Compact electronic pressure switch

PPE Series

Circuit diagram symbol 

Refer to the CKD website for detailed compatible model Nos.

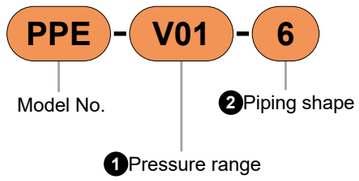
Overview

Pressure switch PPE Series is trimmer setting semiconductor pressure switch developed for pneumatic/ vacuum systems. Usage is flexible due to compact shape and three types of piping connection (R1/8, ø6 plug, ø6 push-in fitting).

Features

- Semiconductor pressure sensor
  Used semiconductor sensor pressure detection, high precision and high reliability are achieved.
- 2-wire
  Wiring man-hours are 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 vacuum burst 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
  ø6 plug
  ø6 push-in fitting

Model No. Notation Method



1 Pressure range

Code	Description
V01	−101.3 to 0 kPa
P01	0 to 101 kPa
P10	0 to 1 MPa

2 Piping shape

Code	Description	
6	R1/8	
H6-B	ø6 mm plug	
H6	In-line of push-in fitting for ø6 (2 pcs.)	

Clean-room specifications (Catalog No. CB-033SAA)

●Anti-dust generation structure for use in cleanrooms

PPE -··· P70

PPE -··· P80

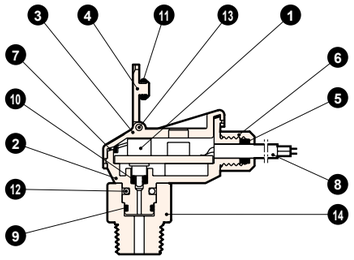
Specifications

Model No. / Item	Vacuum	For positive pressure	
	PPE-V01-□ *1	PPE-P01-□ *1	PPE-P10-□ *1
Rated pressure	−101.3 to 0 kPa	0 to 100 kPa	0 to 1 MPa
Plate color *2	Red	Green	Blue
Pressure sensitive element	Diffusion semiconductor pressure sensor		
Applicable fluid	Air/non-corrosive gas		
Proof pressure	0.6 MPa	0.3MPa	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 lamp	Yellow LED lit when ON		
Lead wire length	Standard 3 m (oil resistant vinyl cabtyre cable 2-conductor 0.15 mm² Insulator outer diameter ø1.0)		
Operating ambient temperature range	0 to 50°C (no freezing)		
Vibration resistance	10 to 55 Hz compound amplitude 1.5 mm 4 hours per X, Y, Z direction		
Degree of Protection	IEC standards IP65 or equivalent		
Piping method	R1/8, ø6 plug, ø6 push-in fitting		
Weight	PPE-□-6/-H6-B: Approx. 37 g, PPE-□-H6: Approx. 42 g		

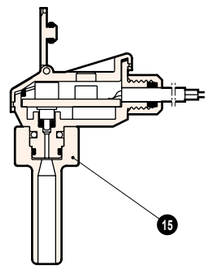
*1: □ section is matched to piping section. (Refer to Model No. Notation Method)
*2: Name plate color is changed by pressure range. (To prevent improper use when intermixed)

