

Close contact confirmation switch

HPS/MHPS/UHPS Series



Overview

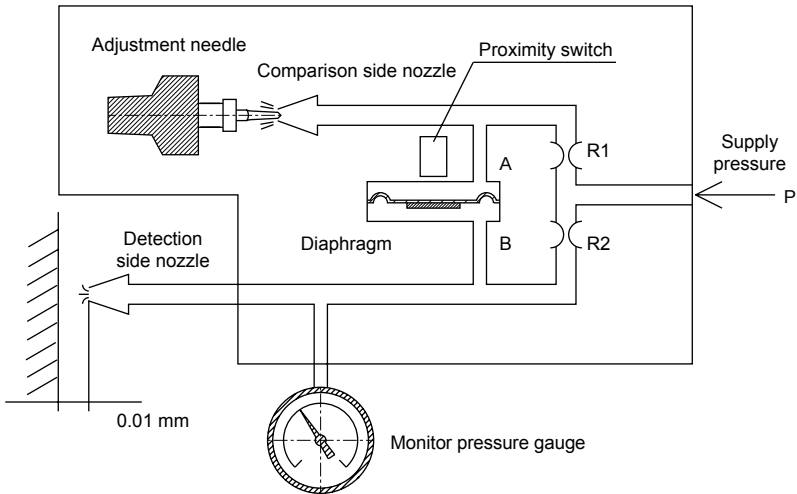
The close contact confirmation switch HPS Series incorporates a highly accurate needle mechanism to enable highly accurate detection for contact confirmation, etc.

With various special nozzles, this switch is used for a variety of position detections.

Features

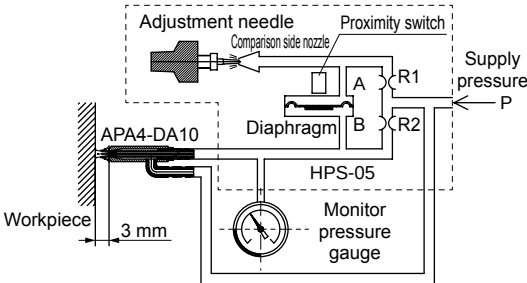
- **High precision**
Highly accurate variable-adjustment is possible with the precise linear needle.
Min. detection distance 0.01 mm
Resolution ± 0.005 mm
- **Low air consumption**
This switch is used with low pressure so air consumption is reduced.
- **Lock mechanism with dial scale**
The position is 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.
- **Environmental resistance**
IP67 degree of protection: resistant to splattering coolant and other substances.
- **Special nozzle usable**
The detection distance is 3 mm with the back pressure nozzle.

Close contact confirmation switch principle drawing



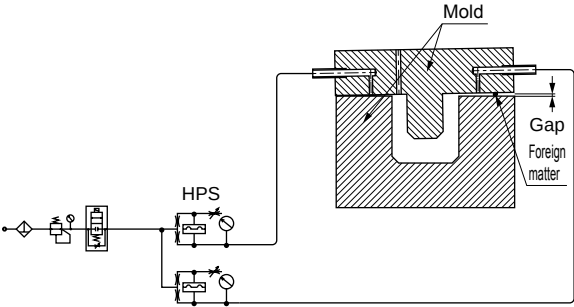
Operational explanation

- **HPS body**
The compressed air pressurized in the 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.

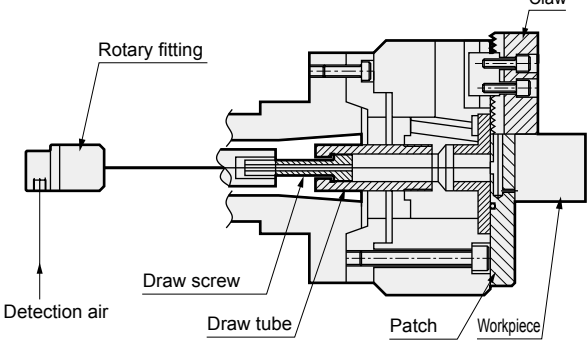


Applications

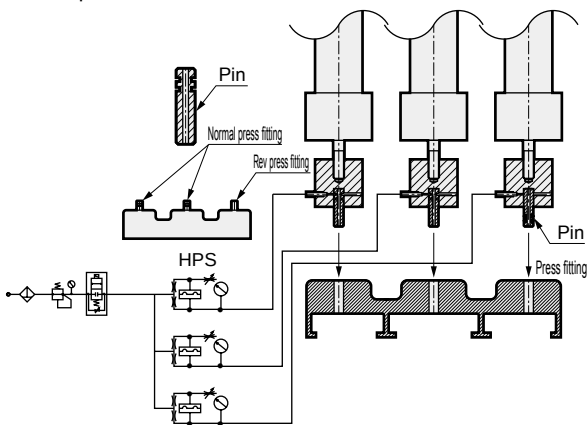
● Melted aluminum alloy die-casting leak detection



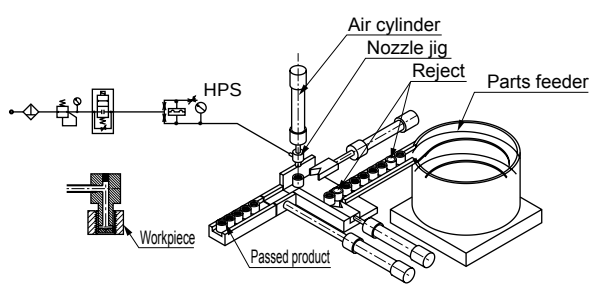
● Lathe contact confirmation



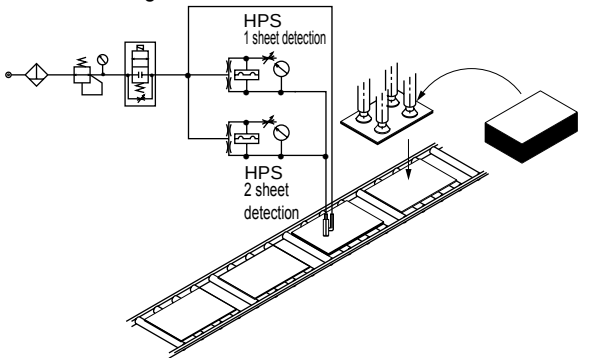
● Workpiece installation confirmation



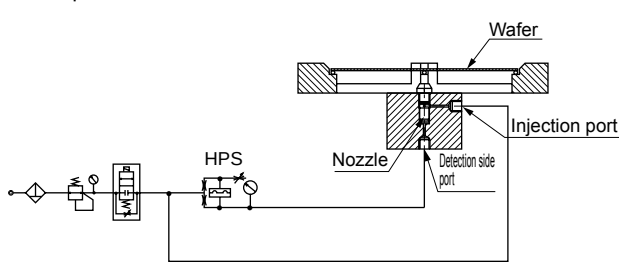
● Screw hole confirmation



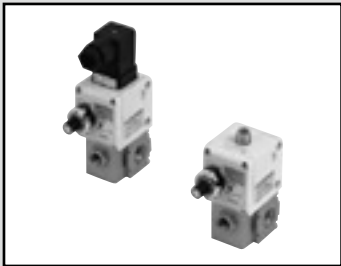
● 2 sheet feeding detection



● Wafer presence confirmation



F.R.L.
F.R.
F (Filtr)
R (Reg)
L (Lub)
Drain
Separ
Mech
Press SW
Res press
exh valve
SlowStart
Anti-bac/Bac-
remove Filtr
Film
Resist FR
Oil-ProhR
Med
Press FR
No Cu/
PTFE FRL
Outdris FRL
Adapter
Joiner
Press
Gauge
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
Speed Ctrl
Silncr
CheckV/
other
Fit/Tube
Nozzle
Air Unit
PrecsCompn
Electro
Press SW
ContactSW
AirSens
PresSW
Cool
Air Flo
Sens/Ctrl
WaterRISens
TotAirSys
(Total Air)
TotAirSys
(Gamma)
Gas
generator
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg
etc
Ending



