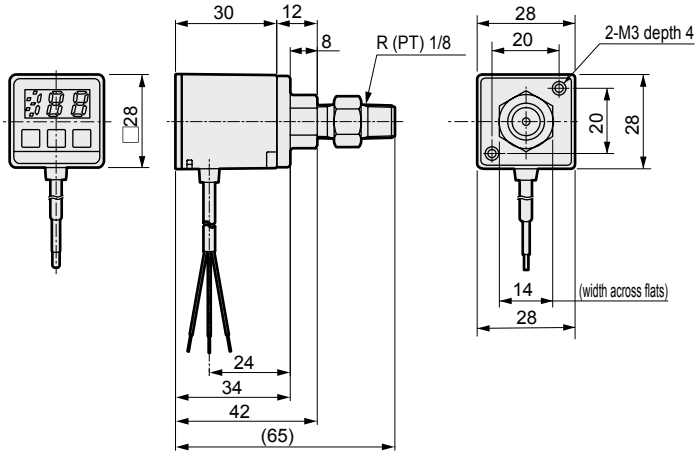
● PPD- ****** -6B



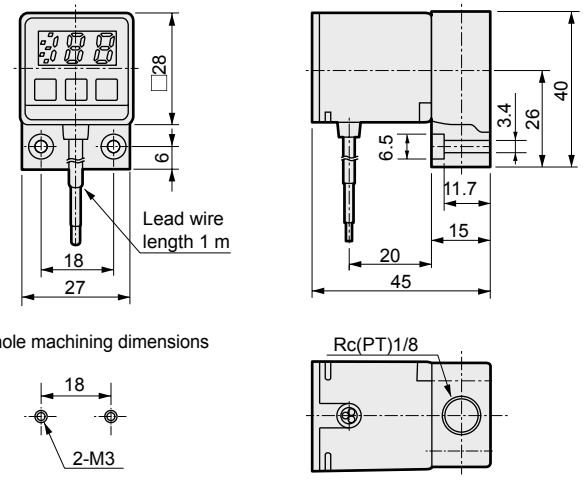
● PPD- ****** -6P



● PPD- ****** -6M



● PPD- ****** -6D

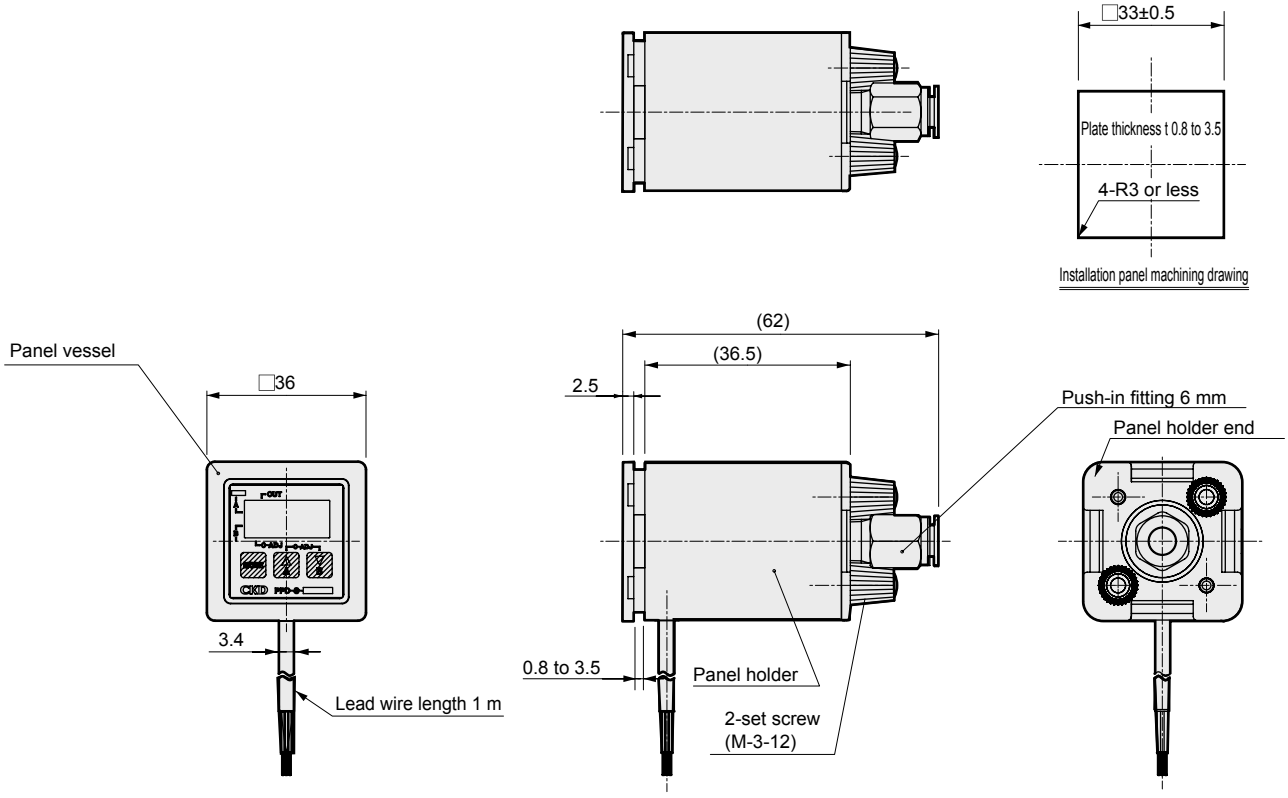


Installation hole machining dimensions

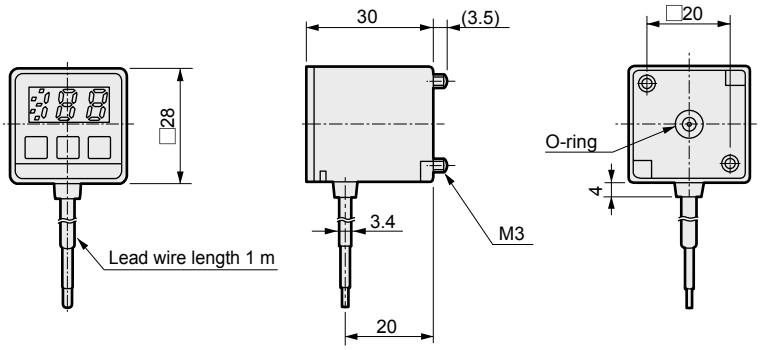
⚠ Refer to Safety precautions of PPD Series on pages 1169 to 1171 for wiring method and precautions.

Dimensions

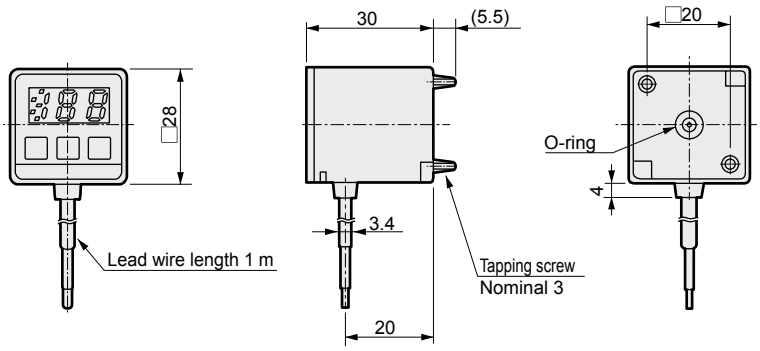
● PPD- ** -HS



● PPD- ** -1F



● PPD- ** -1F-1/-1F-2

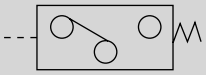


Refer to Safety precautions PPD Series on pages 1169 to 1171 for details.

Electronic pressure switch/stainless steel diaphragm sensor type (pressure switch)

PPD-S Series

Suction confirmation of wet workpiece
Drain containing air in factory can be used



Features

- Stainless steel diaphragm sensor in sensor section
- Drain containing air in factory can be used
- Proof pressure for vacuum is 3 times greater than the conventional product. This switch can also be used for vacuum breaking pressure or positive pressure for air blow

How to order

PPD - S - P10PK N - HS

- PPD - S - : fixed
- P10PK: Ⓐ Pressure range and unit
- N: Ⓑ Output type
- HS: Ⓒ Installation attitude

Symbol	Descriptions
Ⓐ Pressure range and unit	
P10PK	0 to 0.98 MPa
P01AK	0 to 98 kPa
V01AH	0 to -100 kPa
Ⓑ Output type	
N	NPN transistor open collector output 1 point
P	PNP transistor open collector output 1 point
Ⓒ Installation attitude	
6B	Back surface Rc1/8, with bracket
HS	Panel mount With push-in fitting 6 mm

Specifications

Descriptions	PPD-S-P10PKN/P	PPD-S-P01AKN/P	PPD-S-V01AHN/P
Pressure sensitive element	Stainless steel diaphragm pressure sensor		
Applicable fluid	Air, compressed air (including water/oil/drain), non-corrosive gas		
Kind of pressure	Gauge pressure		
Rated pressure	0 to 0.98 MPa	0 to 98 kPa	0 to -100 kPa
Min. indication figure	0.01 MPa	1 kPa	
Proof pressure	1.47 MPa	588 kPa	588 kPa
Leak rate	1 cm^3/min (ANR) or less		
Display	2 1/ 2 digit red LED display, character height 8 mm		
Indicator accuracy (25°C)	±2% F.S.	±3% F.S.	
Temperature characteristics (0 to 50°C)	±4% F.S.	±5% F.S.	
Power supply voltage	12 to 24 VDC ± 10% (ripple rate 1% or less)		
Current consumption	50 mA or less		
Output response time	Approximately 5 msec		
Output type	N: NPN transistor open collector output 1 point P: PNP transistor open collector output 1 point		
Output rated	NPN: MAX 30 VDC 100 mA PNP: MAX 26.4 VDC 50 mA (Note1)		
Voltage drop	NPN: 1.2 V or less/PNP: 2.4 V or less (Note 1)		
Set point holding	EEPROM		
Lead wire	Oil resistance vinyl cable 3-conductor (0.2 mm^2 insulator O. D. φ 1.1) 1 m		
Ambient temperature	0 to 50°C		
Ambient humidity	0 to 85%RH (no dew condensation)		
Vibration resistance	10 to 55 Hz double amplitude 1.5 mm 2 hours per X, Y, Z direction		
Degree of protection	IP40 equiv.		
Weight	PPD-S-□-6B: approx. 70 g, PPD-S-□-HS: approx. 125 g		

Note 1: Note that the output rating and voltage drop values are different for NPN and PNP.
Note 2: CE-compatible parts are available as custom orders. Contact CKD for details.

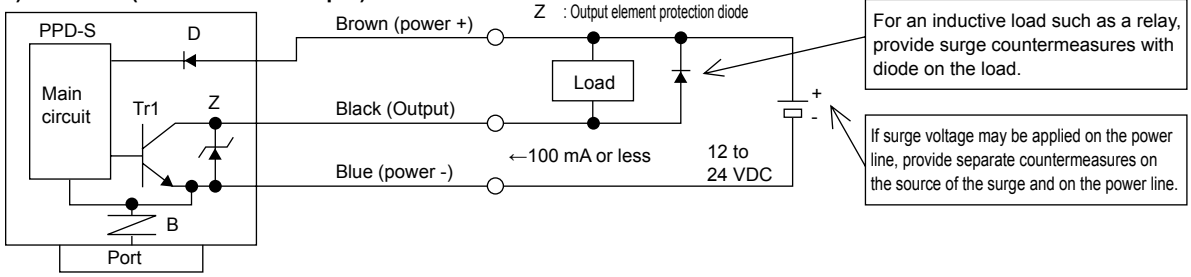
<Example of model number>

PPD-S-P10PKN-HS Indicates panel mounted type with rated pressure 0 to 0.98 MPa, NPN transistor output type output, and panel mount installation.

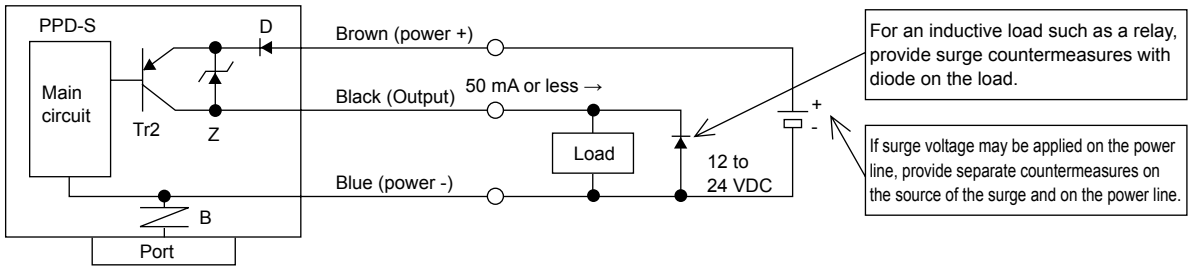
<Internal circuit and connection method>

Tr1: NPN output transistor
Tr2: PNP output transistor
D : Power supply reverse connection protection diode
Z : Output element protection diode

1) PPD-S-*N (NPN transistor output)

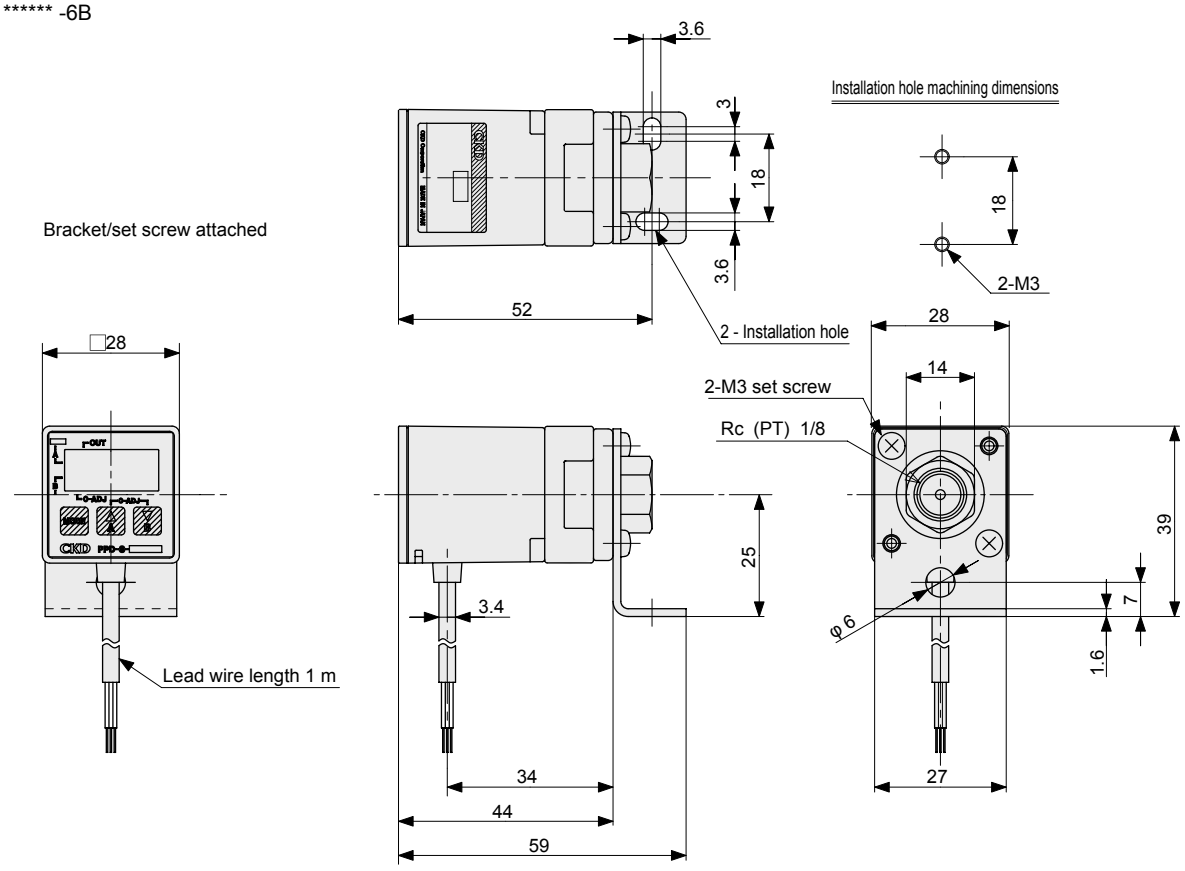


2) PPD-S-*P (PNP transistor output)

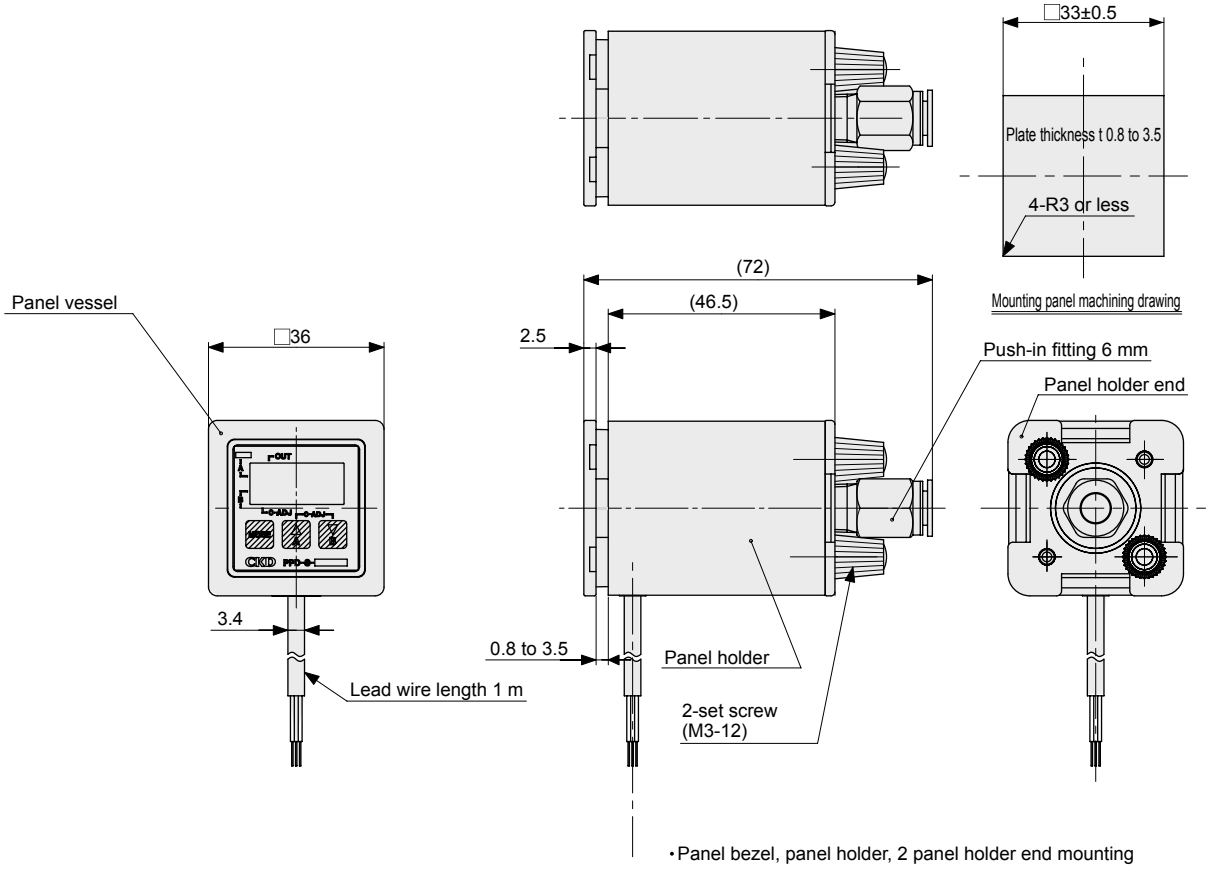


Dimensions

● PPD-S- ****** -6B



● PPD-S- ****** -HS



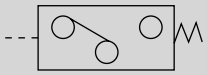
・Panel bezel, panel holder, 2 panel holder end mounting screws (M3 × 12) attached

Refer to Safety precautions PPD-S Series on pages 1169 to 1171 for details.

