Cutting tool breakage detection switch

TLPS, MTLPS, UTLPS Series

Overview

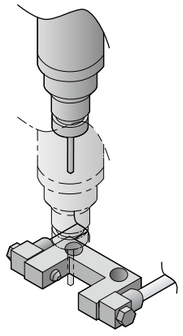
- The cutting tool breakage detection switch TLPS Series is an air sensor used to detect broken or chipped drills and taps used in the metal machining line.
- A dedicated nozzle unit is used for the detection nozzle to match the cutting tool. This switch is also usable in adverse environments, which is one of the features of the air sensor.

Features

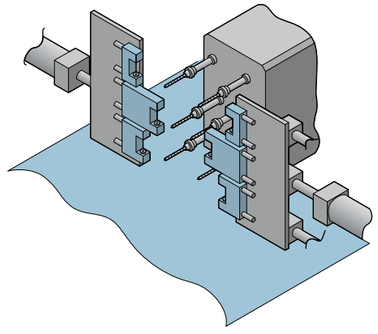
- Shorter machining tact
  Since non-contact detection makes it possible to detect the state while the tool is rotating, tact time is shortened compared to conventional methods.
- Compatible with adverse environments
  Self-cleaning by the air nozzle enables use even in environments where coolant or swarf scatter.
- Small-diameter drill and cutting edge chipping detection
  Chips are detected on a ø0.3 small drill or 1 mm drill tip.
- Low air consumption
  This switch is used with low pressure so air consumption is reduced.
  (3 L/min (ANR) at 50 kPa)
- High stability
  Stable cutting tool breakage, unaffected by fluctuations in supply pressure, is detectable with the air bridge.
- Easy adjustment
  The highly accurate needle with lock mechanism and dial scale makes it possible to adjust the detecting position easily with no worry about deviation.
- Modularization
  Modularization makes it easy to connect to the CKD module connection component.

Example of cutting tool breakage detection applications

●Nozzle unit fixed

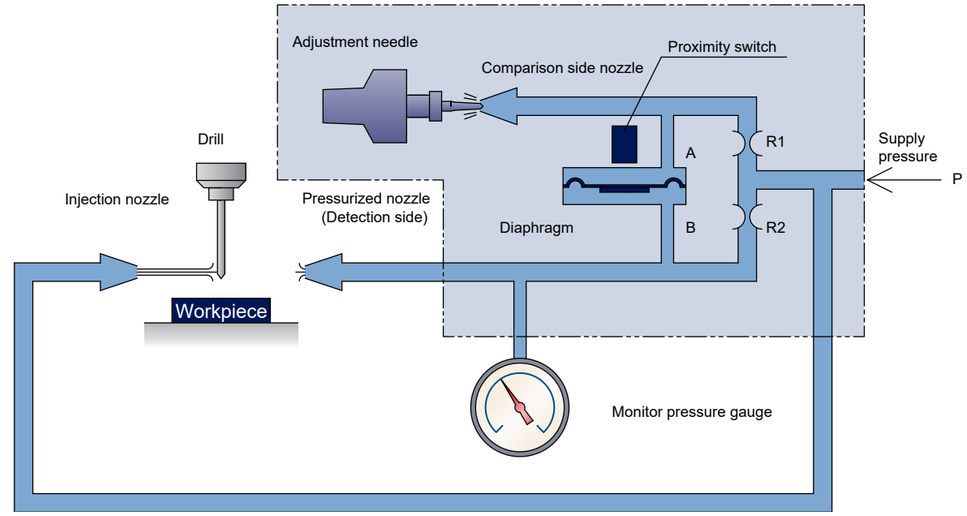


●Detecting nozzle moving type



Operational explanation

●Diagram of TLPS (facing) principle



●Detecting nozzle

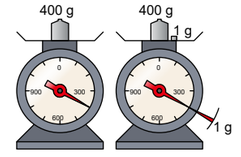
Two nozzles are used facing each other. A small amount of detection air is passed from the nozzle pressurized through the TLPS switch, and exhausted from nozzles. Conversely, air injected from the injection nozzle collides with detection air. When air collides, the back pressure of the nozzle pressurized rises, and the proximity switch in the TLPS switch is activated, generating an electrical signal. If there is a drill or other object between detecting nozzles, injection air is diffused and does not reach the nozzle pressurized, so the proximity switch in the TLPS is not activated.

●Cutting tool breakage detection switch

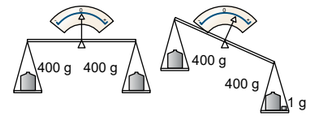
The difference of pressure when a drill is present and absent is amplified by the air bridge circuit. When expressed as a scale, the balance is the bridge type. The air bridge circuit is a system which detects micro-fluctuations in pressure highly accurately. If the detection pressure with drill is P1, and the detection pressure without drill is P2,

Adjusted pressure = (P1 + P2) / 2

If the drill is present, then P1 is smaller than the adjusted pressure and the diaphragm lowers. If the drill is absent, then P2 is greater than the adjusted pressure, so the diaphragm rises, the proximity switch is activated, and an electrical signal is generated.



Spring scale



Balance

Cutting tool breakage detection switch, single unit

TLPS Series

Refer to the CKD website for detailed compatible model Nos.

Model No. Notation Method

TLPS - 03 - N Y TL - B - GW2

- TLPS: Model No.
- 03: Orifice size: ø0.3 For detecting nozzle
- N: ❶Output style
- Y: Lamp color: Yellow
- TL: ❷Electrical connection option
- B: ❸Bracket
- GW2: ❹Pressure gauge

*1: Refer to page 202 for the model No. of the detecting nozzle.
*2: Refer to pages 196 to 201 for option and model No. of related components.

❶Output style

Code	Description
N	NPN open collector
P	PNP open collector

❷Electrical 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)	

❸Bracket

Code	Description	
Blank	Without bracket	
B	With bracket	

❹Pressure gauge

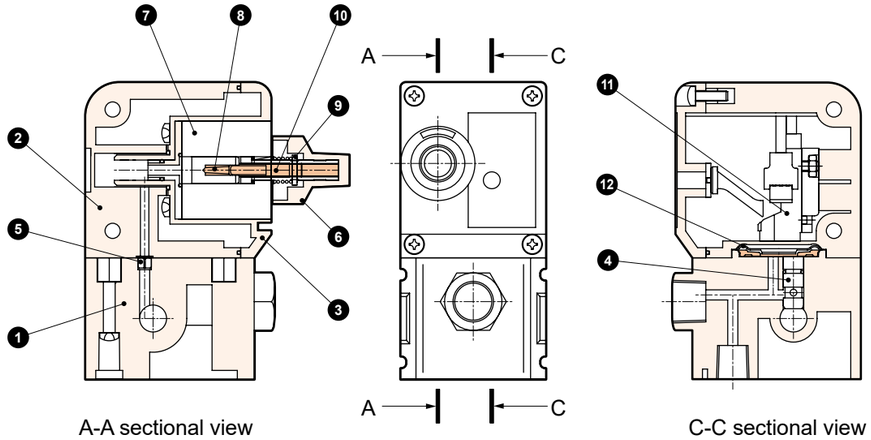
Code	Description
Blank	No pressure gauge
G2	Pressure gauge with safety marker attached (G40D-8-P02-S501)
GW2	Pressure gauge assembly with safety marker (G40D-8-P02-S501)

