Electronic pressure sensor with digital display

PPG-D Series

Easy to read with 2-color display, and for environments exposed to dust or water

- Switch output 2 points, analog output 1 point (1 to 5 V or 4 to 20 mA)
- Hysteresis setting possible
- Pressure display accuracy: ±2%F.S.±1digit

CE UKCA cULus RoHS

Pressure range

Model No.		Rated pressure range (MPa) −0.100.1… 1.0
PPG-D-P	Positive pressure	0 to 1.0 MPa
PPG-D-V	Vacuum pressure	-101.3 kPa to 0 MPa
PPG-D-R	Compound pressure	-100 kPa to 100 kPa

2-color LED (Green/Red)

The display color can be set to green or red, allowing the pressure state to be confirmed at a glance.

	SoG	Sor	Grn	rEd
ON	Green	Red	Green	Red
OFF	Red	Green	Green	Red

Dust-proof/waterproof function

Degree of protection: IP65

Note: Environmental surveys are only available for “RoHS Certificate” and “REACH Certificate”. Parts level detailed data is not supported.

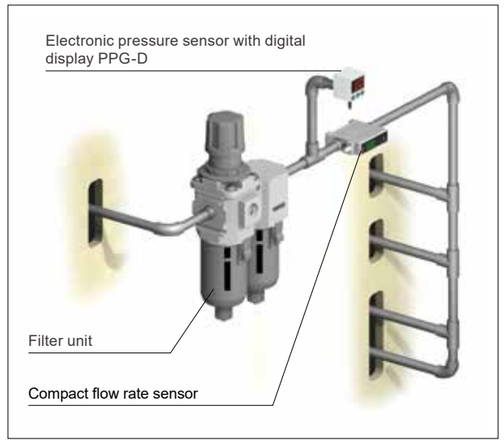
Easy Installation / Construction

Wiring The cables are connectors, making pressure switch mounting possible after electric wiring.

Piping Select from female thread and male thread.

Examples of applications

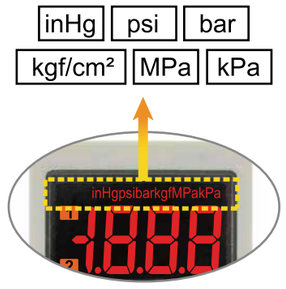
Checking equipment source pressure



Overseas support*1

The pressure unit can be changed.

*1: Supported when the model No. ends in "2".



Copy function

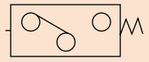
Ideal for reducing work processes and preventing misoperation.

Setting master device

Setting copy device

Electronic pressure sensor with digital display

PPG-D Series

Circuit diagram symbol 

Refer to the CKD website for detailed compatible model Nos.

Model No. Notation Method

PPG - D - R NA - 6BM

- PPG: Model No.
- R: ❶Pressure range
- NA: ❷Output
- 6BM: ❸Piping shape
- (blank): ❹Unit change

❶Pressure range

Code	Description
R	Compound pressure (-100 to 100 kPa)
V	Vacuum pressure (0 to -101.3 kPa)
P	Positive pressure (0.000 to 1.000 MPa)

❷Output

Code	Description
NV	NPN transistor open collector 2 points + analog (voltage) output (1 to 5 V)
NA	NPN transistor open collector 2 points + analog (current) output (4 to 20 mA)
NC	NPN transistor, open collector 2 points + copy function
PV	PNP transistor open collector 2 points + analog (voltage) output (1 to 5 V)
PA	PNP transistor open collector 2 points + analog (current) output (4 to 20 mA)
PC	PNP transistor, open collector 2 points + copy function

❸Piping shape

Code	Description	
6BM	R1/8" (male thread), M5	
6NM	NPT1/8", #10-32UNF	
6GM	G1/8" (male thread), M5	
6B	Rc1/8 (female thread)	
6N	NPT 1/8 (female thread)	
6G	G1/8 (female thread)	

❹Unit change

Code	Description
Blank	SI unit fixed (kPa/MPa) User's Manual: Japanese, English
2	User's Manual with unit change function: Traditional Chinese, English

Note: In compliance with the new Measurement Act, it cannot be used in Japan.

