CKD

SM-235591-A

INSTRUCTION MANUAL

COMPACT ELECTRONIC

PRESSURE SWITCH

PPE

- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

Ver.3
CKD Corporation

For Safety Use

To use this product safety, basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism, is required (to the level pursuant to JIS B 8370 Pneumatic System Rules).

We do not bear any responsibility for accidents caused by any person without such knowledge or arising from improper operation.

Our customers use this product for a very wide range of applications, and we cannot keep track of all of them. Depending on operating conditions, the product may fail to operate to maximum performance, or cause an accident. Thus, before placing an order, examine whether the product meets your application, requirements, and how to use it.

This product incorporates many functions and mechanisms to ensure safety. However, improper operation could result in an accident. To prevent such accidents, **read this operation manual carefully for proper operation.**

Observe the cautions on handling described in this manual, as well as the following instructions:

⚠ Precautions :

- This product is designed for air and compressed dry air. Do not use it with corrosive and combustible gases.
- Do not touch electric wiring connections (exposed live parts): this will cause an electric shock. During wiring, keep the power off. Also, do not touch these live parts with wet hands.

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PPE
Compact electronic pressure switch
Manual No. SM-235591-A

1. PRODUCT

1.1 Specifications

Model code / Item	Vacuum	Positive pressure	
	PPE-V01- ※1	PPE-P01- ※1	PPE-P10- ※1
Rated pressure	−101.3 kPa to 0 kPa	0 kPa to 100 kPa	0 MPa 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	0.3 MPa	1.5 MPa
Repeatability	±1% F.S.		
Hysteresis	3% F.S. or less		
Temperature characteristics	±3% F.S.		
Load voltage	10 VDC to 30 VDC		
Load current	5 mA 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 mm^2 insulator outer diameter ø1.0)		
Operating ambient temperature range	0°C to 50°C (no freezing)		
Degree of protection	IEC standards IP65 or equivalent		
Vibration resistance	10 Hz to 55 Hz compound amplitude 1.5 mm 4 hours per X, Y, Z direction		
Piping method	R1/8, ø6 plug, ø6 push-in fitting		
Weight (with cable)	37g (R1/8 type, plug type) 42g (push-in fitting type)		
Weight (without cable)	9g (R1/8 type, plug type) 14g (push-in fitting type)		

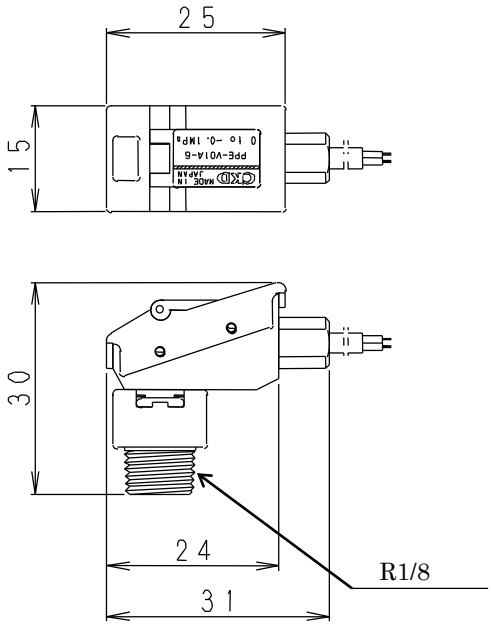
※1. □section is matched to piping section.
(Refer to How to order.)
※2. Name plate color is changed by pressure range.
((To prevent improper use when intermixed.)

1.2 External Dimension

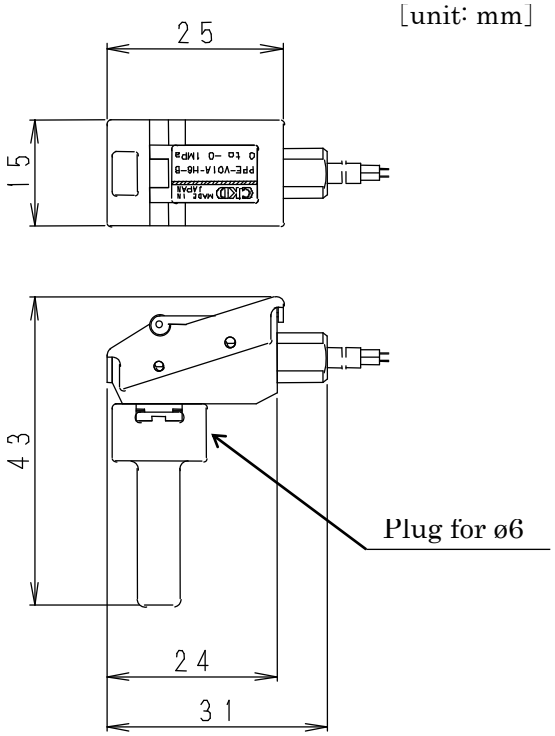
1.2.1 External Dimension

[unit: mm]