Specifications

Item		TLPS-03		
Orifice size (mm)		ø0.3		
Working pressure *1 kPa		50 to 200 (100 recommended)		
Detection cutting tool diameter mm		ø0.3 to 30		
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 and signal	When drill is broken	Yellow lamp ON, output ON		
	When drill is normal	Yellow lamp OFF, output OFF		
Cutting edge detecting position		1 mm and over from end of the edge		
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 *2		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) * Air consumption Value when CKD's standard nozzle is selected	Nozzle	TLPS-J0310	TLPS-J0510	TLPS-J0715
	50 kPa	2.8	4.8	6.6
	100 kPa	4.2	7.2	9.7
	200 kPa	6.6	11.1	15.1

*1: If the nozzle clogs, working pressure should be set between 100 and 200 kPa.
*2: 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



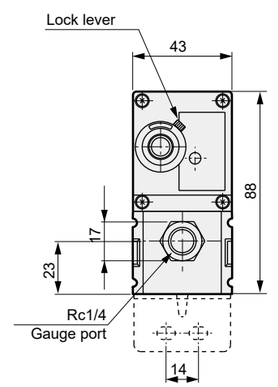
A-A sectional view

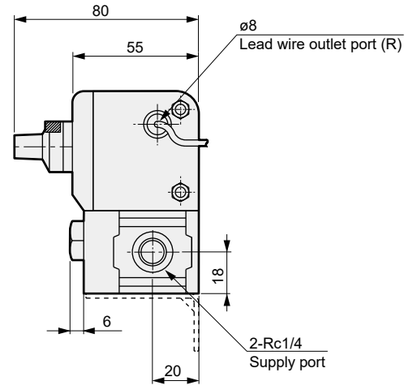
C-C sectional view

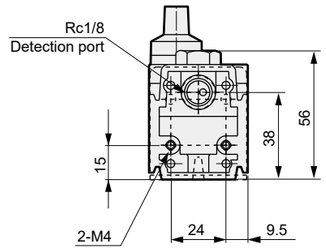
Part No.	Part name	Material	Part No.	Part name	Material
1	Base	Aluminum	7	Needle holder	Aluminum
2	Body	Polybutylene terephthalate	8	Needle	Stainless steel
3	Front cover	Polybutylene terephthalate	9	Pin	Piano wire
4	Orifice nozzle A	Brass	10	Needle shaft	Brass
5	Orifice nozzle B	Brass	11	Proximity switch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

Dimensions

●Basic
TLPS-03-□□ R
L
W



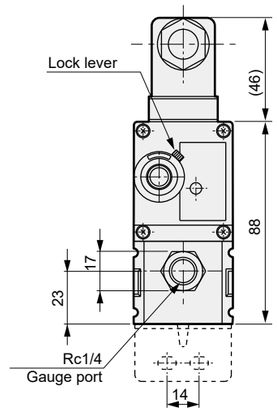


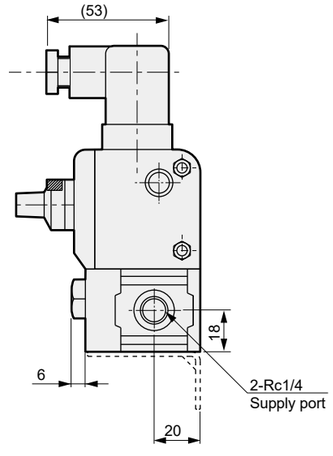


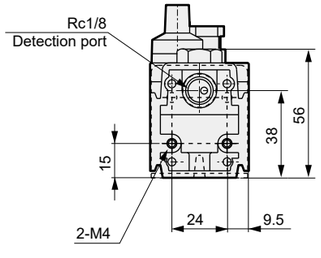
·Weight: 300 g

Note: Bracket and pressure gauge options are not included.

●DIN terminal box
TLPS-03-□□F







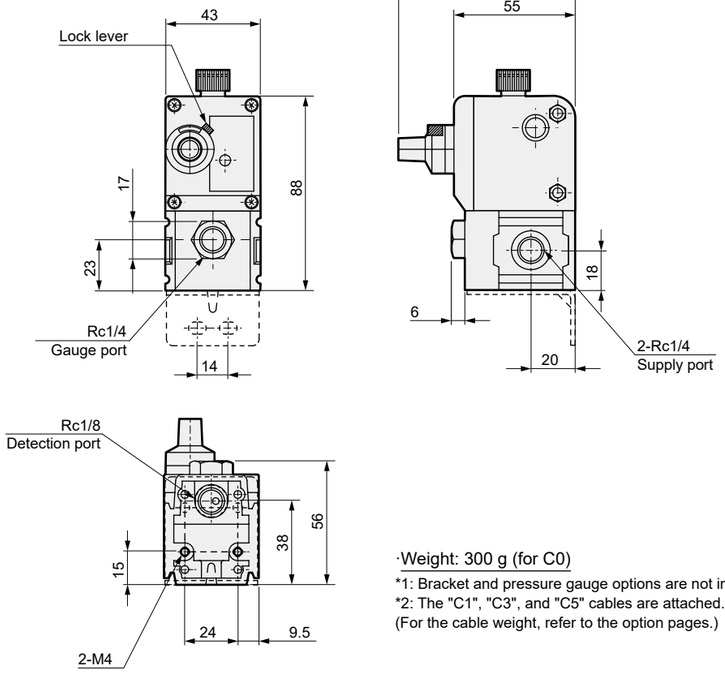
·Weight: 340 g

Note: Bracket and pressure gauge options are not included.

Dimensions

●Connector

● TLPS-03-□□ C0 C1 C3 C5

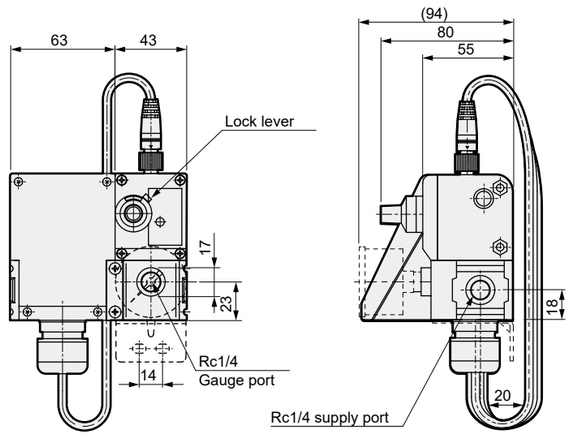


·Weight: 300 g (for C0)

*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

●TLPS-03-□□ CTL (CTR)

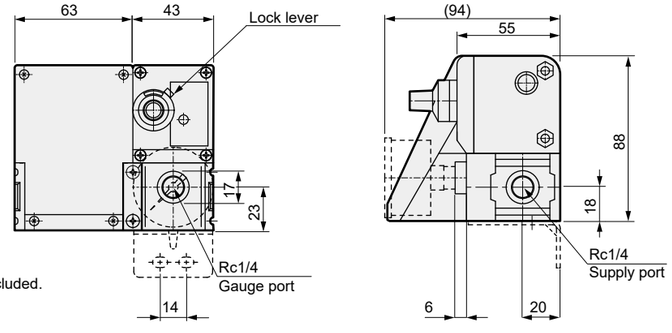


·Weight: 583 g

Note: Bracket and pressure gauge options are not included.

●Lead wire common terminal box

● TLPS-03-□□ TL (TR)



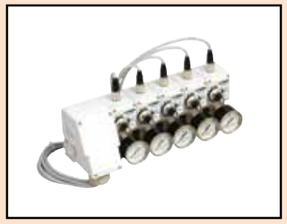
·Weight: 513 g

Note: Bracket and pressure gauge options are not included.