Internal Structure Diagram / Material

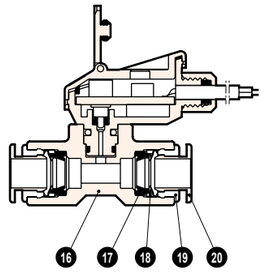
●PPE-□-6



●PPE-□-H6-B



●PPE-□-H6

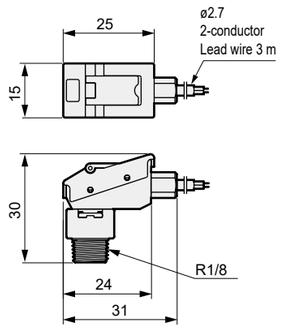


Cannot be disassembled

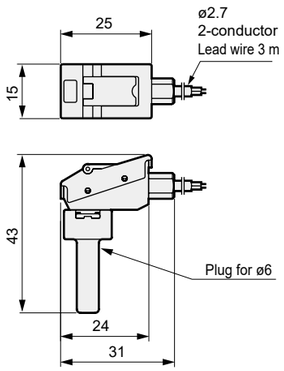
Part No.	Part name	Material	Part No.	Part name	Material
1	Pressure sensor	Diffusion semiconductor strain gauge	11	O-ring	Nitrile Rubber
2	Body	Polybutylene terephthalate	12	Stopper	Stainless steel
3	Cover	Polycarbonate	13	Spring pin	Stainless steel
4	Trimmer guard	Polycarbonate	14	R1/8	Polybutylene terephthalate
5	Bush	Nitrile Rubber	15	Plug	Polybutylene terephthalate
6	Bush holder	Aluminum	16	Push-in fitting	Polybutylene terephthalate
7	Cover gasket	Silicone 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

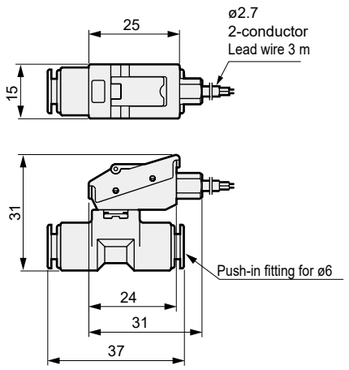
●PPE-□-6



●PPE-□-H6-B

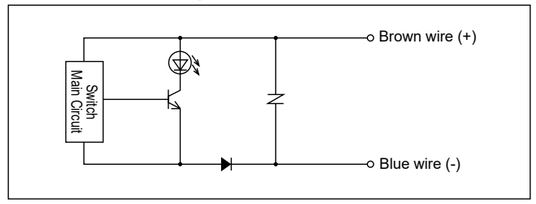


●PPE-□-H6

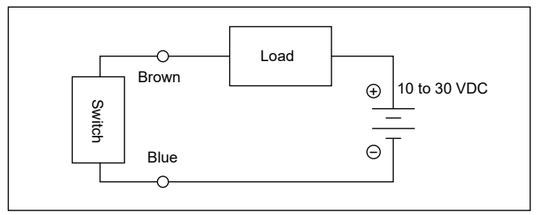


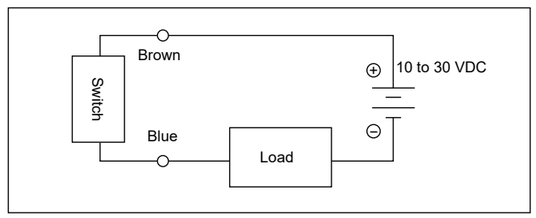
Internal circuit / connection method

●Internal circuit diagram



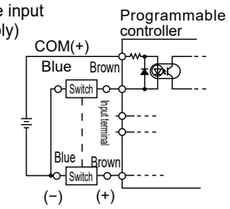
●Connecting the lead wire



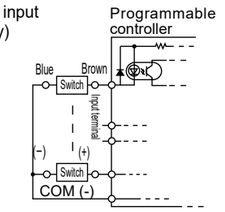


●Connection to programmable controller (PLC)

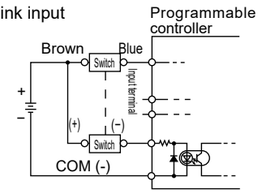
●Connection to source input (external power supply)



●Connection to source input (internal power supply)



●Connection to sink input



Safety Precautions

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

Compact electronic pressure switch (pressure switch) PPE 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.

■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 outside.

■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.

■Be careful of internal voltage drop.
When using with a voltage less than the specified voltage, the pressure switch may be activated correctly, but the load may not function correctly. Check the load working voltage to see that the following formula is satisfied: Power supply voltage - internal voltage drop > load working voltage

■Pay attention to the leakage current.
Even when the 2-wire pressure switch is OFF, the 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 fail. 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.

■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 100m/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 sensor, be sure to ground the components 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.

■Handling the product
- When installing the product, hold the body section so that impact is not applied to the body and excessive stress is not applied to the lead wire.
- Do not disassemble or dismantle the product. If disassembled, parts could pop off when pressure is applied. 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 short-circuit the PPE's brown and blue wires to recover normal switch operations.

