CKD

Compliant with Internationally Consistent Explosion Proof Guidelines, Explosion proof capability Exd II BT4

New product

Pilot-operated explosion proof 5 port valve 4F**0EX series

EXPLOSION PROOF 5 PORT PILOT OPERATED VALVE

Safely usable in hazardous atmosphere Compliant with IEC standard

Compliant with Internationally Consistent Explosion-Proof Guidelines

Explosion-proof capability EXD II BT4

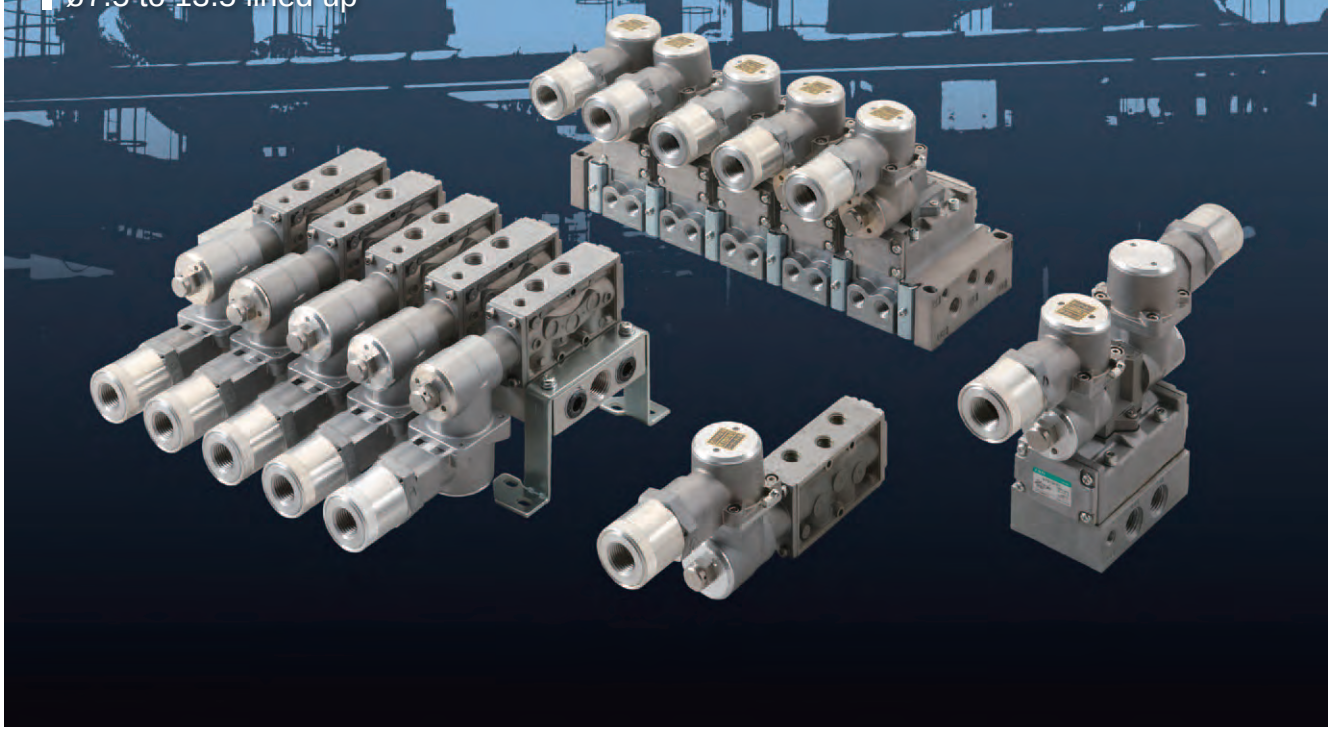
Pressure-resistant explosion-proof construction d
Group II B
Temperature class T4
Accepted No. for model test No.TC20523

Usable outdoors

Protection construction IP65 (dust-proof, jet-proof)

Extended range of cable diameter selection

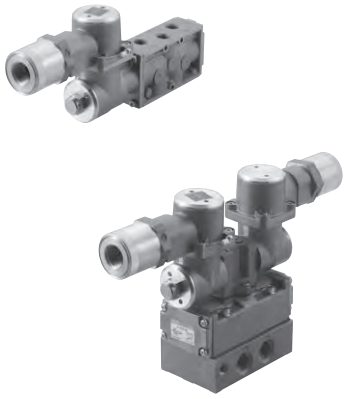
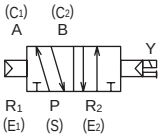
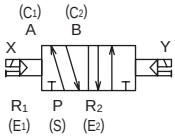
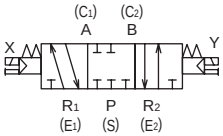
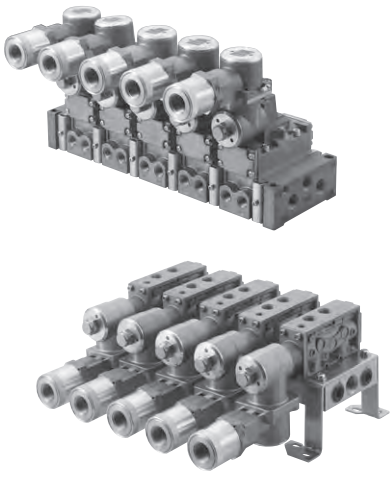
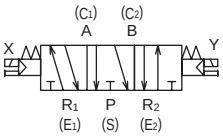
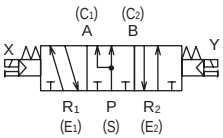
ø7.5 to 13.5 lined up



CKD Corporation

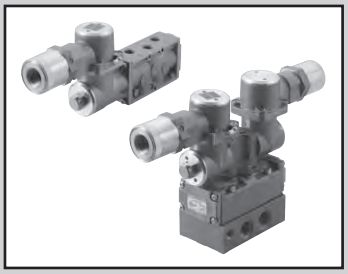
Series variation

4F**0EX series

Series appearance			Model No.	No. of solenoid position JIS symbol	Flow characteristics		Applicable cylinder bore size	
					C [dm³/(s·bar)] Note 1	Effective sectional area S (mm²)		
Discrete component	4F**OEX 	Direct	4F3*0EX	●2-position, single solenoid 	3.9 to 5.8	-	ø63 to ø100	
		Sub plate	4F4*0EX		5.0 to 5.3	-	ø63 to ø100	
			4F5*0EX	●2-position, double solenoid 	9.7 to 10	-	ø80 to ø160	
			4F6*0EX		15 to 18	-	ø140 to ø200	
			4F7*0EX	●3-position, all ports closed 	-	160	ø180 to ø250	
Manifold	M4F**OEX 	Direct	M4F3*0EX		3.9 to 5.8	-	ø63 to ø100	
		Sub plate	M4F4*0EX	●3-position, ABR connection 	5.0 to 5.3	-	ø63 to ø100	
			M4F5*0EX		9.7 to 10	-	ø80 to ø160	
			M4F6*0EX	●3-position, PAB connection 	15 to 18	-	ø140 to ø200	
			M4F7*0EX		-	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						External wire entrance	Heat resistance class	Page for selection
							Female thread								
	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	Rp 1/4	Rp 3/8	Rc 1/4	Rc 3/8	Rc 1/2	Rc 3/4	Protecting tube screw-in type with pressure-resistant packing	H	
	●	●	●	●	●		●	●					●	●	3
	●	●	●	●	●				●	●			●	●	
	●	●	●	●	●					●	●		●	●	
	●	●	●	●	●						●	●	●	●	
	●	●	●	●	●							●	●	●	
	●	●	●	●	●	●	●	●					●	●	13
	●	●	●	●	●	●			●				●	●	
	●	●	●	●	●	●				●			●	●	
	●	●	●	●	●	●					●		●	●	
	●	●	●	●	●	●						●	●	●	



Discrete valve
Pilot-operated explosion proof 5 port pneumatic valve

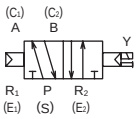
4F**0EX Series

● Applicable cylinder bore size: ø63 to ø250

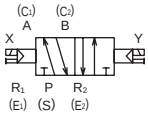
RoHS

JIS symbol

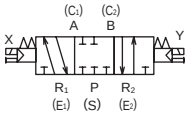
2-position, single solenoid



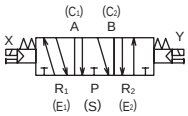
2-position, double solenoid



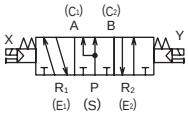
3-position, all ports closed



3-position, ABR connection



3-position, PAB connection



Common specifications

Item	Descriptions
Type of valve / operation method	Pilot-operated soft spool valve
Working fluid	Compressed air
Max. working pressure MPa	1.0
Min. working pressure MPa (Note 2)	Refer to the following individual specifications.
Withstand 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 capability	Exd II BT4
Manual override	Locking type
Vibration resistance m/s^2	50 or less
Shock resistance m/s^2	300 or less
Atmosphere	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.

Electrical specifications

Item			Descriptions
Rated voltage	AC		100 V, 200 V (50/60 Hz)
	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 resistance class			H

Individual specifications

Item			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		Rp 1/4, Rp 3/8	Rc 1/4, Rc 3/8	Rc 3/8, Rc 1/2	Rc 1/2, Rc 3/4	Rc 3/4 to Rc 1
	Exhaust port E		Rp 1/4, Rp 3/8	Rc 1/4, Rc 3/8	Rc 3/8, Rc 1/2	Rc 1/2, Rc 3/4	Rc 3/4 to Rc 1
	Pilot exhaust port (PE)		(Rp 1/8)	(Rc 1/8)	(Rc 1/8)	(Rc 1/4)	(Rc 1/4)
Response time Note 2 ms			100	120	140	400	600
Weight kg	2-position	Single solenoid	0.92	1.27	1.53	2.20	3.74
		Double solenoid	1.48	1.85	2.14	2.82	4.34
	3-position		1.69	2.02	2.40	3.20	5.36

Note 1: NPT threads are usable for the 4F4 to 7 piping port threads. Contact CKD for details.
(Note that the size of the external wire entrance is G1/2. Consult with CKD regarding NPT threads. The same applies to manifolds.)

Note 2: Response speed is the value at supply pressure of 0.5 MPa and in an oil-free ON state. The value will change based on quality of pressure and oil to be supplied.

Flow characteristics

Model No.	Solenoid position		Port size	C [dm³/(s•bar)]	b	S(mm²)
4F3	2-position	Single solenoid	Rp 1/4	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	Rp 3/8	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	Rc 1/4 Rc 3/8	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	Rc 3/8 Rc 1/2	10.0	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	Rc 1/2 Rc 3/4	18.0	0.31	-
		Double solenoid				
	3-position	All ports closed		15.0	0.23	
		A/B/R connection				
		P/A/B connection				
4F7	2-position	Single solenoid	Rc 3/4 Rc 1	-	-	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.

Secondary battery specifications

- The airflow passage and the material of the sliding sections are restricted to allow the unit to be used in the secondary battery manufacturing process. Contact CKD for types.