●For information on Options and Peripheral Dimensions diagrams, refer to pages 196 to 201.

MEMO

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



Cutting tool breakage detection switch/manifold

MTLPS Series

Refer to the CKD website for detailed compatible model Nos.

Model No. Notation Method

MTLPS - 03 - 2 N Y TL - B - GW2

*1: Refer to P. 202 for the model No. of the detecting nozzle.
*2: Refer to P. 196 to 201 for option and model No. of related components.

- MTLPS: Model No.
- 03: Orifice size: ø0.3 For detecting nozzle
- 2: ❶Station No.
- N: ❷Output style
- Y: Lamp color: Yellow
- TL: ❸Electrical connection option
- B: ❹Bracket
- GW2: ❺Pressure gauge

❶Station No.

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

❷Output style

Code	Description
N	NPN open collector
P	PNP open collector

❸Electrical connection option

Code	Description		Degree of Protection (*2)
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		Intermediate assembly (1st from left)	
T2		Intermediate assembly (2nd from left)	
T3		Intermediate assembly (3rd from left)	
T4		Intermediate assembly (4th from left)	

*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.

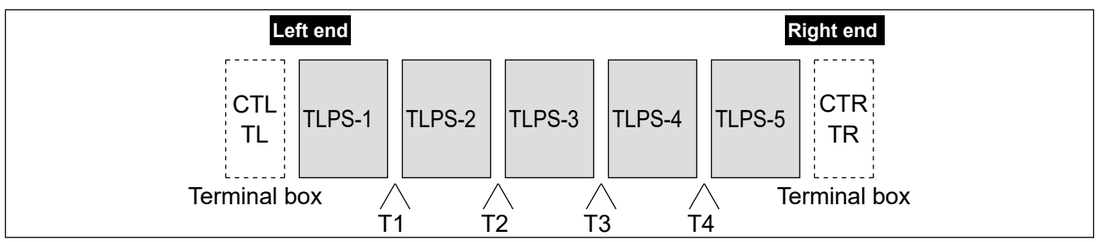
❹Bracket

Code	Description	
Blank	Without bracket	
B	With bracket	

❺Pressure 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)

Terminal box installation position relation diagram



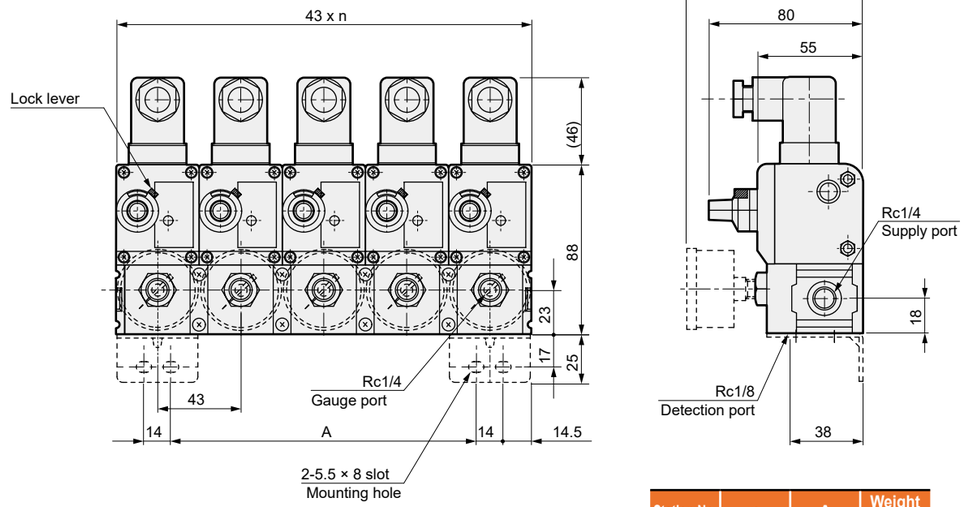
Specifications

Basic specifications are the same as the Discrete on page 183 .

Dimensions

●Manifold (DIN terminal box: F)

●MTLPS-03-□□□ F



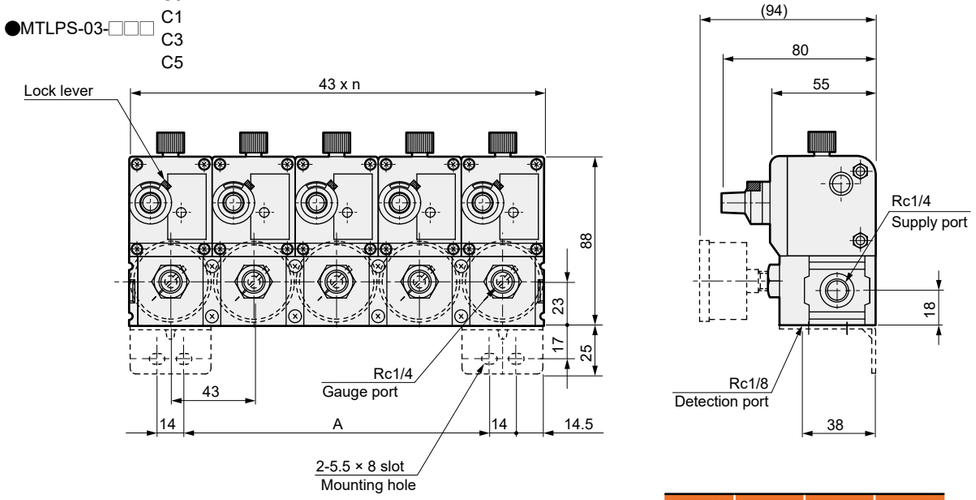
Station No.	n	A	Weight (g)
2 stations	2	29	680
3 stations	3	72	1030
4 stations	4	115	1370
5 stations	5	158	1710

Note: Bracket and pressure gauge options are not included.

Dimensions

●Manifold (connector: C□)

●MTLPS-03-□□□ C0 C1 C3 C5

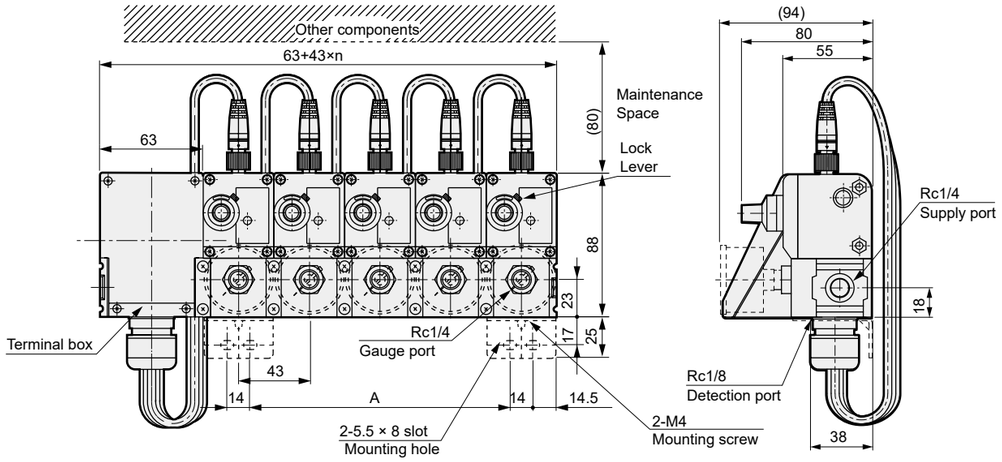


Station No.	n	A	Weight (g) (For C0)
2 stations	2	29	590
3 stations	3	72	890
4 stations	4	115	1190
5 stations	5	158	1490