Model No. Notation Method discrete option

PPG - D - KD

- KD: ❶Option

❶Option

❸Piping shape code	Description			Code
6BM, 6NM, 6GM	For male thread	Parallel mounting bracket (mounting screws included)		KD
		L-shaped mounting bracket (mounting screws attached)		KL
6B, 6N, 6G	For female thread	Parallel mounting bracket (mounting screws included)		KDA
		L-shaped mounting bracket (mounting screws attached)		KLA
6BM, 6NM, 6GM 6B, 6N, 6G	For both female/male threads	Panel adapter		KHS
		Panel adapter + Front protective cover		KHSCB

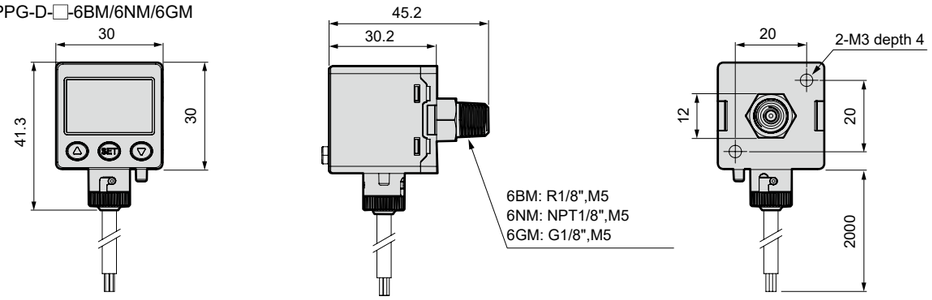
Specifications

Item			PPG-D-P-□-□ (Positive pressure)	PPG-D-V-□-□ (Vacuum pressure)	PPG-D-R-□-□ (Compound pressure)
Rated pressure			0.000 to 1.000 MPa	0.0 to -101.3 kPa	-100.0 to 100.0 kPa
Pressure setting			-0.100 to 1.000 MPa	10.0 to -101.3 kPa	-101.0 to 101.0 kPa
Proof pressure			1.5 MPa	300kPa	
Applicable fluid			Clean air, non-corrosive/non-combustible gas		
Unit indicated		kPa	-	0.1	
		MPa	0.001	-	
		kgf/cm²	0.01	0.001	
		bar	0.01	0.001	
		psi	0.1	0.01	
		inHg	-	0.1	
Power supply voltage			12 VDC to 24VDC ±10%, ripple (P-P) 10% or less or class 2		
Current consumption			40 mA or less (no load)		
Switch output	Output		NPN or PNP transistor, open collector 2 points		
	Max. load current		125 mA		
	Max. power supply voltage		NPN output: 24 VDC, PNP output: 24 VDC		
	Internal voltage drop		1.5 V or less		
	Response time		2.5 ms or less (Chattering prevention function: 25 ms, 100 ms, 250 ms, 500 ms, 1000 ms, and 1500 ms are selectable)		
	Switch output load short-circuit protection		Yes		
Analog output *2,*3	Voltage output	Voltage	1 to 5V (±2.5%)		
		Impedance	Approx. 1 kΩ		
	Current output	Current	4 to 20mA (±2.5%)		
		Impedance	Max. load impedance: 250 Ω (12 VDC) 600 Ω (24VDC) Min. load impedance: 50 Ω		
	Linearity		±1% F.S.		
Indicator	LCD display		3 1/2-digit, 7 segment (Red/Green)		
	Switch ON indicator lamp		Orange (1, 2 indicator lamps) OUT1 OUT2		
	Update time		Approx. 0.2 seconds		
	Indicator accuracy		±2% F.S. ±1 digit (Reference temperature: 25±3°C)		
Repeatability (switch output)			±0.2% F.S. ±1 digit		
Environment conditions	Degree of protection		IP65		
	Operating ambient temperature		0 to 50 °C		
	Storage ambient temperature		-10 to 60 °C (no condensation or freezing)		
	Ambient humidity		35 to 85% RH (no condensation)		
	Withstand voltage		1000 VAC, 1 minute (between the case and lead wire)		
	Insulation resistance		50 MΩ (500 VDC, between the case and lead wire)		
	Vibration resistance		Compound amplitude 1.5mm, 10 G, 10Hz-55Hz-10Hz per minute, 2 hours each in X, Y, Z directions		
	Shock resistance		100m/s² (10 G), 3 times each in X, Y, Z directions		
Temperature characteristics			±2% F.S. (25 °C Reference) temperature range 0 to 50 °C		
Port size			6BM:R1/8", M5 6NM:NPT1/8", #10-32UNF 6GM:G1/8", M5 6B:Rc1/8 (female thread), 6N:NPN1/8 (female thread), 6G:G1/8 (female thread)		
Lead wire			PVC cable ø4, 5-conductor (0.15mm². Outer diameter of insulator ø0.95 mm) 2m		
Weight			Male thread: approx. 86 g (including lead wire 2 m)/Female thread: approx. 115 g (including lead wire 2 m)		