Electronic pressure switch/protection box attached (pressure switch)

PPD-A Series

Reinforced strength equivalent to degree of protection IP67
Can be operated with a wet hand



RoHS CAD

Features

- Equivalent to degree of protection IP67
- Protective functions ensured full-time
  Settings possible even when wet
  No need to open case
- With push-in fitting
  Lightweight due to resin case and push-in fitting

Specifications

Descriptions	PPD-A-P10PKN/P-H	PPD-A-P01AKN/P-H	PPD-A-V01AHN/P-H
Pressure sensitive element	Diffusion type semiconductor pressure sensor		
Applicable fluid	Air, non-corrosive gas		
Kind of pressure	Gauge pressure		
Rated pressure	0 to 0.98 MPa	0 to 98 kPa	0 to -100 kPa
Min. indication figure	0.01 MPa	1 kPa	
Proof pressure	1.47 MPa	196 kPa	196 kPa
Leak rate	1 cm^3/min (ANR) or less		
Display	2 1/ 2 digit red LED display, character height 8 mm		
Indicator accuracy	±2% F.S. (25°C)		
Temperature characteristics	±4% F.S. (0 to 50°C)		
Power supply voltage	12 to 24 VDC ± 10% (ripple rate 1% or less)		
Current consumption	50 mA or less		
Output response time	Approximately 5 msec		
Output type	N: NPN transistor open collector output 1 point P: PNP transistor open collector output 1 point		
Output rated	NPN: MAX 30 VDC 100 mA PNP: MAX 26.4 VDC 50 mA (Note1)		
Voltage drop	NPN: 1.2 V or less/PNP: 2.4 V or less (Note 1)		
Set point holding	EEPROM		
Lead wire	Oil resistance vinyl cable 3-conductor (0.2 mm^2 insulator O. D. φ 1.1) 1 m		
Ambient temperature	0 to 50°C		
Ambient humidity	0 to 85% RH (no dew condensation)		
Vibration resistance	10 to 55 Hz double amplitude 1.5 mm 2 hours per X, Y, Z direction		
Degree of protection	IP67 equiv.		
Weight	Approx. 120 g		
Port size	Push-in fitting (conforming tube O. D. 6 mm) Recommended tube: F-1506, U-9506		
Atmosphere introduction port	Barbed fitting Recommended tube: FH-3224, U-9532, U-9504		

Note 1: Note that the output rating and voltage drop values are different for NPN and PNP.

How to order

PPD - A - P10PK N - H

Ⓑ Output type

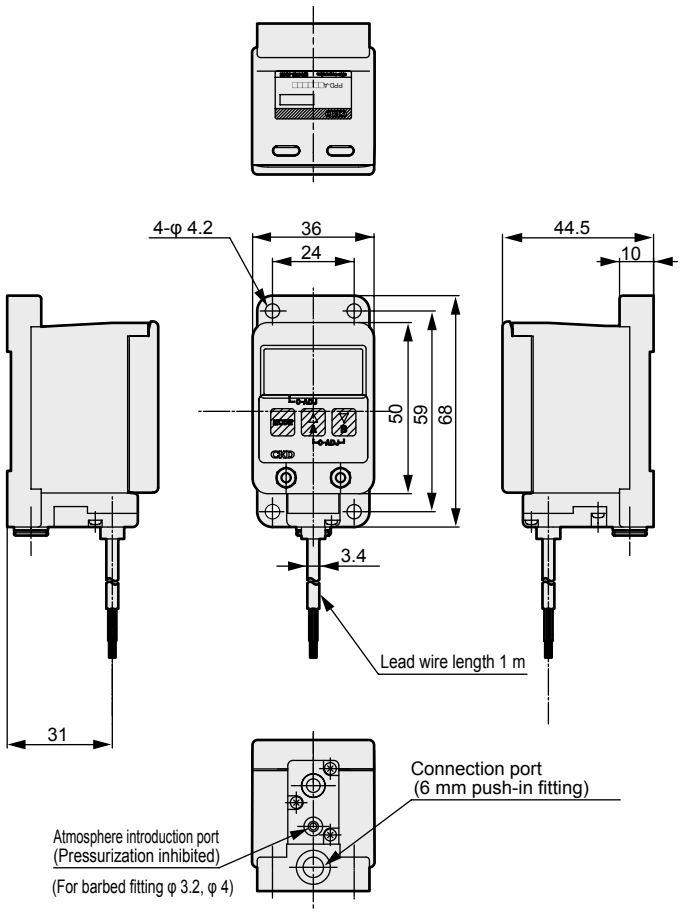
Ⓐ Pressure range and unit

Symbol	Descriptions
Ⓐ Pressure range and unit	
P10PK	0 to 0.98 MPa
P01AK	0 to 98 kPa
V01AH	0 to -100 kPa
Ⓑ Output type	
N	NPN transistor open collector output 1 point
P	PNP transistor open collector output 1 point

<Example of model number> PPD-A-P10PKN-H

Indicates type with rated pressure 0 to 0.98 MPa, NPN transistor output type output, with protective box.

Dimensions

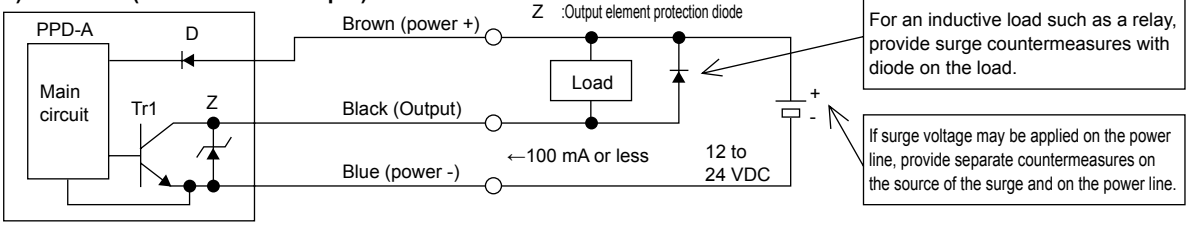


Refer to Safety precautions PPD-A Series on pages 1169 to 1171 for details.

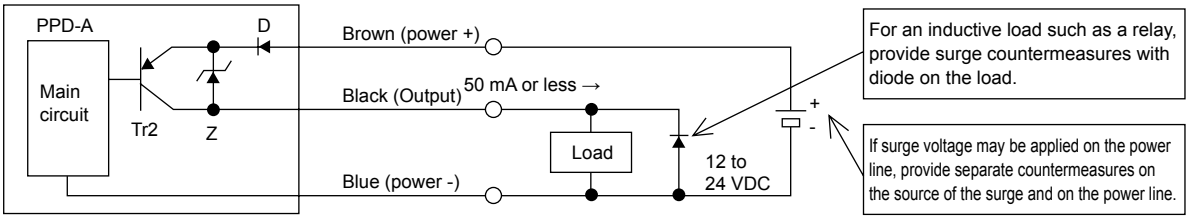
<Internal circuit and connection method>

Tr1: NPN output transistor
Tr2: PNP output transistor
D : Power supply reverse connection protection diode
Z :Output element protection diode

1) PPD-A-*N (NPN transistor output)

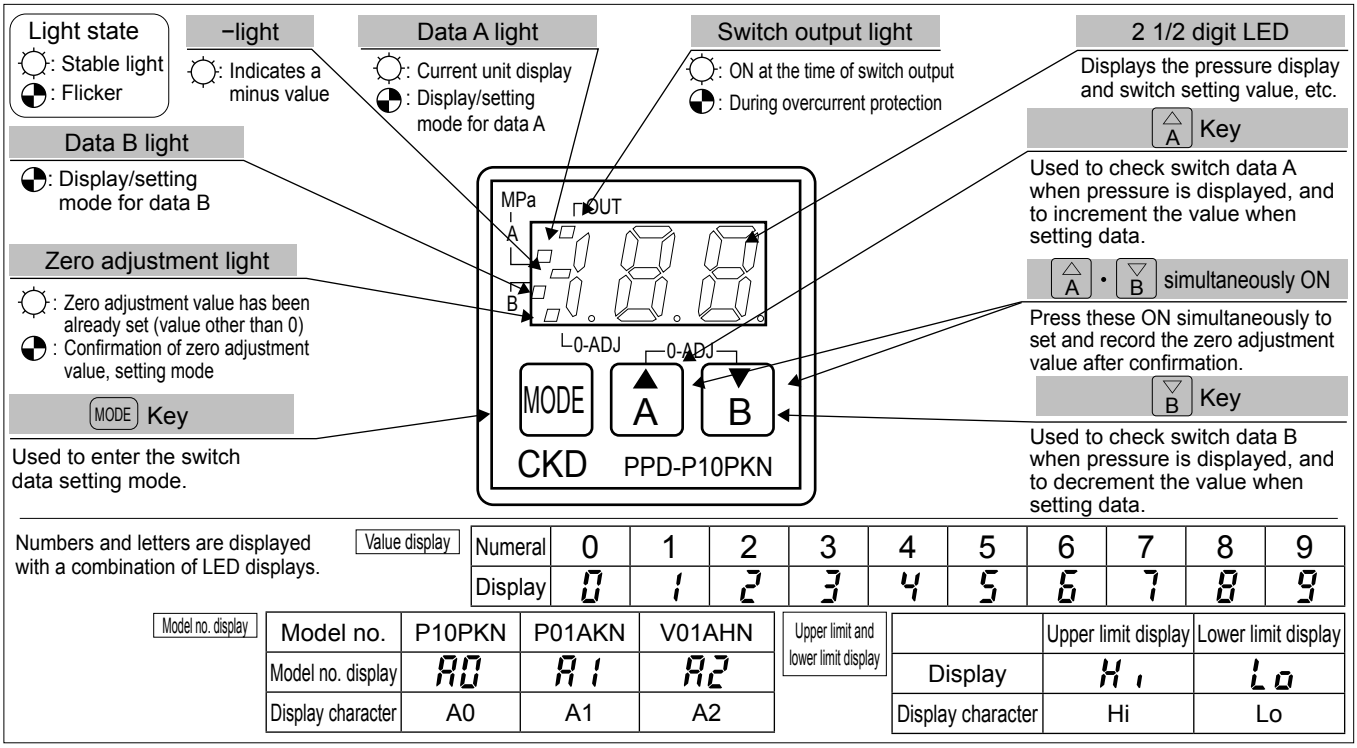


2) PPD-A-*P (PNP transistor output)



PPD, PPD-A, PPD-S COMMON

Display and function



Numbers and letters are displayed with a combination of LED displays.

Value display

Numeral	0	1	2	3	4	5	6	7	8	9
Display	0	1	2	3	4	5	6	7	8	9

Model no. display

Model no.	P10PKN	P01AKN	V01AHN
Model no. display	A0	A1	A2
Display character	A0	A1	A2

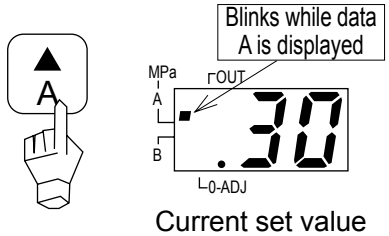
Upper limit and lower limit display

	Upper limit display	Lower limit display
Display	H i	Lo
Display character	Hi	Lo

Confirming setting values

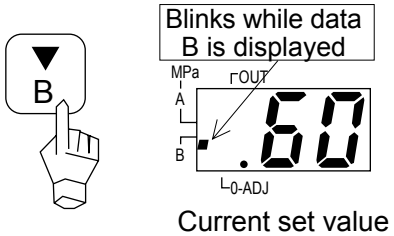
Data A and data B, which are switch setting values, and the zero adjustment value are checked quickly with pressure display status.

Displaying data A setting



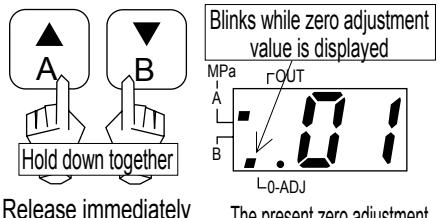
Current set value

Displaying data B setting



Current set value

Display of zero adjustment value

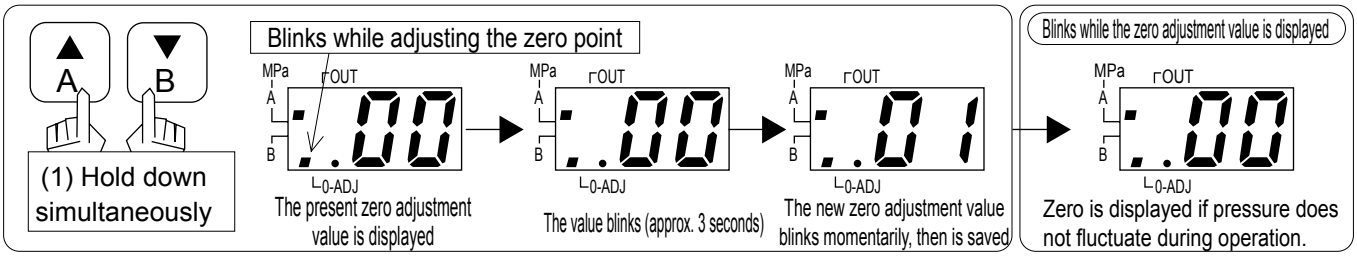


Release immediately after confirmation

The present zero adjustment value is displayed

Adjusting the zero point

The differential pressure display near zero can be set to the zero display. This value is adjusted within 0 ± approx. 8% F.S.



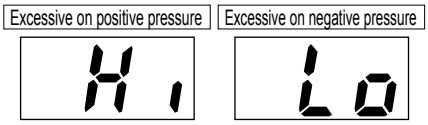
The present zero adjustment value is displayed

The value blinks (approx. 3 seconds)

The new zero adjustment value blinks momentarily, then is saved

Zero is displayed if pressure does not fluctuate during operation.

- If there is no deviation and the zero point need not be adjusted, the 0-ADJ light does not turn ON even when zero adjustment is started.
- If pressure exceeds the tolerable range, zero adjustment stops, data is cleared, and the 0-ADJ light turns OFF. (Tolerable range = 0 ± 8% F.S.)
  To clear an incorrect zero adjustment value, apply pressure higher than 20%F.S., then adjust the zero point.
- When the two steps above are taken, the 0-ADJ light turns ON after zero adjustment.



Clear data when the tolerable setting range has been exceeded.

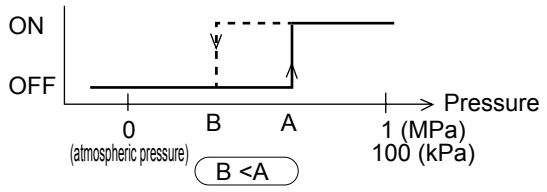
Types of switch operation

Two operations can be selected based on the magnitude relation of switch data.

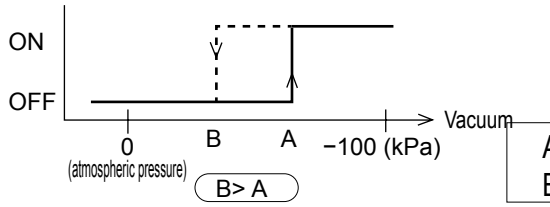
Two types of operation mode can be set based on the magnitude relation of two data (data A and data B).
Refer to the operation chart and select the operation that suits the application, then determine settings for data A and data B.
When not using or when stopping the switch function, disable data A or data B settings for safety. (There is a special display for disabling the settings.) Switch output is stopped (forcibly turned OFF) while settings are being made.