*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)

●MTLPS-03-□□□ CTL (CTR)



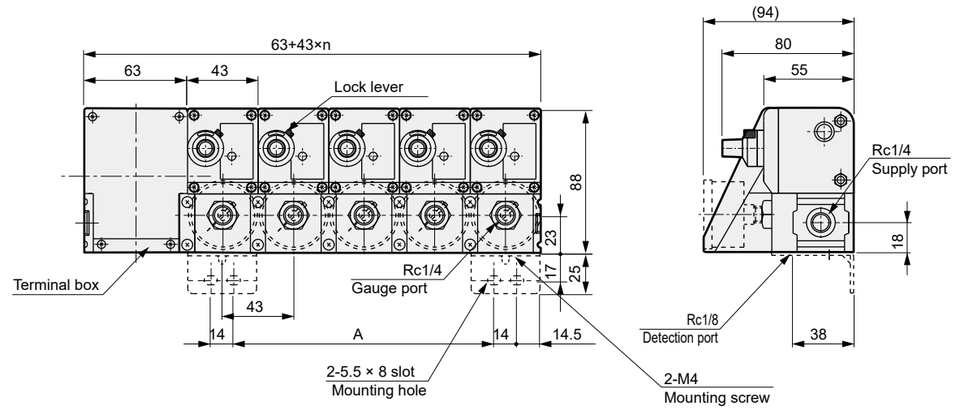
Station No.	n	A	Weight (g)
2 stations	2	29	930
3 stations	3	72	1270
4 stations	4	115	1620
5 stations	5	158	1980

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

Dimensions

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

●MTLPS-03-□□□ 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 information on Options and Peripheral Dimensions diagrams, refer to P. 196 to 201.

Cutting tool breakage detection switch unit

UTLPS Series

●Solenoid valve with needle, regulator integrated general purpose unit

Refer to the CKD website for detailed compatible model Nos.

Model No. Notation Method

UTLPS - 03 - 2 N Y TL - B - GW2 - 2H - 1

- UTLPS: Model No.
- 03: Orifice size: ø0.3 For detecting nozzle
- 2: ❶Station No.
- N: ❷Output style
- Y: Lamp color: Yellow
- TL: ❸Electrical connection option
- B: ❹Bracket
- GW2: ❺Pressure gauge
- 2H: ❻Solenoid valve electrical connection
- 1: ❼Solenoid valve voltage

*1: Refer to P. 202 for the model No. of the detecting nozzle.
*2: Refer to P. 196 to 201 for option and model No. of related components.

❶Station No.

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

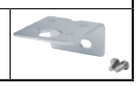
❷Output style

Code	Description
N	NPN open collector
P	PNP open collector

❸Electrical 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

❹Bracket

Code	Description	
Blank	Without bracket	
B	With bracket	

❺Pressure gauge

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

*1: Regulator pressure gauge is also provided.

❻Solenoid valve electrical connection

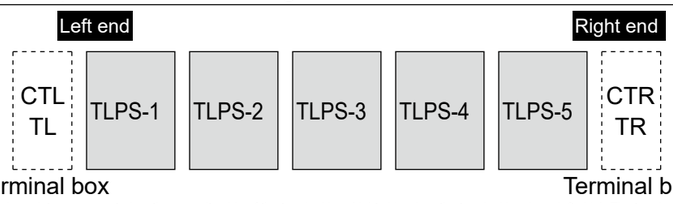
Code	Description
2E	DIN terminal box
2H	DIN terminal box with lamp
3N	HP terminal box with lamp

Note: For CE marking/UKCA-compatible parts, select from "2E" and "2H".

❼Solenoid 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.

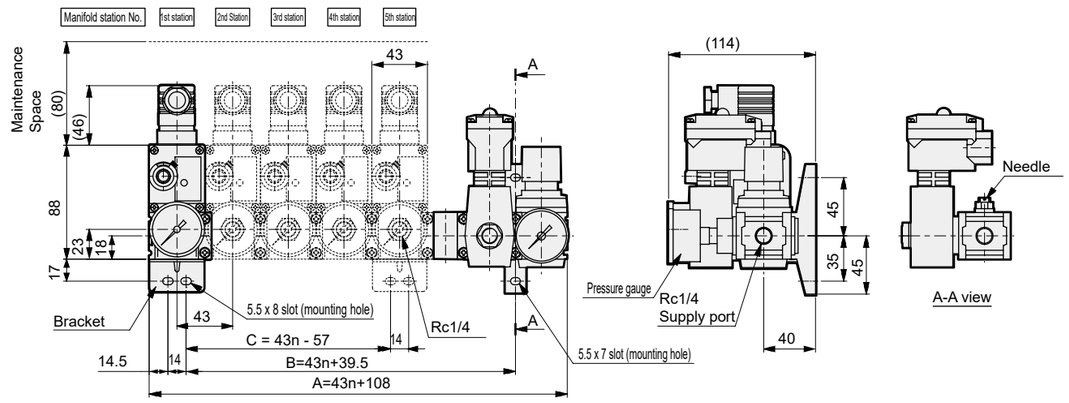
Specifications

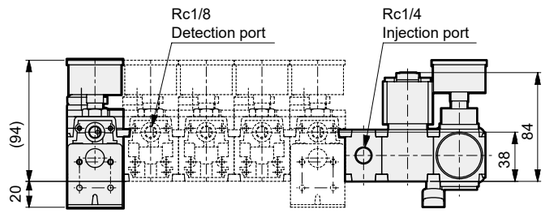
Basic specifications are the same as the Discrete on page 183 .

Dimensions

●Unit (DIN terminal box: F)

●UTLPS-03-□□□ F





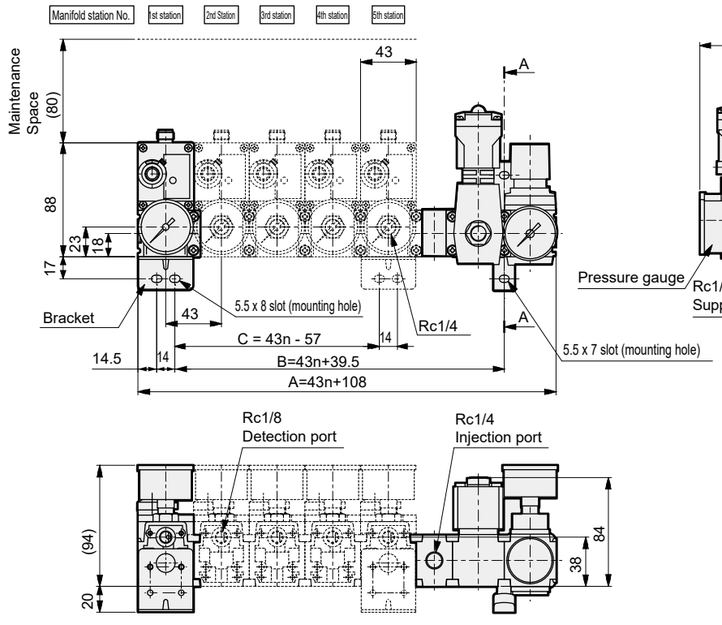
		Station No.				
		1	2	3	4	5
Dimensions (mm)	A	151	194	237	280	323
	B	82.5	125.5	168.5	211.5	254.5
	C	–	–	72	115	158
Bracket set		1	1	2	2	2
Weight (g)		1070	1420	1800	2150	2490

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

Dimensions

●Unit (connector: C□)