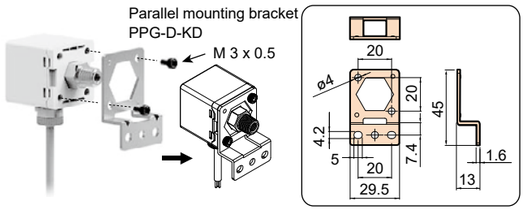
*1: The hysteresis value of one-point set mode and window comparator mode can be adjusted to between 1 and 8 digits.
*2: Analog current output cannot be selected together with analog voltage output.
*3: Analog voltage output cannot be selected together with analog current output.

Dimensions diagram (piping shape male thread)

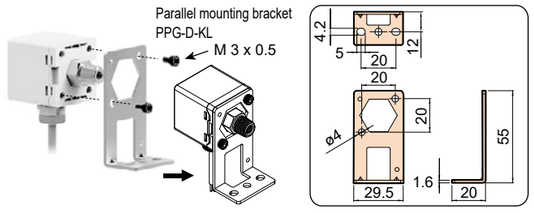
●Body PPG-D-□-6BM/6NM/6GM



●Parallel mounting bracket (mounting screws included)

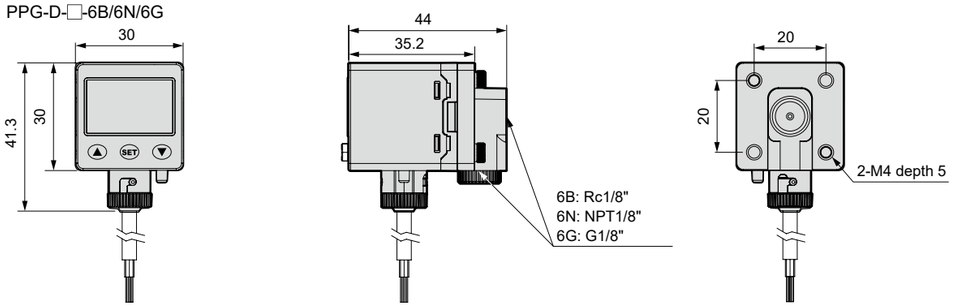


●L-shaped mounting bracket (mounting screws attached)

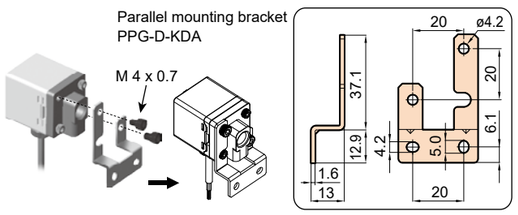


Dimensions diagram (piping shape female thread)