Close contact confirmation switch, single unit

HPS Series



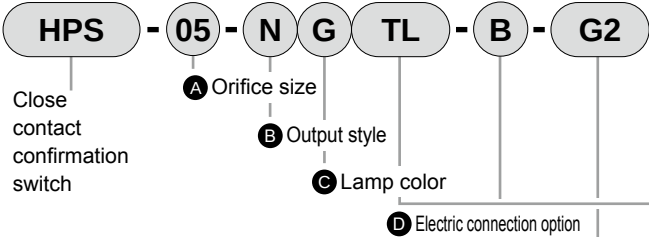
Specifications

1 MPa = 10 bar

Item		HPS-05	HPS-07	HPS-10
Orifice size	mm	ø0.5	ø0.7	ø1.0
Working pressure	(*2) kPa	50 (≈7.3 psi) to 200 (≈29 psi)	50 (≈7.3 psi) to 200 (≈29 psi)	100 (≈15 psi) to 200 (≈29 psi)
Detection range scale	mm	0.01 to 0.2	0.02 to 0.3	0.05 to 0.7
Repeatability	mm	±0.005 (detection range scale 0.01 to 0.1)	±0.005 (detection range scale 0.02 to 0.1)	±0.02 (detection range scale 0.05 to 0.3)
Hysteresis	mm	0.005 or less (detection range scale 0.01 to 0.1)	0.005 or less (detection range scale 0.02 to 0.1)	0.01 or less (detection range scale 0.05 to 0.3)
Detection nozzle	(*1)	Single hole nozzle ø1.5		
Power supply voltage	V	DC10.2 to 26.4		
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 (when using 100 mA)		
Indicator lamp		LED green or yellow		
Insulation resistance		10 MΩ and over at 500 VDC megger		
Withstand voltage		No failure impressed at 1000 VAC for one minute		
Vibration resistance	m/sec ²	98		
Ambient temperature	°C	5 (41°F) to 60 (140°F)		
Degree of protection	(*3)	IP67 equivalent (connector), IP64 equivalent (DIN terminal box)		
Connection tube	mm	Inner diameter 4		
Port size		Detection port Rc1/8, supply port Rc1/4, pressure gauge port Rc1/4		
Weight	g	300 (electric connection option C0)		
Air consumption ℓ/min (ANR)	50 kPa (≈7.3 psi)	6	11	-
	100 kPa (≈15 psi)	9	15	24
	200 kPa (≈29 psi)	14	24	38

- *1: The above specifications apply to the ø1.5 single-hole detection nozzle.
 *2: If the nozzle clogs, working pressure should be set between 100 and 200 kPa.
 *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.

How to order



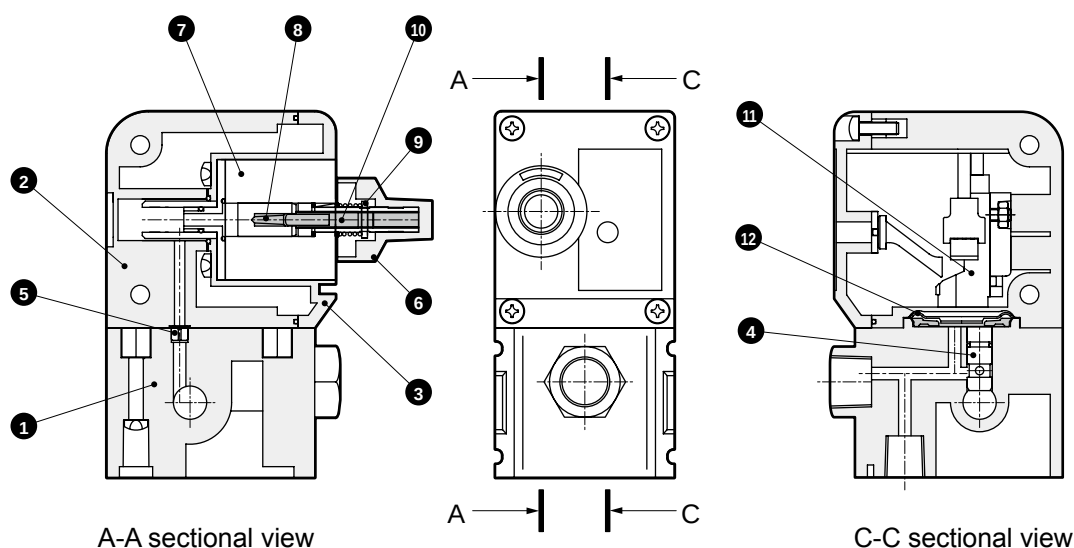
⚠ Precautions for model No. selection

- *1: Refer to page 1287 for model No. of back pressure nozzles.
 *2: Refer to pages 1302 to 1307 for option and model No. of related components.

Code	Description
A Orifice size	
05	ø0.5
07	ø0.7
10	ø1.0
B Output style	
N	NPN open collector
P	PNP open collector
C Lamp color	
G	Green
Y	Yellow
D Electric connection option	
F	DIN terminal box (Pg11)
C0	Connector (without cable)
C1	Connector (cable 1 m included)
C3	Connector (cable 3 m included)
C5	Connector (cable 5 m included)
CTL	Connector common terminal box left assembly
CTR	Connector common terminal box right assembly
TL	Lead wire common terminal box left assembly
TR	Lead wire common terminal box right 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)
E Bracket	
Blank	Without bracket
B	With bracket
F Pressure gauge	
Blank	No pressure gauge
G2	Pressure gauge with safety mark included (G40D-8-P02-S501)
GW2	Pressure gauge assembly with safety mark (G40D-8-P02-S501)



Internal structure and parts list



Parts list

No.	Part name	Material	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	Copper alloy	10	Needle shaft	Copper alloy
5	Orifice nozzle B	Copper alloy	11	Proximity switch	-
6	Dial	Aluminum alloy, polyamide, etc.	12	Diaphragm	HNBR

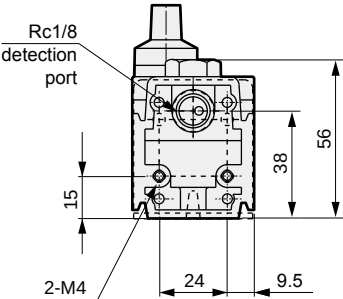
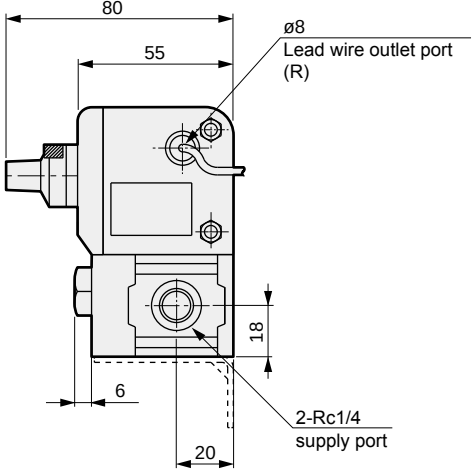
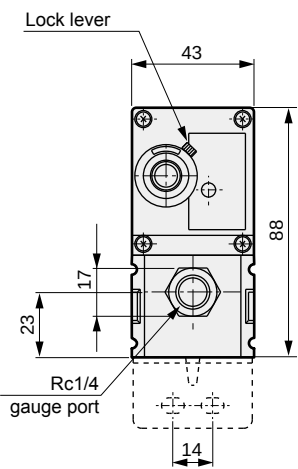
F.R.L.
F.R.
F (Filtr)
R (Reg)
L (Lub)
Drain Separ
Mech Press SW
Res press exh valve
SlowStart
Anti-bac/Bac-remove Filtr
Film Resist FR
Oil-ProhR
Med Press FR
No Cu/ PTFE FRL
Outdrs FRL
Adapter Joiner Press Gauge
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
Speed Ctrl
Silncr
CheckV/ other
Fit/Tube
Nozzle
Air Unit
PrecsCompn
Electro Press SW
ContactSW
AirSens
PresSW Cool
Air Flo Sens/Ctrl
WaterRISens
TotAirSys (Total Air)
TotAirSys (Gamma) Gas generator
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending



Dimensions

R
L
W

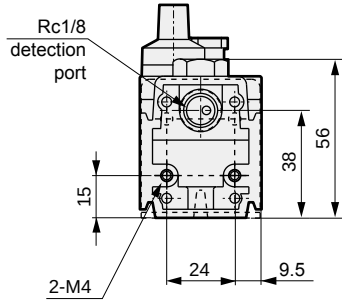
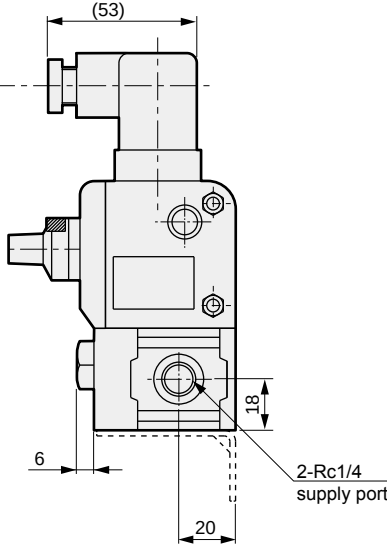
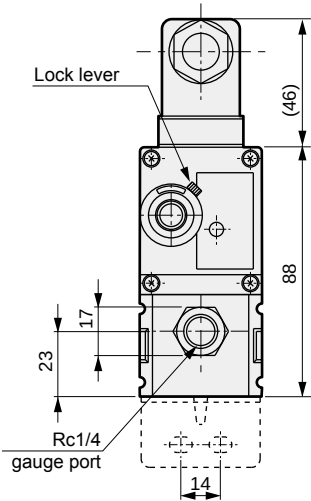
● Basic HPS-*-***



· Weight: 300g

* Bracket and pressure gauge (option) are not included.

● DIN terminal box HPS-*-***F

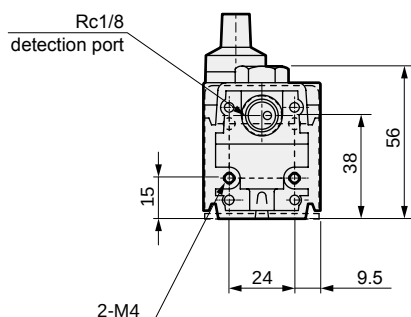
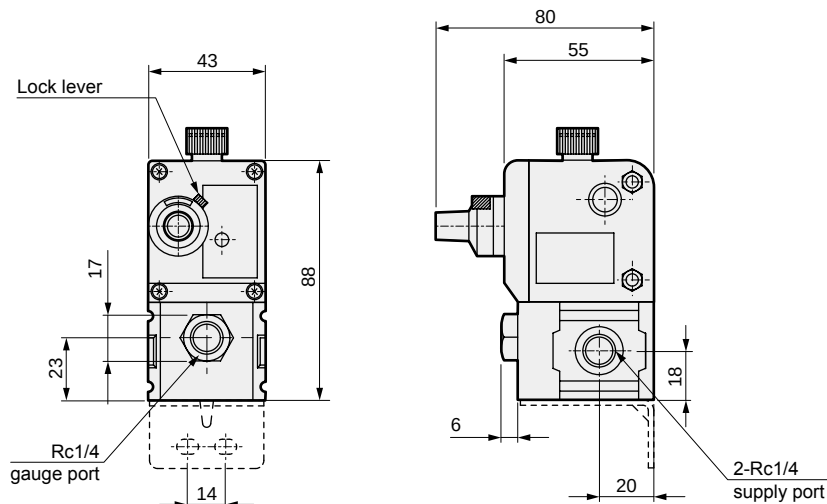


· Weight: 340g

* Bracket and pressure gauge (option) are not included.

Dimensions

- Connector HPS-*.***
- C0
- C1
- C3
- C5



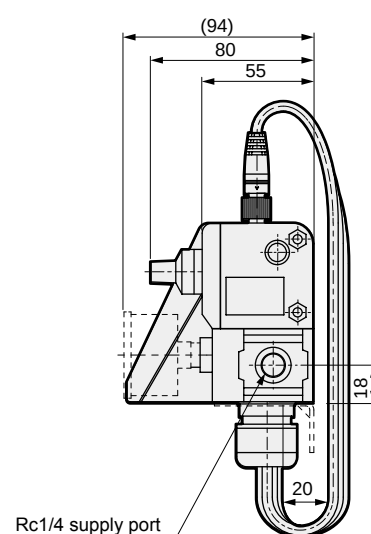
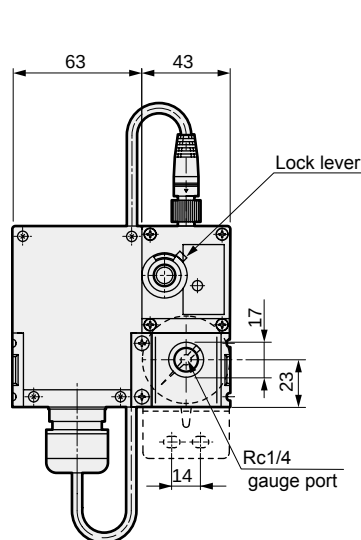
· Weight: 300g (for C0)

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

*2: Cable for C1, C3, C5 is included.

(For the cable weight, refer to the option pages.)

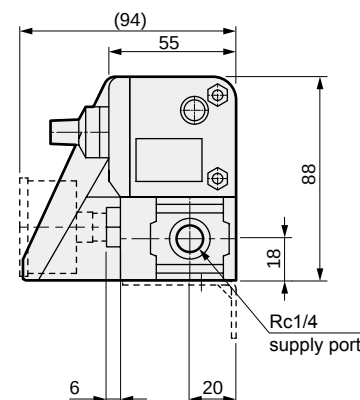
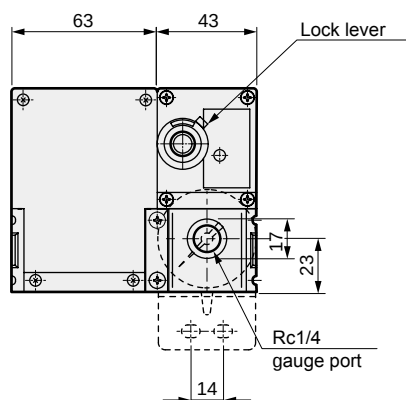
- Connector common terminal box HPS-*.***
- CTL
- (CTR)



· Weight: 583g

* Bracket and pressure gauge (option) are not included.

- Lead wire common terminal box HPS-*.***
- TL
- (TR)

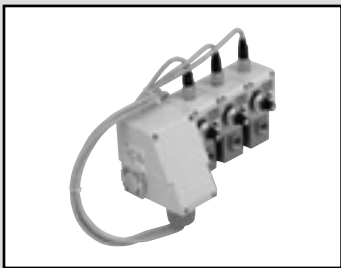


· Weight: 513g

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

- Refer to pages 1302 to 1307 for dimensions of options and peripheral devices.