●UTLPS-03-□□□ C0 C1 C3 C5



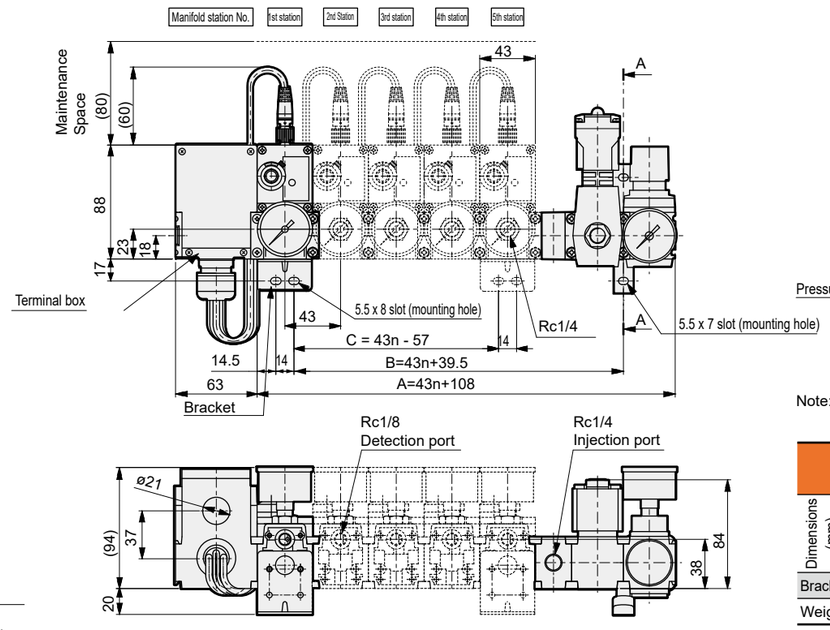
Note: Refer to the "A-A view" on P. 193 for needle position.

		Station No.				
		1	2	3	4	5
Dimensions (mm)	A	151	194	237	280	323
	B	82.5	125.5	168.5	211.5	254.5
	C	–	–	72	115	158
Bracket set		1	1	2	2	2
Weight(For C0) g		1030	1330	1670	1970	2270

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

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

●UTLPS-03-□□□ CTL (CTR)



Note: Refer to the "A-A view" on P. 193 for needle position.

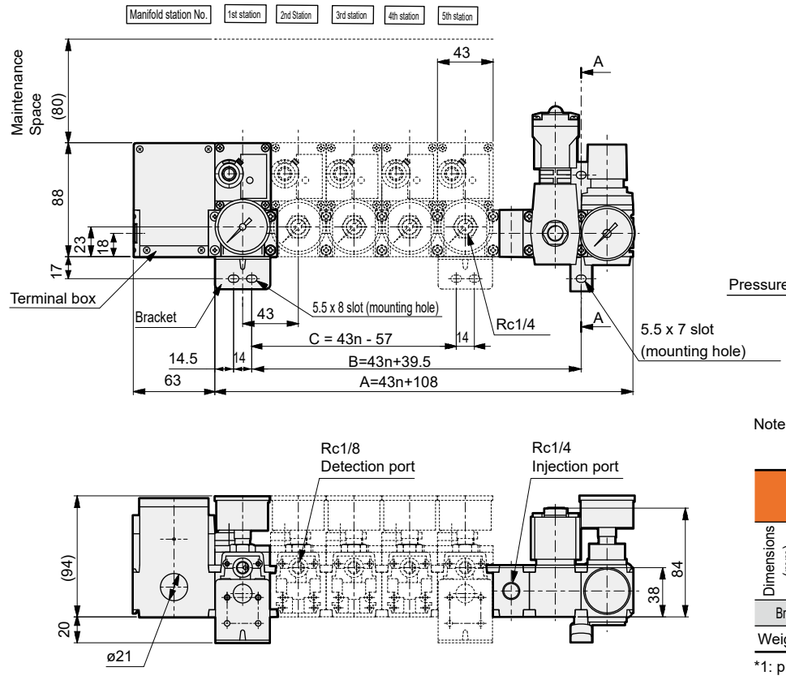
		Station No.				
		1	2	3	4	5
Dimensions (mm)	A	151	194	237	280	323
	B	82.5	125.5	168.5	211.5	254.5
	C	–	–	72	115	158
Bracket set		1	1	2	2	2
Weight (g)		1320	1660	2050	2400	2750

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

Dimensions

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

●UTLPS-03-□□□ TL (TR)



Note: Refer to the "A-A view" on P. 193 for needle position.

		Station No.				
		1	2	3	4	5
Dimensions (mm)	A	151	194	237	280	323
	B	82.5	125.5	168.5	211.5	254.5
	C	–	–	72	115	158
Bracket set		1	1	2	2	2
Weight (g)		1250	1560	1920	2230	2540

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

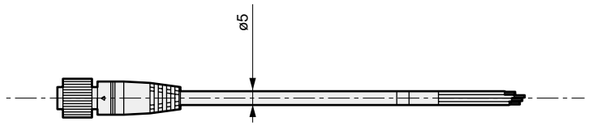
●For information on Options and Peripheral Dimensions diagrams, refer to P. 196 to 201.

Model No. Notation Method options/Dimensions diagrams

●Model No. Notation Method connector cable

GPS2-C1

Cable length



❶Cable length

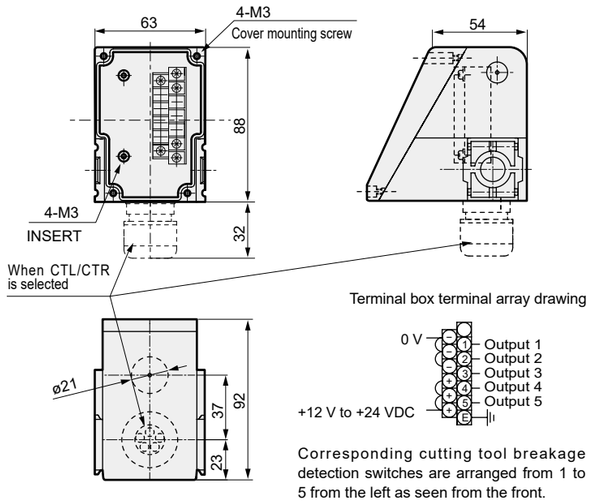
Code	Description	Weight (g)
C1	1 m	45
C3	3 m	123
C5	5 m	195

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 cutting tool breakage detection 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

Model No. with safety marker pressure gauge

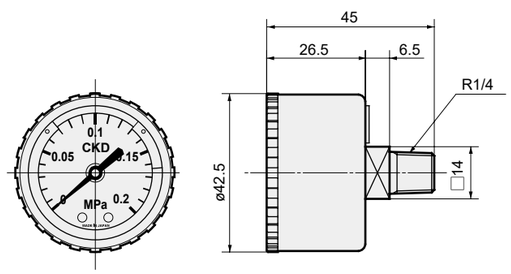
Port size R1/4

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

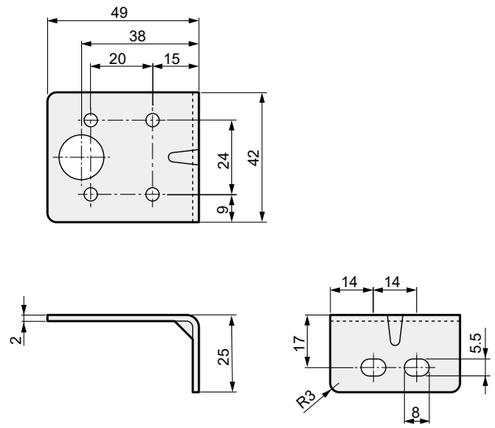


*1: Safety zone setting range: 0.03 to 0.2 MPa
*2: Safety zone setting max. width: 0.09 MPa
*3: Gage accuracy: JIS B 7505, Former 3.0 grade
*4: Cover material: Transparent nylon

