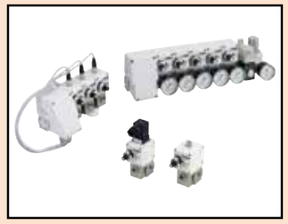


HPS, MHPS, UHPS Series

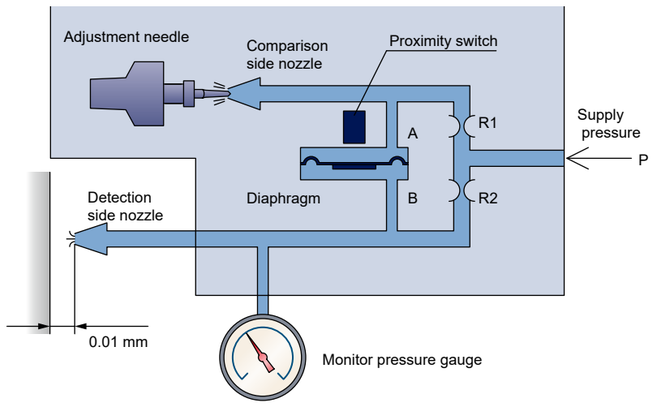
Overview

- The close contact confirmation switch HPS Series incorporates a highly accurate needle mechanism to enable highly accurate detection for contact confirmation, etc.
- With various special nozzles, this switch is used for a variety of position detections.

Features

- High precision
  Highly accurate variable-adjustment is possible with the precise linear needle.
  Min. detection distance 0.01 mm
  Resolution ±0.005 mm
- Low air consumption
  This switch is used with low pressure so air consumption is reduced.
- Lock mechanism with dial scale
  The position is adjusted easily with no need to worry about deviation.
- Modularization
  Modularization makes it easy to connect to the CKD module connection component.
- High stability
  Stable detection, unaffected by fluctuations in supply pressure, is possible with the air bridge circuit.
- Environment conditions
  IP67 degree of protection is resistant to spattering coolant and other substances.
- Special nozzle usable
  The detection distance is 3 mm with the back pressure nozzle.

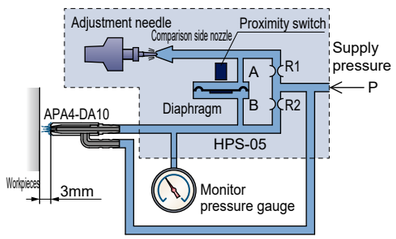
Close contact confirmation switch principle drawing



Operational explanation

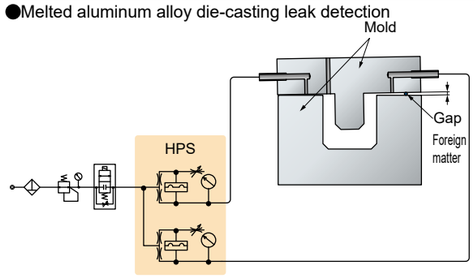
- HPS body
  The compressed air pressurized in supply port P passes through orifice R1 and R2 of the air bridge circuit, and flows to nozzles on the comparison and detection sides. When the detection side nozzle clearance becomes smaller than the clearance set with the adjustment needle within the comparison side nozzle, back pressure reverses and pushes up the diaphragm. This activates the proximity switch and generates an electrical signal.

- Back pressure nozzle
  The detection air is diffused as the clearance widens, and returns to atmospheric pressure at 0.7 mm when using the single-hole nozzle. However, if the outside circumference of the detection nozzle is shielded with air from another system, the detection air is not diffused as easily, making it possible to detect up to 3 mm.

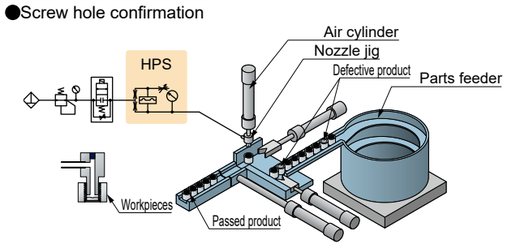


Applications

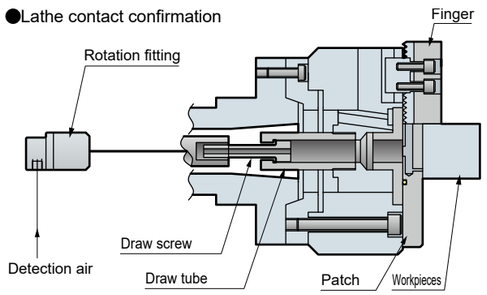
●Melted aluminum alloy die-casting leak detection



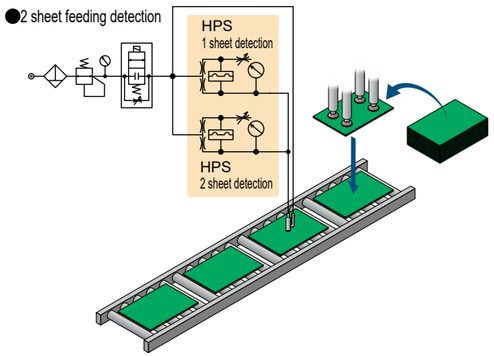
●Screw hole confirmation



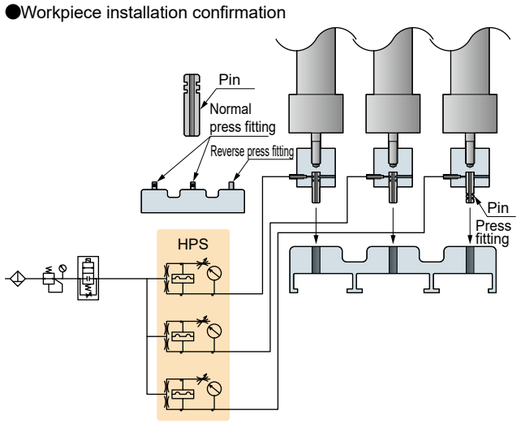
●Lathe contact confirmation



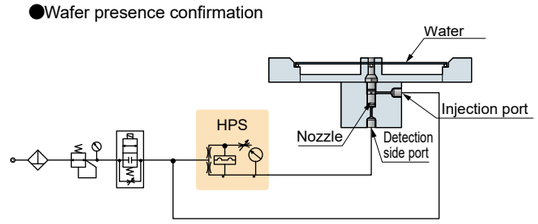
●2 sheet feeding detection



●Workpiece installation confirmation



●Wafer presence confirmation



Close contact confirmation switch, single unit

HPS Series

Refer to the CKD website for detailed compatible model Nos.

Model No. Notation Method

HPS - 05 - N G TL - B - G2

- HPS: Model No.
- 05: ❶Orifice size
- N: ❷Output style
- G: ❸Lamp color
- TL: ❹Electrical connection option
- B: ❺Bracket
- G2: ❻Pressure gauge

*1: For model No. of back pressure nozzles, refer to P. 174.
*2: For option and model numbers of related components, refer to P. 168 to 173.

❶Orifice size

Code	Description
05	ø0.5
07	ø0.7
10	ø1.0

❷Output style

Code	Description
N	NPN open collector
P	PNP open collector

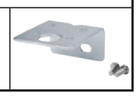
❸Lamp color

Code	Description
G	Green
Y	Yellow

❹Electrical connection option

Code	Description	
F	DIN terminal box (Pg11)	
C0	Connector	Without cable
C1		Cable 1 m attached
C3		Cable 3 m attached
C5		Cable 5 m attached
CTL	Connector common terminal box	Left side assembly
CTR		Right side assembly
TL	Lead wire common terminal box	Left side assembly
TR		Right side assembly
R	Lead wire direction right (left end for mounting)	
L	Lead wire direction left (right end for mounting)	
W	Lead wire direction both sides (intermediate for mounting)	

❺Bracket

Code	Description	
Blank	Without bracket	
B	With bracket	

❻Pressure gauge

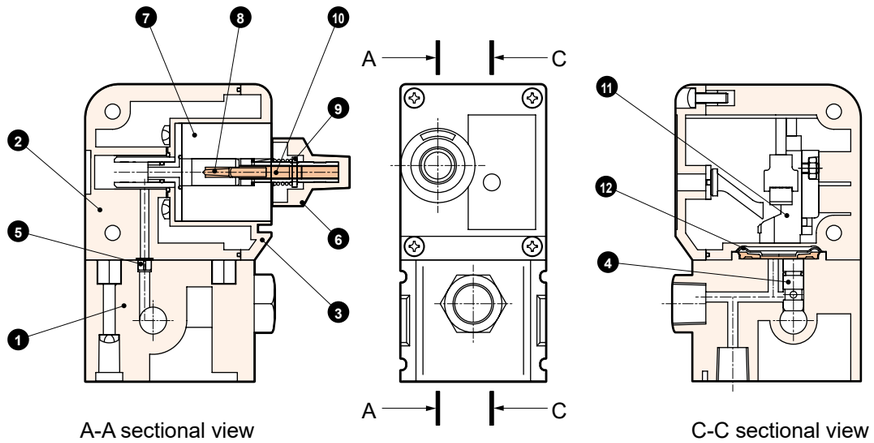
Code	Description
Blank	No pressure gauge
G2	Pressure gauge with safety marker included (G40D-8-P02-S501)
GW2	Pressure gauge assembly with safety marker (G40D-8-P02-S501)