F.R.L.
F.R.
F (Filtr)
R (Reg)
L (Lub)
Drain Separ
Mech Press SW
Res press exh valve
SlowStart
Anti-bac/Bac-remove Filtr
Film Resist FR
Oil-ProhR
Med Press FR
No Cu/ PTFE FRL
Outdrs FRL
Adapter Joiner Press Gauge
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
Speed Ctrl
Silncr
CheckV/ other
Fit/Tube
Nozzle
Air Unit
PrecsCompn
Electro Press SW
ContactSW
AirSens
PresSW Cool
Air Flo Sens/Ctrl
WaterRISens
TotAirSys (Total Air)
TotAirSys (Gamma)
Gas generator
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending



Close contact confirmation switch manifold

MHPS Series

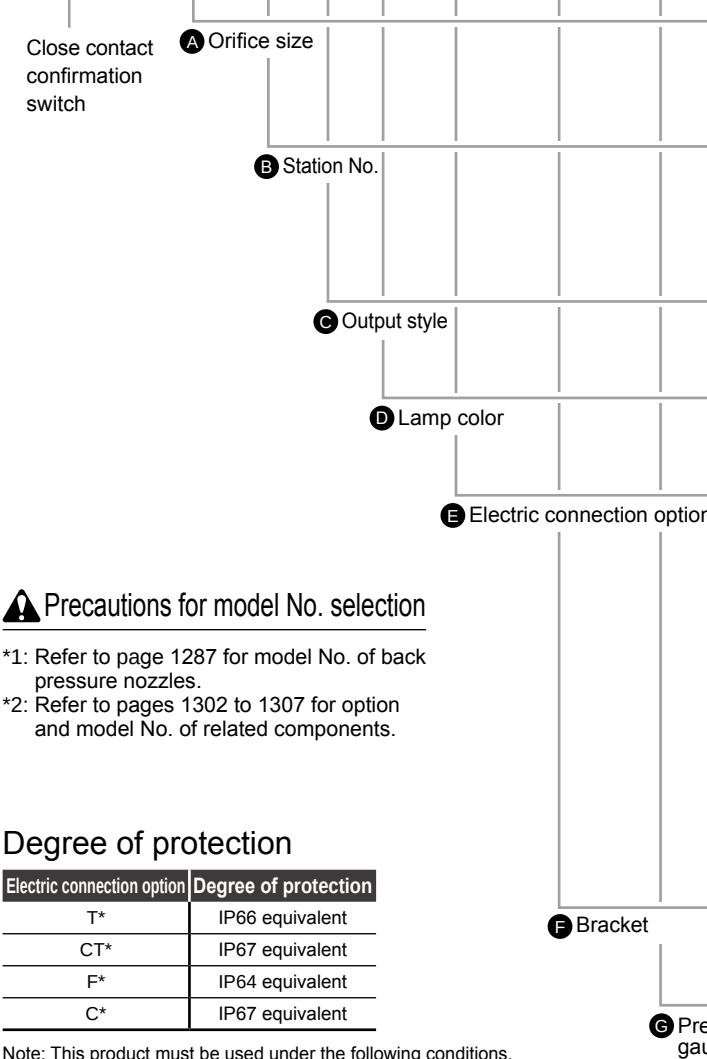


Specifications

Basic specifications are the same as the single units on page 1276.

How to order

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



⚠ Precautions for model No. selection

- *1: Refer to page 1287 for model No. of back pressure nozzles.
- *2: Refer to pages 1302 to 1307 for option and model No. of related components.

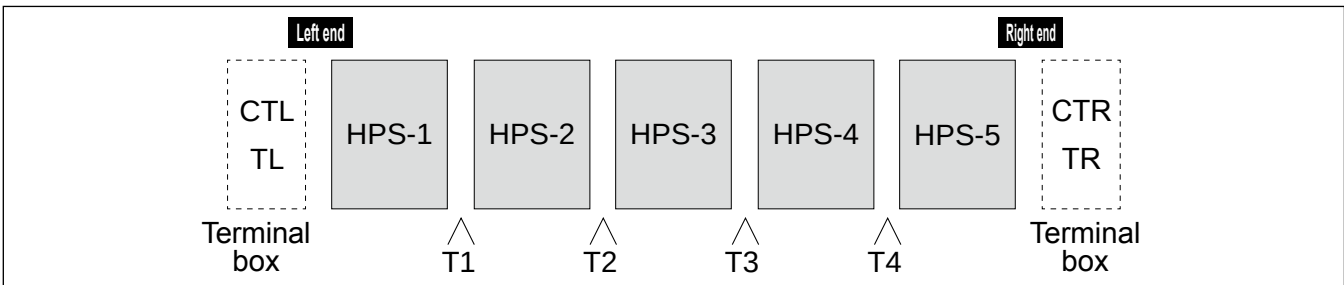
Degree of protection

Electric connection option	Degree of protection
T*	IP66 equivalent
CT*	IP67 equivalent
F*	IP64 equivalent
C*	IP67 equivalent

Note: 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.

Code	Description
A Orifice size	
05	ø0.5
07	ø0.7
10	ø1.0
B Station No.	
2	2 stations
3	3 stations
4	4 stations
5	5 stations
C Output style	
N	NPN open collector
P	PNP open collector
D Lamp color	
G	Green
Y	Yellow
E Electric connection option	
F	DIN terminal box (Pg11)
C0	Connector (without cable)
C1	Connector (cable 1 m included)
C3	Connector (cable 3 m included)
C5	Connector (cable 5 m included)
CTL	Connector common terminal box left assembly
CTR	Connector common terminal box right assembly
TL	Lead wire common terminal box left assembly
TR	Lead wire common terminal box right assembly
T1	Lead wire common terminal box (1st from left)
T2	Lead wire common terminal box (2nd from left)
T3	Lead wire common terminal box (3rd from left)
T4	Lead wire common terminal box (4th from left)
F Bracket	
Blank	Without bracket
B	With bracket
G Pressure gauge	
Blank	No pressure gauge
G2	Pressure gauge with safety mark included (G40D-8-P02-S501)
GW2	Pressure gauge assembly with safety mark (G40D-8-P02-S501)

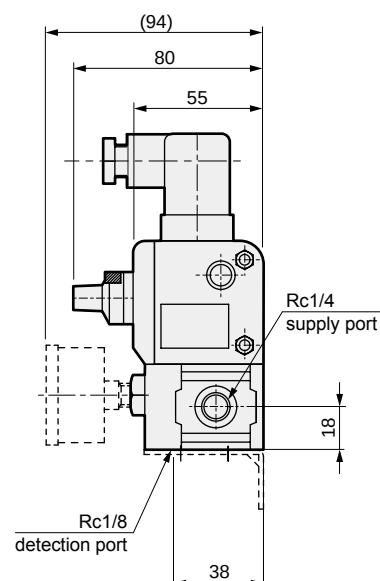
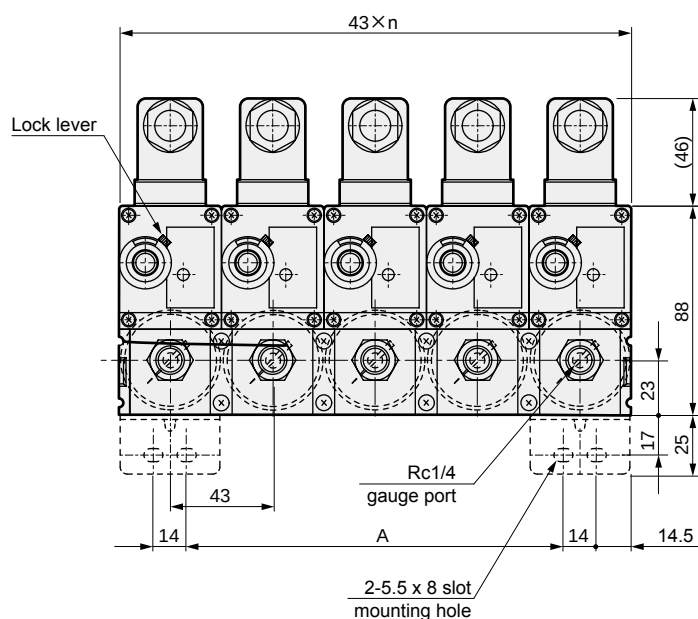
Terminal box installation position relation diagram