Hysteresis mode operation chart

P10*/P01*

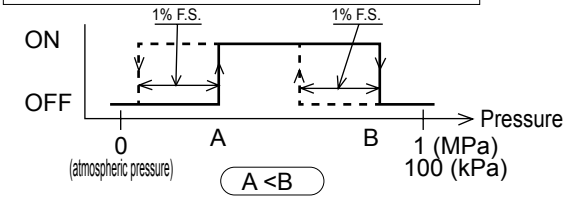


V01*

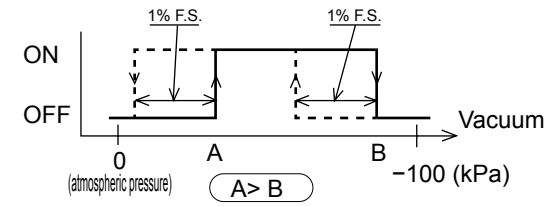


Window mode operation chart

P10*/P01*



V01*



A: Data A
B: Data B

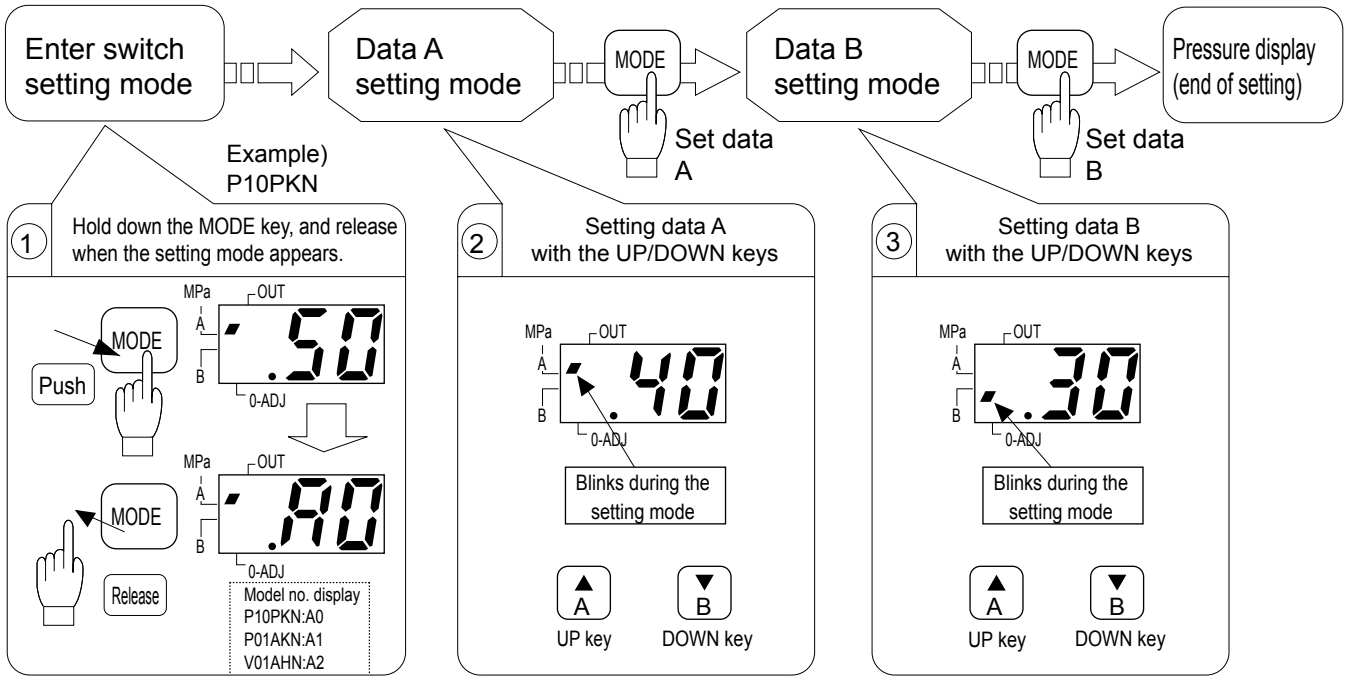
To ensure stable operations, provide the following differences with the min. digit between data A and data B when making a setting:
Hysteresis operation: 1 and over
Window operation : 3 and over

Do not use a setting where data A equals data B!

To stabilize wind operation, a hysteresis of 1% F.S. is automatically added.

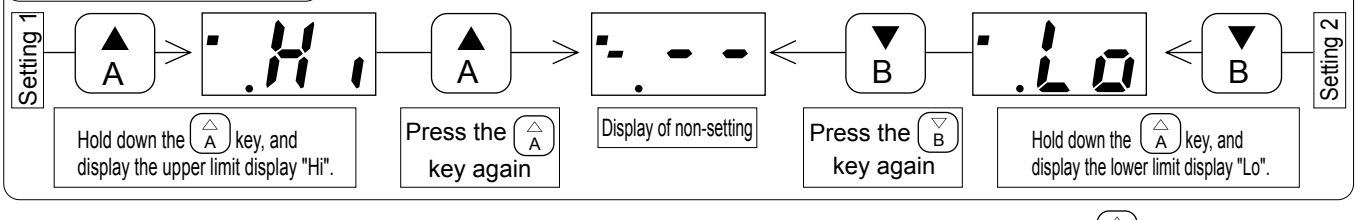
Setting data A and data B

Switch operation starts when data A and data B are set.



Disabling the setting

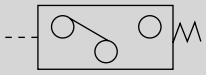
Disable both data A and data B as follows when not using the switch function.



△A

Compact electronic pressure switch (pressure switch)

PPE Series



Overview

Pressure switch PPE Series is trimmer setting type semiconductor pressure switch developed for pneumatic/vacuum systems. Usage is flexible due to compact shape and three types of piping connection (R1/8, φ 6 plug, φ 6 push-in fitting).

Features

- Semiconductor pressure sensor
  Used semiconductor sensor pressure detection, high precision and high reliability are achieved.
- 2 wire
  Due to 2 wire type, wiring man-hour is reduced, and both PLC input formats (source and sink) can be used.
- High proof pressure
  Proof pressure of negative pressure type (V01) is as high as 0.6 MPa, so the product can withstand to vacuum break by pressurization.
- Reverse connection / overcurrent protection circuit integrated
  A protection circuit for improper wire connection (reverse connection, load short circuit) is integrated.
- Wide port size
  R1/8
  φ 6 plug
  φ 6 push-in fitting

Specifications

Model no. / Descriptions	Vacuum	Positive pressure	
	PPE-V01-□ Note 1	PPE-P01-□ Note 1	PPE-P10-□ Note 1
Rated pressure	-101.3 to 0 kPa	0 to 100 kPa	0 to 1 MPa
Plate color Note 2	Red	Green	Blue
Pressure sensitive element	Diffusion type semiconductor pressure sensor		
Applicable fluid	Air/non-corrosive gas		
Proof pressure	0.6 MPa	0.3 MPa	1.5 MPa
Repeatability	±1% F.S.		
Hysteresis	3% F.S. or less		
Temperature characteristics	±3% F.S.		
Load voltage	10 to 30 VDC		
Load current	5 to 50 mA		
Internal voltage drop	4 V or less		
Leakage current	1 mA or less		
Indicator light	Yellow LED lighting at the time of ON		
Lead wire length	Standard 3 m (oil resistant vinyl cabtyre cable 2-conductor 0.15 mm^2 insulator O. D. φ1.0)		
Operating ambient temperature	0 to 50°C (no freezing)		
Vibration resistance	10 to 55 Hz double amplitude 1.5 mm 4 hours per X, Y, Z direction		
Degree of protection	IEC standards IP65 or equivalent		
Piping method	R1/8, φ 6 plug, φ 6 push-in fitting		
Weight	PPE-□-6/-H6-B: approx. 37 g, PPE-□-H6: approx. 42 g		

Note 1: □ section is matched to piping section. (Refer to How to order)
Note 2: Name plate color is changed per pressure range. (To prevent improper use)

Clean room specifications

(Catalog no. CB-033SA)

- Dust generation preventing structure for use in cleanrooms

PPE-.....-P70

PPE-.....-P80

How to order

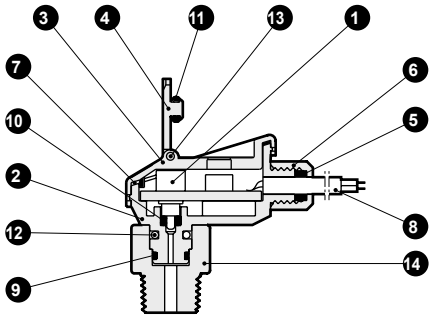
PPE - V01 - 6

- Ⓐ Pressure range
- Ⓑ Piping shape

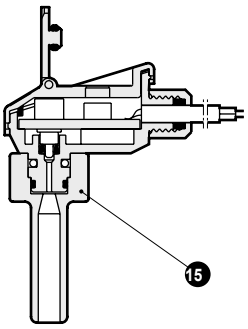
Symbol	Descriptions
Ⓐ Pressure range	
V01	−101.3 to 0 kPa
P01	0 to 101 kPa
P10	0 to 1 MPa
Ⓑ Piping shape	
6	R1/8
H6-B	φ 6 mm plug
H6	In-line of push-in fitting for φ 6 (2 pcs.)

Internal structure and parts list

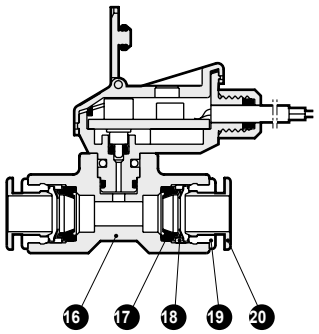
● PPE-*-6



● PPE-*-H6-B



● PPE-*-H6

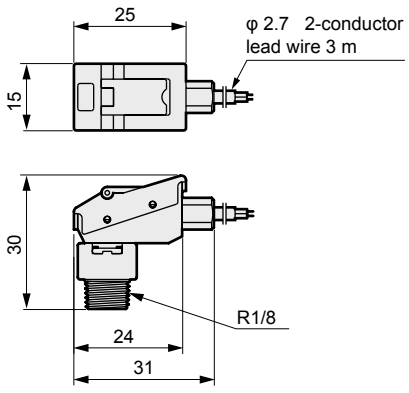


No.	Parts name	Material	No.	Parts name	Material
1	Pressure sensor	Diffusion type semiconductor strain gauge	11	O-ring	Nitrile rubber
2	Body	PBT (glass fiber 30%)	12	Stopper	Stainless steel
3	Cover	Polycarbonate	13	Spring pin	Stainless steel
4	Trimmer guard	Polycarbonate	14	R1/8	PBT (glass fiber 30%)
5	Bush	Nitrile rubber	15	Plug	PBT (glass fiber 30%)
6	Bush holder	Aluminum	16	Push-in fitting	PBT
7	Cover gasket	Silicon rubber	17	Packing	Nitrile rubber
8	Lead wire (3 m)	Polyvinyl chloride	18	Chuck	Brass (electroless nickeling)
9	O-ring	Nitrile rubber	19	Outer ring	Brass (electroless nickeling)
10	O-ring	Nitrile rubber	20	Push ring	Polyacetal

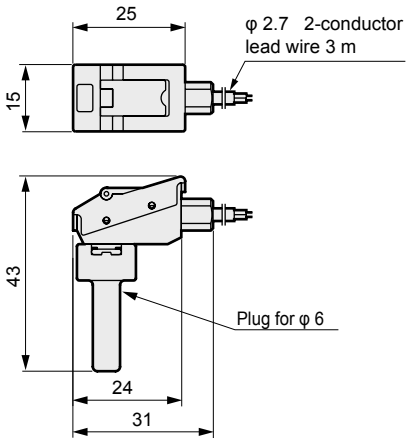
Dimensions

CAD

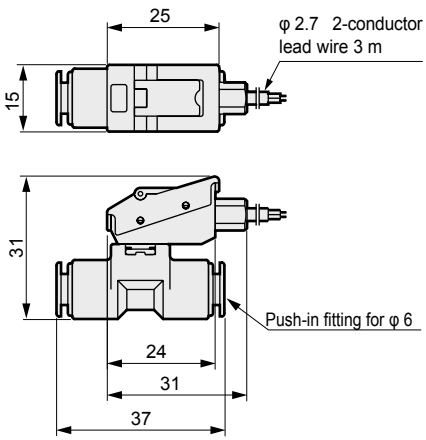
● PPE-*-6



● PPE-*-H6-B



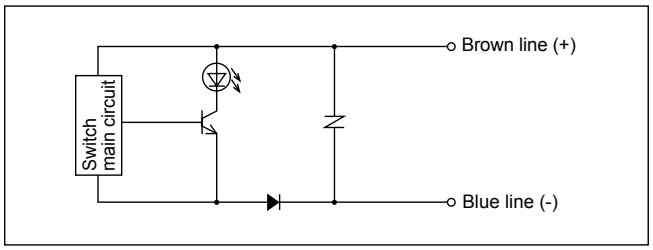
● PPE-*-H6



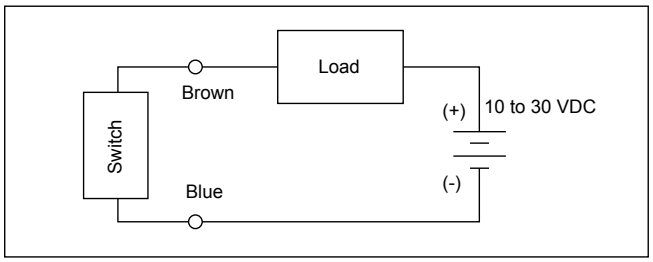
⚠ Refer to Precaution PPE Series on pages 1162 to 1163 for each component.

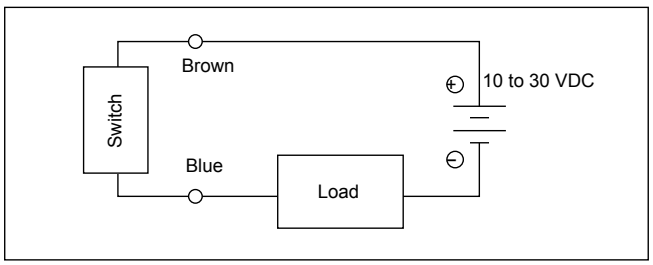
Internal circuit / connection method

● Internal circuit diagram



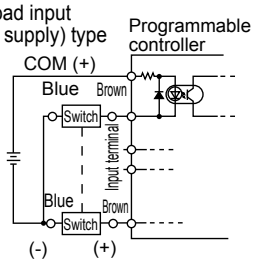
● Connecting the lead wire



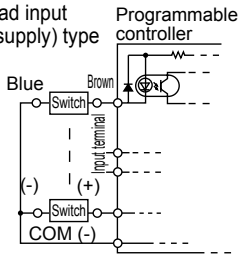


● Connection to programmable controller (PLC)

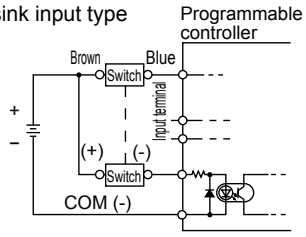
● Connection to source load input (external electric power supply) type

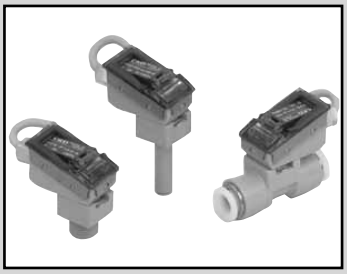


● Connection to source load input (internal electric power supply) type



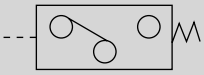
● Connection to sink input type





Compact electronic pressure sensor (pressure sensor)
Analog output type

PPE-*A Series



Overview

Pressure sensor PPE-A Series is semiconductor pressure sensor developed for pneumatic and vacuum systems.
Output promotional to impressed voltage: 1 to 5 V (analog output).
Usage is flexible due to compact shape and three types of piping connection (R1/8, φ 6 plug, φ 6 push-in fitting).

Features

- Semiconductor pressure sensor: Used semiconductor sensor pressure detection, high precision and high reliability.
- Analog output: Analog output proportional to impressed voltage (1 to 5 V).
- Power supply indicator light: When power is energized, green LED lights to show operational status at load short circuit.
- Integrating protection circuit to prevent power supply reverse connection / load short circuit
  A protection circuit for improper wire connection (power supply reverse connection, load short circuit) is integrated.
- Wide port size: R1/8, φ 6 plug, φ 6 push-in fitting

Specifications

Model no. / Descriptions	Vacuum	Positive pressure	
	PPE-V01A-□ Note 1	PPE-P01A-□ Note 1	PPE-P10A-□ Note 1
Rated pressure	0 to -100 kPa	0 to 100 kPa	0 to 1 MPa
Plate line color Note 2	Red	Green	Blue
Pressure sensitive element	Diffusion type semiconductor pressure sensor		
Applicable fluid	Air/non-corrosive gas		
Proof pressure	0.3 MPa	0.3 MPa	1.5 MPa
Accuracy	±1% F.S. or less		
Linearity	±0.3% F.S. or less		
Analog output	1 to 5 V (output impedance 1 KΩ)		
Power supply voltage	12 to 24 VDC ±10% (ripple rate 1% or less)		
Current consumption	10 mA or less		
Indicator light	Green LED lighting when power supply is energized		
Lead wire length	Standard 3 m (oil resistant vinyl cabtyre cable 3-conductor 0.15 mm^2 insulator O. D. φ 1.0)		
Protection circuit	Prevention of power supply reverse connection/load short circuit		
Ambient temperature	0 to 50°C (no freezing)		
Temperature characteristics	±0.12% F.S./°C or less		
Insulation resistance	20 MΩ and over at 500 VDC megger		
Withstand voltage	1000 VAC for 1 minute		
Vibration resistance	10 to 55 Hz double amplitude 1.5 mm 4 hours per X, Y, Z direction		
Degree of protection	IEC standards IP65 or equivalent		
Piping method	R1/8, φ 6 plug, φ 6 push-in fitting		
Weight	PPE-□-6/-H6-B: approx. 37 g, PPE-□-H6: approx. 42 g		

Note 1: □ varies depending on piping shape. (Refer to How to order)
Note 2: Name plate color differs with pressure range. (To prevent improper use)

Clean room specifications

(Catalog no. CB-033SA)

- Dust generation preventing structure for use in cleanrooms

PPE-* A- ..... **-P70**

PPE-* A- ..... **-P80**

How to order

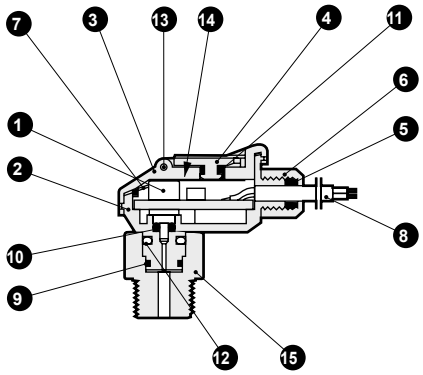
PPE - V01 A - 6

Ⓐ Pressure range
Ⓑ Piping shape

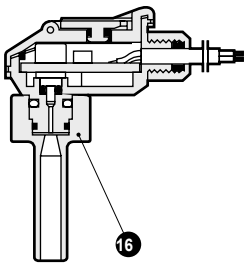
Symbol	Descriptions
Ⓐ Pressure range	
V01	0 to −100 kPa
P01	0 to 100 kPa
P10	0 to 1 MPa
Ⓑ Piping shape	
6	R1/8
H6-B	φ 6 mm plug
H6	In-line of push-in fitting for φ 6 (2 pcs.)