Specifications

Item		HPS-05	HPS-07	HPS-10
Orifice size	mm	ø0.5	ø0.7	ø1.0
Working pressure	*1 kPa	50 to 200	50 to 200	100 to 200
Detection range	mm	0.01 to 0.2	0.02 to 0.3	0.05 to 0.7
Repeatability	mm	±0.005 (detection range 0.01 to 0.1)	±0.005 (detection range 0.02 to 0.1)	±0.02 (detection range 0.05 to 0.3)
Hysteresis	mm	0.005 or less (detection range 0.01 to 0.1)	0.005 or less (detection range 0.02 to 0.1)	0.01 or less (detection range 0.05 to 0.3)
Detection nozzle	*2	Single hole nozzle ø1.5		
Power supply voltage	V	10.2 to 26.4 DC		
Current consumption	mA	15 or less (when using 24 VDC)		
Output style		NPN, PNP open collector		
Output rating		30 VDC, 100 mA or less		
Internal voltage drop	V	2.0 or less (using 100 mA)		
Indicator lamp		LED green or yellow		
Insulation resistance		10 MΩ and over at 500 VDC megger		
Withstand voltage		No failure after 1 minute at 1000 VAC		
Vibration resistance	m/sec^2	98		
Ambient temperature	°C	5 to 60		
Degree of protection	*3	IP67 equivalent (connector), IP64 equivalent (DIN terminal box)		
Tube mm		Inner diameter 4		
Port size		Detection port Rc1/8, Supply port Rc1/4,pressure gauge port Rc1/4		
Weight	g	300 (electrical connection option C0)		
Air consumption L/min (ANR)	50 kPa	6	11	-
	100 kPa	9	15	24
	200 kPa	14	24	38

*1: If the nozzle clogs, working pressure should be set between 100 and 200 kPa.
*2: The above specifications apply to the detection nozzle with a ø1.5 single-hole nozzle.
*3: This product must be used under the following conditions:
(1) Piping and wiring must be completed and pressure applied.
(2) A waterproof bushing must be used on the wires to the terminal box.

Internal Structure Diagram / Material



A-A sectional view

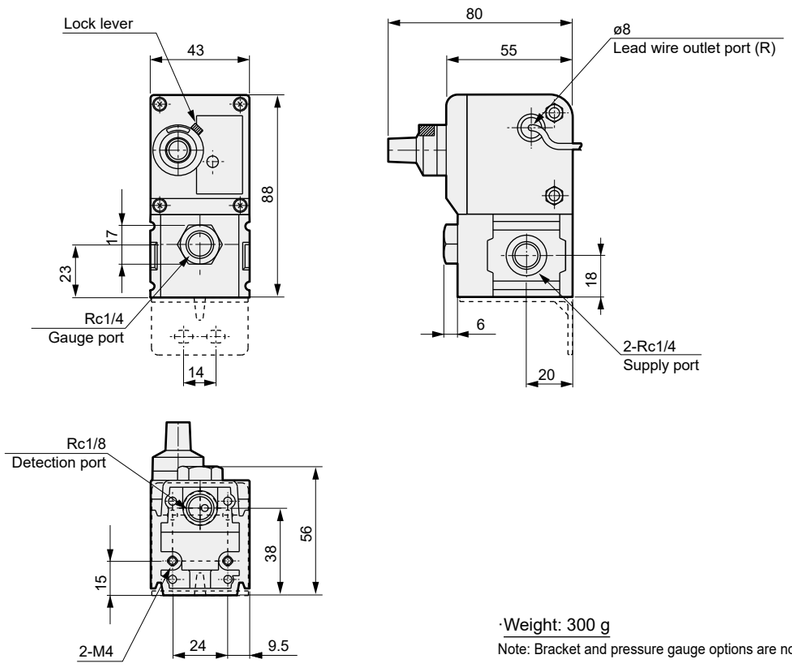
C-C sectional view

Part No.	Part name	Material	Part No.	Part name	Material
1	Base	Aluminum	7	Needle holder	Aluminum
2	Body	Polybutylene terephthalate	8	Needle	Stainless steel
3	Front cover	Polybutylene terephthalate	9	Pin	Piano wire
4	Orifice nozzle A	Brass	10	Needle shaft	Brass
5	Orifice nozzle B	Brass	11	Proximity switch	-
6	Dial	Aluminum alloy, polyamide, etc.	12	Diaphragm	HNBR

Dimensions

●Basic

●HPS-□-□□□ R / L / W

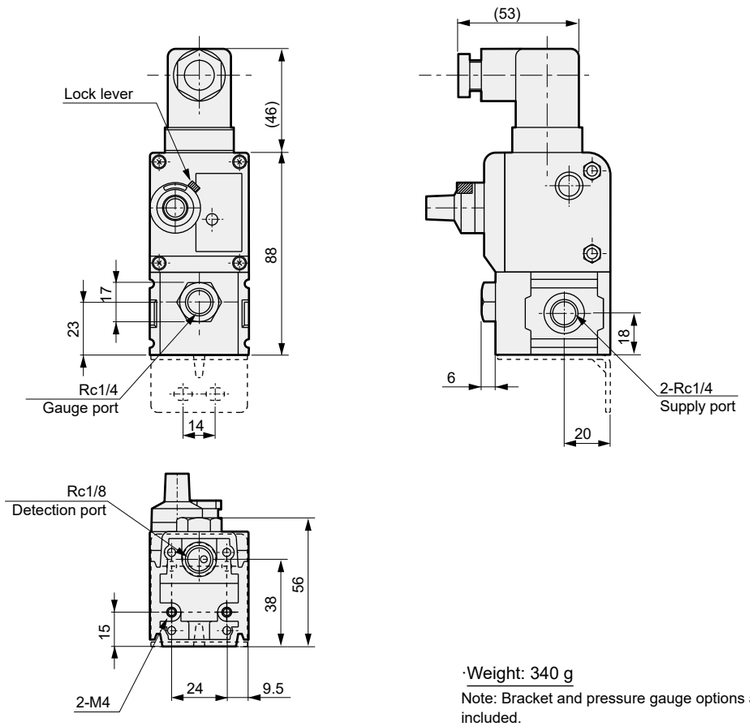


·Weight: 300 g

Note: Bracket and pressure gauge options are not included.

●DIN terminal box

● HPS-□-□□□F

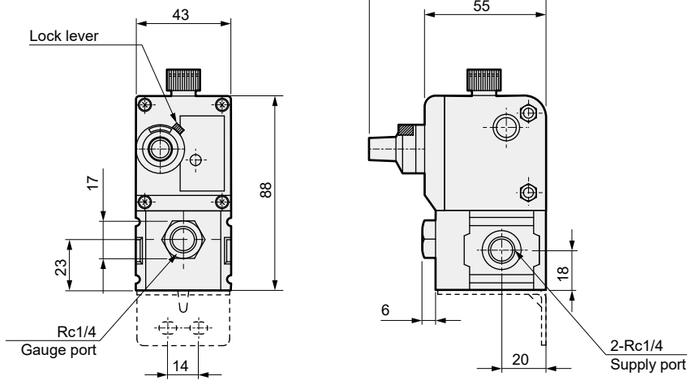


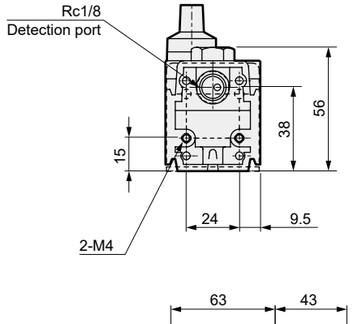
·Weight: 340 g

Note: Bracket and pressure gauge options are not included.

Dimensions

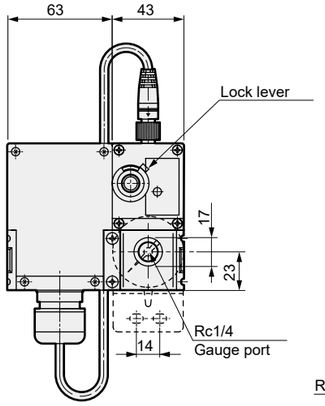
●Connector
C0
C1
C3
C5
● HPS-□-□□□

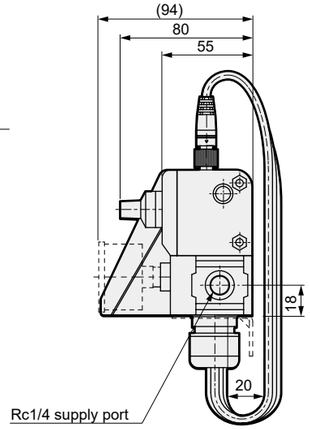




·Weight: 300 g (for C0)
*1: Bracket and pressure gauge options are not included.
*2: The "C1", "C3", and "C5" cables are attached.
(For the cable weight, refer to the option pages.)

