Pilot operated 2 port solenoid valve
(general purpose valve)

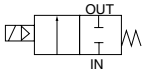
AP11/AP12 Series

- NC (normally closed) type, NO (normally open) type
- Port size: Rc1/4 to Rc1
- Piston structure

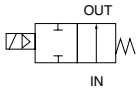
CE RoHS CAD

JIS symbol

- AP11:
  NC (normally closed) type



- AP12:
  NO (normally open) type



Common specifications

Item	Standard specifications	Optional specifications
Working fluid	Air, water, kerosene, oil (50 mm²/s or less)	Steam
Working pressure differential range MPa	0.05 to 1.2 (refer to max. working pressure differential in individual specifications.)	
Max. working pressure MPa	2	1
Withstanding pressure (water) MPa	10	
Fluid temperature (Note 1) ˚C	-10 to 60	-10 to 180
Ambient temperature ˚C	-20 to 60	-20 to 100
Heat proof class	B	H
Atmosphere	Place free of corrosive gas and explosive gas	
Valve structure	Pilot operated poppet, piston structure	
Valve seat leakage (Note 2) cm³/min. (ANR)	0.2 or less (air)	300 or less (air)
Mounting attitude	Free (within working pressure differential range)	
Body, sealant	Bronze, nitrile rubber	Bronze, PTFE

Note 1: No freezing

Note 2: For AP11 (NC (normally closed) type), these values apply to pneumatic pressure 0.05 to 1.2 MPa, and for AP12 (NO (normally open) type), these apply to pneumatic pressure 0.05 to 0.9 MPa.

Individual specifications

Item / Model no.	Port size	Orifice (mm)	Min. working pressure diff. (MPa)	Max. working pressure diff. (MPa)							Rated voltage	Apparent power (VA)				Power consumption (W)		Weight (kg)
				Air		Water, kerosene		Oil (50 mm²/s)		Steam		Holding		Starting		AC	DC	
				AC	DC	AC	DC	AC	DC	AC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz		
NC (normally closed) type																		
AP11-8A	Rc1/4	10	0.05	1.2	0.9	1.0	0.9	0.9	0.9	1.0	100 VAC 50/60 Hz	12	10	17	14	5.2/3.8	11 (8.1) *4 (7) *5	0.9
AP11-10A	Rc3/8	10		1.2	0.9	1.0	0.9	0.9	0.9	1.0								0.9
AP11-15A	Rc1/2	15		1.2	0.6	1.0	0.6	0.6	0.6	1.0	110 VAC 60 Hz	18	15	29	24	6.7/5.7	11 (10.4) *4 (7) *5	1.4
AP11-20A	Rc3/4	20		1.2	0.6	1.0	0.6	0.6	0.6	1.0								1.8
AP11-25A	Rc1	25		1.2	0.6	1.0	0.6	0.6	0.6	1.0	200 VAC 50/60 Hz							2.5
NO (normally open) type																		
AP12-8A	Rc1/4	10	0.05	0.9	0.9	0.9	0.9	0.9	0.9	0.9	220 VAC 60 Hz	22	18	35	29	8.7/6.7	15.5 (14)	1.0
AP12-10A	Rc3/8	10		0.9	0.9	0.9	0.9	0.9	0.9	0.9								1.0
AP12-15A	Rc1/2	15		0.5	0.5	0.5	0.5	0.5	0.5	0.5	12 VDC 24 VDC 48 VDC 100 VDC							1.4
AP12-20A	Rc3/4	20		0.5	0.5	0.5	0.5	0.5	0.5	0.5								1.8
AP12-25A	Rc1	25		0.5	0.5	0.5	0.5	0.5	0.5	0.5								2.5

*1: The model numbers above show the basic port size (Rc). Refer to How to order for other combinations.
*2: Refer to DC column for the maximum working pressure differential of AP11 type coil with diode.
*3: Voltage fluctuation should be within ±10% of the rated voltage.
*4: Power consumption of coil housing 2E/2G/2H is indicated.
*5: Power consumption of coil housing 6C/6E/6G/6H is indicated.