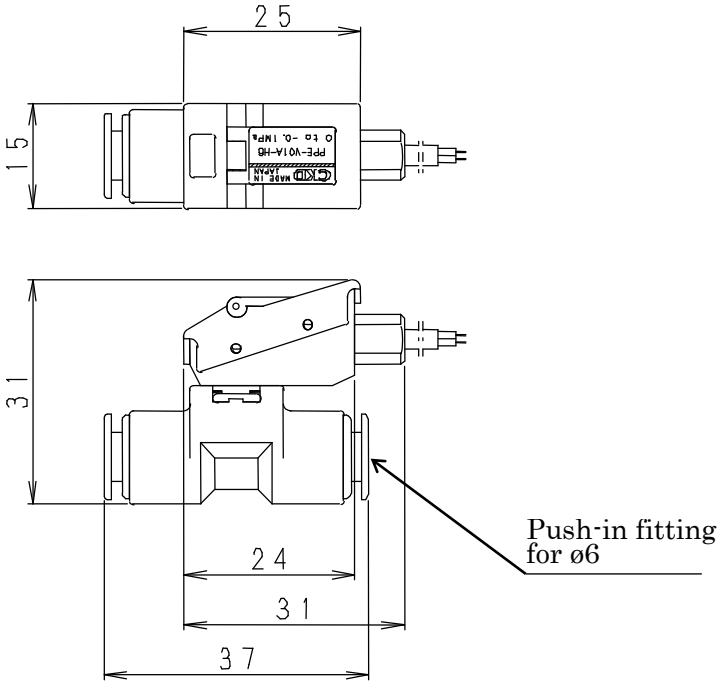
● PPE - □ - 6



● PPE - □ - H6 - B

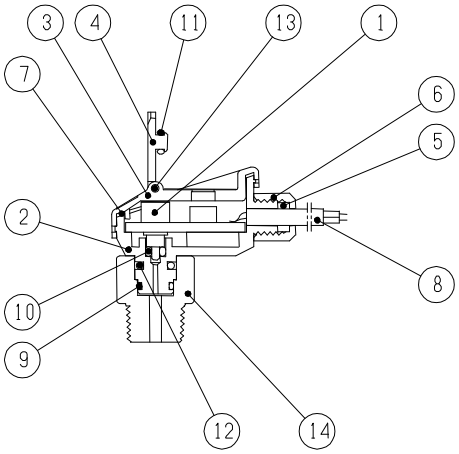


● PPE - □ - H6



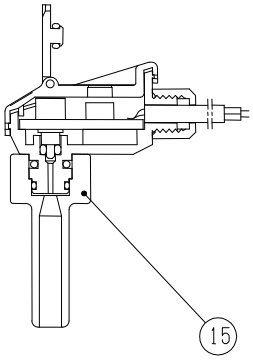
1.3 Internal Structure Drawing

● PPE - 6

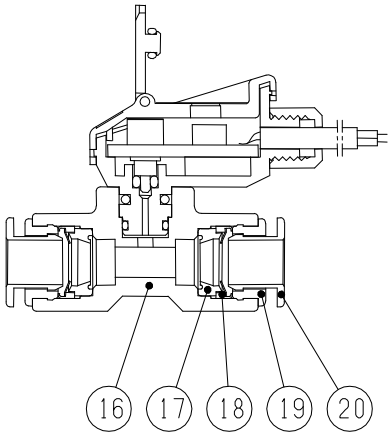


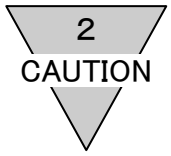
Number	Parts	Material
1	Pressure sensor	Diffusion semiconductor strain gauge
2	Body	PBT
3	Cover	PC
4	Trimmer guard	PC
5	Bush	NBR
6	Bush holder	A2017
7	Cover gasket	VMQ
8	Lead wire (3 m)	PVC
9	O-ring	NBR
10	O-ring	NBR
11	O-ring	NBR
12	Stopper	SUS304WPB
13	Spring-pin	SUS420
14	R1/8	PBT
15	Plug	PBT
16	Push-in fitting	PBT
17	Packing	NBR
18	Chuck	C3604B (electroless nickeling)
19	Outer ring	C3604B (electroless nickeling)
20	Push ring	POM