Internal structure and parts list

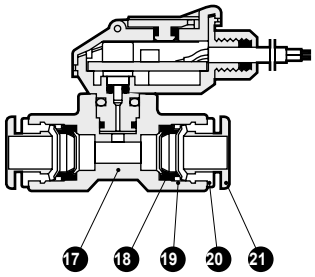
● PPE-*A-6



● PPE-*A-H6-B



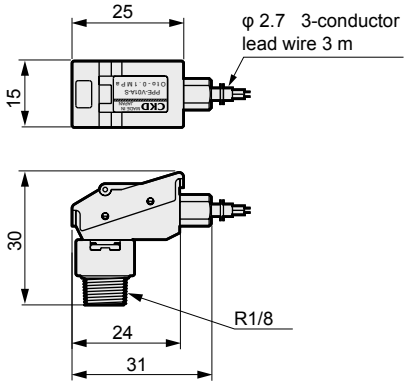
● PPE-*A-H6



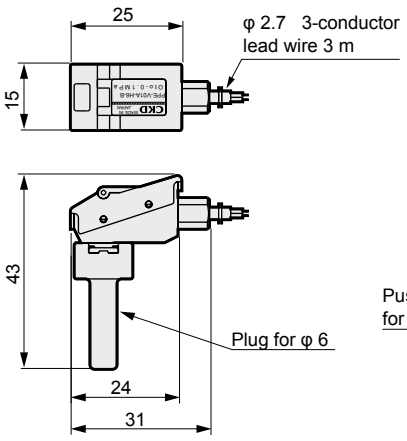
No.	Parts name	Material	No.	Parts name	Material
1	Pressure sensor	Diffusion type semiconductor strain gauge	12	Stopper	Stainless steel
2	Body	PBT (glass fiber 30%)	13	Spring pin	Stainless steel
3	Cover	Polycarbonate	14	Shield sheet	Aluminum
4	Trimmer guard	Polycarbonate	15	R1/8	PBT (glass fiber 30%)
5	Bush	Nitrile rubber	16	Plug	PBT (glass fiber 30%)
6	Bush holder	Aluminum	17	Push-in fitting	PBT
7	Cover gasket	Silicon rubber	18	Packing	Nitrile rubber
8	Lead wire (3 m)	Polyvinyl chloride	19	Chuck	Brass (electroless nickeling)
9	O-ring	Nitrile rubber	20	Outer ring	Brass (electroless nickeling)
10	O-ring	Nitrile rubber	21	Push ring	Polyacetal
11	O-ring	Nitrile rubber			

Dimensions CAD

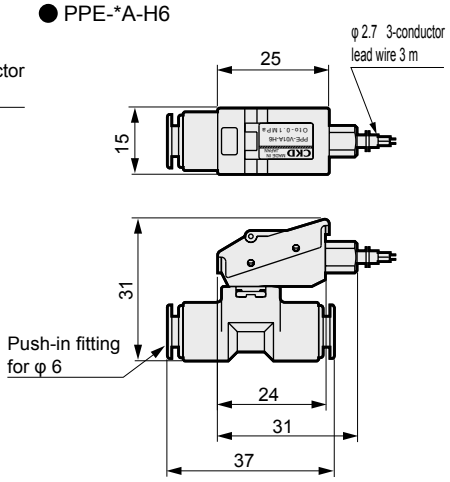
● PPE-*A-6



● PPE-*A-H6-B



● PPE-*A-H6

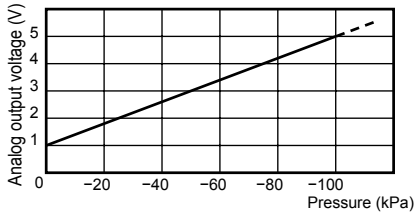


Caution

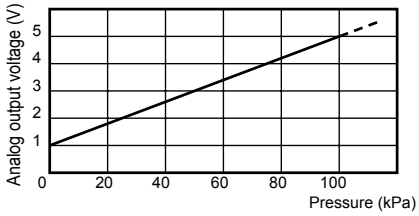
- Analog output accuracy is also affected by self exoergic at energized other than temperature characteristics. Provide enough stand-by time (5 minutes and over after energizing) before use.
- Refer to precautions in PPE-*A Series on pages 1164 to 1165.

Analog output voltage - pressure characteristics

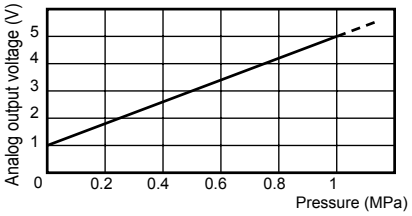
● PPE-V01A-*



● PPE-P01A-*



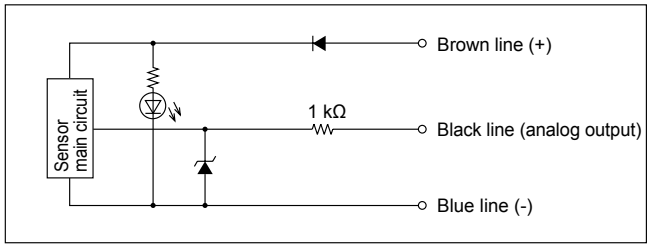
● PPE-P10A-*



Internal circuit / connection method

<Circuit diagram and connection method>

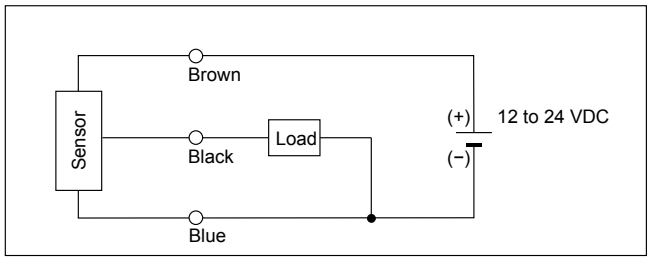
● Internal circuit diagram



● Lead wire color and descriptions

Line color	Descriptions
Brown	Power supply 12 to 24 VDC
Black	Analog output (1 to 5 V)
Blue	0 V (GND)

● Connecting the lead wire



Electronic pressure switch (pressure switch)

PSW Series

High precision pressure switch with semiconductor pressure sensor

RoHS CAD

Overview

This product is a reliable pressure switch developed for pneumatics/vacuum systems. Due to a semiconductor pressure sensor, high precision and high speed response are achieved.

Features

- Fast response time (10 ms)
- Due to no movable part, high reliability and long durability are achieved.
- Using multi rotation trimmer and operational indicator light, setting is easily done.
- Accuracy ± 3% F.S.

Specifications

Descriptions	PSW-P01	PSW-P10	PSW-V01
Pressure sensitive element	Diffusion type semiconductor pressure sensor		
Applicable fluid	Air/non-corrosive gas		
Rated pressure	0 to 100 kPa	0 to 1 MPa	0 to −100 kPa
Proof pressure	F.S. × 1.5 times		
Accuracy	±3% F.S. (0 to 50°C)		
Indicator light	Red LED lighting at the time of ON		
Hysteresis	2% F.S. or less		
Operating ambient temperature	0 to 50°C		
Storage ambient temperature	−20 to 80°C (no freezing)		
Response time	10 ms or less		
Switch output	NPN transistor open collector MAX 30 V 80 mA		
Analog output Note	1 to 5 VDC (0 to F.S.) ±3% F.S. (25°C)		
Power supply voltage	11 to 26 VDC 30 mA (ripple rate 1% or less)		
Vibration resistance	10 to 55 Hz double amplitude 1.5 mm 2 hours per X, Y, Z direction		
Lead wire	1.5 m shield wire		
Weight	Approx. 80 g (body: approx. 60 g, mounting bracket: approx. 20 g)		

Note: Voltage of analog output may vary within 1±0.4 VDC to 5±0.8 VDC among products.

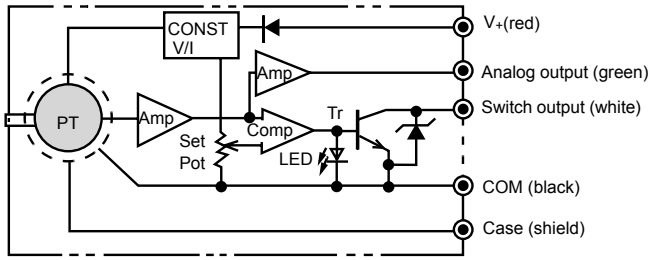
How to order

PSW – **P01**

Ⓐ Pressure range

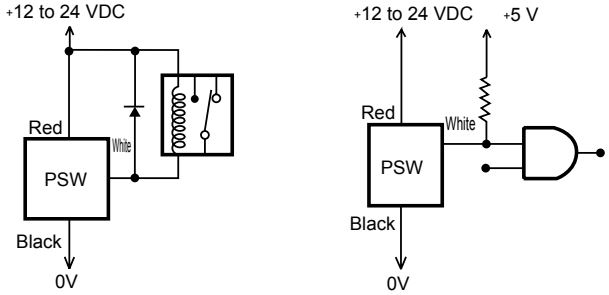
Symbol	Descriptions
Ⓐ **Pressure range**	
P01	0 to 100 kPa
P10	0 to 1 MPa
V01	0 to −100 kPa

Configuration diagram

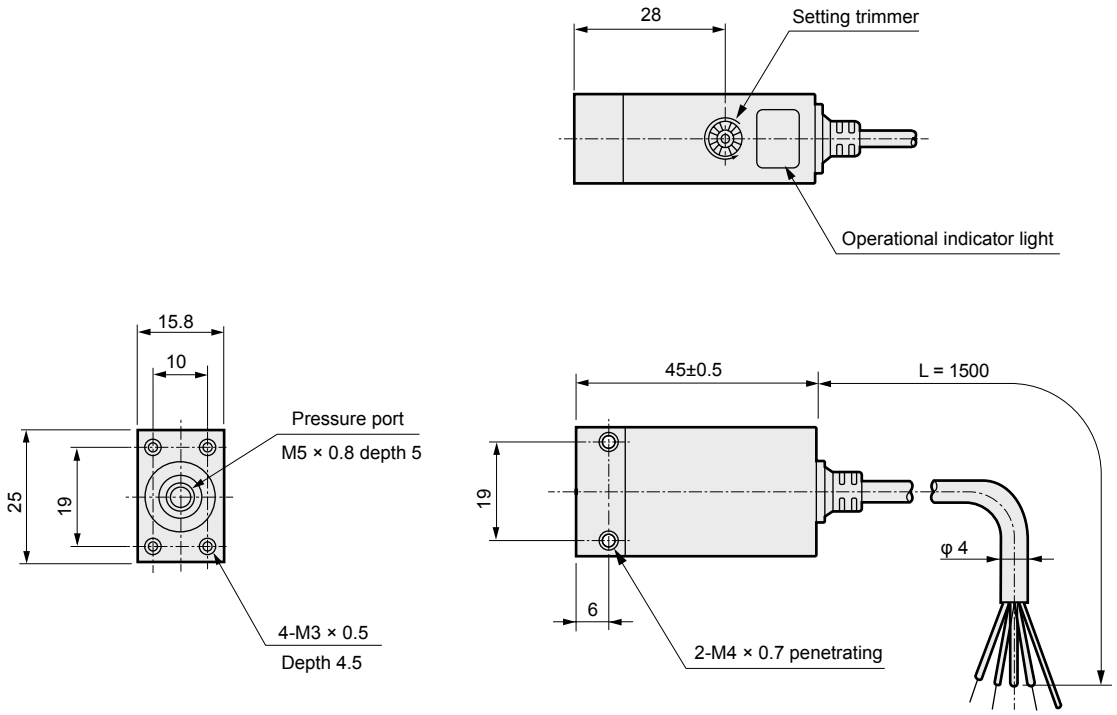


- Red LED lights when turning ON.
- Care must be taken for handling for lead wire.

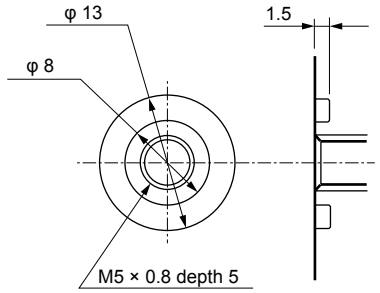
Example of wiring



Dimensions

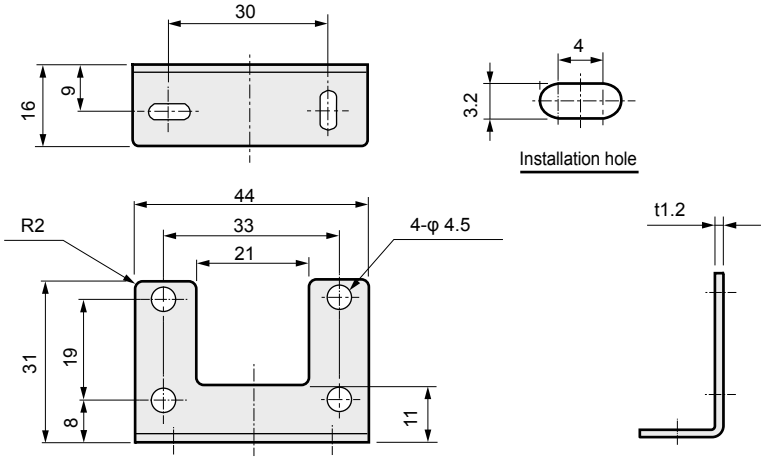


● Pressure port section details (Note)



(Note): Conforming O-ring (JIS B2401)
Positive pressure: P10
Negative pressure: P8

● Mounting bracket (accessory)

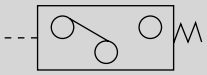


Refer to Safety precautions PSW Series on page 1166 for details.

Electronic pressure switch (pressure switch)

PPS2 Series

Air pressure digitally displayed with semiconductor pressure sensor and 8 bits microcomputer



Overview

This product is a high reliable and high precision pressure switch developed for pneumatic and vacuum systems. Different from conventional mechanical mechanism, configured with semiconductor pressure sensor and 8 bits one chip microcomputer. Precisely detecting pneumatic/vacuum, the result is displayed with digital display. Switch output is 4 points to allow wide applications.

Features

- Can be used in adverse environment
  IP66 is available as option for front control panel of main body.
  Also, due to water proof IP67 in pressure sensor section of sensor separated type, the product can be used where water contacts to the product. Connect a water proof pipe to atmospheric release (M3 x 0.5), while preventing water from entering.
- Compact design
  DIN standards size *48 mm, and compact.
- Wide rated pressure
  New positive/negative pressure (-0.1 to 0.5 MPa) types are added, so wide pressure range is available.
- LED display
  Easy confirmation of pressure and set value in dark place.
- Independent 4 points of switch output
  2 types of switching (window and hysteresis operations) can be set up to 4 points. There is no polarity to switch output. NO (normally open) and NC (normally closed) types are available.
- Easy installation and adjustment
- Easy zero point adjustment by front key operation
- Certain wiring by gland connection
- With analog output 0 to 5 VDC

Specifications

Descriptions		PPS2-P01A (kPa)	PPS2-P10P (MPa)	PPS2-V01A (kPa)	PPS2-VPP (MPa)
Rated pressure		0 to 100.0 kPa	0 to 1.000 MPa	0 to -101.3 kPa	-0.101 to 0.5 MPa
Min. indication figure		0.1 kPa	0.001 MPa	0.1 kPa	0.001 MPa
Pressure sensitive element		Diffusion type semiconductor pressure sensor			
Applicable fluid		Air/non-corrosive gas			
Proof pressure		150 kPa	1.5 MPa	150 kPa	0.75 MPa
Display		3 1/ 2 digit red LED display, character height 8 mm			
Display sampling rate		Approx. 4 times/second			
Power supply voltage		11 to 26 VDC (ripple rate 1% or less)			
Current consumption		100 mA			
Set point holding		Maintaining for 10 years without energizing (E^2PROM)			
Indicator accuracy		±1%F.S.±1 digit (at 25°C)			
Temperature characteristics		Zero shift :±0.1% F.S./°C Span shift :±0.1% F.S./°C			
Switch output		Output points. : 4 points Output type : No polarity transistor output Proof pressure : MAX 30 V		Current : Max. 100 mA Internal voltage drop: 3 V or less	
Switch response time		200 Hz and over (5 msec. or less)			
Analog output		Output voltage : 0 to 5 VDC (0 to F.S.) Accuracy : ±2% F.S. (at 25°C)		Temperature characteristics: ±0.1%F.S./°C Load impedance: 1 kΩ and over	
Special function		• Zero point adjustment • Switch output load short-circuit protection and error display • Changing switch output mode of NO (normally open) and NC (normally closed) possible			
Environment conditions	Operating ambient temperature	0 to 50°C			
	Storage ambient temperature	-20 to 60°C			
	Operating ambient humidity	0 to 85%R.H.			
	Degree of protection	None (Optional water resistant front operating section (IP66) is available)			
	Vibration resistance	10 to 55 Hz double amplitude 1.5 mm 2 hours per X, Y, Z direction			
	Shock resistance	100 m/s^2 X, Y, Z each direction			
Port size		Rc 1/8 (PT 1/8 female thread)			
Weight		Approx. 180 g (sensor body)			

Clean room specifications

(Catalog no. CB-033SA)

- Dust generation preventing structure for use in cleanrooms

PPS2-.....-P70

PPS2-.....-P80

How to order

● Sensor / Integrated type

PPS2 - P01A ○

Ⓐ Pressure range

Ⓑ Option
Note 1

Symbol	Descriptions
Ⓐ Pressure range	
P01A	0 to 100.0 kPa
P10P	0 to 1.000 MPa
V01A	0 to -101.3 kPa
VPP	-0.101 to 0.5 MPa
Ⓑ Option	
Blank	No water proof
W	Water proof (IP66)

Note 1: Main body front control section only.

● Sensor, body separate type

Note: The main unit and sensor are adjusted as a set. Do not use a main unit and sensor having different lot numbers.

PPS2 - P01AS 3 - A - ○

Ⓐ Pressure range
Note 1

Ⓑ Connector cable length

Ⓒ Bracket

Ⓓ Option
Note 2

Symbol	Descriptions
Ⓐ Pressure range	
P01AS	0 to 100.0 kPa
P10PS	0 to 1.000 MPa
V01AS	0 to -101.3 kPa
VPPS	-0.101 to 0.5 MPa
Ⓑ Connector cable length	
3	3 m
5	5 m
Ⓒ Bracket	
A	Bracket A (horizontal installation)
B	Bracket B (vertical installation)
Ⓓ Option	
Blank	No water proof
W	Water proof (IP66)

Note 1: "S" indicates sensor/body separate type.
Note 2: Main body front control section only. IP67 for sensor section.