4F**0EX Series

Discrete valve

How to order

● Explosion proof 5 port pneumatic valve

4F3 1 0EX - 08 - G 10 - P - AC100V

- Ⓐ Model No.
- Ⓑ Solenoid position
- Ⓒ Port size
- Ⓓ Applicable cable diameter
- Ⓔ Option
- Ⓕ Voltage Note 1

Symbol	Descriptions	Ⓐ Model No. 4F3	4F4	4F5	4F6	4F7
Ⓑ Solenoid position						
1	2-position single	●	●	●	●	●
2	2-position double	●	●	●	●	●
3	3-position all ports closed	●	●	●	●	●
4	3-position ABR connection	●	●	●	●	●
5	3-position PAB connection	●	●	●	●	●
Ⓒ Port size						
08	Rp 1/4 (for 4F3), Rc 1/4	●	●			
10	Rp 3/8 (for 4F3), Rc 3/8	●	●	●		
15	Rc 1/2			●	●	
20	Rc 3/4				●	●
25	Rc 1					●
Ⓓ Applicable cable outer diameter						
9	ø7.5 to ø9.5	●	●	●	●	●
10	ø9.5 to ø10.5	●	●	●	●	●
11	ø10.5 to ø11.5	●	●	●	●	●
13	ø11.5 to ø13.5	●	●	●	●	●
Ⓔ Option						
Blank	No option	●	●	●	●	●
P	Mounting leg (L-type fitting) (for 2-position single)	●	●	●	●	●
P1	Mounting leg (U-type fitting)	●				
H	Check valve attached (Applicable to only 3-position all ports closed)	●	●	●	●	●
N	Plug attached (3 port valve)	●	●	●	●	●
R	Position change of manual override	●				
NC	3 way valve with plug assembly (C1:A, E1:R1 assembly)	●	●	●	●	●
NO	3 way valve with plug assembly (C2:B, E2:R2 assembly)	●	●	●	●	●
Ⓕ Voltage						
AC100V	100 VAC (50/60 Hz)	●	●	●	●	●
AC200V	200 VAC (50/60 Hz)	●	●	●	●	●
DC24V	24 VDC	●	●	●	●	●
DC12V	12 VDC	●	●	●	●	●
AC110V	110 VAC (50/60 Hz)	●	●	●	●	●
AC220V	220 VAC (50/60 Hz)	●	●	●	●	●
***Other custom order**						
<AC voltage>						
12 V, 24 V, 48 V		●	●	●	●	●
115 V, 120 V, 125 V		●	●	●	●	●
127 V, 210 V, 230 V		●	●	●	●	●
240 V, 250 V, 380 V		●	●	●	●	●
<DC voltage>						
45 V, 48 V, 80 V		●	●	●	●	●
100 V, 110 V, 125 V, 220 V		●	●	●	●	●

⚠ Note on model no. selection

Note 1: As built-to-order products, only units with the following voltages can be manufactured. (Voltages that are not listed are not approved.)

Voltage	AC [V] (50/60 Hz)	12, 24, 48, 115, 120, 125, 127, 210, 230, 240, 250, 380
	DC [V]	45, 48, 80, 100, 110, 125, 220

Note 2: When you order a coil, please order it as a pilot actuator assembly.

Note 3: Contact CKD for using the unit for vacuum pressurization of an external pilot (K), cylinder port pressurization, or exhaust pressurization.

<Example of model number>

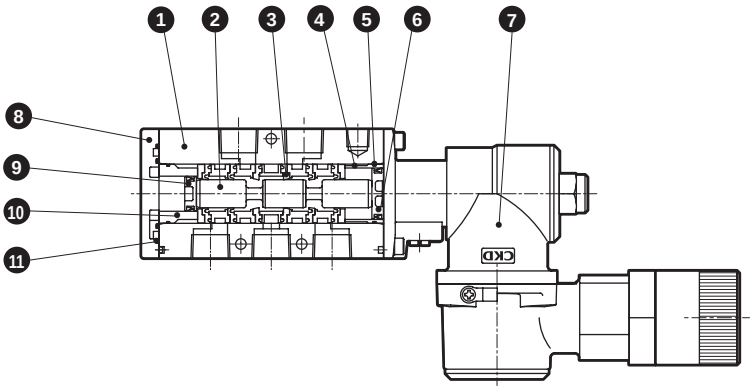
4F410EX-10-G10-P-AC100V

- Ⓐ Model : Pilot-operated explosion proof 5 port valve
- Ⓑ Solenoid position : 2-position single solenoid
- Ⓒ Port size : Rc 3/8
- Ⓓ Applicable cable outer diameter: ø9.5 to 10.5
- Ⓔ Option : Mounting leg U-type fitting
- Ⓕ Voltage : 100 VAC

Internal structure and parts list

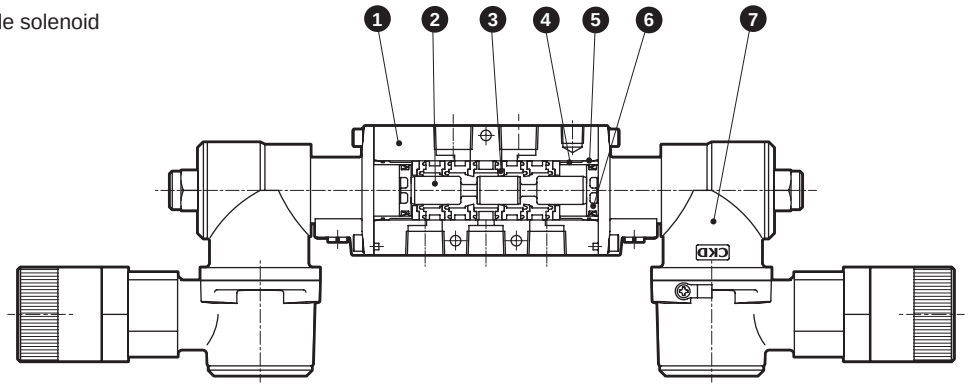
4F310EX

● 2-position single solenoid



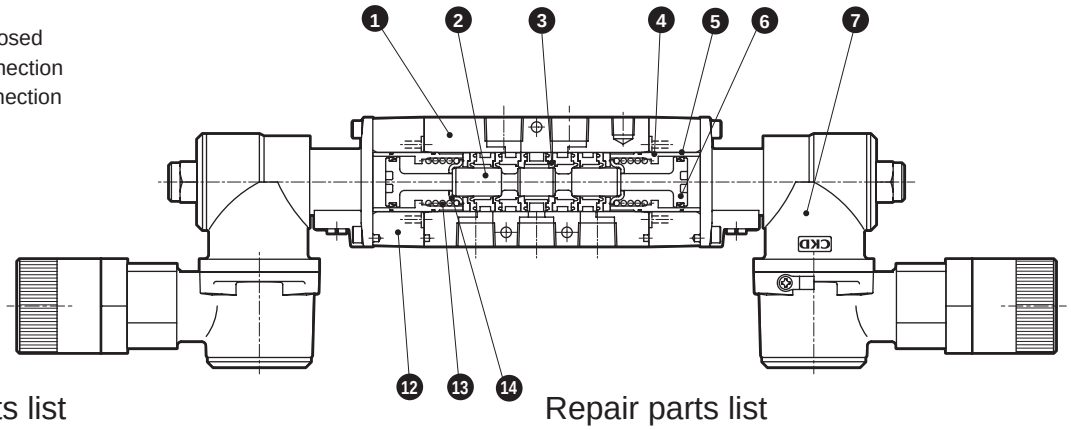
4F320EX

● 2-position double solenoid



4F330EX, 4F340EX, 4F350EX

● 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	Seal assembly	-
4	Cylinder (A) (large)	Aluminum alloy
5	O ring	Nitrile rubber
6	Piston assembly (A) (large)	-
7	Actuator assembly	Note 1
8	Cap	Aluminum alloy die-casting
9	Piston assembly (B) (small)	-
10	Cylinder (B) (small)	Aluminum alloy
11	Gasket	Nitrile rubber
12	Body block	Aluminum alloy die-casting
13	Spring	Piano wire
14	Spring washer	Stainless steel

Repair parts list

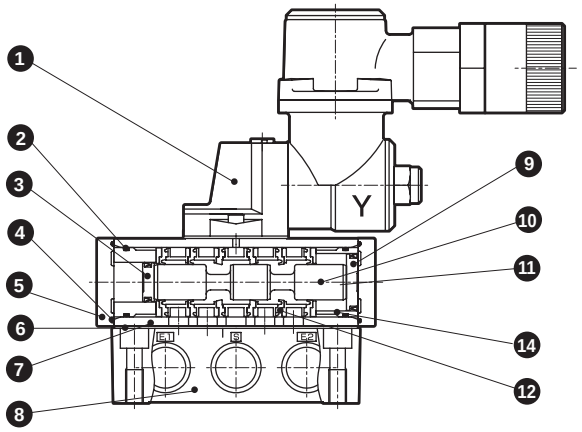
Product No., Component name / Model no.	3 Seal assembly	6 Piston assembly (A) (large)	9 Piston assembly (B) (small)
4F310EX	4F9-106	4F9-104	4F9-103
4F320EX			-
4F330EX		4F9-114	-
4F340EX			-
4F350EX			-

Note 1 (Actuator assembly model)
4F3$\frac{1}{3}$0EX-G Ⓓ-Ⓕ
Select from How to order on page 5.

Internal structure and parts list

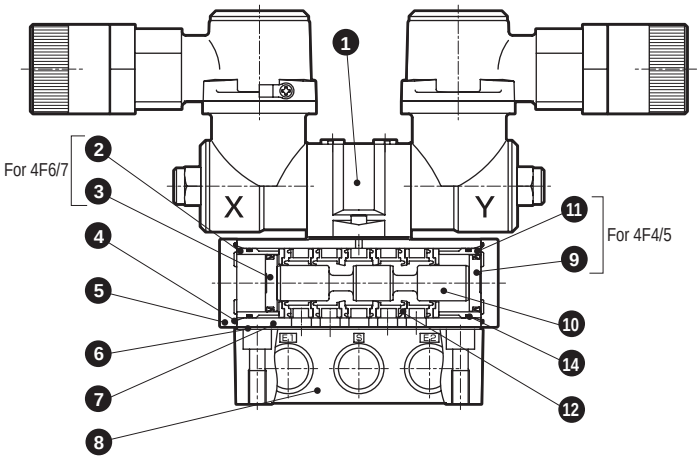
4F[4,5,6,7]10EX

● 2-position single solenoid



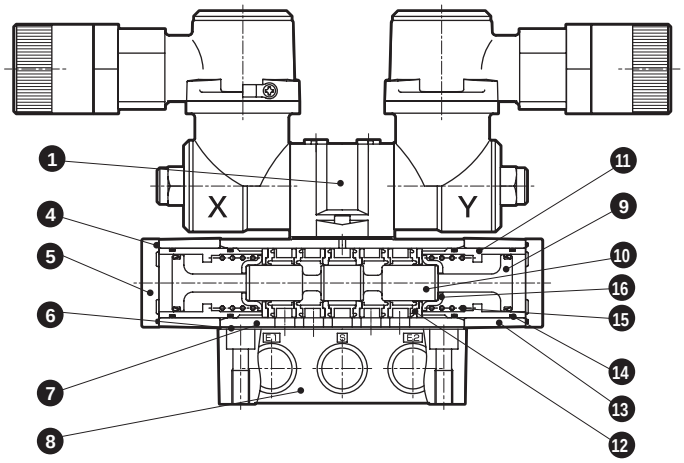
4F[4,5,6,7]20EX

● 2-position double solenoid



4F[4,5,6,7]30EX, 4F[4,5,6,7]40EX
4F[4,5,6,7]50EX

● 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) (small)	Aluminum alloy
3	Piston assembly (B) (small)	-
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) (large)	-
10	Spool	Aluminum alloy
11	Cylinder (A) (large)	Aluminum alloy
12	Seal assembly	-
13	Body block	Aluminum alloy die-casting
14	O ring	Nitrile rubber
15	Spring	Piano wire
16	Spring washer	Stainless steel

Note 1 (Actuator assembly)
4F4[1,2]0EX-G Ⓓ - Ⓕ
Select from How to order on page 5.