■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.

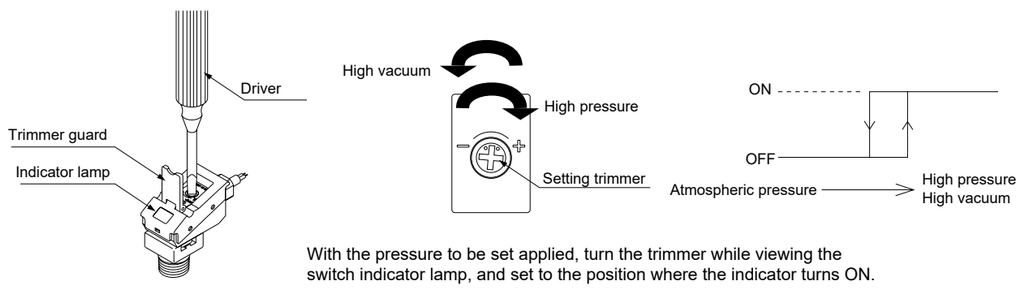
[Precautions for installation]

■Driver
When setting, use a flathead screwdriver or a 1-bit Phillips screwdriver that matches the trimmer grooves (0.5 W × 2.3 L × 0.5 D).

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

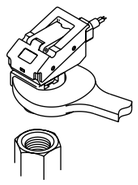
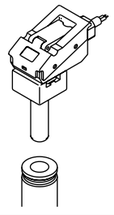
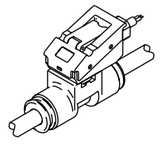
■Opening and closing the trimmer guard
Use a flathead screwdriver to open the trimmer guard and set the trimmer. After setting, press the trimmer guard with a finger and completely close it. The degree of protection (IP65) is not satisfied if the cover is not completely closed.

Setting pressure and switch operations



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

Piping method

PPE-□-6	PPE-□-H6-B	PPE-□-H6
		
Use sealing tape or sealant, and catch a wrench against the width across flats (13 mm) of the R1/8 fitting to install. (Precautions) 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. (Precautions) • 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. (Precautions) • Use the designated tube and plastic plug. Tube outer diameter accuracy Nylon, soft nylon tube: Within ±0.1 mm Polyurethane tube: +0.1 mm or less New urethane tube: −0.2 mm or more and with hardness of 93° and over. • Securely insert the tube completely to the end, and make sure that the tube cannot be pulled out. If the tube is not fully inserted, it could be dislocated or air could leak. • Cut the tube with a dedicated cutter and always at a right angle.

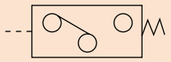
For precautions during mounting, installation, adjustment, use and maintenance, refer to the CKD Components Product Site (https://www.ckd.co.jp/kiki/en/) → "Model No.→ Instruction Manual

MEMO

Pressure switch
Electronic pressure Switch
Contact Confirm Switch
For Coolant Pressure Switch
Ending

Compact electronic pressure sensor (pressure sensor)
Analog output

PPE-□A Series

Circuit diagram symbol 

Refer to the CKD website for detailed compatible model Nos.

Overview

Pressure sensor PPE-A Series is semiconductor pressure sensor developed for pneumatic/vacuum systems. Output proportional to applied voltage: 1 to 5 V (analog output). Usage is flexible due to compact shape and three types of piping connection (R1/8, ø6 plug, ø6 push-in fitting).

