Air Gap Sensor

DPA-SR1/LR1

Air Gap Sensor series

1 Signal Point Setting Type

Short/Long range detection

* Photo shows the optional protective tube attached.

- **1–100μm Short Range Detection Type**

  DPA-SR1

  The gaps caused by cutting chips put between the workpiece and the jig can be detected reliably with ±0.5μm to ±1μm repeatability.

- **80–350μm Long Range Detection Type**

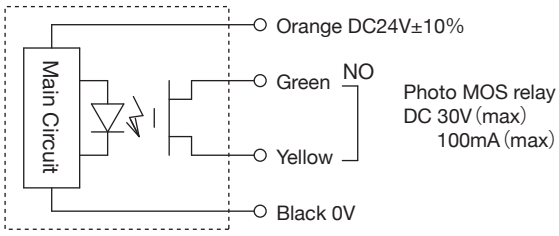
  DPA-LR1

  Reliably detects the gaps of 80 to 350μm with ±1μm to ±5μm repeatability.
  Best suited for seating confirmation of big workpieces or workpieces with rough surface.

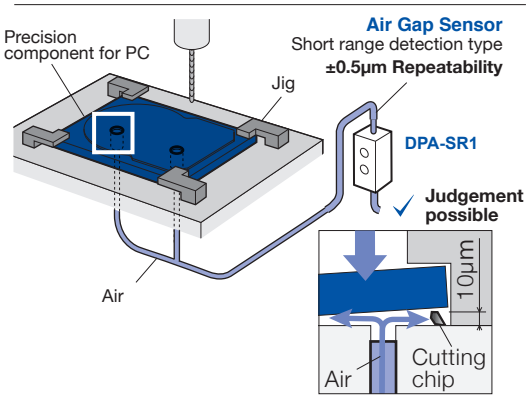
Specification

Product name	**DPA-SR1** (Short range detection type)	**DPA-LR1** (Long range detection type)
Detection range	1–100μm (When using a recommended nozzle)	80–350μm (When using a recommended nozzle)
Signal point	Configurable by master set bottun The signal point values are saved even when the power is turned off.	
Repeatability	±0.5μm : Detection range 1–60μm ±1μm : Detection range 60－100μm **Air Pressure change : within ±1%** Tube length 1.5m/When using a recommended nozzle	±1μm : Detection range 80–150μm ±3μm : Detection range 150－250μm ±5μm : Detection range 250－350μm **Air Pressure change : within ±1%** Tube length 1.5m/When using a recommended nozzle
Response speed	0.8 seconds (Tube length 1.5m/Time between the air pressure supply and the signal output of the sensor.)	
Electrical response speed	80ms	
Protective structure	IP67	
Setting pressure	0.15–0.2MPa	
Pipe diameter	O.D. ϕ6 X I.D. ϕ4 tube	
Fluid	Dry air (filtered to 5μm)	
Consumption flow rate	9ℓ/min (max)	24ℓ/min (max)
Operating temperature range	0°C–60°C (no condensation)	
Cable (Refer to P7-5)	Standard length 3m Oil resistance ϕ5/4 cores AWG 30	
Power supply voltage	DC24V±10% Current consumption : less than 100mA	
Output specification	Photo MOS output (Non-voltage floating output) DC30V (max) 100mA (max)	

Circuit diagram



±0.5μm Repeatability.
Reliably detects 10μm gap caused by cutting chips and stops machining automatically.