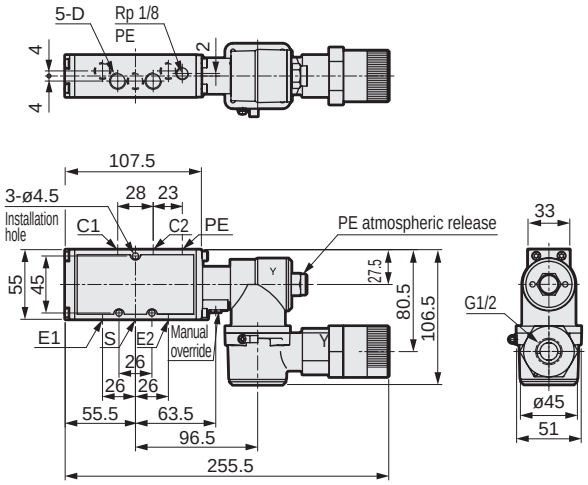
Repair parts list

Product No., Component name / Model No.	9 12 3 Repair kit	9 Piston assembly (A) (large)	12 Seal assembly	3 Piston assembly (B) (small)
4F410EX	4F410-K	4F9-104	4F9-106	4F9-103
4F420EX	4F420-K			-
4F430EX	4F430-K	4F9-114		-
4F440EX				-
4F450EX				-
4F510EX	4F510-K	4F9-108	4F9-107	4F9-109
4F520EX	4F520-K			-
4F530EX	4F530-K	4F9-115		-
4F540EX				-
4F550EX				-
4F610EX	4F610-K	4F9-117	4F9-118	4F9-116
4F620EX	4F620-K	-		
4F630EX	4F630-K	4F9-122		-
4F640EX				
4F650EX				-
4F710EX	4F710-K	4F9-121	4F9-119	4F9-120
4F720EX	4F720-K	-		
4F730EX	4F730-K	4F9-123		-
4F740EX				
4F750EX				-

Dimensions

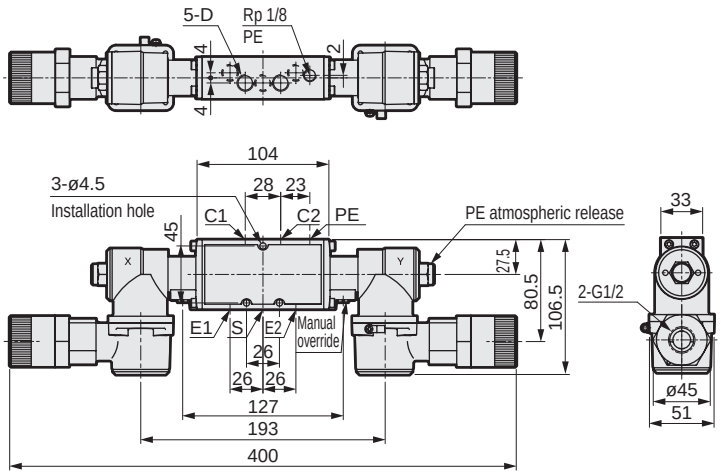
4F310EX

● 2-position single solenoid



4F320EX

● 2-position double solenoid



Model No.	D
*-08	Rp 1/4
*-10	Rp 3/8

4F330EX

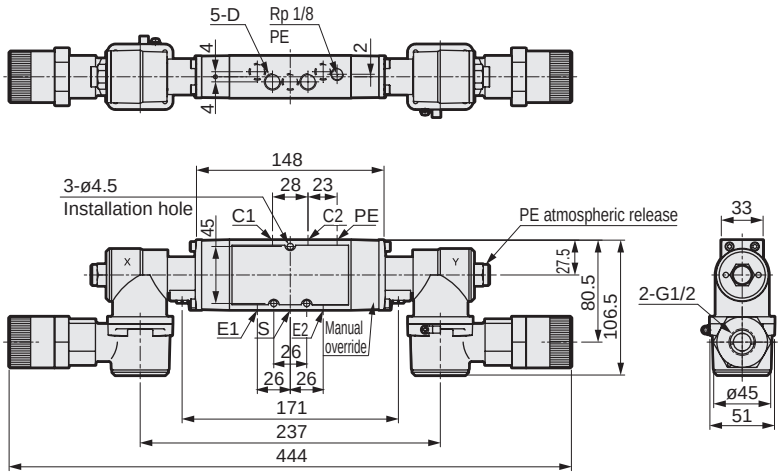
● 3-position all ports closed

4F340EX

● 3-position A/B/R connection

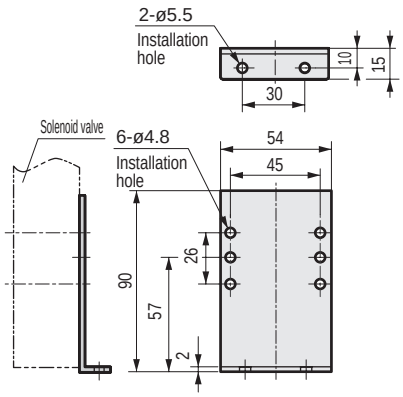
4F350EX

● 3-position P/A/B connection

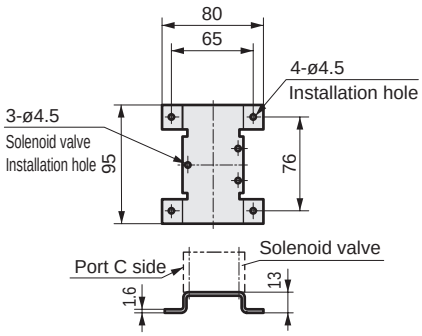


Model No.	D
*-08	Rp 1/4
*-10	Rp 3/8

● L-type mounting leg (P) for single solenoid



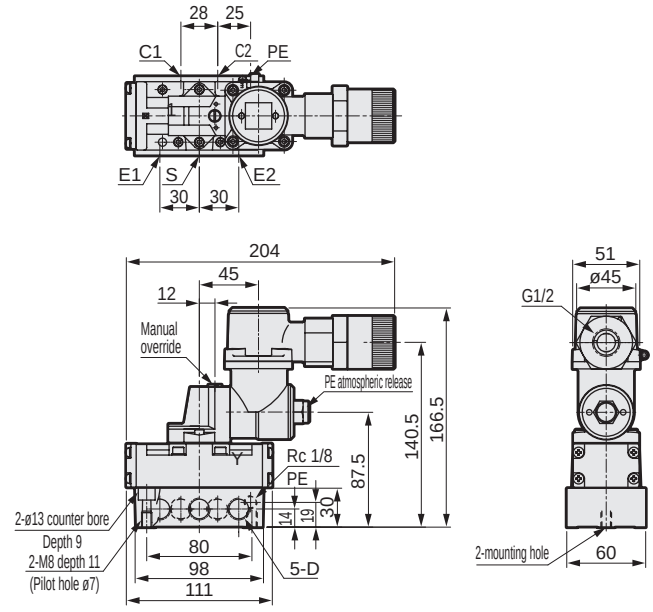
● U-type mounting leg (P1)



dimensions

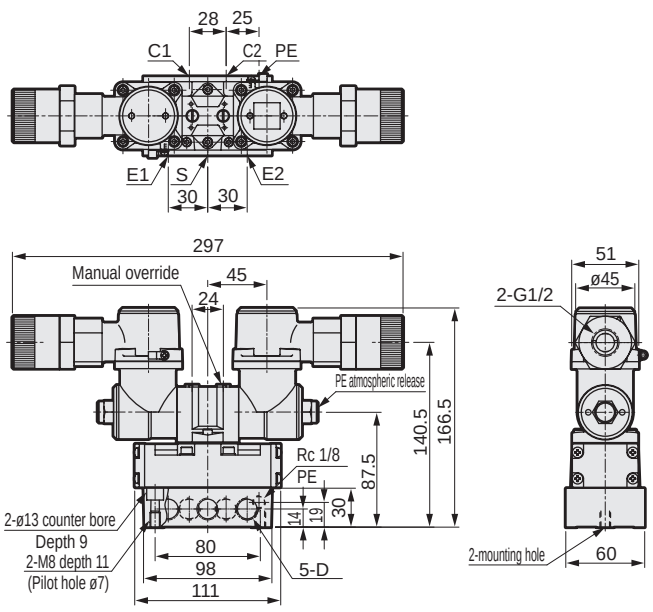
4F410EX

● 2-position single solenoid



4F420EX

● 2-position double solenoid



Model No.	D
*-08	Rc 1/4
*-10	Rc 3/8

4F430EX

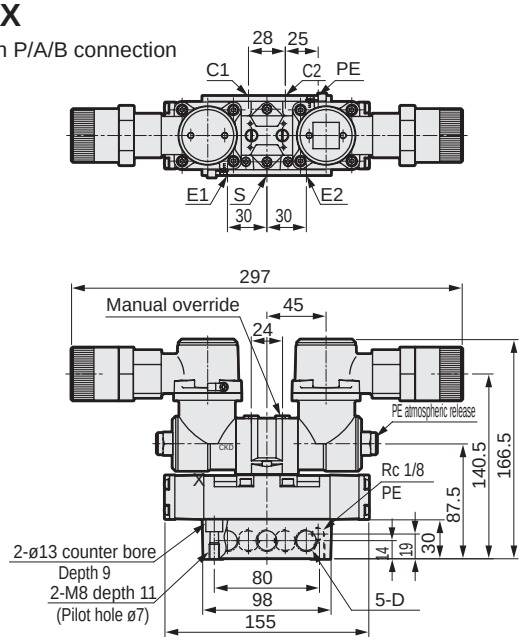
● 3-position all ports closed

4F440EX

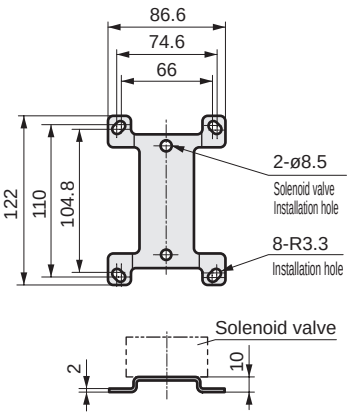
● 3-position A/B/R connection

4F450EX

● 3-position P/A/B connection



● U-type mounting leg (P)