Model No. Notation Method options/Dimensions diagrams

●Model No. Notation Method L-bracket

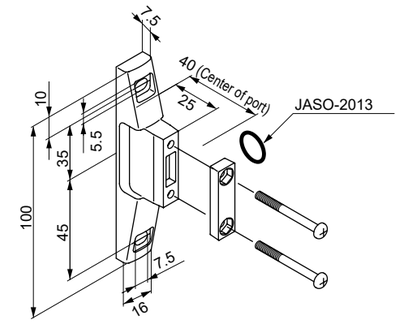
GPS2-B



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

●Model No. Notation Method T-bracket set

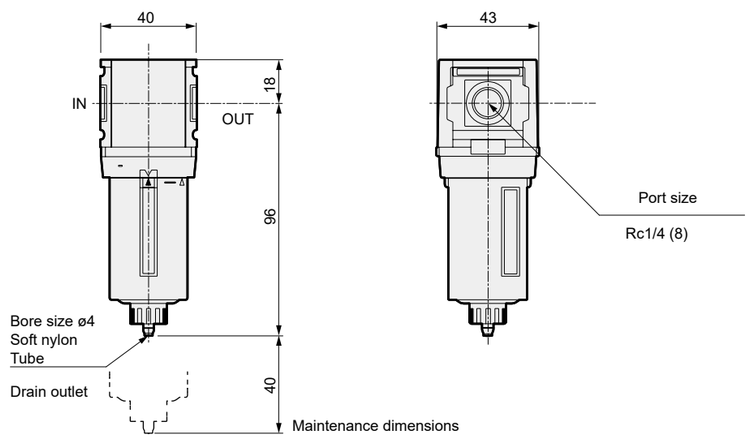
B110-W



·Weight: 24 g
· Material: Polyamide resin

●Model No. Notation Method air filter

F1000-8-W

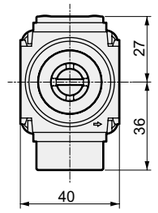


Weight: 87 g

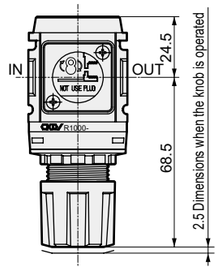
Model No. Notation Method Peripheral components / Dimensions diagram

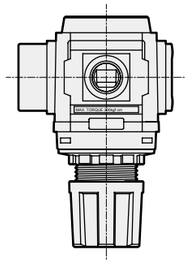
●Model No. Notation Method regulator

R1000-8-W-LT



Panel cut dimension
(Panel plate thickness: max. 6 mm)

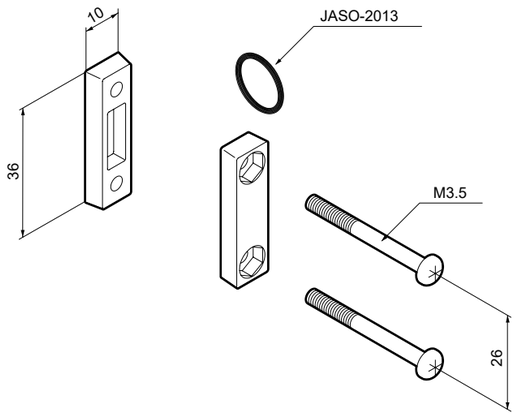




Weight: 150 g

●Model No. Notation Method joiner set

C1000-J100-W

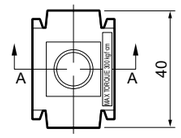


·Weight: 11 g
· Material: Polyamide resin

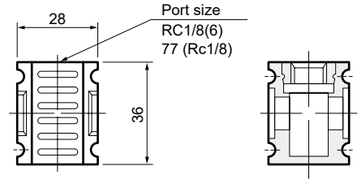
●Model No. Notation Method distributor

D101-00-8-W

Note: A joiner set and one gasket are attached.



Plane



Front

Cross section A-A

·Weight: 45 g
· Material: Polyamide resin

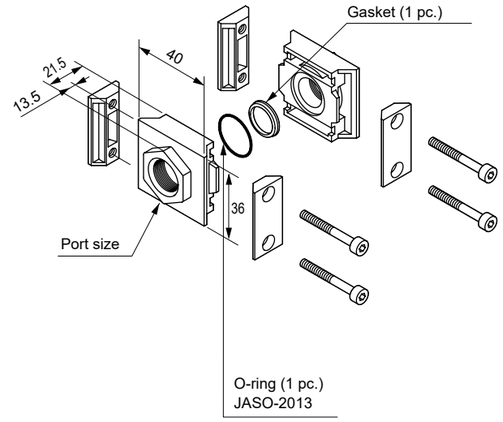
Model No. Notation Method Peripheral components / Dimensions diagram

●Pipe adaptor set
(with joiner set)

A100-8-W
❶Port size

❶Port size

Code	Description
8	Rc1/4
10	Rc3/8



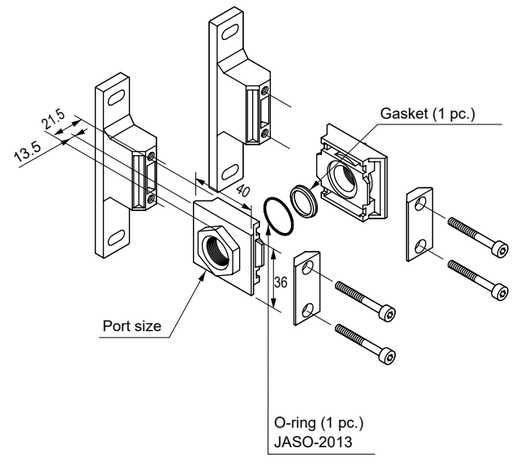
·Weight: 90 g
·Material: Aluminum alloy die-casting
Painting

●Pipe adaptor set
(with T-bracket set)