Features

- Semiconductor pressure sensor: Used semiconductor sensor pressure detection, high precision and high reliability are realized.
- Analog output: Analog output proportional to impressed voltage (1 to 5 V).
- Power supply indicator lamp: When power is energized, green LED lights to show operational status at load short circuit.
- Integrated protection circuit to prevent power reverse connection/load short-circuit
  A protection circuit for improper wire connection (power reverse connection, load short-circuit) is integrated.
- Selectable pipe connection method: R1/8, ø6 plug, ø6 push-in fitting

Model No. Notation Method

PPE - V01 A - 6

Model No. ❶Pressure range ❷Piping shape

❶Pressure range

Code	Description
V01	0 to −100 kPa
P01	0 to 100 kPa
P10	0 to 1 MPa

❷Piping shape

Code	Description	
6	R1/8	
H6-B	ø6 mm plug	
H6	Push-in fitting for ø6 (2 pcs.) inline	

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

- Anti-dust generation structure for use in cleanrooms

PPE-□A-····-P70

PPE-□A-····-P80

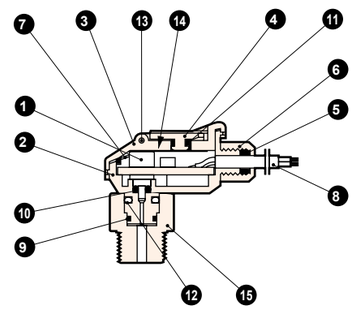
Specifications

Model No. / Item	Vacuum	For positive pressure	
	PPE-V01A-□ *1	PPE-P01A-□ *1	PPE-P10A-□ *1
Rated pressure	0 to −100 kPa	0 to 100 kPa	0 to 1 MPa
Plate line color *2	Red	Green	Blue
Pressure sensitive element	Diffusion 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 lamp	Green LED lighting when power supply is energized		
Lead wire length	Standard 3 m (oil resistant vinyl cabtyre cable 3-conductor 0.15 mm² Insulator outer diameter ø1.0)		
Protection circuit	Power reverse connection protection, load short-circuit protection		
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		
Withstand voltage	1000 VAC for 1 minute		
Vibration resistance	10 to 55 Hz compound amplitude 1.5 mm 4 hours per X, Y, Z direction		
Degree of Protection	IEC standards IP65 or equivalent		
Piping method	R1/8, ø6 plug, ø6 push-in fitting		
Weight	PPE-□-6/-H6-B: Approx. 37 g, PPE-□-H6: Approx. 42 g		

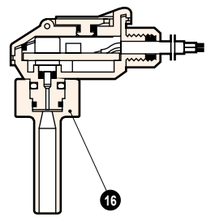
*1: □ section is matched to piping section. (Refer to Model No. Notation Method)
*2: Name plate line is changed by pressure range. (To prevent improper use when intermixed)

Internal Structure Diagram / Material

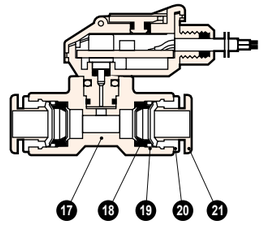
●PPE-□A-6



●PPE-□A-H6-B



●PPE-□A-H6

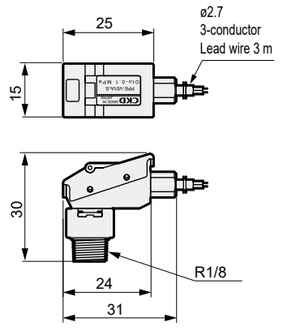


Cannot be disassembled

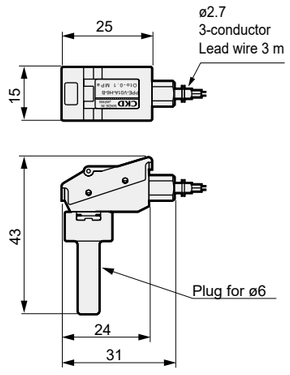
Part No.	Part name	Material	Part No.	Part name	Material
1	Pressure sensor	Diffusion semiconductor strain gauge	12	Stopper	Stainless steel
2	Body	Polybutylene terephthalate	13	Spring pin	Stainless steel
3	Cover	Polycarbonate	14	Shield sheet	Aluminum
4	Trimmer guard	Polycarbonate	15	R1/8	Polybutylene terephthalate
5	Bush	Nitrile Rubber	16	Plug	Polybutylene terephthalate
6	Bush holder	Aluminum	17	Push-in fitting	Polybutylene terephthalate
7	Cover gasket	Silicone 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