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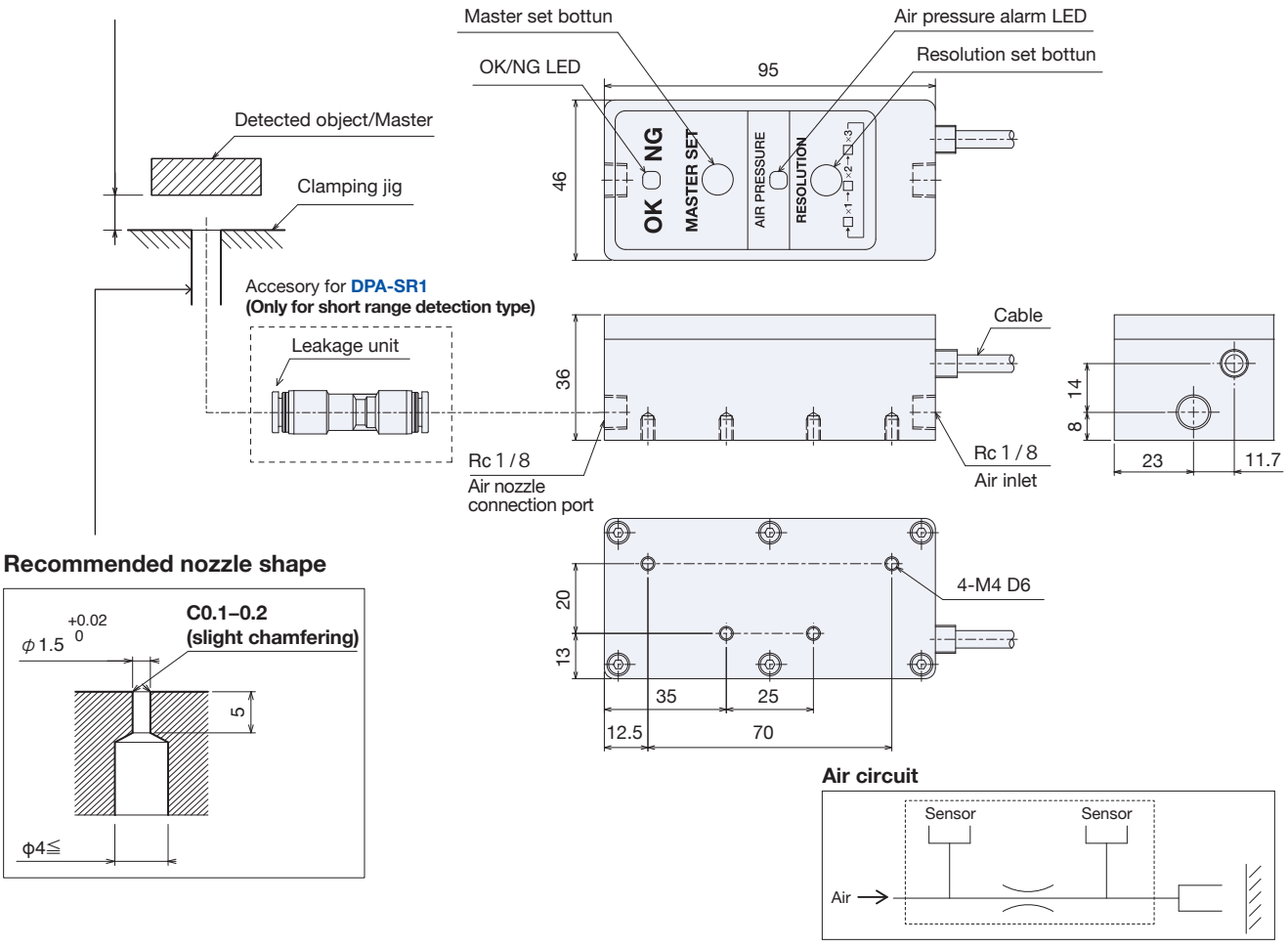
Outer dimension

DPA-SR1：Detection range 1-100μm
DPA-LR1：Detection range 80-350μm

Unit：mm



Options

Product No.		Tube length	Cable protection
DPA-SR1 **DPA-LR1**	—	Blank : 3m	Blank : No cable protection **P2** : Protective tube 2m

▶ e.g.) DPA-SR1-P2

Precautions before using the product

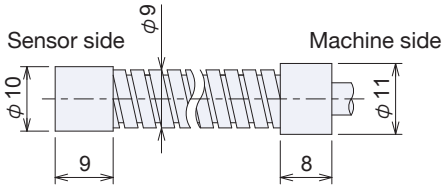
Following parts are not included.
It is necessary for the customer to prepare.

- **Precision regulator**
- **Air filter**
- **Tube**

Please refer to P2-9 for details.

Protective tube for cable protection

Dimension : outer diameter φ9
Minimum bending radius : 25mm



Sensor side is screwed in and metal ring is attched to machine side.

Handling instruction

1) Because protective tube is not flexible, clamp it to fix so as not apply excessive force to the sensor.
2) When binding it up and clamp with other cables, make sure not to apply excessive force to the attachement end.
3) Cables are not waterproof.

