Pneumatic components (sensors)

Safety Precautions

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

Contact confirmation switch (gap switch) GPS2 Series

During Design and Selection

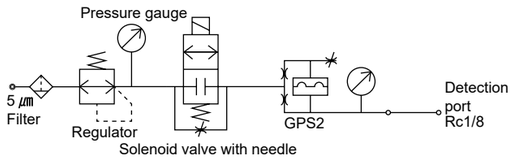
⚠WARNING

■Use the product in the range of conditions specified for the product. Contact CKD when using the product outside specifications or for special applications.
Use of the product outside the specifications range may result in insufficient performance, and its safety cannot be guaranteed.

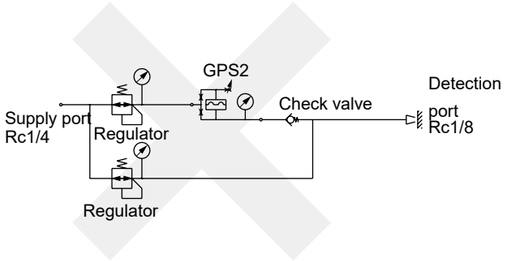
■Confirm before use that the product will withstand the working environment.
- This product cannot be used in environments where functional obstacles could occur.
- The main materials of this product are aluminum and resin. Do not use in atmospheres where corrosive gases are generated. Such environments include high temperatures, chemical atmospheres, where chemical liquids, vibration, moisture, water dripping, coolant, or gas is present; where ozone is generated; chemical plants, semiconductor pre-processing, outdoors, etc.
- Compressed air quality must satisfy JIS1.4.1, "oilless clean dry air."

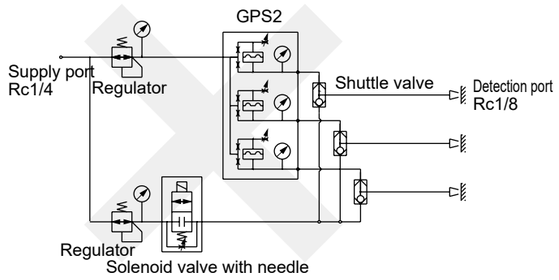
■Understand compressed air features before designing a pneumatic circuit.
This product has a small orifice, so to prevent the entry of foreign matter, use clean air with the recommended circuit shown below (Fig. 1).

Fig. 1 Recommended circuit



■Do not use the following air circuit when blowing air from the detection nozzle.
- Circuit with check valve
  The check valve acts as exhaust resistance, and limits the adjustable range.
- Circuit with shuttle valve and 2-way valve
  Residual pressure in the OUT side of the 2-way valve prevents a correct detection. Even if a 3-way valve is used, the shuttle valve may vibrate excessively.





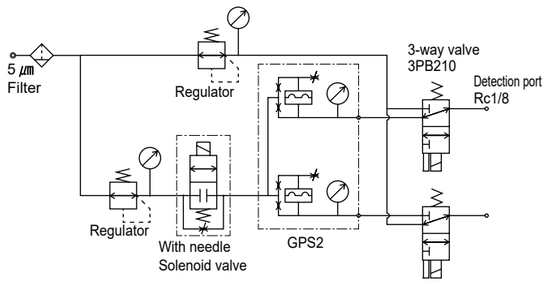
⚠CAUTION

■The entry of compressor oil and tarry substances may obstruct the flow of air and result in problems. Regularly inspect the compressor and discharge drainage.

■Keep the air flow constant so coolant and oil do not flow back from the detection nozzle, or use a solenoid valve with needle and let in a small amount of air from the bypass as shown in the recommended circuit (Fig. 1).

■Swarf and grinder chips, etc., could clog the nozzle. Increasing the supply pressure to blow these out will have no effect. Provide a 3-way valve on the pressurized nozzle as shown below (Fig. 2). The orifice for the 3-way valve should be ø2.5 mm or larger.

Fig. 2 Circuit for detection and air blow



■Select an output format (NPN, PNP) matching the input unit of the programmable controller being used.

■Operation may be disabled if a capacitance load such as an AC/DC buzzer is connected to the load. Turn power OFF and restart in this case. A protection circuit is provided to prevent damage from incorrect wiring or overcurrent. A relay must be used when connecting a capacitance load.

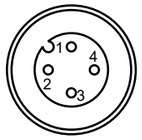
■GPS2 Precautions
- Detection side — Use inner diameter ø4 and outer diameter ø6 for piping.
- An air bridge circuit is used for this product. Even if the fine air solenoid valve is turned OFF, Even if the fine air solenoid valve is turned OFF, the output is not turned OFF, which is the same for the conventional pressure switch. Output is ON—OFF according to the pressure of a workpiece. Care must be taken when creating the program. If the program has already been created and cannot be changed, stop the fine air. Note that a delay of one second occurs when output is ON—OFF.
- Pressure switch and solenoid valve with fine air
  When the fine air solenoid valve is ON → Workpiece absent: OFF Workpiece present: ON
  When the fine air solenoid valve is OFF → Workpiece absent: OFF Workpiece present: OFF
- GPS2 and solenoid valve with fine air
  When the fine air solenoid valve is ON → Workpiece absent: OFF Workpiece present: ON
  When the fine air solenoid valve is OFF → Workpiece absent: OFF Workpiece present: ON

