Direct Operated | Pilot Operated

2-Port Solenoid Valve

Improved environmental resistance due to the stainless steel coil cover [IP67 enclosure]

Refer to pages 5, 7, 21, and 31 for details.

Refer to page 38 for details.

RoHS | IP67

Air | Water | Oil

Body material •Stainless steel •Brass/Bronze*1 •Aluminum

Environmental resistance Enclosure: IP67*2

*1 The bronze body is only selectable for the pilot operated type. *2 IP65 for models with a DIN terminal

Direct Operated 2-Port Solenoid Valve
JSX Series

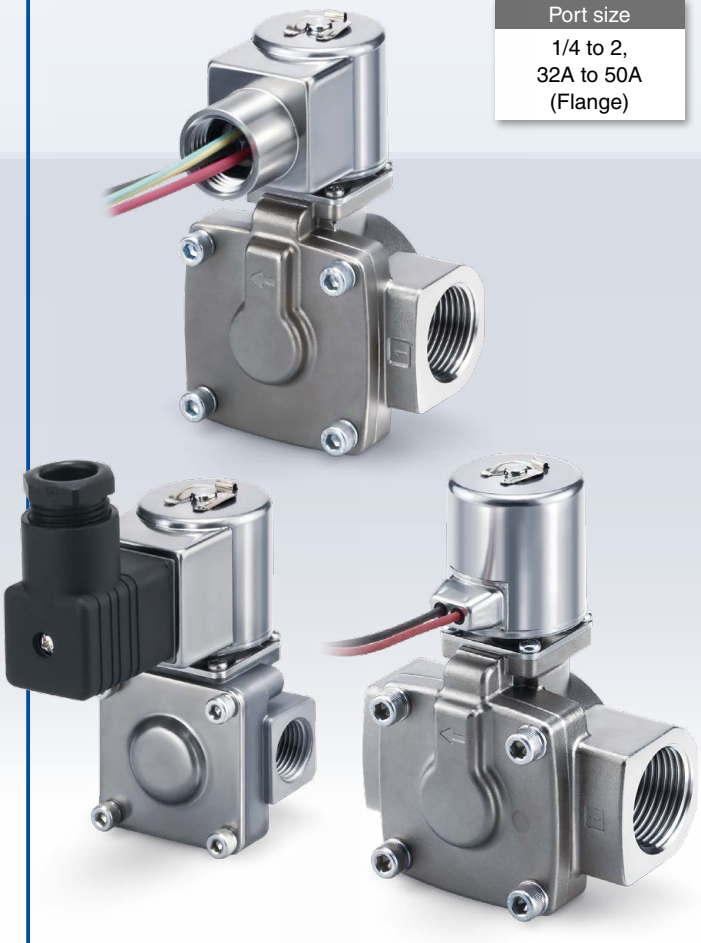
Port size
1/8 to 3/8

New • Modular mounting type 2-port solenoid valve

New • Body material: Brass/Aluminum
• M12 connector

New Pilot Operated 2-Port Solenoid Valve
JSXD Series

Port size
1/4 to 2,
32A to 50A
(Flange)



JSX/JSX□ Series

SMC

CAT.ES70-56B

Space saving

Compact

Valve volume: **25% reduction**[*1]

Lightweight

Weight: **30% reduction**[*1]

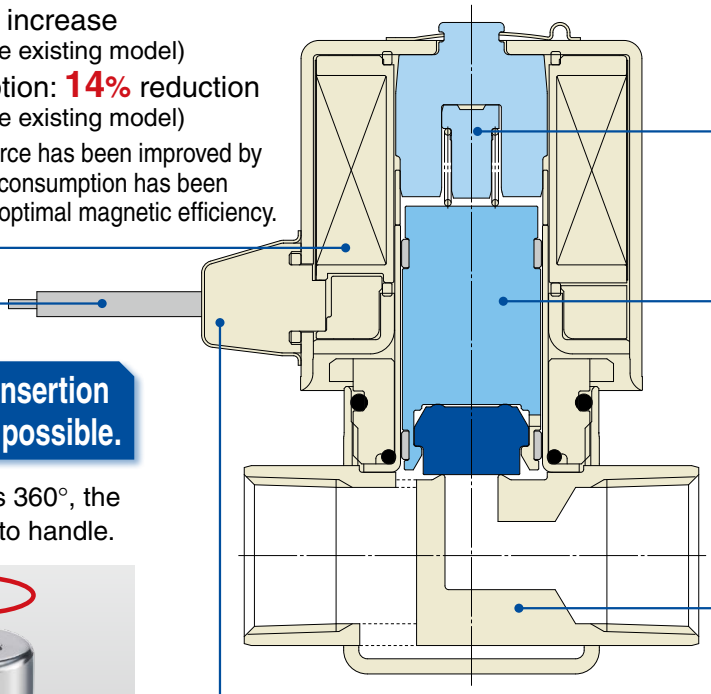
*1 Compared with the existing model

Energy saving

Coil force: **10%** increase
(Compared with the existing model)
Power consumption: **14%** reduction
(Compared with the existing model)
The coil attraction force has been improved by 10% and the power consumption has been reduced by 14% for optimal magnetic efficiency.

Stopper construction

Metal noise reduced by the resin stopper
Longer service life



Improved armature durability

IP67 enclosure

* IP65 for models with a DIN terminal

Choice of body material

· Stainless steel · Brass/Bronze[*2]
· Aluminum

*2 The bronze body is only selectable for the pilot operated type.

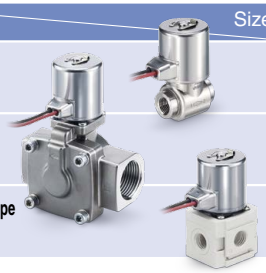
360° lead wire insertion and removal is possible.

As the coil rotates 360°, the lead wire is easy to handle.

Power consumption * For DC voltages

[W]

Model \ Size	10	20	30	40	50	60	70	80	90
JSX Series	4	6	8	—	—	—	—	—	—
JSXD Series	—	—	6	6	6	8	8	8	8
Modular mounting type **JSXM Series**	—	6	8	8	—	—	—	—	—



Full-wave rectifier type (AC specification: Insulation type Class B)

Improved durability

Extended service life due to the special construction (Compared with the existing shading coil)

Reduced buzzing noise

Due to being rectified to DC by the full-wave rectifier

Reduced apparent power

* Class B, N.C. valve (Compared with the existing model)
9.5 VA → **8** VA (**JSX20/JSXD60, 70** Series)
12 VA → **9.5** VA (**JSX30/JSXD80, 90** Series)

Improved OFF response

Specially constructed to improve the OFF response when operated with high viscosity fluids such as oil

Low-noise construction

Specially constructed to reduce metal noise during operation

Electrical entry variations

Grommet

Conduit

DIN terminal

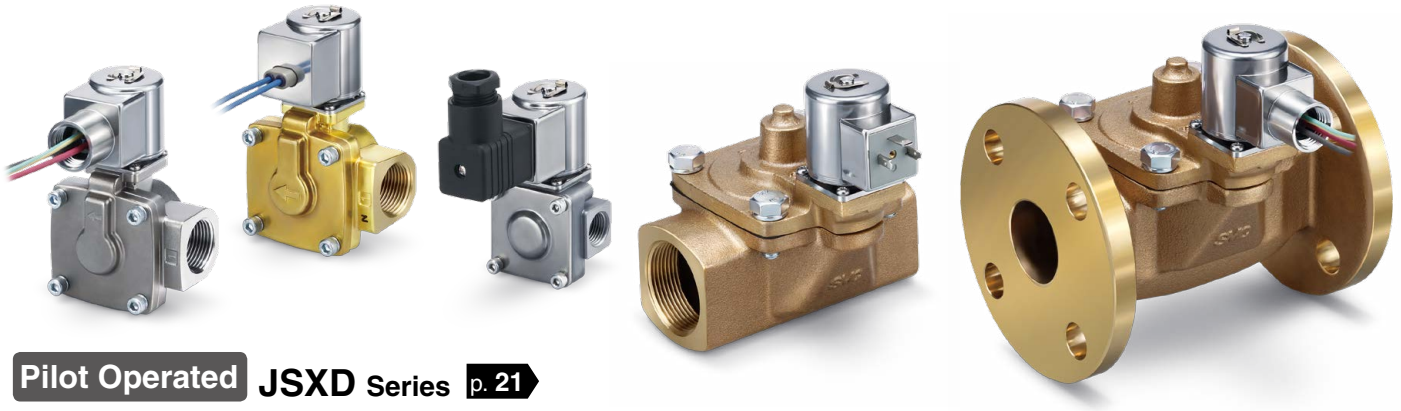
M12 connector

Series Variations

Direct Operated JSX Series pp. 5, 7

Model	Port size	Orifice diameter [mmø]	Flow rate*1 [L/min] 5 10 20 30	Fluid	Body material	Seal material	Electrical entry
JSX10 Series	1/8	1.6 2.4	5	Air Water Oil	Stainless steel Brass Aluminum	NBR FKM EPDM	Grommet DIN terminal Conduit M12 connector
JSX20 Series	1/8	3.2	15				
	1/4, 3/8	3.2, 4 5.6, 7.1					
JSX30 Series	1/4, 3/8	4, 5.6, 7.1	25				

*1 At the max. operating pressure differential (Fluid: Water)

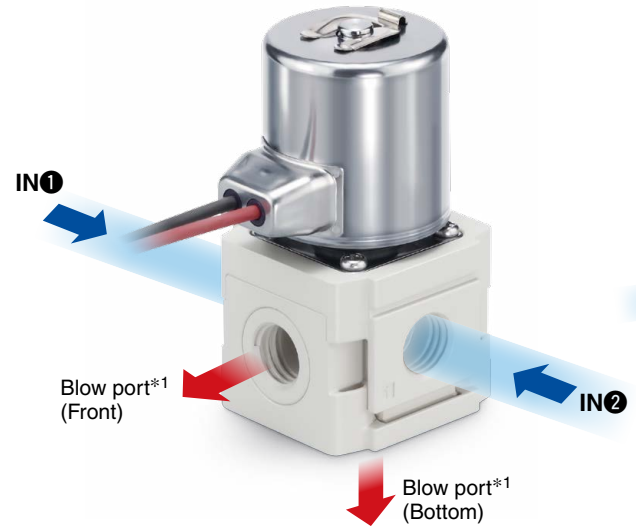


Pilot Operated JSXD Series p. 21

Model	Port size	Orifice diameter [mmø]	Flow rate*1 [L/min] 200 400 1000	Fluid	Body material	Seal material	Electrical entry
JSXD30 Series	1/4, 3/8, 1/2	10	100	Air Water Oil	Stainless steel Brass/Bronze Aluminum	NBR FKM EPDM	Grommet DIN terminal Conduit M12 connector
JSXD40 Series	3/8, 1/2	15	200				
JSXD50 Series	3/4	20	430				
JSXD60 Series	1	25	580				
JSXD70 Series	1 1/4, 32A	35	1000				
JSXD80 Series	1 1/2, 40A	40	1400				
JSXD90 Series	2, 50A	50	2200				

*1 At the max. operating pressure differential (Fluid: Water)

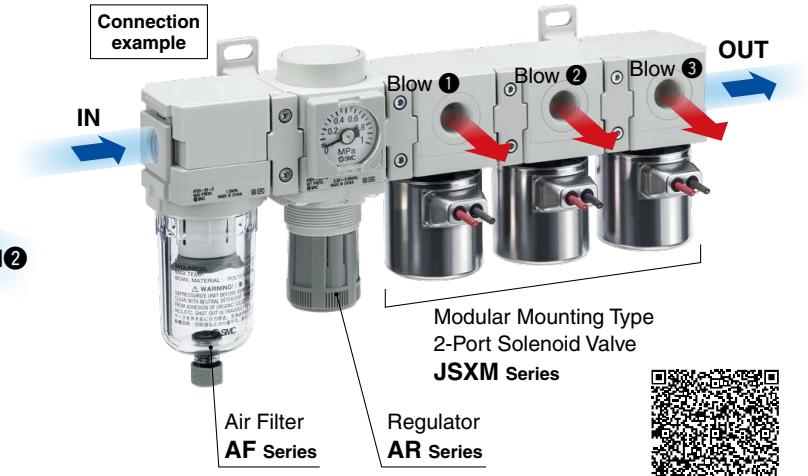
Modular Mounting Type 2-Port Solenoid Valve *JSXM Series* p. 31



*1 The blow port position is selectable.

Coil: OFF	Coil: ON
IN❶ ⇔ IN❷	IN❶/IN❷ ➡ Blow port Front or bottom (Selectable)

Can be connected to modular type F.R.L. units



More information on F.R.L. units can be viewed here.

Simple Specials System

A system designed to respond quickly and easily to your special ordering needs

For modular connection units (shipped assembled), the simple specials system can be used.

Short lead times

This system enables us to respond to your special needs (additional machining, accessory assembly, or the designing of a modular unit) and deliver your personalized products as quickly as standard products.

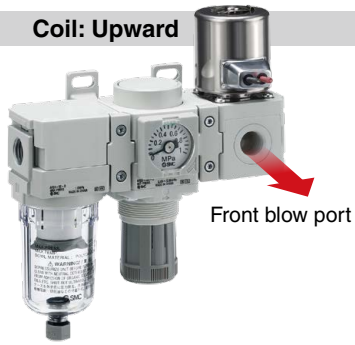
Repeat orders

Once we receive a simple special part number from one of your previous orders, we will process the order, manufacture the product, and deliver it to you as quickly as possible.

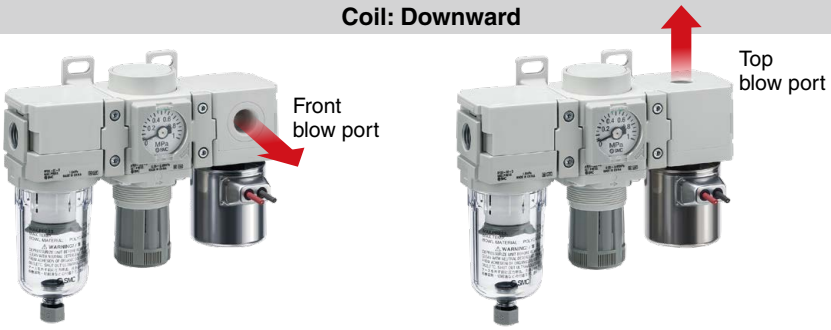
Please contact your local sales representative for more details.

The coil orientation and blow port position can be selected.

Coil: Upward



Coil: Downward



Series Variations

Model	Port size	Orifice diameter [mmø]	Flow rate*1 [L/min (ANR)] (500 / 1000)	Fluid	Body material	Seal material	Electrical entry
JSXM20 Series	1/8, 1/4	3.2	650	Air	Aluminum	NBR FKM	Grommet DIN terminal Conduit M12 connector
JSXM30 Series	1/4, 3/8	4	1300				
JSXM40 Series	1/4, 3/8, 1/2	4	1300				

*1 At the max. operating pressure differential (Fluid: Air)

CONTENTS

Direct Operated 2-Port Solenoid Valve JSX Series

For Water Air Oil | Body Material **Stainless Steel, Brass**

For Air | Body Material **Aluminum**

Pilot Operated 2-Port Solenoid Valve JSXD Series

Modular Mounting Type 2-Port Solenoid Valve JSXM Series

Direct Operated 2-Port Solenoid Valve

JSX Series

Body Material Stainless Steel, Brass

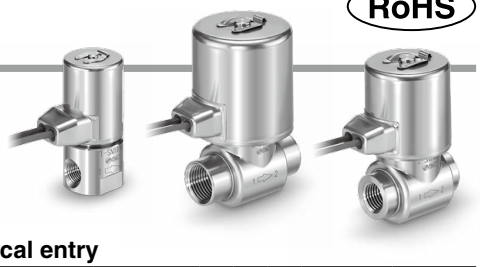
Differs depending on the voltage and electrical entry. For details, refer to table ❽ below.