Air Gap Sensor

DPA-SR2/LR2

Air Gap Sensor series

2 Signal Point Setting Type

Short/Long range detection

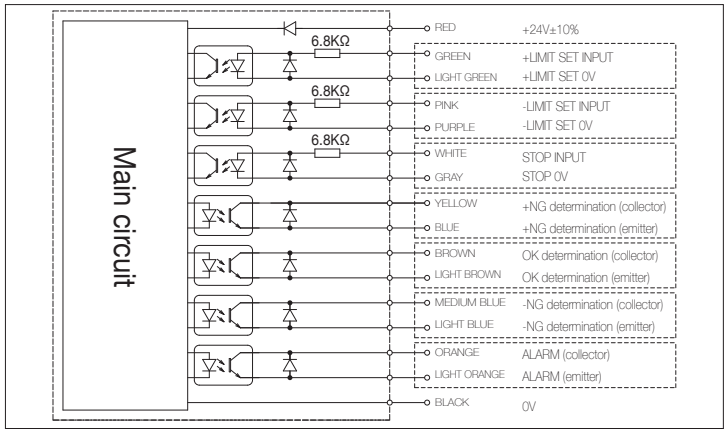
* Photo shows the optional protective tube attached.

- **3 Classifications (-NG, OK, +NG)**
  Displays results and outputs signals based on 3 classifications (-NG, OK, +NG) by setting upper and lower limit points.

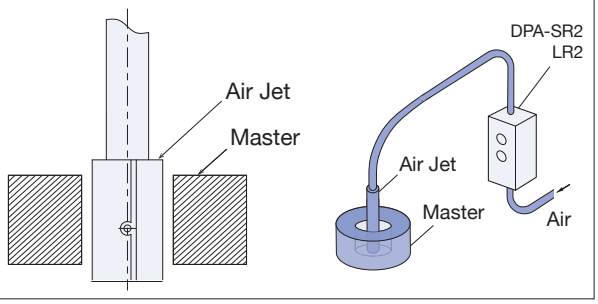
Specification

Product name	**DPA-SR2** (Short range detection type)	**DPA-LR2** (Long range detection type)
Detection range	1–100μm (When using a recommended nozzle)	80–350μm (When using a recommended nozzle)
Signal point	Set by +LIMIT SET button, -LIMIT SET button, + LIMIT SET input and -LIMIT SET input The signal point values are saved even when the power is turned off.	
Repeatability	±0.5μm : Detection range 1–60μm ±1μm : Detection range 60－100μm **Air pressure change : within ±1%** Tube length 1.5m/When using a recommended nozzle	±1μm : Detection range 80–150μm ±3μm : Detection range 150－250μm ±5μm : Detection range 250－350μm **Air pressure change : within ±1%** Tube length 1.5m/When using a recommended nozzle
Response speed	0.8 seconds (Tube length 1.5m/ Time between the air pressure supply and the signal output of the sensor.)	
Electrical response speed	10ms	
Protective structure	IP67	
Setting pressure	0.15–0.2MPa	
Pipe diameter	O.D. ϕ6 X I.D. ϕ4 tube	
Fluid	Dry air (filtered to 5μm)	
Consumption flow rate	9ℓ/min (max)	24ℓ/min (max)
Operating temperature range	0°C–60°C (no condensation)	
Cable (Refer to P7-5)	Standard length 3m Oil resistance ϕ5.5/16 cores AWG 28	
Power supply voltage	DC24V±10% Current consumption : less than 100mA	
Input specification	Photocoupler input DC24V±10%	
Output specification	Photocoupler output (Non-voltage floating output) DC24V±10% 20mA (max) Low level output voltage : less than 1.5V (at 15mA)	