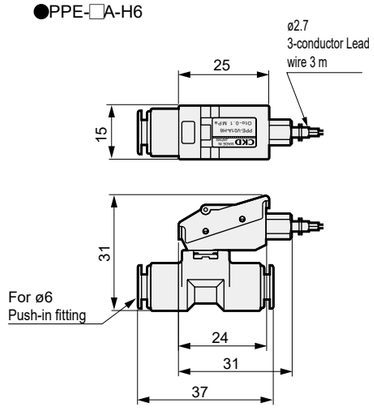
●PPE-□A-6



●PPE-□A-H6-B

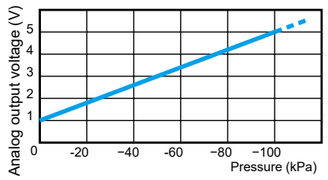


●PPE-□A-H6

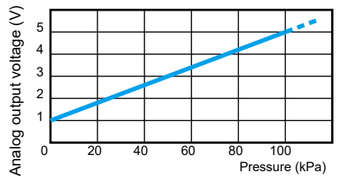


Analog output voltage - pressure characteristics

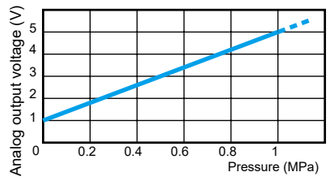
●PPE-V01A-□



●PPE-P01A-□

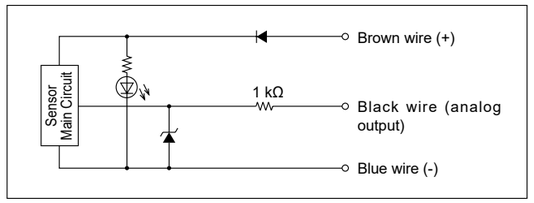


●PPE-P10A-□



Internal circuit / connection method

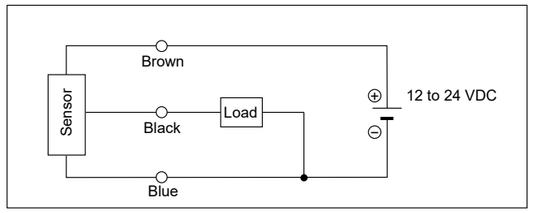
●Internal circuit diagram



●Lead wire color and content

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

●Connecting the lead wire



Pneumatic components (electronic pressure switch and sensor)

Safety Precautions

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

Product-specific cautions: Compact electronic pressure sensor Analog output PPE-/A 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.

■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 outside Please.

■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.

■How to wire
Turn power OFF before wiring this product. Discharge static electricity charged in the 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
This product and its wiring should be installed as far away from noise sources such as strong power lines as possible. Take separate countermeasures against surge that enter the power wire.

■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 flywheel diode onto all inductive loads in the same power circuit.

■Analog output accuracy
Analog output accuracy is affected by temperature characteristics and heat generated when energized. Provide a standby time (5 minutes or more after energizing) before use.

■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

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

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

Output value error ⇨approx. 0.1%

■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 sensor, be sure to ground the components 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.

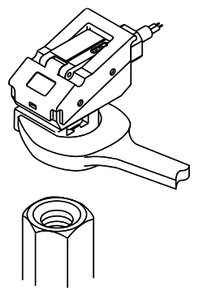
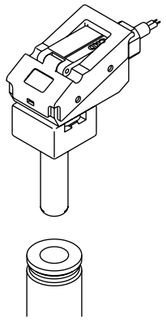
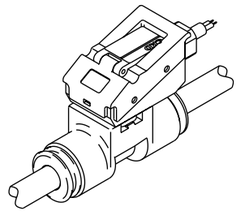
■Components When selecting dryer, air filter, oil mist filter or regulator, select a device with a flow rate higher than that used by proportional pressure controls.

■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.

■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.