LISTED

Refer to page 38 for details.

RoHS

For Water Air Oil



How to Order

JSX 2 1 – S N 302 R – 5 G – B

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾

❶ Size

Symbol	Size
1	10
2	20
3	30

❷ Valve type

Symbol	Valve type
1	N.C. 2(OUT) 1(IN)

❸ Body material

Symbol	Body material
S	Stainless steel
C	Brass

❹ Seal material

Symbol	Seal material
N	NBR
F	FKM
E	EPDM

❺ Orifice diameter and port size

Symbol	Orifice diameter [mmø]	Port size	Size 10	20	30
101	1.6	1/8	●	—	—
201	2.4	1/8	●	—	—
301	3.2	1/8	—	●	—
302		1/4	—	●	—
303		3/8	—	●	—
402	4.0	1/4	—	●	●
403		3/8	—	●	●
502	5.6	1/4	—	●	●
503		3/8	—	●	●
702	7.1	1/4	—	●	●
703		3/8	—	●	●

❻ Thread type

Symbol	Thread type
R	Rc
N	NPT
F	G

❼ Rated voltage

AC

Symbol	Rated voltage	Symbol	Rated voltage
1	100 VAC	7	240 VAC
2	200 VAC	8	48 VAC
3	120 (110) VAC	B	24 VAC
4	220 VAC	J	230 VAC

DC

Symbol	Rated voltage
5	24 VDC
6	12 VDC

❾ Option

Symbol	Option
Nil	None
B	With bracket*1 (Stainless steel)

*1 Bracket assembly part nos. (page 50)

❽ Electrical entry

Symbol	Electrical entry		Size 10	20	30	CE-compliant	UL Standards
G	Grommet*1		●	●	●	24 VDC 12 VDC	Refer to page 38.
GS	Grommet with PCB (With surge voltage suppressor)		●	●	●	100 VAC 24 VDC 12 VDC 48 VAC 24 VAC	
CS	Conduit (With surge voltage suppressor)		—	●	●	All voltages	
DS	DIN terminal (With surge voltage suppressor)		●	●	●	All voltages	
DZ	DIN terminal with light (With surge voltage suppressor)		●	●	●	All voltages	
DN	DIN terminal without connector (With surge voltage suppressor)		●	●	●	All voltages	
WN	M12 connector/Without connector cable (With surge voltage suppressor)*2		●	●	●	All voltages	

*1 DC voltage only

*2 A cable for the M12 connector is not included with the product. Refer to "Option" on page 39 to order it separately.

Flow Rate Characteristics

Size	Port size	Orifice diameter [mmø]	Flow rate characteristics*1 Air C [dm³/(s·bar)]	Air b	Air Cv	Water, Oil Kv	Water, Oil Conversion Cv	Max. operating pressure differential [MPa]	Model	Weight*2 [g] Stainless steel body*3	Weight*2 [g] Brass body
10	1/8	1.6	0.36	0.58	0.08	0.07	0.08	0.9	JSX11-$^{S}_{C}$□101	160	160
		2.4	0.62	0.45	0.15	0.13	0.15	0.4	JSX11-$^{S}_{C}$□201	160	160
20	1/8	3.2	1.35	0.48	0.35	0.30	0.35	0.7	JSX21-$^{S}_{C}$□301	320	330
	1/4	3.2	1.35	0.48	0.35	0.30	0.35	0.7	JSX21-$^{S}_{C}$□302	320	330
		4.0	2.02	0.48	0.52	0.45	0.52	0.3	JSX21-$^{S}_{C}$□402	320	330
		5.6	2.62	0.43	0.73	0.63	0.73	0.2	JSX21-$^{S}_{C}$□502	320	330
		7.1	3.15	0.44	0.88	0.76	0.88	0.1	JSX21-$^{S}_{C}$□702	320	330
	3/8	3.2	1.35	0.48	0.35	0.30	0.35	0.7	JSX21-$^{S}_{C}$□303	320	360
		4.0	2.02	0.48	0.52	0.45	0.52	0.3	JSX21-$^{S}_{C}$□403	320	360
		5.6	2.62	0.43	0.73	0.63	0.73	0.2	JSX21-$^{S}_{C}$□503	320	360
		7.1	3.15	0.44	0.88	0.76	0.88	0.1	JSX21-$^{S}_{C}$□703	320	360
30	1/4	4.0	2.02	0.48	0.52	0.45	0.52	1.0	JSX31-$^{S}_{C}$□402	450	490
		5.6	2.62	0.43	0.73	0.63	0.73	0.5	JSX31-$^{S}_{C}$□502	450	490
		7.1	3.15	0.44	0.88	0.76	0.88	0.2	JSX31-$^{S}_{C}$□702	450	490
	3/8	4.0	2.02	0.48	0.52	0.45	0.52	1.0	JSX31-$^{S}_{C}$□403	450	520
		5.6	2.62	0.43	0.73	0.63	0.73	0.5	JSX31-$^{S}_{C}$□503	450	520
		7.1	3.15	0.44	0.88	0.76	0.88	0.2	JSX31-$^{S}_{C}$□703	450	520

*1 The flow rate characteristics of this product have variations.

*2 Add 20 g for grommet with PCB, 70 g for conduit, 50 g for DIN terminal, and 15 g for M12 connector.

*3 The values were calculated based on the combination of Rc, NPT thread, and grommet. Add 30 g for G thread (port size 3/8).

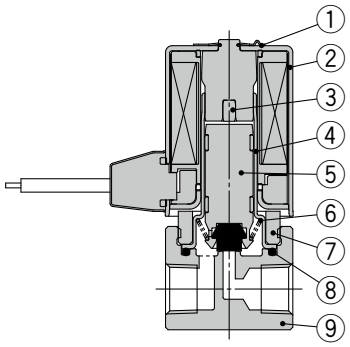
Applicable Fluid Check List

Applicable fluid	Seal material NBR	FKM	EPDM
Air	●	●	●
Water	●	●	●
Oil	—	●	—

* The list shows the compatibility between general fluids and seal materials. Consider the operating environment and application sufficiently before selecting the seal material. Fluid and component compatibility should be checked in the application before use. If something is not clear, please contact SMC.

Construction

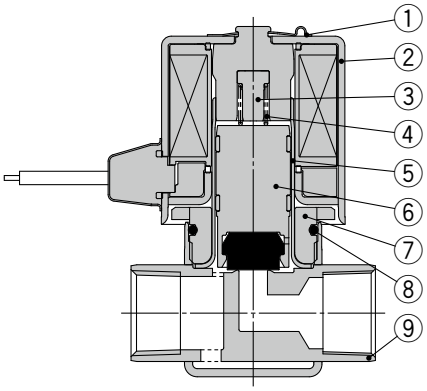
JSX10
Body material: Stainless steel, Brass



Component Parts

No.	Description	Material	
1	**Clip**	Stainless steel	
2	**Solenoid coil**	Stainless steel, Cu, Resin	
3	**Stopper**	PPS	
4	**Tube assembly**	Stainless steel	
5	**Armature assembly**	Stainless steel, PPS, NBR (FKM, EPDM)	
6	**Spring**	Stainless steel	
7	**Set nut**	Stainless steel	
8	**Gasket**	NBR, (FKM, EPDM)	
9	**Body**	Stainless steel	Brass

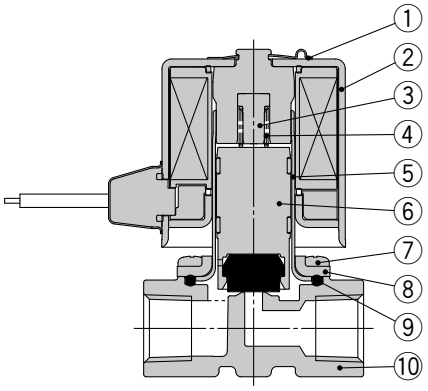
JSX20, 30
Body material: Stainless steel



Component Parts

No.	Description	Material
1	**Clip**	Stainless steel
2	**Solenoid coil**	Stainless steel, Cu, Resin
3	**Stopper**	PPS
4	**Spring**	Stainless steel
5	**Tube assembly**	Stainless steel
6	**Armature assembly**	Stainless steel, PPS, NBR (FKM, EPDM)
7	**Nut**	Stainless steel
8	**Gasket**	NBR (FKM, EPDM)
9	**Body**	Stainless steel

Body material: Brass



Component Parts

No.	Description	Material
1	**Clip**	Stainless steel
2	**Solenoid coil**	Stainless steel, Cu, Resin
3	**Stopper**	PPS
4	**Spring**	Stainless steel
5	**Tube assembly**	Stainless steel
6	**Armature assembly**	Stainless steel, PPS, NBR (FKM, EPDM)
7	**Mounting screw**	Fe
8	**Bonnet**	Stainless steel
9	**Gasket**	NBR (FKM, EPDM)
10	**Body**	Brass

Common Specifications

Size			10	20	30
Valve specifications	**Valve construction**		Direct operated poppet		
	Valve type		Normally closed (N.C.)		
	Fluid and fluid temperature		Air : –10 to 60°C (Dew point temperature: –10°C or less) Water: 1 to 60°C (No freezing) Oil : –5 to 60°C (Kinematic viscosity: 50 mm²/s or less)		
	Withstand pressure		2.0 MPa		
	Max. system pressure		1.0 MPa		
	Ambient temperature		–20 to 60°C		
	Valve leakage∗1**/ External leakage**∗1	**Air**	1 cm³/min (ANR) or less		
		Water, Oil	0.1 cm³/min or less		
	Mounting orientation		Unrestricted		
	Enclosure∗2		IP67 (IP65 for the DIN terminal)		
	Standards∗3		CE, UL Recognized, UL Listed		
	Operating environment		Location without the presence of corrosive gases, explosive gases, or constant fluid adhesion		
	Body material		Stainless steel, Brass		
	Seal material		NBR, FKM, EPDM		
Coil specifications	**Rated voltage**	**AC**	24 V, 48 V, 100 V, 110 V, 120 V, 200 V, 220 V, 230 V, 240 V		
		DC	12 V, 24 V		
	Allowable voltage fluctuation		±10% of rated voltage		
	Allowable leakage voltage	**AC**	5% or less of rated voltage		
		DC	2% or less of rated voltage		
	Apparent power∗4, ∗5	**AC**	4.5 VA	8 VA	9.5 VA
	Power consumption∗4	**DC**	4 W	6 W	8 W
	Temperature rise∗6	**AC/DC**	70/65°C		

∗1 The leakage amount value at a differential pressure of 0.01 MPa or higher and an ambient temperature of 20°C
∗2 This product ensures IP67, but if water enters the product, it may result in operation failure or breakage.
Therefore, take appropriate measures to prevent water from entering the product when used in an environment where it is constantly exposed to water.
∗3 Conformance to standards varies depending on the model. For details, refer to pages 5 and 38.
∗4 Power consumption/Apparent power: The value at an ambient temperature of 20°C and when the rated voltage is applied (Variation: ±10%)
∗5 There is no difference in the frequency and the inrush and energized apparent power, since a rectifying circuit is used in the AC.
∗6 Temperature rise: The value at an ambient temperature of 20°C and when the rated voltage is applied. The value depends on the ambient environment. This is for reference.
Be sure to read "Specific Product Precautions" before handling.

Direct Operated 2-Port Solenoid Valve

JSX Series

Body Material **Aluminum**

CE

Differs depending on the voltage and electrical entry. For details, refer to table ❽ below.

RoHS

For Air

How to Order

JSX **2** **1** – **A** **N** **302** **R** – **5** **G** – **B**

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾

❶ Size

Symbol	Size
2	20
3	30

❷ Valve type

Symbol	Valve type
1	N.C. 2(OUT) 1(IN)

❸ Body material

Symbol	Body material
A	Aluminum

❹ Seal material

Symbol	Seal material
N	NBR
F	FKM

❺ Orifice diameter and port size

Symbol	Orifice diameter [mmø]	Port size	Size 20 (Aluminum body)	Size 30 (Aluminum body)
301	3	1/8	●	—
302		1/4	●	—
402	4	1/4	—	●
403		3/8	—	●
501	5	1/8	●	—
502		1/4	●	—
702	7	1/4	—	●
703		3/8	—	●

❻ Thread type

Symbol	Thread type
R	Rc
N	NPT
F	G

❼ Rated voltage

AC

Symbol	Rated voltage	Symbol	Rated voltage
1	100 VAC	**7**	240 VAC
2	200 VAC	**8**	48 VAC
3	120 (110) VAC	**B**	24 VAC
4	220 VAC	**J**	230 VAC

DC

Symbol	Rated voltage
5	24 VDC
6	12 VDC

❾ Option

Symbol	Option
Nil	None
B	With bracket*1

*1 Bracket assembly part nos. (page 50)

❽ Electrical entry

Symbol	Electrical entry		Size 20	Size 30	CE-compliant
G	Grommet*1		●	●	24 VDC 12 VDC
GS	Grommet with PCB (With surge voltage suppressor)		●	●	100 VAC 24 VDC 12 VDC 48 VAC 24 VAC
CS	Conduit (With surge voltage suppressor)		●	●	All voltages
DS	DIN terminal (With surge voltage suppressor)		●	●	All voltages
DZ	DIN terminal with light (With surge voltage suppressor)		●	●	All voltages
DN	DIN terminal without connector (With surge voltage suppressor)		●	●	All voltages
WN	M12 connector/Without connector cable (With surge voltage suppressor)*2		●	●	All voltages

*1 DC voltage only

*2 A cable for the M12 connector is not included with the product. Refer to "Option" on page 39 to order it separately.

Flow Rate Characteristics

Aluminum Body Type

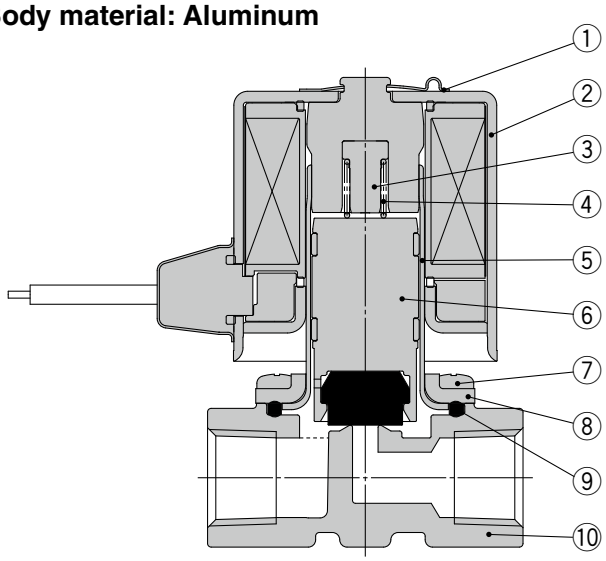
Size	Port size	Orifice diameter [mmø]	Flow rate characteristics*1 C [dm³/(s·bar)]	b	Cv	Max. operating pressure differential [MPa]	Model	Weight*2 [g]
20	1/8, 1/4	3	1.41	0.54	0.35	0.7	JSX21-A□30□	240
		5	1.66	0.54	0.52	0.2	JSX21-A□50□	240
30	1/4, 3/8	4	1.57	0.59	0.52	1.0	JSX31-A□40□	400
		7	3.02	0.53	0.88	0.2	JSX31-A□70□	400

*1 The flow rate characteristics of this product have variations.