Dimensions



- Manifold (DIN terminal box: F)
- MHPS-*-*F



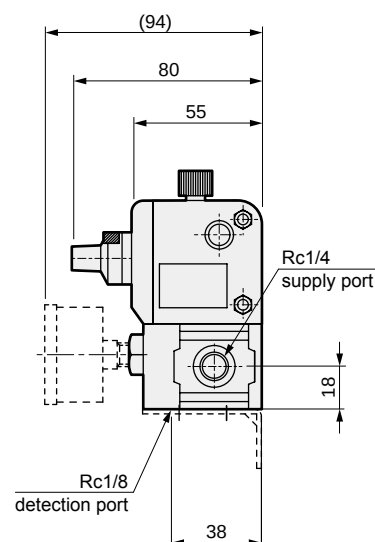
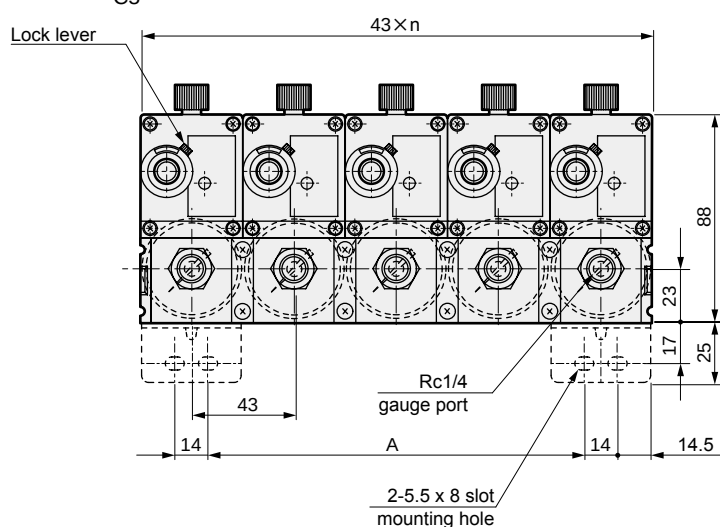
Station No.	n	A	Weight g
2 stations	2	29	680
3 stations	3	72	1030
4 stations	4	115	1370
5 stations	5	158	1710

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

- Manifold (connector: C*)

C0
C1
C3
C5

- MHPS-*-*



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: Cable for C1, C3, C5 is included.

(For the cable weight, refer to the option pages.)

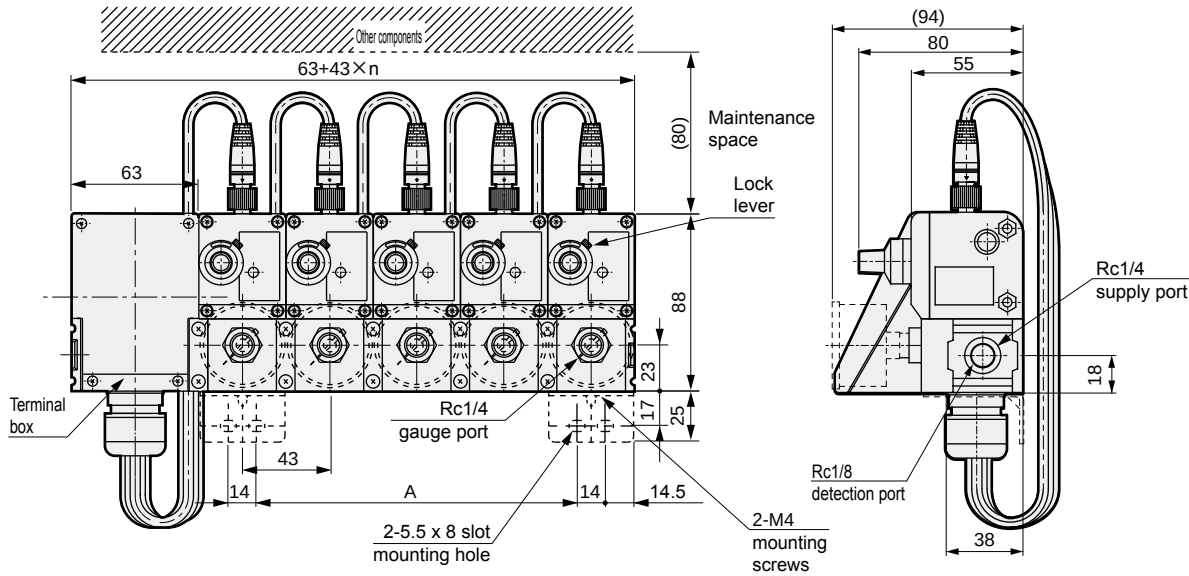
F.R.L.
F.R.
F (Filtr)
R (Reg)
L (Lub)
Drain Separ
Mech Press SW
Res press exh valve
SlowStart
Anti-bac/Bac-remove Filt
Film Resist FR
Oil-ProhR
Med Press FR
No Cu/ PTFE FRL
Outdris FRL
Adapter Joiner Press Gauge
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
Speed Ctrl
Silncr
CheckV/ other
Fit/Tube
Nozzle
Air Unit
PrecsCompn
Electro Press SW
ContactSW
AirSens
PresSW Cool
Air Flo Sens/Ctrl
WaterRISens
TotAirSys (Total Air)
TotAirSys (Gamma)
Gas generator
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending



Dimensions

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

● MHPS-*.*** CTL
(CTR)

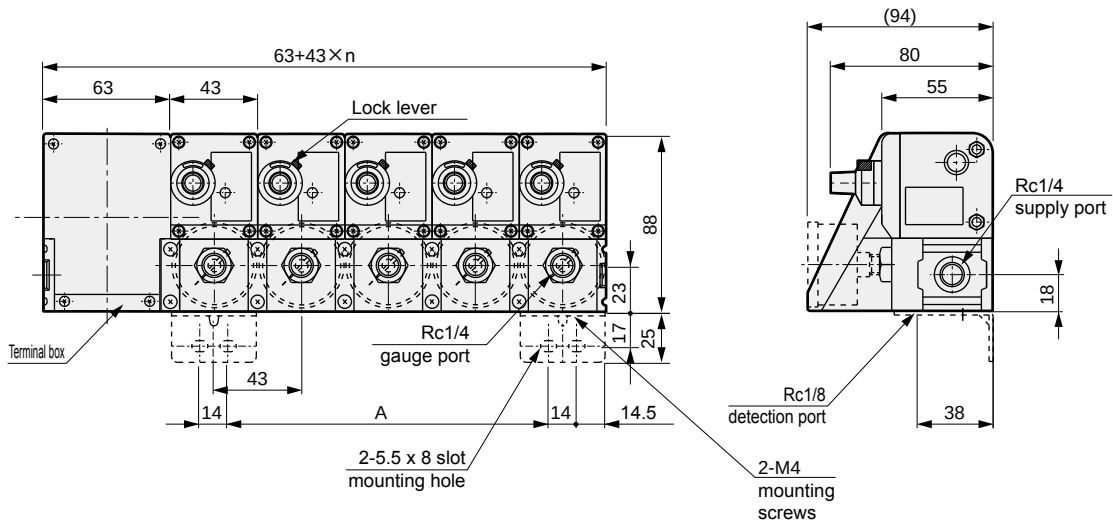


Station No.	n	A	Weight g
2 stations	2	29	930
3 stations	3	72	1270
4 stations	4	115	1620
5 stations	5	158	1980

* Bracket and pressure gauge (option) are not included.