A100-8-W-B11W
❶Port size

❶Port size

Code	Description
8	Rc1/4
10	Rc3/8



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

Model No. Notation Method Peripheral components / Dimensions diagram

Solenoid valve with needle

GPS2-AB3X-2E-FL-AC100V

❶Terminal box ❷Voltage

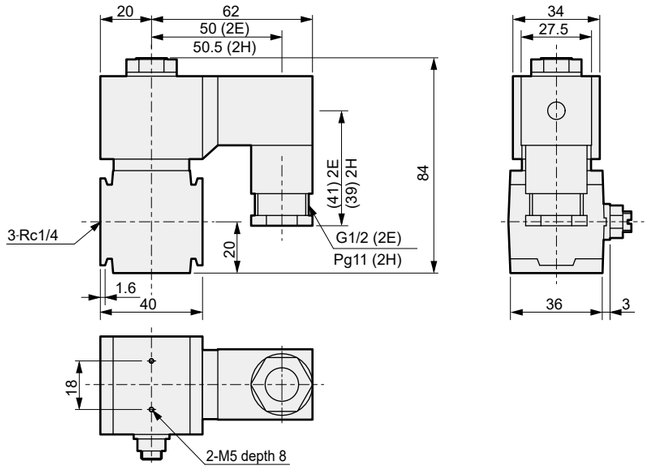
❶Terminal box

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

❷Voltage

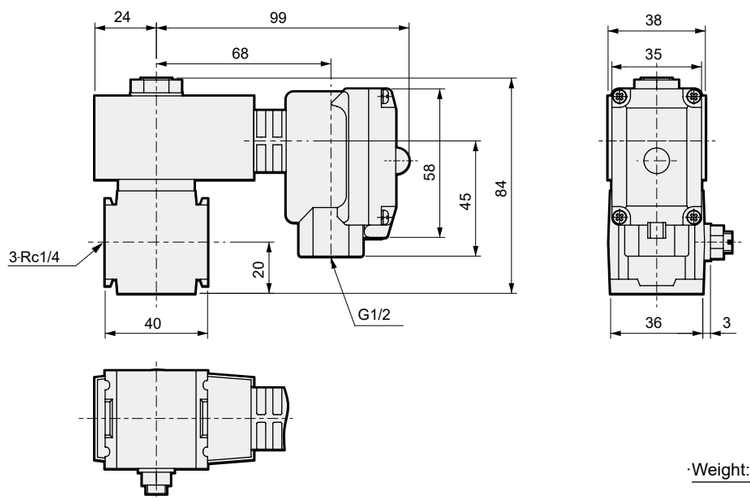
Code	Description
AC100V	100 VAC
AC200V	200 VAC
DC24V	24 VDC

●GPS2-AB3X-2E/2H-FL-AC100V/AC200V



·Weight: 280 g

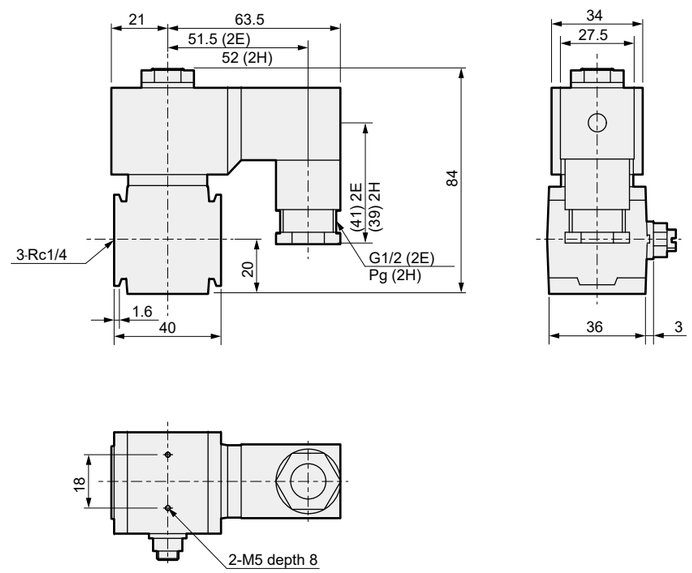
●GPS2-AB3X-3N-FL-AC100V/AC200V



·Weight: 445 g

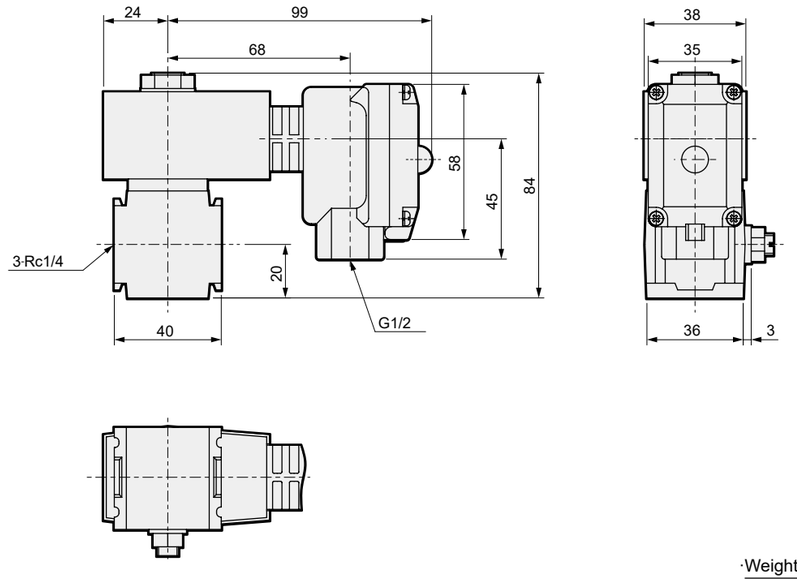
Model No. Notation Method Peripheral components / Dimensions diagram

●GPS2-AB3X-2E/2H-FL-DC24V



·Weight: 280 g

●GPS2-AB3X-3N-FL-DC24V



·Weight: 445 g

Model No. Notation Method Detecting nozzle/Dimensions diagram

TLPS-J 0310

❶Nozzle specifications

❶Nozzle specifications

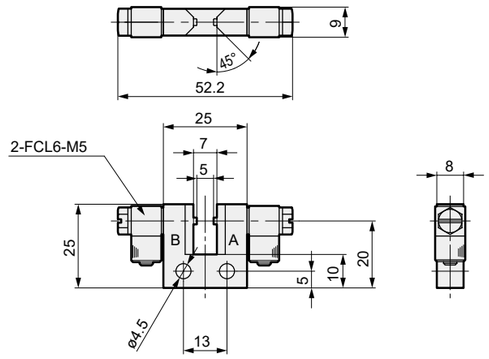
Code	Description	
	Injection nozzle diameter (A side)	Nozzle pressurized diameter (B side)
0310	ø0.3	ø1.0
0510	ø0.5	ø1.0
0715	ø0.7	ø1.5

Specifications

Item	TLPS-J0310	TLPS-J0510	TLPS-J0715
Applicable drill diameter mm	ø0.3 to 3	ø1 to 10	ø3 to 30
Distance between nozzles mm	5	12	32
Guide to the number of needle rotations	1.8 to 2.2	2.3 to 2.7	5.3 to 5.7

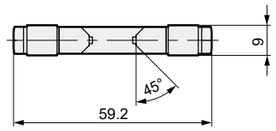
*1: The table above shows reference values when supply pressure is 0.1 MPa and pipe length is 5 m.
*2: Contact CKD for made to order nozzle and multi spindle.
*3: Jet nozzle is indicated as A, and pressurizing nozzle is indicated as B.
*4: Pipe the injection nozzle (A side) to the supply source (injection port for units) and the pressurized nozzle (B side) to the TLPS detection port.