Circuit diagram



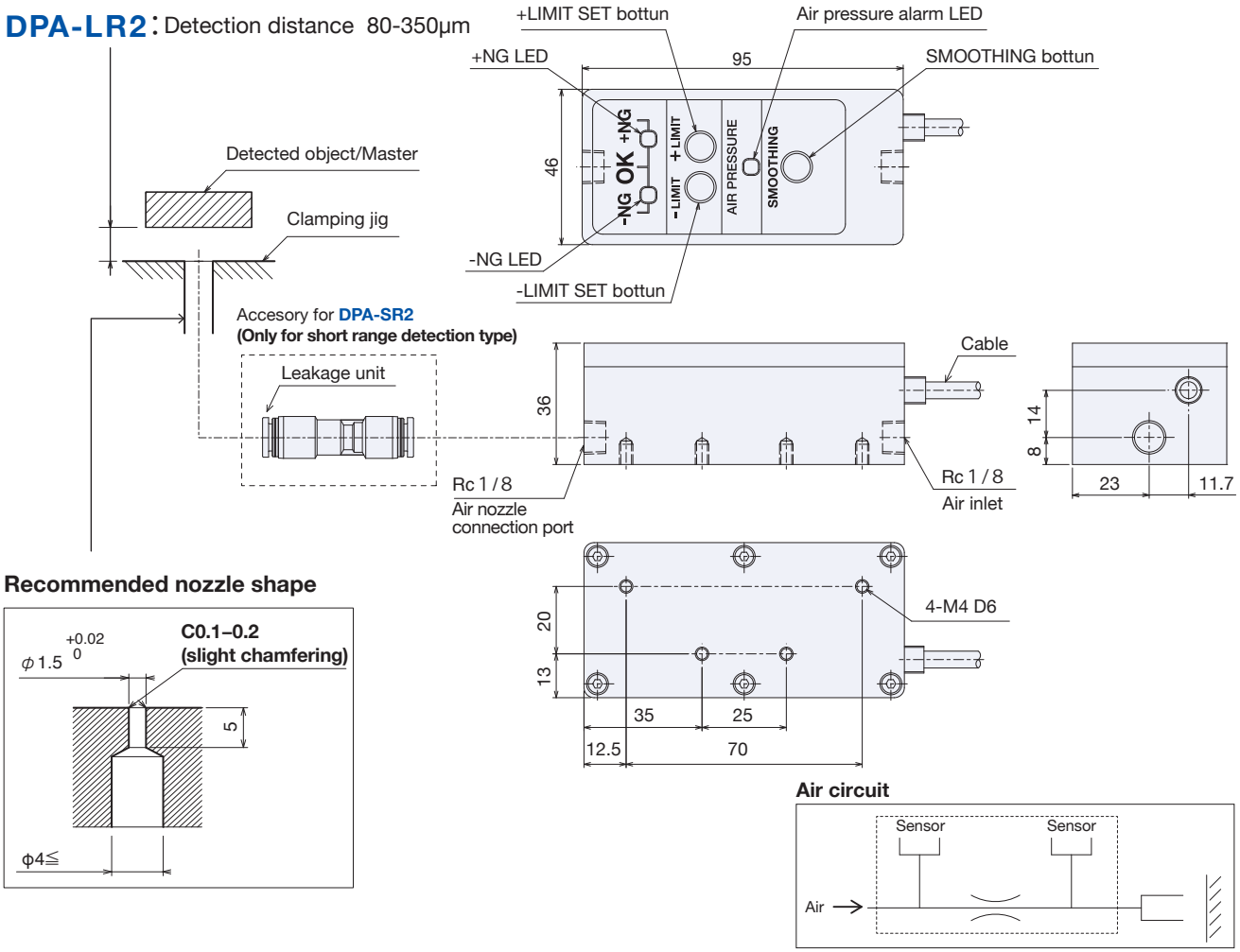
◎ When using DPASR2/LR2 for inner diameter measurement, please consult us for air jet and master.



■Outer dimension

DPA-SR2：Detection distance 1-100μm
DPA-LR2：Detection distance 80-350μm

Unit：mm



■Options

Product No.		Tube length	Cable protection
DPA-SR2 **DPA-LR2**	−	Blank : 3m	Blank : No cable protection **P2** : Protective tube 2m

▶ e.g.) DPA-SR2-P2

Precautions before using the product

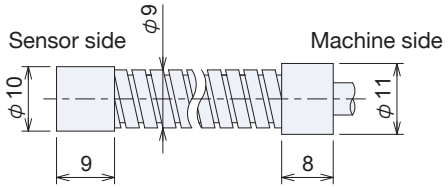
Following parts are not included.
It is necessary for the customer to prepare.

- **Precision regulator**
- **Air filter**
- **Tube**

Please refer to P2-9 for details.