[Piping method]

PPE-□A-6	PPE-□A-H6-B	PPE-□A-H6
		
Use sealing tape or sealant, and catch a wrench against the width across flats (13 mm) of the R1/8 fitting to install. (Precautions) 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. (Precautions) ・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. (Precautions) ・Use the designated tube and plastic plug. Tube outer diameter accuracy Nylon, soft nylon tube: Within ±0.1 mm Polyurethane tube: +0.1 mm or less New urethane tube: −0.2 mm or more and with hardness of 93˚ and over. ・Securely insert the tube completely to the end, and make sure that the tube cannot be pulled out. If the tube is not fully inserted, it could be dislocated or air could leak. ・Cut the tube with a dedicated cutter and always at a right angle.

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

Compact Electronic Pressure Sensor

PPEV-□A Series

Refer to the CKD website for detailed compatible model Nos.

Overview

The electronic compact pressure sensor PPEV-A Series is a semiconductor pressure sensor for pneumatic and vacuum systems. Output proportional to applied voltage: 1 to 5 V (analog output). Compact at just 10 mm wide, it can be connected to small components such as pneumatic valves for use in output confirmation, etc.

Features

- Semiconductor pressure sensor: Uses a semiconductor sensor for pressure detection to achieve high accuracy and high reliability.
- Compact and Lightweight: Just 10 mm wide and 11 g light.
- Connector wiring: Uses a connector in the sensor connection part, enabling easy pressure sensor replacement.
- Confirmation of pneumatic valve output: Use in combination with the 4GR and 3QR Series for confirmation of output and vacuum suction.

Model No. Notation Method

PPEV - P10A - H4-B

- PPEV: Model No.
- P10A: ❶Pressure range
- H4-B: ❷Port size

❶Pressure range

Code	Description
P10A	0 to 1 MPa
V01A	-100 to 0 kPa

❷Port size

Code	Description	
H4-B	ø4 mm plug	
H6-B	ø6 mm plug	
M5	M5	

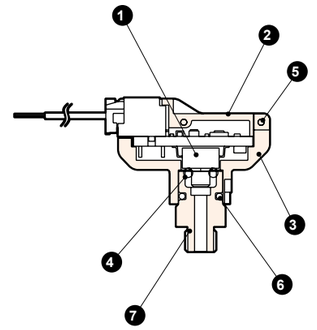
Specifications

Item		Positive pressure	Negative pressure
		PPEV-P10A-□	PPEV-V01A-□
Working pressure		0 to 1.0 MPa	-100 to 0 kPa
Service voltage		10.8 to 30.0 VDC	
Current consumption		5 mA (no 24 VDC load)	
Pressure detection method		Diffused semiconductor pressure switch	
Applicable fluid		Compressed air	
Proof pressure		1.5 MPa	0.5 MPa
Ambient temperature		0 to 55 °C	
Analog Output	Output voltage	1 to 5 V	
	Zero point voltage	1±0.1 V	
	Linearity	±0.5% F.S. max	
	Temperature characteristics	±2% F.S. max	
	Output current	0.5 mA max. (load resistance 10 kΩ)	
Indicator		None	
Wiring method		Connector connection	
Wire length		1000 mm	
Insulation resistance		20 MΩ and over at 500 VDC	
Withstand voltage		1000 VAC for 1 minute	
Shock resistance		300 m/s^2 or less	
Vibration resistance		50 m/s^2 or less	
Degree of Protection		Dust-proof	
Piping method		M5, ø4 plug, ø6 plug	
Weight	Note	PPEV-□-M5: 11.2 g, PPEV-□-H-4B: 10.7 g, PPEV-□-H-6B: 11.1 g	

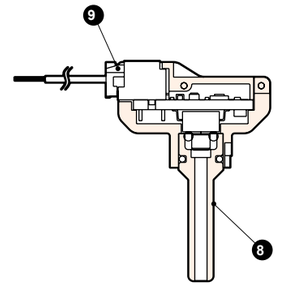
Note: Weight includes connector wiring.