*2 Indicates case of grommet type
Add 20 g for grommet with PCB, 70 g for conduit, 50 g for DIN terminal, and 15 g for M12 connector.

Construction

JSX20, 30
Body material: Aluminum



Component Parts

No.	Description	Material
1	**Clip**	Stainless steel
2	**Solenoid coil**	Stainless steel, Cu, Resin
3	**Stopper**	PPS
4	**Spring**	Stainless steel
5	**Tube assembly**	Stainless steel
6	**Armature assembly**	Stainless steel, PPS, NBR, (FKM)
7	**Mounting screw**	Fe
8	**Bonnet**	Stainless steel
9	**Gasket**	NBR, (FKM)
10	**Body**	Aluminum

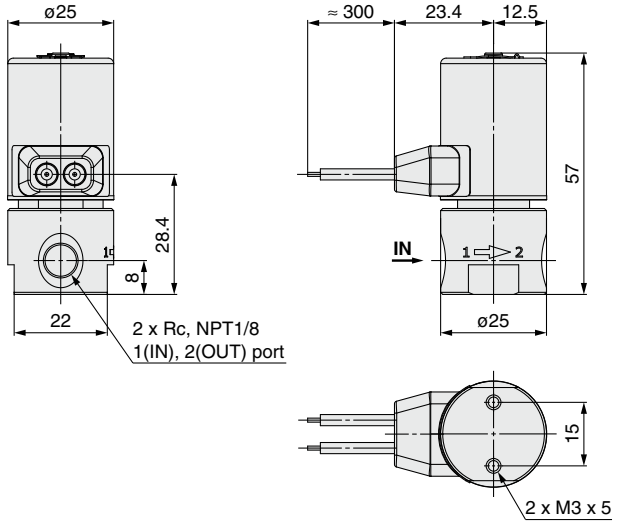
Common Specifications

Size			10	20	30
Valve specifications	**Valve construction**		Direct operated poppet		
	Valve type		Normally closed (N.C.)		
	Fluid and fluid temperature		Air: –10 to 60°C (Dew point temperature: –10°C or less)		
	Withstand pressure		2.0 MPa		
	Max. system pressure		1.0 MPa		
	Ambient temperature		–20 to 60°C		
	Valve leakage∗1**/External leakage**∗1	**Air**	1 cm^3/min (ANR) or less		
	Mounting orientation		Unrestricted		
	Enclosure∗2		IP67 (IP65 for the DIN terminal)		
	Standards∗3		CE		
	Operating environment		Location without the presence of corrosive gases, explosive gases, or constant fluid adhesion		
	Body material		Aluminum		
	Seal material		NBR, FKM		
Coil specifications	**Rated voltage**	**AC**	24 V, 48 V, 100 V, 110 V, 120 V, 200 V, 220 V, 230 V, 240 V		
		DC	12 V, 24 V		
	Allowable voltage fluctuation		±10% of rated voltage		
	Allowable leakage voltage	**AC**	5% or less of rated voltage		
		DC	2% or less of rated voltage		
	Apparent power∗4, ∗5	**AC**	4.5 VA	8 VA	9.5 VA
	Power consumption∗4	**DC**	4 W	6 W	8 W
	Temperature rise∗6	**AC/DC**	70/65°C		

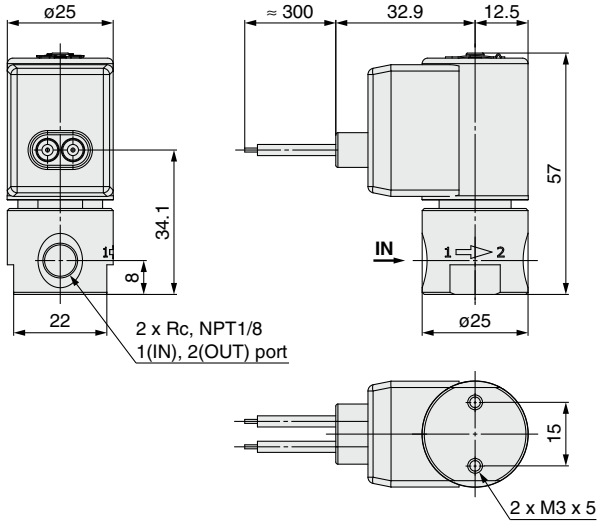
∗1 The leakage amount value at a differential pressure of 0.01 MPa or higher and an ambient temperature of 20°C
∗2 This product ensures IP67, but if water enters the product, it may result in operation failure or breakage.
Therefore, take appropriate measures to prevent water from entering the product when used in an environment where it is constantly exposed to water.
∗3 Conformance to standards varies depending on the model. For details, refer to page 7.
∗4 Power consumption/Apparent power: The value at an ambient temperature of 20°C and when the rated voltage is applied (Variation: ±10%)
∗5 There is no difference in the frequency and the inrush and energized apparent power, since a rectifying circuit is used in the AC.
∗6 Temperature rise: The value at an ambient temperature of 20°C and when the rated voltage is applied. The value depends on the ambient environment. This is for reference.
Be sure to read "Specific Product Precautions" before handling.

Dimensions: JSX10 Port Size 1/8 Body Material Stainless Steel, Brass

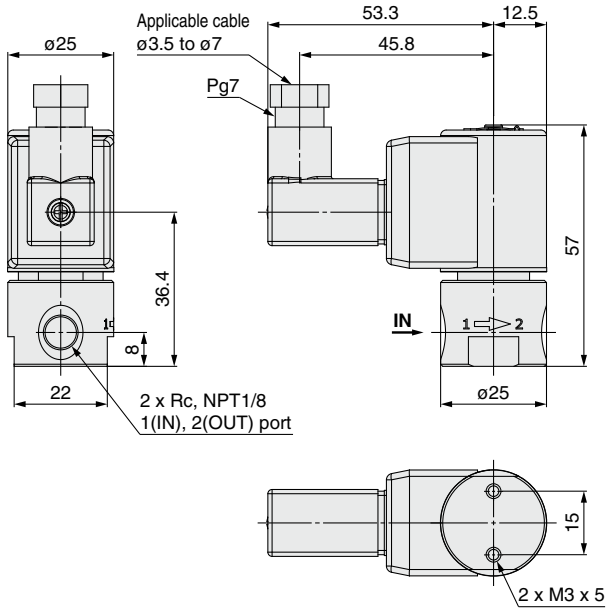
G: Grommet



GS: Grommet with PCB

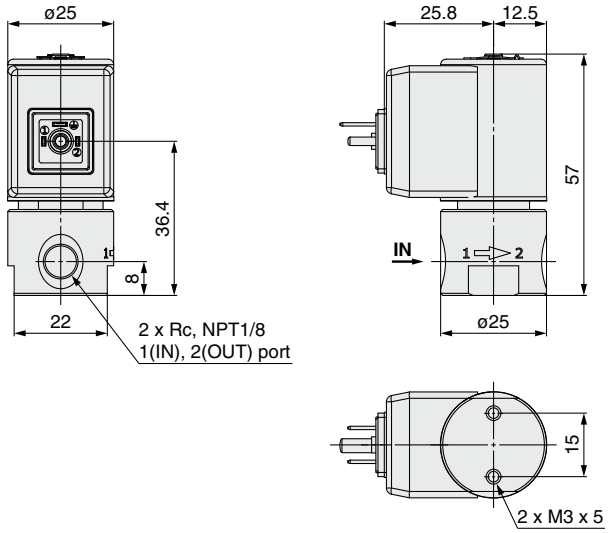


DS: DIN terminal
DZ: DIN terminal with light

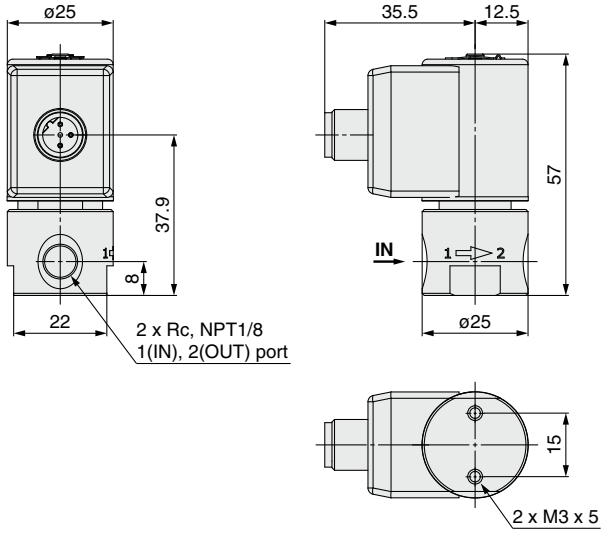


Dimensions: JSX10 Port Size 1/8 Body Material Stainless Steel, Brass

DN: DIN terminal without connector

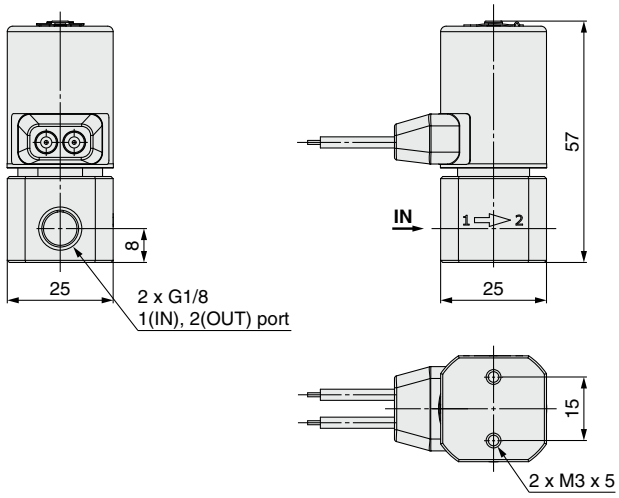


WN: M12 connector



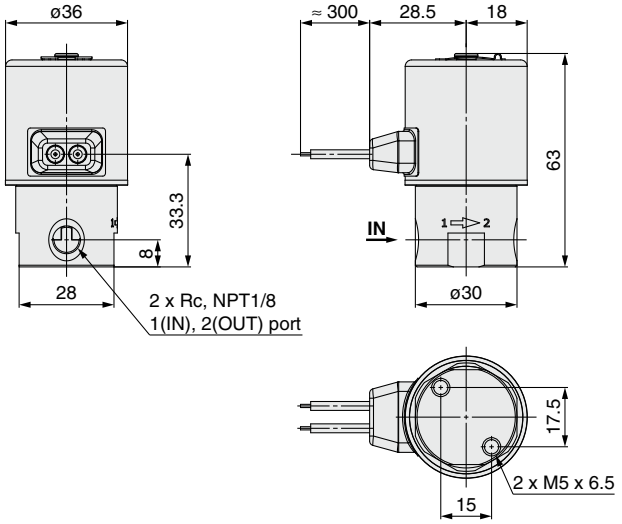
G thread type

∗ Dimensions other than those below are the same as those of the Rc type.