Protective tube for cable protection

Dimension : outer diameter φ9
Minimum bending radius : 25mm



Sensor side is screwed in and metal ring is attched to machine side.

Handling instruction

1) Because protective tube is not flexible, clamp it to fix so as not apply excessive force to the sensor.
2) When binding it up and clamp with other cables, make sure not to apply excessive force to the attachement end.
3) Cables are not waterproof.

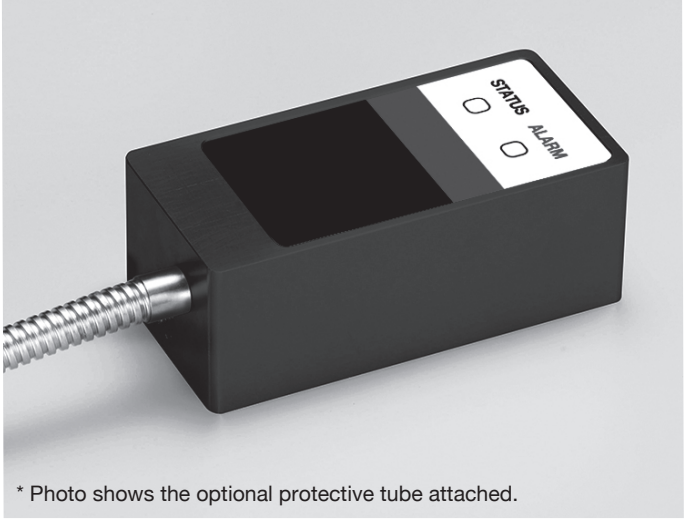
Air Gap Sensor

DPA-PLR2B

Air Gap Sensor series

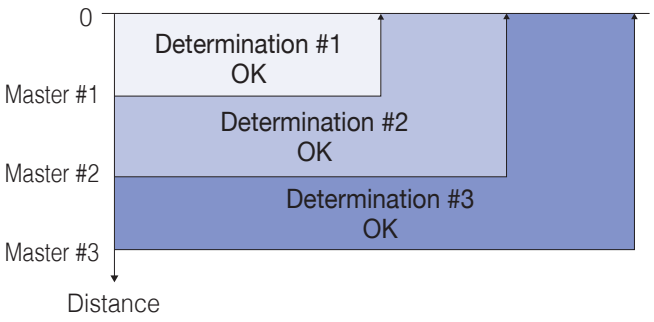
3 Signal Point Setting Type

Long range detection



* Photo shows the optional protective tube attached.

- This sensor will judge the current value, in comparison with master setting points.
- The master values, composed of masters #1, #2, and #3, are displayed and output.

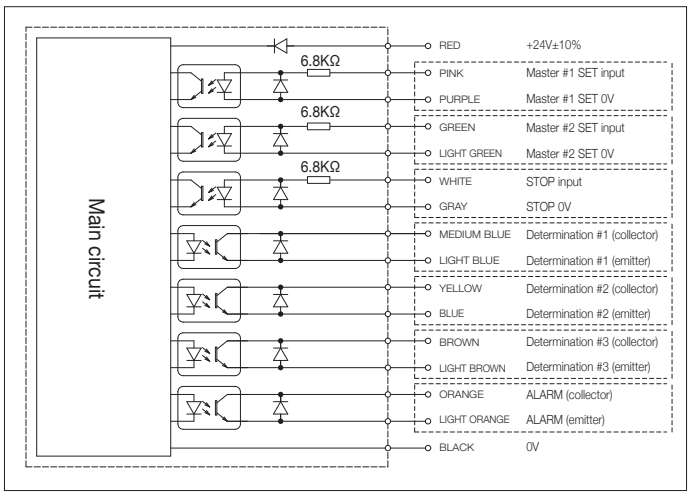


Specification

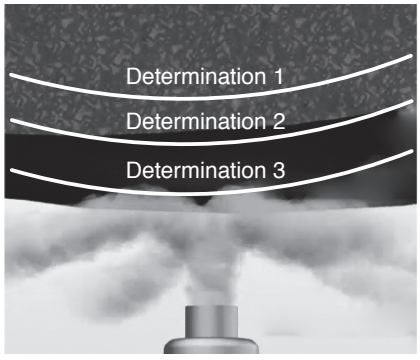
Product name	**DPA-PLR2B**
Detection range	80–350μm (When using a recommended nozzle)
Signal point	The arbitrary 3 points can be set
Repeatability	±1μm : Detection range 80-150μm ±3μm : Detection range 150－250μm ±5μm : Detection range 250-350μm **Air pressure change : within ±1%** Tube length 1.5m/When using a recommended nozzle
Response speed	0.8 seconds (Tube length 1.5m/ Time between the air pressure supply and the signal output of the sensor)
Electrical response speed	10ms
Protective structure	IP67