● PPE - □ - H6 - B



● PPE - □ - H6





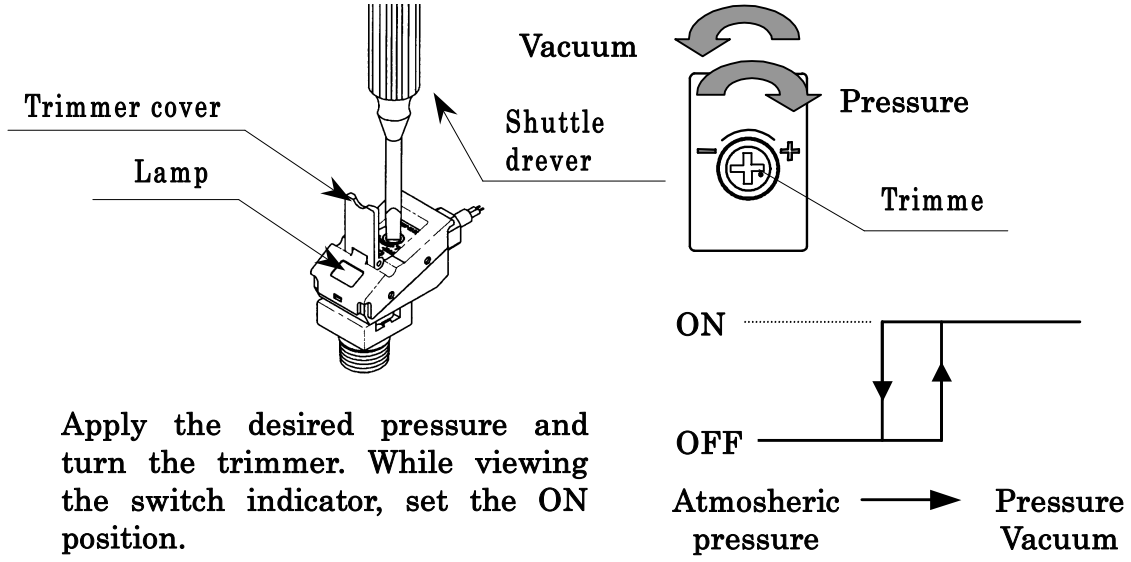
2. CAUTION

2.1 Caution of Handling the Product

1) In installation, please be sure to hold the product's main body to prevent any impact to body and stress to the flying lead.
2) Please do not apply other media than "indicated" applicable media. In case other media is used, we are not in a position to guarantee the performance of the product and assure the safety. Please never apply corrosive gases, inflammable gases, oxygen etc.
3) When vacuum suction is checked and the positive pressure for vacuum break is applied to this product, ensure the pressure does not exceed the specified value.
4) Do not disassemble this product. If the product is disassembled, a part may be ejected when pressure is applied.
5) Connection area between the body and the joint can be rotated. Do not rotate it repeatedly.
6) The protection is equivalent to IP65. Do not use the product in an environment where water splashes. Take necessary measures to prevent leakage of machining oil or coolant fluid.

3. OPERATION

3.1 Pressure Setting Method and Switch Operation



Apply the desired pressure and turn the trimmer. While viewing the switch indicator, set the ON position.

Precautions for setting

(1) Driver

In setting, use a flat edged screwdriver that fits the trimmer groove (0.5 W x 2.3 L x 0.5 D) Or use a 1-bit cross head screwdriver.

(2) Trimmer

The trimmer turning range is 240 degrees. Further turning or turning by force may break the trimmer.

(3) Closing/opening the trimmer cover

After setting, press the trimmer cover with a finger to close it firmly. If the cover is not closed firmly, protection specification (IP65) has not been fulfilled. When setting, open the trimmer cover with a flat edged screw driver.