Optional specifications

Sealant	Fluoro rubber		PTFE	
Coil (heat proof class)	B	H	B	H
Fluid temperature (Note 1) ˚C	-10 to 60	-10 to 90	-10 to 60	-10 to 180
Ambient temperature ˚C	-20 to 60	-20 to 100 (Note 3)	-20 to 60	-20 to 100 (Note 3)
Valve seat leakage (Note 2) cm³/min. (ANR)	0.2 or less (air)		300 or less (air)	

Note 1: No freezing

Note 2: For AP11 (NC (normally closed) type), these values apply to pneumatic pressure 0.05 to 1.2 MPa, and for AP12 (NO (normally open) type), these apply to pneumatic pressure 0.05 to 0.9 MPa.

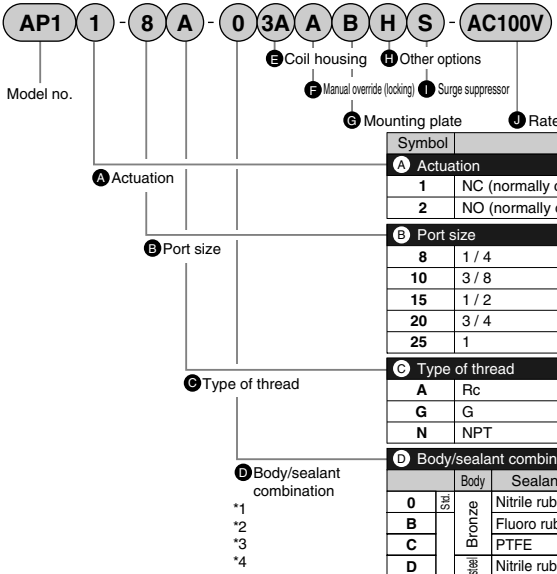
Note 3: The range is -20 to 80˚C when using the HP terminal box with indicator light for the coil housing.

Flow characteristics

Model no.	Port size	Orifice (mm)	Flow characteristics			
			C [dm³/(s·bar)]	b	Cv flow factor	S (mm²)
NC (normally closed) type						
AP11-8A	Rc1/4	10	8.1	0.17	1.4	-
AP11-10A	Rc3/8	10	10	0.19	1.8	-
AP11-15A	Rc1/2	15	21	0.22	4.5	-
AP11-20A	Rc3/4	20	-	-	9.3	162
AP11-25A	Rc1	25	-	-	12.0	231
NO (normally open) type						
AP12-8A	Rc1/4	10	8.1	0.17	1.4	-
AP12-10A	Rc3/8	10	10	0.19	1.8	-
AP12-15A	Rc1/2	15	21	0.22	4.5	-
AP12-20A	Rc3/4	20	-	-	9.3	162
AP12-25A	Rc1	25	-	-	12.0	231

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

How to order



Symbol	Descriptions
Ⓐ Actuation	
1	NC (normally closed) type
2	NO (normally open) type
Ⓑ Port size	
8	1 / 4
10	3 / 8
15	1 / 2
20	3 / 4
25	1
Ⓒ Type of thread	
A	Rc
G	G
N	NPT

Ⓓ Body/sealant combination

		Body	Sealant	O ring	Treatment	Remarks
0	Std.	Bronze	Nitrile rubber	Nitrile rubber	-	Air, water, kerosene, oil (up to 60˚C)
B			Fluoro rubber	Fluoro rubber		Air, kerosene, oil (up to 90˚C *1)
C			PTFE	Fluoro rubber		Steam (up to 180˚C *1)
D		Stainless steel	Nitrile rubber	Nitrile rubber		Air, water, kerosene, oil (up to 60˚C)
E			Fluoro rubber	Fluoro rubber		Air, kerosene, oil (up to 90˚C *1)
F			PTFE	PTFE		Steam (up to 180˚C *1)
H	Option	Bronze	Nitrile rubber	Nitrile rubber	Oil free	Air, water, kerosene, oil (up to 60˚C)
J			Fluoro rubber	Fluoro rubber		Air, kerosene, oil (up to 90˚C *1)
K			PTFE	Fluoro rubber		Steam (up to 180˚C *1)
L		Stainless steel	Nitrile rubber	Nitrile rubber		Air, water, kerosene, oil (up to 60˚C)
M			Fluoro rubber	Fluoro rubber		Air, kerosene, oil (up to 90˚C *1)
N			PTFE	PTFE		Steam (up to 180˚C *1)

Refer to page 36 in the Introduction for details on the material combinations.