Setting pressure	0.15–0.2MPa
Pipe diameter	O.D. ϕ6 X I.D. ϕ4 tube
Fluid	Dry air (filtered to 5μm)
Consumption flow rate	24ℓ/min （max）
Operating temperature	0°C–60°C (no condensation)
Cable (Refer to P7-5)	Standard length 3m Oil resistance ϕ5.5/16 cores AWG 28
Power supply voltage	DC24V±10%
Consumption current	Less than 100mA
Input specification	Photocoupler input DC24V±10%
Output specification	Photocoupler output (Non-voltage floating output) DC24V±10% 20mA (max), Low level output voltage : less than 1.5V (at 15mA)

Circuit diagram



3 Signal Point Setting Example



Since 3 determination signal points can be output, it can be used for various applications.

- The signals can be divided into the deceleration signal (Determination 1), measurement signal (Determination 2), and stop signal (Determination 3).
- Usage with 3 types of grindstones with different grits is possible.

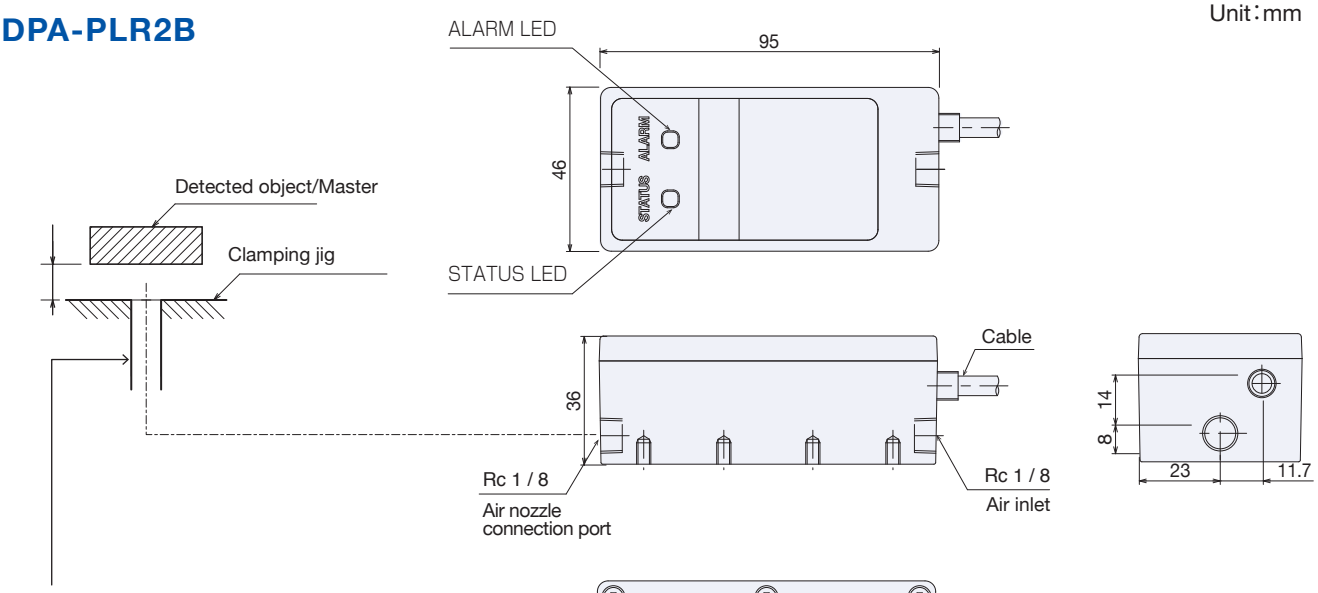
DPA-PLR2B

www.metrol.co.jp/en

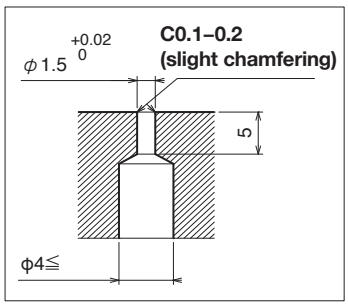
■Outer dimension

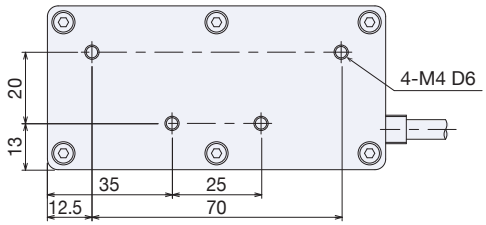
Unit：mm

DPA-PLR2B

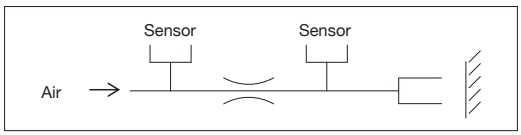


Recommended nozzle shape





Air circuit



■Options

Product No.	–	Tube length	Cable protection
DPA-PLR2B		Blank : 3m	Blank : No cable protection P2 : Protective tube 2m

▶ e.g.) DPA-PLR2B

Precautions before using the product

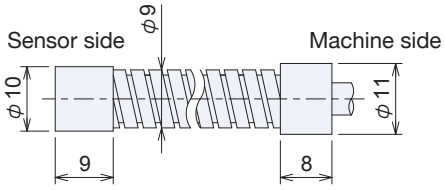
Following parts are not included.
It is necessary for the customer to prepare.

- **Precision regulator**