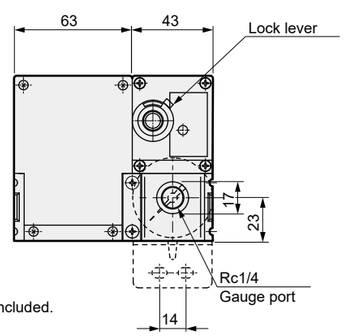
●Connector common terminal box
● HPS-□-□□□ CTL (CTR)

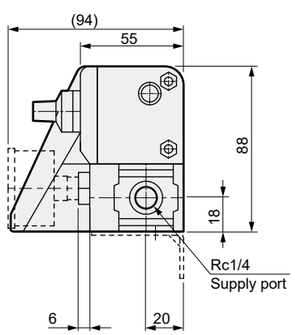




·Weight: 583 g
Note: Bracket and pressure gauge options are not included.

●Lead wire common terminal box
● HPS-□-□□□ TL (TR)





·Weight: 513 g
Note: Bracket and pressure gauge options are not included.

●For information on Options and Peripheral Dimensions diagrams, refer to P. 168 to 173.

MEMO

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

Close contact confirmation switch manifold

MHPS Series

Refer to the CKD website for detailed compatible model Nos.

Model No. Notation Method

MHPS - 05 - 2 N Y TL - B - G2

- MHPS: Model No.
- 05: ❶Orifice size
- 2: ❷Station No.
- N: ❸Output style
- Y: ❹Lamp color
- TL: ❺Electrical connection option
- B: ❻Bracket
- G2: ❼Pressure gauge

*1: For model No. of back pressure nozzles, refer to P. 174.
*2: For option and model numbers of related components, refer to P. 168 to 173.

❶Orifice size

Code	Description
05	ø0.5
07	ø0.7
10	ø1.0

❷Station No.

Code	Description
2	2 stations
3	3 stations
4	4 stations
5	5 stations

❸Output style

Code	Description
N	NPN open collector
P	PNP open collector

❹Lamp color

Code	Description
G	Green
Y	Yellow

❺Electrical connection option

Code	Description		Degree of Protection (*1)
F	DIN terminal box (Pg11)		IP 64 or equiv.
C0	Connector	Without cable	IP 67 or equiv.
C1		Cable 1 m attached	
C3		Cable 3 m attached	
C5		Cable 5 m attached	
CTL	Connector common terminal box	Left side assembly	IP 67 or equiv.
CTR		Right side assembly	
TL	Lead wire common terminal box	Left side assembly	IP 66 or equiv.
TR		Right side assembly	
T1		Left 1st	
T2		2nd from left	
T3		Left 3rd	
T4		Left 4th	

*1: The degree of protection should be used under the following conditions:
(1) Piping and wiring must be completed and pressure applied.
(2) A waterproof bushing must be used on the wires to the terminal box.

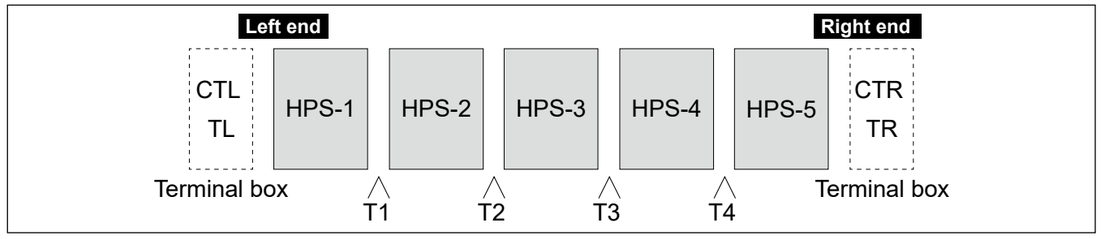
❻Bracket

Code	Description	
Blank	Without bracket	
B	With bracket	

❼Pressure gauge

Code	Description
Blank	No pressure gauge
G2	Pressure gauge with safety marker attached (G40D-8-P02-S501)
GW2	Pressure gauge assembly with safety marker (G40D-8-P02-S501)

Terminal box installation position relation diagram

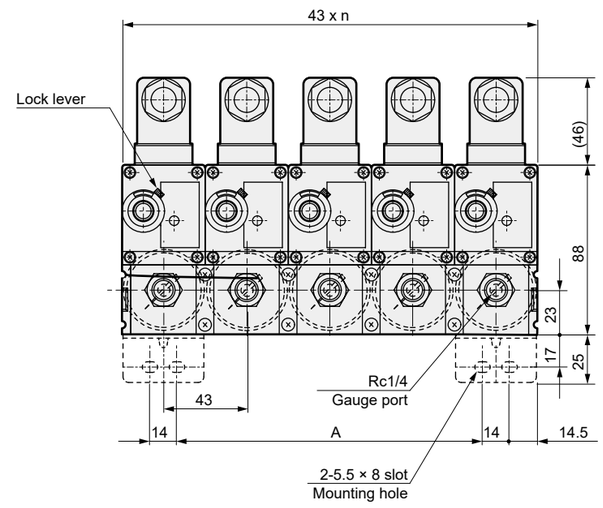


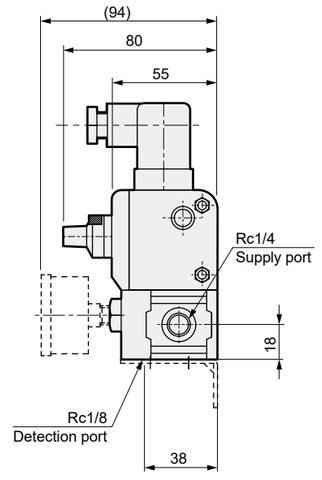
Specifications

Basic specifications are the same as the Discrete on page 155.

Dimensions

●Manifold (DIN terminal box: F)
●MHPS-□-□□□F





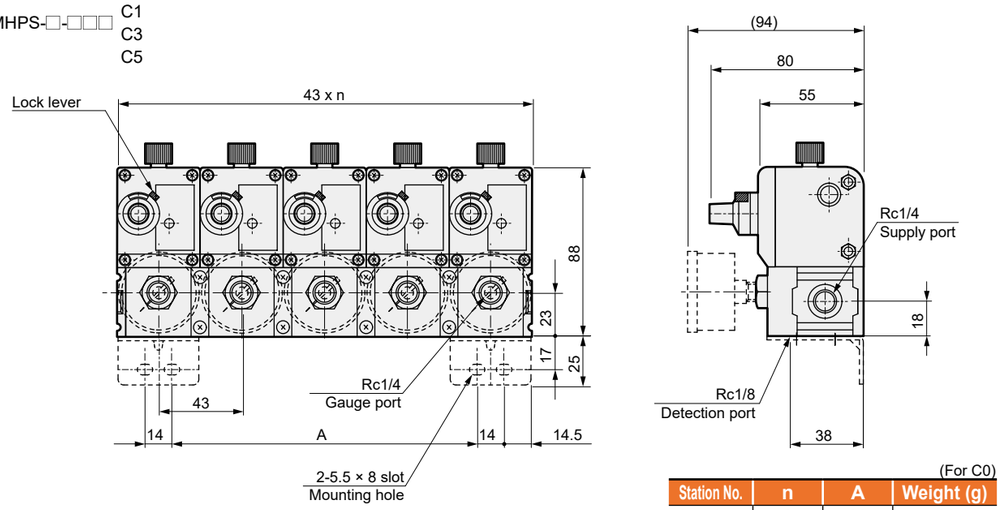
Station No.	n	A	Weight g
2 stations	2	29	680
3 stations	3	72	1030
4 stations	4	115	1370
5 stations	5	158	1710

Note: Bracket and pressure gauge (option) are not included.

Dimensions

●Manifold (connector: C□)

●MHPS-□-□□□ C0 C1 C3 C5



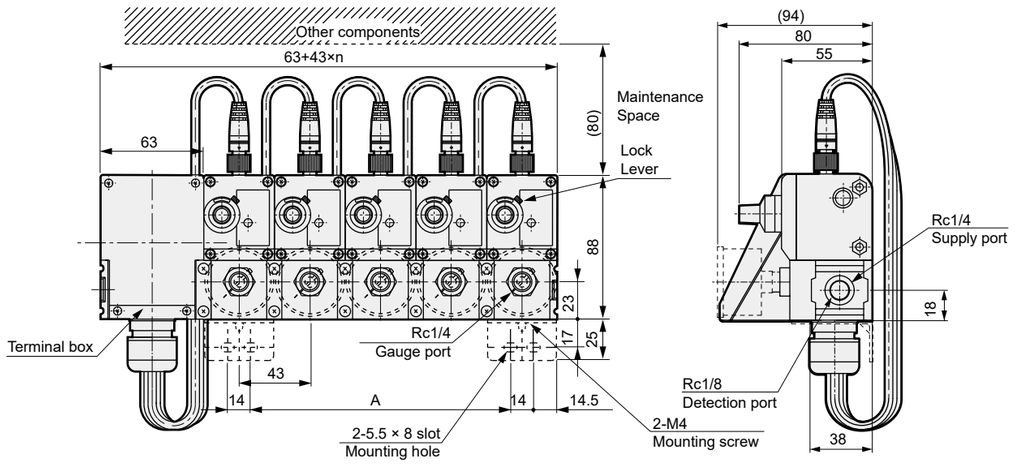
(For C0)

Station No.	n	A	Weight (g)
2 stations	2	29	590
3 stations	3	72	890
4 stations	4	115	1190
5 stations	5	158	1490

*1: Bracket and pressure gauge (option) are not included.
*2: The "C1", "C3", and "C5" cables are attached.
(For the cable weight, refer to the option pages.)