Ⓔ to Ⓙ

Refer to the following page for details on the coil housing, other options and voltage, etc.

<Example 1 of model number>

AP11-15A-03A-AC100V
Series: AP11

- Ⓐ Actuation: NC (normally closed) type
- Ⓑ Port size: 1/2
- Ⓒ Type of thread: Rc
- Ⓓ Body/sealant combination
  : Body - bronze, sealant - nitrile rubber, O ring - nitrile rubber
- Ⓔ Coil housing: Open frame lead wire
- Ⓕ to Ⓘ: Blank
- Ⓙ Rated voltage
  : 100 VAC 50/60 Hz, 110 VAC 60 Hz

<Example 2 of model number>

AP12-25N-E3MAD-AC200V
Series: AP12

- Ⓐ Actuation: NO (normally open) type
- Ⓑ Port size: 1
- Ⓒ Type of thread: NPT
- Ⓓ Body/sealant combination
  : Body - stainless steel, sealant - fluoro rubber, O ring - fluoro rubber
- Ⓔ Coil housing: Open frame HP terminal box (G1/2)
- Ⓕ Manual override (locking): Selected
- Ⓖ Mounting plate: Blank
- Ⓗ Other options: Cable gland A-15a
- Ⓘ Surge suppressor: Blank
- Ⓙ Rated voltage
  : 200 VAC 50/60 Hz, 220 VAC 60 Hz

⚠ Note on model no. selection

Note on Ⓓ

*1: Ⓔ: When selecting 4A, 4M or 4N.
*2: When using the PTFE valve sealant with class H coil, the O ring material will be fluoro rubber for steam.
*3: For Ⓑ (port size) 8 (1/4) or 10 (3/8), the standard body material is brass.
*4: When Ⓓ is C, F, K or N, the coil housings Ⓔ 6C, 6E, 6G and 6H cannot be selected.

For Ⓔ to Ⓙ, the combinations indicated with symbols can be manufactured.
Note that if options Ⓕ to Ⓘ are not required, no symbol is indicated.

Ⓔ Coil housing				Ⓕ	Ⓖ	Ⓗ Other options					Ⓘ	Ⓙ Rated voltage
Descriptions				Manual override (locking)	Mounting plate	Cable gland (Marine cable gland)			Conduit (Conduit pipe)		Surge suppressor	Descriptions
						A-15a	A-15b	A-15c	CTC19	G1/2		
3A	Std	Open frame lead wire		A	B				G	H	S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
2C	Option	Grommet lead wire		A	B						S	100 VAC, 200 VAC
2E		DIN terminal box	(G1/2)									100 VAC, 200 VAC
2G		DIN terminal box	(Pg11)									12 VDC, 24 VDC, 48 VDC, 100 VDC
2H		DIN terminal box + small light	(Pg11)							H		100 VAC, 200 VAC, 24 VDC
3M		Open frame type	HP terminal box (G1/2)	A	B	D	E	F			S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3N			HP terminal box + light (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I			HP terminal box (IP65 or equivalent) (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J			HP terminal box + light (IP65 or equivalent) (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open frame type (Heat proof class H)	Lead wire	A	B				G	H	S	100 VAC, 200 VAC
4M			HP terminal box (G1/2)			D	E	F				
4N			HP terminal box + light (G1/2)									
5A		Open frame type (Diode integrated)	Lead wire	A	B				G	H		100 VAC, 200 VAC
5M			HP terminal box (G1/2)			D	E	F				
5N			HP terminal box + light (G1/2)									
5I			HP terminal box (IP65 or equivalent) (G1/2)									
5J			HP terminal box + light (IP65 or equivalent) (G1/2)									
6C		Grommet lead wire	7W	A	B						S	12 VDC, 24 VDC
6E		DIN terminal box	(G1/2) 7W									
6G		DIN terminal box	(Pg11) 7W									
6H		DIN terminal box + small light	(Pg11) 7W							H		24 VDC

⚠ Refer to the following precautions for Ⓔ to Ⓙ.