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

● MHPS-*.*** TL
(TR)

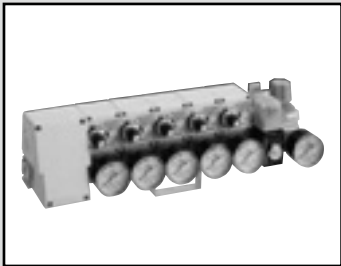


Station No.	n	A	Weight g
2 stations	2	29	830
3 stations	3	72	1140
4 stations	4	115	1460
5 stations	5	158	1770

* Bracket and pressure gauge (option) are not included.

● Refer to pages 1302 to 1307 for dimensions of options and peripheral devices.

F.R.L.
F.R.
F (Filtr)
R (Reg)
L (Lub)
Drain Separ
Mech Press SW
Res press exh valve
SlowStart
Anti-bac/Bac- remove Filtr
Film Resist FR
Oil-ProhR
Med Press FR
No Cu/ PTFE FRL
Outdrs FRL
Adapter Joiner Press Gauge
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
Speed Ctrl
Silncr
CheckV/ other
Fit/Tube
Nozzle
Air Unit
PrecsCompn
Electro Press SW
ContactSW
AirSens
PresSW Cool
Air Flo Sens/Ctrl
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
Gas generator
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending



Close contact confirmation switch unit

UHPS Series

- Solenoid valve with needle, regulator integrated general purpose unit

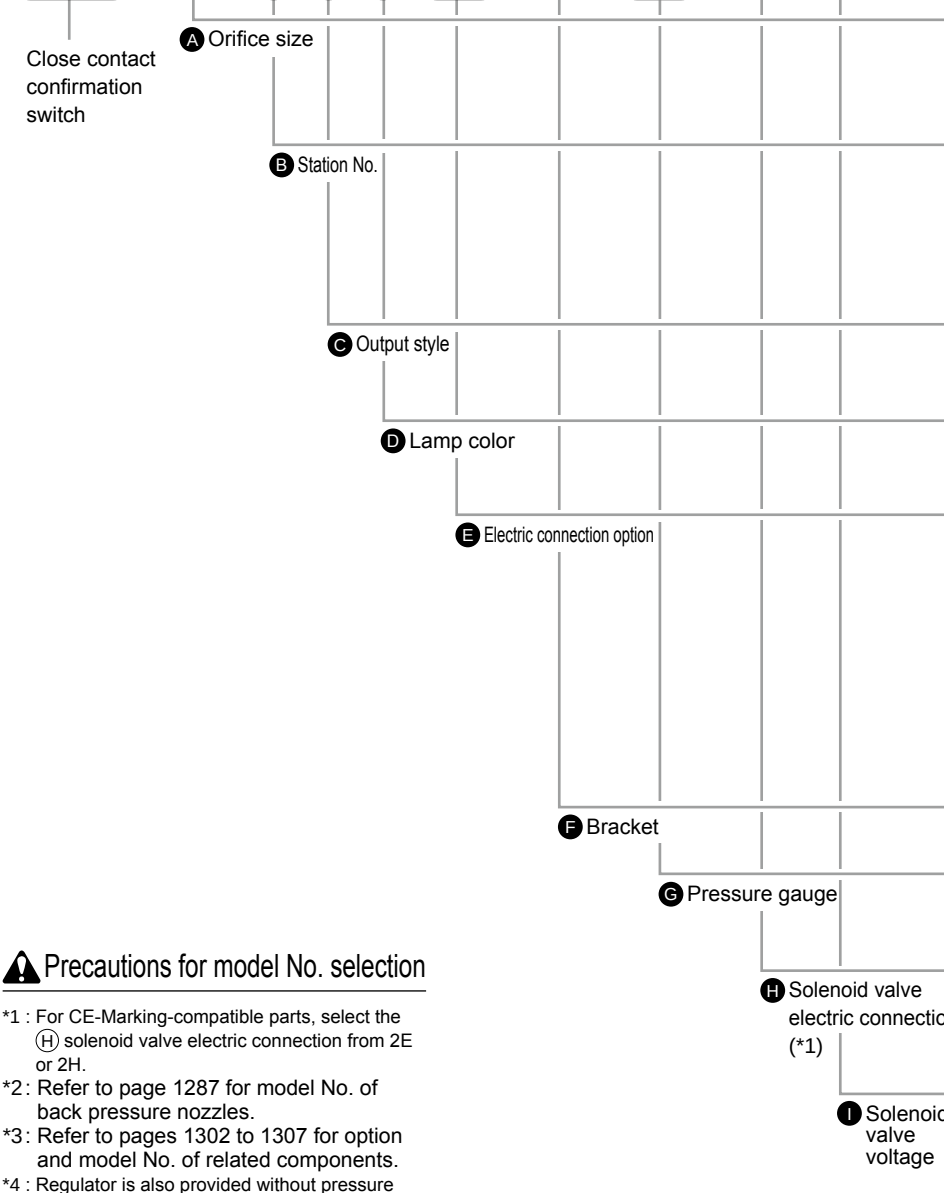


Specifications

Basic specifications are the same as the single units on page 1276.

How to order

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

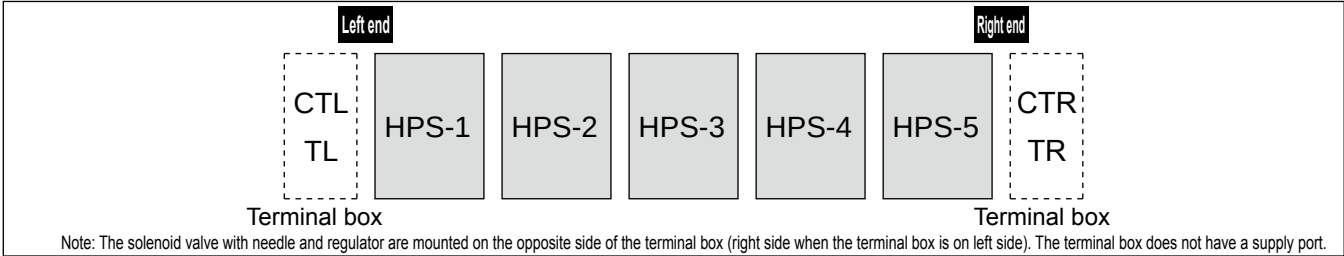


Code	Description
A Orifice size	
05	ø0.5
07	ø0.7
10	ø1.0
B Station No.	
1	1 station
2	2 stations
3	3 stations
4	4 stations
5	5 stations
C Output style	
N	NPN open collector
P	PNP open collector
D Lamp color	
G	Green
Y	Yellow
E Electric connection option	
F	DIN terminal box (Pg11)
C0	Connector (without cable)
C1	Connector (cable 1 m included)
C3	Connector (cable 3 m included)
C5	Connector (cable 5 m included)
CTL	Connector-common Term box Lt Assy
CTR	Connector-common Term box Rt Assy
TL	Lead wire common terminal box left assembly
TR	Lead wire common terminal box right assembly
F Bracket	
B	With bracket
G Pressure gauge	
Blank (*4)	None
GW2	Press gauge Assy, safety mark (G40D-8-P02-S501)
H Solenoid valve electric connection	
2E	DIN terminal box
2H	DIN terminal box with light
3N	HP terminal box with light
I Solenoid valve voltage	
1	100 VAC
2	200 VAC
3	24 VDC

⚠ Precautions for model No. selection

- *1 : For CE-Marking-compatible parts, select the (H) solenoid valve electric connection from 2E or 2H.
- *2: Refer to page 1287 for model No. of back pressure nozzles.
- *3: Refer to pages 1302 to 1307 for option and model No. of related components.
- *4 : Regulator is also provided without pressure gauge.