●Manifold (connector common terminal box: CTL/CTR)

●MHPS-□-□□□ CTL (CTR)



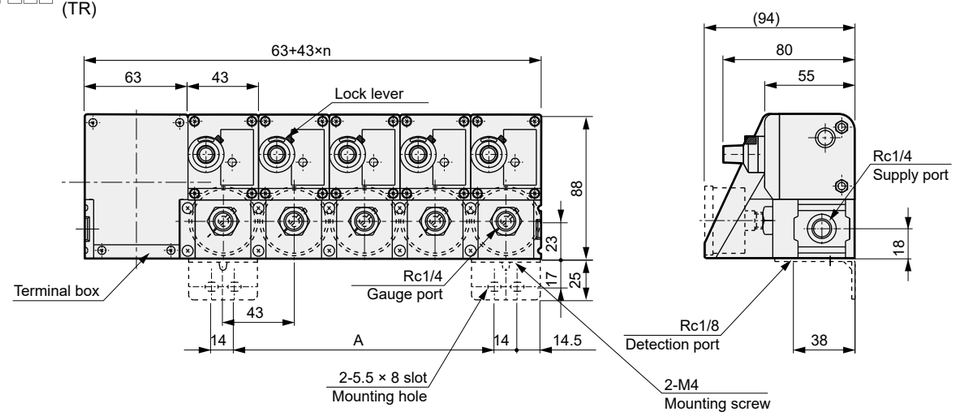
Station No.	n	A	Weight (g)
2 stations	2	29	930
3 stations	3	72	1270
4 stations	4	115	1620
5 stations	5	158	1980

Note: Bracket and pressure gauge (option) are not included.

Dimensions

●Manifold (lead wire common terminal box: TL/TR)

●MHPS-□-□□□ TL (TR)



Station No.	n	A	Weight (g)
2 stations	2	29	830
3 stations	3	72	1140
4 stations	4	115	1460
5 stations	5	158	1770

Note: Bracket and pressure gauge (option) are not included.

●For Options and Peripheral dimensions diagram, refer to P. 168 to 173.

Close contact confirmation switch unit

UHPS Series

●Solenoid valve with needle, regulator integrated general purpose unit

Refer to the CKD website for detailed compatible model Nos.

Model No. Notation Method

UHPS - 05 - 2 N G TL - B - GW2 - 2H - 1

- UHPS: Model No.
- 05: ❶Orifice size
- 2: ❷Station No.
- N: ❸Output style
- G: ❹Lamp color
- TL: ❺Electrical connection option
- B: ❻Bracket
- GW2: ❼Pressure gauge
- 2H: ❽Solenoid valve electrical connection
- 1: ❾Solenoid valve voltage

*1: For model No. of back pressure nozzles, refer to P. 174.
*2: For option and model numbers of related components, refer to P. 168 to 173.

❶Orifice size

Code	Description
05	ø0.5
07	ø0.7
10	ø1.0

❷Station No.

Code	Description
1	1 station
2	2 stations
3	3 stations
4	4 stations
5	5 stations

❸Output style

Code	Description
N	NPN open collector
P	PNP open collector

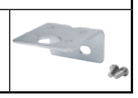
❹Lamp color

Code	Description
G	Green
Y	Yellow

❺Electrical connection option

Code	Description	
F	DIN terminal box (Pg11)	
C0	Connector	Without cable
C1		Cable 1 m attached
C3		Cable 3 m attached
C5		Cable 5 m attached
CTL	Connector common terminal box	Left side assembly
CTR		Right side assembly
TL	Lead wire common terminal box	Left side assembly
TR		Right side assembly

❻Bracket

Code	Description	
Blank	Without bracket	
B	With bracket	

❼Pressure gauge

Code	Description
Blank	Without (*1)
GW2	Pressure gauge assembly with safety marker (G40D-8-P02-S501)

*1: Regulator pressure gauge is also provided.

❽Solenoid valve electrical connection

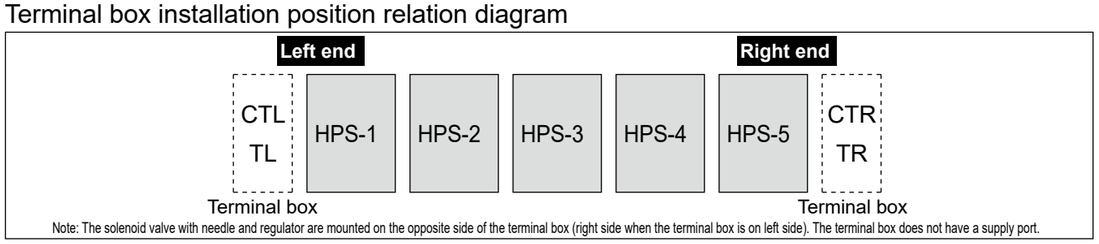
Code	Description
2E	DIN terminal box
2H	DIN terminal box with lamp
3N	HP terminal box with lamp

Note: When CE-Marking/UKCA-compatible, select from "2E" and "2H".

❾Solenoid valve voltage

Code	Description
1	100 VAC
2	200 VAC
3	24 VDC

Terminal box installation position relation diagram



Note: The solenoid valve with needle and regulator are mounted on the opposite side of the terminal box (right side when the terminal box is on left side). The terminal box does not have a supply port.

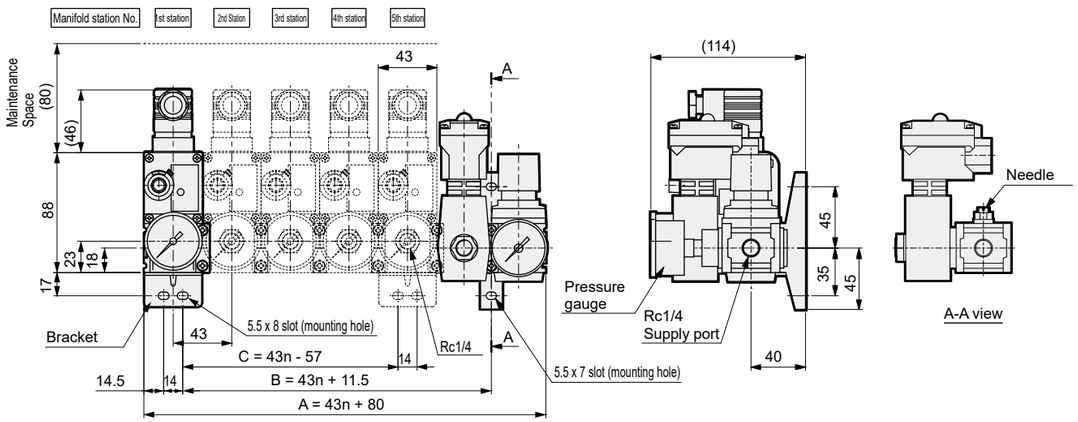
Specifications

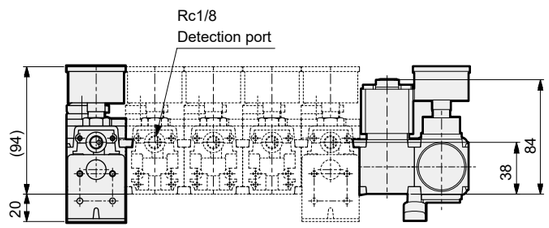
Basic specifications are the same as the Discrete on page 155.

Dimensions

●Unit (DIN terminal box: F)

●UHPS-□-□□□F





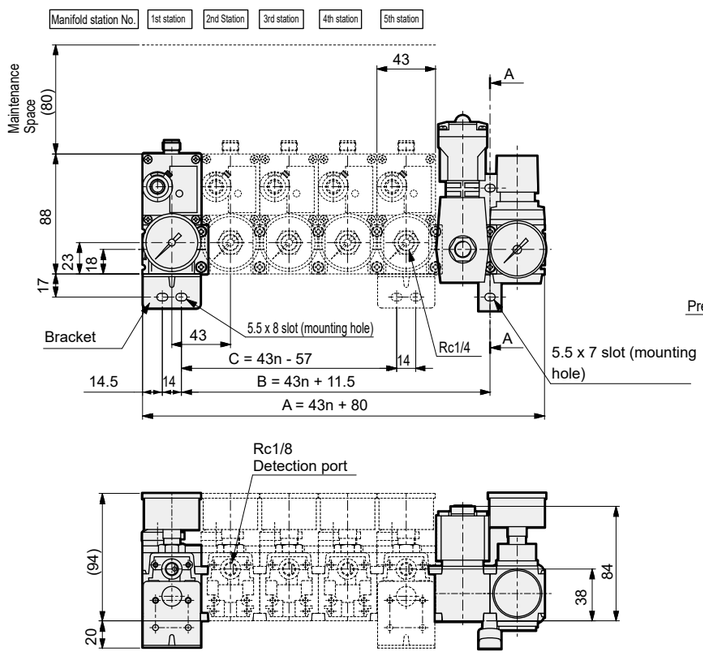
		Station No.				
		1	2	3	4	5
Dimensions (mm)	A	123	166	209	252	295
	B	54.5	97.5	140.5	183.5	226.5
	C	–	–	72	115	158
Bracket set		1	1	2	2	2
Weight (g)		1020	1360	1750	2090	2440

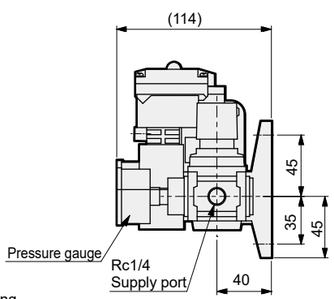
*1: pressure gauge option is not included.
*2: When solenoid valve is electrical connection "3N".