4. INSTALLATION

4.1 Piping

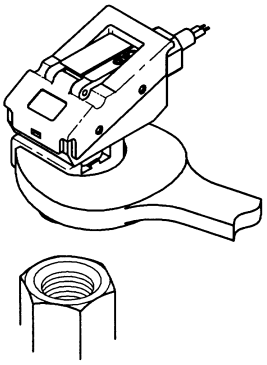
1) PPE - □ - 6

Place seal tape or a sealing material and use a wrench at the width across flats (13mm) of the R1/8 joint for installation.

(Precautions)

The tightening torque must be 1.0 N·m to 1.5 N·m or less. Since it is made of resin, excessive tightening may break the pipe.

PPE - □ - 6



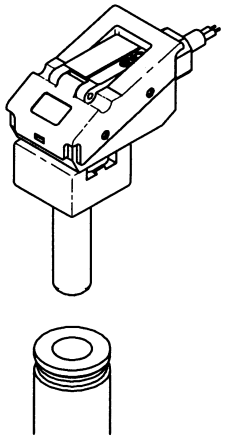
2) PPE - □ - H6 - B

This type should be installed onto CKD ø6 push-in fitting.

(Precautions)

- Plug part should be inserted firmly and before use, plug should be checked that it is not inserted to the end, plug can be come out and leakage may happen.
- Following push-in joints are recommended, GZ series, GW series and GM series.

PPE - □ - H6 - B



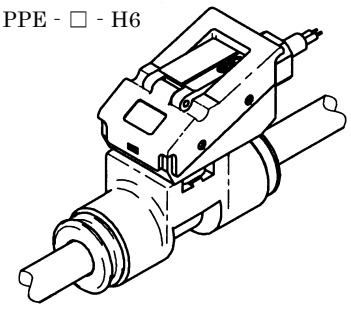
3) PPE - □ - H6

Insert 6mm tubes into 2 quick joints for use.

(Precautions)

- Following tubes are recommended nylon tube, soft nylon tube, Urethane tube, non-inflammable tube.
- Tubes should be inserted firmly and before use tube should be checked that it is not come out. In case the tube is not inserted to the end, tube can be come out and leakage may happen.
- Cut the tube vertically.

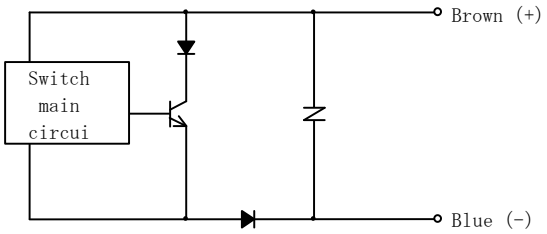
PPE - □ - H6



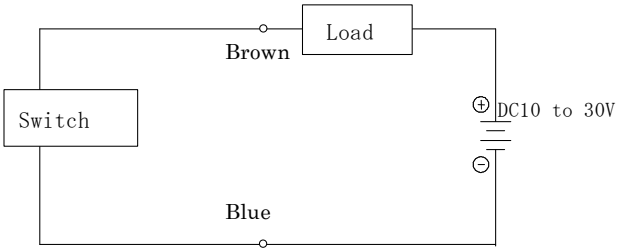
4.2 Wiring

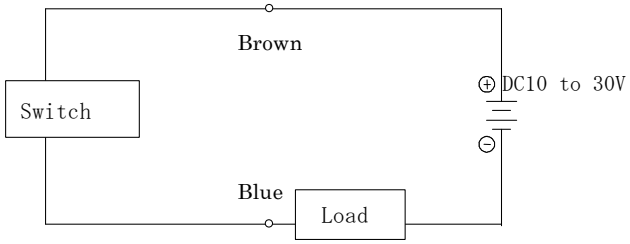
4.2.1 Internal Circuit Diagram and Connection