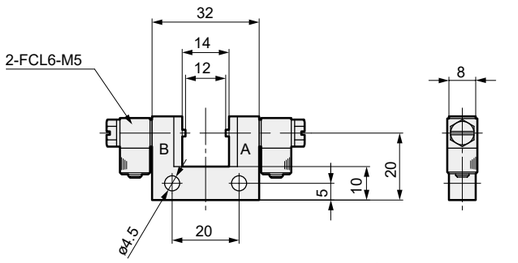
●J0310



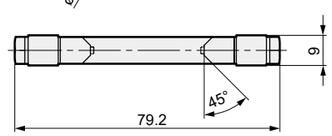
Weight: 30 g

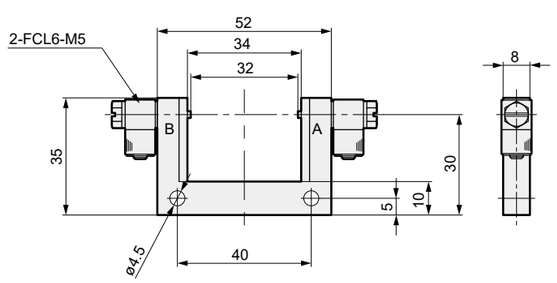
●J0510





●J0715





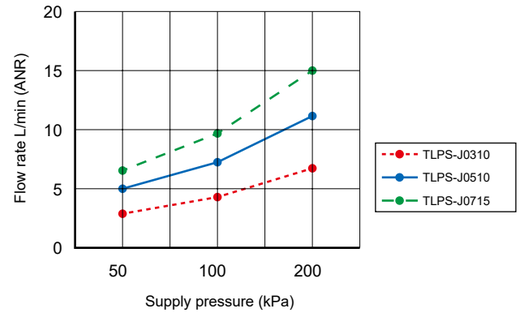
Weight: 31 g

Weight: 39 g

Characteristics data (TLPS Series)

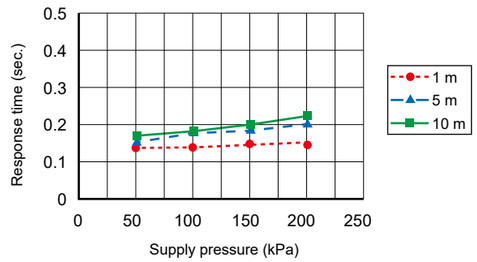
Characteristics data is data of TLPS single unit

Air consumption

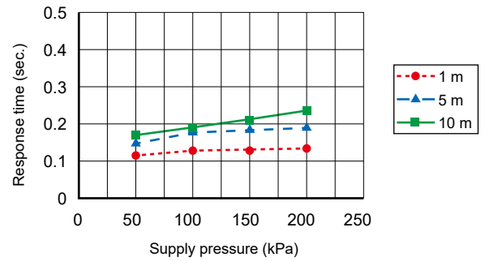


Response time - influence by pipe length

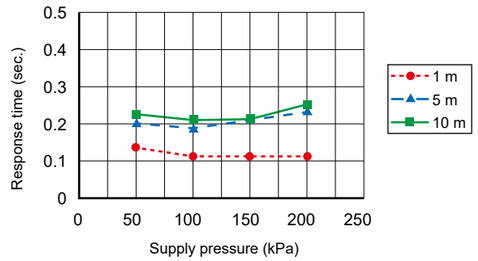
●Detecting nozzle TLPS-J0310



●Detecting nozzle TLPS-J0510



●Detecting nozzle TLPS-J0715



Safety Precautions

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

Product-specific cautions: Cutting tool breakage detection switch TLPS Series

Installation / Selection

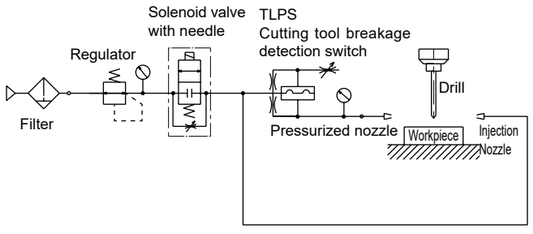
⚠WARNING

■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



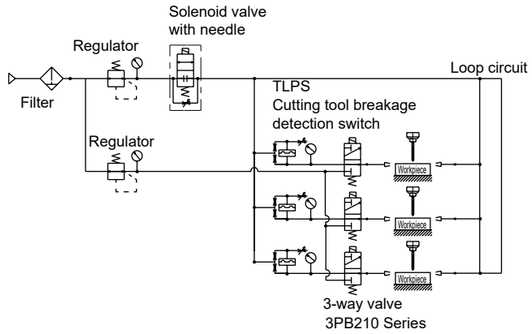
⚠CAUTION

■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 With air blow used by several applications



■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 TLPS
- Use a ø4 bore and ø6 outer diameter pipe. When using 3, 4, or 5 nozzles in a row, try to keep the jet flow of each nozzle as even as possible. For branching, use outer diameter ø8 and inner diameter ø6 in this pipe as shown in Fig. 2, and form a loop circuit.
- Signals for the cutting tool breakage detection switch are shown below.

Drill Status	Drill present	Without drill
Air stop	OFF	OFF
Air supply	OFF	ON

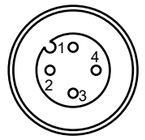
- When using the recommended circuit (Fig. 1) having a solenoid valve with needle, a small amount of air is supplied constantly. Even if the solenoid valve with needle is OFF, the cutting tool breakage detection switch may activate depending on the air supply.
- The recommended supply pressure when using the standard detecting nozzle is 100 kPa. Contact CKD on the detecting nozzle shape and air circuit when a width larger than the standard nozzle detection width of 32 mm is required.
- Air flows only during detection
  Let air flow for at least two seconds. After the solenoid valve is released, wait at least 1 second for the state to stabilize before retrieving signals. The remaining 1 second acts as judgment time, and the signal turns OFF when the drill is normal.
  · Continuously flowing air
  Response time differs with the pipe length and supply pressure, but is approx. 0.2 secs (Page 203). As a reference, the judgment time should be set to 0.5 seconds.

■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)

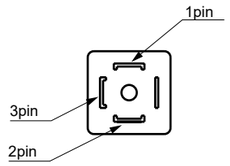


PIN array/lead wire color list

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.

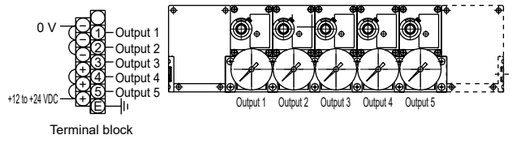
Fig. 4 DIN terminal box pin array (body side)



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.

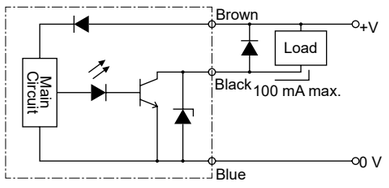
Fig. 5 Terminal box layout



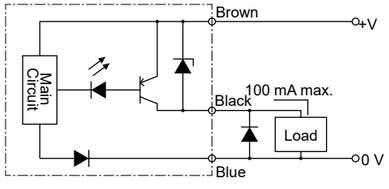
- When using a load with a large rush current, such as a motor, the protection circuit will activate. In this case, use a relay.
- If there is a device (motor, welder) that generates a large surge near this product, insert a surge absorber, such as a varistor, at the source of the surge.
- If this product's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

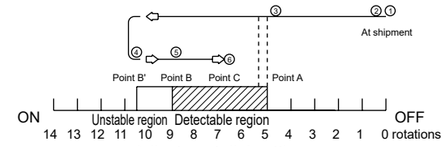


(PNP output)

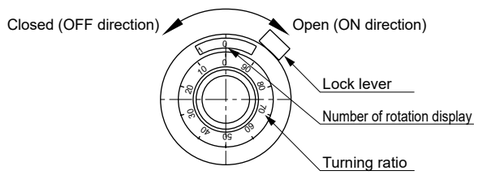


■Adjustment sequence

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. Turn the value of the knob rotation of the adjustment needle in the direction in which it increases (open) in the no drill state, and obtain the switching point A for OFF→ON.
4. Insert the drill tip of 1 mm between the nozzles (turns OFF) and turn it in the direction in which the value rises (open) to obtain the switching point B' for OFF→ON. Point B' may not be found if more than 1 mm of the end of the nozzle, or a nozzle other than the standard nozzle is used. In this case, turn the dial half a turn (50 scale) from point A, and set that point as setting point C.
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.



Adjustment dial setting



Needle adjustment dial

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.

MEMO

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

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