Dimensions

●Unit (connector: C□)

●UHPS-□-□□□ C0 C1 C3 C5





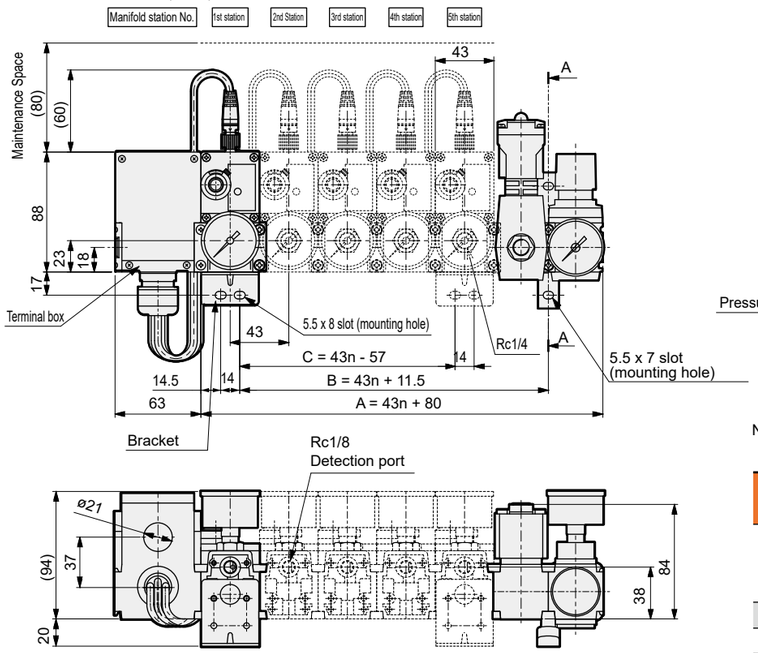
Note: Refer to the "A-A view" on page 165 for needle position.

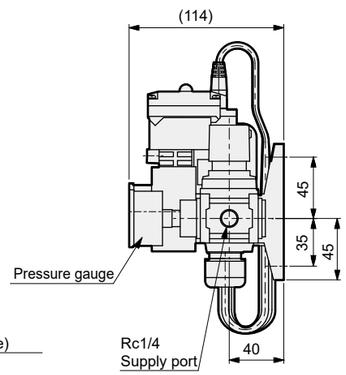
		Station No.				
		1	2	3	4	5
Dimensions (mm)	A	123	166	209	252	295
	B	54.5	97.5	140.5	183.5	226.5
	C	–	–	72	115	158
Bracket set		1	1	2	2	2
Weight (For C0) g		970	1270	1620	1920	2220

*1: pressure gauge option is not included.
*2: When solenoid valve is electrical connection "3N".
*3: The "C1", "C3", and "C5" cables are attached.
(For the cable weight, refer to the option pages.)

●Unit (connector common terminal box: CTL/CTR)

●UHPS-□-□□□ CTL (CTR)





Note: Refer to the "A-A view" on page 165 for needle position.

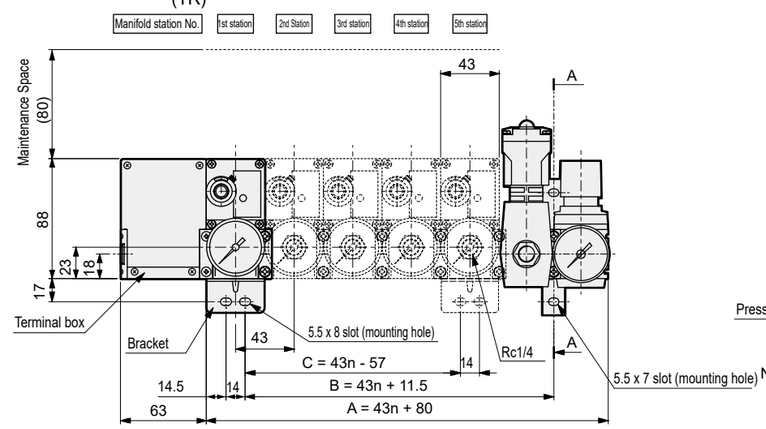
		Station No.				
		1	2	3	4	5
Dimensions (mm)	A	123	166	209	252	295
	B	54.5	97.5	140.5	183.5	226.5
	C	–	–	72	115	158
Bracket set		1	1	2	2	2
Weight (g)		1260	1610	1990	2340	2700

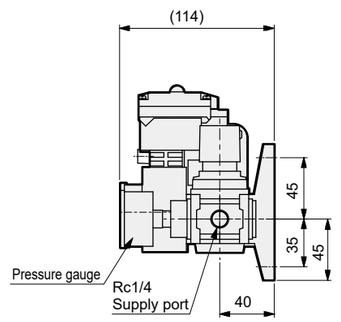
*1: pressure gauge option is not included.
*2: When solenoid valve is electrical connection "3N".

Dimensions

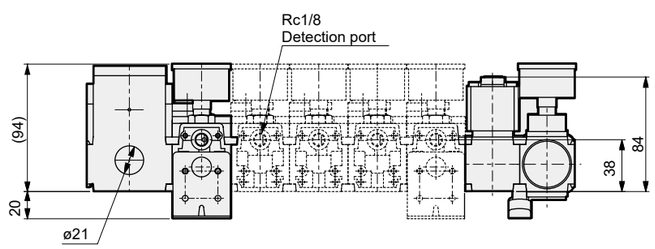
●Unit (lead wire common terminal box: TL/TR)

●UHPS-□-□□□ TL (TR)





Note: Refer to the "A-A view" on page 165 for needle position.



		Station No.				
		1	2	3	4	5
Dimensions (mm)	A	123	166	209	252	295
	B	54.5	97.5	140.5	183.5	226.5
	C	–	–	72	115	158
Bracket set		1	1	2	2	2
Weight (g)		1190	1500	1860	2170	2490

*1: pressure gauge option is not included.
*2: When solenoid valve is electrical connection "3N".

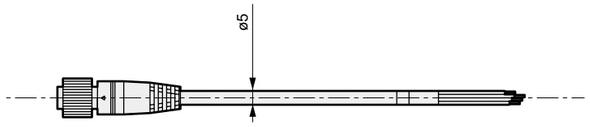
●For Options and Peripheral dimensions diagram, refer to P. 168 to 173.

Model No. Notation Method options/Dimensions diagrams

●Model No. Notation Method connector cable

GPS2-C1

Cable length



❶Cable length

Code	Description	Weight (g)
C1	1 m	45
C3	3 m	123
C5	5 m	195

Lead wire color	Applications
Brown	Power supply +
White	NC
Blue	Power supply -
Black	Output

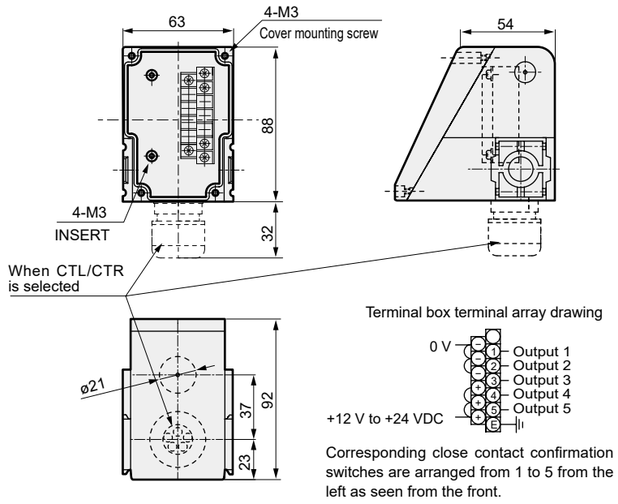
●Model No. Notation Method terminal box

GPS2-CTL

❶Terminal box

❶Terminal box

Code	Description	Weight (g)
CTL	For connector common terminal box left assembly	234 (for up to 4 stations) 245 (for 5 stations)
CTR	For connector common terminal box right assembly	
TL	For lead wire common terminal box left assembly	207
TR	For lead wire common terminal box right assembly	
TW	For lead wire common terminal box intermediate assembly	



Terminal box terminal array drawing

Corresponding close contact confirmation switches are arranged from 1 to 5 from the left as seen from the front.