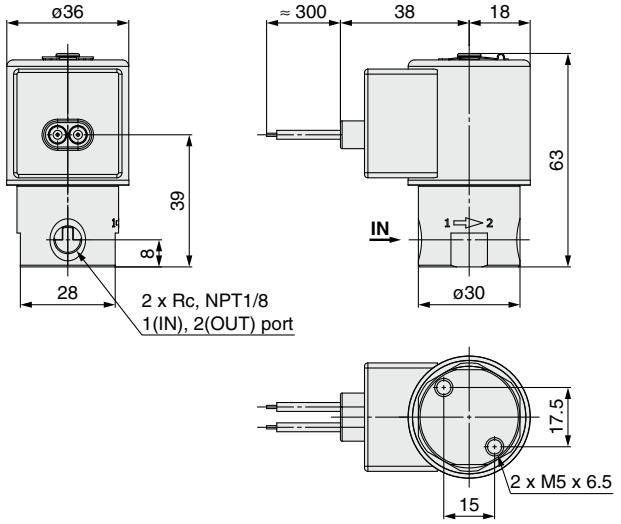


Dimensions: JSX20 Port Size 1/8 Body Material Stainless Steel

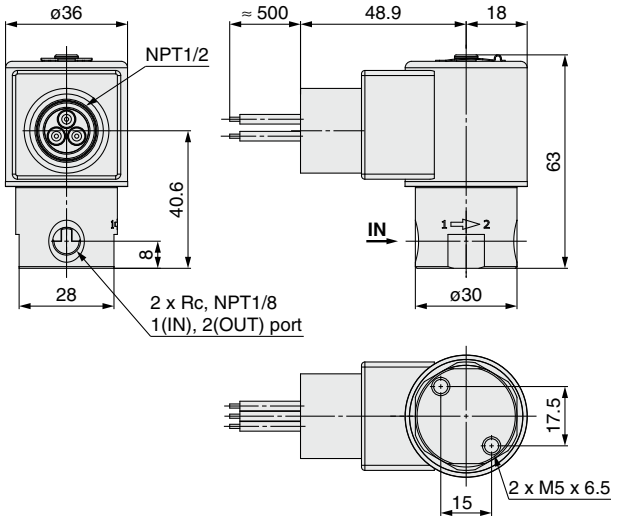
G: Grommet



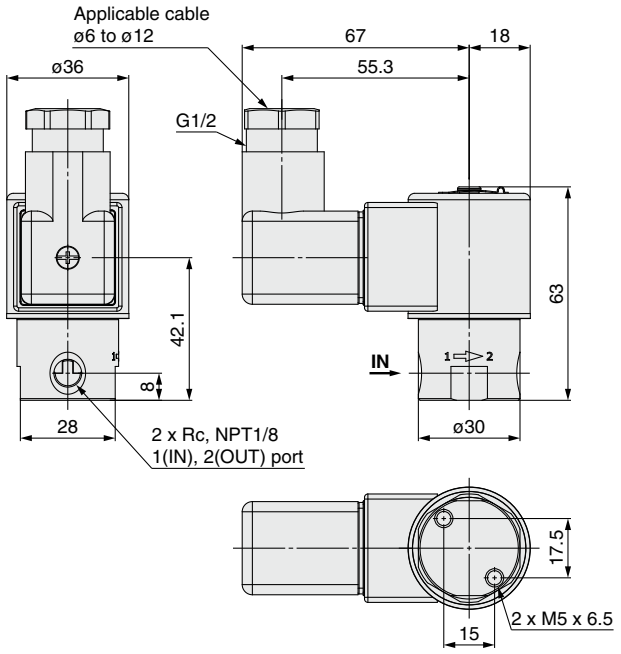
GS: Grommet with PCB



CS: Conduit

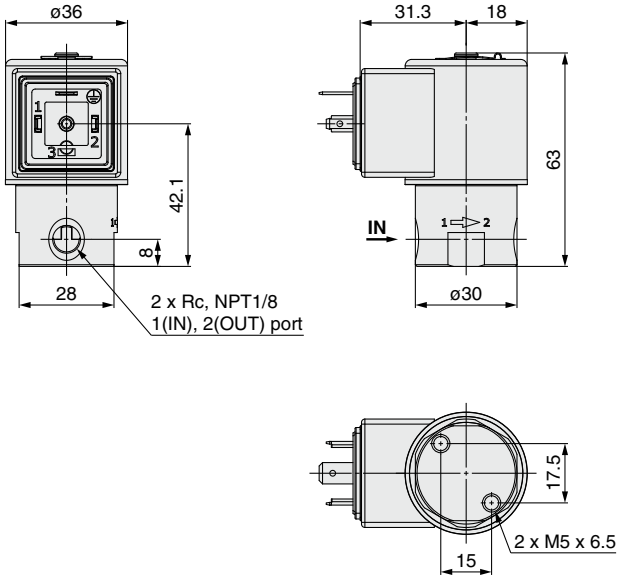


DS: DIN terminal
DZ: DIN terminal with light

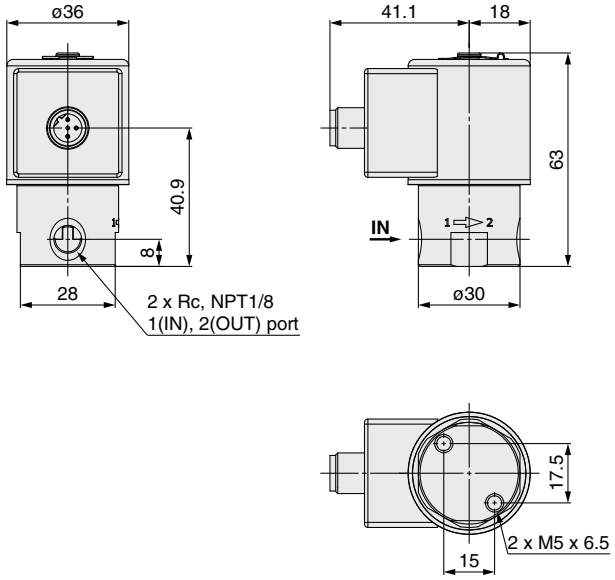


Dimensions: JSX20 Port Size 1/8 Body Material Stainless Steel

DN: DIN terminal without connector

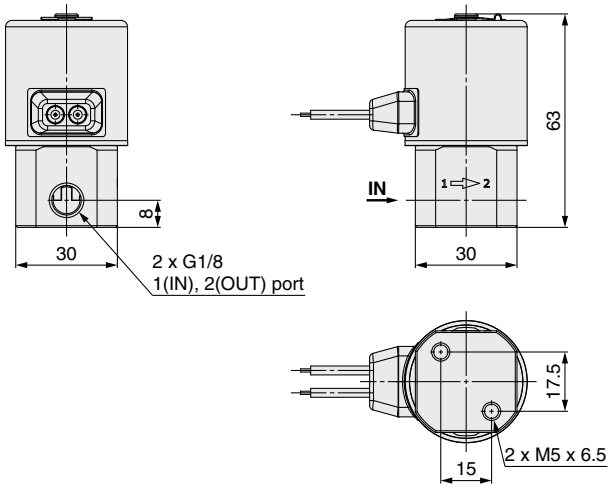


WN: M12 connector



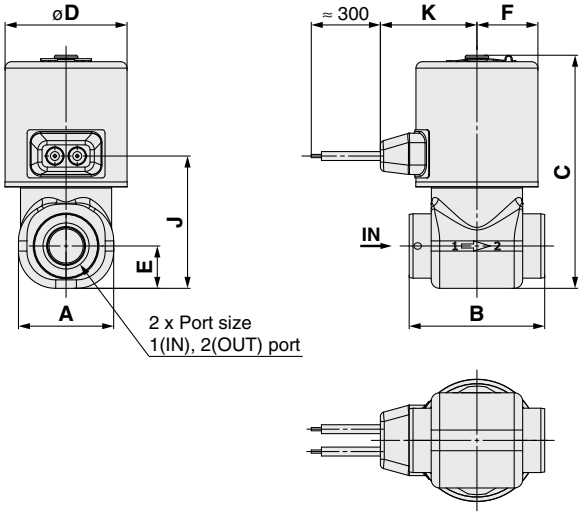
G thread type

∗ Dimensions other than those below are the same as those of the Rc type.

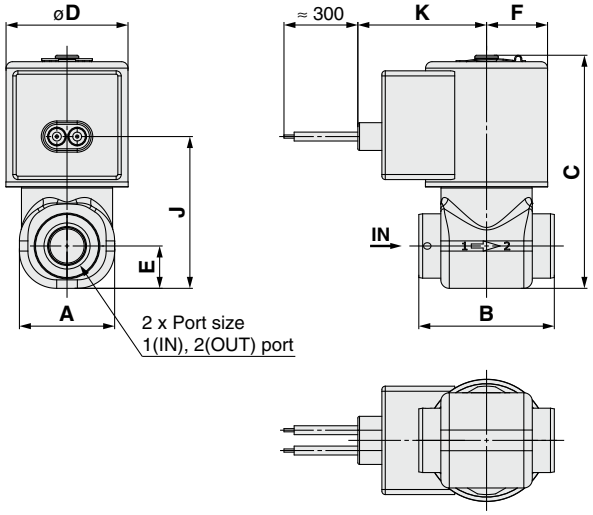


Dimensions: JSX20, 30 Port Size 1/4, 3/8 Body Material Stainless Steel

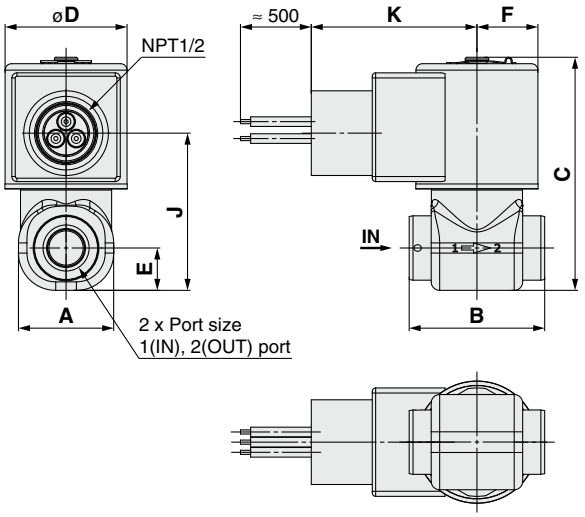
G: Grommet



GS: Grommet with PCB



CS: Conduit



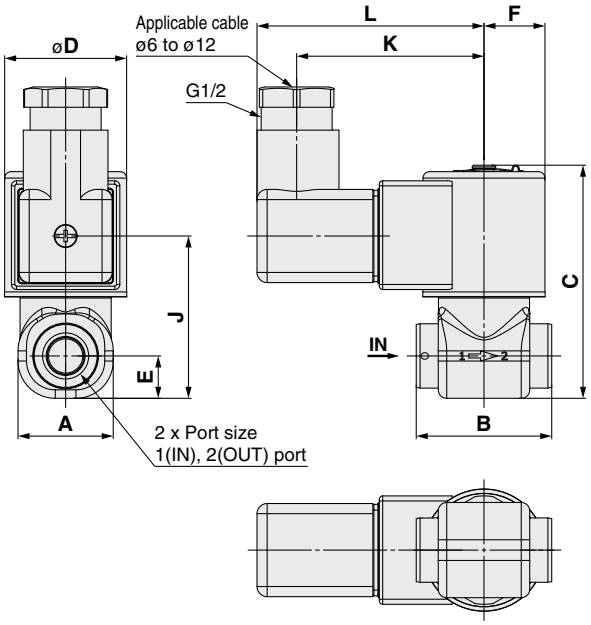
[mm]

Size	Port size	A	B	C	D	E	F
20	1/4	28.1	40	69	36	12.5	18
	3/8		48				
	G3/8			72		14	
30	1/4	28.1	40	78	42	12.5	21
	3/8		48				
	G3/8			81		14	

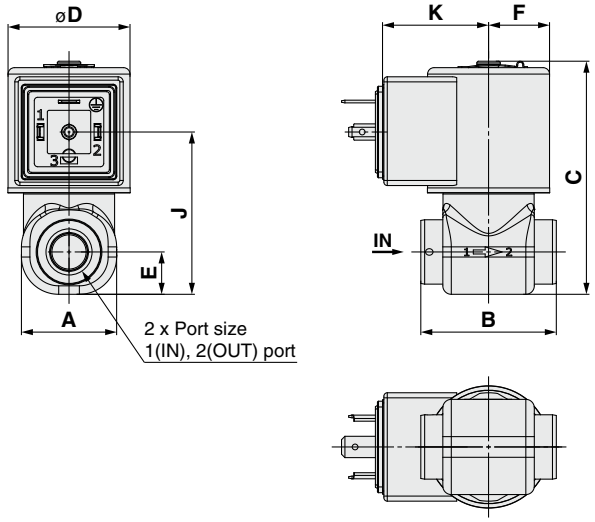
Size	Port size	Grommet		Grommet with PCB		Conduit	
		J	K	J	K	J	K
20	1/4	39	28.5	44.8	38	46.4	48.9
	3/8						
	G3/8	42		47.8		49.4	
30	1/4	40	31.1	45.8	41	47.4	51.9
	3/8						
	G3/8	43		48.8		50.4	

Dimensions: JSX20, 30 Port Size 1/4, 3/8 Body Material Stainless Steel

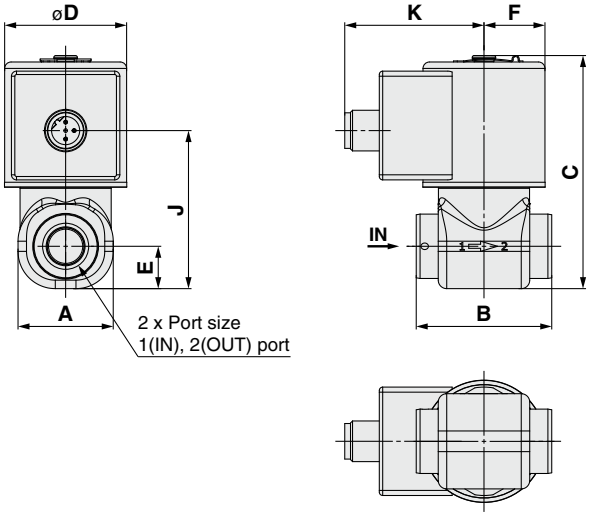
DS: DIN terminal
DZ: DIN terminal with light



DN: DIN terminal without connector



WN: M12 connector



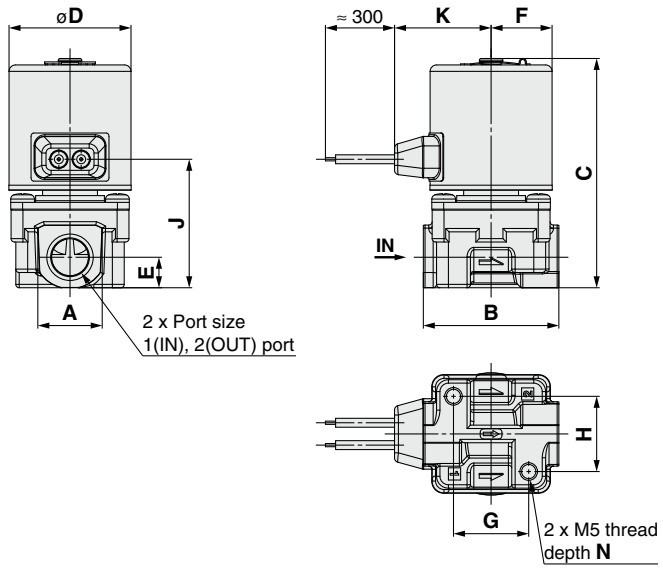
[mm]

Size	Port size	A	B	C	D	E	F
20	1/4	28.1	40	69	36	12.5	18
	3/8		48				
	G3/8			72		14	
30	1/4	28.1	40	78	42	12.5	21
	3/8		48				
	G3/8			81		14	

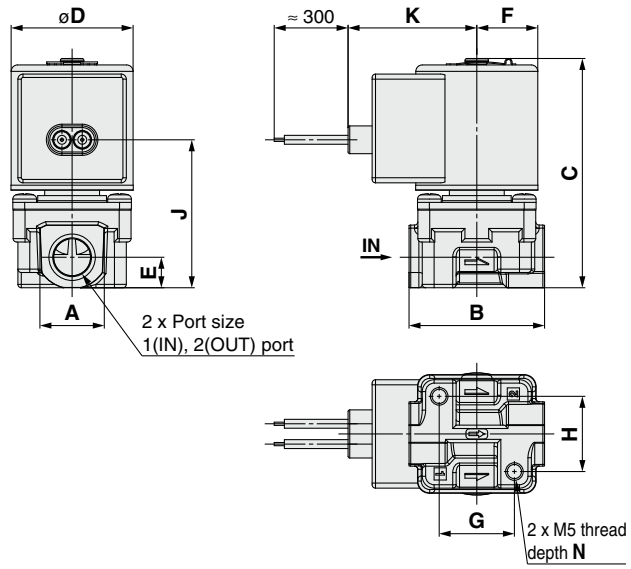
Size	Port size	DIN terminal			DIN terminal without connector		M12 connector	
		J	K	L	J	K	J	K
20	1/4	47.9	55.3	67	47.9	31.3	46.7	41.1
	3/8							
	G3/8	50.9			50.9		49.7	
30	1/4	48.9	58.3	70	48.9	34.3	47.7	44.1
	3/8							
	G3/8	51.9			51.9		50.7	