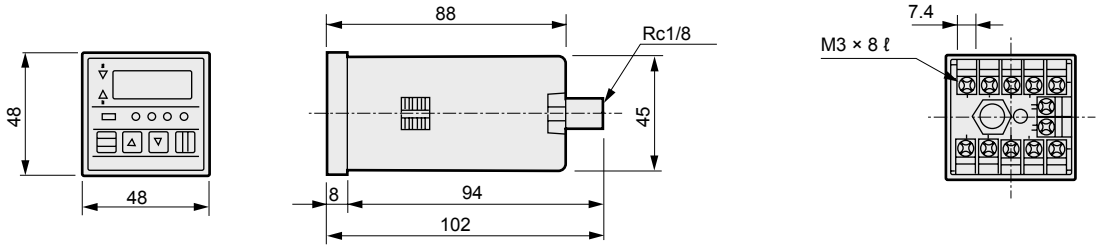
Model no. of connector cable only

PPS2 - L 3

Symbol	Descriptions
Connector cable length	
3	3 m
5	5 m

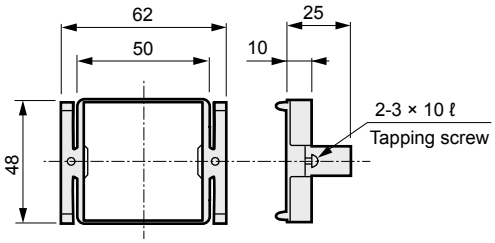
Dimensions

● Sensor / Integrated type

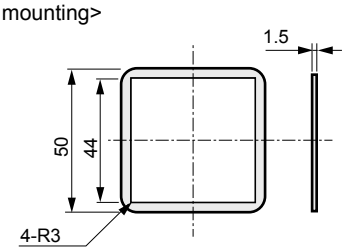


• Panel mounting dimension (sensor integrated type / sensor separate type common)

<Panel bracket>

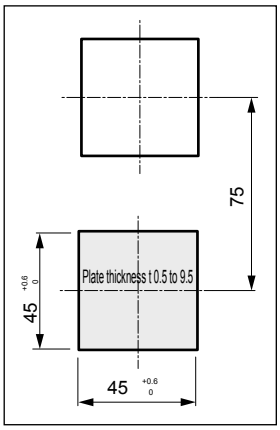


<Gasket for panel mounting>



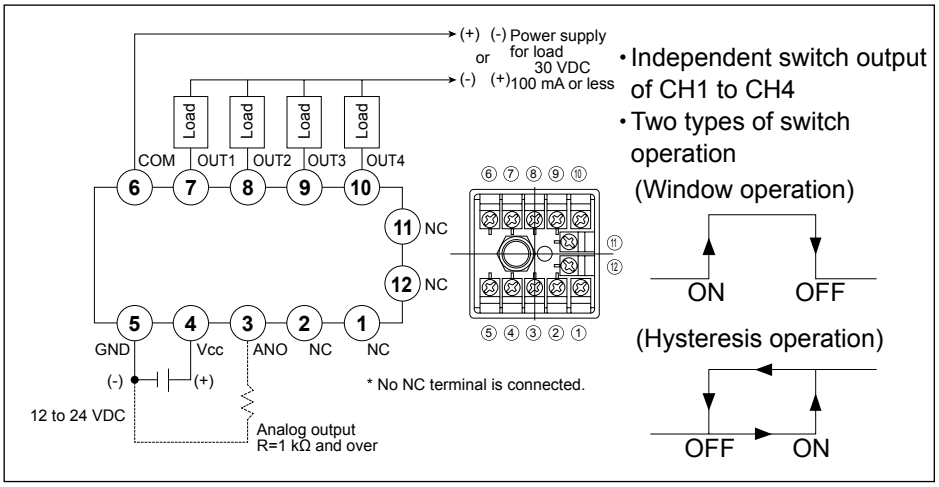
Assembled at shipment for optional "-W" water resistance.

<Panel cut dimension>



Connection

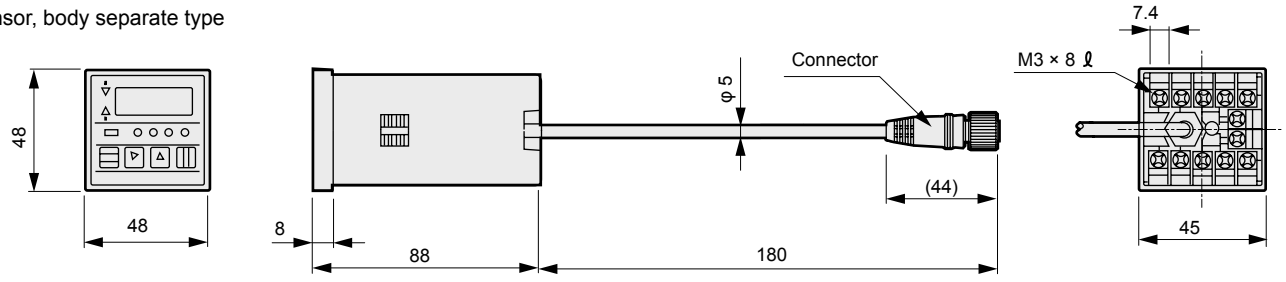
PPS2 Switch type



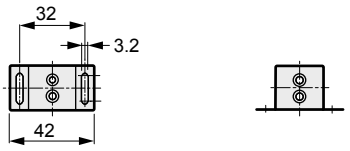
Refer to Safety precautions PPS2 Series on page 1172 for details.

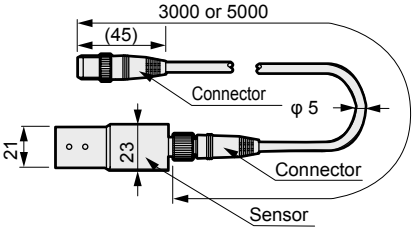
Dimensions

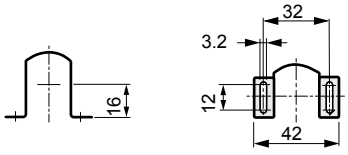
● Sensor, body separate type



Weight: Approx. 150 g

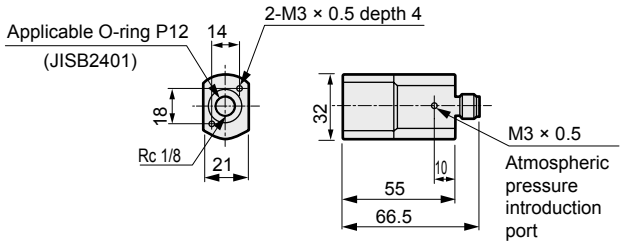






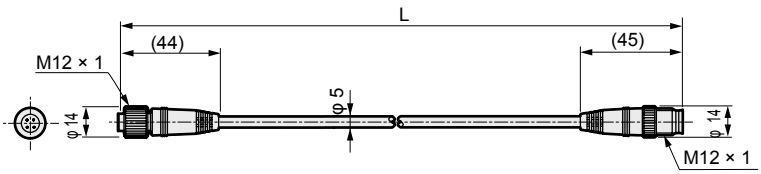
Bracket A
Weight: Approx. 15 g

Bracket B
Weight: Approx. 15 g



Sensor
Weight: Approx. 150 g

• Connector cable (PPS2-L3, PPS2-L5)

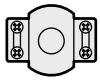


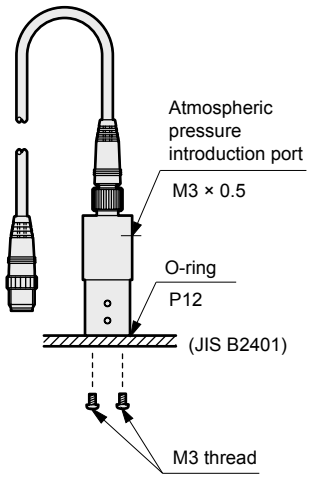
*1
PPS2-L*

Pin no.	Signal
1	+9 V
2	Shield
3	GND
4	Sensor output

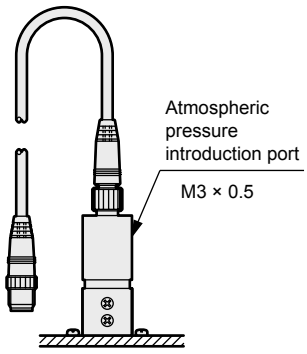
*1 Connector cable	Dimensions		Weight
3	3000	+100 0	Approx. 145 g
5	5000	+100 0	Approx. 220 g

• Sensor installation Configuration



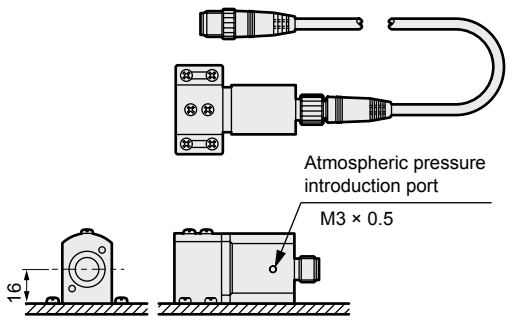


(For direct mount)



*O-ring sealant is not available.

(For bracket B installation)



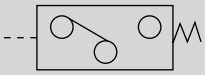
(For bracket A installation)

⚠ Refer to Safety precautions PPS2 Series on page 1172 for details.

Electronic pressure controller (pressure controller)

PPS2 Series

Sensors (electro pneumatic/electronic regulator and proportional valve) with directive signal output function integrated



RoHS CAD

Overview

This product, combined with electro-pneumatic proportional control components, is a pressure controller to control and set pressure digitally. Allowing 4 points of pressure setting, switch output is provided per set pressure to check feedback information.

Features

- Can be used in adverse environment
  IP66 is available as option for front control panel of main body.
  Also, due to water proof IP67 in pressure sensor section of sensor separated type, the product can be used where water contacts to the product. Connect a water proof pipe to atmospheric release (M3 x 0.5), while preventing water from entering.
- Compact design
  DIN standards size *48 mm, and compact.
- LED display
  Easy confirmation of set value in dark place.
- Easily connected to peripheral components
  Peripheral components can be connected directly.
  (EV Series, APC (3AP2))
- Easy setting of directive output
  Only setting the required pressure value, directive signals can be outputted.
  Compensation is easily done on the front key operation.
- Easy zero point adjustment by front key operation
- Certain wiring by gland connection

Specifications

Descriptions		PPS2-APCP	PPS2-EV01A	PPS2-EV05P	PPS2-EV25P
Display pressure		0 to 1.00 0 MPa	0 to 100.0 kPa	0 to 1.000 MPa	
Min. indication figure		0.001 MPa	0.1 kPa	0.001 MPa	
Set pressure		0.05 to 0.6 MPa	0 to 100.0 kPa	0 to 0.5 MPa	
Pressure sensitive element		Diffusion type semiconductor pressure sensor			
Applicable fluid		Air/non-corrosive gas			
Proof pressure		1.5 MPa	150 kPa	1.5 MPa	
Display		3 1/ 2 digit red LED display, character height 8 mm			
Display sampling rate		Approx. 4 times/second			
Power supply voltage		24 VDC ±10% (ripple rate 1% or less)			
Current consumption		100 mA			
Set point holding		Maintaining for 10 years without energizing (E^2PROM)			
Indicator accuracy		±1% F.S.±1 digit (at 25°C)			
Temperature characteristics		Zero shift : ±0.1% F.S./°C Span shift : ±0.1% F.S./°C			
Switch output		Output points. : 4 points Output type : NPN open collector output Proof pressure : MAX 30 V Current : Max. 100 mA Internal voltage drop : 3 V or less * If pressure ±0.01 MPa is reached (±1.0 kPa for R310, EV01), switch output turns ON			
Switch response time		200 Hz and over (5 msec. or less)			
Input specification (Set pressure selection input)		Number of inputs : 4 points Input type : No voltage contact or NPN open collector input (negative logic) Min. input pulse width : 50 msec			
Electronic pressure control device command output		Output voltage : 0 to 10 VDC (0 to set pressure F.S.) Temperature characteristics : ±0.1% F.S./°C			
Special function		• Zero point adjustment • Switch output load short-circuit protection and error display • Changing switch output mode of NO (normally open) and NC (normally closed) possible			
Environment conditions	Operating ambient temperature	0 to 50°C			
	Storage ambient temperature	-20 to 60°C			
	Operating ambient humidity	0 to 85% R.H.			
	Degree of protection	None (Optional water resistant front operating section (IP66) is available)			
	Vibration resistance	10 to 55 Hz double amplitude 1.5 mm 2 hours per X, Y, Z direction			
	Shock resistance	100 m/s^2 X, Y, Z each direction			
Port size		Rc 1/8 (PT 1/8 female thread)			
Weight		Approx. 180 g (sensor body)			

Clean room specifications

(Catalog no. CB-033SA)

- Dust generation preventing structure for use in cleanrooms

PPS2- ..... **-P70**

PPS2- ..... **-P80**

How to order

● Sensor / Integrated type

PPS2 - EV01A ○

Ⓐ Model no.

Ⓑ Option
Note 2

Symbol	Descriptions
Ⓐ Model no.	
APCP	For APC (3AP2) (MPa)
EV01A	For EV0100 (kPa)
EV05P	For EV0500 (MPa)
EV25P	For EV2500 (MPa)
Ⓑ Option	
Blank	No water proof
W	Water proof (IP66)

Note 1: Pressure switch should be used with input signal voltage of 0 to 10 V.
Note 2: Main body front control section only.

● Sensor, body separate type

Note: The main unit and sensor are adjusted as a set. Do not use a main unit and sensor having different lot numbers.

PPS2 - EV01AS 3 - A - ○

Ⓐ Model no.

Ⓑ Connector cable length

Ⓒ Bracket

Ⓓ Option
Note 2

Symbol	Descriptions
Ⓐ Model no.	
APCPS	For APC (3AP2) (MPa)
EV01AS	For EV0100 (kPa)
EV05PS	For EV0500 (MPa)
EV25PS	For EV2500 (MPa)
Ⓑ Connector cable length	
3	3 m
5	5 m
Ⓒ Bracket	
A	Bracket A (horizontal installation)
B	Bracket B (vertical installation)
Ⓓ Option	
Blank	No water proof
W	Water proof (IP66)

Note 1: Pressure switch should be used with input signal voltage of 0 to 10 V.
Note 2: Main body front control section only. IP67 for sensor section.

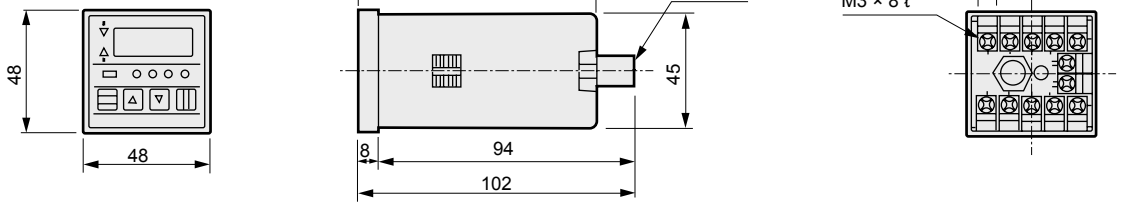
Model no. of connector cable only

PPS2- L 3

Symbol	Descriptions
Connector cable length	
3	3 m
5	5 m

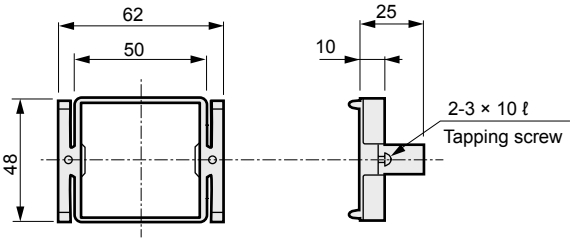
Dimensions

● Sensor / Integrated type

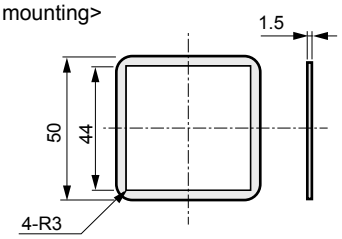


• Panel mounting dimension (sensor integrated type / sensor separate type common)

<Panel bracket>

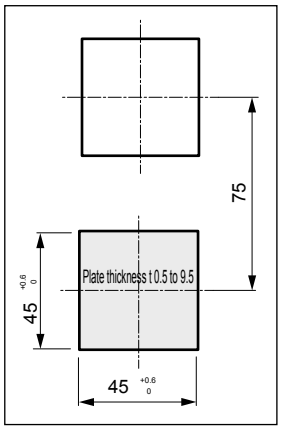


<Gasket for panel mounting>



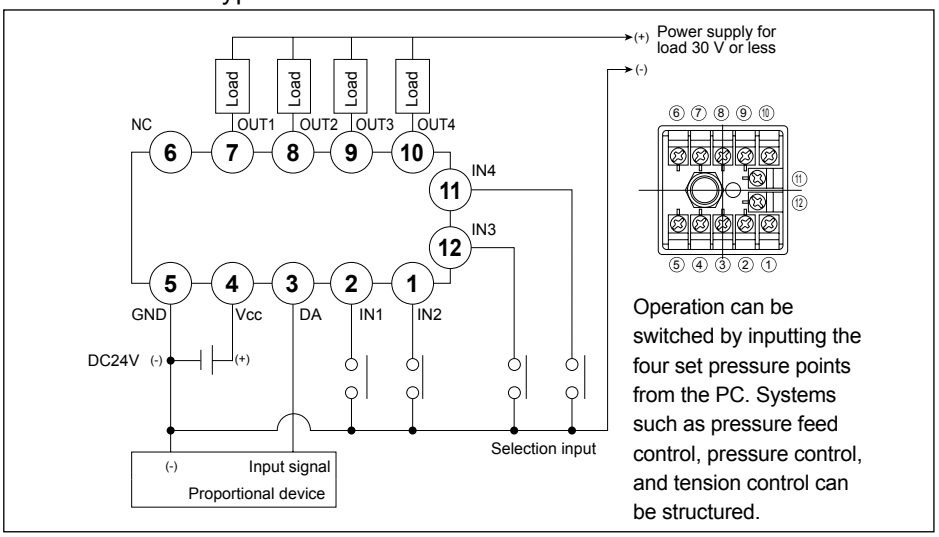
Assembled at shipment for optional "-W" water resistance.