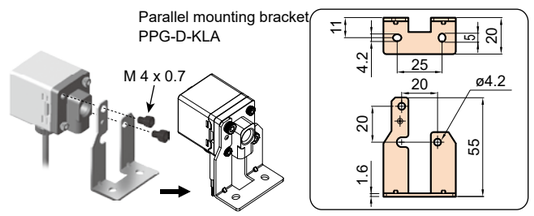
●Body PPG-D-□-6B/6N/6G



●Parallel mounting bracket (mounting screws included)

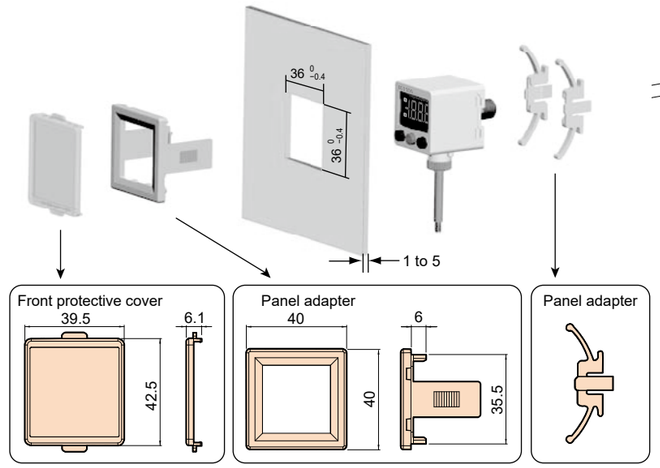


●L-shaped mounting bracket (mounting screws attached)

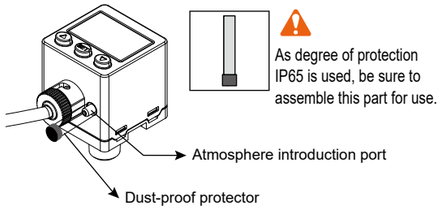


Common option dimensions diagram

●Panel adapter + Front protective cover
PPG-D-KHS, PPG-D-KHSCB

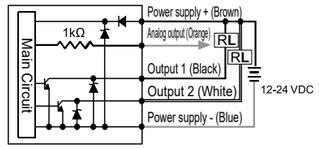


●Protector (IP65)

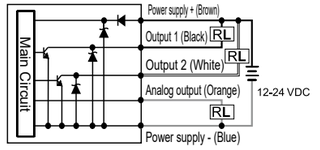


Internal circuit / connection method

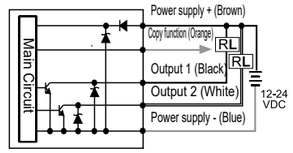
●PPG-D-□NV
2NPN + Analog output (1 to 5 V)



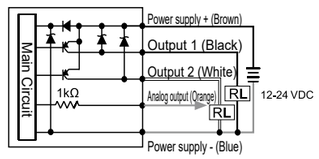
●PPG-D-□NA
2NPN + Analog output (4 to 20 mA)



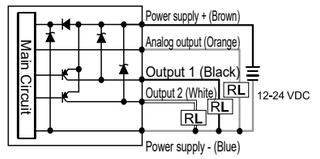
●PPG-D-□NC
2NPN + Copy function



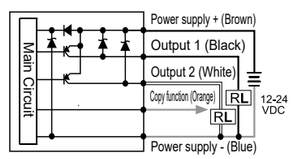
●PPG-D-□PV
2PNP + Analog output (1 to 5 V)