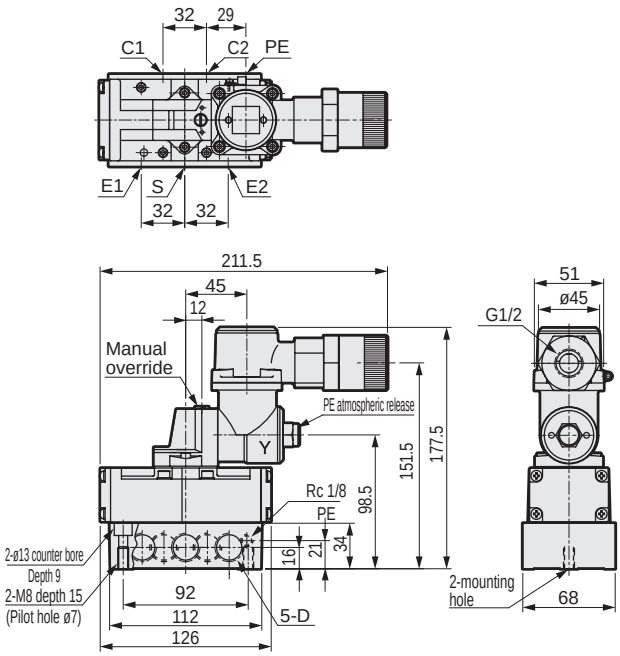


Model No.	D
*-08	Rc 1/4
*-10	Rc 3/8

dimensions

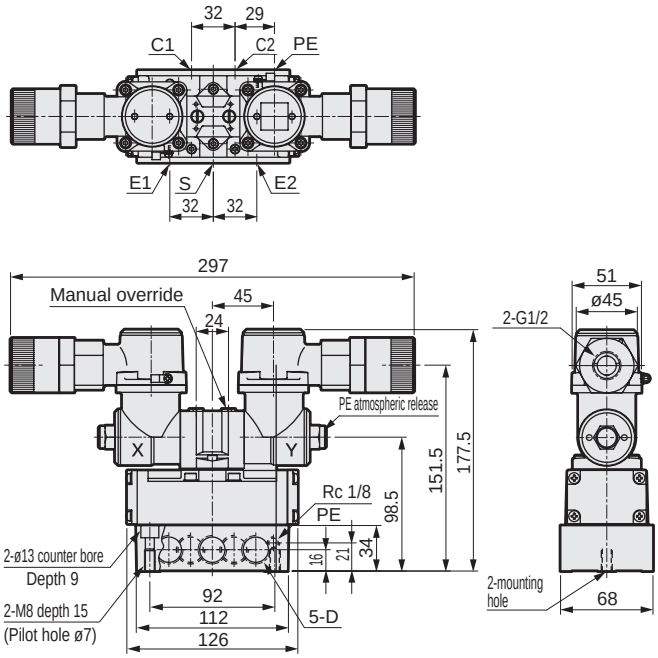
4F510EX

● 2-position single solenoid



4F520EX

● 2-position double solenoid



Model No.	D
*-10	Rc 3/8
*-15	Rc 1/2

4F530EX

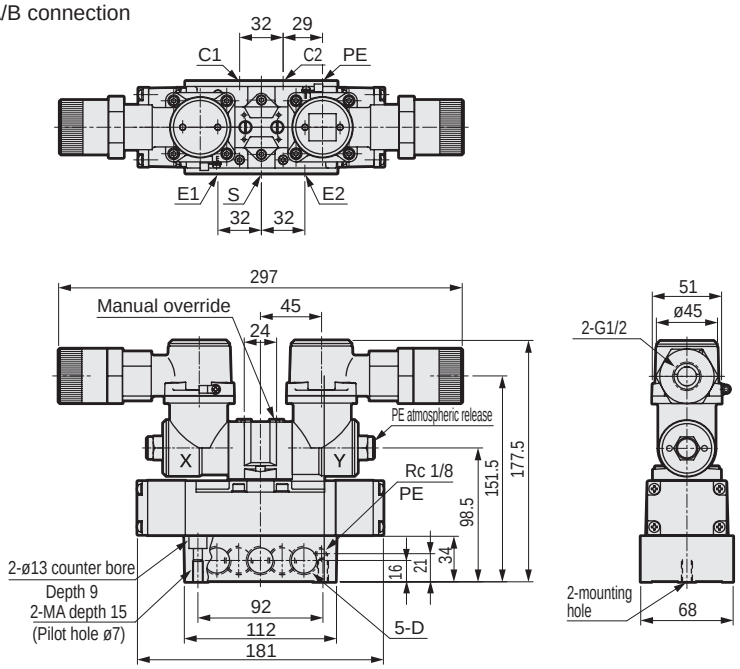
● 3-position all ports closed

4F540EX

● 3-position A/B/R connection

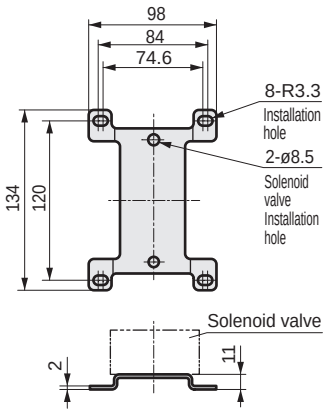
4F550EX

● 3-position P/A/B connection



Model No.	D
*-10	Rc 3/8
*-15	Rc 1/2

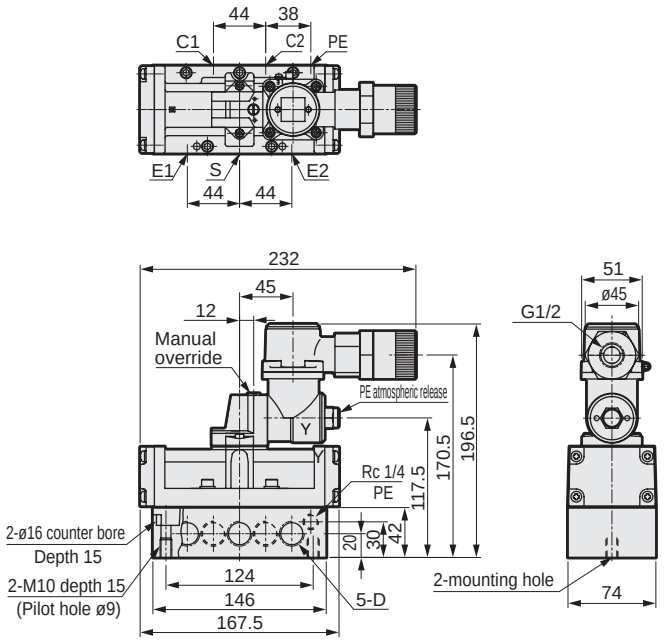
● U-type mounting leg (P)



dimensions

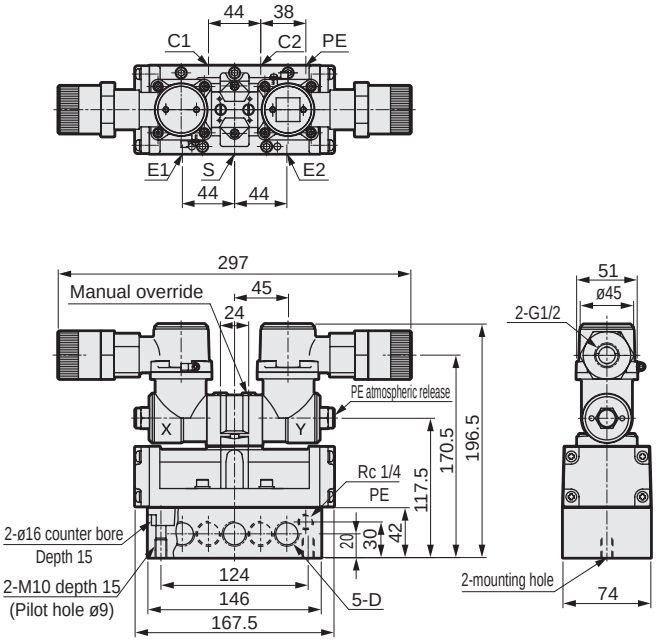
4F610EX

● 2-position single solenoid



4F620EX

● 2-position double solenoid



Model No.	D
*-15	Rc 1/2
*-20	Rc 3/4

4F630EX

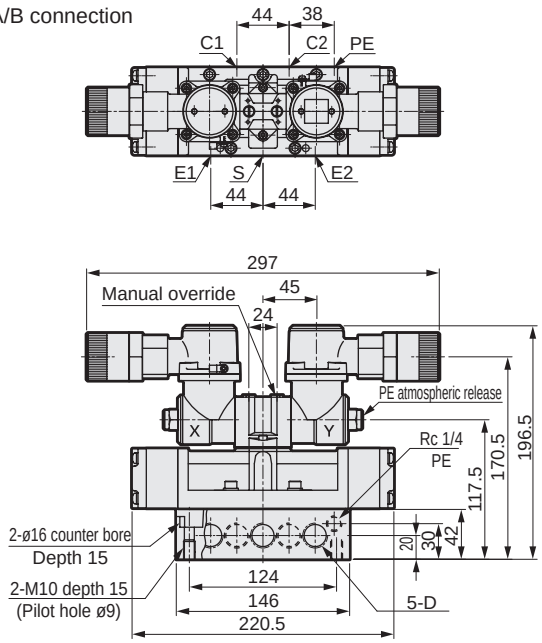
● 3-position all ports closed

4F640EX

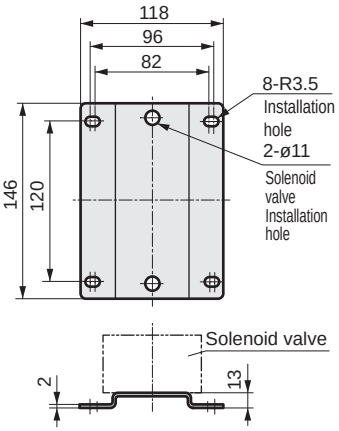
● 3-position A/B/R connection

4F650EX

● 3-position P/A/B connection



● U-type mounting leg (P)

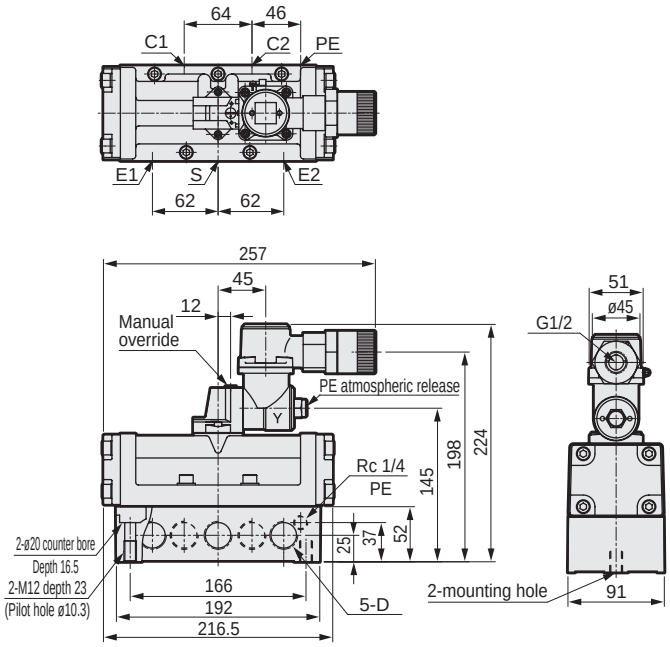


Model No.	D
*-15	Rc 1/2
*-20	Rc 3/4

dimensions

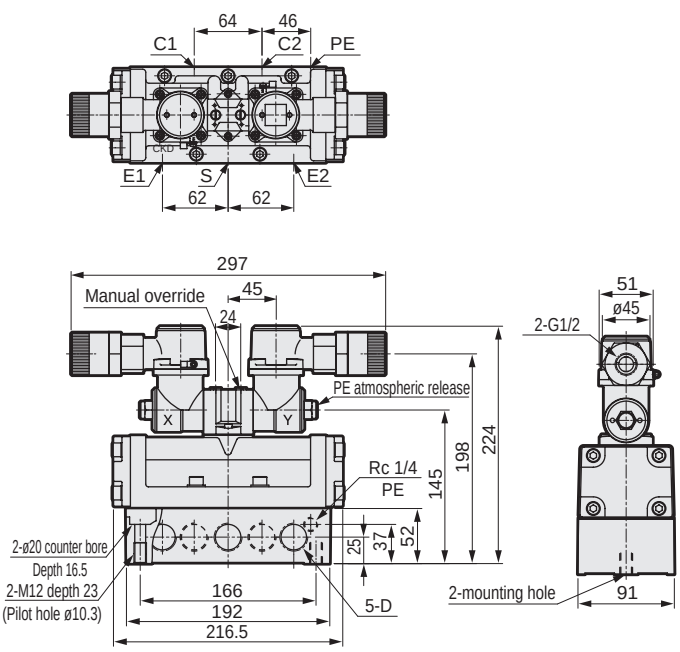
4F710EX

● 2-position single solenoid



4F720EX

● 2-position double solenoid



Model No.	D
*-20	Rc 3/4
*-25	Rc 1

4F730EX

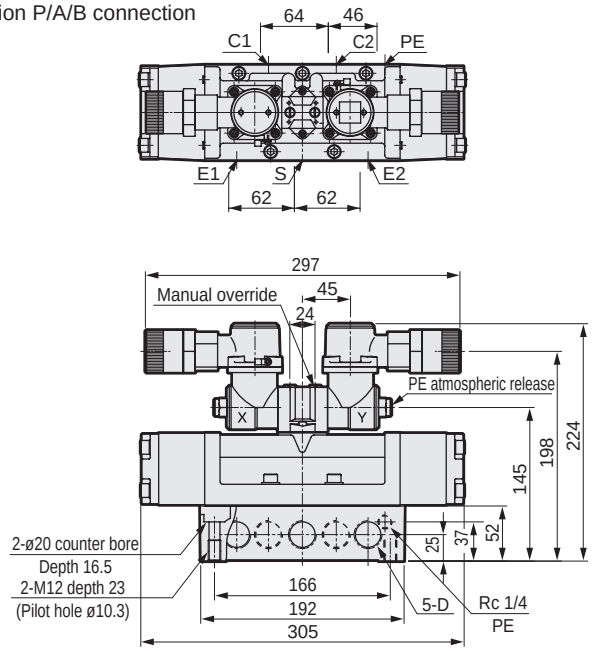
● 3-position all ports closed

4F740EX

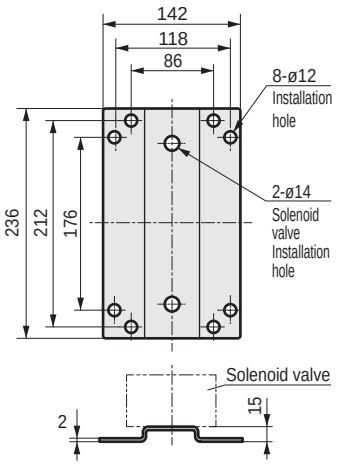
● 3-position A/B/R connection

4F750EX

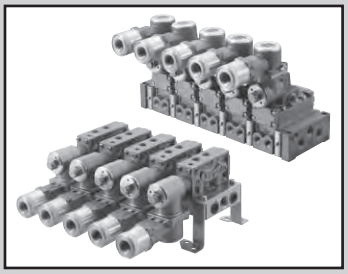
● 3-position P/A/B connection



● U-type mounting leg (P)



Model No.	D
*-20	Rc 3/4
*-25	Rc 1



Individual wiring manifold
Pilot-operated explosion proof 5 port pneumatic valve

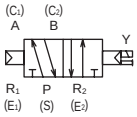
M4F**0EX Series

● Applicable cylinder bore size: ø63 to ø250

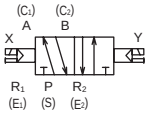
RoHS

JIS symbol

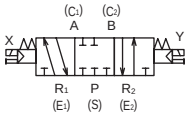
2-position, single solenoid



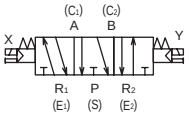
2-position, double solenoid



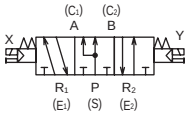
3-position, all ports closed



3-position, ABR connection



3-position, PAB connection



Common specifications

Item	Descriptions
Manifold method	Manifold integral type
Manifold type	Common exhaust
	Individual exhaust (M4F3)
Station no.	2 to 10
Type of valve and operation method	Pilot-operated soft spool valve
Working fluid	Compressed air
Max. working pressure MPa	1.0
Min. working pressure MPa (Note 2)	Refer to the following individual specifications.
Withstand 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 capability	Exd II BT4
Manual override	Locking type
Vibration resistance m/s^2	50 or less
Shock resistance m/s^2	300 or less
Atmosphere	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.