<Panel cut dimension>



Connection

PPS2 controller type

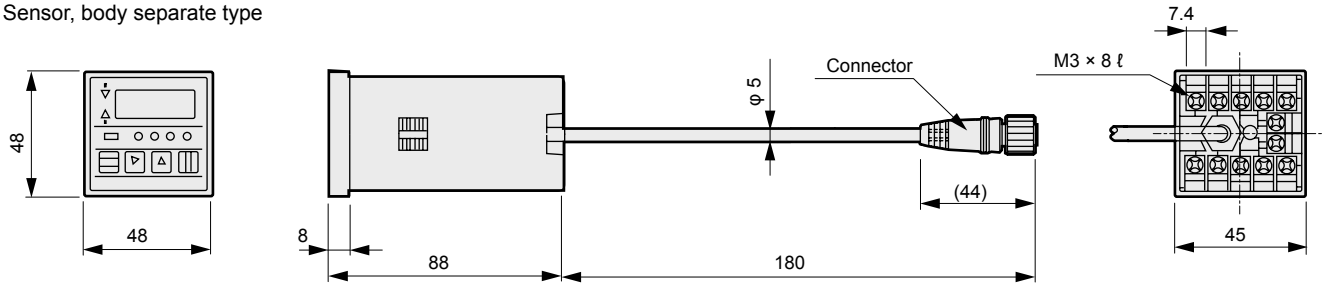


Operation can be switched by inputting the four set pressure points from the PC. Systems such as pressure feed control, pressure control, and tension control can be structured.

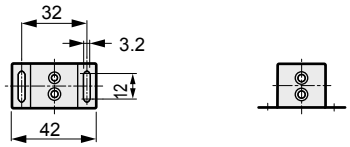
Refer to Safety precautions PPS2 Series on page 1172 for details.

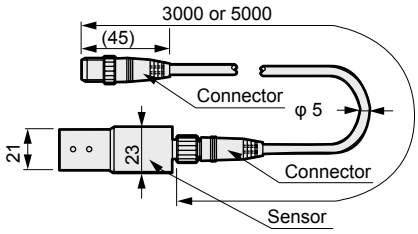
Dimensions

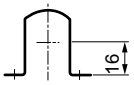
● Sensor, body separate type



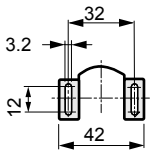
Weight: Approx. 150g







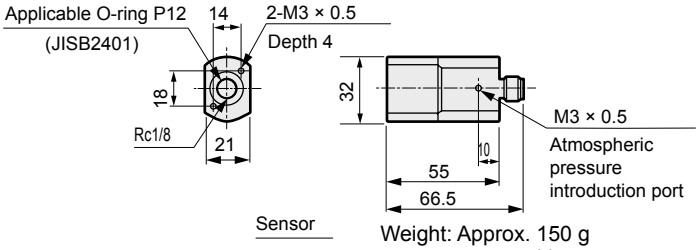
Bracket A



Bracket B

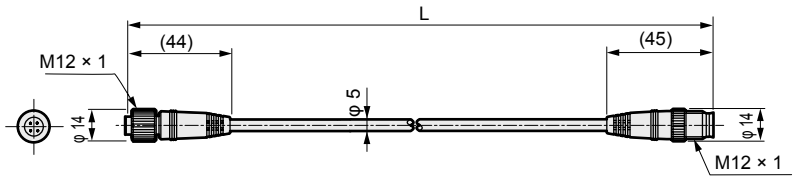
Weight: Approx. 15 g

Weight: Approx. 15 g



Weight: Approx. 150 g

• Connector cable (PPS2-L3, PPS2-L5)

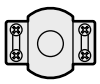


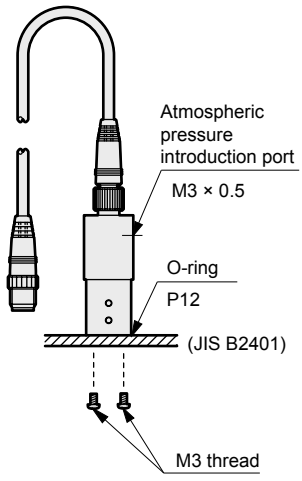
Pin no.	Signal
1	+9 V
2	Shield
3	GND
4	Sensor output

PPS2-L*

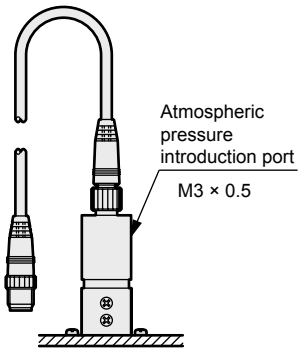
*1 Connector cable	Dimensions		Weight
3	3000	+100 0	Approx. 145 g
5	5000	+100 0	Approx. 220 g

• Sensor installation configuration



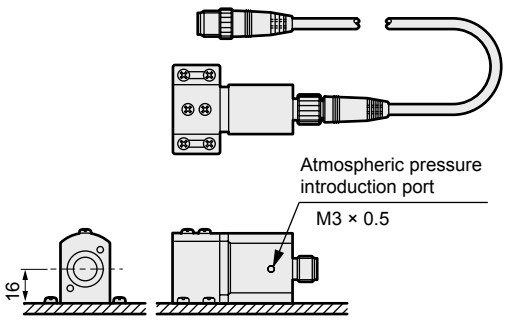


(For direct mount)



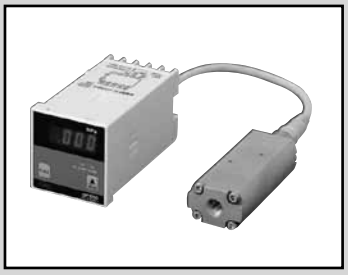
*O-ring sealant is not available.

(For bracket B installation)



(For bracket A installation)

⚠ Refer to Safety precautions PPS2 Series on page 1172 for details.



Electronic differential pressure switch

DP1000 Series

Appropriate for preventive maintenance of pneumatics system
Differential pressure measurement range: 0 to 0.2 MPa±3% F.S

JIS symbol 

RoHS CAD

Overview

Electronic differential pressure switch DP1000 Series is a powerful differential pressure switch for maintenance and inspection of pneumatic components. This DP1000 Series is not only water and oil drip proof, but also back pressure resistance structure. Due to separate type, monitor can be installed at any place.

Features

- High durability
  Conforming IP67 specifications, sensor section can be used where water or oil drops contact to the product.
- Resistant to back pressure
  Used semiconductor pressure sensor, damage caused by back pressure is eliminated.
- Differential pressure (MPa) 3-digit display
  Differential pressure LED display with MPa unit
  (Red 3 1/2 digits).
- 2 contact output of back up alarm/alarm
  Output signals per back up alarm and alarm.
- Sensor section separate type
  Sensor and monitor sections are separated, so differential pressure control of plant wide can be integrated.
- Free installation
  Since vertical and horizontal port directions are provided in sensor section, mounting direction can be decided freely. If the attached bracket is used, the product can be easily fixed.

Specifications

Descriptions	DP1000
Working fluid	Compressed air
Rated pressure	0 to 1.0 MPa
Differential pressure measurement range	0 to 0.2 MPa
Proof pressure	0 to 1.5 MPa
Differential pressure Proof pressure	0 to 1.0 MPa
Operating ambient temperature	0 to 50°C
Display	3 decimal places red LED display, character height 8 mm
Indicator accuracy	±3% F.S. ±1 digit (at 25°C)
Switch output	2 points Output type: No polarity transistor output MAX 30 V, MAX 100 mA Internal voltage drop: 3 V or less
Power supply voltage	11 to 26 VDC (ripple rate 1% or less)
Current consumption	100 mA
Port size	Rc 1/8
Weight	Approx. 400 g

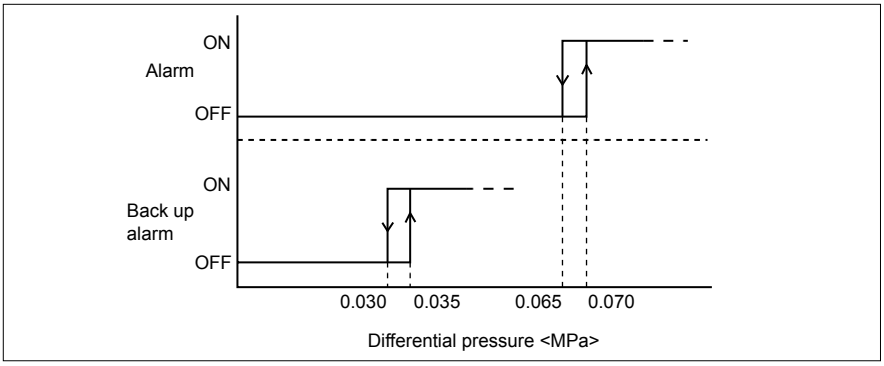
Note 1. A bracket, connector cable 3 m, a plug with hexagon head hole are attached as standard.

How to order

Model no. **DP1000**

Electronic differential pressure switch

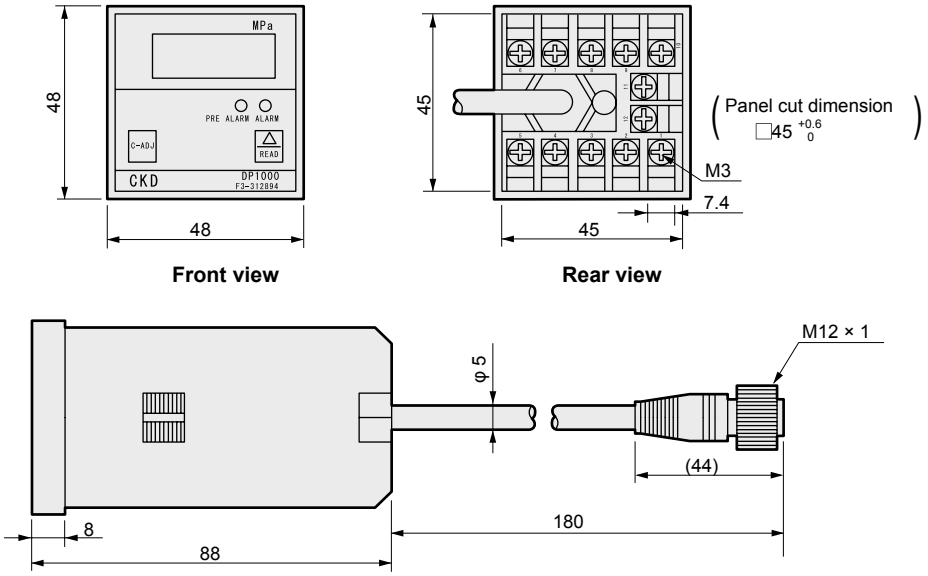
Switch output set value



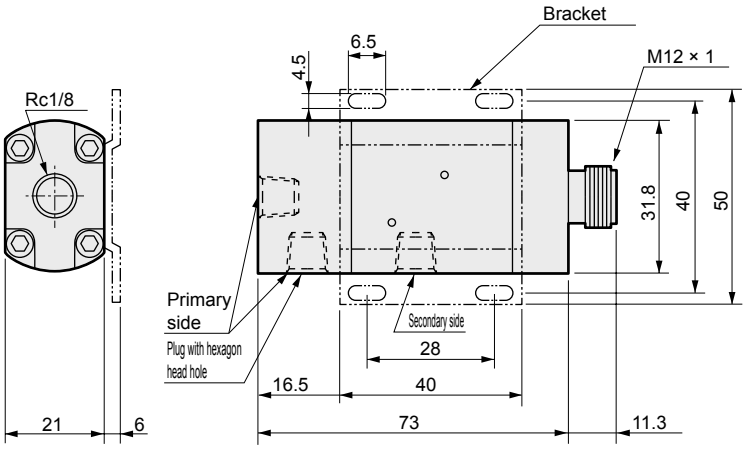
Note 2: Switch output set value is fixed before shipping, so it cannot be changed. Contact a CKD sales representative if a type for which the setting value can be changed be required.

Dimensions

● Monitor section

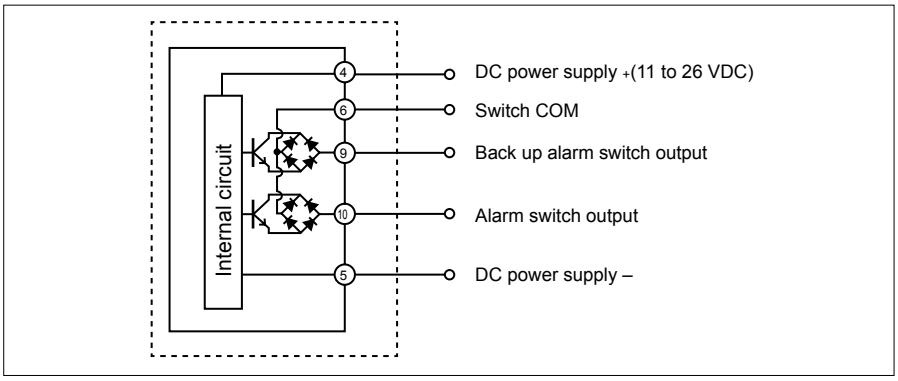


● Sensor



* Broken line section is for bracket.

Connection



Pneumatic components (electronic pressure switch and sensor)

Safety precautions

Always read this section before use.

Refer to Intro 63 for general precautions for pneumatic components, and refer to "⚠Safety precautions" for detailed precautions of individual series.

Design & selection

⚠WARNING

■ Use this product in accordance with specifications.
- Use for applications, or at load currents, voltages, temperatures, impacts or sites excluded from the specifications could result in damage or malfunctions.

■ Do not use oxygen, corrosive or combustible gas, or toxic fluid for this product.

■ Do not use this product in explosive atmosphere.
- The pressure switch is not explosion proof. Do not use in an explosive gas atmosphere as explosions or fires could result.

■ Avoid installing this product in a sealed control box or indoors.
- If the fluid should leak due to any trouble, the pressure in the sealed chamber could change and recreate a hazardous state. Use this product in the control box having safety device to control internal pressure, or indoors with no pressure differential from the outside.

■ Power supply voltage

Use the product within the specified power supply voltage. The product could rupture or burn if voltage exceeding the working range is applied or if AC power supply (100 VAC) is applied.

■ Load short circuit

Do not short-circuit the load. Failure to observe this could result in rupture or burning.

■ Incorrect wiring

Avoid incorrect wiring such as wrong polarity of power source, etc. Failure to observe this could result in rupture or burning.

⚠CAUTION

■ Applicable fluid

When using applicable fluid other than air; nitrogen gas, etc., oxygen deficiency could be caused. Observe the following instructions.
- Use this product in well ventilated locations.
- Ventilate the work area when nitrogen gas is being used.
- Inspect piping regularly, so nitrogen gas piping does not leak.
- Non-corrosive gas means substances such as nitrogen or carbon dioxide contained in air and inert gases such as argon or neon.
- When using this product for compressed air containing water or oil, use PPD(3)-S (stainless steel diaphragm sensor specifications) with increased corrosion resistance.

■ If this product is used for vacuum suction confirmation, care must be taken for following matters.
- When applying positive pressure for vacuum break onto the product, check that it does not exceed the specified proof pressure.

■ Working environment
- Avoid using this product where vibration or impact exceeding 100 m/s^2 could be applied.
- Check the temperature of fluid being measured and the environmental temperature in piping.
- When using a type that does not have the corresponding degree of protection, do not use for applications in which water or oil could be applied.

■ Determine the setting taking error caused by accuracy and temperature characteristics into consideration.

■ Take care when using this product for an interlock circuit.
- When using the pressure switch for an interlock signal required high reliability, provide a double interlock by installing a mechanical protection function or a switch (sensor) other than a pressure switch as a guard if problems occur.
  Execute inspection regularly to check that the normal operation is done.

(Recommended values)

Model no.	Degree of protection
PPX/PPD/PPD-S	IP40
PPE (-A) /PPD3 (-S)	IP65
PPS2 front controls (option)	IP66
PPD-A/PPS2 sensor's separate sensor section only	IP67

■ Response is affected by working pressure and load volume. If repeatability with stable responsiveness is required, install a regulator in the proceeding stage.

■ Take the following countermeasures to prevent malfunction caused by noise.
- Insert a line filter in the AC power supply line.
- Do not share power with an inverter or components causing motor noise, etc.
- Use a surge suppressor, such as a CR or diode on the inductive load (solenoid valve, relay, etc.) and remove noise when generated.
- When using a device such as a switching regulator or inverter motor that could generate noise near the sensor, be sure to ground the device frame ground (F.G.) terminal.
- Separate wiring to the sensors from strong magnetic fields.
- Connect wiring to sensors with a shield wire.
- Ground the shield wire on the power supply side.

■ When releasing secondary control pressure, such as an air blowing, to the atmosphere, pressure could fluctuate depending on piping conditions and flow conditions. Test the product under actual working conditions, or contact CKD before using this method.

■ When selecting dryer,air filter,oil mist filter or regulator, select a device with a flow rate higher than that used with proportional pressure controls.

■ CE-compliance working conditions

The standard for the immunity for industrial environments applied to CE conforming product is EN61000-6-2, but the following requirements must be satisfied in order to conform to this standard.

Conditions
- The assessment of this product is performed by using a cable pairing a power supply line and a signal line, treating this cable as a signal line.
- This product is not equipped with surge immunity. Implement surge protection measures on the system side.

Installation & adjustment

⚠ WARNING

■ Avoid incorrect connection.
- An incorrect connection may cause a fatal error not only to this product but also peripheral devices.

■ DC power not insulated from AC primary side may damage the product and power, so an electric shock could occur. Do not use the product in this case.

⚠ CAUTION

■ Do not use the product where the product is exposed to direct-sunlight or may come in contact with water or oil.

■ Flush air pipe sensors before connecting.
Prevent pipe from catching tips of sealing tape when piping.

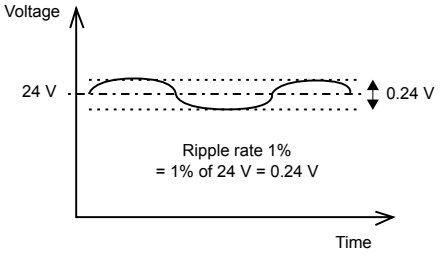
■ Correct pressure control is not possible if the exhaust port is plugged. Release this port into the atmosphere.

■ Apply adequate torque when connecting pipes.
- To prevent air leakage and screw damage.
- First tighten the screw by hand to prevent damage to screw threads, then use a tool.

Port thread	Tightening torque N·m
M3	0.3 to 0.6
M5	1 to 1.5
Rc1/8	3 to 5
Rc1/8 (resin)	1 to 1.5

■ Care must be taken for protection of body and lead wire.
- Do not bump or drop the main unit, or apply excessive bending or tensile force to the lead wire because the lead could be disconnected.
- Connect and wire bending-resistant material, such as robot wire material, for the movable sections

■ Wiring
- Turn the power OFF before wiring this product. Discharge static electricity from personnel or tools before and during work.
- Use a stabilized noise-free power supply with a ripple voltage of 1% or less.