●Model No. Notation Method pressure gauge with safety marker

GPS2-G40D-8-P02-S501

Port size
R1/4

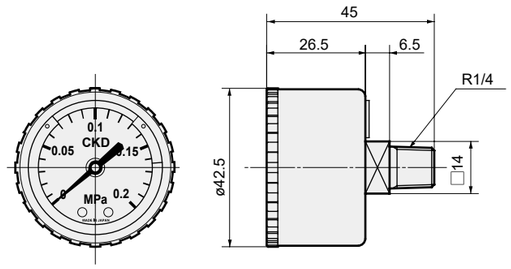
Pressure gauge with safety marker

❶Pressure display

❶Pressure display

Code	Description
P02	0 to 0.2 MPa
P04	0 to 0.4 MPa
P10	0 to 1.0 MPa

Weight: 85 g

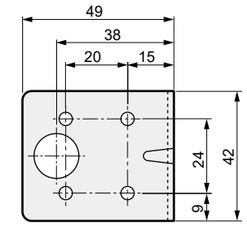


*1: Safety zone setting range: 0.03 to 0.2 MPa
*2: Safety zone setting max. width: 0.09 MPa
*3: Gage accuracy: JIS B 7505, Former 3.0 grade
*4: Cover material: Transparent nylon

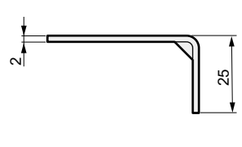
Model No. Notation Method options/Dimensions diagrams

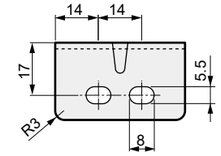
●Model No. Notation Method L-bracket

GPS2-B



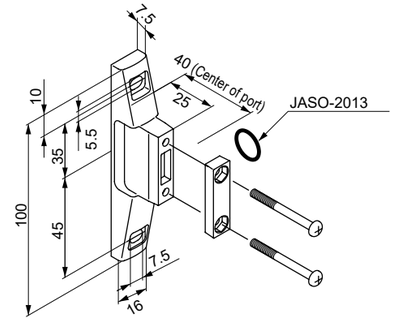
·Weight: 41 g
· Material: Iron
Trivalent chromate treatment





●Model No. Notation Method T-bracket set

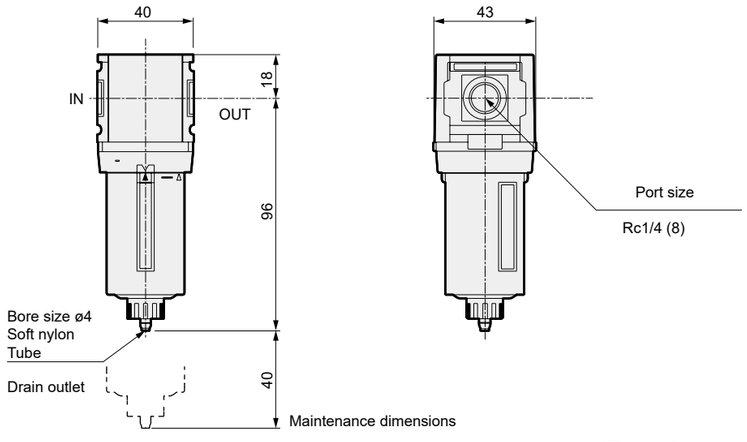
B110-W



·Weight: 24 g
· Material: Polyamide resin

●Model No. Notation Method air filter

F1000-8-W

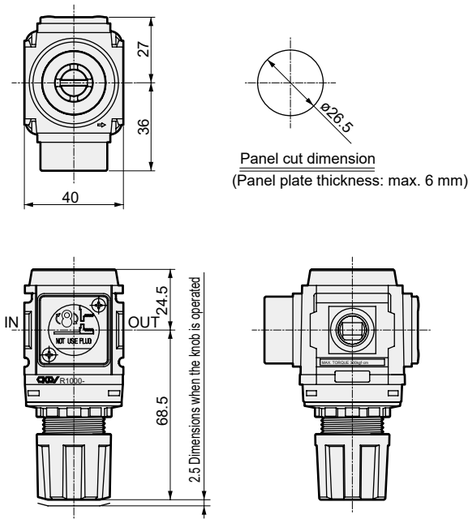


Weight: 87 g

Model No. Notation Method Peripheral components / Dimensions diagram

●Model No. Notation Method regulator

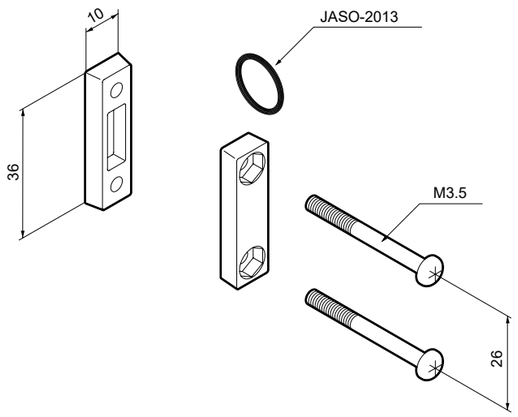
R1000-8-W-LT



Weight: 150 g

●Model No. Notation Method joiner set

C1000-J100-W

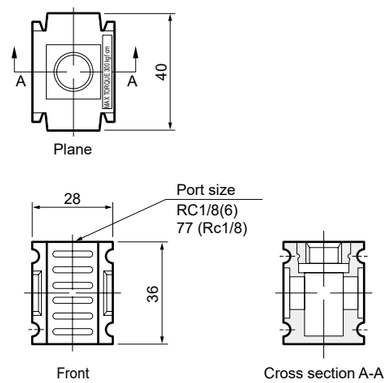


·Weight: 11 g
· Material: Polyamide resin

●Model No. Notation Method distributor

D101-00-8-W

Note: A joiner set and one gasket are attached.



·Weight: 45 g
· Material: Polyamide resin

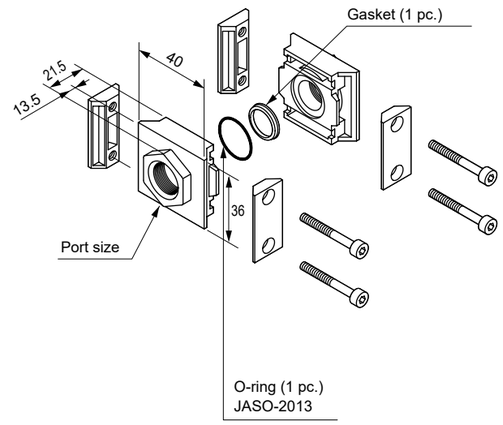
Model No. Notation Method Peripheral components / Dimensions diagram

●Pipe adaptor set
(with joiner set)

A100-8-W
❶ Port size

❶Port size

Code	Description
8	Rc1/4
10	Rc3/8



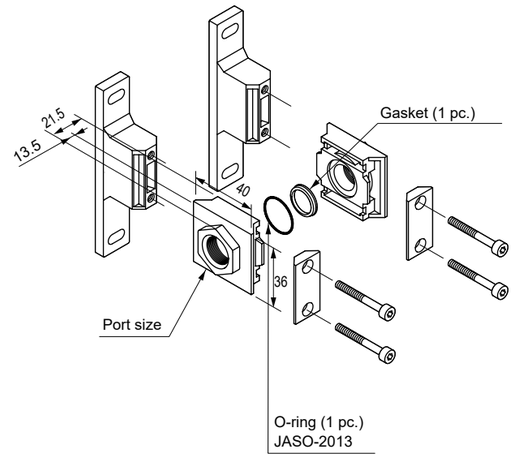
·Weight: 90 g
·Material: Aluminum alloy die-casting
Painted

●Pipe adaptor set
(with T-bracket set)

A100-8-W-B11W
❶ Port size

❶Port size

Code	Description
8	Rc1/4
10	Rc3/8



·Weight: 90 g
·Material: Aluminum alloy die-casting
Painted

Model No. Notation Method Peripheral components / Dimensions diagram

Solenoid valve with needle

GPS2-AB3X-2E-FL-AC100V

❶Terminal box ❷Voltage

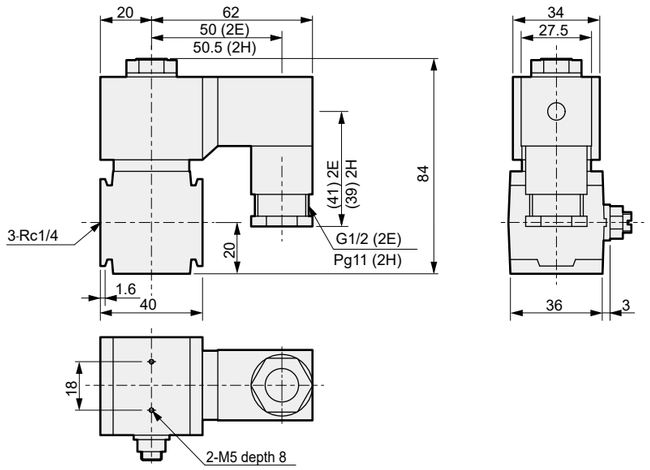
❶Terminal box

Code	Description
2E	DIN terminal box
2H	DIN terminal box with lamp
3N	HP terminal box with lamp