1) Internal circuit diagram

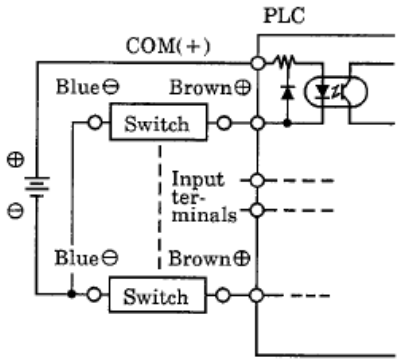


2) Connecting the lead wire

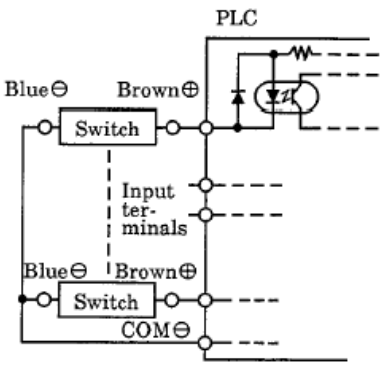




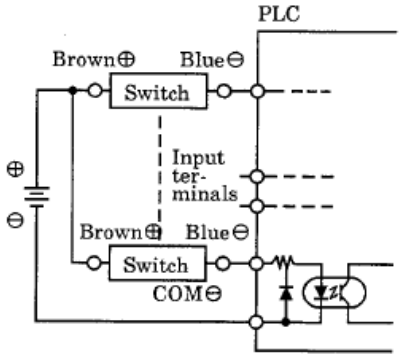
3) Connection to programmable controller (PLC)



Connection to source input type (an external power source)



Connection to source input type (an internal power source)



Connection to sink input type

4) Precautions for wiring

(1) Wiring

Please be sure that the wiring works are done after the electrical supply was cut. Before and during the wiring works, charged static electricity on body or on tools should be discharged. For moving part, flexible cables should be used.

(2) Wiring installation

This product and wiring should be installed as much away as possible from those noise source like strong electric cables. Also please take measures for surge transferred to power source cable.

(3) Power voltage

Do not use this component with higher voltage than specified. If voltage exceeds the specification or alternative current (AC100V) is applied, the equipment may be damaged or burned.

(4) Short-circuiting

Do not short-circuit the wiring, otherwise, damage or burning may occur.

(5) Incorrect wiring

Connect wires to the correct poles or terminals, otherwise, wires may be damaged or burned.

(6) Load

If an inductive load like relay or solenoid valve is used, surge voltage will occur when the switch is turned OFF. Provide flywheel diodes directly to all inductive loads in the same power circuit.

(7) Protection circuit for short-circuited by mistake, the built-in protection circuit for sort-circuiting functions and the switch will remain OFF. After correcting the wiring, turn off the power or short-circuit the brown wire and the blue wire of PPE to return to normal switch operation.

5. MAINTENANCE

5.1 Trouble Shooting

Ir-regular phe-nomenon	Cause	Disposal to correct
Switch output dose not turn ON	Non connection	Check outside wiring
	Broken wiring (Breakage by curvature)	The wiring should be changed so that the curvature will not be happened to only one point of the flying lead, or use flexible wires.
	Broken wiring (Breakage by tension)	The wiring should have allowance so that any tensions will not be happened to the flying lead.
	Not enough pressure is applied.	Check applied pressure.
	Incorrect setting	Check the setting values.
	Incorrect wiring (Reverse connection)	Do wiring connection correctly.
	Incorrect wiring (Short-circuiting)	After correcting the wiring, release the operation of the protection circuit by switching ON/OFF the voltage source.
	Miss matching with PLC input (Internal Voltage dropmax.4v)	Check PLC input spec. (ON voltage) and load voltage.
	Damage of PPE (Sensor breakage by over-pressure)	Replace PPE
	Damage of PPE (Damage of circuit)	Replace PPE
	Damage of PPE (Damage of trimmer)	Replace PPE
Switch output dose not turn OFF	Pressure is kept applied	Check applied pressure.
	Incorrect setting	Check the setting values.
	Miss matching with PLC input (Leak current max.1mA)	Check PLC input spec. (OFF current or revertive voltage) and load voltage.
	Damage of PPE (Sensor breakage by over-pressure)	Replace PPE
	Damage of PPE (Damage of circuit)	Replace PPE
	Damage of PPE (Damage of trimmer)	Replace PPE
Switch output is not stable, i.e.switch turns ON and OFF alternately.	The difference between applied pressure and the set pressure is too small.	Review the set pressure or applied pressure.
	The ripple of applied pressure is big	Review piping connection or the set pressure.
The trimmer cover opens and the air leaks from there.	Sensor breakage by over-pressure	Replace PPE Take measures so that the higher pressure than the proof pressure will not be applied.

6.HOW TO ORDE

6.1 How To Order

PPE – VO1 – 6
[A] [B]

[A]: Pressure range		[B]: Piping shape	
V01	0 kPa to –101.3 kPa	6	Rc1/8
P01	0 kPa to 100 kPa	H6-B	ø6 mm plug
P10	0 MPa to 1 MPa	H6	In-line of push-in fitting for ø6 (2 pcs.)