Electrical specifications

Item			Descriptions
Rated voltage	AC		100 V, 200 V (50/60 Hz)
	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 resistance class			H

Individual specifications

Item				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						
Port size	Common exhaust type	Cylinder port C		Rp 1/4, Rp 3/8	Rc 1/4	Rc 3/8	Rc 1/2	Rc 3/4
		Exhaust port E		Rc 1/2	Rc 3/8	Rc 1/2	Rc 3/4	Rc 3/4
		Supply port S		Rc 1/2	Rc 3/8	Rc 1/2	Rc 3/4	Rc 1
	Individual exhaust type	Cylinder port C		Rp 1/4, Rp 3/8	Rc 1/4	Rc 3/8	Rc 1/2	Rc 3/4
		Exhaust port E		Rc 1/4, Rc 3/8	Rc 1/4	Rc 3/8	Rc 1/2	Rc 1/2
		Supply port S		Rc 1/2	Rc 3/8	Rc 1/2	Rc 3/4	Rc 1
Response time Note 1 ms				100	120	140	400	600
Mass calculation formula kg (n: Station no.)	2-position	Single solenoid		1.27×n+0.98	1.52×n+0.47	1.85×n+0.77	3.53×n+1.79	4.84×n+1.79
		Double solenoid		1.83×n+0.98	2.10×n+0.47	2.46×n+0.77	4.15×n+1.79	5.44×n+1.79
	3-position			2.04×n+0.98	2.27×n+0.47	2.72×n+0.77	4.53×n+1.79	6.46×n+1.79

Note 1: Response speed is the value at supply pressure of 0.5 MPa and in an oil-free ON state. The value will change based on quality of pressure and oil to be supplied.

Flow characteristics

Model No.	Solenoid position		Port size	C [dm³/(s•bar)]	b	S(mm²)
4F3	2-position	Single solenoid	Rp 1/4	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	Rp 3/8	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	Rc 1/4	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	Rc 3/8	10.0	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	Rc 1/2	18.0	0.31	-
		Double solenoid				
	3-position	All ports closed		15.0	0.23	
		A/B/R connection				
		P/A/B connection				
4F7	2-position	Single solenoid	Rc 3/4	-	-	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 × C.

M4F**0EX Series

Individual wiring manifold

How to order

● Discrete solenoid valve for manifold (4F3)

4F3 1 0 EX - 08 - G 10 - N — AC100V

*Purchase M4F3-GASKET-KIT together.

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

4F4 1 9 EX - 00 - G 10 — AC100V

● Manifold

M 4F3 1 0 EX - 08 - G 10 - N - 9 - C L - AC100V

S1 S2 S3 S4 S5 MP

Enter the number of solenoid valves used in the case of mix manifold. (Refer to page 16 for examples of the description.)

Ⓐ Model No. Ⓑ Solenoid position Ⓒ Port size Ⓓ Applicable cable outer diameter Ⓔ Option Ⓕ Station no. Ⓖ Exhaust type Ⓗ Mounting leg Ⓘ Voltage

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 ABR connection	●	●	●	●	●
5	3-position PAB connection	●	●	●	●	●
8	Mix manifold (when there are multiple solenoid positions)	●	●	●	●	●
Ⓒ Port size						
08	Rp 1/4 (for M4F3), Rc 1/4	●	●			
10	Rp 3/8 (for M4F3) Rc 3/8	●		●		
D15	Rc 1/2				●	
E20	Rc 3/4					●
Ⓓ Applicable cable outer diameter						
9	ø7.5 to ø9.5	●	●	●	●	●
10	ø9.5 to ø10.5	●	●	●	●	●
11	ø10.5 to ø11.5	●	●	●	●	●
13	ø11.5 to ø13.5	●	●	●	●	●
Ⓔ Option						
Blank	No option	●	●	●	●	●
N	Plug attached (3 port valve)	●	●	●	●	●
R	Position change of manual override	●				
NC	3 way valve with plug assembly (C1:A, E1:R1 assembly)	●	●	●	●	●
NO	3 way valve with plug assembly (C2:B, E2:R2 assembly)	●	●	●	●	●
Ⓕ Station no.						
2	2	●	●	●	●	●
to	to					
10	10 stations					
Ⓖ Exhaust type						
C	Common exhaust	●	●	●	●	●
I	Individual exhaust	●				
Ⓗ Mounting leg						
L	L-type fitting (for single)	●				
U	U-type fitting	●				
Ⓘ Voltage						
AC100V	100 VAC (50/60 Hz)	●	●	●	●	●
AC200V	200 VAC (50/60 Hz)	●	●	●	●	●
DC24V	24 VDC	●	●	●	●	●
DC12V	12 VDC	●	●	●	●	●
AC110V	110 VAC (50/60 Hz)	●	●	●	●	●
AC220V	220 VAC (50/60 Hz)	●	●	●	●	●
***Other custom order**						
<AC voltage>						
12 V, 24 V, 48 V		●	●	●	●	●
115 V, 120 V, 125 V		●	●	●	●	●
127 V, 210 V, 230 V		●	●	●	●	●
240 V, 250 V, 380 V		●	●	●	●	●
<DC voltage>						
45 V, 48 V, 80 V		●	●	●	●	●
100 V, 110 V, 125 V, 220 V		●	●	●	●	●

⚠ Note on model no. selection

Note 1: As built-to-order products, only units with the following voltages can be manufactured.
(Voltages that are not listed are not approved.)

Voltage	AC [V] (50/60 Hz)	12, 24, 48, 115, 120, 125, 127, 210, 230, 240, 250, 380
	DC [V]	12, 45, 48, 80, 100, 110, 125, 125, 220

Note 2: Contact CKD for using the unit for vacuum pressurization of an external pilot (K), cylinder port pressurization, or exhaust pressurization.

<Example of model number>

M4F310EX-08-G9-N-7-CL-AC100V

Ⓐ Model : Explosion proof 5 port pneumatic valve manifold
Ⓑ Solenoid position : 2-position single solenoid
Ⓒ Port size : Rp 1/4
Ⓓ Applicable cable outer diameter: ø7.5 to 9.5
Ⓔ Option : Plug attached
Ⓕ Station number : 7-station
Ⓖ Exhaust type : Common exhaust
Ⓗ Mounting leg : L-type fitting
Ⓘ Voltage : 100 VAC

How to order masking plate kit

M4F3 - 08 - MP-KIT

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

Ⓐ Model No. Ⓑ Port size

Ⓐ Model No.
M4F3
M4F4
M4F5
M4F6
M4F7

Ⓑ Port size		
Symbol	Descriptions	Model No.
08	Rc 1/4	M4F3
10	Rc 3/8	
Blank	Rc 1/4	M4F4
Blank	Rc 3/8	M4F5
D15	Rc 1/2	M4F6
E20	Rc 3/4	M4F7

How to order mix manifold

M 4F3 8 0EX - 08 - G 9 - N - 7 - C U - AC100V - S1 S2 S3 S4 S5 MP: **2 2 1 1 1 0**

Mix manifold "8"

*Refer to the previous page for other model indications.

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

How to indicate mix manifold model numbers

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

e.g.: 2-position single solenoid -> S1

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

Indicate the quantity.

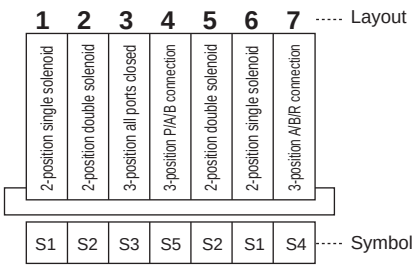
Symbol	Function (Solenoid position)
S1	2-position single solenoid
S2	2-position double solenoid
S3	3-position all ports closed
S4	3-position A/B/R connection
S5	3-position P/A/B connection
MP	Masking plate

② Enter the function (solenoid position) and layout position in the remark field with 6 digit.

Solenoid position = X, Xth station (The left side when viewed from the piping port is the first station.)

e.g.: S1 = 1, 6 (2-position single solenoid is specified for 1st and 6th stations.)

<Example of model number>
In the case of 7 stations



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

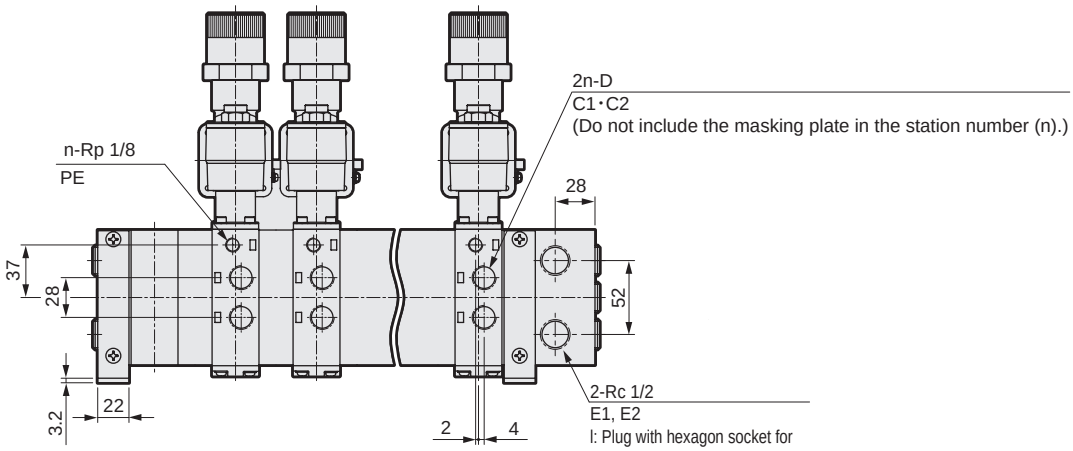
M4F380EX-08-G9-N-7-CU-AC100V - S1 S2 S3 S4 S5 MP: **2 2 1 1 1 0**

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

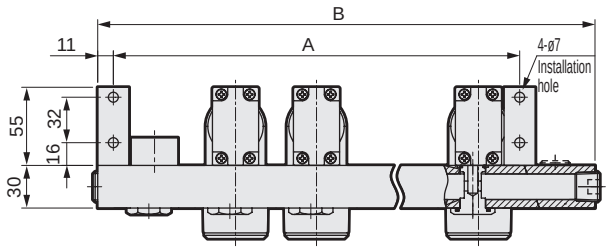
dimensions

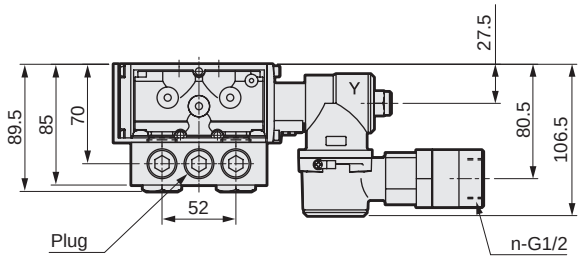
M4F310EX- 08/10 -G*- CL (Common exhaust type) / IL (Individual exhaust type)