❷Voltage

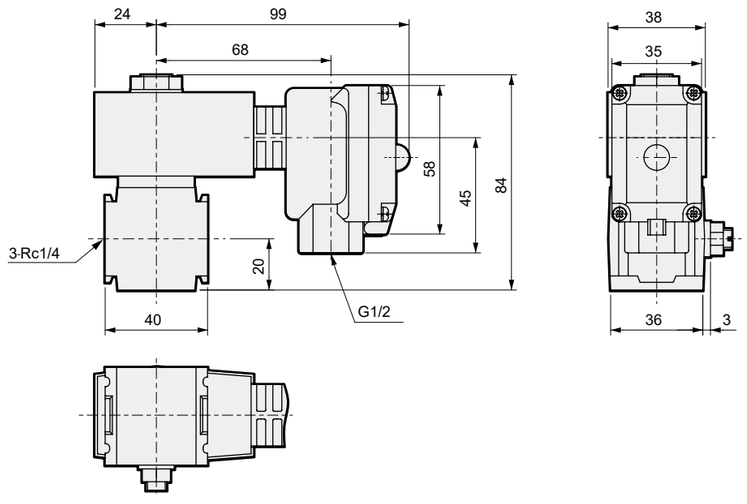
Code	Description
AC100V	100 VAC
AC200V	200 VAC
DC24V	24 VDC

●GPS2-AB3X-$\begin{matrix}2E\\2H\end{matrix}$-FL-$\begin{matrix}AC100V\\AC200V\end{matrix}$



·Weight: 280 g

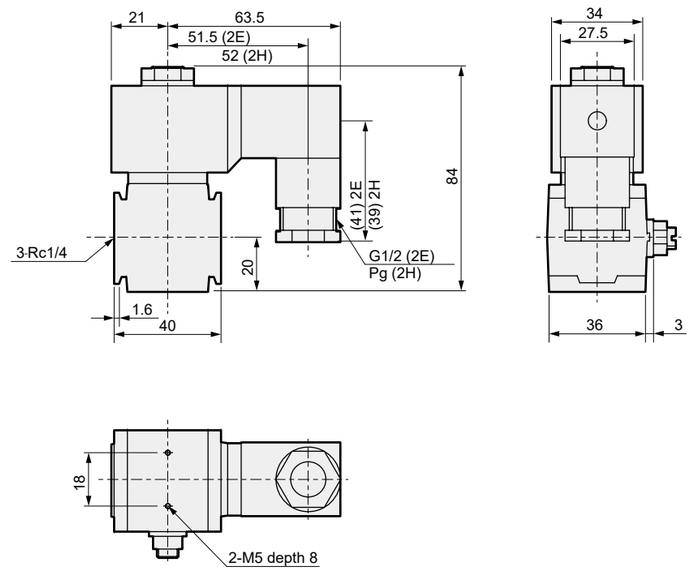
●GPS2-AB3X-3N-FL-$\begin{matrix}AC100V\\AC200V\end{matrix}$



·Weight: 445 g

Model No. Notation Method Peripheral components / Dimensions diagram

●GPS2-AB3X-$\begin{matrix}2E\\2H\end{matrix}$-FL-DC24V



·Weight: 280 g

●GPS2-AB3X-3N-FL-DC24V

·Weight: 445 g

Optional nozzle

Model No. Notation Method

APA4-DA10

❶Nozzle specifications

❶Nozzle specifications

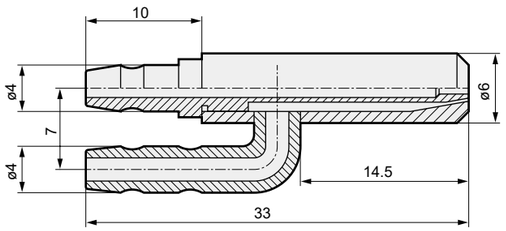
Code	Description
DA10	Outer diameter ø6, back pressure nozzle
DA20	Outer diameter M6 x P0.5, back pressure nozzle
DH10	Back pressure nozzle embedded

*1: Combine optional nozzle with HPS-05.
***2: For the characteristics, refer to P. 175 for the characteristics data.**
***3: When using HPS with standard specifications, use the same single-hole nozzle as for the GPS2. (Refer to P. 176)**

Dimensions

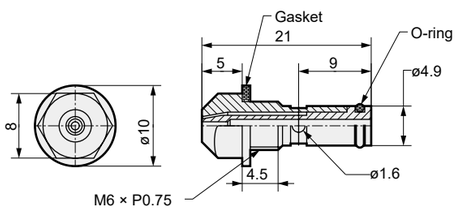
●Back pressure nozzle

· APA4-DA10



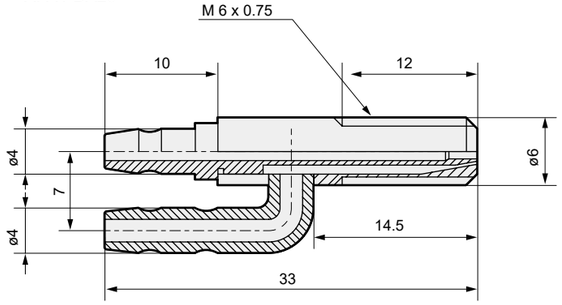
·Weight: 7 g

APA4-DH10



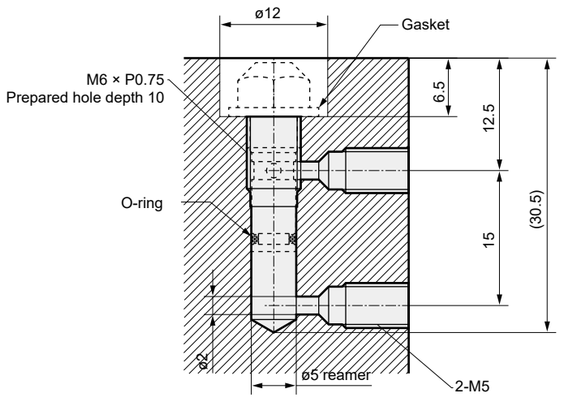
·Weight: 4 g

· APA4-DA20



·Weight: 7 g

●Example of embedding type jig design

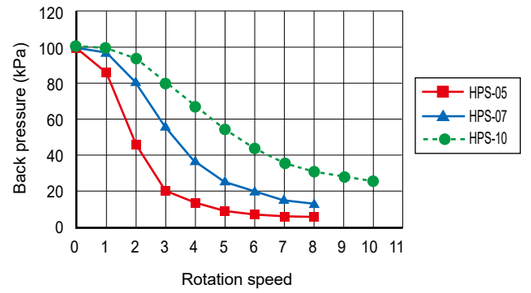


Characteristics data (HPS Series)

Characteristics data is for HPS single unit

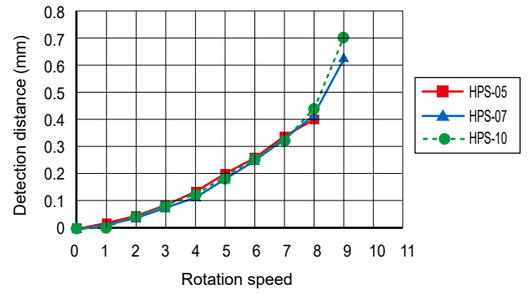
●Back pressure characteristics 1 (ø1.5 nozzle)
Measuring conditions
Port size: ø6 × ø4
Pipe length: 5 m
Supply pressure: 100 kPa
Nozzle diameter: ø1.5

Back pressure characteristics (ø1.5 nozzle)



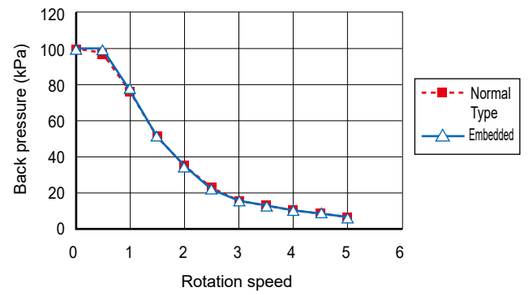
●Detection distance characteristics 1 (ø1.5 nozzle)
Measuring conditions
Port size: ø6 × ø4
Pipe length: 5 m
Supply pressure: 100 kPa
Nozzle diameter: ø1.5

Detection distance characteristics (ø1.5 nozzle)



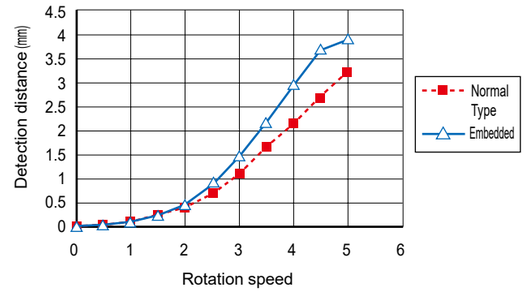
●Back pressure characteristics 2 (back pressure nozzle)
Measuring conditions
Port size: ø6 × ø4
Pipe length: 5 m
Supply pressure: 100 kPa