■Observe the following items when installing:
- Install this product so the detection port faces downward.
- Install this product at a position higher than the seating surface to prevent coolant from entering.
- Provide enough space for adjustment, monitoring, and maintenance.
- Use rust-resistant material such as nylon tubes or stainless steel pipes for piping material.
- When installing this product on a device, check that no load is applied to the device.
- When using steel pipes, securely fix the pipe to prevent excessive bending force from being applied to the connection.
- When welding near this product, cover it to prevent spatter from coming in contact.
- When housing this product in a box, provide an exhaust port so atmospheric pressure is maintained in the box.

■Observe the following items when wiring:
- When using a switching regulator for the power supply, ground the F.G. (frame ground).
- Avoid using in a transient state, continuing 1s after power is turned ON.
- Take special care to prevent load short-circuits or incorrect wiring. The protective circuit is activated. Turn power OFF to restart the product.
- Connector pins are arranged as shown in Fig. 3. Take special care to prevent incorrect wiring.

Brown → 24 VDC
Blue → 0 VDC
Black → signal, open collector

Fig. 3 Connector pin array (body side)

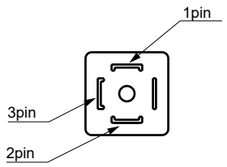


PIN array/lead wire color list

PIN No.	Electrical connection option (-C1, -C3, -C5) lead wire color	Applications
1pin	Brown	Power supply +
2pin	White	NC
3pin	Blue	Power supply -
4pin	Black	Output

The assignment of the DIN terminal box terminal numbers is shown in Fig. 4.

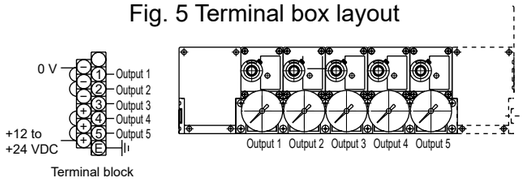
Fig. 4 DIN terminal box pin array (body side)



PIN No.	Applications
1pin	Power supply +
2pin	Power supply -
3pin	Output

When using the common terminal box, power supply terminals are on the lower side of the gland. Signal wire terminals are on the upper row. This product is wired as shown in Fig. 5.

Fig. 5 Terminal box layout



When using a load with a large rush current, such as a motor, the protection circuit will activate. In this case, use a relay.

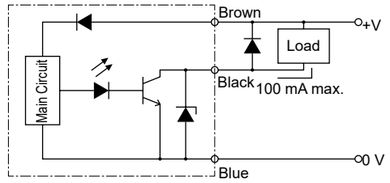
If there is a device (motor, welder) that generates a large surge near this product, insert a surge absorber, such as a varistor, at the source of the surge.

If this product's lead wire is wired with the drive cable or power cable, it is affected by surge and noise deteriorating or damaging the sensor element in the switch. Use separate wiring.

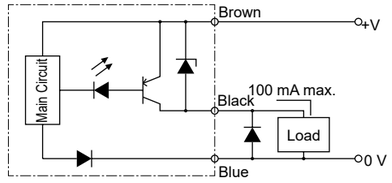
NPN output and PNP output contact confirmation switches are available. The lamp turns ON even if program controller compliance is incorrect, but signals are not retrieved. Wire the switch based on the output as shown in Fig. 6.

Fig. 6 Output circuit

(NPN output)



(PNP output)



■Handling the gap adjustment dial

The detection distance is stamped on the adjustment dial. Red indicates 0.05 mm, blue 0.1 mm, and yellow 0.2 mm. Shipment inspection is done with a 1.5 mm detection nozzle diameter, and a 5 m long 4 mm bore nylon tube. Use the following table when not using the standard nozzle of ø1.5.

◎ Relation between dial scale and detection distance

The following table is a guide for when the following conditions are applied.

(Conditions) Supply pressure: 100 kPa

Piping: ø6 × ø4 tube, length 5 m

[GPS2-05-15]

		Detection distance (mm)			Change in detecting distance per notch (mm)
Detection nozzle diameter		ø1.0	ø1.5	ø2.0	ø1.0 to ø2.0
Scale line	1 (Red wire)	0.07	0.05	0.03	0.005
	2 (Blue wire)	0.14	0.09	0.06	0.005 to 0.007
	3 (Yellow)	−	0.20	0.14	0.008 to 0.010

[GPS2-07-15]

		Detection distance (mm)			Change in detecting distance per notch (mm)
Detection nozzle diameter		ø1.0	ø1.5	ø2.0	ø1.0 to ø2.0
Scale line	1 (Red wire)	0.07	0.05	0.03	0.005
	2 (Blue wire)	0.15	0.10	0.06	0.005 to 0.007
	3 (Yellow)	−	0.20	0.13	0.008 to 0.010

■One detection nozzle can be used for one of these product units.

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

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