Terminal box installation position relation diagram

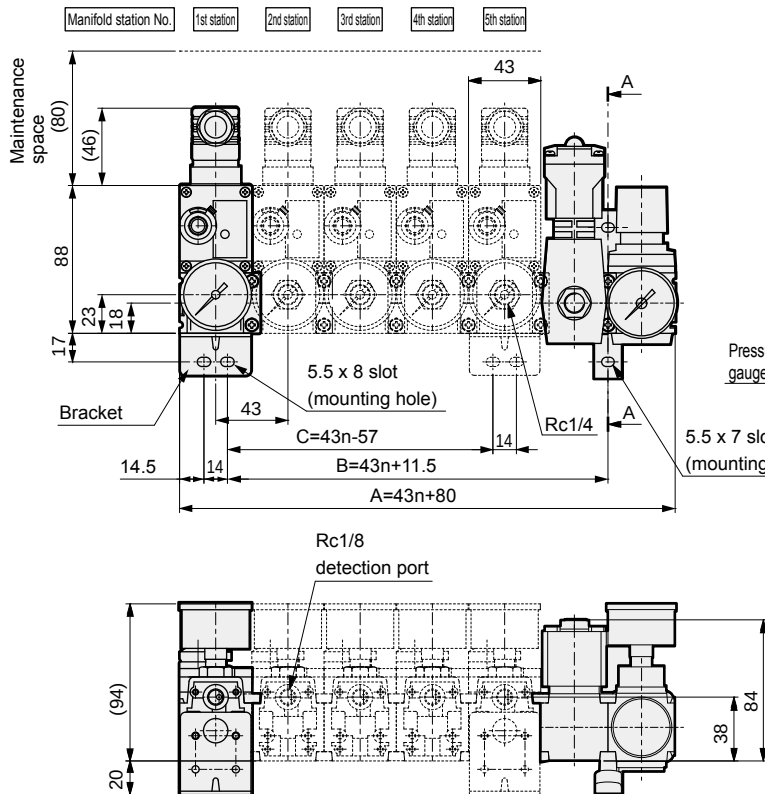


Dimensions



- Unit (DIN terminal box: F)

- UHPS-*-***F



		Station No.				
		1	2	3	4	5
Dimen. (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

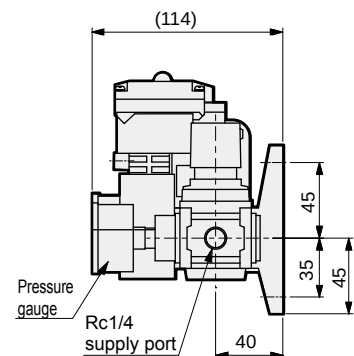
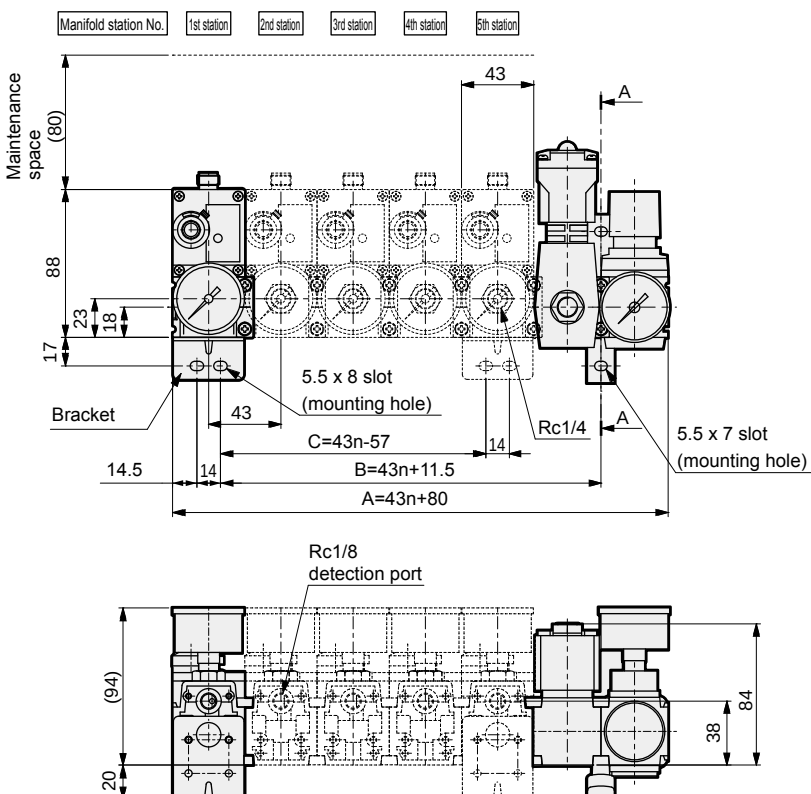
*1: Pressure gauge (option) is not included.

*2: When solenoid valve is the electric connection 3N.

- Unit (connector: C*)

C0
C1
C3
C5

- UHPS-*-***



Note: Refer to the "A-A view" of the figure above for needle position.

		Station No.				
		1	2	3	4	5
Dimen. (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 the electric connection 3N.

*3: Cable for C1, C3, C5 is included.

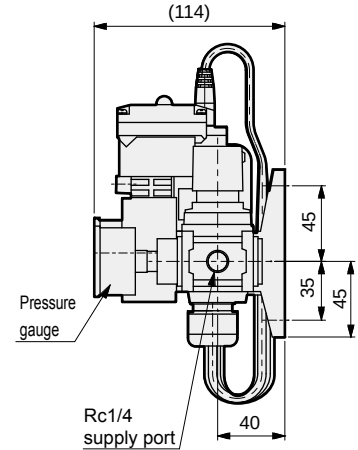
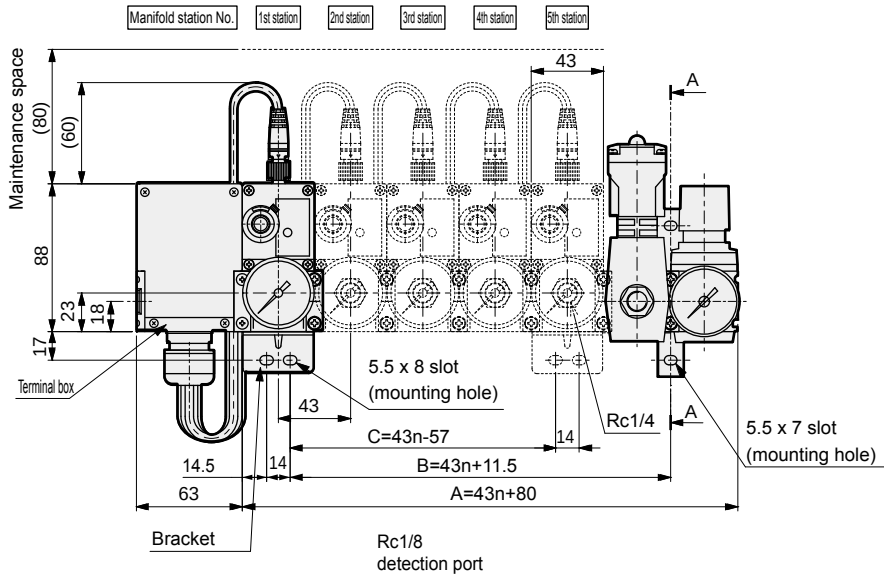
(For the cable weight, refer to the option pages.)