Back pressure characteristics (back pressure nozzle)



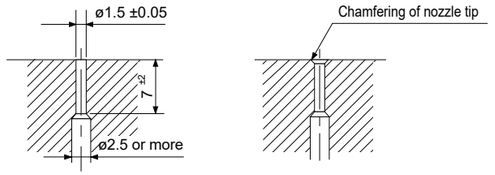
●Detection distance characteristics 2 (back pressure nozzle)
Measuring conditions
Port size: ø6 × ø4
Pipe length: 5 m
Supply pressure: 100 kPa

Detection distance characteristics (back pressure nozzle)



Design of detection nozzle

●Single hole nozzle

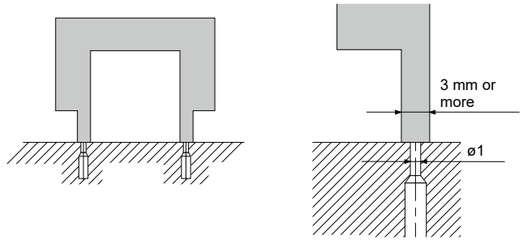


Correct nozzle shape　　Incorrect nozzle shape

Design the detection nozzle with a point size of ø1.5 mm and depth of 7 ±2 mm. The blow-off section of the nozzle cannot be chamfered. If chamfered, the nozzle retracts from the seating place, and the scale on the adjustment dial and actual dimensions do not match.

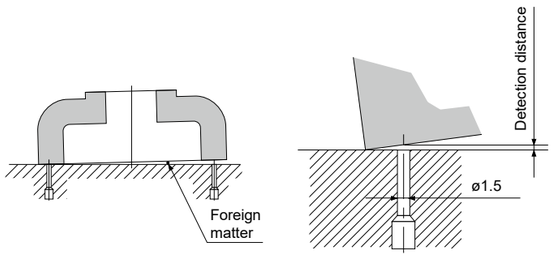
Selection of detection nozzle diameter

●When the workpiece detection surface is narrow - nozzle diameter ø1 and width is less than 3 mm, please contact us.



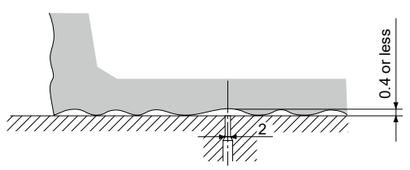
· Use with a detection distance of 0.1 mm or less.
· Use with a workpiece surface roughness of Rz=5 or less
· Check that nozzle does not separate from the detection surface.

●When the workpiece detection surface is sufficiently wide: Use ø1.5 mm nozzle.



· Use with a detection distance of 0.2 mm or less.
· Use with a workpiece surface roughness of Rz=5 or less

●When detecting the presence of a workpiece with a rough detection surface: Use ø1.5 mm or ø2.0 mm nozzle.



· The max. detection distance of the GPS2 is 0.4 mm. The workpiece cannot be detected if non-uniformity exceeds 0.4 mm. In that case, use the HPS-10.

Pneumatic components (sensors)

Safety Precautions

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

Product-specific cautions: Close contact confirmation switch HPS Series

During Design and Selection

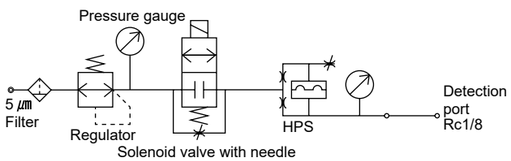
⚠WARNING

■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.

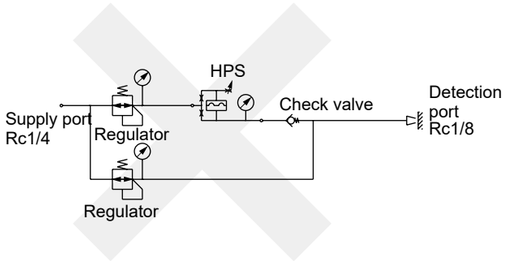
■Confirm before use that the product will withstand the working environment.
- This product cannot be used in environments where functional obstacles could occur.
- The main materials of this product are aluminum and resin. Do not use in atmospheres where corrosive gases are generated. Such environments 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."

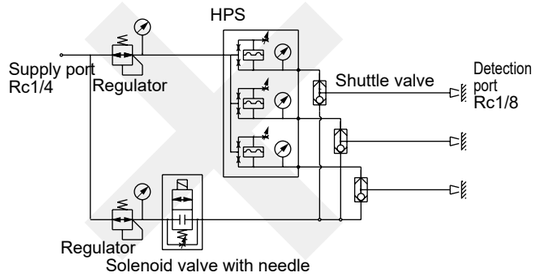
■Understand compressed air features before designing a pneumatic circuit.
This product has a small orifice, so to prevent the entry of foreign matter, use clean air with the recommended circuit shown below (Fig. 1).

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.





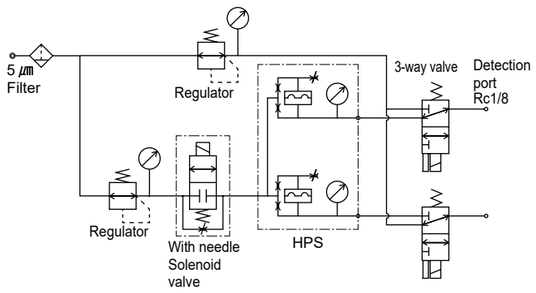
⚠CAUTION

■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.

■Precautions for HPS

- 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
- HPS and fine air solenoid valve
  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:

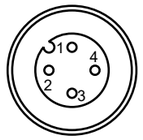
- Install this product so the detection port faces downward.
- Install this product at a position higher than the seating surface to prevent coolant from entering.
- Provide enough space for adjustment, monitoring, and maintenance.
- Use rust-resistant material such as nylon tubes or stainless steel 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)

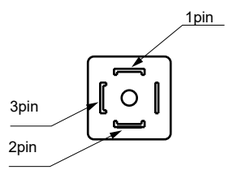


PIN array/lead wire color list

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.

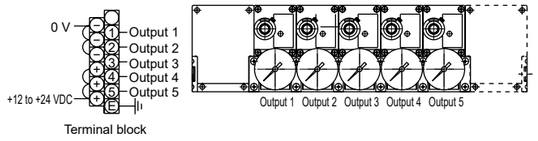
Fig. 4 DIN terminal box pin array (body side)



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

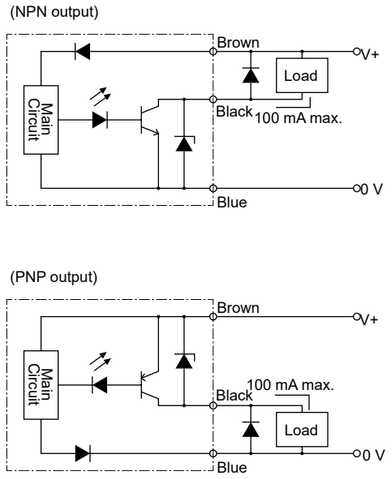
- When using the common terminal box, power supply terminals are on the lower side of the gland. Signal wire terminals are on the upper row. This product is wired as shown in Fig. 5.

Fig. 5 Terminal box layout



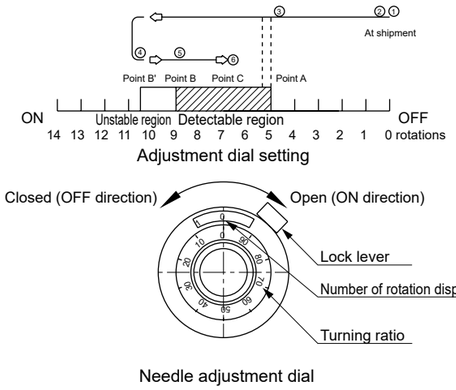
- When using a load with a large rush current, such as a motor, the protection circuit will activate. In this case, use a relay.
- If there is a device (motor, welder) that generates a large surge near this product, insert a surge absorber, such as a varistor, at the source of the surge.
- If this product's 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



■Adjustment sequence

1. When this product is shipped from CKD, the adjustment dial is set to display 0 rotations as the number of rotations, and rotation angle 0.
2. Supply air. The indicator lamp turns OFF.
3. With the master gage OK, turn the knob rotation of the adjustment needle in the direction in which the value rises (open) and determine the OFF→ON switching point A.
4. Turn the master gage NG side (OFF state) in the direction in which the value rises (open) again to obtain the OFF→ON switching point B'.
5. Turn the motor in the direction in which the rotation speed decreases (closed), and obtain switch point B for ON→OFF. The adjusting range is found by counting the number of rotations from point A to point B.
6. Rotate the adjustment needle in the closed direction, and set to the middle point between point A and point B. This position is point C. If point C is near point B, the signal turns ON easily and response time is short. However, it will take time to return. Stable detection is possible by setting adjustment point C between point A and point B.
7. Lock the dial after adjusting.



Do not turn the dial with force at extremities of the rotation.
The dial can be rotated up to 14 times.

■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