- **Air filter**
- **Tube**

Please refer to P2-9 for details.

Protective tube for cable protection

Dimension : outer diameter φ9
Minimum bending radius : 25mm



Sensor side is screwed in and metal ring is attched to machine side.

Handling instruction

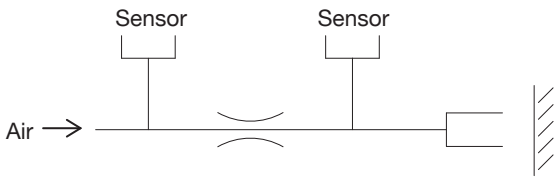
1) Because protective tube is not flexible, clamp it to fix so as not apply excessive force to the sensor.
2) When binding it up and clamp with other cables, make sure not to apply excessive force to the attachement end.
3) Cables are not waterproof.

Air sensors

A sensor that detects the distance by the pressure (back pressure) changes and outputs electric signals to the control system.

Air Gap Sensor detecting circuit

DPA-SR1/LR1



DPA-SR1 / LR1 gives a detection gap to the detection air nozzle, and records the pressure value by pressing the **Master Set Button.**
The differential pressure by detection gap is detected by the internal pressure sensor.

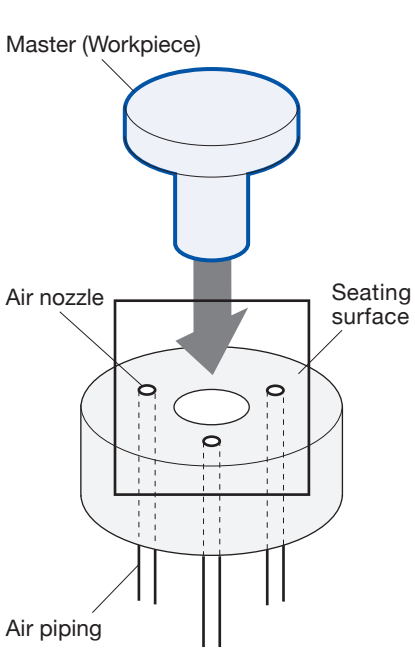
Repetitive accuracy

Indicates the repeatability of the output operating point of the sensor when the pressure is changed by the detection gap at 20°C.

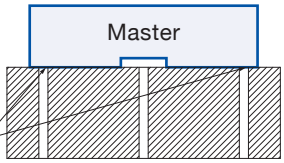
*Specifications on this catalog apply to conditions where one nozzle is used per body.
When using multiple nozzles or using a nozzle which diameter is different from the recommended nozzle shape, repeatability will be deteriorated, make appropriate judgments upon confirmation of use with the actual device.