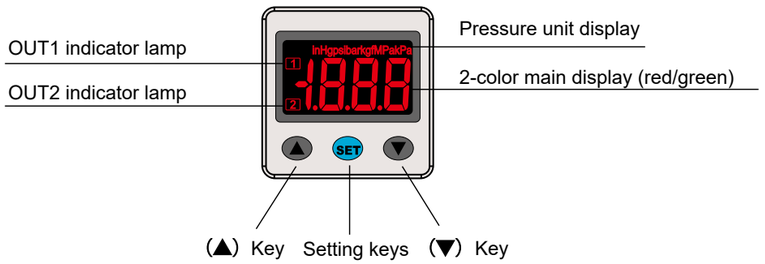
●PPG-D-□PA
2PNP + Analog output (4 to 20 mA)



●PPG-D-□PC
2PNP + Copy function



Names of display/operation sections



Function list

Measurement mode

Item	Description	Initial state
Switch output setting	Pressure value of OUT1 and OUT2 can be set.	P type: OPT mode .500 R type: OPT mode 50.0 V type: OPT mode -50.0
Zero value setting	The pressure display in the atmospheric pressure state can be forced to zero.	—
Maximum/minimum value display mode	The max. and min. values within the mode setting period can be confirmed.	—
Key lock/unlock	Locks key operations.	—

Initial setting mode

Item	Description	Initial state
OUT1 operation mode setting	Set the OUT1 mode. OPS, HYS, WIN	oPS
OUT1 output style setting	Set the output style of OUT1. NO, NC	no
OUT2 operation mode setting	Set the OUT2 mode. OFF, OPS, HYS, WIN	oFF
OUT2 output style setting	Set the output style of OUT2. NO, NC	—
Setting response time	Set the switch output response time. 2.5, 25, 100, 250, 500, 1000, 1500	2.5
Indicator color setting	Set the display color. SoG, Sor, Grn, rEd	SoG
Unit indicated	Pa (MPa/kPa) With unit change function (kPa, MPa, kgf, bar, psi, inHg)	PA Pa (MPa/kPa)

Function list

Applied setting mode

Item	Description	Initial state
Hysteresis value setting	Set the hysteresis (H) of one-point (OPT) mode and window comparator (WIN) mode. (8 stages)	3
LCD display color setting	Set the switch output to link display color changes. (OUT1, OUT2)	ot1
Power saving mode	Set the power saving mode. (OFF, ON)	oFF
Copy function setting	Set the copy function. (OFF, ON, ONL)	oFF
Initialization setting	Make the initialization settings. (OFF, ON)	oFF
Fine adjustment mode	Set the fine adjustment mode. (OFF, ON)	oFF

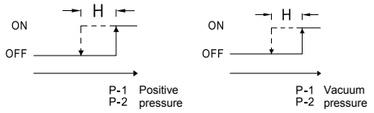
For details on operation and setting method, refer to CKD Components Product website (https://www.ckd.co.jp/kiki/en/) → "Model No."→ Instruction manual

Output

One-point mode

Normally open mode

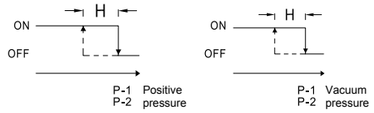
Positive pressure/compound pressure (PPG-D-P, PPG-D-R)



Vacuum pressure (PPG-D-V)

Normally closed mode

Positive pressure/compound pressure (PPG-D-P, PPG-D-R)

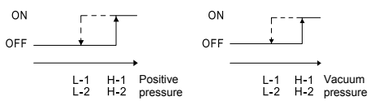


Vacuum pressure (PPG-D-V)

Hysteresis mode

Normally open mode

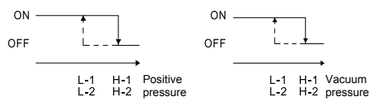
Positive pressure/compound pressure (PPG-D-P, PPG-D-R)



Vacuum pressure (PPG-D-V)

Normally closed mode

Positive pressure/compound pressure (PPG-D-P, PPG-D-R)

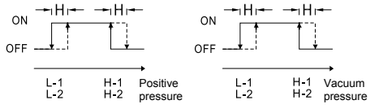


Vacuum pressure (PPG-D-V)

Window comparator mode

Normally open mode

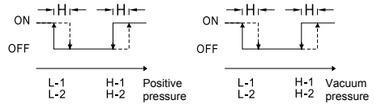
Positive pressure/compound pressure (PPG-D-P, PPG-D-R)



Vacuum pressure (PPG-D-V)

Normally closed mode

Positive pressure/compound pressure (PPG-D-P, PPG-D-R)



Vacuum pressure (PPG-D-V)

*1: When the hysteresis is set to 2 digits or less, if the input pressure is very close to the set pressure, malfunction may occur in the switch output.