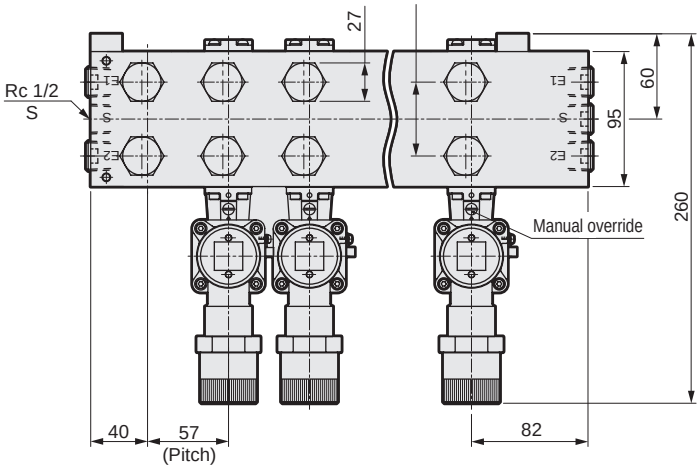
● L-type fitting



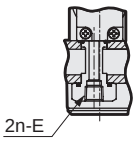
Station no. No.1 No.2 No.3 ····· No.n







I: Section Z for individual exhaust



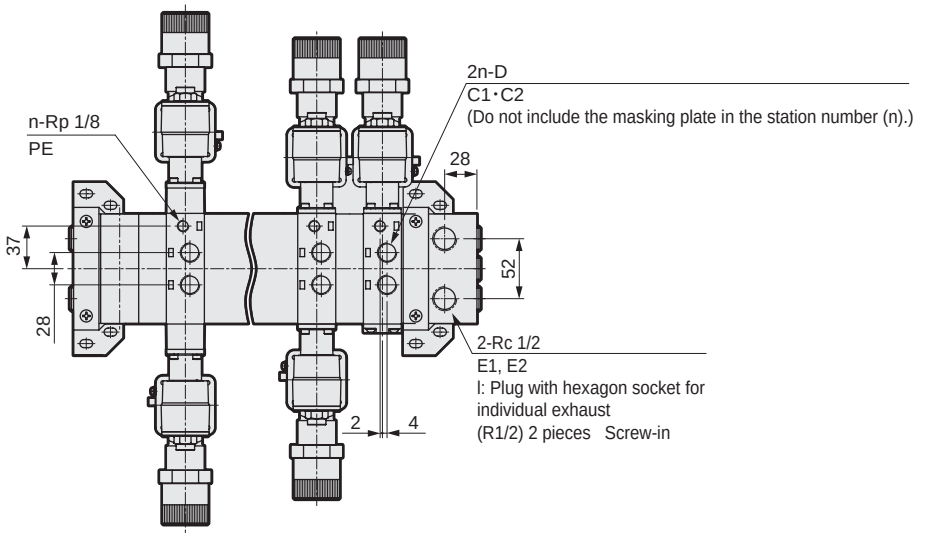
Station no.	2	3	4	5	6	7	8	9	10
A	115	172	229	286	343	400	457	514	571
B	179	236	293	350	407	464	521	578	635

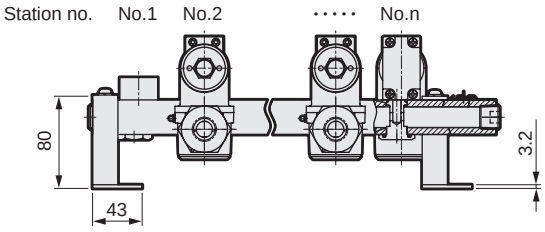
Model No.	D	E	Discrete manifold model no.
4F310EX-08	Rp 1/4	Rc 1/4	4F310EX 4F320EX 4F330EX 4F340EX 4F350EX
4F320EX-08			
4F330EX-08			
4F340EX-08			
4F350EX-08			
4F310EX-10	Rp 3/8	Rc 3/8	
4F320EX-10			
4F330EX-10			
4F340EX-10			
4F350EX-10			

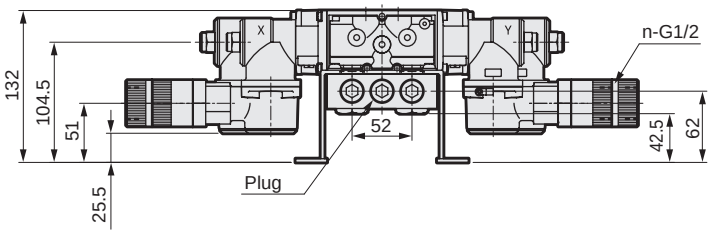
dimensions

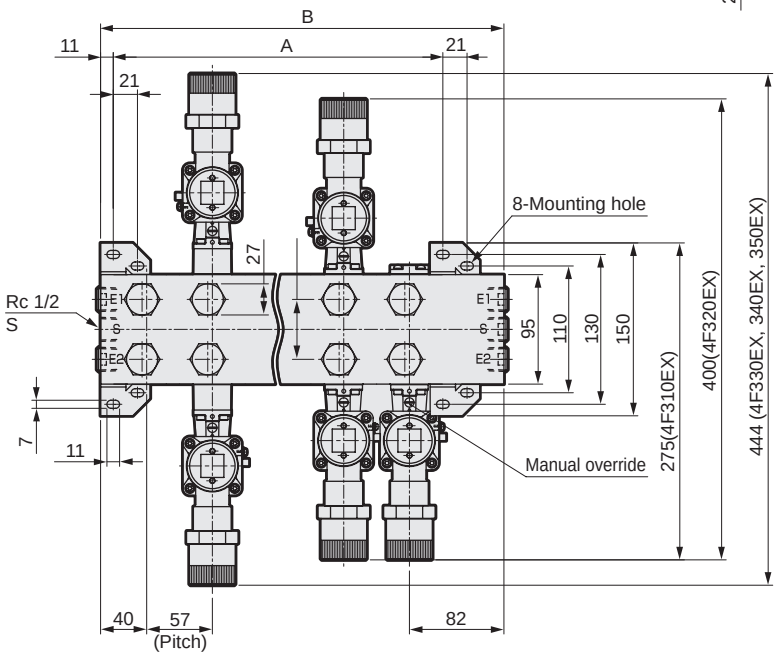
M4F3*0EX- $\frac{08}{10}$**-G*-** **CU (Common exhaust type)**
IU (Individual exhaust type)

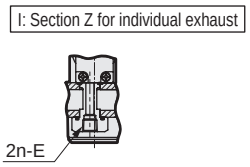
● U-type fitting included











Station no.	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

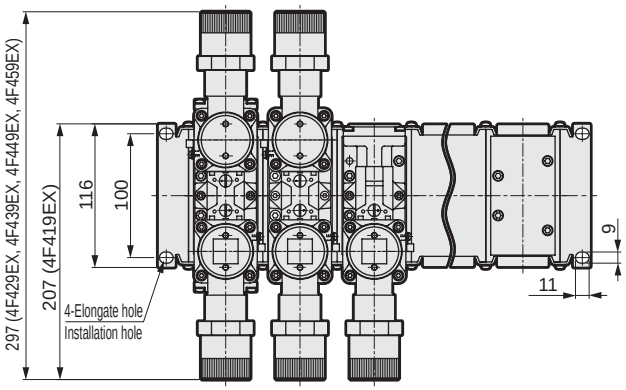
Model No.	D	E	Discrete manifold model no.
4F310EX-08	Rp 1/4	Rc 1/4	4F310EX 4F320EX 4F330EX 4F340EX 4F350EX
4F320EX-08			
4F330EX-08			
4F340EX-08			
4F350EX-08			
4F310EX-10	Rp 3/8	Rc 3/8	
4F320EX-10			
4F330EX-10			
4F340EX-10			
4F350EX-10			

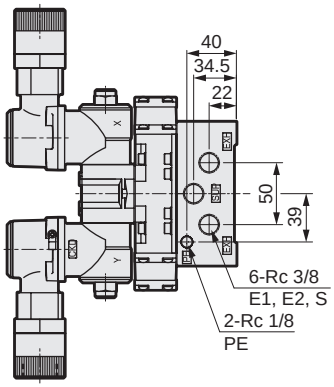
M4F4*0EX, M4F5*0EX Series

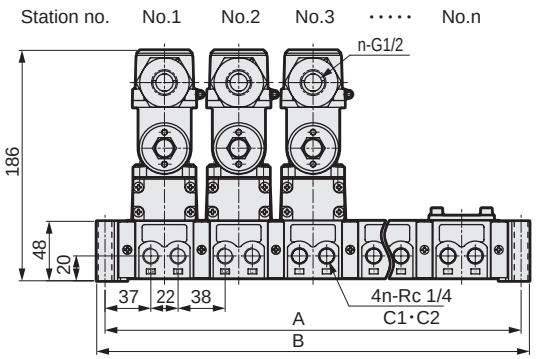
Individual wiring manifold; sub-plate piping

dimensions

M4F4*0EX-08-G*-*-C



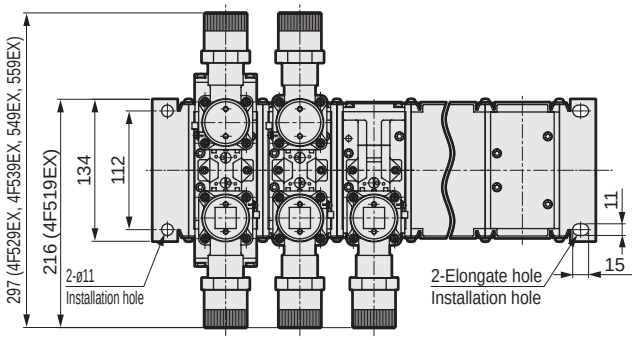


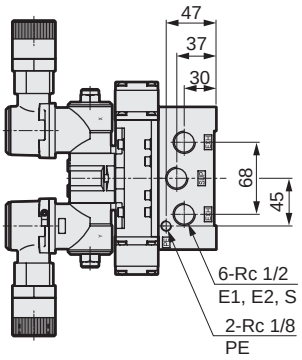


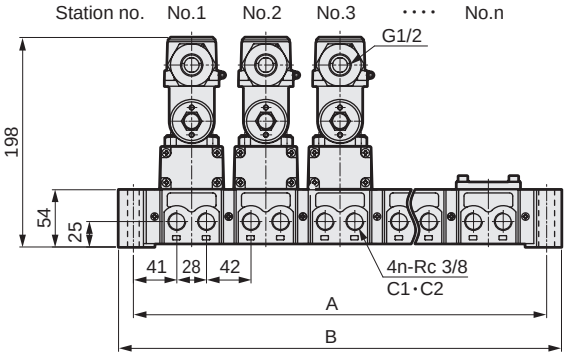
Station no.	2	3	4	5	6	7	8	9	10
A	156	216	276	336	396	456	516	576	636
B	169.4	229.4	289.4	349.4	409.4	469.4	529.4	589.4	649.4

Discrete manifold model no.	
Solenoid valve	**4F419EX, 4F429EX, 4F439EX**
	4F449EX, 4F459EX

M4F5*0EX-10-G*-*-C





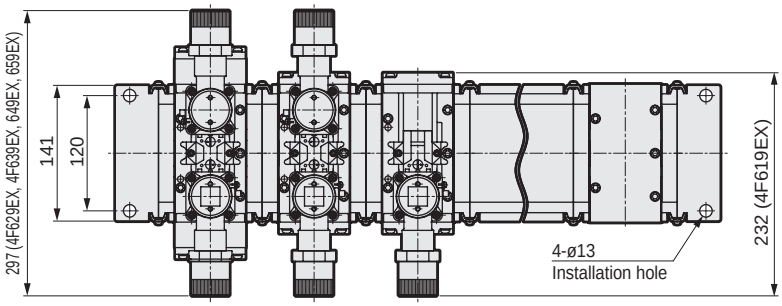


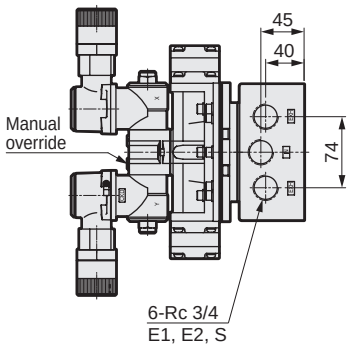
Station no.	2	3	4	5	6	7	8	9	10
A	180	250	320	390	460	530	600	670	740
B	208	278	348	418	488	558	628	698	768

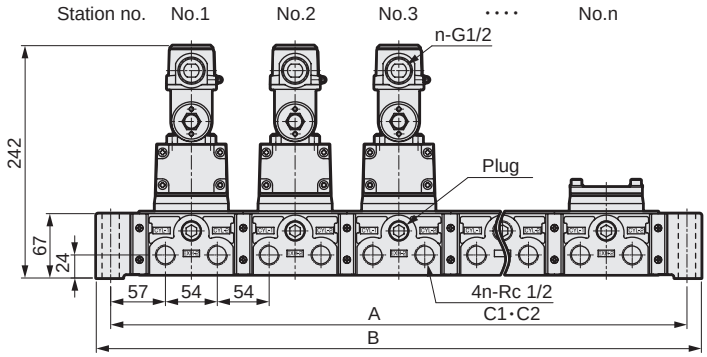
Discrete manifold model no.	
Solenoid valve	**4F519EX, 4F529EX, 4F539EX**
	4F549EX, 4F559EX

dimensions

M4F6*0EX-15-G*-*-C



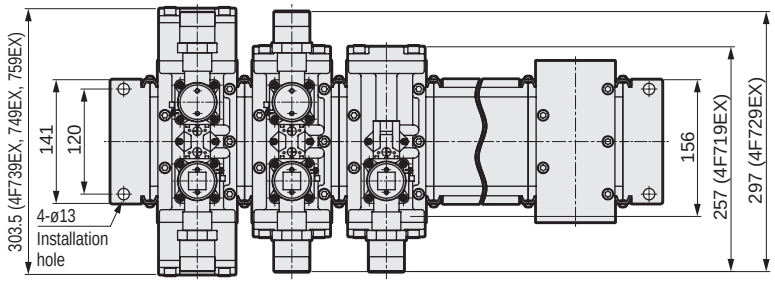


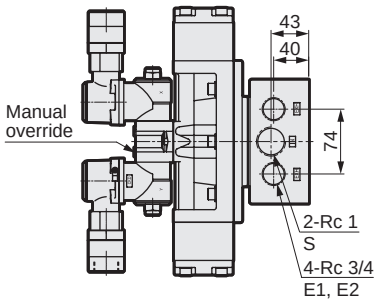


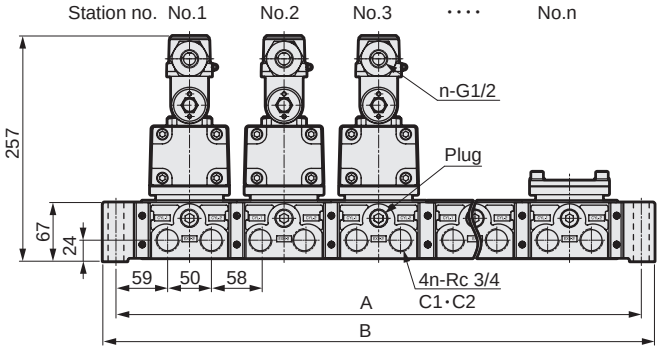
Station no.	2	3	4	5	6	7	8	9	10
A	276	384	492	600	708	816	924	1032	1140
B	306	414	522	630	738	846	954	1062	1170

Discrete manifold model no.	
Solenoid valve	4F619EX, 4F629EX, 4F639EX 4F649EX, 4F659EX

M4F7*0EX-20-G*-*-C







Station no.	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 manifold model no.	
Solenoid valve	4F719EX, 4F729EX, 4F739EX 4F749EX, 4F759EX

Safety precautions

Always read this section before starting use.

When designing and manufacturing a device using CKD products, the manufacturer is obligated to check that device safety mechanism, pneumatic control circuit, or water control circuit and the system operated by electrical control that controls the devices is secured.
It is important to select, use, handle, and maintain the product appropriately to ensure that the CKD product is used safely.
Observe warnings and precautions to ensure device safety.
Check that device safety is ensured, and manufacture a safe device.

Warning

1 This product is designed and manufactured as a general industrial machine part.
It must be handled by an operator having sufficient knowledge and experience in handling.

2 Use this product in accordance with specifications.

This product must be used within its stated specifications. Do not attempt to modify or additionally machine the product.
This product is intended for use as a general-purpose industrial device or part. It is not intended for use outdoors or for use under the following conditions or environment.
(Note that this product can be used when CKD is consulted prior to use and the customer consents to CKD product specifications. The customer must provide safety measures to avoid risks in the event of problems.)

❶ Use for special applications including nuclear energy, railway, aircraft, marine vessel, vehicle, medicinal devices, devices or applications coming into contact with beverages or foodstuffs, amusement devices, emergency shutoff circuits, press machine, brake circuits, or for safeguard.
❷ Use for applications where life or assets could be adversely affected, and special safety measures are required.

3 Observe corporate standards and regulations, etc., related to the safety of device design and control, etc.

ISO 4414, JIS B 8370 (Pneumatic system rules)
JFPS2008 (Principles for pneumatic cylinder selection and use)
Including High Pressure Gas Maintenance Law, Occupational Safety and Sanitation Laws, other safety rules, body standards and regulations, etc.

4 Do not handle, pipe, or remove devices before confirming safety.

❶ Inspect and service the machine and devices after confirming safety of the entire system related to this product.
❷ Note that there may be hot or charged sections even after operation is stopped.
❸ When inspecting or servicing the device, turn off the energy source (air supply or water supply), and turn off power of the facility. Discharge any compressed air from the system, and pay attention to possible leakage of water and electricity.
❹ When starting or restarting a machine or device that incorporates pneumatic components, make sure that the system safety, such as pop-out prevention measures, is secured.

5 Observe warnings and cautions on the pages below to prevent accidents.

■ The safety cautions are ranked as “DANGER”, “WARNING” and “CAUTION” in this section.

DANGER:	When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, or when there is a high degree of emergency to a warning.
WARNING:	When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.
CAUTION:	When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as “CAUTION” may lead to serious results depending on the situation.
In any case, important information that must be observed is explained.

Disclaimer

1 Term of warranty

“Warranty Period” is 18 months from the first delivery to the customer.

2 Scope of warranty

In case any defect attributable to CKD is found during the Warranty Period, CKD shall, at its own discretion, repair the defect or replace the relevant product in whole or in part, according to its own judgement.
Note that the following faults are excluded from the warranty term:
(1) Product abuse/misuse contrary to conditions/environment recommended in its catalogs/specifications
(2) Failure caused by other than the delivered product
(3) Use other than original design purposes.
(4) Third-party repair/modification
(5) Failure caused by reason that is unforeseeable with technology put into practical use at the time of delivery
(6) Failure attributable to force majeure.
In no event shall CKD be liable for business interruptions, loss of profits, personal injury, costs of delay or for any other special, indirect, incidental or consequential losses, costs or damages.

3 Compatibility confirmation

In no event shall CKD be liable for merchantability or fitness for a particular purpose, notwithstanding any disclosure to CKD of the use to which the product is to be put.

Pneumatic components

Safety precautions

Be sure to read the instructions before use.
Refer to page 59 at the beginning of the book for the general valves.

Specific precautions: Pilot-operated explosion proof 5 port pneumatic valve 4F**0EX series

Design & Selection

⚠ WARNING

- This product can be used in Hazardous Area Zone 1 and Zone 2, where flammable gas or steam is present. It cannot be used in special hazard areas.
- For model selection and installation, follow JIS. C.60079 and Users' Guidelines for Installations for Explosive Atmospheres in General Industry JNIOSH-TR-NO.44 (2012).

⚠ CAUTION

■ Explosive gas and explosion proof construction

The degree of explosive gas danger is classified based on the group and temperature class. 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, group, and temperature class are indicated on explosion proof electrical devices. These symbols must be indicated in this sequence. These symbols indicate which group and temperature class the electrical device has been manufactured for, and indicate which gases can be used. The following examples shows an indication of Exd II BT4 on an explosion proof solenoid valve:

Exd II B T4

- T4 — Temperature class T4
- II B — Group II B
- Exd — Pressure-resistant explosion proof construction

Based on Table 2, this indicates that the valve can be used for a gas with group II B and temperature class T4. This also indicates that explosion proof properties are ensured for gases having a risk lower than this. Temperature class indicates the degree of the risk of ignition, classified into give classes depending on the ignition point, and specifies the maximum surface temperature on the corresponding device (Table 1). The higher the value is, the lower the ignition temperature is, meaning a hazardous gas that can ignite more easily. Group indicates the risk of a fire spreading outside through a narrow clearance and is classified into three grades depending on the clearance. It is indicated with symbols shown in Table 1. This Group can be described as a classification by explosion energy level. The narrower the maximum safety clearance is, the higher the explosion energy of the gas is, meaning a fire is more likely to spread outside through a narrow clearance.

Table 1

Descriptions	Symbol	Specification
Temperature class	T1	Maximum surface temperature 450°C
	T2	300°C
	T3	200°C
	T4	135°C
	T5	100°C
	T6	85°C
Group	II A	Maximum safety clearance 0.9 mm or more
	II B	More than 0.5 and less than 0.9
	II C	0.5 mm or less

Table 2

Temperature class / Group	T1	T2	T3	T4	T5
II A	Acetone Ammonia Carbon monoxide Ethane Acetic acid Ethyl acetate Toluene Propane Benzene Methanol Methane	Ethanol Isoamyl acetate Butane Acetic anhydride	Gasoline Hexane	Acetaldehyde	
II B		Ethylene Ethylene oxide		Ethyl ether	
II C	Hydrogen	Acetylene			Carbon bisulfide

■ Hazardous area

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 Zone 0, Zone 1, and Zone 2 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.

● Zone 0 (4F explosion proof series cannot be used.)

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.

e.g.: a. Space over the liquid in a tank or container containing flammable liquid
b. Inside a tank or container containing flammable gas
c. Near the surface of flammable liquid in an open container

● Zone 1

(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.

● Zone 2

(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.

■ Explosion proof certification type number

Explosion proof certification has been obtained with the pilot actuator assembly.
The pilot actuator assembly certification type number and model number are shown below.

(e.g.)

Product Model	Certification type
4F310EX to 4F350EX-G*	EX3-GP
4F410EX to 4F710EX-G*	EX4-GP
4F420EX to 4F720EX-G*	EX5-GP
4F430EX to 4F730EX-G*	
4F440EX to 4F750EX-G*	
4F450EX to 4F750EX-G*	

Installation & Adjustment

1. Piping

⚠ CAUTION

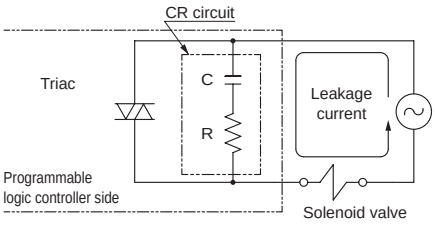
■ A pilot exhaust hole is provided on the pilot actuator. Consult with CKD when using this product where problems could occur from exhaust, such as in a clean room.

2. Wiring

⚠ CAUTION

■ Check leakage current to prevent other fluid control components from malfunctioning due to leakage current.

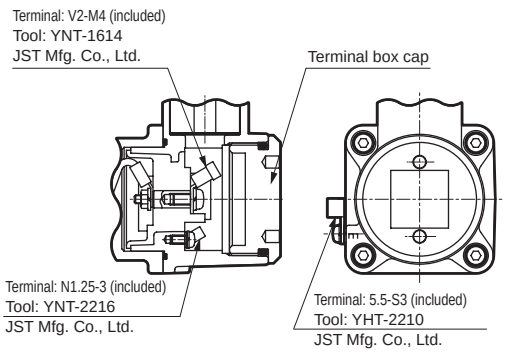
- When using a sequencer that absorbs surge voltage with the CR circuit and protects the switching devices, it should be noted that leak current flows through the CR element, possibly affecting the product operation.



The residual leak current levels of
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 220 VDC 0.6 mA or less
} must be maintained.

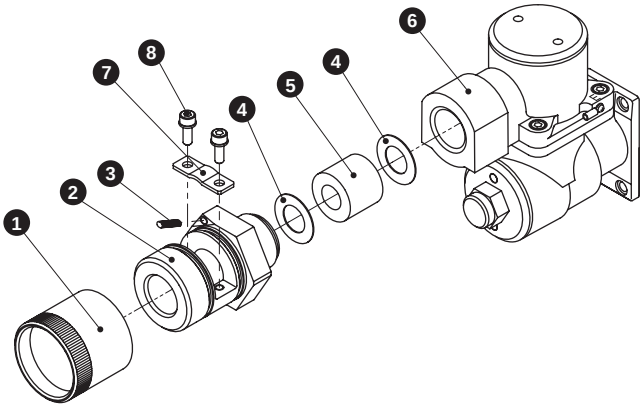
■ About wiring

- Follow the JIS explosion proof guidelines when wiring.
- Remove and wire the terminal box cap with the enclosed disassembly tool. When wiring, use the specified tools shown in the following figure to crimp crimp-on terminals. After wiring, be sure to tighten the terminal box cap completely.
  The disassembling tools should be kept by the user for maintenance.



■ Ground tightening method

1. Run the cable through ① connector cap, ② ground, ④ spacer, ⑤ packing, and ④ spacer and connect it to ⑥ terminal box.
2. Insert ④ spacer, ⑤ packing, and ④ spacer into ⑥ terminal box, and screw in ② ground into ⑥ terminal box to torques of 40 to 44 N·m until no clearance is left.
3. As a locking device for ② ground, be sure to tighten ③ hexagon socket set screw.
4. As a cable holder, tighten ⑧ two hexagon socket bolts and two spring washers to torques of 1.9 to 2.0 N·m.
5. Tighten ① connector cap until it comes into contact with ② ground.

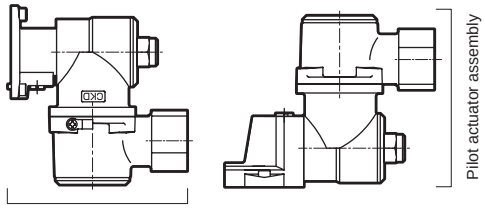


■ Packing is available in the following four sizes (value indicated on the packing).
ø7.5-9.5, ø9.5-10.5, ø10.5-11.5, ø11.5-13.5
Be sure to use a cable with a diameter within the range indicated on the packing. A mismatch between the packing size and the cable diameter compromises the explosion proof capability.

During Use & Maintenance

⚠ WARNING

■ Do not disassemble parts of the pilot actuator other than the ground parts or 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.



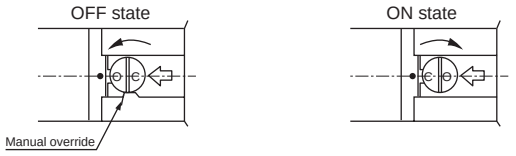
■ About manual override

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 the character with the arrow.

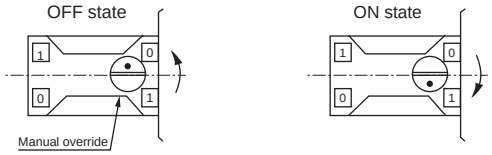
O: ON Turn in the arrow direction until it stops.
(The arrow does not necessarily align with "0".)



● **4F4**, **5**, **6**, **7**

0……OFF Align ● with the number.

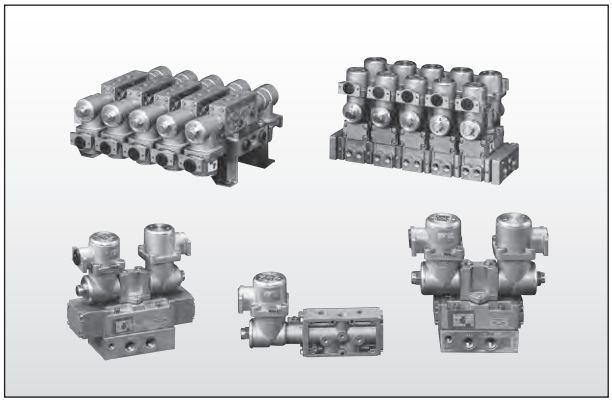
1……ON Turn in the 1 direction until it stops.
(1 does not necessarily match ●.)



Related products

Pilot explosion proof 5 port valve 4F**0E series

Catalog No. CB-023SA



■Explosion proof capability d2G4
Pressure-resistant explosion proof construction, explosion class 2, ignition level G4

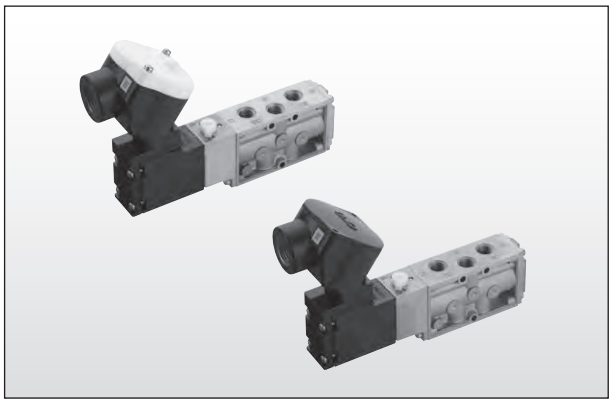
■Drives a cylinder with the diameter up to 250.
4F3 to 6 : C [dm^3/(S·bar)]: 3.9 to 18 *1
4F7 : Effective cross-sectional area: 160 mm^2

■Easy wiring
360° manually rotatable pilot solenoid valve, wire entrance adjustable in increments of 90°
Wide wiring box

■Many variations are provided
Discrete, manifold, locking manual control equipped as standard

Pilot 5 port valve 4F series outdoor option

Catalog No.CC-1070A



■Suitable for outdoor use
Accelerated weathering test (sunshine weather meter): Cleared 1,000 h
Combined cycle corrosion test: Cleared 960 h

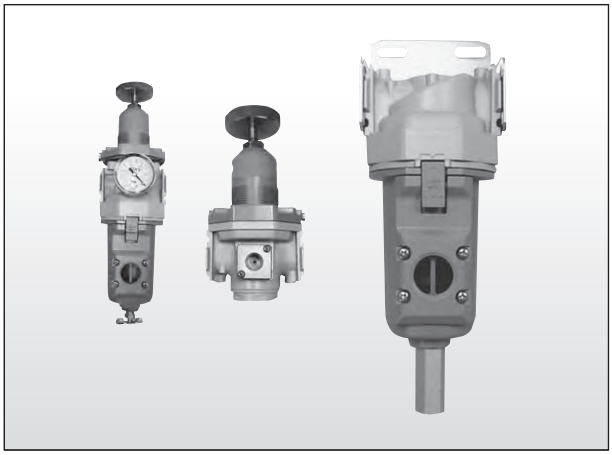
■Conforms to IP65 (compliance standard: IEC/EN 60529)

■Now with a more durable terminal box cover seal structure

■Equipped with stainless steel set screw

Filter/regulator outdoor series

Catalog No. CC-1154A-1



■Accelerated weathering[*1] test of an equivalent of three years passed

■Combined cycle[*2] test of an equivalent of seven years passed

■All-metal appearance

■Stainless-steel bolt specification

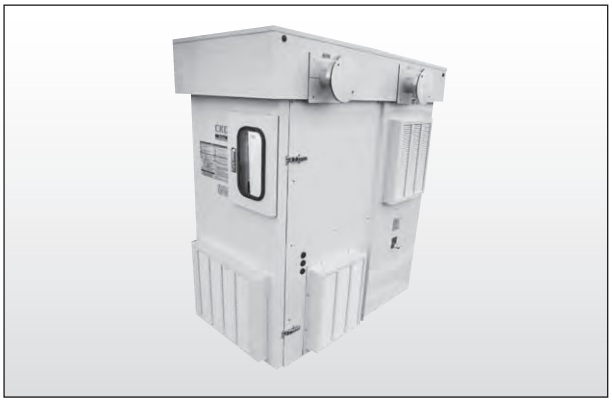
*1: Sunshine weather meter test

*2: Salt spray test

Related products

Outdoor freezing drier GT series

Catalog No. CC-1154A-1



■IP03-compliant

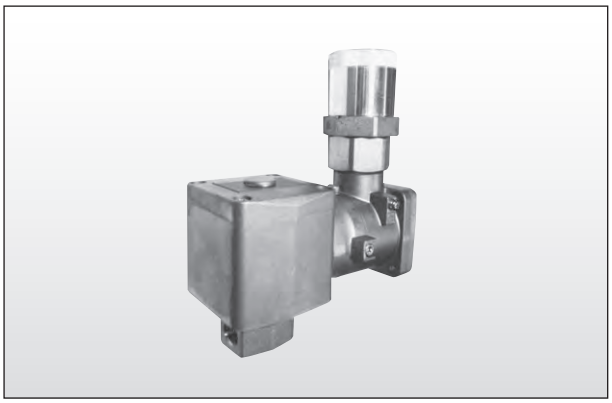
■75 to 450 kW-compliant

■Outdoor specification available with special order

* Consult with CKD for more information.

2/3 port solenoid valve for control of various fluids AB/AG/AP/AD/ADK series

Catalog No. CC-1154A-1



■Pilot operated type and pilot kick type supported

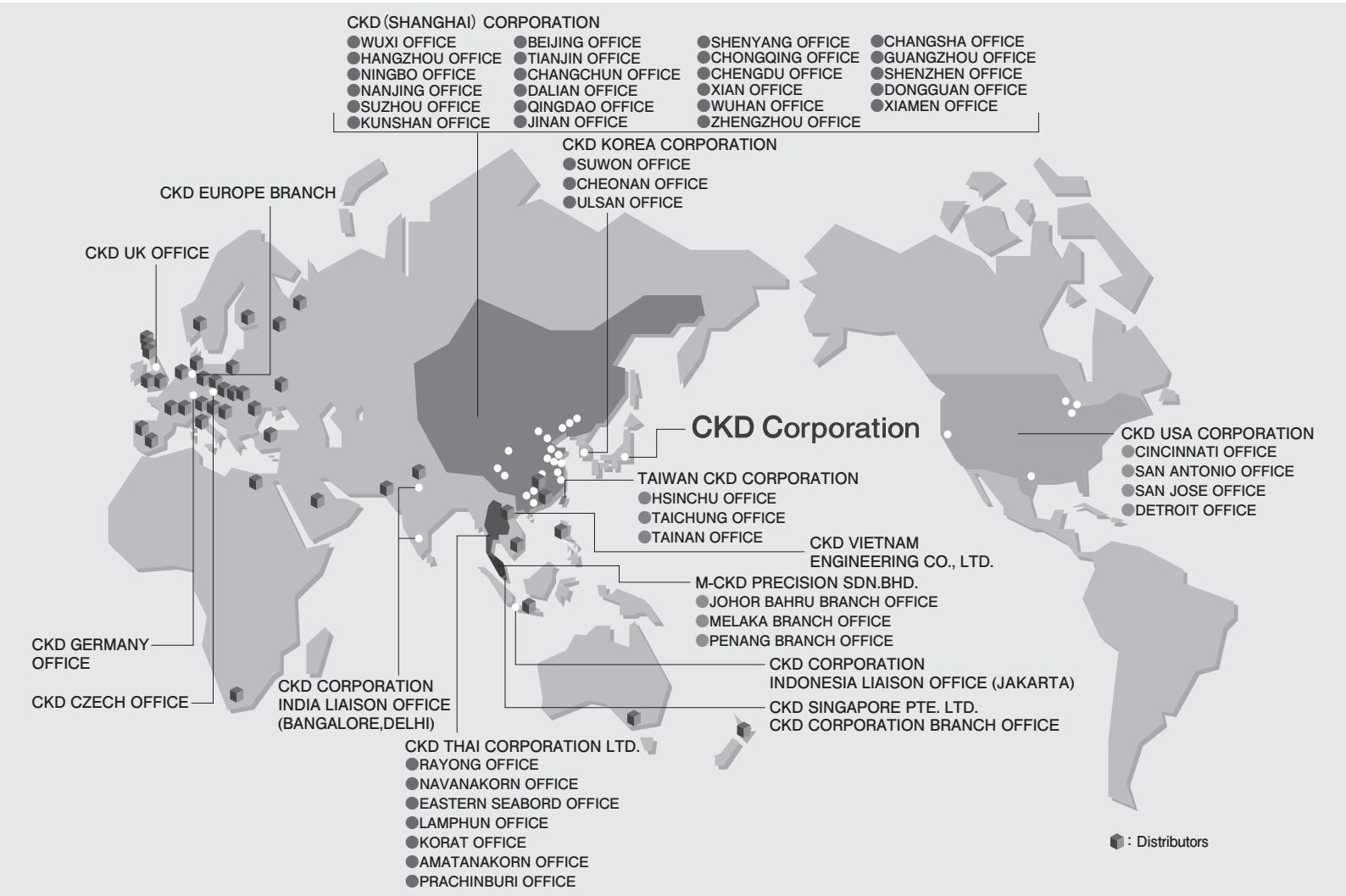
■Valve construction inheriting the essence of Multilex valves, supporting various fluids

■Applicable cable outer diameter extended to ø7.5 to 13.5 mm

■Automatic valve controllable with air or steam

■Explosion proof capability: International standard (IEC) Exd II BT4

WORLD-NETWORK



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