Dimensions: JSX20, 30 Port Size 1/8, 1/4, 3/8 Body Material Brass

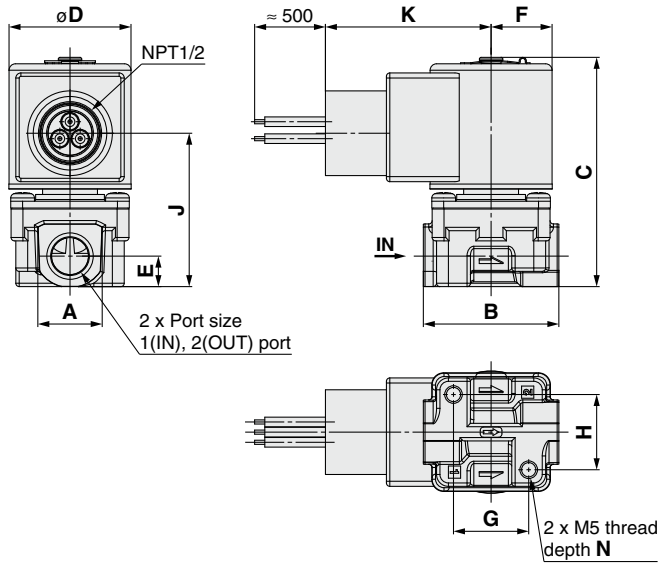
G: Grommet



GS: Grommet with PCB



CS: Conduit



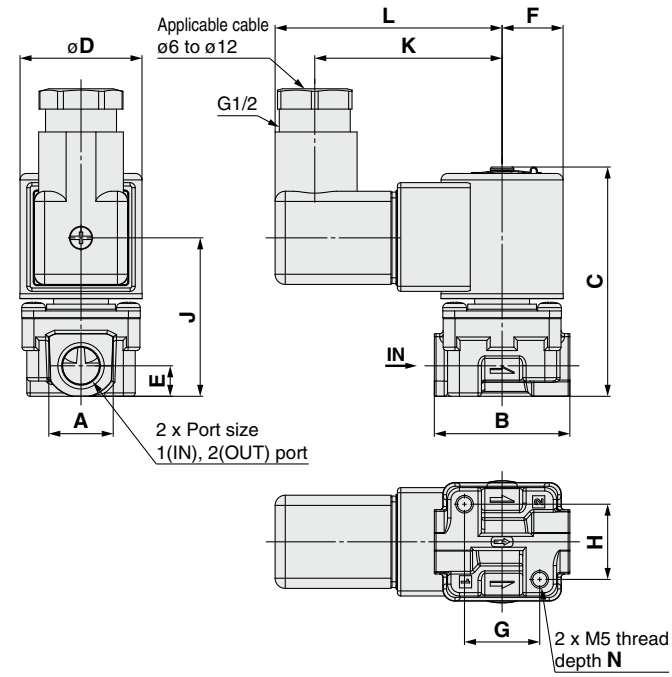
[mm]

Size	Port size	A	B	C	D	E	F	G	H	N
20	1/8	14	30	69.2	36	9	18	15	17.5	6.4
	1/4	19	40	67.7				22.2	22.2	7.6
	3/8	22	48	70.7		11		19	20.6	6
30	1/4	19	40	76.7	42	9	21	22.2	22.2	7.6
	3/8	22	48	79.7		11		19	20.6	6

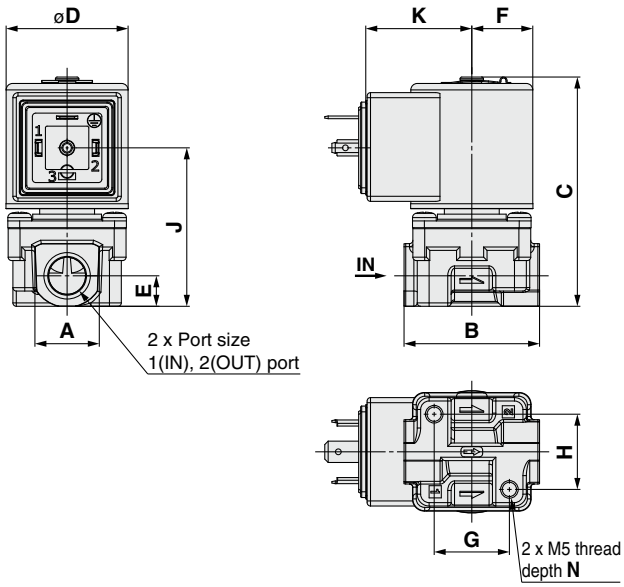
Size	Port size	Grommet		Grommet with PCB		Conduit	
		J	K	J	K	J	K
20	1/8	39.4	28.5	45.2	38	46.8	48.9
	1/4	37.9		43.7		45.3	
	3/8	40.9		46.7		48.3	
30	1/4	39	31.1	44.7	41	46.3	51.9
	3/8	42		47.7		49.3	

Dimensions: JSX20, 30 Port Size 1/8, 1/4, 3/8 Body Material Brass

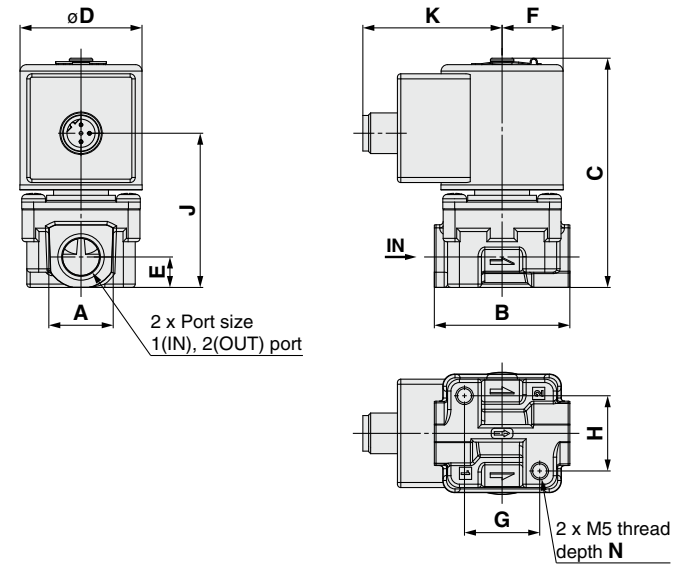
DS: DIN terminal
DZ: DIN terminal with light



DN: DIN terminal without connector



WN: M12 connector



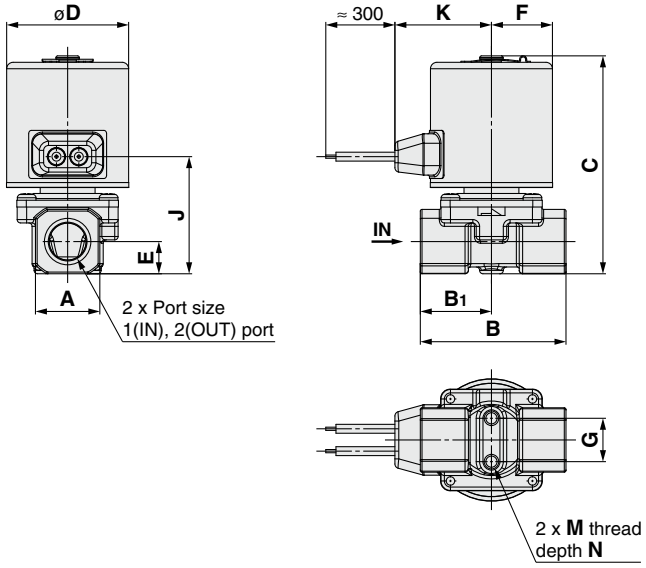
[mm]

Size	Port size	A	B	C	D	E	F	G	H	N
20	1/8	14	30	69.2	36	9	18	15	17.5	6.4
	1/4	19	40	67.7				22.2	22.2	7.6
	3/8	22	48	70.7		11		19	20.6	6
30	1/4	19	40	76.7	42	9	21	22.2	22.2	7.6
	3/8	22	48	79.7		11		19	20.6	6

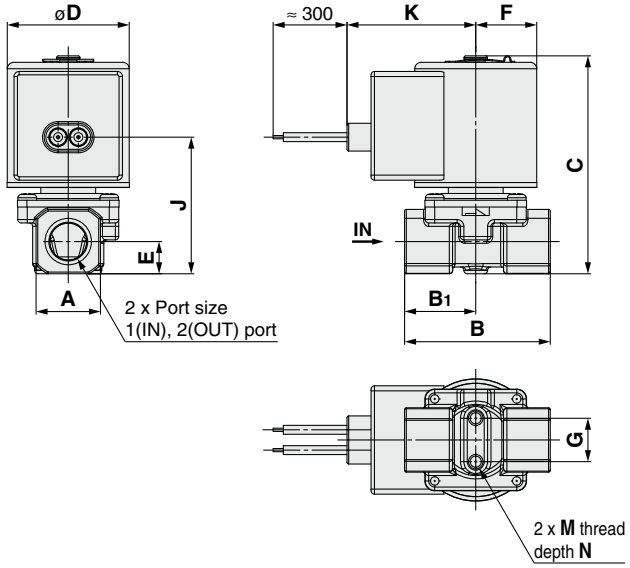
Size	Port size	DIN terminal			DIN terminal without connector		M12 connector	
		J	K	L	J	K	J	K
20	1/8	48.3	55.3	67	48.3	31.3	47	41.1
	1/4	46.8			46.8		45.5	
	3/8	49.8			49.8		48.5	
30	1/4	47.8	58.3	70	47.8	34.3	46.6	44.1
	3/8	50.8			50.8		49.6	

Dimensions: JSX20, 30 Port Size 1/8, 1/4, 3/8 Body Material Aluminum

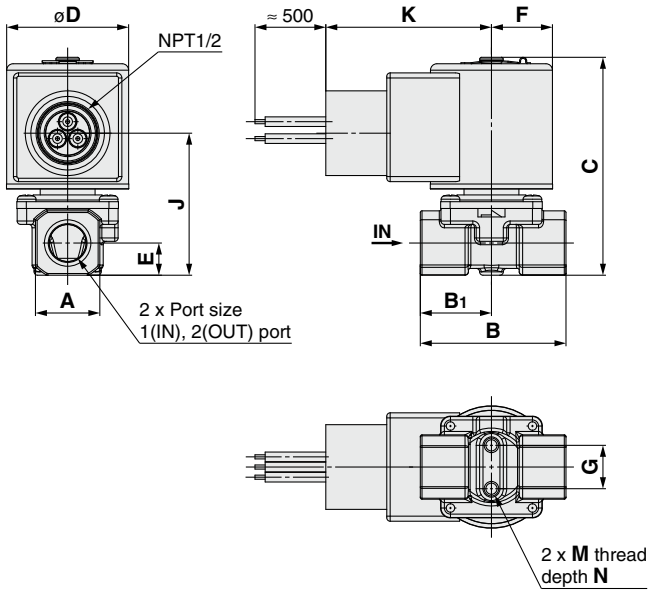
G: Grommet



GS: Grommet with PCB



CS: Conduit



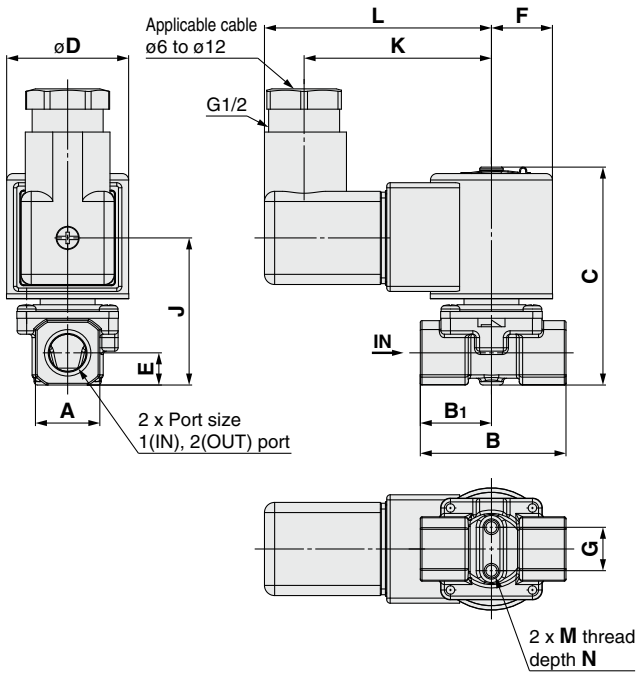
[mm]

Size	Port size	A	B	B1	C	D	E	F	G	M	N
20	1/8, 1/4	19	43	21	64.3	36	9.5	18	12.8	M4	6
30	1/4, 3/8	24	45	22.5	80.7	42	12	21	19	M5	8

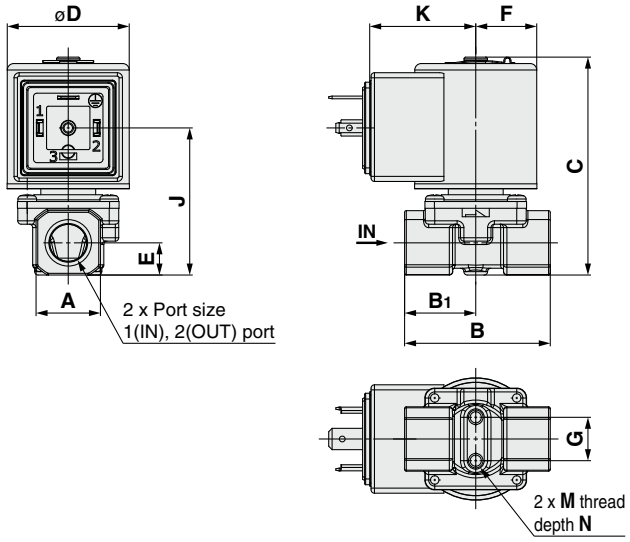
Size	Port size	Grommet		Grommet with PCB		Conduit	
		J	K	J	K	J	K
20	1/8, 1/4	34.6	28.5	40.3	38	41.9	48.9
30	1/4, 3/8	43	31.1	48.7	41	50.3	51.9

Dimensions: JSX20, 30 Port Size 1/8, 1/4, 3/8 Body Material Aluminum

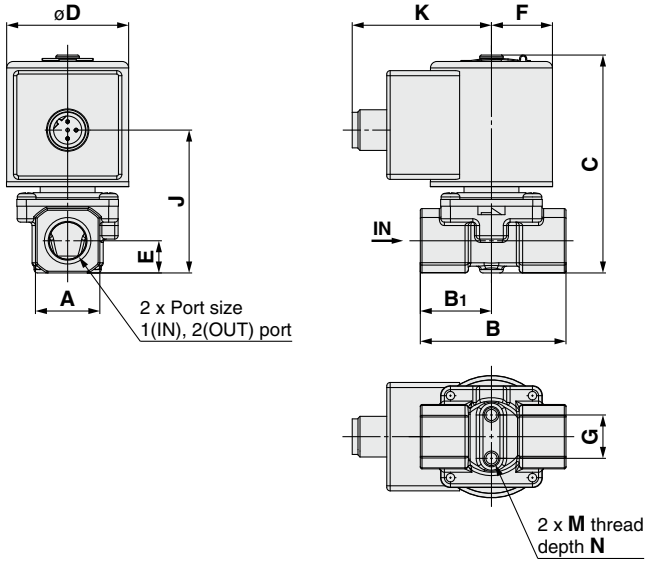
DS: DIN terminal
DZ: DIN terminal with light



DN: DIN terminal without connector



WN: M12 connector



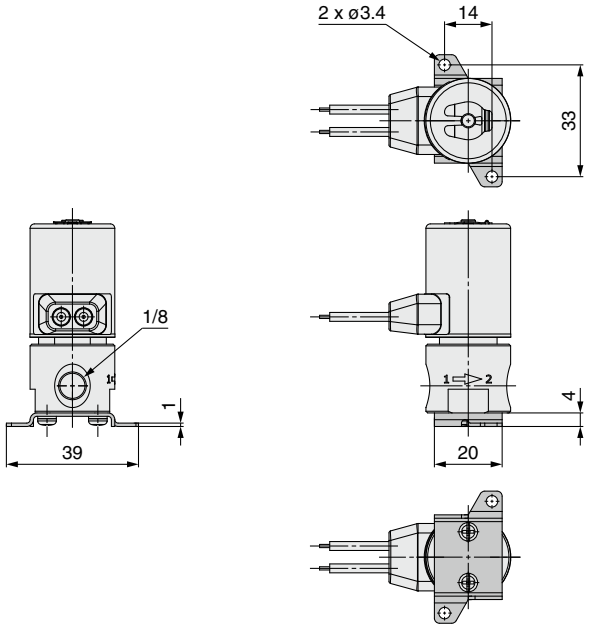
[mm]

Size	Port size	A	B	B1	C	D	E	F	G	M	N
20	1/8, 1/4	19	43	21	64.3	36	9.5	18	12.8	M4	6
30	1/4, 3/8	24	45	22.5	80.7	42	12	21	19	M5	8

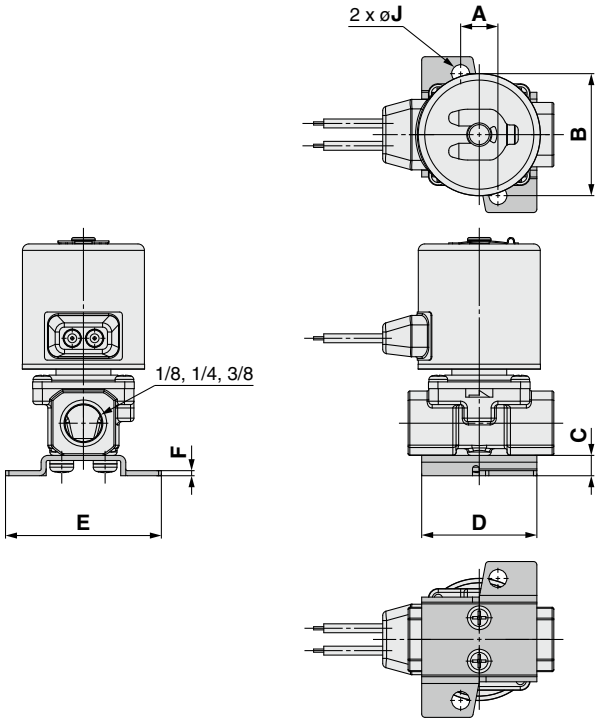
Size	Port size	DIN terminal			DIN terminal without connector		M12 connector	
		J	K	L	J	K	J	K
20	1/8, 1/4	43.4	55.3	67	43.4	31.3	42.2	41.1
30	1/4, 3/8	51.8	58.3	70	51.8	34.3	50.6	44.1

Dimensions: Bracket Options

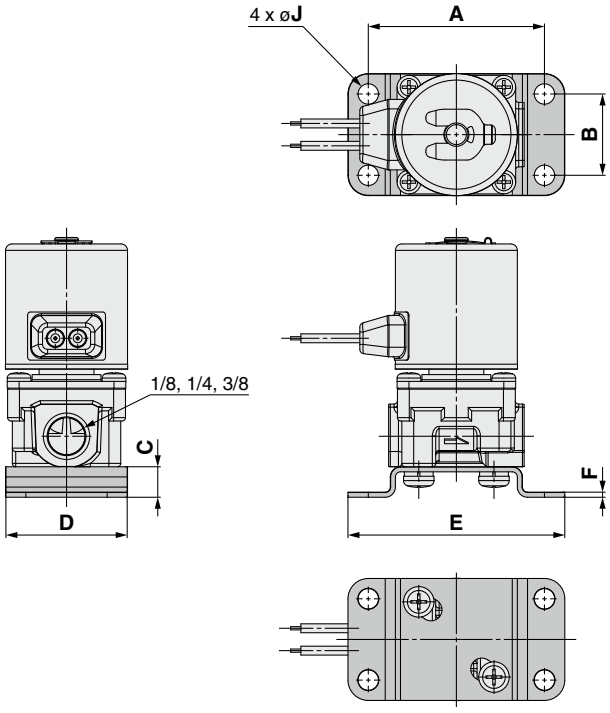
JSX10 Body Material: Stainless Steel, Brass



JSX20, 30 Body Material: Aluminum



JSX20, 30 Body Material: Brass



Body Material: Brass [mm]

Size	Port size	A	B	C	D	E	F	øJ
20	1/8	52	24	9	36	64	1.5	6
20, 30	1/4	52	24	9	36	64	1.5	6
	3/8							

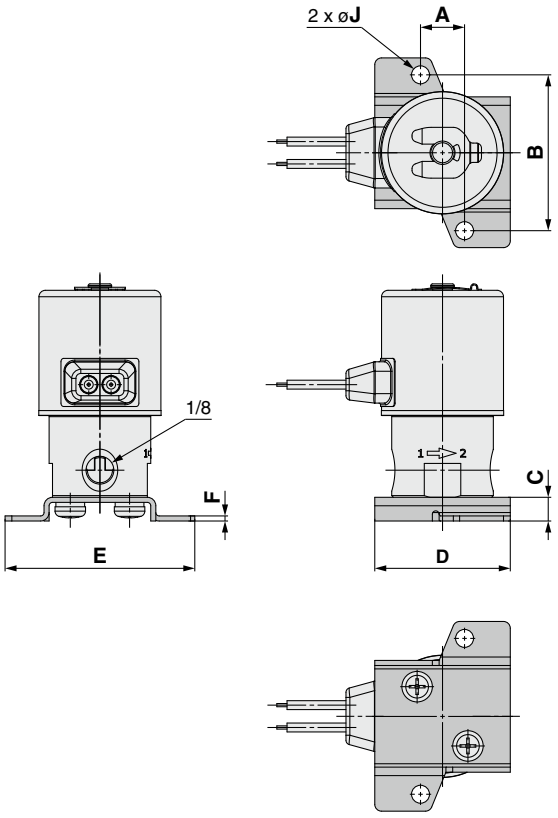
Body Material: Aluminum [mm]

Size	Port size	A	B	C	D	E	F	øJ
20	1/8, 1/4	11	36	6	34	46	1.5	5.3
30	1/4, 3/8	13	46	7	40	56	1.5	

Dimensions: Bracket Options

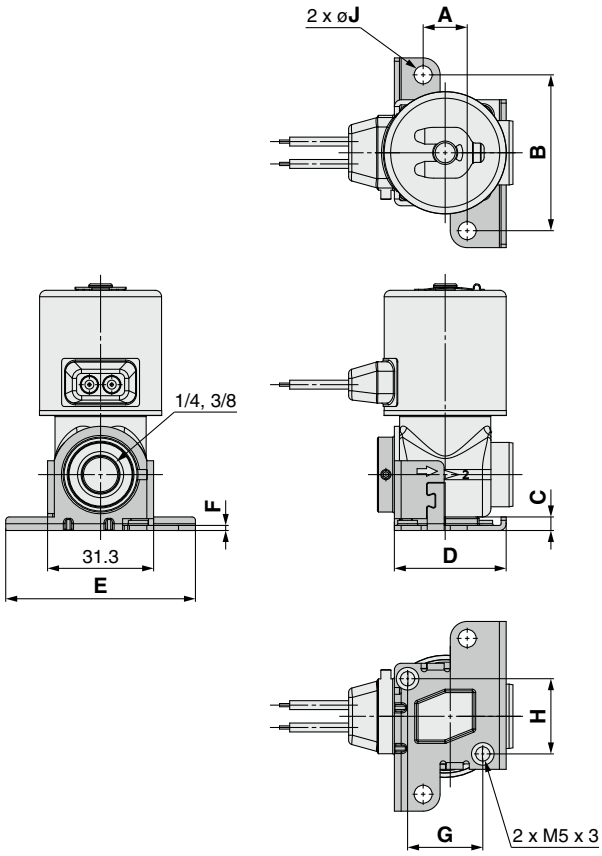
JSX20, 30 Body Material: Stainless Steel

(Port size 1/8 type)



JSX20, 30 Body Material: Stainless Steel

(Port size 1/4, 3/8 type)



Stainless Steel [mm]

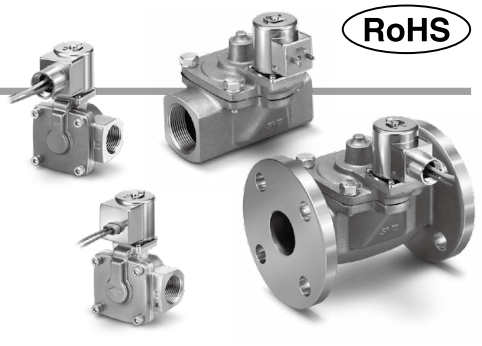
Size	Port size	A	B	C	D	E	F	G	H	øJ
20	1/8	13	46	7	40	56	1.5	—	—	5.3
20, 30	1/4, 3/8	13	46	4	33	56	1.5	22.2	22.2	5.3
	G3/8							19	20.6	

Pilot Operated
2-Port Solenoid Valve
JSXD Series

CE

Differs depending on the voltage and electrical entry. For details, refer to table ❽ below.

RoHS



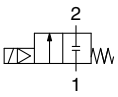
How to Order

JSXD ❶ ❷ – ❸ ❹ ❺ ❻ – ❼ ❽ – ❾ – ❿

❶ Size

Symbol	Size
3	30
4	40
5	50
6	60
7	70
8	80
9	90

❷ Valve type

Symbol	Valve type	
1	N.C.	

❸ Body material

Symbol	Body material	Size		
		30	**40, 50, 60**	**70, 80, 90**
C	Brass	●	●	—
S	Stainless steel	●	●	—
B	Bronze	—	—	●
A	Aluminum	●	—	—

❹ Seal material

Symbol	Seal material
N	NBR
F	FKM
E∗1	EPDM

∗1 Cannot be used in combination with the aluminum body

❺ Port size

Symbol	Connection	Port size	Size						
			30	**40**	**50**	**60**	**70**	**80**	**90**
02	Thread	1/4	●	—	—	—	—	—	—
03		3/8	●	●	—	—	—	—	—
04		1/2	●	●	—	—	—	—	—
06		3/4	—	—	●	—	—	—	—
10		1	—	—	—	●	—	—	—
12		1 1/4	—	—	—	—	●	—	—
14		1 1/2	—	—	—	—	—	●	—
20		2	—	—	—	—	—	—	●
32	Flange	32A	—	—	—	—	●	—	—
40		40A	—	—	—	—	—	●	—
50		50A	—	—	—	—	—	—	●

❻ Thread type

Symbol	Thread type
R	Rc
N	NPT
F	G

❼ Rated voltage

AC

Symbol	Rated voltage	Symbol	Rated voltage
1	100 VAC	**7**	240 VAC
2	200 VAC	**8**	48 VAC
3	120 (110) VAC	**B**	24 VAC
4	220 VAC	**J**	230 VAC

DC

Symbol	Rated voltage
5	24 VDC
6	12 VDC

❽ Electrical entry

Symbol	Electrical entry		CE-compliant
G	Grommet∗1		12 VDC 24 VDC
GS	Grommet with PCB (With surge voltage suppressor)		100 VAC 24 VDC 12 VDC 48 VAC 24 VAC
CS	Conduit (With surge voltage suppressor)		All voltages
DS	DIN terminal (With surge voltage suppressor)		All voltages
DZ	DIN terminal with light (With surge voltage suppressor)		All voltages
DN	DIN terminal without connector (With surge voltage suppressor)		All voltages
WN	M12 connector without cable (With surge voltage suppressor)∗2		All voltages

∗1 DC voltage only

∗2 A cable for the M12 connector is not included with the product. Refer to “Option” on page 39 to order it separately.

❾ Oil-free option

Symbol	Option
Nil	None
D	Oil-free

❿ Bracket

Symbol	With bracket	Size		
		30	**40, 50, 60**	**70, 80, 90**
Nil	None	●	●	●
B	With bracket	●	●	—∗1

∗1 Sizes 70 to 90 are not available with a bracket.

Flow Rate Characteristics

Size	Body material	Port size	Orifice diameter [mmø]	Flow rate characteristics*1						Min. operating pressure differential [MPa]	Max. operating pressure differential [MPa]	Model	Weight*2 [g]
				Air				Water, Oil					
				C [dm³/(s·bar)]	b	Cv	Effective area [mm²]	Kv	Conversion Cv				
30	Aluminum	1/4	10	8.5	0.35	2.0	—	—		0.02	1.0	JSXD31-A□02	410
		3/8		9.2		2.4						JSXD31-A□03	410
		1/2		9.2		2.4						JSXD31-A□04	410
	Brass Stainless steel	1/4		8.5	0.35	2.0		1.6	1.9			JSXD31-S□02	500
		3/8		9.2		2.4		2.0	2.4			JSXD31-S□03	500
		1/2		9.2		2.4		2.0	2.4			JSXD31-S□04	500
40	Brass Stainless steel	3/8	15	18	0.35	5.0		3.9	4.5			JSXD41-S□03	720
		1/2		20		5.5		4.6	5.5			JSXD41-S□04	720
50	Brass/Stainless steel	3/4	20	38	0.30	9.5		8.2	9.5			JSXD51-S□06	880
60	Brass/Stainless steel	1	25	—			225	11.0	13.0			JSXD61-S□10	1460
70	Bronze	1 1/4, 32A	35				415	19.6	23.0	0.03	1.0	JSXD71-B□(12, 32)	5500/3000
80	Bronze	1 1/2, 40A	40				560	26.4	31.0			JSXD81-B□(14, 40)	6900/4100
90	Bronze	2, 50A	50				880	42.8	49.0			JSXD91-B□(20, 50)	8500/5500

*1 The flow rate characteristics of this product have variations.
*2 Indicates case of grommet type
Add 20 g for grommet with PCB, 70 g for conduit, 50 g for DIN terminal, and 15 g for M12 connector.
For sizes 70, 80, and 90, the weight on the left is for the flange type, and the weight on the right is for the thread type.

Applicable Fluid Check List

Applicable fluid	Seal material		
	NBR	FKM	EPDM
Air	●	●	●
Water	●	●	●
Oil	—	●	—

* The list shows the compatibility between general fluids and seal materials. Consider the operating environment and application sufficiently before selecting the seal material. Fluid and component compatibility should be checked in the application before use. If something is not clear, please contact SMC.