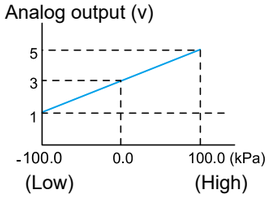
*2: In window comparator mode, if the difference between the two set points is smaller than the fixed hysteresis set value, the switch output may malfunction.

Analog output

The applicable pressure range for analog output ranges of 1 to 5 V or 4 to 20 mA is shown in the graph l

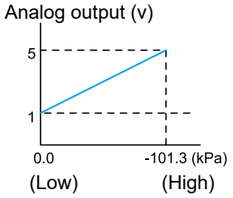
(Compound pressure)

Analog output (v)



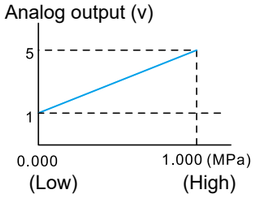
(Vacuum pressure)

Analog output (v)



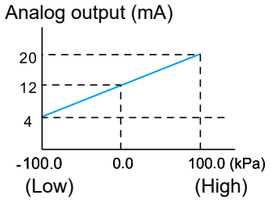
(Positive pressure)

Analog output (v)



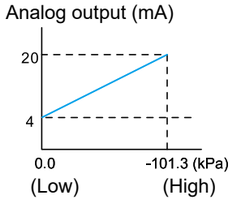
(Compound pressure)

Analog output (mA)



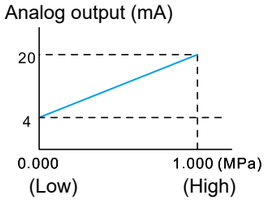
(Vacuum pressure)

Analog output (mA)



(Positive pressure)

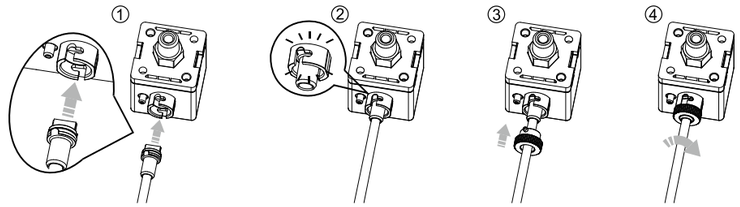
Analog output (mA)



Lead wire mounting procedure

Mount the lead wires as below.

- Set the terminal protrusion facing upward. (Refer to Fig. (1))
- Insert the terminal protrusion into the pressure sensor groove. (Refer to Fig. (2))
- Mount the terminal cover on the product. (Refer to Fig. (3))
- Rotate the terminal cover to lock. (Refer to Fig. (4))



Note: Do not insert and remove 20 times or more.

Copy function setting

◎ The copy function enables copying pressure values from the master sensor to the device sensor.

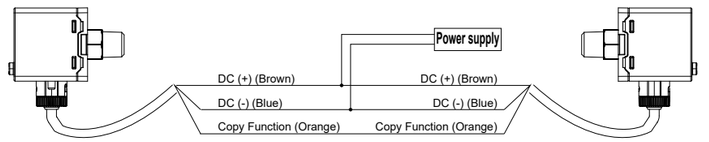
◎ Before copying, confirm the pressure sensor model number.
This function cannot be used between different model numbers.

◎ This function copies from the master side sensor to one slave side sensor at a time.