Master for setting

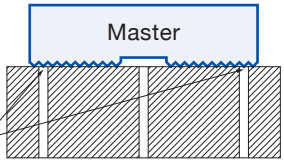
The master for setting is necessary in order to set the signal point correctly.
If the surface roughness of the master is bad or the signal point is set while the master is floating from the seating surface, there may be variations in the set value, so use a master with a good surface roughness, and make sure that it is fixed firmly on the seating surface.



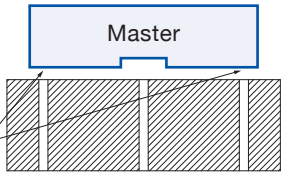
✓ **Normal master setting**
The surface roughness of the master is good and fixed firmly on the seating surface.



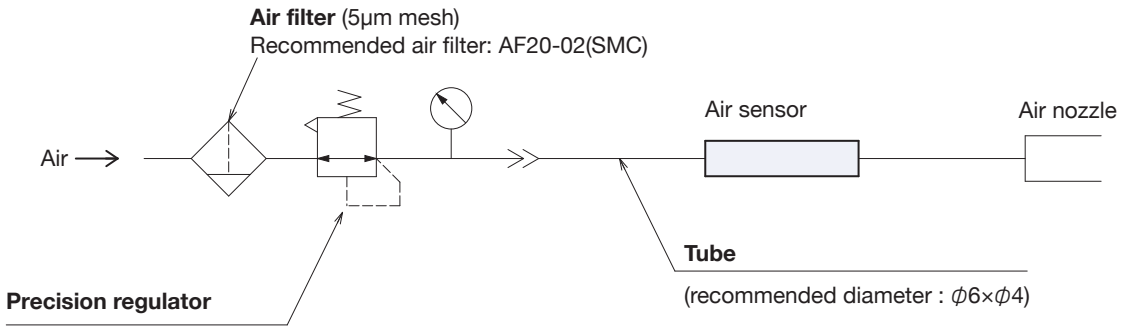
✗ **Master setting that causes variation**
The surface roughness of the master is bad.



✗ The signal point is set while the master is floating from the seating surface.



■Regulator (reducing valve)



Setting pressure : Adjust the air pressure within the range of **0.15-0.2MPa**

Recommended regulator : IR2000 (SMC)
RP1000 (CKD)

《Precautions for air piping》

Connect the air pipe after adjusting the setting pressure within the range of 0.15-0.2MPa.

■Precision regulator (reducing valve)

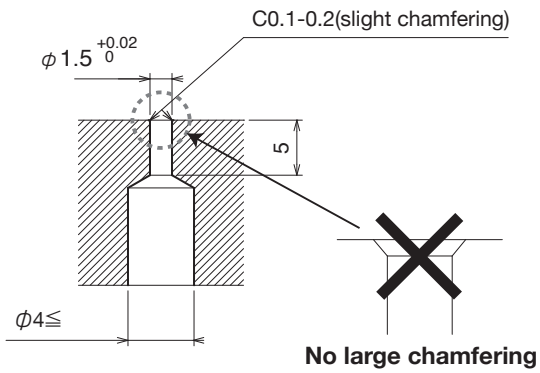
It can be used to adjust the air supplied from the compressor to the appropriate pressure according to the specifications of the air equipment used.

The "precision regulator (±0.5% level)" needs to be provided on the air supply side of the Air gap sensor to reduce the pressure fluctuation.

■Air filter

· Prevents troubles such as malfunctions that are caused by dust and moisture entering into the regulator or Air Gap Sensor.
· As the moisture separation rate (removal rate) is about 30 to 90%, the use of dry air is desirable.
· There is a drainage valve at the lower end of the filter, which needs to be opened regularly in order to discharge.

■Recommended nozzle shape



Precautions for piping

· When installing air gap sensor, make sure to place it above the nozzle to prevent backflow of coolant.
· The shorter the air piping tube, the faster the response speed.
· For the piping from the body to the detection nozzle, do not use devices or joints which will lead to air leaks or resistance.
· When supplying air of 0.3MPa or higher to the device, there is a risk of sensor damage.
Connect the air pipe after adjusting the setting pressure within the range of **0.15 to 0.2 MPa**.