2C 6C		● Grommet lead wire 300 mm
2E 2G 2H 6E 6G 6H		● DIN terminal box
3A 4A 5A		● Open frame grommet lead wire 300 mm ● 4A (heat proof class H) ● 5A (diode integrated)
3M 3N 4M 4N 5M 5N		● Open frame HP terminal box ● 4M, 4N (heat proof class H) ● 5M, 5N (diode integrated)
3I 3J 5I 5J		● Open frame HP terminal box (IP65 or equivalent) ● 5I, 5J (diode integrated)

Refer to page 222 for coil selection.

G H		● Conduit ● G (CTC19) ● H (G1/2)

⚠ Note on model no. selection

Note on Ⓔ

*5: 5A, 5M, 5N, 5I and 5J are coils for which AC power is converted to DC with a diode.
*6: A DC coil for steam is available for AP11. Contact CKD for more information.
* 6C, 6E, 6G and 6H are available only for AP11.
*7: The coil housings 6C, 6E and 6G are 12 VDC and 24 VDC dedicated. 6H is 24 VDC dedicated.

Note on Ⓕ to Ⓘ

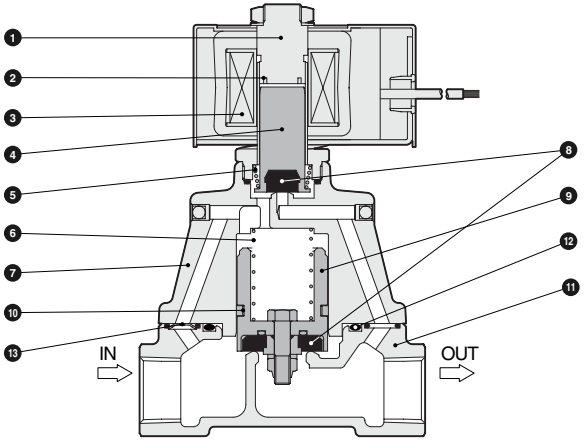
*8: The mounting plate (Ⓖ B) can be mounted only on Ⓑ (port size) 8 (1/4) or 10 (3/8).
*9: When Ⓓ is C, F, K or N, the manual override (Ⓕ A) is not available.
*10: Select one among D, E, F, G and H for Ⓗ.
*11: The surge suppressor is an accessory for the lead wire coil. When selecting a coil with terminal box, the surge suppressor is mounted in the terminal box.
*12: As standard, the surge suppressor is incorporated in the coil with diode and the 24 VDC coil (Ⓔ 2H/6H), so the surge suppressor symbol S cannot be selected.
*13: Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that the tropicalization is not available when the manual override option A and the coil option 6C/6E/6G/6H are selected.

Note on Ⓙ

*14: 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. Note that the coils Ⓔ 5A/5M/5N/5I/5J can be used only with 100 VAC 50/60 Hz or 200 VAC 50/60 Hz.
*15: For voltages other than above, consult with CKD.
*16: The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● AP11 Series



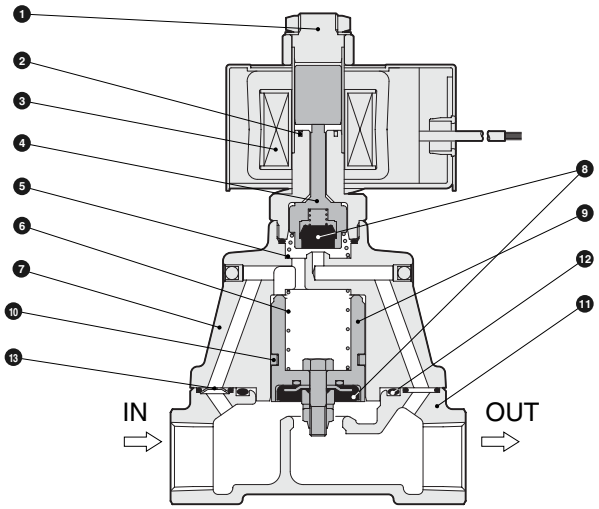
(Figure shows operation when closed)

No.	Parts name	Material	
1	Core assembly	SUS405 or equivalent, SUS316L, SUS403 *1	Stainless steel
2	Shading coil *2	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger	SUS405 or equivalent	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Stuffing	Bronze (SCS13) *3	Bronze casting (stainless steel casting)
8	Sealant	NBR (FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
9	Main valve assembly	C3604, SUS303, SUS304 (SUS303, SUS304)	Stainless steel, brass (stainless steel)
10	Piston ring	SUS304, PTFE	Stainless steel, tetrafluoroethylene resin
11	Body	Bronze (SCS13) *3	Bronze casting (stainless steel casting)
12	O ring	NBR (FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
13	Orifice plate	SUS304 (SUS303) *3	Stainless steel

( ) shows options.
*1: When the body/sealant combination symbol is other than O and H, or the coil housing symbol is 6C, 6E, 6G or 6H, the material is SUS405 or equivalent, SUS316L, SUS430.
*2: When using the DC coil or a coil with diode, no shedding coil is used.
*3: For port size 8 (1/4) or 10 (3/8), the body stuffing material is C3771 (brass) as standard, and the orifice plate material is SUS303 (stainless steel) for both the standard and options.

Internal structure and parts list

● AP12 Series



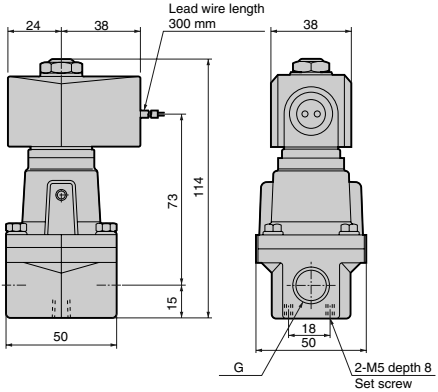
(Figure shows operation when open)

No.	Parts name	Material	
1	Plunger/core assembly	SUS405 or equivalent, SUS316L, SUS304	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	NO valve assembly	POM, NBR (SUS303, PFA, FKM or PTFE)	Acetal resin, nitrile rubber (stainless steel, perfluoroalkoxy resin, fluoro rubber or tetrafluoroethylene resin)
5	Spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Stuffing	Bronze (SCS13) *1	Bronze casting (stainless steel casting)
8	Sealant	NBR (FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
9	Main valve assembly	C3604, SUS303, SUS304 (SUS303, SUS304)	Stainless steel, brass (stainless steel)
10	Piston ring	SUS304, PTFE	Stainless steel, tetrafluoroethylene resin
11	Body	Bronze (SCS13) *1	Bronze casting (stainless steel casting)
12	O ring	NBR (FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
13	Orifice plate	SUS304 (SUS303)	Stainless steel

( ) shows options.
*1: For port size 8 (1/4) or 10 (3/8), the body stuffing material is C3771 (brass) as standard, and the orifice plate material is SUS303 (stainless steel) for both the standard and options.

Dimensions: AP11 Series

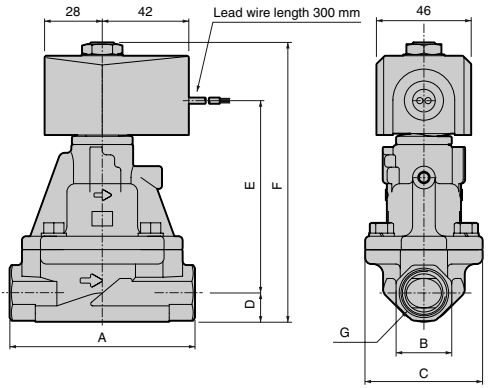
● Open frame lead wire type
AP11-8A/10A-* 3A / 4A / 5A



Model no.	G
AP11-8A-*□A	Rc1/4
AP11-10A-*□A	Rc3/8

*1: The dimensions are the same for the G or NPT thread port size.

● Open frame lead wire type
AP11-15A/20A/25A-* 3A / 4A / 5A



Model no.	A	B	C	D	E	F	G
AP11-15A-*□A	90	27 (29)	57	14 (14.5)	92.5	135.5 (136)	Rc1/2
AP11-20A-*□A	100	32 (35)	65	17 (17.5)	100.5	146.5 (147)	Rc3/4
AP11-25A-*□A	110	41 (44)	76	20.5 (22)	116	165.5 (167)	Rc1

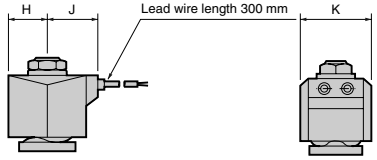
*1: The dimensions are the same for the G or NPT thread port size.
*2: Dimensions shown in ( ) are for stainless steel body.

Optional dimensions: AP11 Series

CAD

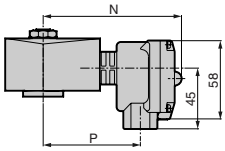
* Refer to the open frame lead wire type dimensions on the left page for common dimensions.

● Grommet lead wire type
AP11-8A to 25A-* 2C / 6C



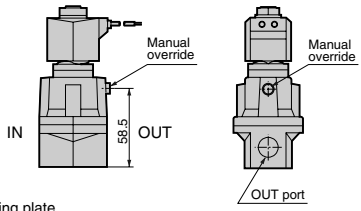
Model no.	H	J	K
AP11-8A to 10A-*2C	20	27	34
AP11-15A to 25A-*2C	23.5	30.5	38
AP11-8A to 25A-*6C	24	30.5	39

● Open frame type + HP terminal box
AP11-8A to 25A-* 3 5 / M N I J / 4M 4N

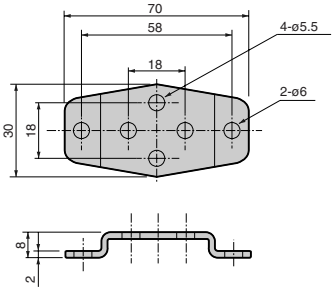


Model no.	N	P
AP11-8A to 10A-*□□	99	68
AP11-15A to 25A-*□□	103	72

● Manual override (locking)
AP11-8A/10A-*** A

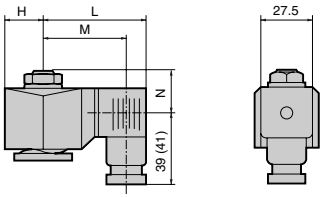


● Mounting plate
AP11-8A/10A-*** B



Mounting plate: GE-100159
* Mounting plate is not available for port size 15 (1/2) to 25 (1).

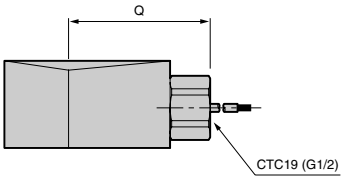
● DIN terminal box
AP11-8A to 25A-* 2 6 / E G H



Dimensions shown in ( ) are for G1/2.

Model no.	H	L	M	N	Model no.	H	L	M	N
AP11-8A to 10A-*2□-AC	20	62	50.5 (50)	20.5	AP11-15A to 25A-*2□-AC	23.5	65.5	54 (53.5)	22
AP11-8A to 10A-*2□-DC	21	63.5	52 (51.5)	20.5	AP11-15A to 25A-*2□-DC	23.5	66	54.5 (54)	22
AP11-8A to 25A-*6□-DC	24	68	56.5 (56)	22					

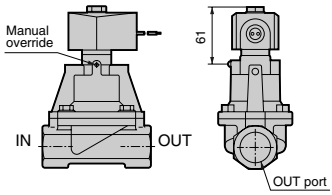
● Open frame type + conduit
AP11-8A to 25A-* 3A 4A 5A / G H



Dimensions shown in ( ) are for G1/2.

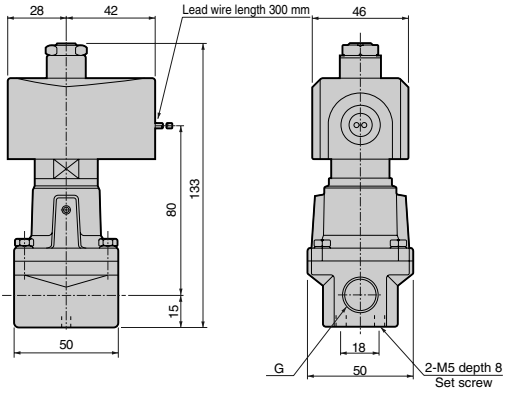
Model no.	Q
AP11-8A to 10A	53 (56)
AP11-15A to 25A	57 (60)

● Manual override (locking)
AP11-15A/20A/25A-*** A



Dimensions: AP12 Series

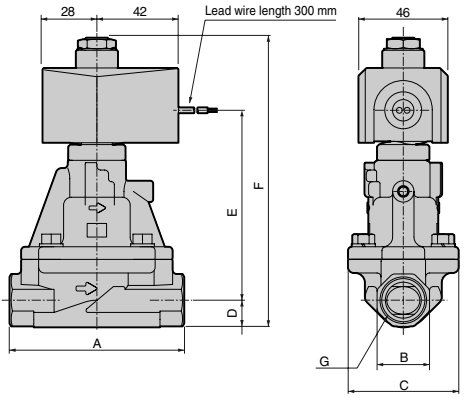
● Open frame lead wire type
AP12-8A/10A-* 3A / 4A / 5A



Model no.	G
AP12-8A-*□A	Rc1/4
AP12-10A-*□A	Rc3/8

*1: The dimensions are the same for the G or NPT thread port size.

● Open frame lead wire type
AP12-15A/20A/25A-* 3A / 4A / 5A



Model no.	A	B	C	D	E	F	G
AP12-15A-*□A	90	27 (29)	57	14 (14.5)	96.5	148.5 (149)	Rc1/2
AP12-20A-*□A	100	32 (35)	65	17 (17.5)	104.5	159.5 (160)	Rc3/4
AP12-25A-*□A	110	41 (44)	76	20.5 (22)	120	178.5 (180)	Rc1

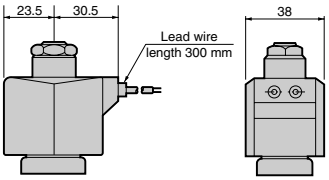
*1: The dimensions are the same for the G or NPT thread port size.
*2: Dimensions shown in ( ) are for stainless steel body.

Optional dimensions: AP12 Series

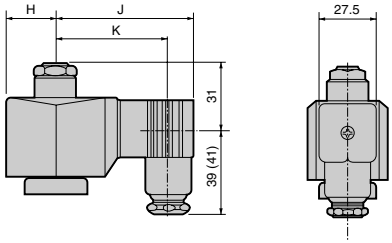
CAD

* Refer to the open frame lead wire type dimensions on the left page for common dimensions.

● Grommet lead wire type
AP12-8A to 25A-* 2C



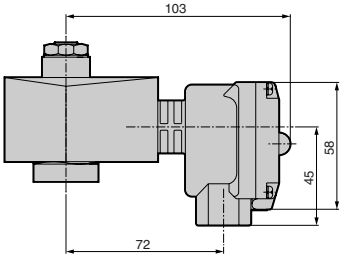
● DIN terminal box
AP12-8A to 25A-* 2E / 2G / 2H



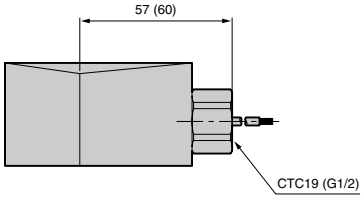
Dimensions shown in ( ) are for G1/2.

Voltage	H	J	K
AC	23.5	65.5	54 (53.5)
DC	28	72	60.5 (60)

● Open frame type + HP terminal box
AP12-8A to 25A-* 3 / 5 | M / N / I / J | 4M / 4N

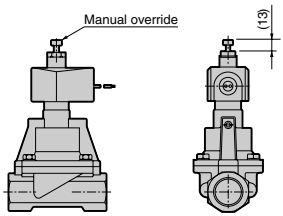


● Open frame type + conduit
AP12-8A to 25A-* 3A / 4A / 5A | G / H

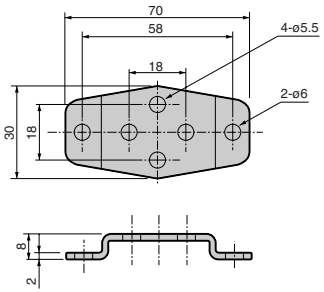


Dimensions shown in ( ) are for G1/2.

● Manual override (locking)
AP12-15A/20A/25A-*** A



● Mounting plate
AP12-8A/10A-*** B



Mounting plate: GE-100159
* Mounting plate is not available for port size 15 (1/2) to 25 (1).