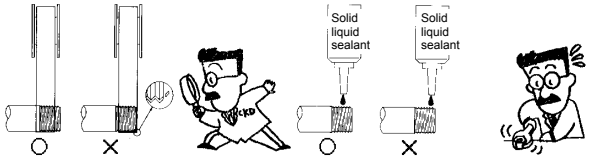


- Turn the power ON and OFF at the quick rising and falling edges of voltage.
If the rated voltage is not reached, the sensor could malfunction. In some cases, the sensor could not recover after the rated voltage is reached. Reset the power in that case.
Even if the rated voltage drops temporarily, shout down the power once, then turn ON the power again.
- Install the product and wiring as far away as possible from sources of noise such as power distribution wires. Take separate measures against surge generated from inductive loads that enters the power wire.
- Do not start the control unit, machinery and equipment immediately after wiring. Unpredicted signals could be output due to inadvertently set values. Conduct a power ON test with the control unit, machinery and equipment stopped, and set required switches.

■ Stop the machinery and equipment and confirm safety before setting switch outputs.

■ Operate keys manually. Sharp instruments, such as knives or screwdriver, contacting plastic film on the operation section could damage film and compromise its protective functions.

■ Piping work
- For the push-in type fitting, use the recommended tube, and perform piping work to the push-in fitting assembly after the brushing.
* Recommended tube: Conforming tube O. D. 6 mm manufactured by CKD F-1506, U-9506 and others.
- For the screw-in type fitting, wind sealing tape or apply a sealant, and screw in without tightening excessively.
Apply a wrench to the metal section when tightening.
(Only for PPE and PPD-R*D-6, apply to the resin section)
- Wrap sealing tape from threads starting 2 mm inside from the end of piping threads.
* If sealing tape protrudes from pipe threads, it could be cut when screwed in. This could cause the tape to enter the component and lead to faults.



- Make the pipe length of approx.1 m, and take caution not to apply tensile force or impact on the piping. For the longer tube, by its own weight and vibration/ impact,unexpected tensile force is produced. In order not to apply a weight, fix and relay the tube to the machine device in the middle of the piping.

■ Avoid connecting the output for a relay contact, operation switch, or other component output in parallel with the PLC to the product's output,or short-circuit the input terminal of the PLC to which this product is connected with the power supply cable's minus side to test the input device. This product's output circuit could be damaged.

Installation & adjustment

⚠ CAUTION

■ Some models have a push-in fitting for the measured pressure port. Check the perpendicularity of the tube side, and check that there are no scratches, indents, or dirt near the end. Air and compressed air are measured. Check that water and dirt do not enter the tube during piping.

During use & maintenance

⚠ WARNING

■ Do not apply overcurrent.

● If overcurrent flows to the pressure switch due to a load short-circuit, etc., the pressure switch will be damaged and could also ignite. Provide an overcurrent protection circuit, such as a fuse, for the output wire and power cable as needed.

⚠ CAUTION

■ Do not disassemble the products.

● The product could be damaged or its performance compromised if it is disassembled. CKD does not guarantee performance after disassembly. Remove the entire installation section (pressurized port section) when replacing or moving the product.

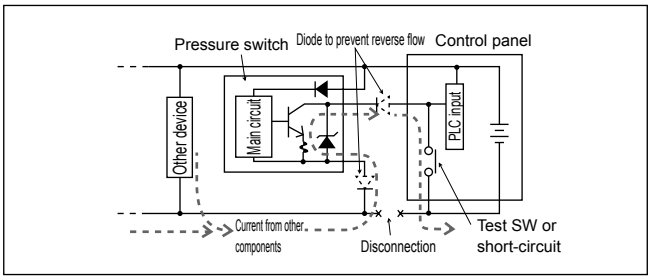
● With PPD-*-IF* type, the case must be removed during initial assembly. Take special care in handling. (Be sure to follow assembly methods and precautions given in the instruction manual enclosed with the product.)

■ Stop machinery and equipment, then check the safety before operating the product.

■ With PPD/PPD3/PPS2, pressure is detected 200 times per second, but this display is updated 4 times a second, and cannot track fast pressure changes. The switch could therefore start operating at quickly changing pressure even when the display does not indicate the switch setting.

■ The case is made of resin. Do not use solvent, alcohol or detergent in cleaning, or resin could absorb it. There is a risk of affecting the resin. Wipe off dirt with a rag soaked in a diluted neutral detergent solution and wrung out well.

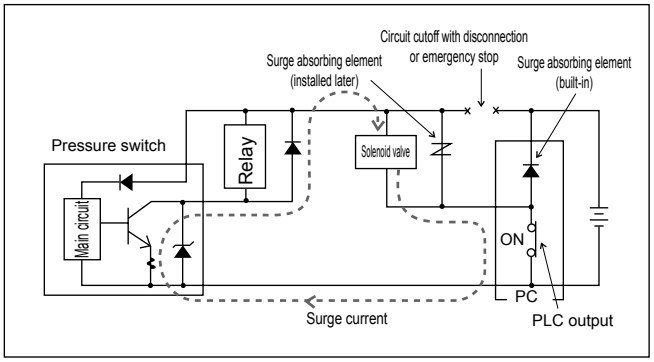
■ Pay attention to reverse currents caused by disconnected wires and wiring resistance.
When other devices, including pressure switches, are connected to the same power supply as the pressure switch, and the output cable and power cable's minus side are short-circuited or the power supply's minus side is disconnected to check operation of the input device from the control panel, reverse current could flow to the pressure switch's output circuit and cause damage.



Take countermeasures as followings to prevent damages caused by reverse current.

(1) Avoid centralizing current at the power cable, especially the minus side power cable, and use as thick a cable as possible.
(2) Limit the number of devices connected to the same power supply as the pressure switch.
(3) Insert a diode in serial with the pressure switch's output cable to prevent reversal of current.
(4) Insert a diode in serial with the pressure switch's power cable minus side to prevent reversal of current.

■ Care must be taken for surge current leading.
When the power is shared with inductive loads that create surge current such as pressure switches, solenoid valves or relays, if the circuit is closed with inductive loads activated, surge current could lead to the output circuit, causing damages.

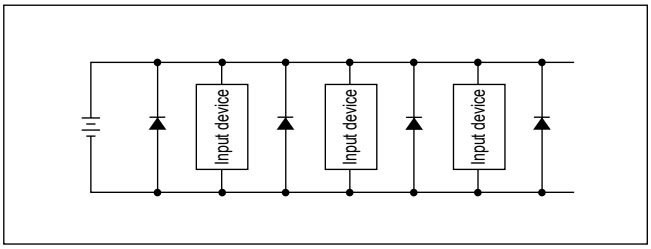


Take countermeasures as followings to prevent damage caused by surge current leading.

(1) Separate the power supply for the output system comprising the inductive load, such as the solenoid valve and relay, and the input system, such as the pressure switch.

(2) If separate power supplies cannot be used, directly install a surge absorbing element for all inductive loads. Remember that the surge absorbing element connected to the PLC, etc. protects only that device.

(3) Connect a surge absorbing element to the following places on the power wiring as shown below as a measure against disconnections in unspecific areas.



When the devices are connected to a connector, the output circuit could be damaged by the above phenomenon if the connector is disconnected while the power is ON. Turn the power OFF before connecting or disconnecting the connector.

Electronic pressure switch PPE Series

Design & selection

⚠WARNING

■ The main body and fitting connection rotate, but this section should not repeatedly rotate during use.

■ The degree of protection is equivalent to IP65, but this product must not be used in an environment where it could come in contact with water. Check that cutting oil and coolant do not come in contact.

■ Check the internal drop voltage.

● When using with a voltage less than specified voltage, the pressure switch may be activated correctly, but the load may not function correctly. Check the load's working voltage, and check that the following expression is satisfied:

Power supply voltage – internal voltage drop > load working voltage

■ Care must be taken for leakage current.

● Even when the 2-wire pressure switch is OFF, current (leakage current) flows to operate the internal circuit. (1 mA or less)

Load working current > leakage current

If the above expression is not satisfied, the switch may be interpreted as ON even when it is OFF, and operation fails. Use the 3-wire PPD if specifications are not met. If n units are connected in parallel, the current that flows to the load increases n-fold.

■ The customer is responsible for checking safety and taking appropriate countermeasures for using fluids other than applicable fluid. Do not use this product for corrosive or flammable gases or for oxygen.

Installation & adjustment

⚠CAUTION

■ Handling the product

● When installing the product, hold the body section so that impact is not applied to the body or excessive stress is not applied to the lead wire.

● Do not disassemble or dismantle the product. The product could be damaged or its performance compromised if it is disassembled. CKD does not guarantee performance after disassembly.

■ Load short circuit protection circuit

● If the load is inadvertently short-circuited, the internal load short-circuit protection circuit is activated and the switch remains OFF. Fix wiring, then turn power OFF, or shortcircuit the PPE's brown and blue lines to recover normal switch operations.

<Cautions on installation>

■ Driver

Use a flat head screwdriver corresponding to the trimer groove (0.5 W × 2.3 L × 0.5 D) or a cross-point screwdriver for 1 bit to set the trimmer.

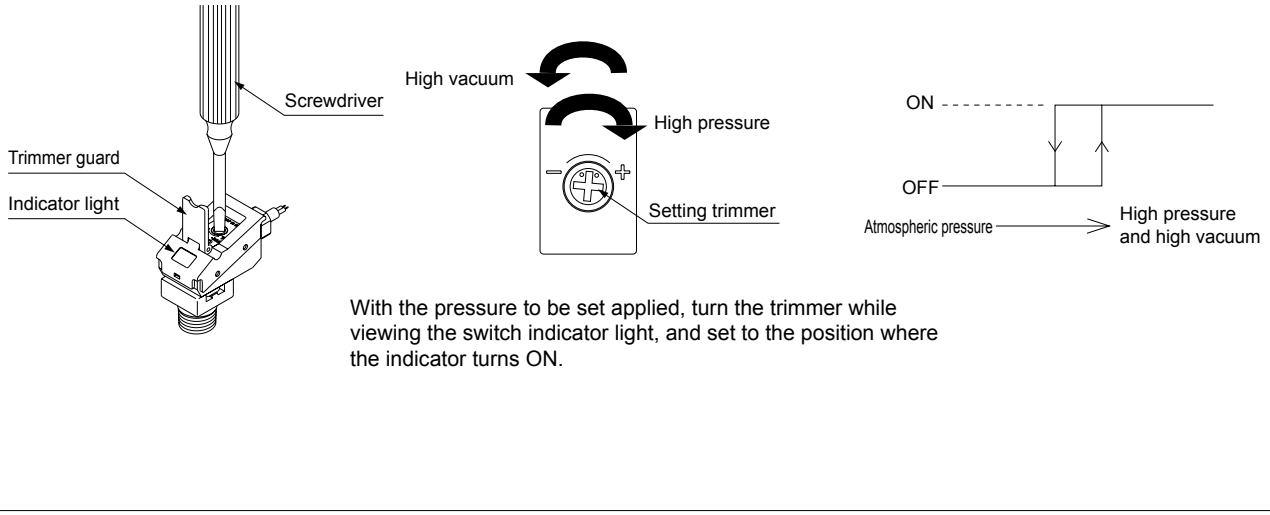
■ Trimmer

The rotation range of the trimmer is 240 degree. The trimmer could be damaged if turned any further or if turned forcibly.

■ Opening and closing the trimmer cover

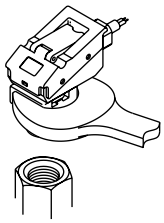
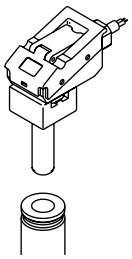
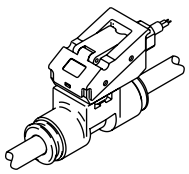
Use a flat head screwdriver to open the trimmer cover and set the trimmer. After setting, press the trimmer cover with a finger and completely close it. The degree of protection (IP65) is not satisfied if the cover is not completely closed.

Setting pressure and switch operations



With the pressure to be set applied, turn the trimmer while viewing the switch indicator light, and set to the position where the indicator turns ON.

Connection

PPE-*-6	PPE-*-H6-B	PPE-*-H6
		
Use sealing tape or sealant, and catch a wrench against the cross width section (13 mm) of the R1/8 fitting into install. (Caution) • The tightening torque is 1.0 to 1.5 N·m or less. Resin parts may be damaged if tightened too far.	Insert the CKD 6 mm tube push-in fitting. (Caution) • Securely insert the plug section, and check that the plug is not dislocated. If the plug is not fully inserted, it could be dislocated or air could leak. • Use the applicable push-in fitting. GW Series GWJ Series	Insert the 6 mm tube into the two push-in fittings. (Caution) • Use the designated tube and plastic plug. Tube O. D. precision Nylon, soft nylon tube : Use a tube within ±0.1 mm Polyurethane tube : within ±0.1 mm Urethane tube : within -0.2 mm and with hardness of 93° and over. • Securely insert the tube to the tube end, and make sure that the tube cannot be pulled off. If the tube is not fully inserted, it could be dislocated or air could leak. • Cut the tube at a right angle with a dedicated cutter.

Electronic pressure sensor analog output type PPE-*A Series

Design & selection

⚠ WARNING

■ Wiring
Turn power OFF before wiring this product. Discharge static electricity charged in human body, tool or equipment before and during operation.
Connect and wire bending-resistant material, such as robot wire material, for the movable sections.

■ Installation
Install this product and wiring as far as possible from noise source such as a strong electric line. Take separate countermeasures against surge entering the power wire.

■ Power supply voltage
Use the product within the specified power supply voltage. The product could rupture or burn if voltage exceeding the working range is applied or if AC power supply (100 VAC) is applied.

■ Load short circuit
Do not short-circuit the load. Failure to observe this could result in rupture or burning.

■ Incorrect wiring
Avoid incorrect wiring such as wrong polarity of power source, etc. Failure to observe this could result in rupture or burning.

■ Connecting load
When connecting an inductive load such as relay or solenoid valve, a surge voltage is generated when the switch is turned OFF. Directly connect a diode onto all inductive loads in the same power circuit.

■ Connecting load
The output impedance of the analog output section is 1 kΩ . If the impedance of the connecting load is small, output error increases. Check error with the impedance of the connecting load before using.

Example of calculation

(PPE-*A output impedance : Ro = 1 KΩ
Load internal impedance : Rx = 1 MΩ

$$\text{Output value} = \left(1 - \frac{Ro}{Ro + Rx}\right) \times 100\%$$

$$= \left(1 - \frac{1\ K\Omega}{1\ K\Omega + 1\ M\Omega}\right) \times 100\%$$

Error in the output ⇨value approx. 0.1%

Installation & adjustment

⚠ CAUTION

■ When installing the product, hold the body section so that impact is not applied to the body or excessive stress is not applied to the lead wire.

■ The customer is responsible for checking safety and taking appropriate countermeasures for using fluids other than applicable fluid. Do not use this product for corrosive or flammable gases or for oxygen.

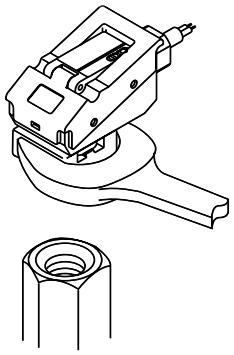
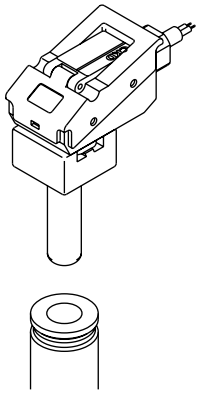
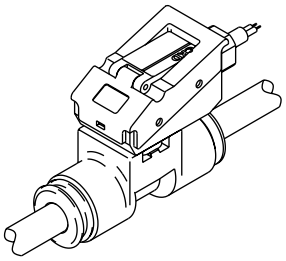
■ When applying positive pressure for vacuum break onto the product to check vacuum suction, check that it does not exceed the specified proof pressure.

■ Do not disassemble or dismantle the product. If disassembled, parts could pop off when pressure is applied.
CKD does not guarantee performance after disassembly.

■ The main body and fitting connection rotate, but this section should not repeatedly rotate during use.

■ The degree of protection is equivalent to IP65, but this product must not be used in an environment where it could come in contact with water. Check that cutting oil and coolant do not come in contact.

(Connection)

PPE-*A-6	PPE-*A-H6-B	PPE-*A-H6
		
Use sealing tape or sealant, and catch a wrench against the cross width section (13 mm) of the R1/8 fitting into install. (Caution) • The tightening torque is 1.0 to 1.5 N·m or less. Resin parts may be damaged if tightened too far.	Insert the CKD 6 mm tube push-in fitting and use. (Caution) • Securely insert the plug section, and check that the plug is not dislocated. If the plug is not fully inserted, it could be dislocated or air could leak. • Use the applicable push-in fitting. GW Series GWJ Series	Insert the 6 mm tube into the two push-in fittings and use. (Caution) • Use the designated tube and plastic plug. Tube O. D. precision Nylon, soft nylon tube : Use a tube within ±0.1 mm Polyurethane tube : within ±0.1 mm Urethane tube : within -0.2 mm and with hardness of 93°and over. • Securely insert the tube to the tube end, and make sure that the tube cannot be pulled off. If the tube is not fully inserted, it could be dislocated or air could leak. • Cut the tube at a right angle with a dedicated cutter.

Electronic pressure switch PSW Series

Installation & adjustment

⚠CAUTION

- When connecting an inductive load, install a surge suppressor within 0.5 m of the load, and eliminate noise at the source.
- Load impedance of analog output must be 10 kΩ and over.

Digital pressure sensor PPX Series

Design & selection

⚠ CAUTION

■ CE-compliance working conditions

● PPX Series is a CE-complaint product following EMC Directives. EN61000-6-2, regulations matched to immunity applies to this product. Conditions below are necessary to comply with these standards.

Conditions

● The power cable connected to the sensor must be less than 10 m long.

Installation & adjustment

⚠ WARNING

■ When using a commercially available switching regulator on the power supply, be sure to ground the power supply frame ground (F.G.) terminal.

⚠ CAUTION

■ Avoid use in high steam and dirt environments.

■ Care must be taken to avoid product contact with organic solvents such as thinner, water, oil and fat.