Dimensions

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

● UHPS-*.*** CTL
(CTR)



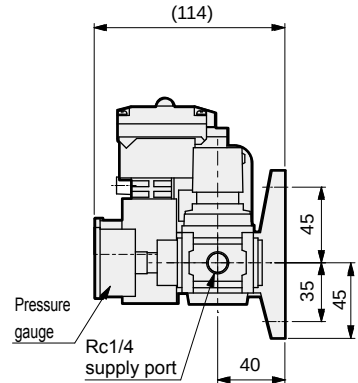
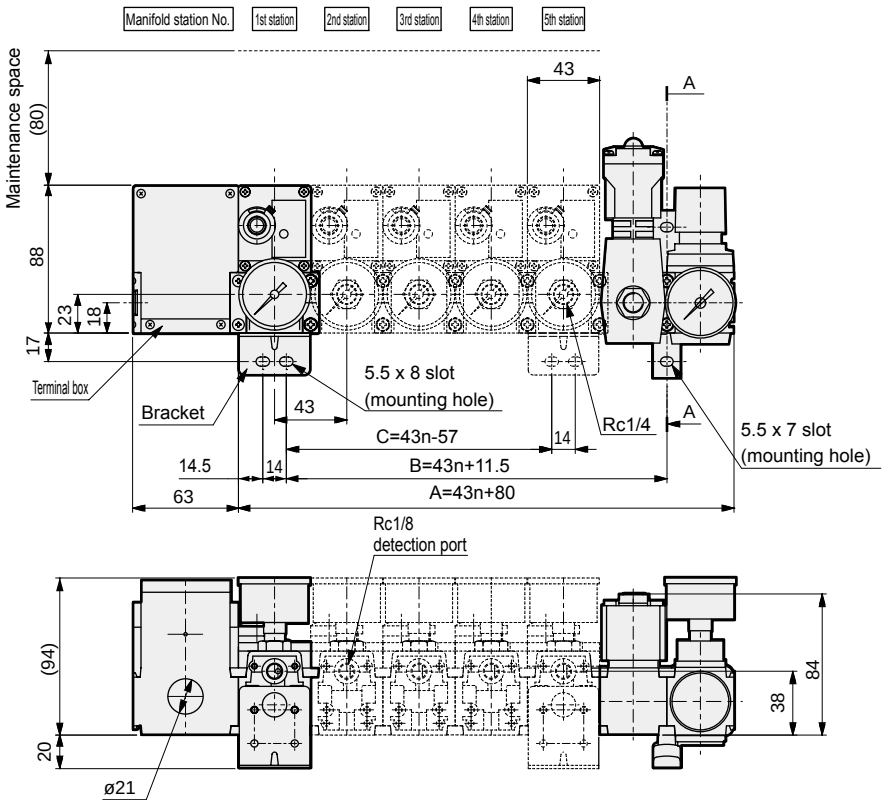
Note: Refer to the "A-A view" on the previous page for needle position.

		Station No.				
		1	2	3	4	5
Dimen. (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 the electric connection 3N.

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

● UHPS-*.*** TL
(TR)



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

		Station No.				
		1	2	3	4	5
Dimen. (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 the electric connection 3N.

● Refer to pages 1302 to 1307 for dimensions of options and peripheral devices.

Optional nozzle

How to order

APA4 - DA 10

Code	Description
DA10	Outer diameter $\phi 6$, 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 : Refer to page 1308 for the characteristics data.

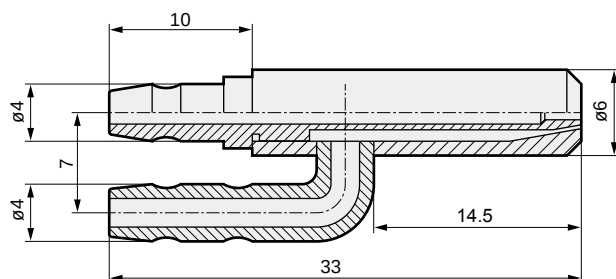
*3 : When using HPS with standard specifications, use a single-hole nozzle the same as for the GPS2. (Refer to page 1273)

Dimensions

● Back pressure nozzle

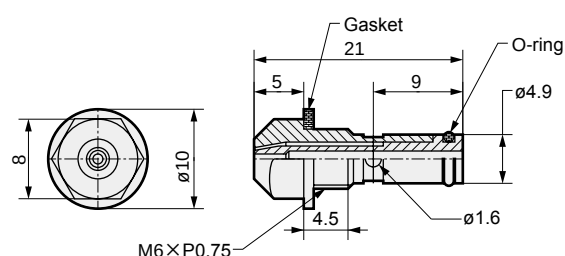


· APA4-DA10



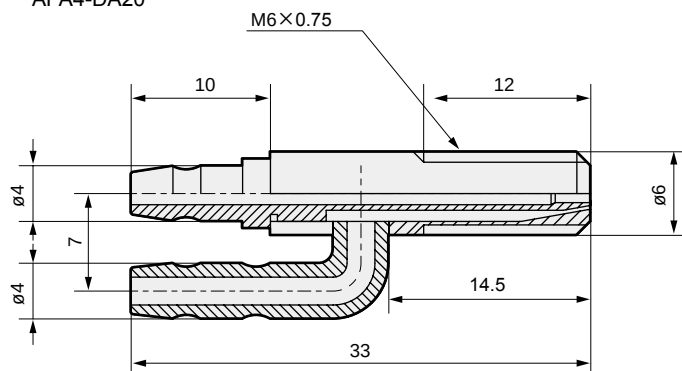
· Weight: 7g

APA4-DH10



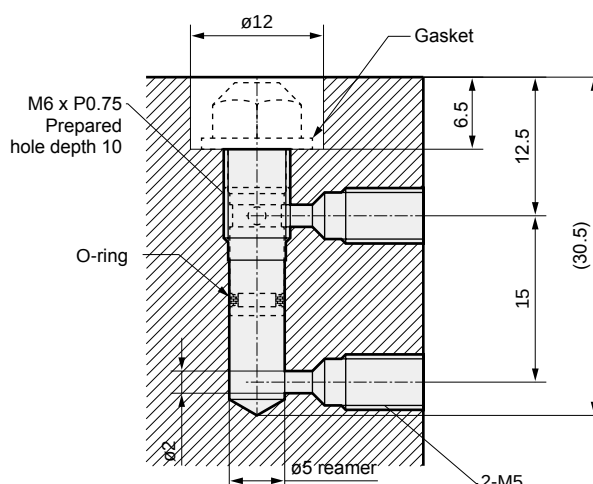
· Weight: 4g

· APA4-DA20



· Weight: 7g

● Example of embedding type jig design



F.R.L.
F.R.
F (Filtr)
R (Reg)
L (Lub)
Drain Separ
Mech Press SW
Res press exh valve
SlowStart
Anti-bac/Bac-remove Filtr
Film Resist FR
Oil-ProhR
Med Press FR
No Cu/ PTFE FRL
Outdrs FRL
Adapter Joiner Press Gauge
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
Speed Ctrl
Silncr
CheckV/ other
Fit/Tube
Nozzle
Air Unit
PrecsCompn
Electro Press SW
ContactSW
AirSens
PresSW Cool
Air Flo Sens/Ctrl
WaterRISens
TotAirSys (Total Air)
TotAirSys (Gamma)
Gas generator
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending