4F**0E

Explosion proof 5 port pilot operated valve — Pneumatic valve

Overview

The 4F Series explosion proof 5 port valve is a compact and easy to use high-performance series used safely in dangerous environments. This valve is suitable for driving cylinders ø63 to ø250.

Features

Explosion-proof performance d2G4

High pressure and explosion proof structure, explosion class 2, ignitability G4

Certification No.: class A: No. T28178
Class H: No. T29615

(Complies with the Ministry of Labor, Industrial Safety Research Laboratory Engineering Policy.)

Lightweight and compact

The weight has been reduced by more than half. (CKD comparison)

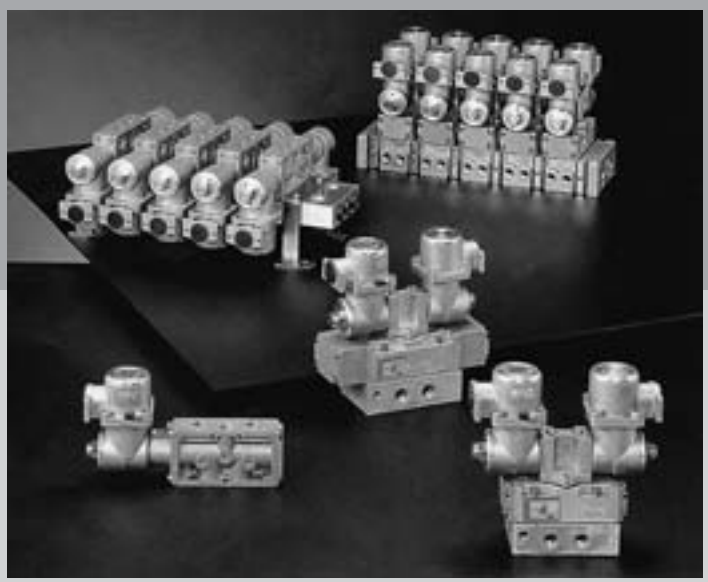
Easy wiring

Usable outdoors

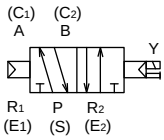
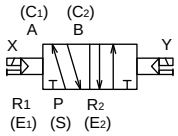
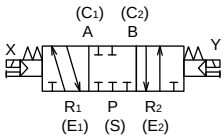
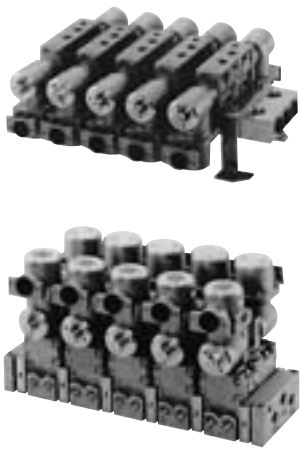
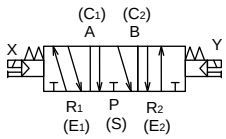
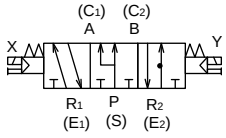
This valve complies with the JIS rainproof structure, and can be used outdoors.

Energy saving type

This valve can be used with a low wattage (4.5 W) in an oil-free state.



CONTENTS

Appearance			Model no.		Position No. of solenoid JIS symbol	Flow characteristics: C (dm^3/ (s·bar)) Note 1	Flow characteristics: Effective sectional area S (mm^2)	Applicable bore size	
Discrete	4F**OE 	Direct	5 port	4F3*0E	● 2-positiond single 	3.9 to 5.8	-	ø63 to ø100	
		Sub-plate		4F4*0E		5.0 to 5.3	-	ø63 to ø100	
				4F5*0E	● 2-position double 	9.7 to 10	-	ø80 to ø160	
				4F6*0E		15 to 18	-	ø140 to ø200	
				4F7*0E	● 3-position all ports closed 	-	160	ø180 to ø250	
Manifold	M4F**OE 	Direct	5 port	M4F3*0E		3.9 to 5.8	-	ø63 to ø100	
		Sub-plate		M4F4*0E	● 3-position A/B/R connection 	5.0 to 5.3	-	ø63 to ø100	
				M4F5*0E		9.7 to 10	-	ø80 to ø160	
				M4F6*0E	● 3-position P/A/B connection 	15 to 18	-	ø140 to ø200	
				M4F7*0E		-	160	ø180 to ø250	

Note 1: Effective sectional area S and sonic conductance C are converted as S ≒ 5.0 × C.

	Solenoid position						A/B port size						Option		Heat proof class		Selection Page
							Female thread						Junction box				
	2-position single solenoid	2-position double solenoid	3-position all ports closed	3-position A/B/R connection	3-position P/A/B connection	Mix	Rp1/4	Rp3/8	Rc1/4	Rc3/8	Rc1/2	Rc3/4	Conduit screw connection method	Pressure proof packing protective tube screw-in type	A	H	
	●	●	●	●	●		●	●					●	●	●	●	1060
	●	●	●	●	●				●	●			●	●	●	●	
	●	●	●	●	●					●	●		●	●	●	●	
	●	●	●	●	●						●	●	●	●	●	●	
	●	●	●	●	●							●	●	●	●	●	
	●	●	●	●	●	●	●	●					●	●	●	●	1172
	●	●	●	●	●	●			●				●	●	●	●	
	●	●	●	●	●	●				●			●	●	●	●	
	●	●	●	●	●	●					●		●	●	●	●	
	●	●	●	●	●	●						●	●	●	●	●	

Safety precautions

Always read this section before starting use.
Refer to Intro 63 for valve general precautions.

Explosion proof 5 port pilot operated pneumatic valve 4F**0E Series

Design & Selection

WARNING

■ * This valve can be used in a Class 1 or Class 2 Danger Zone containing combustible gas or vapors. It cannot be used in a Class 0 Zone.

■ Select and install the valve model following JIS C 0902, General explosion-proof rules for electrical equipment, "Ministry of Labor Industrial Safety Research Laboratory Factory Electric Facility Explosion Prevention Policy."

CAUTION

■ Explosive gas and explosion proof structure

The degree of explosive gas danger is classified based on the ignitability and flame-proof grade. Gases with an equivalent risk are grouped into one group, and explosion proof structure standards are set for each group. Symbols to indicate the type, flame-proof grade, and ignitability are indicated on explosion-proof electrical devices. These symbols must be indicated in this sequence. These symbols indicate which flame-proof grade and ignitability class the electrical device has been manufactured for, and indicate which gases can be used. If d2G4 is indicated on an explosion proof solenoid valve, for example:

d2G4

- G4 — Ignitability G4
- 2 — Flame-proof grade 2
- d — Pressure and explosion proof structure

Based on Table 1, this indicates that the valve can be used for a gas with a flame-proof grade 2 and ignitability G4. This also indicates that explosion proof properties are ensured for gases having a risk lower than this.

Table 1

Ignitability / Flame-proof grade	G1	G2	G3	G4	G5
1	Acetone	Ethanol	Gasoline	Acetaldehyde	
	Ammonia	Isomyl acetate	Hexane	Ethyl ether	
	Carbon oxide	1-butanol			
	Ethane	Butane			
	Acetic acid	Acetic anhydride			
	Ethyl acetate				
	Toluene				
	Propane				
	Benzene				
	Methanol				
	Methane				
2	Coal gas	Ethylene	Isoprene		
		Ethlene oxide			
3	Water gas, hydrogen	Acetylene			Carbon disulfide

Use in the range of box.

■ Danger zones

Areas where explosive gases and air mix at a level high enough to cause an explosion or fire are called danger zones and are classified into Class 0, Class 1, and Class 2 zones based on the time and frequency at which the dangerous atmosphere is reached. The explosion proof structure that can be used is determined based on these classes.

● Class 0 zone

Zone where a dangerous atmosphere is or could be continuously generated, and where the concentration of explosive gas is maintained continuously or for a long time above the lower limit for explosions.
Example a: Space above fluid level in container or tank of flammable fluid
b: Inside combustible gas containers or tanks, etc. c: Near fluid level of flammable fluid in opened container

● Class 1 zone

(1) Zone where explosive gas could accumulate to a dangerous concentration during normal operation such as during removal of a product, opening/closing of a lid, or operation of a safety valve.
(2) Zone where explosive gas could frequently accumulate to a dangerous concentration during repairs, maintenance or due to a leak, etc.

● Class 2 zone

(1) Zone where combustible or flammable fluids are handled, but where the fluids are sealed in a container or facility, and where the fluid could leak to a dangerous concentration only if the container or facility breaks or if operation is incorrect.
(2) Zone where measures to prevent the accumulation of explosive gas are taken with fail-safe mechanical ventilation, but where explosive gas could accumulate to a dangerous concentration if ventilation fails.
(3) Zone near or adjacent to a Class 1 zone where explosive gases could infiltrate at a dangerous concentration.

■ Explosion proof certification no.

The explosion proof certification is issued for the pilot actuator assembly.
The pilot actuator assembly certification type and model are shown below.

(Example)

Model	Certification type
4F3*0E-TP	E3-TP
4F410E to 4F710E-TP	E4-TP
4F 420/430/440/450 E to 4F 720/730/740/750 E-TP	E5-TP
4F3*0E-TP-X	H3-TP
4F410E to 4F710E-TP-X	H4-TP
4F 420/430/440/450 E to 4F 720/730/740/750 E-TP-X	H5-TP

Installation & Adjustment

1. Piping

⚠ CAUTION

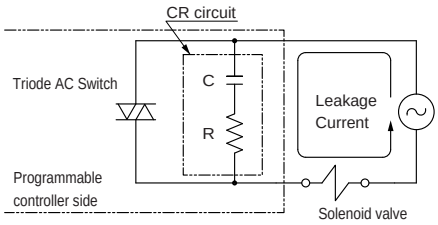
■ A pilot exhaust hole is provided on the pilot actuator. Consult with CKD when using this product where problems could occur from exhaust, such as in a clean room.

2. Wiring

⚠ CAUTION

■ Check the leakage current to prevent malfunctions caused by currents leaking from other control devices.

● Note that when using a PLC, etc., which absorbs the surge voltage with the CR circuit to protect the switching element, the leakage current could flow to the CR element and adversely affect product operation.



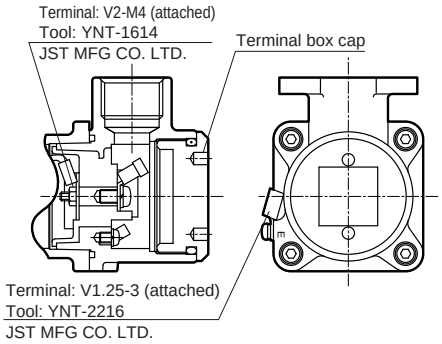
Keep residual leakage current within the following values:
12 to 127 VAC: 4.0 mA or less
200 to 380 VAC: 2.0 mA or less
12 to 48 VDC: 1.5 mA or less
80 to 125 VDC: 0.6 mA or less

■ When using outdoors, use the T-type and check that rain water will not enter from lead wire outlet G1/2. The G type is for indoor use only, and must not be used outdoors.

■ Wiring

● Wire based on JIS explosion-proof policy.

● Remove and wire the terminal box cap with the enclosed disassembly tool. Use the tool designated below to crimp the crimp terminal during wiring. After wiring, securely tighten the terminal box cap.
Personnel must store the disassembly tool for maintenance.



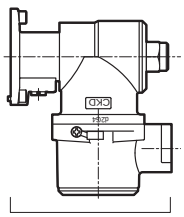
■ Select the cable for the G type from the cables below to ensure explosion-proof performance.

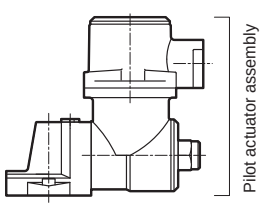
Type of cable	Conductor number	Nominal section area	Strand description	Finish diameter
Polyethylene cable (EV)	2-conductor	2 mm²	7/0.6	ø10.5
600V vinyl insulated vinyl sheath cable (VV)	2-conductor	2 mm²	7/0.6	ø10.5
Control vinyl insulated vinyl sheath cable (CVV)	2-conductor	2 mm²	7/0.6	ø10.5

During Use & Maintenance

⚠ WARNING

■ Do not disassemble parts of the pilot actuator other than the terminal box cap. Otherwise, explosion-proof structure performance cannot be guaranteed. Explosion-proof certification is acquired for the pilot actuator assembly. When replacing the coil, replace the pilot actuator assembly.


Pilot actuator assembly
(4F3 explosion proof)



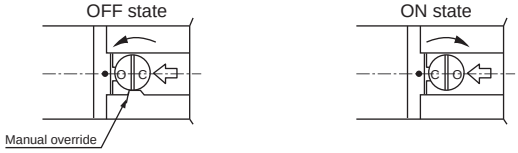
(4F4 to 7 explosion proof)

■ Manual override

The manual override is provided with a lock. Turn it off when not in use. Turn the lock with a flat tip screwdriver to enable manual override.

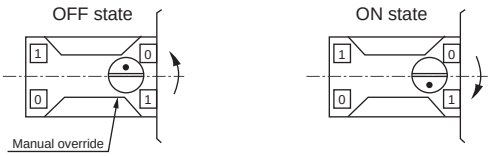
●4F3

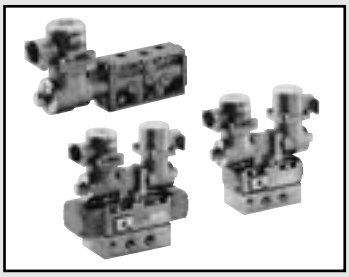
C: OFF Align characters with arrow
O: ON Turn in the direction of the arrow until the lock stops.
(The arrow and "O" may not necessarily be aligned.)



●4F4/5/6/7

0 ... OFF Align • with numbers
1 ... ON Turn in the direction of 1 until the dial lock stops.
(The • mark and 1 may not necessarily be aligned.)





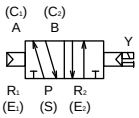
Discrete valve
Explosion proof 5 port pilot operated
4F**0E Series

●Applicable cylinder bore size: ø63 to ø250

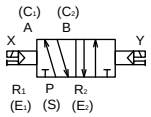
RoHS CAD

JIS symbol

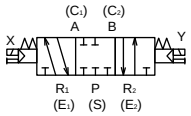
2-position single



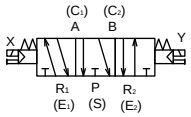
2-position double solenoid



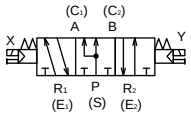
3-position all ports closed



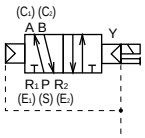
3-position A/B/R connection



3-position P/A/B connection



●External pilot



(Symbol shows 2 position single)

Common specifications

Descriptions	
Valve type / operation method	Pilot operated spool valve
Working fluid	Compressed air
Max. working pressure MPa	1.0
Min. working pressure MPa	Refer to the individual specifications below.
Withstanding pressure MPa	1.5
Ambient temperature °C (Note 1)	-10 to 60 (no freezing)
Fluid temperature °C	5 to 60
Lubrication	Not required (when lubricating, use turbine oil ISO VG32.)
Explosion proof performance	d2G4
Manual override	Locking
Vibration/impact m/s²	50 or less / 300 or less
Working environment	Containing corrosive gas is impermissible.

Note 1: Ambient temperature refers to the temperature for storage and installation, and differs from fluid temperature, which applies during operation.
Note 2: The working pressure range is 0 to 1.0 MPa when the external pilot (option symbol: K) is selected. Set the external pilot pressure between 0.15 and 1.0 MPa.

Electric specifications

Descriptions			
Rated voltage	AC		100 V, 200 V (50/60Hz)
Note 1	DC		24 V
Rated voltage fluctuation range			±10%
Starting current A	AC	100 V	0.186/0.135
		200 V	0.093/0.068
	DC	24 V	0.166
Holding current A	AC	100 V	0.06/0.05
		200 V	0.03/0.025
	DC	24 V	0.166
Power consumption W	AC	100 V	4.5/4
		200 V	4.5/4
	DC	24 V	4
Heat proof class			A (Note 2, H)

Note 1: The 100 VAC 50/60Hz rated voltage can be used at 110 VAC 60Hz, and 200 VAC 50/60Hz can be used at 220 VAC 60Hz.
Note 2: Heat proof class H is as an option. Dimensions are same as A.

Individual specifications

Descriptions			4F3	4F4	4F5	4F6	4F7
Min. working pressure MPa	2-position	Single solenoid	0.1	0.1	0.1	0.15	0.15
		Double solenoid					
	3-position	All ports closed	0.15	0.15	0.15		
		A/B/R connection					
		P/A/B connection					
Port size Note 1	Supply port S, cylinder port C		Rp1/4, Rp3/8	Rc1/4, Rc3/8	Rc3/8, Rc1/2	Rc1/2, Rc3/4	Rc3/4, Rc1
	Exhaust port E Pilot exhaust port (PE)		Rp1/4, Rp3/8 (Rp1/8)	Rc1/4, Rc3/8 (Rc1/8)	Rc3/8, Rc1/2 (Rc1/8)	Rc1/2, Rc3/4 (Rc1/4)	Rc3/4, Rc1 (Rc1/4)
Response time Note 2 ms			100	120	140	400	600
Weight kg	2-position	Single solenoid	0.80	1.18	1.62	2.42	4.32
		Double solenoid	1.20	1.60	2.00	2.90	4.80
	3-position		1.66	2.00	2.30	3.40	5.90

Note 1: NPT threads are available for 4F4 to 7 piping ports threads. Contact CKD for details. (Note that the external lead wire inlet is G1/2.)
Note 2: Response time is the value when supply pressure 0.5 MPa, not lubricated and ON. The value varies depending on pressure and quality of lubricant.

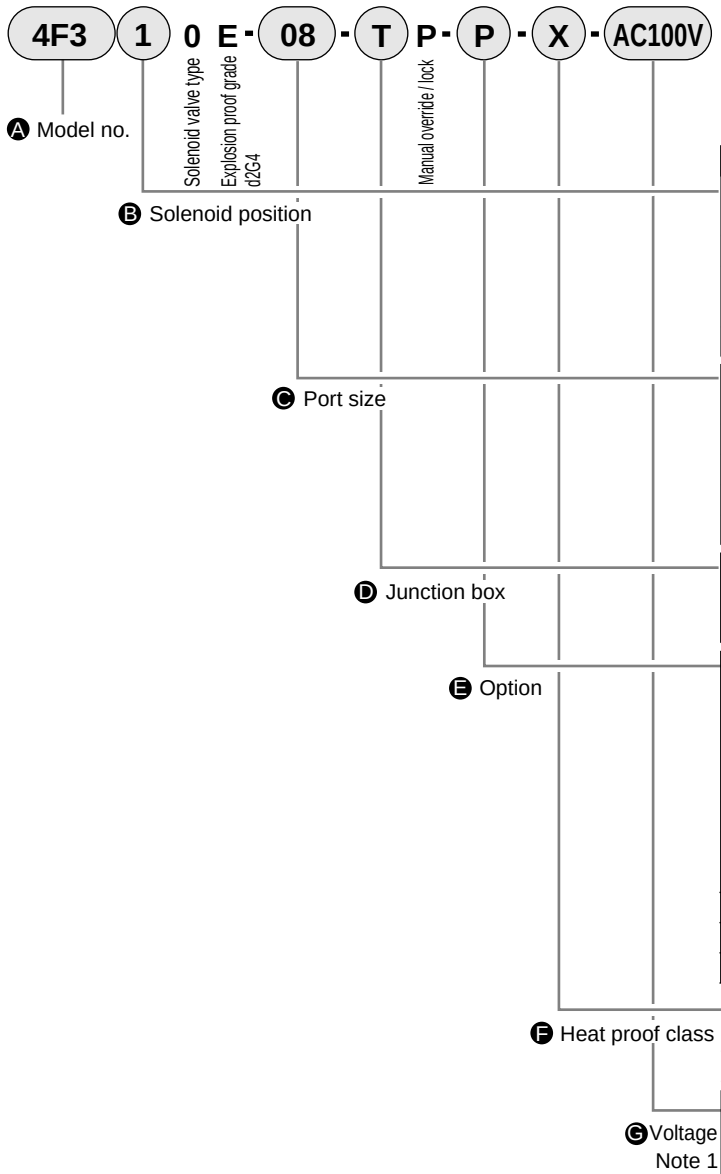
Flow characteristics

Model no.	Solenoid position		Port size	C (dm³/ (s·bar))	b	S (mm²)
4F3	2-position	Single solenoid	Rp1/4	3.9	0.42	-
		Double solenoid				
	3-position	All ports closed		4.0	0.35	
		A/B/R connection		4.5	0.42	
		P/A/B connection		4.0	0.35	
	2-position	Single solenoid	Rp3/8	5.8	0.42	
		Double solenoid				
	3-position	All ports closed		4.4	0.42	
		A/B/R connection		5.1	0.46	
		P/A/B connection		4.4	0.42	
4F4	2-position	Single solenoid	Rc1/4 Rc3/8	5.0	0.21	-
		Double solenoid				
	3-position	All ports closed		4.7	0.24	
		A/B/R connection		5.3	0.29	
		P/A/B connection		5.3	0.29	
4F5	2-position	Single solenoid	Rc3/8 Rc1/2	10	0.32	-
		Double solenoid				
	3-position	All ports closed		9.7	0.28	
		A/B/R connection		9.8	0.25	
		P/A/B connection				
4F6	2-position	Single solenoid	Rc1/2 Rc3/4	18	0.31	-
		Double solenoid				
	3-position	All ports closed		15	0.23	
		A/B/R connection				
		P/A/B connection				
4F7	2-position	Single solenoid	Rc3/4 Rc1	-	-	160
		Double solenoid				
	3-position	All ports closed				
		A/B/R connection				
		P/A/B connection				

Note 1: Effective sectional area S and sonic conductance C are converted as S ≒ 5.0 × C.

How to order

● Explosion proof 5 port valve



Symbol	Descriptions	Ⓐ Model no. 4F3	4F4	4F5	4F6	4F7
Ⓑ Solenoid position						
1	2-position single solenoid	●	●	●	●	●
2	2-position double solenoid	●	●	●	●	●
3	3-position all ports closed	●	●	●	●	●
4	3-position A/B/R connection	●	●	●	●	●
5	3-position P/A/B connection	●	●	●	●	●
Ⓒ Port size						
08	Rp1/4 (4F3), Rc1/4	●	●			
10	Rp3/8 (4F3), Rc3/8	●	●	●		
15	Rc1/2			●	●	
20	Rc3/4				●	●
25	Rc1					●
Ⓓ Junction box						
T	Conduit screw connection method (standard)	●	●	●	●	●
G	Pressure proof packing protective tube screw-in type (option) Note 3	●	●	●	●	●
Ⓔ Option						
Blank	No option	●	●	●	●	●
K	External pilot Note 4		●	●	●	●
P	Mounting bracket L (4F3 2-position single solenoid) Mounting bracket U (4F4 to 4F7)	●	●	●	●	●
P1	Mounting bracket U (2-position double solenoid and 3-position)	●				
H	Check valve attached (3-position all ports closed dedicated)	●	●	●	●	●
N	Plug attached (3 port valve)	●	●	●	●	●
R	Manual override position change	●				
NC	Plug assembly (C1: A, E1: R1)	●	●	●	●	●
NO	Plug assembly (C2: B, E2: R2)	●	●	●	●	●
Ⓕ Heat proof class						
Blank	A (standard products)	●	●	●	●	●
X	H (option)	●	●	●	●	●
Ⓖ Voltage						
AC100V	100 VAC (50/60Hz), 110 VAC 60Hz	●	●	●	●	●
AC200V	200 VAC (50/60Hz), 220 VAC 60Hz	●	●	●	●	●
DC24V	24 VDC	●	●	●	●	●
DC12V	12 VDC	●	●	●	●	●
AC110V	110 VAC (50/60Hz)	●	●	●	●	●
AC220V	220 VAC (50/60Hz)	●	●	●	●	●

⚠ Note on model no. selection

Note 1: Following voltage products are available as custom order.
(Voltage not listed is not available.)

Voltage	AC (V) (50/60Hz)	12, 24, 48, 115, 120, 125, 127, 210, 230, 240, 250, 380
	[VDC]	45, 48, 80, 100, 110, 125

Note 2: Order the coil as the pilot actuator assembly.

Note 3: Select the cable for the G type from the cables below to ensure explosion-proof performance.

Type of cable	Conductor number	Nominal section area	Strand description	Finish diameter
Polyethylene cable (EV)	2-conductor	2 mm²	7/0.6	ø10.5
600V vinyl insulated vinyl sheath cable (VV)	2-conductor	2 mm²	7/0.6	ø10.5
Control vinyl insulated vinyl sheath cable (CVV)	2-conductor	2 mm²	7/0.6	ø10.5

Note 4: Consult with CKD when using for external pilot (K) vacuum pressure, cylinder port pressure, or exhaust pressure.

<Example of model number>

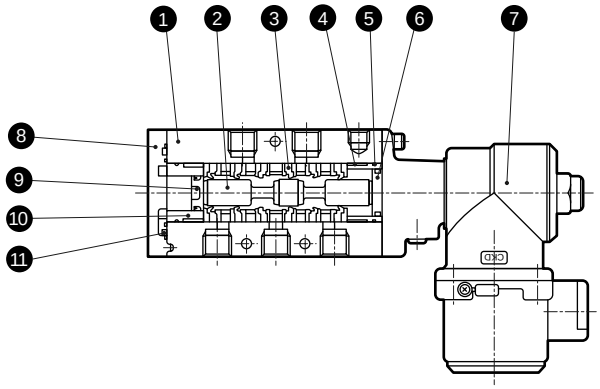
4F410E-10-GP-P-X-AC100V

Ⓐ Model : Explosion proof 5 port pilot operated valve
Ⓑ Solenoid position: 2-position single solenoid
Ⓒ Port size : Rc3/8
Ⓓ Junction box : Pressure proof packing protective tube screw-in type
Ⓔ Option : Mounting bracket U
Ⓕ Heat proof class : H
Ⓖ Voltage : 100 VAC

Internal structure and parts list

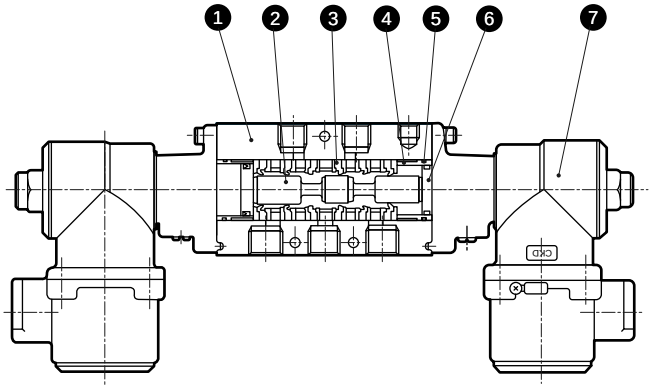
4F310E

● 2-position single solenoid



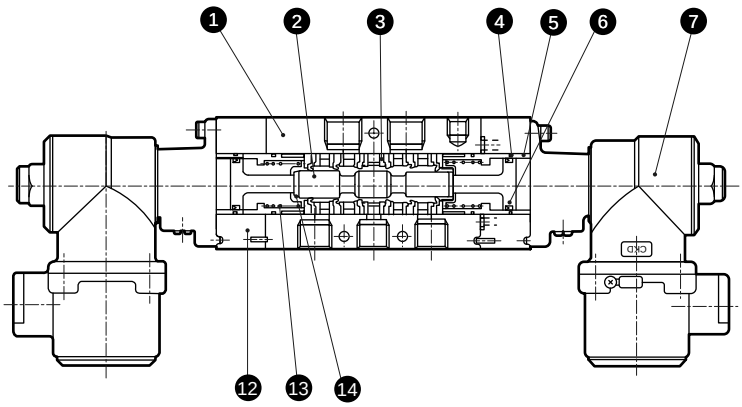
4F320E

● 2-position double solenoid



4F330E/4F340E/4F350E

● 3-position
All ports closed
A/B/R connection
P/A/B connection



Main parts list

No.	Parts name	Material
1	Body	Aluminum alloy die-casting
2	Spool	Aluminum alloy
3	Sealant assembly	-
4	Cylinder (A)	Aluminum alloy
5	O ring	Nitrile rubber
6	Piston assembly (A)	-
7	Actuator assembly	Note 1
8	Cap	Aluminum alloy die-casting
9	Piston assembly (B)	-
10	Cylinder (B)	Aluminum alloy
11	Gasket	Nitrile rubber
12	Body block	Aluminum alloy die-casting
13	Spring	Piano wire
14	Spring retainer	Stainless steel

Repair parts list

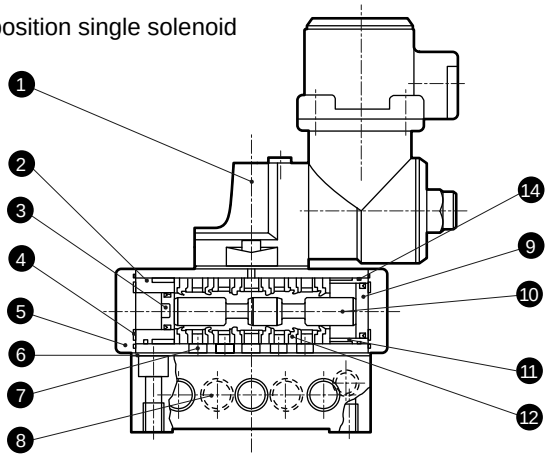
No. / parts name / Model no.	3 Sealant assembly	6 Piston assembly (A)	9 Piston assembly (B)
4F310E	4F9-106	4F9-104	4F9-103
4F320E			-
4F330E		4F9-114	-
4F340E			-
4F350E			-

Note 1 (actuator assembly model no.)
4F310E-Ⓓ P-Ⓕ -Ⓖ
Select from how to order on page 1162.

Internal structure and parts list

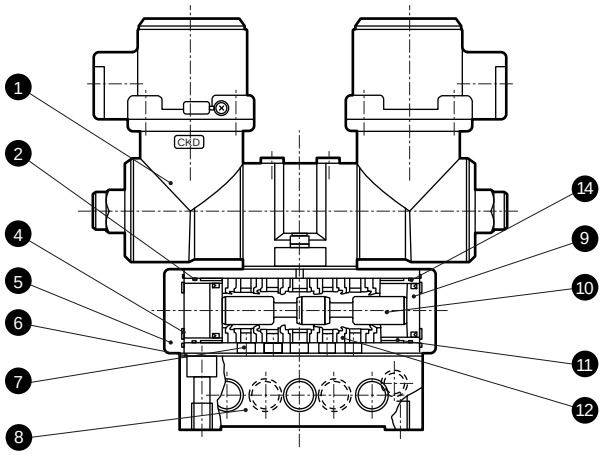
4F410E
4F510E

● 2-position single solenoid



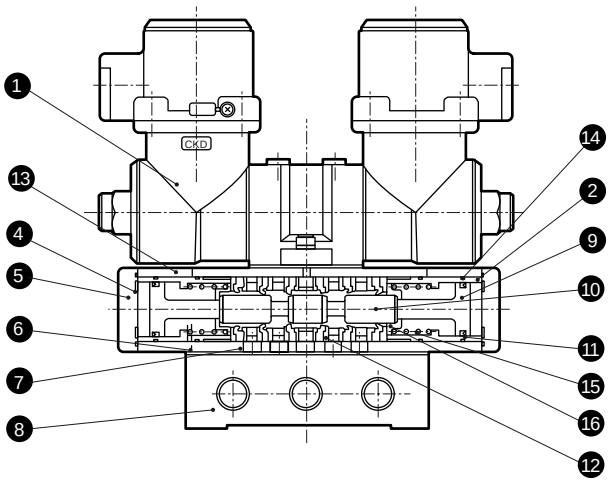
4F420E
4F520E

● 2-position double solenoid



4F430E/4F530E
4F440E/4F540E
4F450E/4F550E

● 3-position
All ports closed
A/B/R connection
P/A/B connection



Main parts list

No.	Parts name	Material
1	Actuator assembly	Note 1
2	Cylinder (B)	Aluminum alloy
3	Piston assembly (B)	-
4	Gasket	Nitrile rubber
5	Cap	Aluminum alloy die-casting
6	Sub-plate gasket	Nitrile rubber
7	Body	Aluminum alloy die-casting
8	Sub-plate	Aluminum alloy die-casting
9	Piston assembly (A)	-
10	Spool	Aluminum alloy
11	Cylinder (A)	Aluminum alloy
12	Sealant assembly	-
13	Body block	Aluminum alloy die-casting
14	O ring	Nitrile rubber
15	Spring	Piano wire
16	Spring retainer	Stainless steel

Repair parts list

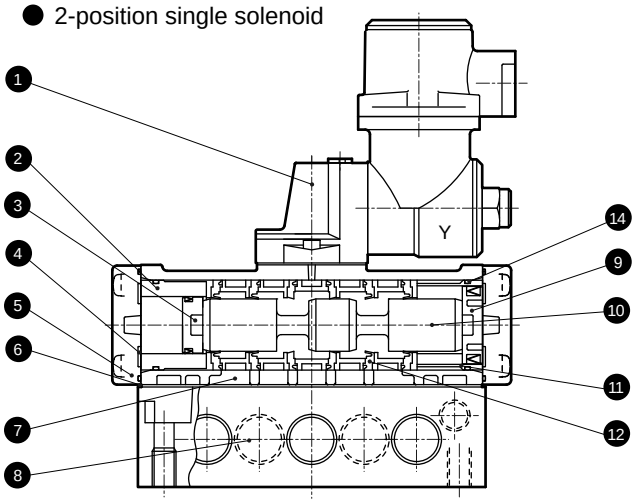
No. / parts name / Model no.	9 Piston assembly (A)	12 Sealant assembly	3 Piston assembly (B)
4F410E	4F9-104	4F9-106	4F9-103
4F420E			-
4F430E	4F9-114		-
4F440E			-
4F450E			-
4F510E	4F9-108	4F9-107	4F9-109
4F520E			-
4F530E	4F9-115		-
4F540E			-
4F550E			-

Note 1 (actuator assembly)
4F**0E- Ⓓ P- Ⓕ - Ⓖ
Select from how to order on page 1162.

Internal structure and parts list

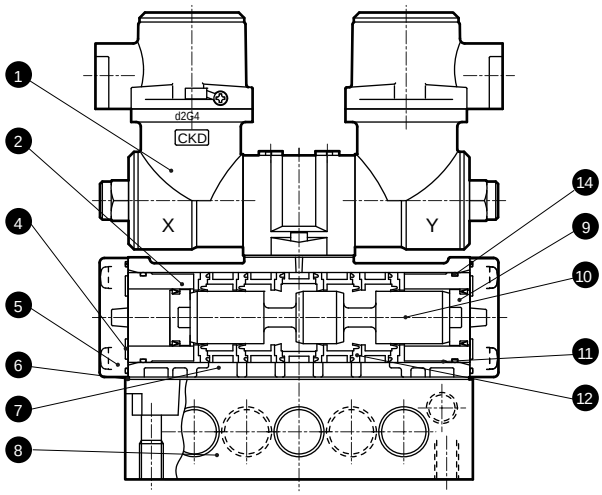
4F610E
4F710E

● 2-position single solenoid



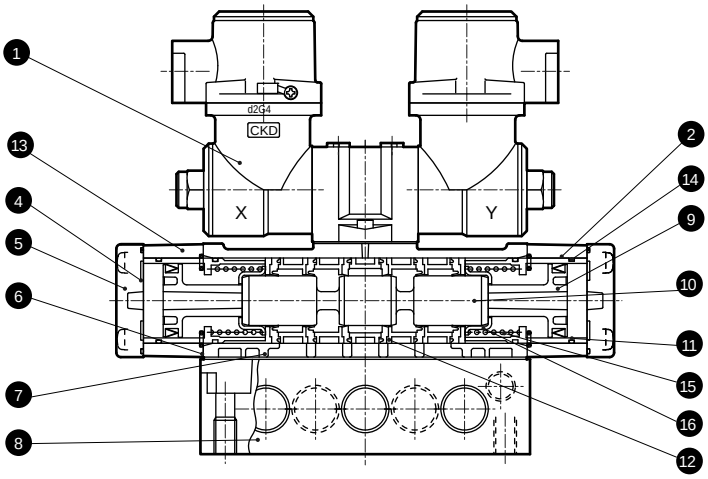
4F620E
4F720E

● 2-position double solenoid



4F630E/4F730E
4F640E/4F740E
4F650E/4F750E

● 3-position
All ports closed
A/B/R connection
P/A/B connection



Main parts list

No.	Parts name	Material
1	Actuator assembly	Note 1
2	Cylinder (B)	Aluminum alloy
3	Piston assembly (B)	-
4	Gasket	Nitrile rubber
5	Cap	Aluminum alloy die-casting
6	Sub-plate gasket	Nitrile rubber
7	Body	Aluminum alloy die-casting
8	Sub-plate	Aluminum alloy die-casting
9	Piston assembly (A)	-
10	Spool	Aluminum alloy
11	Cylinder (A)	Aluminum alloy
12	Sealant assembly	-
13	Body block	Aluminum alloy die-casting
14	O ring	Nitrile rubber
15	Spring	Piano wire
16	Spring retainer	Stainless steel

Repair parts list

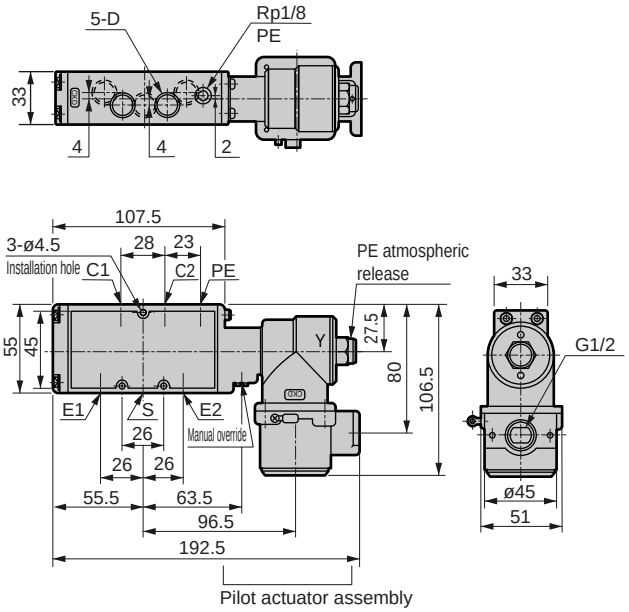
No. / parts name	9	12	3
Model no.	Piston assembly (A)	Sealant assembly	Piston assembly (B)
4F610E	4F9-117	4F9-118	4F9-116
4F620E	-		
4F630E	4F9-122		-
4F640E			-
4F650E			-
4F710E	4F9-121	4F9-119	4F9-120
4F720E	-		
4F730E	4F9-123		-
4F740E			-
4F750E			-

Note 1 (actuator assembly)
4F**0E- Ⓓ P- Ⓕ - Ⓖ
Select from how to order on page 1162.

Dimensions CAD

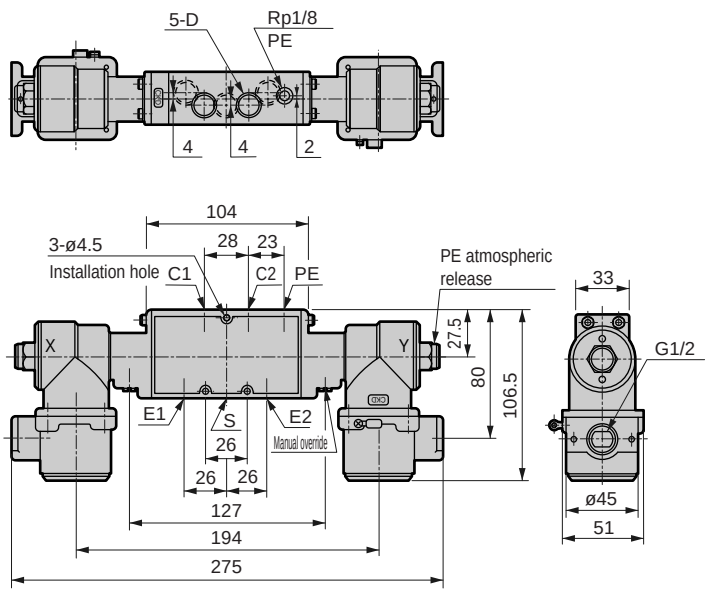
4F310E

● 2-position single solenoid



4F320E

● 2-position double solenoid



4F330E

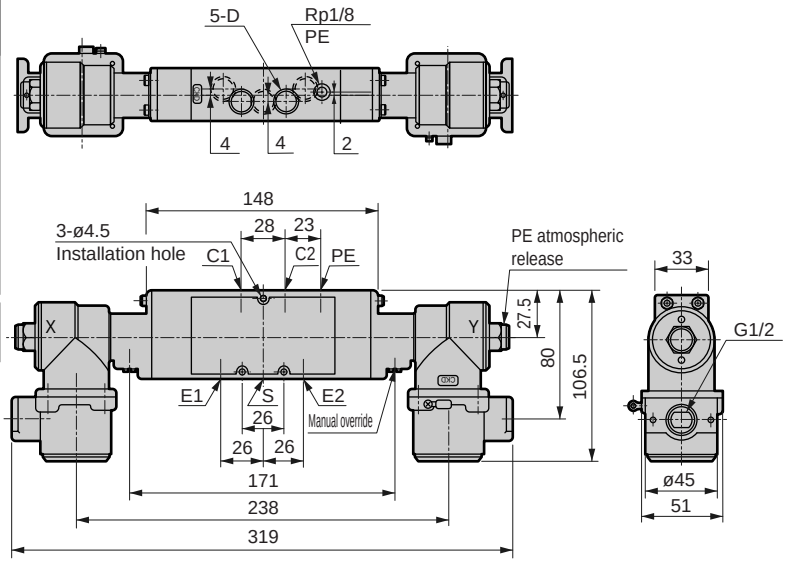
● 3-position all ports closed

4F340E

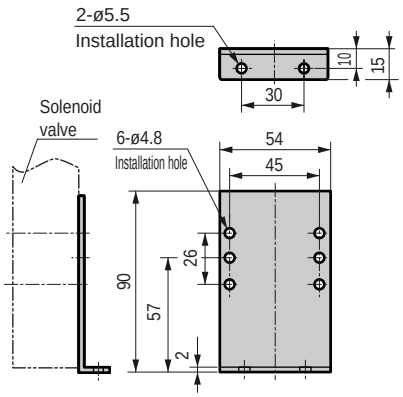
● 3-position A/B/R connection

4F350E

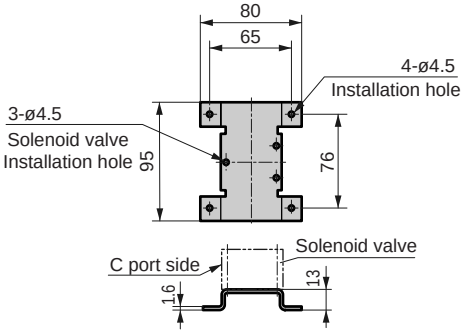
● 3-position P/A/B connection



● L type mounting bracket (P) 4F310E dedicated



● U type mounting bracket (P1)

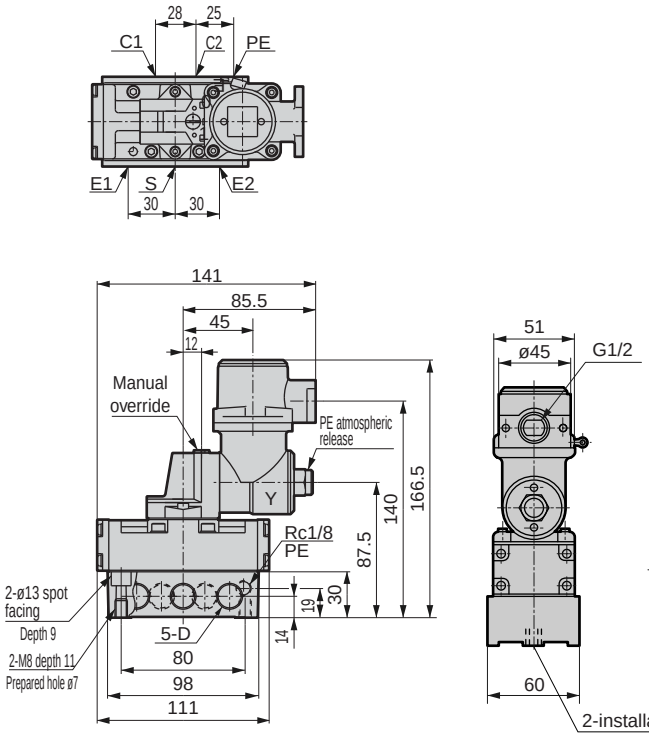


Model no.	D
*-08	Rp1/4
*-10	Rp3/8

Dimensions CAD

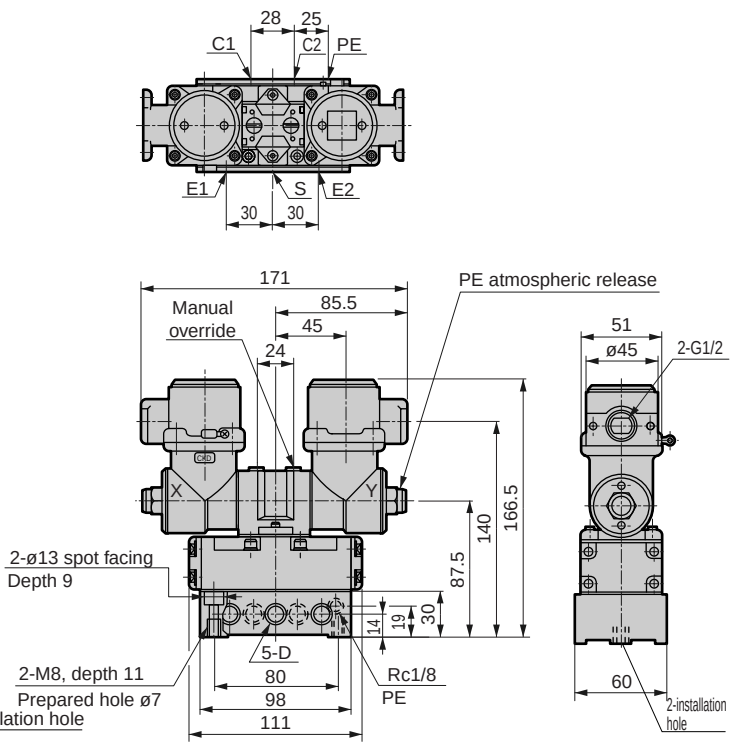
4F410E

● 2-position single solenoid



4F420E

● 2-position double solenoid



4F430E

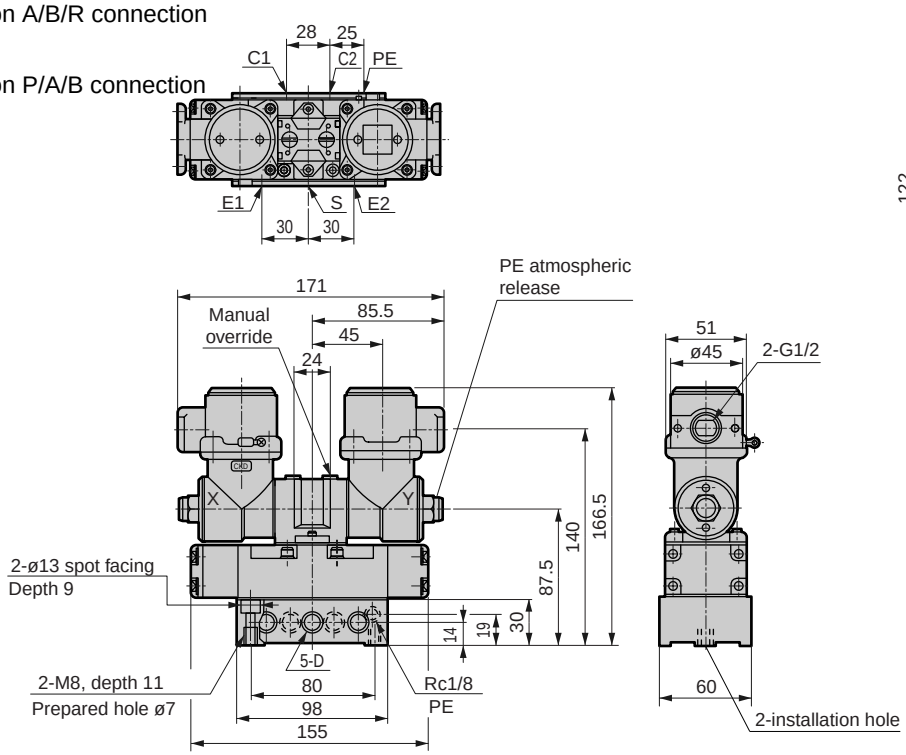
● 3-position all ports closed

4F440E

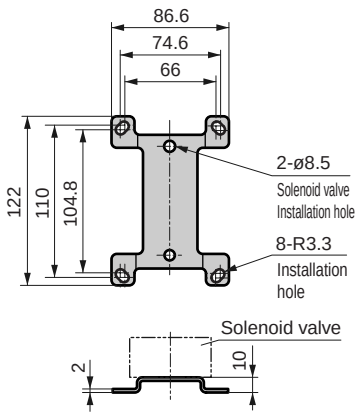
● 3-position A/B/R connection

4F450E

● 3-position P/A/B connection



● U type mounting bracket (P)

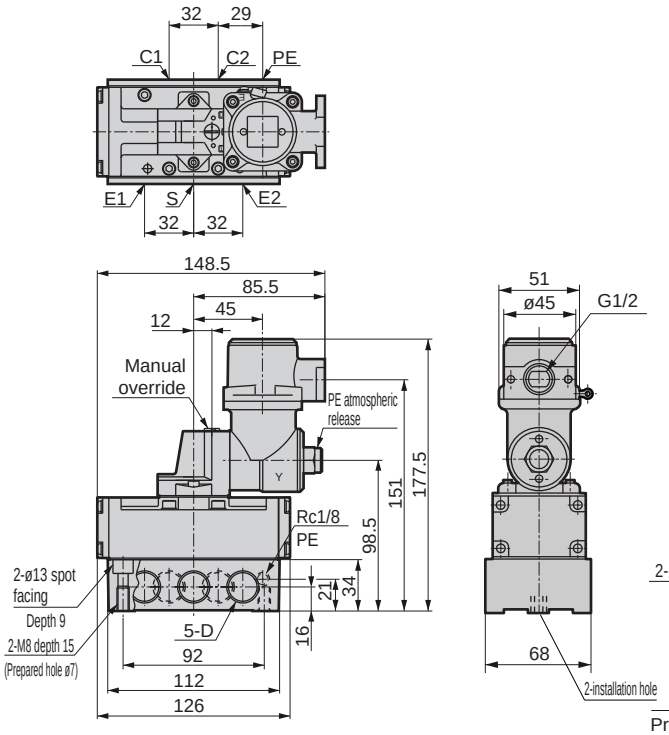


Model no.	D
*-08	Rc1/4
*-10	Rc3/8

Dimensions CAD

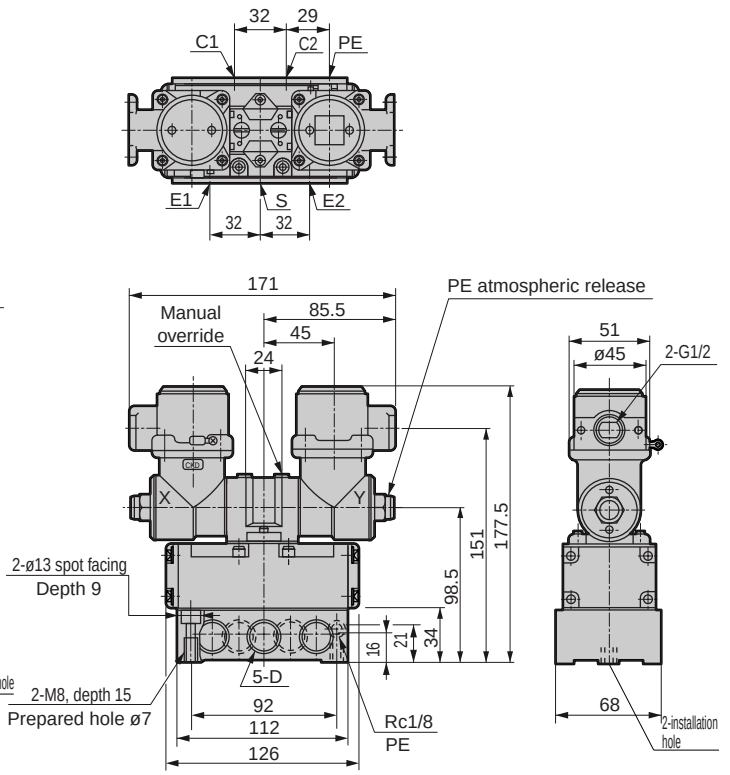
4F510E

● 2-position single solenoid



4F520E

● 2-position double solenoid



4F530E

● 3-position all ports closed

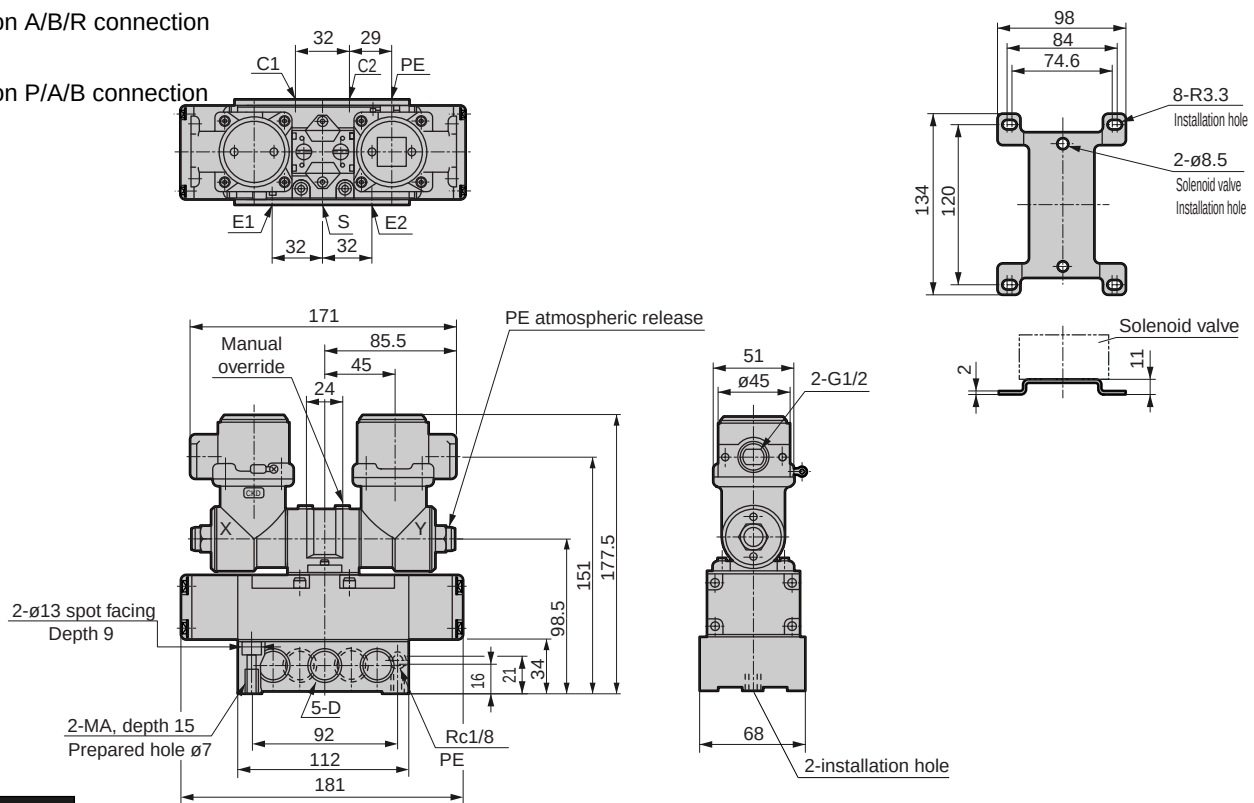
4F540E

● 3-position A/B/R connection

4F550E

● 3-position P/A/B connection

● U type mounting bracket (P)

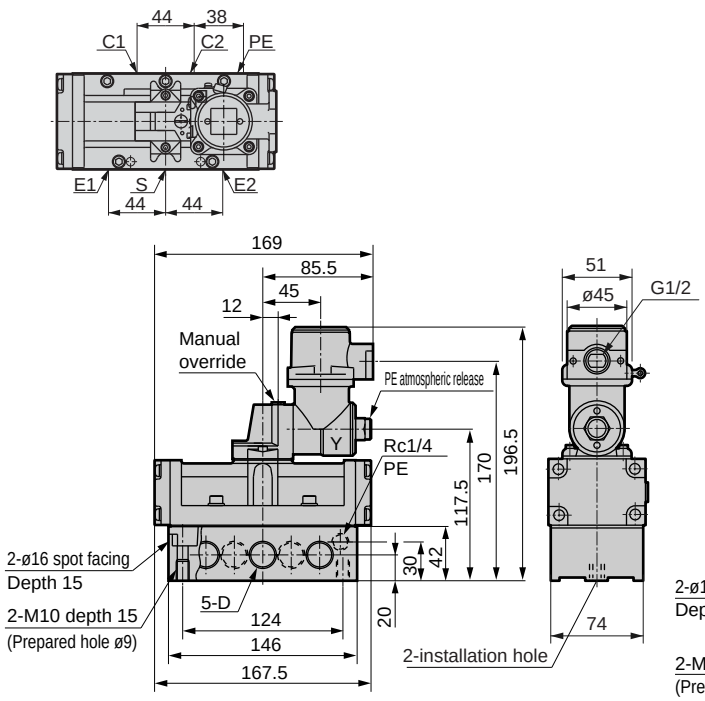


Model no.	D
*-10	Rc3/8
*-15	Rc1/2

Dimensions

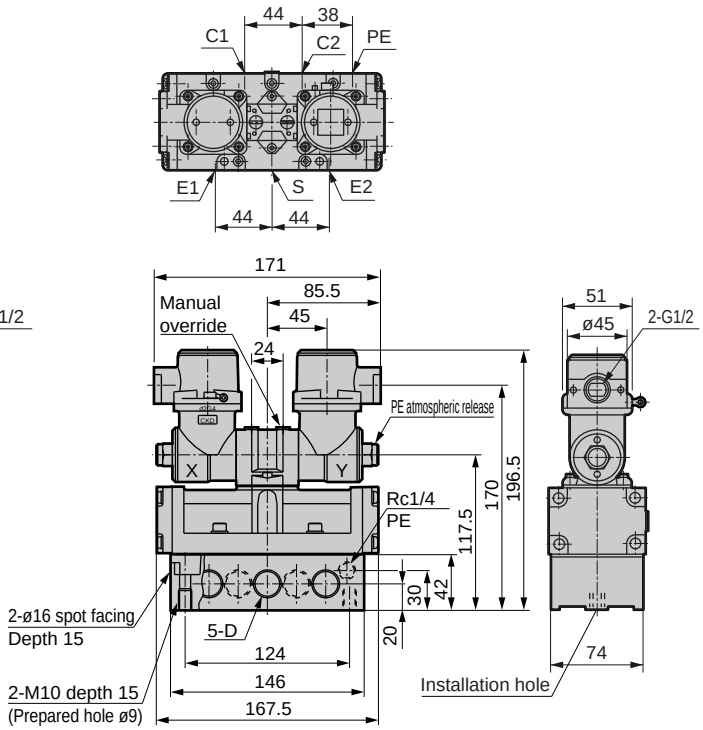
4F610E

● 2-position single solenoid



4F620E

● 2-position double solenoid



4F630E

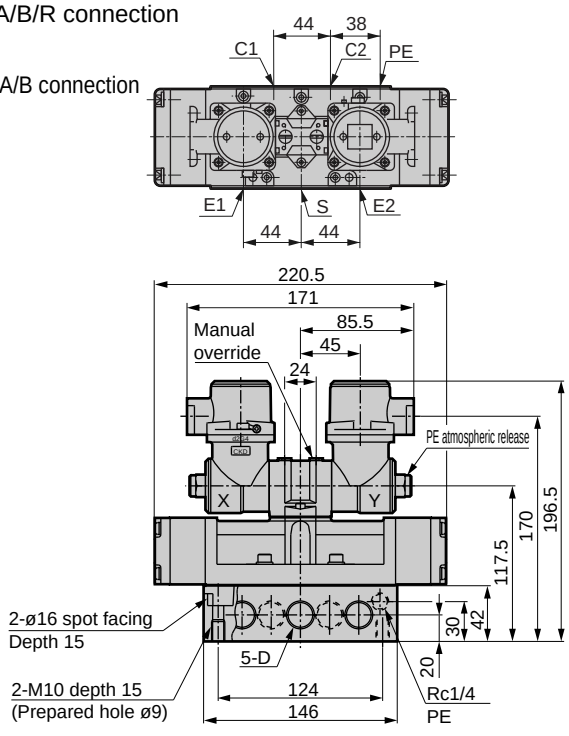
● 3-position all ports closed

4F640E

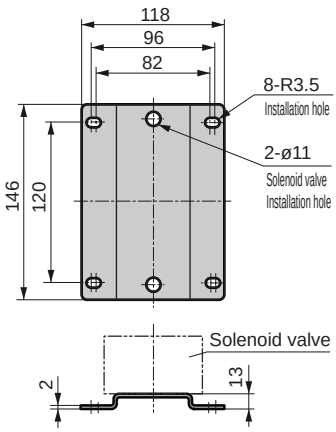
● 3-position A/B/R connection

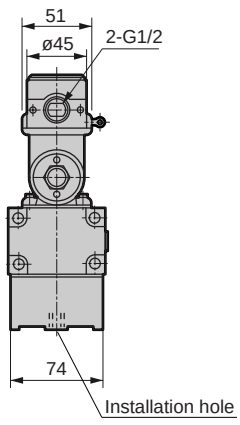
4F650E

● 3-position P/A/B connection



● U type mounting bracket (P)



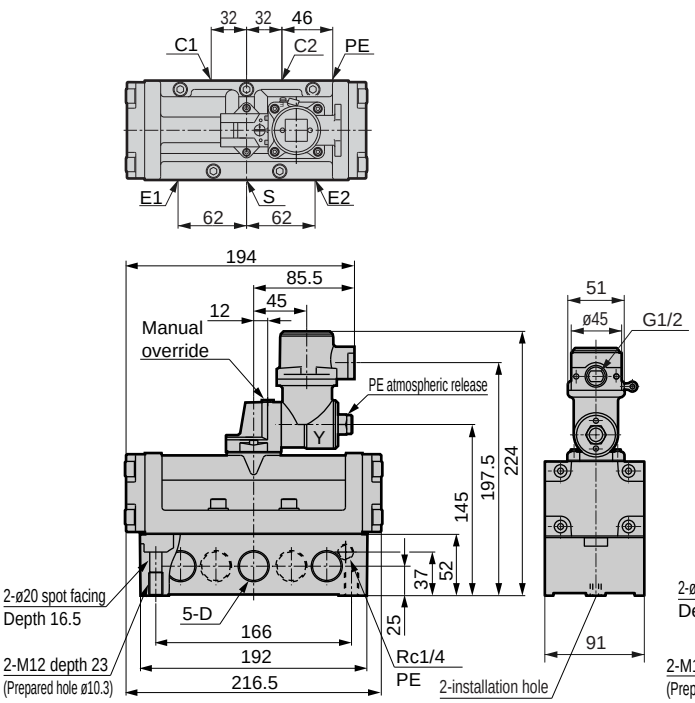


Model no.	D
*-15	Rc1/2
*-20	Rc3/4

Dimensions CAD

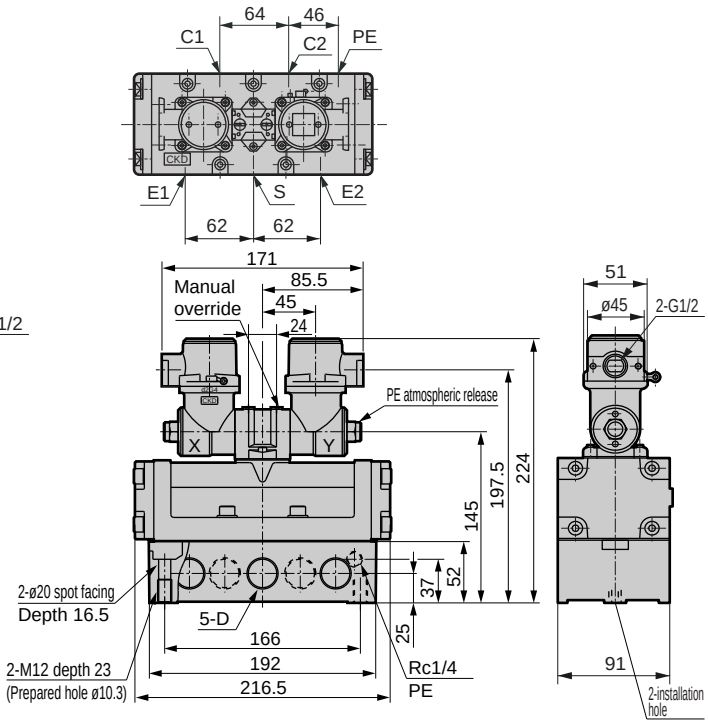
4F710E

● 2-position single solenoid



4F720E

● 2-position double solenoid



4F730E

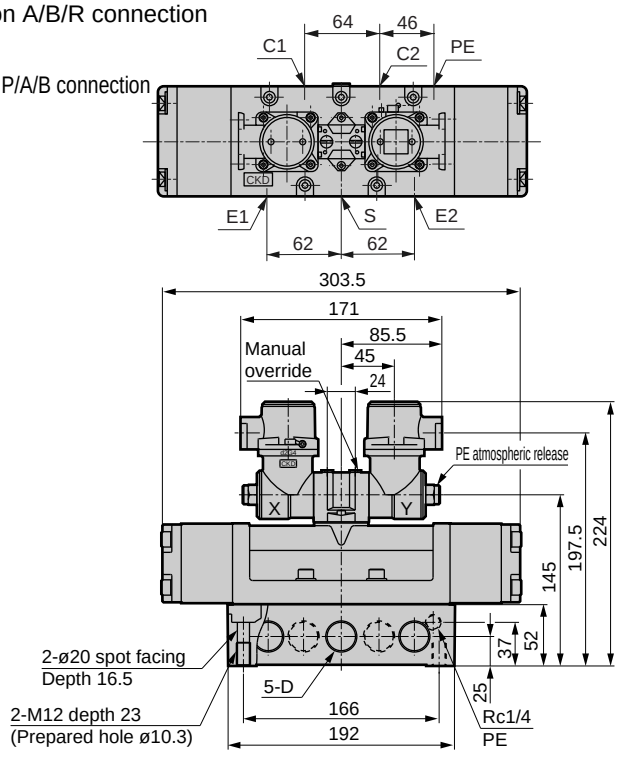
● 3-position all ports closed

4F740E

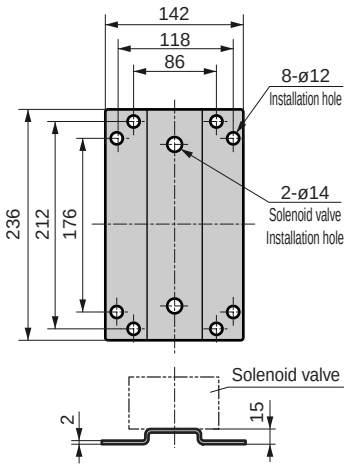
● 3-position A/B/R connection

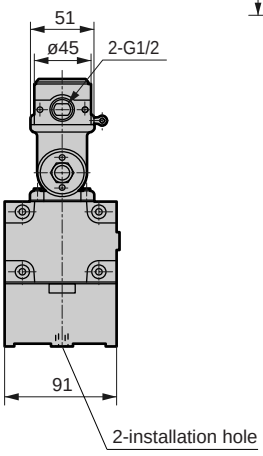
4F750E

● 3-position P/A/B connection



● U type mounting bracket (P)



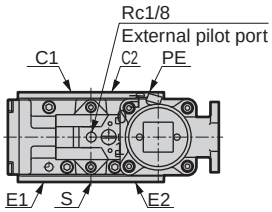


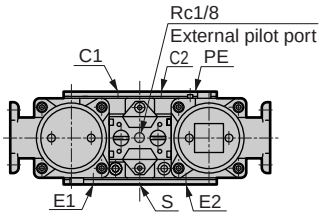
Model no.	D
*-20	Rc3/4
*-25	Rc 1

Dimensions

4F4 to 4F7

● External pilot port: (K)

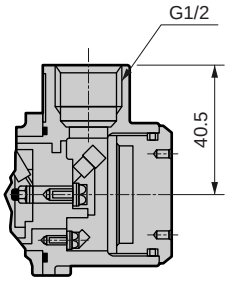




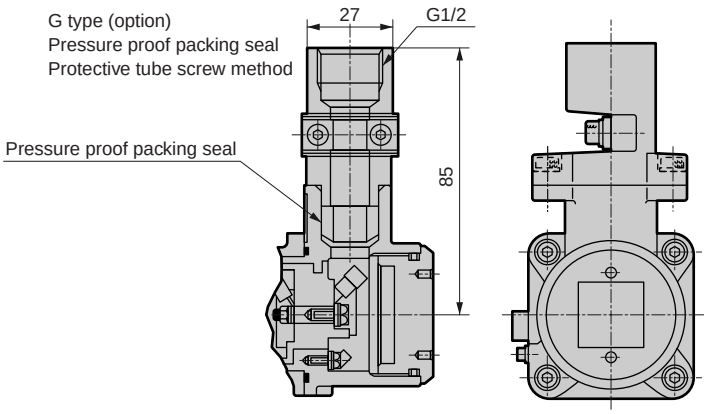
*The external pilot port position is common for 4F4 to 4F7.

Junction box

T type (standard)
Conduit screw connection method



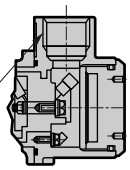
G type (option)
Pressure proof packing seal
Protective tube screw method



<Safety precautions>

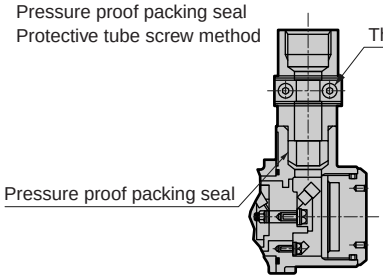
T type (standard)
Conduit screw connection method

When using outdoors, use a thick steel conduit so that water does not enter from threads, and check seals, etc.



After piping outdoors, check that water will not enter even if left outside without electrical piping.
(Water could enter into the wiring box.)

G type (option)
Pressure proof packing seal
Protective tube screw method



The structure prevents the entry of water into the valve, but water could enter into the cable between the valve and terminal box.
When used for a long time, the pressure resistant packing could deteriorate and cause water to enter the valve. This type is designated for indoor use.

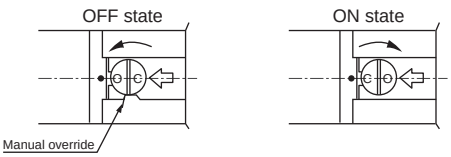
Select the cable for the G type from the cables below to ensure explosion-proof performance.

Type of cable	Conductor number	Nominal section area	Strand description	Finish diameter
Polyethylene cable (EV)	2-conductor	2 mm^2	7/0.6	ø10.5
600V vinyl insulated vinyl sheath cable (VV)	2-conductor	2 mm^2	7/0.6	ø10.5
Control vinyl insulated vinyl sheath cable (CVV)	2-conductor	2 mm^2	7/0.6	ø10.5

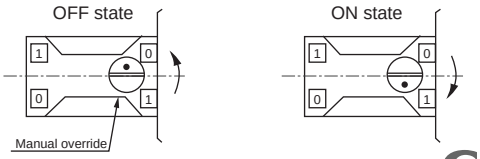
Manual override

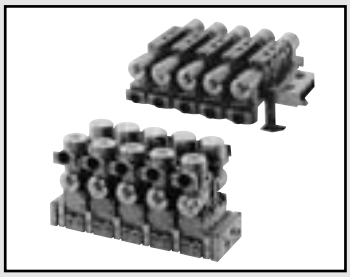
The manual override is provided with a lock. Turn it off when not in use. Turn the lock with a flat tip screwdriver to enable manual override.

● **4F3**
C: OFF Align characters with arrow
O: ON Turn in the direction of the arrow until the lock stops. (The arrow and "O" may not necessarily be aligned.)



● **4F4/5/6/7**
0 ··· OFF Align • with numbers
1 ··· ON Turn in the direction of 1 until the dial lock stops. (The • mark and 1 may not necessarily be aligned)





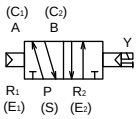
Individual wiring manifold
Explosion proof 5 port pilot operated
M4F**0E Series

● Applicable cylinder bore size: ø63 to ø250

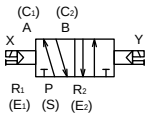
RoHS CAD

JIS symbol

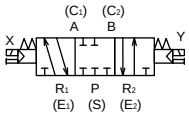
2-position single



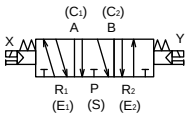
2-position double



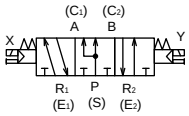
3-position all ports closed



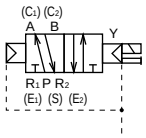
3-position A/B/R connection



3-position P/A/B connection



● External pilot



(Symbol shows 2 position single)

Common specifications

Descriptions	
Manifold method	Manifold integrated
Manifold type	Common exhaust
	Individual exhaust (M4F3)
Station number	2 to 10 stations
Valve type / operation method	Pilot operated spool valve
Working fluid	Compressed air
Max. working pressure MPa	1.0
Min. working pressure MPa	Refer to the individual specifications below.
Withstanding pressure MPa	1.5
Ambient temperature °C (Note 1)	-10 to 60 (no freezing)
Fluid temperature °C	5 to 60
Lubrication	Not required (when lubricating, use turbine oil ISO VG32.)
Explosion proof performance	d2G4
Manual override	Locking
Vibration/impact m/s²	50 or less / 300 or less
Working environment	Containing corrosive gas is impermissible.

Note 1: Ambient temperature refers to the temperature for storage and installation, and differs from fluid temperature, which applies during operation.
Note 2: The working pressure range is 0 to 1.0 MPa when the external pilot (option symbol: K) is selected. Set the external pilot pressure between 0.15 and 1.0 MPa.

Electric specifications

Descriptions			
Rated voltage	AC		100 V, 200 V (50/60Hz)
Note 1	DC		24 V
Rated voltage fluctuation range			±10%
Starting current A	AC	100 V	0.186/0.135
		200 V	0.093/0.068
	DC	24 V	0.166
Holding current A	AC	100 V	0.06/0.05
		200 V	0.03/0.025
	DC	24 V	0.166
Power consumption W	AC	100 V	4.5/4
		200 V	4.5/4
	DC	24 V	4
Heat proof class			A (Note 2, H)

Note1: The 100 VAC 50/60Hz rated voltage can be used at 110 VAC 60Hz, and 200 VAC 50/60Hz can be used at 220 VAC 60Hz.
Note 2: Heat proof class H is as an option. Dimensions are same as A.

Individual specifications

Descriptions				M4F3	M4F4	M4F5	M4F6	M4F7
Min. working pressure MPa		2-position	Single solenoid	0.1	0.1	0.1	0.15	0.15
			Double solenoid					
		3-position	All ports closed	0.15	0.15	0.15		
			A/B/R connection					
			P/A/B connection					
Connection Port size	Common exhaust		Cylinder port C	Rp1/4, Rp3/8	Rc1/4	Rc3/8	Rc1/2	Rc3/4
			Exhaust port E	Rc1/2	Rc3/8	Rc1/2	Rc3/4	Rc3/4
			Supply port S	Rc1/2	Rc3/8	Rc1/2	Rc3/4	Rc1
	Individual exhaust		Cylinder port C	Rp1/4, Rp3/8	Rc1/4 (Note 1 back porting)	Rc3/8 (Note 1 back porting)	Rc1/2	Rc3/4
			Exhaust port E	Rc1/4, Rc3/8	Rc1/4 (Note 1 back porting)	Rc3/8 (Note 1 back porting)	Rc1/2	Rc1/2
			Supply port S	Rc1/2	Rc3/8	Rc1/2	Rc3/4	Rc1
Response time Note 2 ms				100	120	140	400	600

Note 1: Back porting is custom order.
Note 2: Response time is the value when supply pressure 0.5 MPa, not lubricated and ON. The value varies depending on pressure and quality of lubricant.

Flow characteristics

Model no.	Solenoid position		Port size	C (dm³/ (s·bar))	b	S (mm²)
4F3	2-position	Single solenoid	Rp1/4	3.9	0.42	-
		Double solenoid				
	3-position	All ports closed		4.0	0.35	
		A/B/R connection		4.5	0.42	
		P/A/B connection		4.0	0.35	
	2-position	Single solenoid	Rp3/8	5.8	0.42	
		Double solenoid				
	3-position	All ports closed		4.4	0.42	
		A/B/R connection		5.1	0.46	
		P/A/B connection		4.4	0.42	
4F4	2-position	Single solenoid	Rc1/4	5.0	0.21	-
		Double solenoid				
	3-position	All ports closed		4.7	0.24	
		A/B/R connection		5.3	0.29	
		P/A/B connection		5.3	0.29	
4F5	2-position	Single solenoid	Rc3/8	10	0.32	-
		Double solenoid				
	3-position	All ports closed		9.7	0.28	
		A/B/R connection		9.8	0.25	
		P/A/B connection				
4F6	2-position	Single solenoid	Rc1/2	18	0.31	-
		Double solenoid				
	3-position	All ports closed		15	0.23	
		A/B/R connection				
		P/A/B connection				
4F7	2-position	Single solenoid	Rc3/4	-	-	160
		Double solenoid				
	3-position	All ports closed				
		A/B/R connection				
		P/A/B connection				

Note 1: Effective sectional area S and sonic conductance C are converted as S ≒ 5.0 x C.

How to order

● Discrete solenoid valve of manifold (4F3)

4F3 1 0 E- 08 - T P- N - X —— AC100V

● Discrete solenoid valve of manifold (4F4 to 7)

4F4 1 9 E- 00 - T P —— X —— AC100V

● Manifold

M 4F3 1 0 E- 08 - T P- N - X - 2 - C L - AC100V — S1 S2 S3 S4 S5 MP

Indicate the required number of solenoid valve when using the mixed manifold. (Refer to page 1175 for an example.)

Ⓐ Model no. | Solenoid valve type | Explosion proof grade d2G4 | Manual override / lock | Ⓘ Mounting bracket | Ⓙ Voltage Note 2

Symbol	Descriptions	Ⓐ Model no. 4F3	4F4	4F5	4F6	4F7
Ⓑ Solenoid position						
1	2-position single solenoid	●	●	●	●	●
2	2-position double solenoid	●	●	●	●	●
3	3-position all ports closed	●	●	●	●	●
4	3-position A/B/R connection	●	●	●	●	●
5	3-position P/A/B connection	●	●	●	●	●
8	Mix manifold	●	●	●	●	●
Ⓒ Port size						
08	Rp1/4 (for M4F3), Rc1/4	●	●			
10	Rp3/8 (for M4F3), Rc3/8	●		●		
D15	Rc1/2				●	
E20	Rc3/4					●
Ⓓ Junction box						
T	Conduit screw connection method (standard)	●	●	●	●	●
G	Pressure proof packing protective tube screw-in type (option) Note 3	●	●	●	●	●
Ⓔ Option						
Blank	No option	●	●	●	●	●
K	External pilot Note 4		●	●	●	●
N	Plug attached (3 port valve)	●	●	●	●	●
NC	Plug assembly (C1: A, E1: R1)	●	●	●	●	●
NO	Plug assembly (C2: B, E2: R2)	●	●	●	●	●
R	Manual override position change	●				
Ⓕ Heat proof class						
Blank	A (standard products)	●	●	●	●	●
X	H (option)	●	●	●	●	●
Ⓖ Station number						
2 to **10**	2 to 10 stations	●	●	●	●	●
Ⓗ Exhaust method						
C	Common exhaust	●	●	●	●	●
I	Individual exhaust	●				
Ⓘ Mounting bracket						
L	L shaped bracket (single dedicated)	●				
U	U shaped bracket	●				
Ⓙ Voltage						
AC100V	100 VAC (50/60Hz), 110 VAC 60Hz	●	●	●	●	●
AC200V	200 VAC (50/60Hz), 220 VAC 60Hz	●	●	●	●	●
DC24V	24 VDC	●	●	●	●	●
DC12V	12 VDC	●	●	●	●	●
AC110V	110 VAC (50/60Hz)	●	●	●	●	●
AC220V	220 VAC (50/60Hz)	●	●	●	●	●

Ⓑ Solenoid position
Ⓒ Port size
Ⓓ Junction box
Ⓔ Option
Ⓕ Heat proof class
Ⓖ Station number
Ⓗ Exhaust method Note 1

Note on model no. selection

Note 1: "I" for M4F4 to 7 is custom order.

Note 2: Only the voltage parts below are used as custom order. (Voltage not listed is not available.)

Voltage	VAC (50/60Hz)	12, 24, 48, 115, 120, 125, 127, 210, 230, 240, 250, 380
	[VDC]	12, 45, 48, 80, 100, 110, 125

Note 3: Select the cable for the G type from the cables below to ensure explosion-proof performance.

Type of cable	Conductor number	Section area	Strand description	Finish diameter
Polyethylene cable (EV)	2-conductor	2 mm²	7/0.6	ø10.5
600V vinyl insulated vinyl sheath cable (VV)	2-conductor	2 mm²	7/0.6	ø10.5
Control vinyl insulated vinyl sheath cable (CVV)	2-conductor	2 mm²	7/0.6	ø10.5

Note 4: Consult with CKD when using for external pilot (K) vacuum pressure, cylinder port pressure, or exhaust pressure.

<Example of model number>

M4F310E-08-TP-N-7-CL-AC100V

Ⓐ Model : Explosion proof 5 port valve manifold
Ⓑ Solenoid position : 2-position single solenoid
Ⓒ Port size : Rp1/4
Ⓓ Junction box : Conduit screw connection method
Ⓔ Option : Plug attached
Ⓕ Heat proof class : A
Ⓖ Station number : 7 stations
Ⓗ Exhaust method : Common exhaust
Ⓘ Mounting bracket : L shaped bracket
Ⓙ Voltage : 100 VAC

How to order masking plate kit

M4F3 - 08 - MP-KIT

* Gasket attached (M4F3)
Gasket, set screw attached (M4F4 to M4F7)

Ⓐ Model no. Ⓑ Port size

Ⓐ Model no.
M4F3
M4F4
M4F5
M4F6
M4F7

Ⓑ Port size		
Symbol	Descriptions	Model no.
08	Rc1/4	M4F3
10	Rc3/8	
Blank	Rc1/4	M4F4
Blank	Rc3/8	M4F5
D15	Rc1/2	M4F6
E20	Rc3/4	M4F7

How to order mix manifold

M 4F3 8 0E - 08 - T P - N - X - 7 - C U - AC100V -

S1	S2	S3	S4	S5	MP
2	**2**	**1**	**1**	**1**	**0**

Mix manifold "8"

* Refer to previous page for how to order other parts.

S1 = 1, 6 S2 = 2, 5
S3 = 3 S4 = 7
S5 = 4

How to Order Mixed Manifold Models

(1) Indicate the quantity for each function (solenoid position) at the end of the model.
Functions and symbols are indicated below.

Example: 2-position single solenoid ⟶ S1

Symbol	Function (solenoid position)
S1	2-position single solenoid
S2	2-position double solenoid
S3	3-position all ports closed
S4	3-position A/B/R connection
S5	3-position P/A/B connection
MP	Masking plate

\- S1 S2 S3 S4 S5 MP: **2 2 1 1 1 0**

Indicate the quantity.

(2) Indicate the function (solenoid position) and layout position in the remarks field.

Solenoid position = ○, ○ th station (facing the piping port, the left side is the 1st station.)

Example: S1 = 1, 6 (1, 6th station is 2-position single solenoid.)

<Example of model number>
For 7 stations

1	2	3	4	5	6	7	····· Layout
2-position single solenoid	2-position double solenoid	3-position all ports closed	3-position P/A/B connection	2-position double solenoid	2-position single solenoid	3-position A/B/R connection	
S1	S2	S3	S5	S2	S1	S4	····· Symbol

2-position single solenoid (S1) : 2 piece (1st and 6th station)
2-position double solenoid (S2) : 2 piece (2nd and 5th station)
3-position all ports closed (S3) : 1 piece (3rd station)
3-position A/B/R connection (S4) : 1 piece (7th station)
3-position P/A/B connection (S5) : 1 piece (4th station)

M4F380E-08-TP-N-7-CU-AC100V -

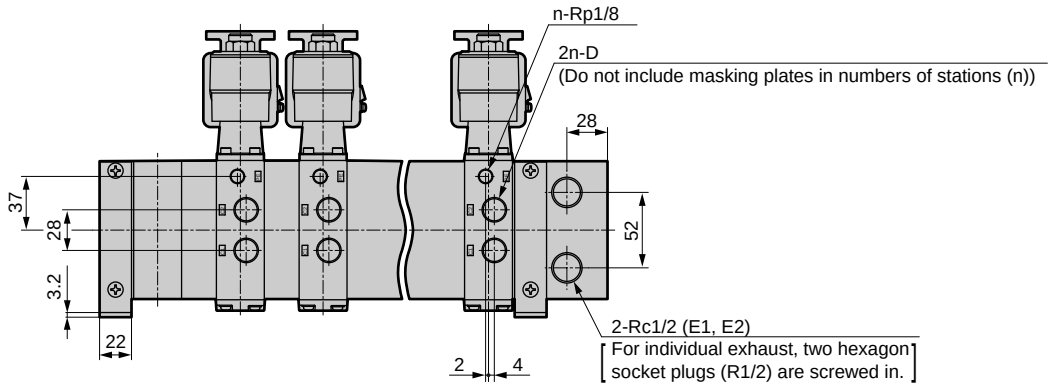
S1	S2	S3	S4	S5	MP
2	**2**	**1**	**1**	**1**	**0**

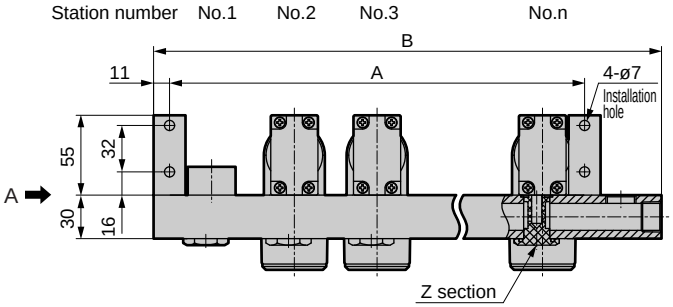
S1 = 1, 6 S2 = 2, 5 S3 = 3
S4 = 7 S5 = 4

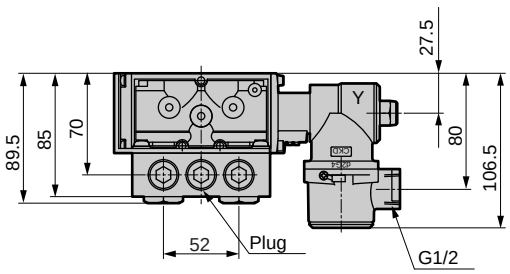
Dimensions CAD

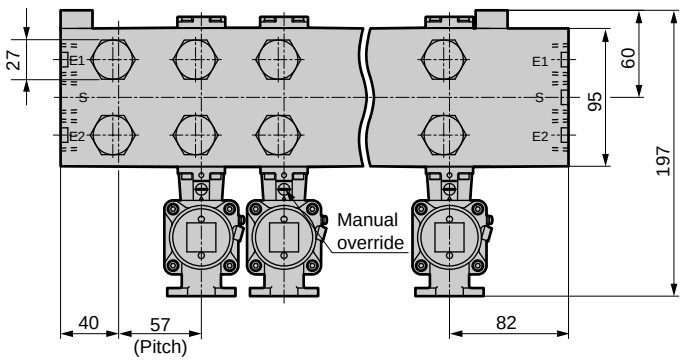
M4F310E-$^{08}_{10}$-TP-$^{\text{CL (common exhaust type)}}_{\text{IL (individual exhaust type)}}$

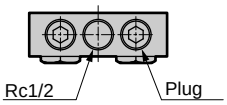
● L bracket attached





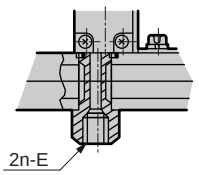






View A
Supply port

This is Z section when individual exhaust



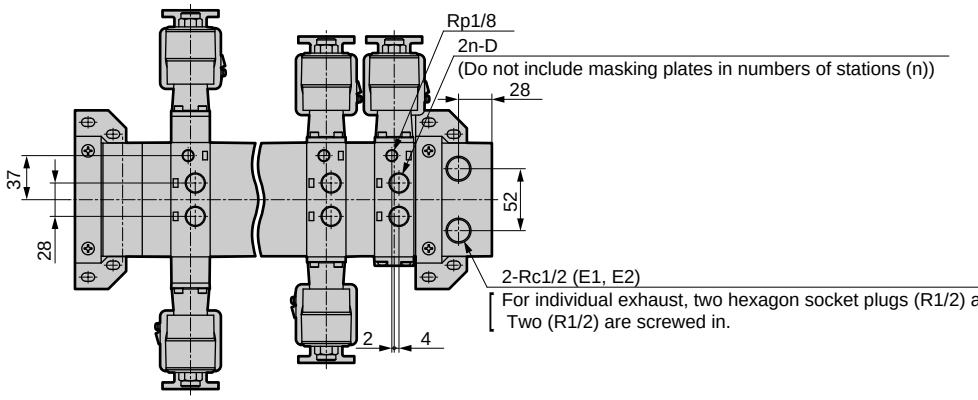
Station number	2	3	4	5	6	7	8	9	10
A	115	172	229	286	343	400	457	514	571
B	179	236	293	350	407	464	521	578	635

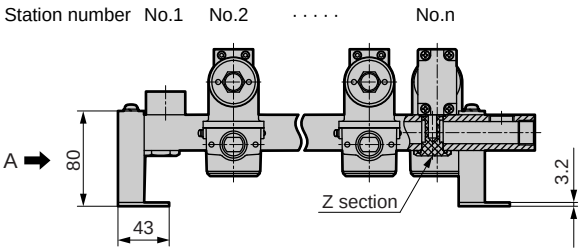
Model no.	D	E	Discrete model No.
4F310E-08	Rp1/4	Rc1/4	**4F310E**
4F320E-08			**4F320E**
4F330E-08			**4F330E**
4F340E-08			**4F340E**
4F350E-08			**4F350E**
4F310E-10	Rp3/8	Rc3/8	
4F320E-10			
4F330E-10			
4F340E-10			
4F350E-10			