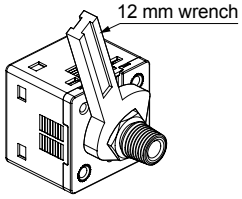
■ Do not put wires, etc., in the pressure port. The diaphragm could be damaged and normal operations disabled.

■ Performance could not be guaranteed in strong electromagnetic field.

■ Flush air pipe connected to sensors before connecting.
Prevent pipe from catching tips of sealing tape when piping.

Piping

■ When connecting a commercially available fitting to the pressure port, attach a 12 mm wrench (14 mm for PPX-6G) to the hexagon section of the pressure port and install with a tightening torque of 9.8 N·m or less. A fitting or the pressure port section could break if too much torque is applied.
Use seal tape to connect fittings to prevent air leak.

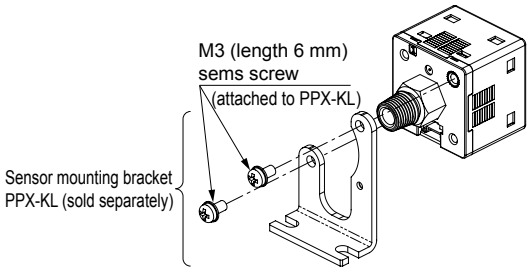


■ The piping port is degreased and washed. Handle carefully when unpacking. (PPX-P12)

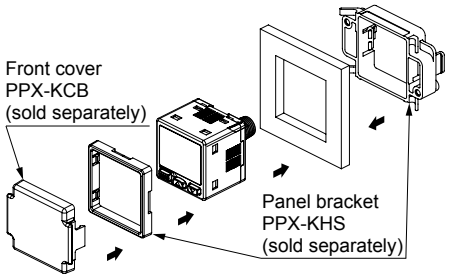
Installation

⚠ WARNING

■ Sensor mounting bracket PPX-KL is available.
If a sensor is installed with a mounting bracket, etc., tightening torque must be 0.5 N·m or less.



■ Panel mounting bracket PPX-KHS (Sold separately) and front cover PPX-KCB (Sold separately) are also available.

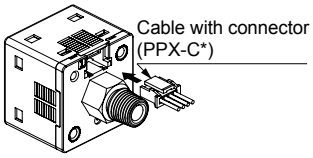


Installation & adjustment

⚠CAUTION

■ Care must be taken for protection of body and lead wire.

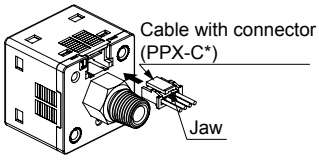
- Check that stress is not directly applied to cable lead outs or connectors.



- Do not bump or drop the main unit, or apply excessive bending or tensile force to the lead wire because the lead could be disconnected.
- Connect and wire bending-resistant material, such as robot wire material, for the movable sections

■ Connector wiring

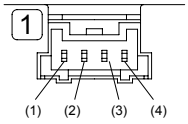
- Connect by inserting the cable with connector PPX-C* into the product connection connector as shown at right.
- To remove, press down on the jaws of the cable with a connector and pull out the connector.



<Connector>
Contact: SPHD-001T-P0.5
Housing: PAP-04V-S
(manufactured by JST MFG CO. LTD.)

- Do not pull on the cable without pressing down on jaws. The cable could break or the connector could be damaged.

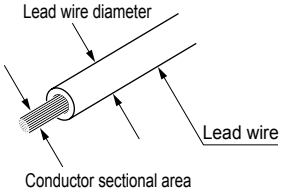
<Connector pin layout drawing>



Connector pin no.	Terminal name
(1)	+V
(2)	Comparison output 1
(3)	Standard type: comparison output 2 High-function type: Analog voltage output or external input
(4)	0 V

- When wiring with a connector set (PPX-CN), be sure to use a compatible cable and crimp tool for housing and contacts.

(Conforming cable)



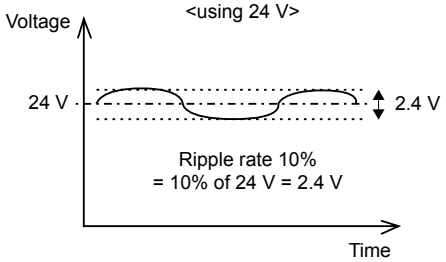
Conductor sectional area	0.12 to 0.32 mm² (AWG26 to 22)
Lead wire diameter	φ 1.0 to φ 1.5 mm
Wire material	Annealed copper twisted wire

Housing	JST MFG CO. LTD. PAP-04V-S
Contact	JST MFG CO. LTD. SPHD-001T-P0.5
Recommended crimping tools	JST MFG CO. LTD. YC-610R (AWG26 to 24)
	JST MFG CO. LTD. YC-611R (AWG22)

■ Wiring

- Turn the power OFF before wiring this product. Discharge static electricity from personnel or tools before and during work.
- Use stabilized noise-free power and having a ripple voltage of 10% or less for the power supply.

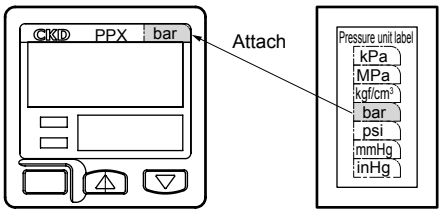
<using 24 V>



- Turn the power ON and OFF at the quick rising and falling edges of voltage.
  If the rated voltage is not reached, the sensor could malfunction. In some cases, the sensor could not recover after the rated voltage is reached.
  Reset the power in that case.
  Even if the rated voltage drops temporarily, shout down the power once, then turn ON the power again.
- Avoid using in a transient state continuing 0.5 s after power is turned on.
- Install the product and wiring as far away as possible from sources of noise such as power distribution wires. Take separate measures against surge generated from inductive loads that enters the power wire.
- Do not start the control unit, machinery and equipment immediately after wiring. Unpredicted signals could be output due to inadvertently set values. Conduct a power ON test with the control unit, machinery and equipment stopped, and set required switches.
- Do not operate the control unit, machinery or equipment immediately after wiring.
- Cable extension is possible up to an overall length of 100 m using a cable with 0.3 mm² and over. However, when using this product as a CE conforming product, the power cable connected to this product must be less than 30 m long.

■ When unit is changed

- When using the type for outside Japan with unit switching function in the unit other than MPa or kPa, make sure to attach the unit seal enclosed and attached to the product to the unit indication section on the operation section.



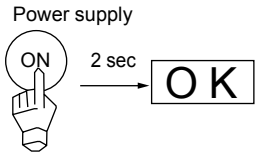
<Unit seal label>

Electronic pressure switch and sensor PPD (-S), PPD-A, PPD3 (-S)

Design & selection

⚠ CAUTION

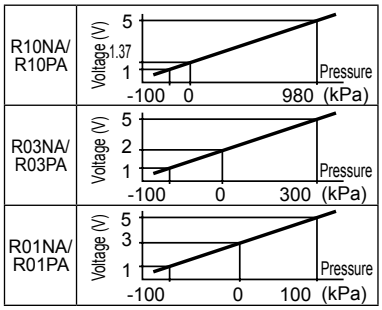
■ This product self-diagnoses the internal circuit immediately after power is turned ON, so pressure is not detected immediately. Set the control circuit so that signals are ignored for about 2 seconds after power is turned ON.



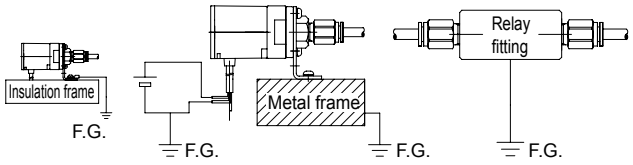
■ This product's overcurrent protection turns the output OFF when an overcurrent is detected. However, output repeatedly turns ON a short time at a set cycle. This causes power supply voltage to fluctuate and may adversely affect peripheral devices.

■ When using this product for compressed air containing water or oil, use PPD (3)-S (stainless steel diaphragm sensor specifications) with increased corrosion resistance.

<Analog output type voltage waveform>

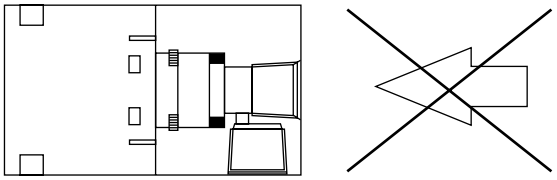


■ Install PPD (3)-S on a frame or panel connected to the frame ground F.G., and if necessary, directly connect from PPD (3)-S port to F.G. When leading fluids in from an external device, connect via a relay fitting connected to F.G. (To provide safety when using conductive fluids)



■ PPD (3)-S power supply is a DC stabilized power supply completely isolated from the AC primary side. Connect either the + side or - side of the power to the FG. A variable resistor (voltage limit 40 V) is connected between the internal power circuit and port installation section of this PPD (3)-S to prevent dielectric breakdown of the sensor. Do not conduct withstand voltage or insulation resistance tests between PPD (3)-S's internal power supply circuit and port installation section. Disconnect PPD (3)-S wiring if this type of test must be done. An excessive potential difference between PPD (3)-S power supply and port installation section could burn internal parts.
After installing, connecting, and wiring PPD (3)-S, electrical welding of the device or frame, or short-circuit accidents, etc., could cause welding current, excessive high voltage caused by welding, or surge voltage, etc , to run through the wiring, ground wire, or fluid path connected between the above devices. This could damage wires or devices.
Conduct any work such as electrical welding after removing this device and disconnecting all electric wires connected to the FG.

■ Care must be taken to entry of water and drain.
PPD (3)-S has a stainless steel diaphragm pressure sensor that cannot be damaged by water. However, when vacuum is broken after checking vacuum suction, drainage in the water and air could collide with the pressure sensor. The water's rush inertia could damage the pressure sensor and prevent the correct pressure from being indicated.
If water or drainage could enter, connect a thin pipe to the PPD3, or install an orifice midway.
Take special care when using the back ports on PPD3-S 6B port.
In addition, this type has a φ 1 built-in orifice inside the pressure port.



Take special care when using the back ports on the 6B if water of drainage could enter.

Installation & adjustment

⚠CAUTION

■ Check the pressure range.
If the pressure switch for low pressure range is incorrectly used for high pressure applications, this product could be ruptured or damaged, and a large amount of air could leak, posing a hazard.

High pressure		vacuum
	P10> P01> V01	
	R10> R03> R01	

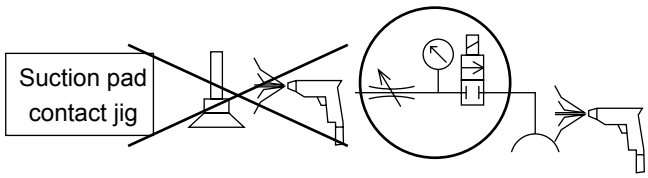
■ When using this product, check that the two keys are accurately installed at the base case and body case contact. (These keys must not be removed) (PPD and PPD-S only)

■ Switch data can be set to values that exceed the rating range, or to unrealistic values, but operation and accuracy at such values are not guaranteed. Confirm that settings enable the target operation. Ensure the following difference between data A and B to stabilize operation:

Operation mode	Difference of min. digit
Hysteresis operation	1% F.S.
Window operation	3% F.S.

Do not set as follows: (Data A = Data B / ON point = OFF point)

■ Avoid air blow
The high pressure near the nozzle could back flow and exceed the product proof pressure. This could result in rupture or damage. Lower the pressure of compressed air to less than the proof pressure, or shield the flow path when blowing air.



■ Remove humidity, dirt and contamination from the installation location. Select a flat installation surface. Any warp or bumps on the installation surface could damage the case or compromise protective functions. Excessive tightening of installation screws can result in similar damage.
- After installation, do not bump the case or use the case as step. Even if there is no apparent external damage, this remains as stress that gradually forms cracks and further damage.

■ Precautions for PPD-A or PPD3 (sensor integrated type) Series
- This product's protective functions are not effective when it is unpacked or during installation. The protective functions are effective when the product is correctly installed, wired and piped. Provide protection so that water and other substances do not come in contact until installation is completed.
- Wire and pipe the product after fixing it at the installation site. Check surrounding safety and that water and other substances do not come in contact before starting wiring. Continue to provide protection after the product is connected. (The current could leak at the connection section, and water could run along the cable and enter the case.)
- The atmospheric introduction port for atmospheric pressure is treated as a key point in ensuring this product's protective performance. Use the following tube, and release the end into the atmosphere at a dry environment with no barometric pressure difference.
Recommended tube: Soft nylon tube model no. FH-3224
Urethane tube model no. U-9532, U-9504
<IMPORTANT> Never apply pressure to atmospheric introduction port.

■ If the atmospheric introduction port is pressurized, protective performance could be lost, and the case could rupture or pop off. Leave this port set at atmospheric pressure. Separate piping for atmospheric release port from other pressurized air piping by using different tube diameters or colors. Take sufficient countermeasures to prevent pressurized air from being applied.
- Even when protective performance is not required, if this product is installed in a humid environment with large temperature variation, dew condensation in the case is prevented by taking these measures. (Dew is fatal to the electric circuit.)
- Note that if this product is connected in a control panel, pressurized to a positive pressure or negative pressure within a dry environment, the pressure difference could affect indicator accuracy.
- This product is intended to protect city water. Protection performance cannot be guaranteed for hot water, oil, coolant (nonwater soluble, water soluble), solvent, acid, alkaline, or chemicals, etc. These substances could cause solvent cracks to form on in the case's resin parts, the gasket to swell, the adhesive to melt and separate, and other problems. Note that if water that gets on the product freezes, the case could be damaged and protective performance could be lost. Please be careful.

■ The sensor-separated display section and sensor section are adjusted as a set. The pressure value could deviate more than accuracy if parts from different lot numbers are used together.

■ The main body and fitting connection of PPD3-R*D rotate, but this section should not repeatedly rotate during use.

■ The degree of protection is equivalent to IP65, but this product must not be used in an environment where it could come in contact with water. Check that cutting oil and coolant do not come in contact.

During use & maintenance

⚠ CAUTION

■ This product has O-ring seals and threaded fittings. A slight amount of air leaks (1 cm^3/min. ANR or less) is tolerated.
When using applicable fluid other than air; nitrogen gas, etc., oxygen deficiency could be caused. Observe the following instructions.
- Use this product in well ventilated locations.
- Ventilate the work area when nitrogen gas is being used.
- Inspect piping regularly, so nitrogen gas piping does not leak.

■ Fluids that could corrode the gas contact area material (*1) or flammable, explosive, or toxic fluids could damage the sensor or main body.

■ Check that fluid being measured does not freeze resulting in expansion or contraction of volume, that these elements do not solidify and stick due to drying, that solid elements do not accumulate, that accumulated fluid does not become putrefied, and that the product is not clogged by dirt. When using inductive fluids, fluid staying in the middle of piping at low pressure ranges may cut off the pressure or cause negative pressure generation, preventing proper measurement. Fluids such as water or oil drainage could result in a water hammer caused by the fluid's inertial pressure, or a sudden pressure rise such as a surge pressure when the valve is turned ON and OFF, etc. Before installing, use a highly responsive pressure sensor and check that these do not exceed the proof pressure even instantly. Pressure exceeding the proof pressure could damage the sensor or body.

■ For safety, be sure to turn power off before connecting the sensor-separated sensor.

*1 Gas contact area material

Model no.	Material
PPD	PP resin, NBR, FKM, aluminum, silicone, crystal polymer
PPD3	PBT resin, NBR, FKM, silicone, PPS
PPD-A	PP resin, NBR, FKM, aluminum
PPD-S	SUS 630, FKM, aluminum, PBT resin
PPD3-S	SUS630, FKM, aluminum

Note: The fitting material is included for models with push-in fittings (PPD-A, PPD-*-HS, PPD3-*-6HD, PPD3-*-6HT).

Fitting	NBR, brass (nickel plating)

Electronic pressure switch PPS2 Series

Design & selection

⚠CAUTION

■ The cable can be extended by adding connectors to a max. length of 20 m.

■ Pipe and connect the atmospheric pressure introduction port (M3 × 0.5) of the sensor-separated type
The sensor's degree of protection (IP67) cannot be satisfied.

■ CE-compliance working conditions
PPS2 is conforming to the EMC Directive and CE standard. EN 61000-6-2, regulations matched to immunity applies to this product. Conditions below are necessary to comply with these standards.
Conditions
- Use a power cable of shorter than 3 m.

Installation & adjustment

⚠CAUTION

■ The body and sensor of sensor separate type are adjusted as a set. Do not use parts with different lot numbers.

■ Do not tighten terminal screws with excessive torque. (Tightening torque: 0.5 to 0.7 N·m)

■ Switch type
- Analog output load impedance must be 1 kΩ and over.
- The zero point of the absolute pressure type cannot be adjusted.

■ Controller type
- Use a proportional pressure device with a 0 to 10 V signal input voltage.
- Do not connect a load other than the proportional pressure device to the proportional pressure device command output terminal.
- Do not issue a voltage signal to pressure selection input. Use a relay contact or NPN transistor open collector. Input these by short-circuiting the "GND" terminal and "IN1 to 4" terminals. Issue the input signal for 50 msec. and over. Input to several selection signals is not accepted.

Electronic differential pressure switch DP1000 Series

Design & selection

⚠ CAUTION

- Do not install in places where corrosive gases are generated, or where chemicals, water, or oil could come in contact.
- Avoid installing where impact or vibration of 98 m/s^2 and over may be applied.
- Separate the sensor and monitor sections from the power distribution cable.

Installation & adjustment

⚠ CAUTION

Sensor section installation

- The body and the sensor are adjusted by a set. Do not use parts with different lot numbers.
- Do not tighten terminal screws with excessive torque.
  (Tightening torque: 0.5 to 0.7 N·m)
- The pressure port is Rc1/8. When installing the nipple, use sealing material (sealing tape, gel type sealant) so air does not leak. Check that sealing material does not get inside. Catch a wrench on the pressure port and screw in the sensor section.
- Pipe so that water and other fluids do not directly enter the sensor section.
- When using the dedicated bracket, take care not to tighten screws too far. Excessive load could be applied to the sensor section.
- Do not disassemble/dismantle the product. The product could be damaged or its performance compromised if it is disassembled. CKD does not guarantee performance after disassembly.

Operation

- Supply voltage of 11 to 26 VDC to the power terminal. Use a power supply with little voltage fluctuation (ripple rate 1% or less). The power current is 100 mA.
- Use this product within working pressure range.
- If the displayed pressure is not zero when no pressure is applied, press the 0-ADJ key and adjust the zero point.
- Press the READ key to check the switch output set value.