IO-Link Parameter Specifications

●Communication specifications

Item	Details
Communication protocol	IO-Link
Communication protocol version	V1.1
Transmission bit rate	COM2 (38.4 kbps)
Port	Class A
Process data length (input)	4 byte
Process data length (output)	0 byte
Min. cycle time	5 ms
Data storage	1 kbyte
SIO mode support	Yes (PNP only)

Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Data name	MSB															LSB
	Ref. value															
Data range	20 to 500 (for GPS3-L-*) 10 to 200 (for GPS3-EL-*)															
Format	UInteger16															

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Data name	Error	WARNING	Alert display output (interior orifice may be clogged)	Alert display output (nozzle may be clogged)	Below display range lower limit	Beyond display range upper limit	Control output CH2	Control output CH1	Detection side pressure value *1							
Data range	True/False								−5 to 250 *2							
Format	Boolean								Integer8							

*1: "V2.0" is stamped on the upper right side of the product nameplate for products whose detection side pressure value can be confirmed. (As products without the above printing do not use from 0 to 7 bit, the detection side pressure value cannot be checked.)

*2: Display value on IODD in kPa. Refer to the instruction manual for details about the relation of process data and detection side pressure value.

*3: IODD files can be downloaded from the CKD website. The IODD file to be applied differs depending on whether *1 is printed above. Please apply the correct version. IODD file to take advantage of the product's features.

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

Sensor components (sensor components)

Safety Precautions

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

Product-specific cautions: Digital gap switch GPS3 Series

Design / Selection

DANGER

■Use with power supply voltage and output in the specified range.
Applying a voltage that is outside of the specified range may cause malfunction, damage to the sensor, electrical shock, and/or fire. Do not use any load that exceeds the rated output. Using such a load may result in damage to the output part or fire.

WARNING

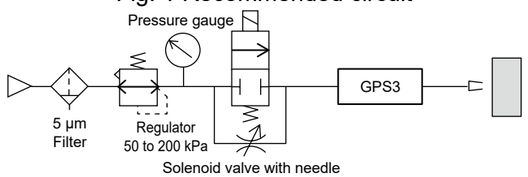
■Use the product in the range of conditions specified for the product. Contact CKD when using the product outside specifications or for special applications.
Use of the product outside the specifications range may result in insufficient performance, and its safety cannot be guaranteed.

■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 material of this product is 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."

■This product cannot be used to display the absolute distance from the reference surface to the workpiece. It is a pressure sensor for calculating the detection output and displaying a reference value (dimensionless number). Refer to the characteristics data in the technical data for information about the relationship between reference value and distance.

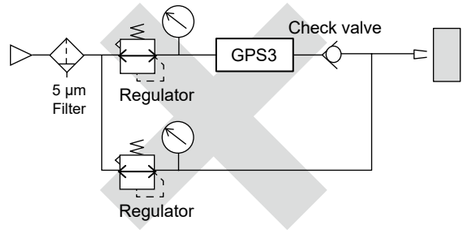
■Working fluid must be clean air from which solids, water and oil have been sufficiently removed using a dryer, filter and oil mist filter. Never supply lubricated air.
This product has a small orifice, so to prevent the entry of foreign matter, use an air filter for clean air (5 μm or less) with the recommended circuit shown below (Fig. 1).

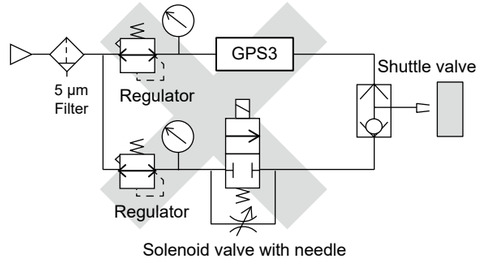
Fig. 1 Recommended circuit



■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.

Fig. 2





■Check wiring insulation. Check that wires do not come into contact with other circuits, that no ground faults occur, and that the insulator between terminals is not defective. Otherwise, eddy current may flow into the sensor, causing damage.

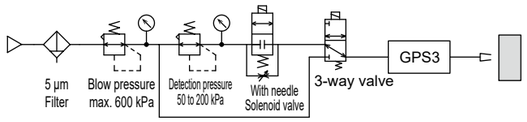
⚠CAUTION

■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. Switch the supply pressure (max. 600 kPa) when transporting the workpiece during machining processes to prevent the detection nozzle from becoming clogged. (Fig. 3)

Fig. 3 Circuit for detection and air blow



(When using high pressure, GPS3 will display "Er1" or "-H-" and the outputs will turn OFF)

■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. A protection circuit is provided to prevent damage from incorrect wiring or overcurrent. A relay must be used when connecting a capacitance load.

■Caution

- Reference for detection side piping (tube) is O.D. ø6, I.D. ø4 and length 5 m. If piping conditions (tube length) differ, use the actual measurement calibration function as needed to bring the reference values closer to the actual values.
- Contact confirmation detection using this product is effective across a 50 to 200 kPa supply pressure range. Outside the effective range the display will show "Er1", "-H-" or "-L-" and the outputs will turn OFF. In the case of a circuit like Fig. 3,"Er1" is displayed when the detection nozzle blows at high pressure. Furthermore, residual pressure may cause the output to instantaneously turn OFF→ON→OFF when normal supply pressure returns. For this circuit, disable the signal immediately after switching to a blower valve.
- When using a solenoid valve with needle on the supply side, "-L-" will be displayed when the solenoid is in the OFF state, indicating lower than normal supply pressure. However, a value will be displayed if there is a small amount of air flow through the needle, so the reference value and output should be disabled.

■Observe the following items when installing:

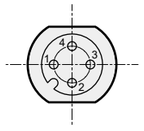
- Install this product so the detection port faces downward.
- Install this product at a position higher than the seating surface to prevent coolant from entering.
- Provide enough space for adjustment, monitoring, and maintenance.
- Use rust-resistant material such as nylon tubes or stainless steel 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.
- M12 connector pins are arranged as shown in Fig. 4. Take special care to prevent incorrect wiring.
- 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.

■Keep unused wires from coming into contact with other wires.

Fig. 4 Connector pin array (body side)



Pin No.	Lead wire color	Applications
1	Brown	Power supply +
2	White	Output 2
3	Blue	Power supply -
4	Black	Output 1 (C/Q *1)

*1: IO-Link compatible option

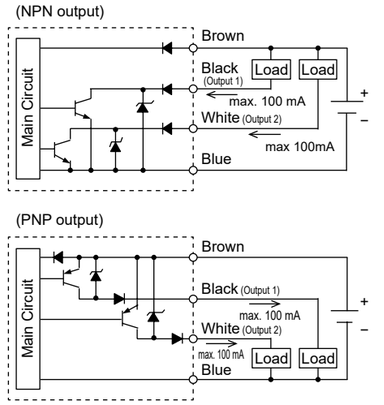
■M12 connector is integrated into the GPS3 body. Pulling on the cable is strictly forbidden. Use cable ties to fix the cable in place.

■Do not bind the sensor cable together with AC power wiring.

■The M12 connector pin array is compatible with the GPS2 Series (wiring option C□). (Excluding pin No.2)

NPN output and PNP output contact confirmation switches are available. Wire the switch based on the output as shown in Fig. 5.

Fig. 5 Output circuit



■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