Internal Structure Diagram / Material

●PPEV-□A-M5



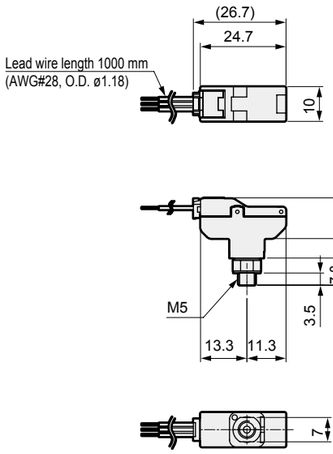
●PPEV-□A-H4(H6)



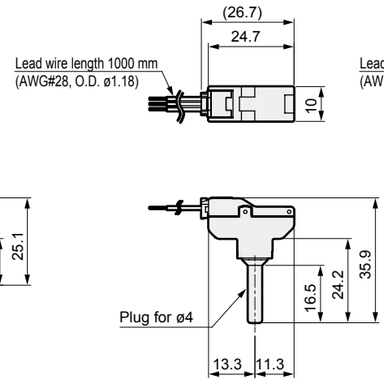
Part No.	Part name	Material	Part No.	Part name	Material
1	Pressure sensor	Diffusion semiconductor strain gauge	6	Fixing clip	Stainless steel
2	Cover	Resin	7	M5 Pipe adaptor	Aluminum
3	Case	Resin	8	ø4 pipe adaptor	Resin
4	O-ring	Nitrile Rubber	9	Connector	-
5	Spring pin	Stainless steel			

Dimensions

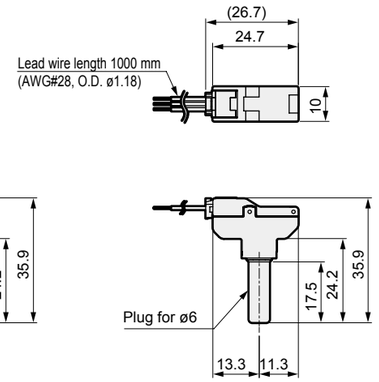
●PPEV-□A-M5



●PPEV-□A-H4



●PPEV-□A-H6

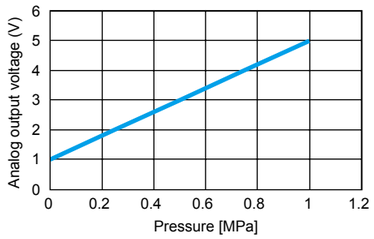


Caution

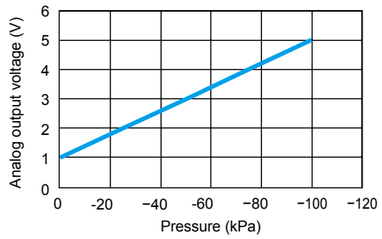
- Analog output accuracy is affected by temperature characteristics and heat generated when energized. Provide a standby time (5 minutes or more after energizing) before use.

Analog output voltage - pressure characteristics

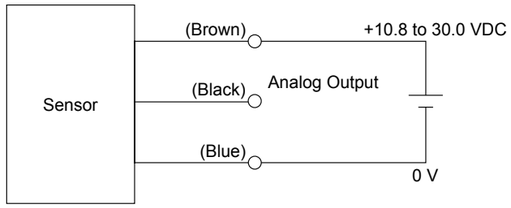
●PPEV-P10A



●PPEV-V01A



Circuit diagram and wiring method



Lead wire color and content

Line color	Description
Brown	Power supply (10.8 to 30.0 VDC)
Black	Analog output (1 to 5 V)
Blue	GND (0V)

Note: The impedance of the analog output is 10 Ω. When connecting a load resistor, use 10 kΩ and over.

$$\text{Output value} = \left(1 - \frac{R_0}{R_0 + R_X}\right) \times 100\%$$

$$\text{Output value} = \left(1 - \frac{10}{10+10000}\right) \times 100\% = 99.9\%$$

Output value error
Approx. 0.1%

Pressure sensor impedance: R_0= 10 Ω
Load internal impedance: R_X=10 kΩ

Pneumatic components (electronic pressure switch and sensor)

Safety Precautions

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

Product-specific cautions: Compact electronic pressure sensor PPEV-/A 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 sensor, be sure to ground the components frame ground (F.G.) terminal.
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■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.

MEMO

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

Pressure switch
Electronic pressure Switch
Contact Confirm Switch
For Coolant Pressure Switch
Ending