[Setting procedure]

1. Set the on or onL copy function so that the master sensor is in copy status.
   Refer to the copy setting in "H. Applied setting modes."
2. Turn the master sensor and device sensor power supply OFF.
3. Wire the master sensor to the device sensor as shown in the figure below.

Master sensor **Device sensor**



4. Turn ON the power for the master sensor and device sensor simultaneously.
5. Wait 5 seconds for data transfer. When complete, the master sensor will display [CPY] and [Gd] alternate
   The device sensor will display [SLv] and [Gd] alternately.
6. When data transfer fails
   The master sensor will display [CPY] and [Gd] alternately.
   The device sensor displays [Er8].
7. Turn the power OFF and remove the wiring.
   Failure to remove the wires could cause sensor failure.

To copy again to different device sensors, repeat steps (3) through (5).
This function is available only with PPG-D-□NC-□and PPG-D-□PC-□.

*1: If the power is not turned ON simultaneously, the data may not be copied.
*2: If the data transfer fails, check that the wiring is correct.
Then repeat steps (3) through (5).

Changing the master sensor display to measurement mode

◎When the master sensor displays [CPY] and [Gd] alternately, press ▼ to display measurement mode.

Safety Precautions

Be sure to read this section before use.
For general pneumatic components precautions, refer to Intro 17 for details.

Product-specific cautions: Electronic pressure sensor with digital display PPG-D Series

During Design and 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.

■Never use this product in an explosive gas atmosphere.
The pressure switch does not have an explosive-proof structure. Never 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 outsidePlease.

■Power supply voltage
Do not use this product at levels exceeding the power supply voltage. If voltage exceeding this range or AC power supply (100 VAC) is applied, the controller could rupture or burn.

■DC power not insulated from the AC primary side may damage the product and power, possibly leading to electric shock. Do not use the product in this case.

■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 mistaken power source polarities, 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 in well ventilated locations.
- Ventilate the work area when nitrogen gas is being used.
- Inspect nitrogen gas piping regularly to avoid leaks.
- 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 the PPD3-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 burst onto the product, check that it does not exceed the specified proof pressure.

■Working environment
- Avoid use in locations subject to vibration or shock of 100 m/s^2 or more.
- 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 limitations and temperature characteristics into consideration.

■Take care when using this product for an interlock circuit.
When using the pressure switch for an interlock signal requiring high reliability, provide a double interlock by installing a mechanical protection function or a switch (sensor) other than a pressure switch as a safeguard against breakdown. Regularly inspect and confirm that the interlock activates correctly.

■Response time is affected by working pressure and load volume. If reproducibility with stable response time 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 from the source.
- When using a components (switching regulator, inverter motor, etc.) that could generate noise near the components, be sure to ground the sensor 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.

■Care must be taken for protection of body and lead wire.
- Do not bump or drop the body, or apply excessive bending or tensile strength to the lead wire. This may lead to disconnection.
- Connect and wire bend-resistant material, such as robot wire material, for movable sections.

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

■When releasing the secondary control pressure, such as air blowing, into the atmosphere, the pressure could fluctuate depending on the piping and flow conditions. Test with actual working conditions, or contact CKD.

■Components When selecting dryer, air filter, oil mist filter or regulator, select a device with a flow rate higher than that used by 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 evaluation of this product is performed by using a cable that has a power supply line and a signal line paired to assess the product's performance.
- This product is not equipped with surge protection. Implement surge protection measures on the system side.

■Environmental surveys are only available for “RoHS Certificate” and “REACH Certificate”. Detailed data at the parts level is not supported.

■As degree of protection IP65 is used, be sure to assemble the protector (parts) attached with the product for use. When constantly exposed to water, introduce normal atmosphere with a long tube.

For precautions during mounting, installation, adjustment, use and maintenance, refer to the CKD Components Product Site (https://www.ckd.co.jp/kiki/en/) → "Model No.→ Instruction Manual