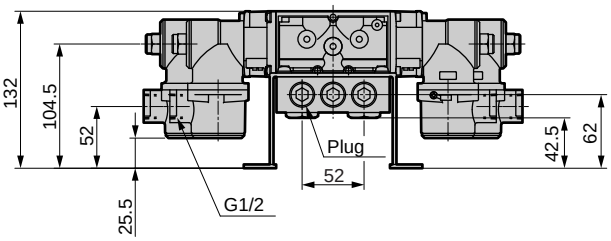
Dimensions

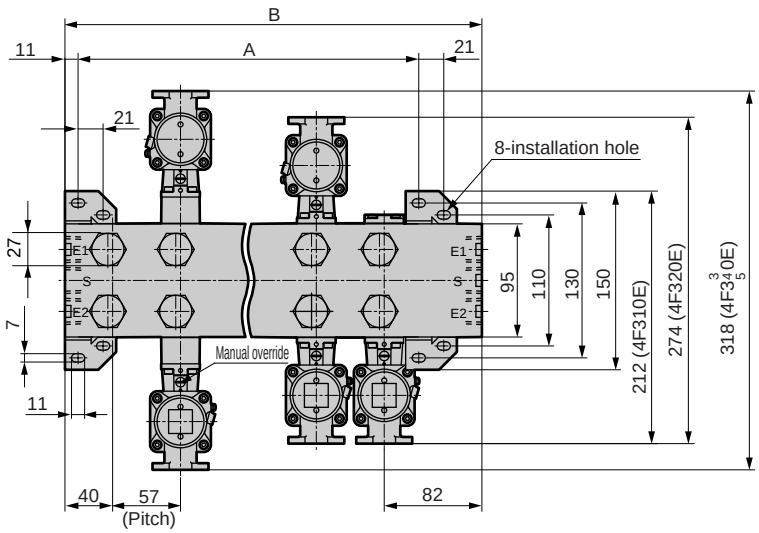
M4F3*0E-$^{08}_{10}$-TP- **CU (common exhaust type)**
IU (individual exhaust type)

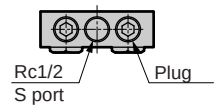
● U bracket attached





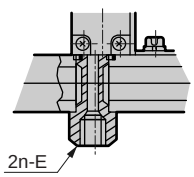






View A
Supply port

This is Z section when individual exhaust

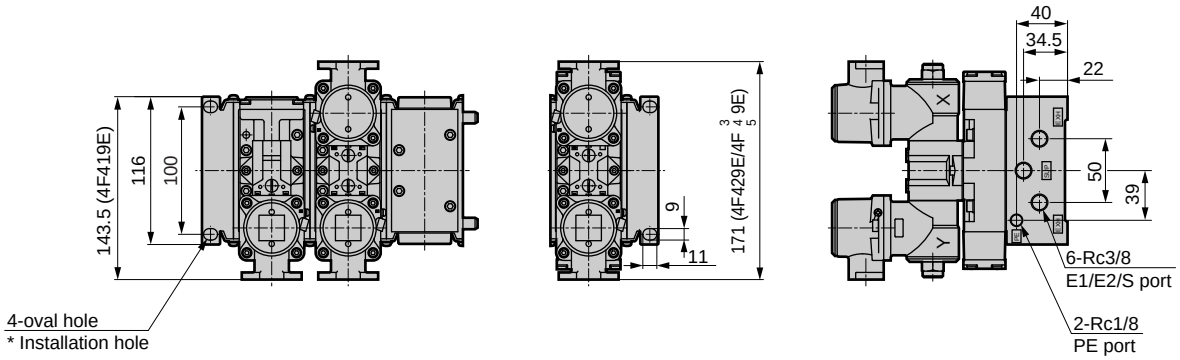


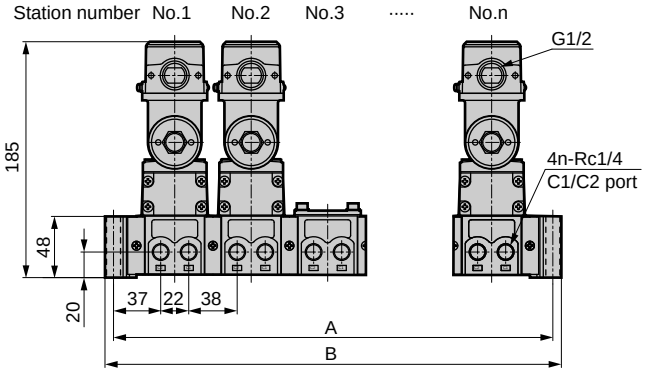
Station number	2	3	4	5	6	7	8	9	10
A	115	172	229	286	343	400	457	514	571
B	179	236	293	350	407	464	521	578	635

Model no.	D	E	Discrete model No.
4F310E-08	Rp1/4	Rc1/4	**4F310E**
4F320E-08			**4F320E**
4F330E-08			**4F330E**
4F340E-08			**4F340E**
4F350E-08			**4F350E**
4F310E-10	Rp3/8	Rc3/8	
4F320E-10			
4F330E-10			
4F340E-10			
4F350E-10			

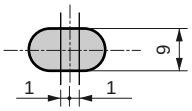
Dimensions CAD

M4F4*0E-08-TP-*-C





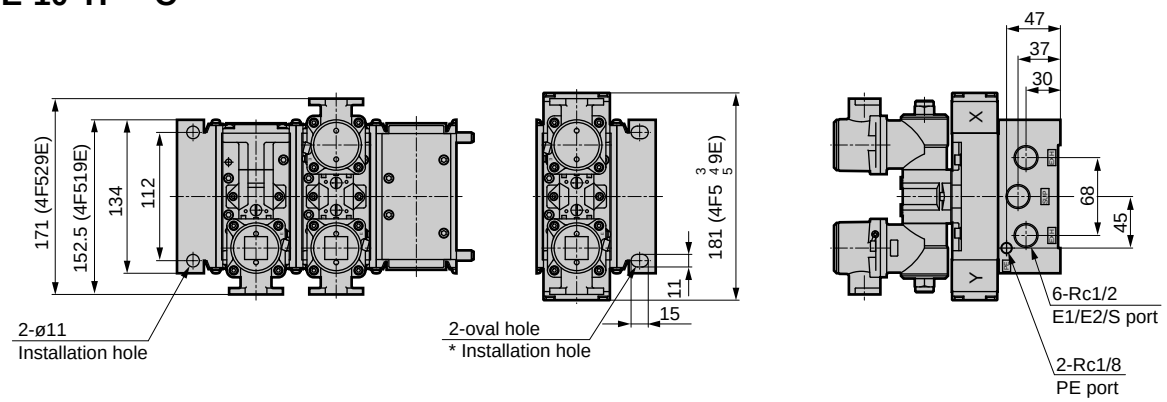
* Enlarged view of installation hole.

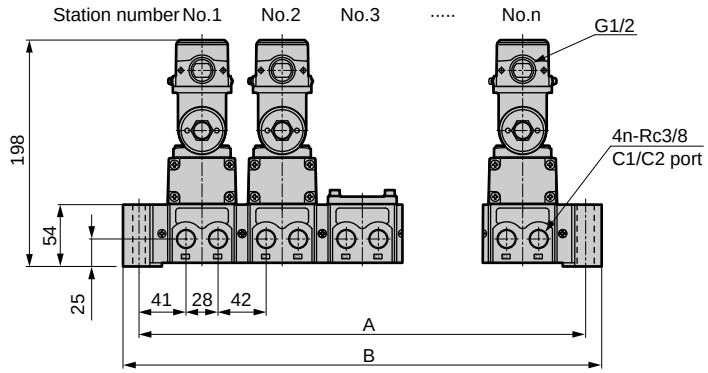


Station number	2	3	4	5	6	7	8	9	10
A	156	216	276	336	396	456	516	576	636
B	169.4	229.4	289.4	349.4	409.4	469.4	529.4	589.4	649.4

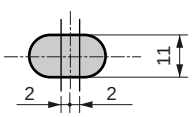
Discrete model no.	
Solenoid valve	**4F419E, 4F429E, 4F439E**
	4F449E, 4F459E

M4F5*0E-10-TP-*-C





* Enlarged view of installation hole.

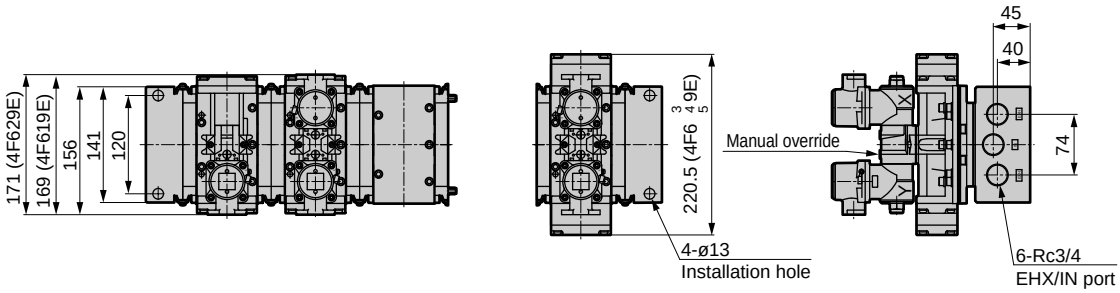


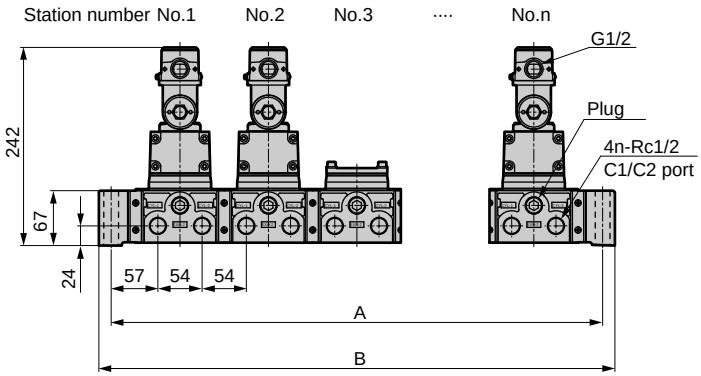
Station number	2	3	4	5	6	7	8	9	10
A	180	250	320	390	460	530	600	670	740
B	208	278	348	418	488	558	628	698	768

Discrete model no.	
Solenoid valve	**4F519E, 4F529E, 4F539E**
	4F549E, 4F559E

Dimensions CAD

M4F6*0E-D15-TP-*-C

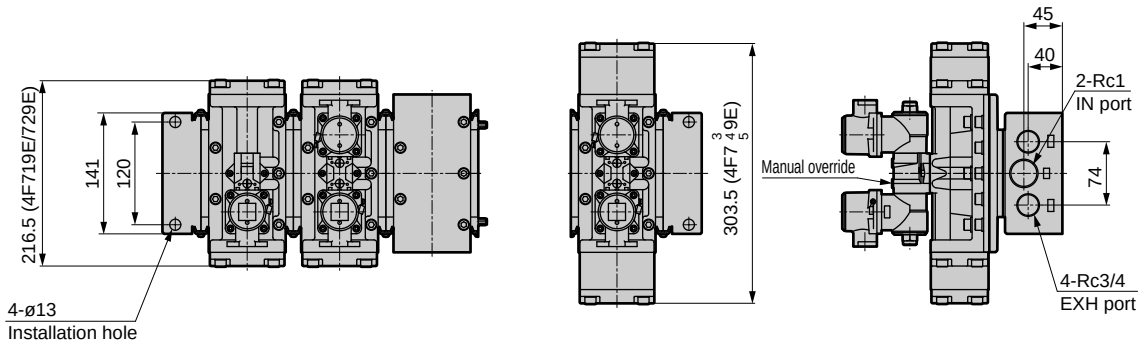


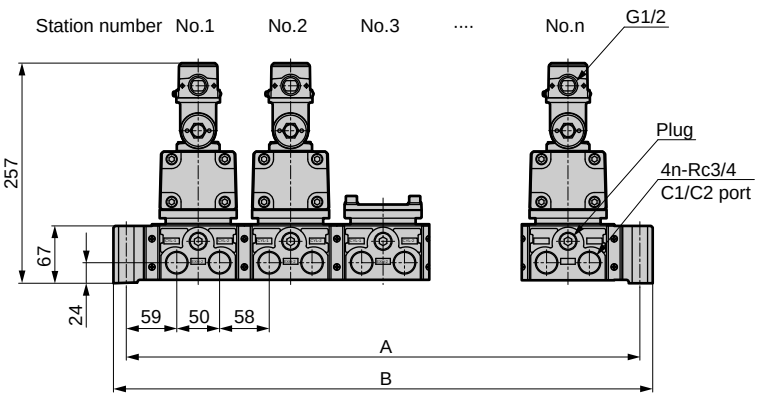


Station number	2	3	4	5	6	7	8	9	10
A	276	384	492	600	708	816	924	1032	1140
B	306	414	522	630	738	846	954	1062	1170

Discrete model no.	
Solenoid valve	**4F619E, 4F629E, 4F639E**
	4F649E, 4F659E

M4F7*0E-E20-TP-*-C





Station number	2	3	4	5	6	7	8	9	10
A	276	384	492	600	708	816	924	1032	1140
B	306	414	522	630	738	846	954	1062	1170

Discrete model no.	
Solenoid valve	**4F719E, 4F729E, 4F739E**
	4F749E, 4F759E