Common Specifications

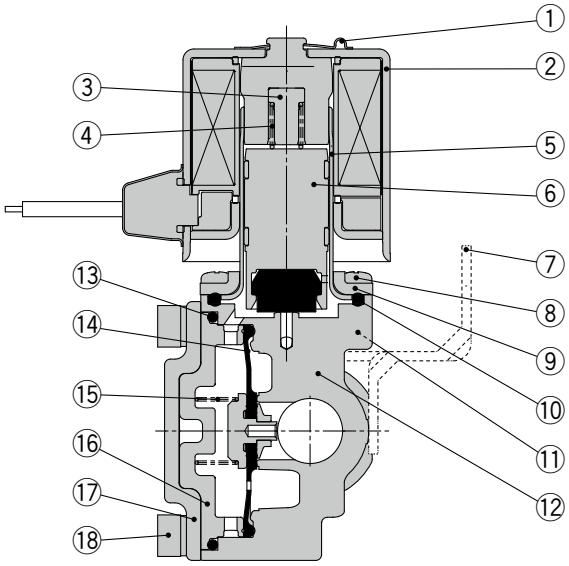
	Size		30		40	50	60	70	80	90
Valve specifications	Body material		Aluminum	Brass, Stainless steel	Brass, Stainless steel			Bronze		
	Valve construction		Pilot operated diaphragm							
	Valve type		Normally closed (N.C.)							
	Fluid and fluid temperature	Air*1	–10 to 60°C							
		Water, Oil	—	Water: 1 to 60°C (No freezing), Oil: –5 to 60°C (Kinematic viscosity: 50 mm²/s or less)						
	Withstand pressure		2 MPa							
	Max. system pressure		1 MPa							
	Ambient temperature		–20 to 60°C							
	Valve leakage*2	Air	15 cm³/min (ANR) or less	2 cm³/min (ANR) or less				10 cm³/min (ANR) or less		
		Water, Oil	—	0.2 cm³/min or less				1 cm³/min or less		
	External leakage*2	Air	15 cm³/min (ANR) or less	1 cm³/min (ANR) or less						
		Water, Oil	—	0.1 cm³/min (ANR) or less						
	Mounting orientation		Unrestricted							
	Enclosure*3		IP67 (IP65 for the DIN terminal)							
	Standards*4		CE							
	Operating environment		Indoors, Location without the presence of corrosive gases, explosive gases, or constant fluid adhesion							
	Seal material		NBR, FKM, EPDM							
Coil specifications	Rated voltage	AC	24 V, 48 V, 100 V, 110 V, 120 V, 200 V, 220 V, 230 V, 240 V							
		DC	12 V, 24 V							
	Allowable voltage fluctuation		±10% of rated voltage							
	Allowable leakage voltage	AC	5% or less of rated voltage							
		DC	2% or less of rated voltage							
	Apparent power*5, *6	AC	8 VA				9.5 VA			
	Power consumption*5	DC	6 W				8 W			
	Temperature rise*7	AC/DC	70/65°C							

*1 Dew point temperature: –10°C or less
*2 The leakage amount value at a differential pressure the same as or higher than the min. operating pressure differential, and an ambient temperature of 20°C
*3 This product ensures IP67, but if water enters the product, it may result in operation failure or breakage.
Therefore, take appropriate measures to prevent water from entering the product when used in an environment where it is constantly exposed to water.
*4 Conformance to standards varies depending on the model. For details, refer to page 21.
*5 Power consumption/Apparent power: The value at an ambient temperature of 20°C and when the rated voltage is applied (Variation: ±10%)
*6 There is no difference in the frequency and the inrush and energized apparent power, since a rectifying circuit is used in the AC.
*7 Temperature rise: The value at an ambient temperature of 20°C and when the rated voltage is applied. The value depends on the ambient environment. This is for reference.

Be sure to read "Specific Product Precautions" before handling.

Construction

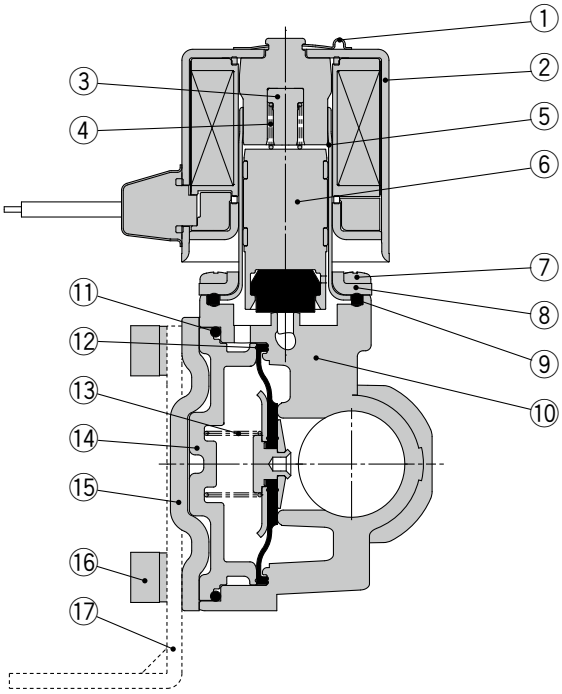
JSXD30, Normally closed (N.C.)
Body material: Brass, Stainless steel, Aluminum



Component Parts

No.	Description	Material		
		Brass	Stainless steel	Aluminum
1	**Clip**	Stainless steel		
2	**Solenoid coil**	Stainless steel, Cu, Resin		
3	**Stopper**	PPS		
4	**Spring**	Stainless steel		
5	**Tube assembly**	Stainless steel		
6	**Armature assembly**	Stainless steel, PPS, NBR, (FKM, EPDM)		Stainless steel, PPS, NBR, (FKM)
7	**Bracket**	Fe		
8	**Mounting screw**	Fe		
9	**Bonnet**	Stainless steel		
10	**Gasket**	NBR, (FKM, EPDM)		NBR, (FKM)
11	**Bolt**	Fe		
12	**Body**	Brass	Stainless steel	Aluminum
13	**O-ring**	NBR, (FKM, EPDM)		NBR, (FKM)
14	**Diaphragm assembly**	Stainless steel, NBR, (FKM, EPDM)		Stainless steel, NBR, (FKM)
15	**Valve spring**	Stainless steel		
16	**Buffer**	PPS		
17	**Bonnet**	Stainless steel		
18	**Bolt**	Fe		

JSXD40, Normally closed (N.C.)
Body material: Brass, Stainless steel

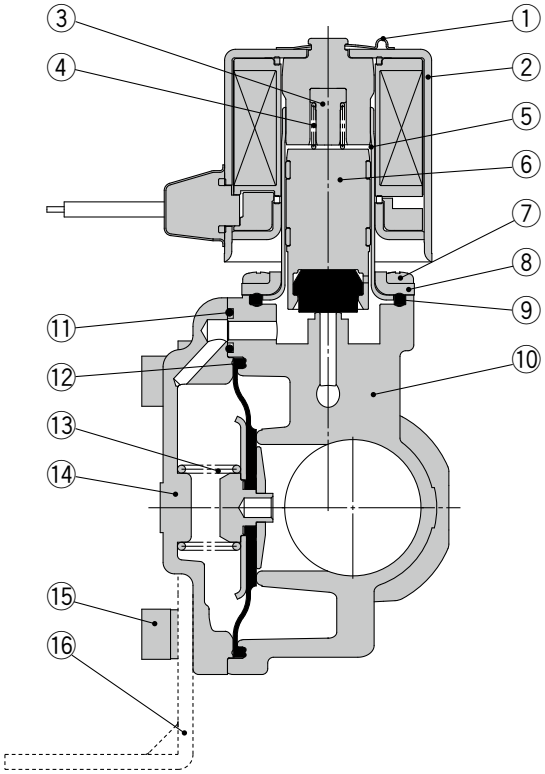


Component Parts

No.	Description	Material	
		Brass	Stainless steel
1	**Clip**	Stainless steel	
2	**Solenoid coil**	Stainless steel, Cu, Resin	
3	**Stopper**	PPS	
4	**Spring**	Stainless steel	
5	**Tube assembly**	Stainless steel	
6	**Armature assembly**	Stainless steel, PPS, NBR, (FKM, EPDM)	
7	**Mounting screw**	Fe	
8	**Bonnet**	Stainless steel	
9	**Gasket**	NBR, (FKM, EPDM)	
10	**Body**	Brass	Stainless steel
11	**O-ring**	NBR, (FKM, EPDM)	
12	**Diaphragm assembly**	Stainless steel, NBR, (FKM, EPDM)	
13	**Valve spring**	Stainless steel	
14	**Buffer**	PPS	
15	**Bonnet**	Stainless steel	
16	**Bolt**	Fe	
17	**Bracket**	Fe	

Construction

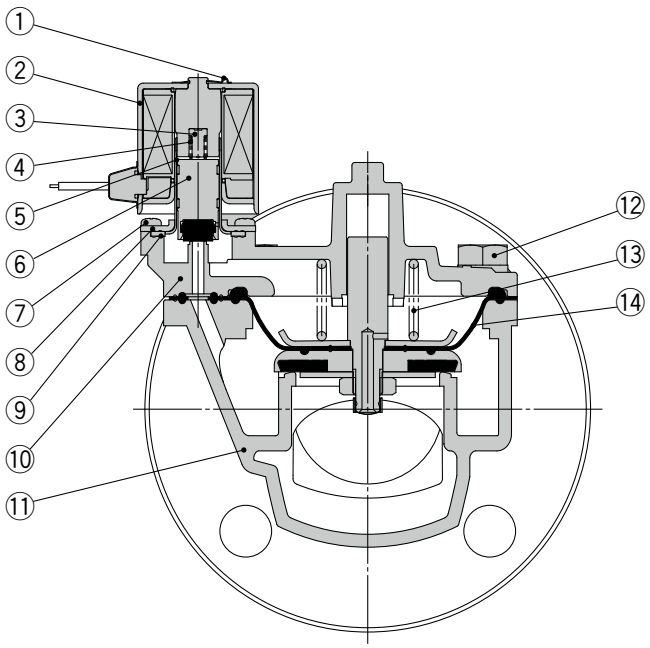
JSXD50, 60, Normally closed (N.C.)
Body material: Brass, Stainless steel



Component Parts

No.	Description	Material	
		Brass	Stainless steel
1	**Clip**	Stainless steel	
2	**Solenoid coil**	Stainless steel, Cu, Resin	
3	**Stopper**	PPS	
4	**Spring**	Stainless steel	
5	**Tube assembly**	Stainless steel	
6	**Armature assembly**	Stainless steel, PPS, NBR, (FKM, EPDM)	
7	**Mounting screw**	Fe	
8	**Bonnet**	Stainless steel	
9	**Gasket**	NBR, (FKM, EPDM)	
10	**Body**	Brass	Stainless steel
11	**O-ring**	NBR, (FKM, EPDM)	
12	**Diaphragm assembly**	Stainless steel, NBR, (FKM, EPDM)	
13	**Valve spring**	Stainless steel	
14	**Bonnet**	Brass	Stainless steel
15	**Bolt**	Fe	
16	**Bracket**	Fe	

JSXD70, 80, 90, Normally closed (N.C.)
Body material: Bronze

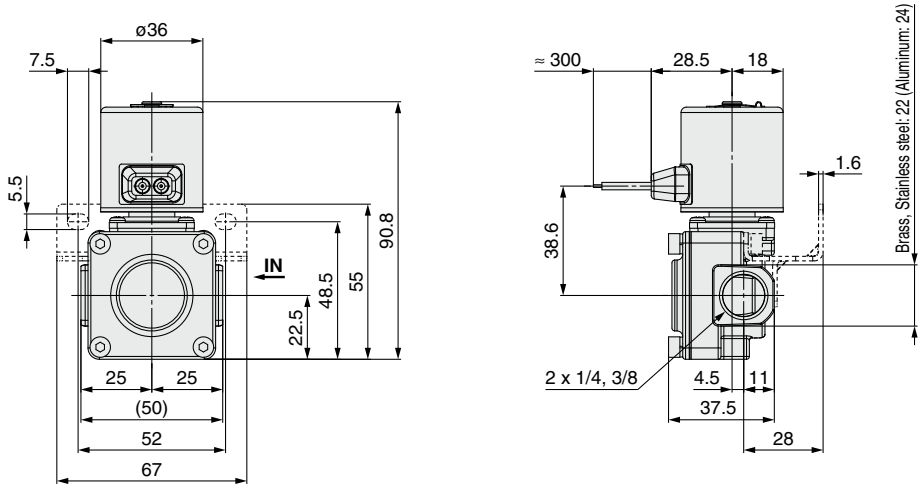


Component Parts

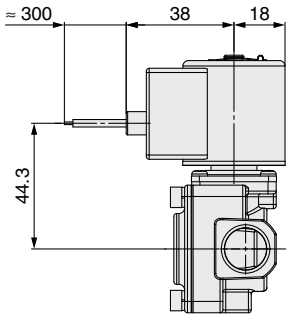
No.	Description	Material
1	**Clip**	Stainless steel
2	**Solenoid coil**	Stainless steel, Cu, Resin
3	**Stopper**	PPS
4	**Spring**	Stainless steel
5	**Tube assembly**	Stainless steel
6	**Armature assembly**	Stainless steel, PPS, NBR, (FKM, EPDM)
7	**Mounting screw**	Fe
8	**Bonnet**	Stainless steel
9	**Gasket**	NBR, (FKM, EPDM)
10	**Bonnet**	Bronze
11	**Body**	Bronze
12	**Bolt**	Fe
13	**Valve spring**	Stainless steel
14	**Diaphragm assembly**	Stainless steel, NBR, (FKM, EPDM)

Dimensions: JSXD30 Port Size 1/4, 3/8 Body Material Aluminum, Brass, Stainless Steel

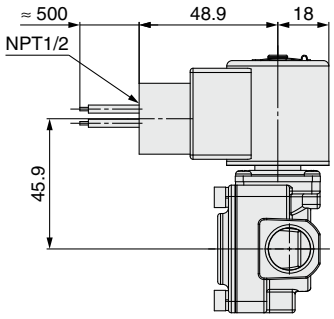
G: Grommet



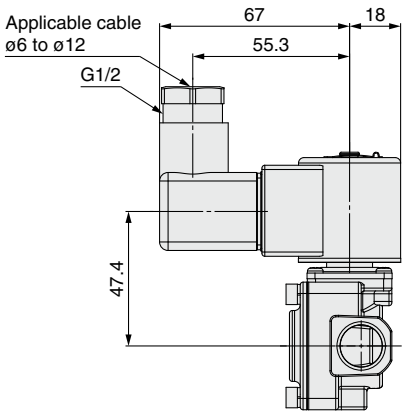
GS: Grommet with PCB



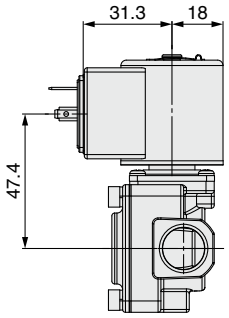
CS: Conduit



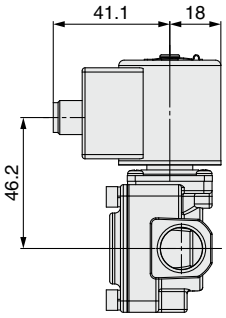
DS: DIN terminal
DZ: DIN terminal with light



DN: DIN terminal without connector

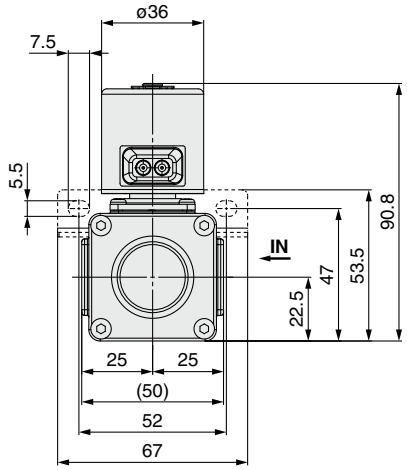


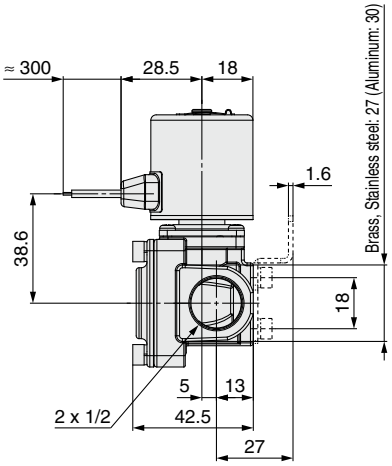
WN: M12 connector



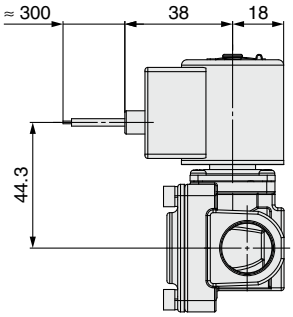
Dimensions: JSXD30 Port Size 1/2 Body Material Aluminum, Brass, Stainless Steel

G: Grommet

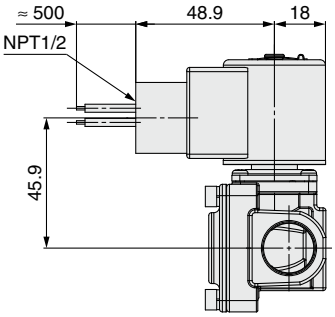




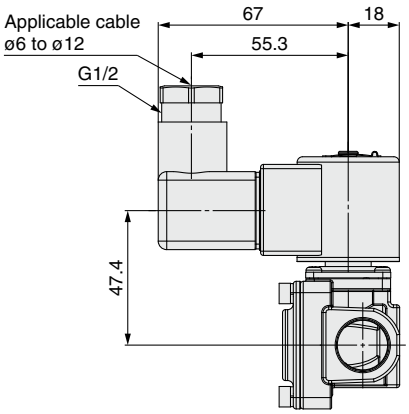
GS: Grommet with PCB



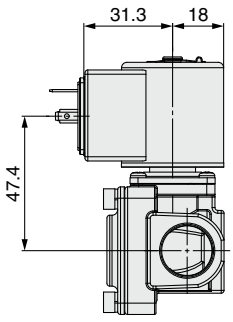
CS: Conduit



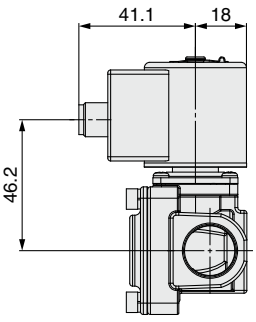
DS: DIN terminal
DZ: DIN terminal with light



DN: DIN terminal without connector

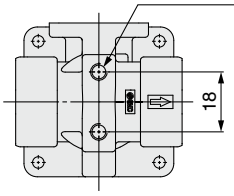


WN: M12 connector



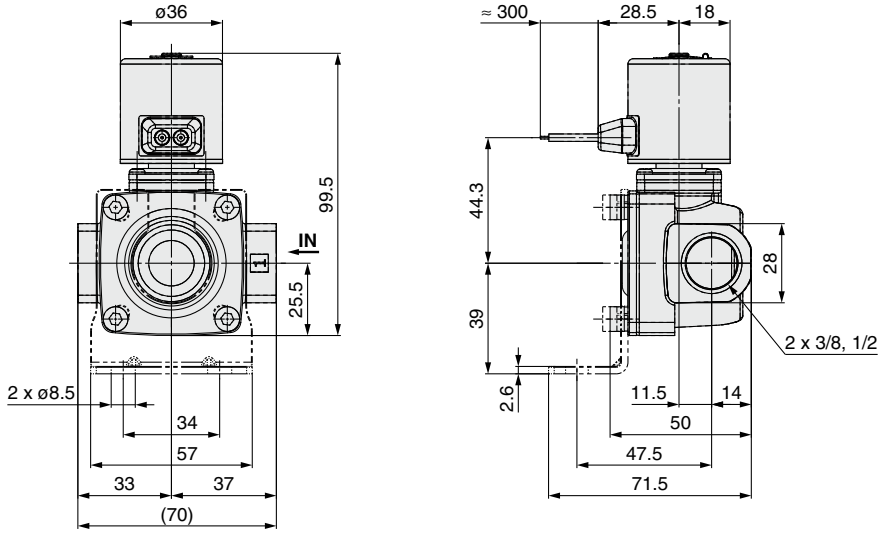
JSXD31-□□04

* Only the JSXD31 with port size of 04 (1/2) has threads on the bottom of the body.

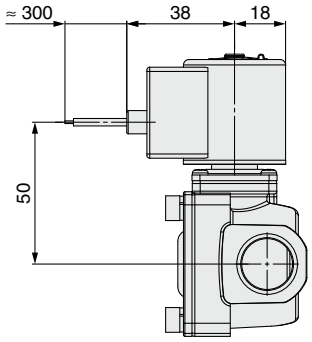


Dimensions: JSXD40 Port Size 3/8, 1/2 Body Material Brass, Stainless Steel

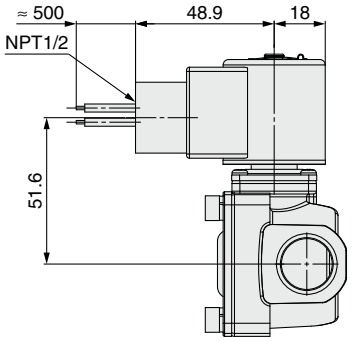
G: Grommet



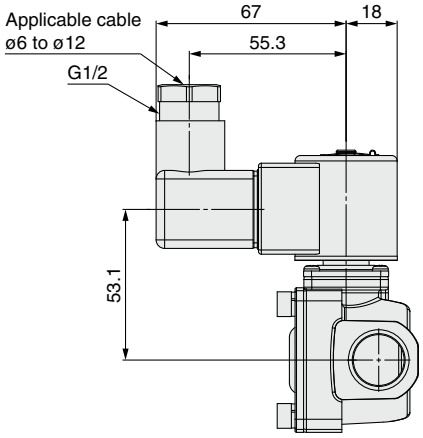
GS: Grommet with PCB



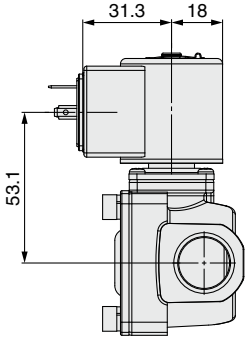
CS: Conduit



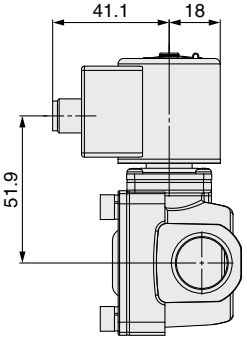
DS: DIN terminal
DZ: DIN terminal with light



DN: DIN terminal without connector

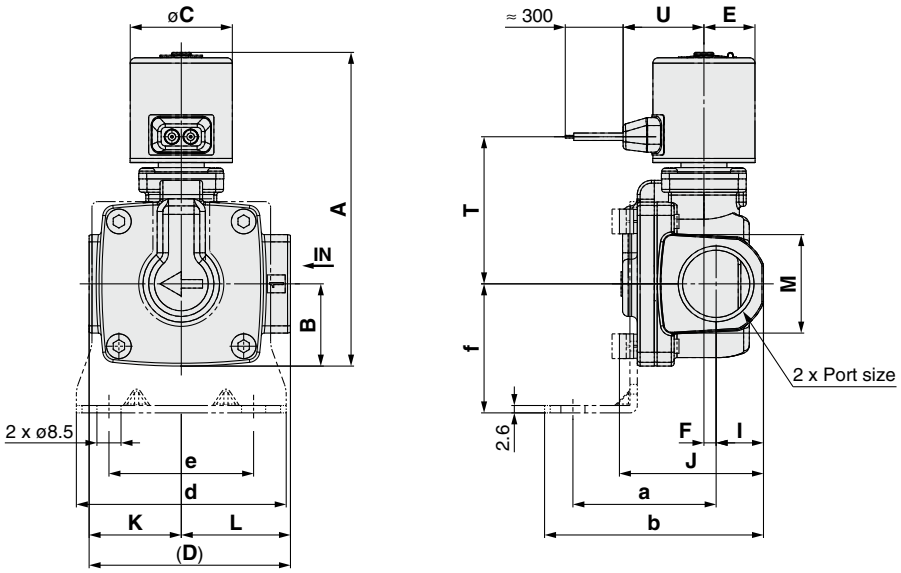


WN: M12 connector

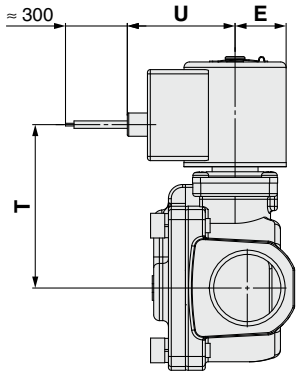


Dimensions: JSXD50, 60 Port Size 3/4, 1 Body Material Brass, Stainless Steel

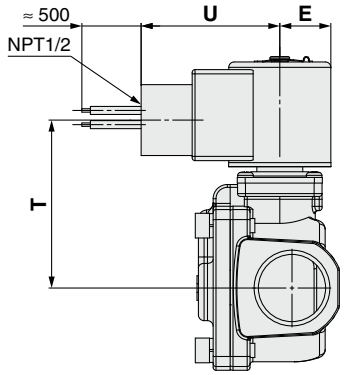
G: Grommet



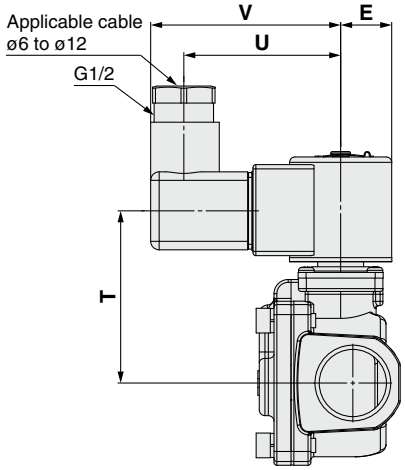
GS: Grommet with PCB



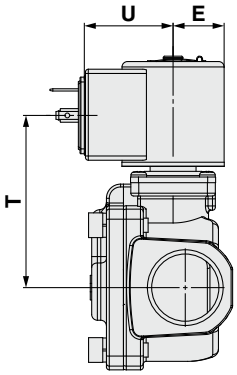
CS: Conduit



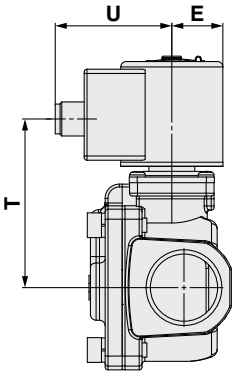
DS: DIN terminal
DZ: DIN terminal with light



DN: DIN terminal without connector



WN: M12 connector



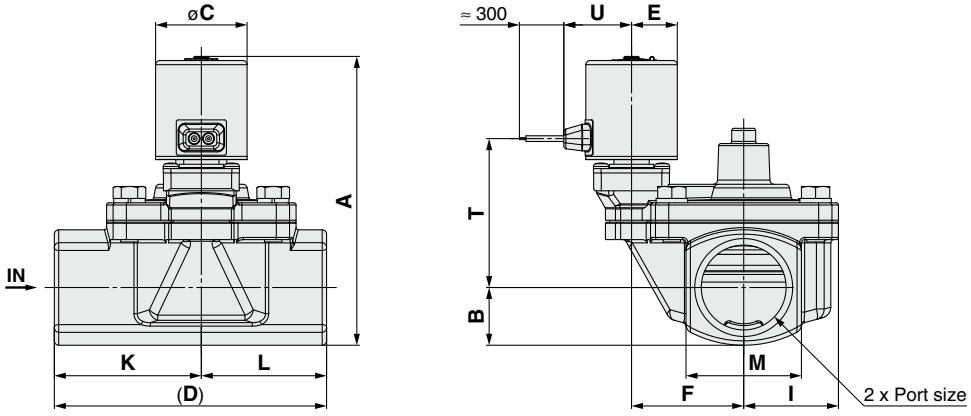
[mm]

Size	Port size	A	B	C	D	E	F	I	J	K	L	M	Grommet		Grommet with PCB	
													T	U	T	U
50	3/4	110.6	29	36	71	18	4.5	17	51	32.5	38.5	35	51.9	28.5	57.6	38
60	1	131	33	42	95	21	4.5	20	59.5	45.5	49.5	42	60.4	31.1	66	41

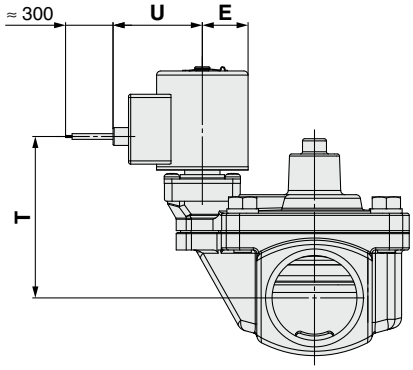
Size	Port size	Conduit		DIN terminal			DIN terminal without connector		M12 connector		Bracket mount dimensions				
		T	U	T	U	V	T	U	T	U	a	b	d	e	f
50	3/4	59.2	48.9	60.7	55.3	67	60.7	31.3	59.5	41.1	50.5	77.5	74	51	45.5
60	1	67.6	51.9	69.1	58.3	70	69.1	34.3	67.9	44.1	55.5	85.5	81	58	49.5

Dimensions: JSXD70, 80, 90 Port Size 1 1/4, 1 1/2, 2 Body Material Bronze

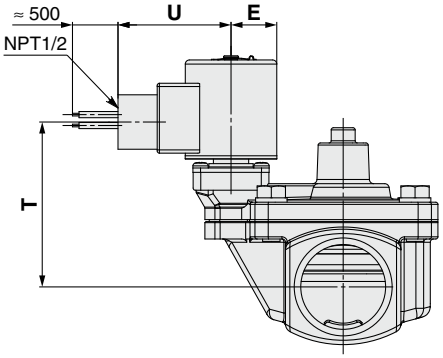
G: Grommet



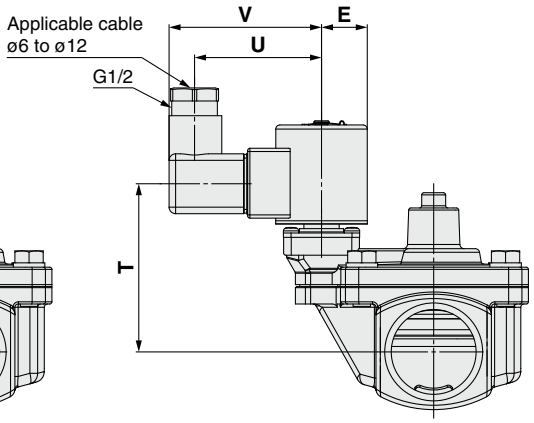
GS: Grommet with PCB



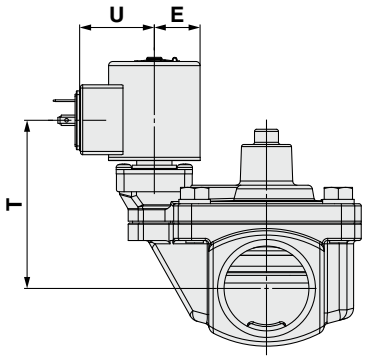
CS: Conduit



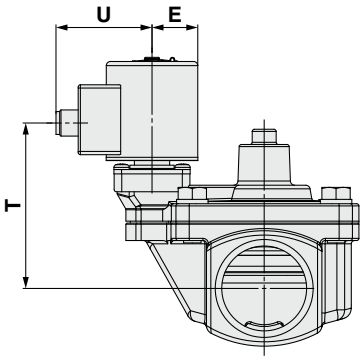
DS: DIN terminal
DZ: DIN terminal with light



DN: DIN terminal without connector



WN: M12 connector



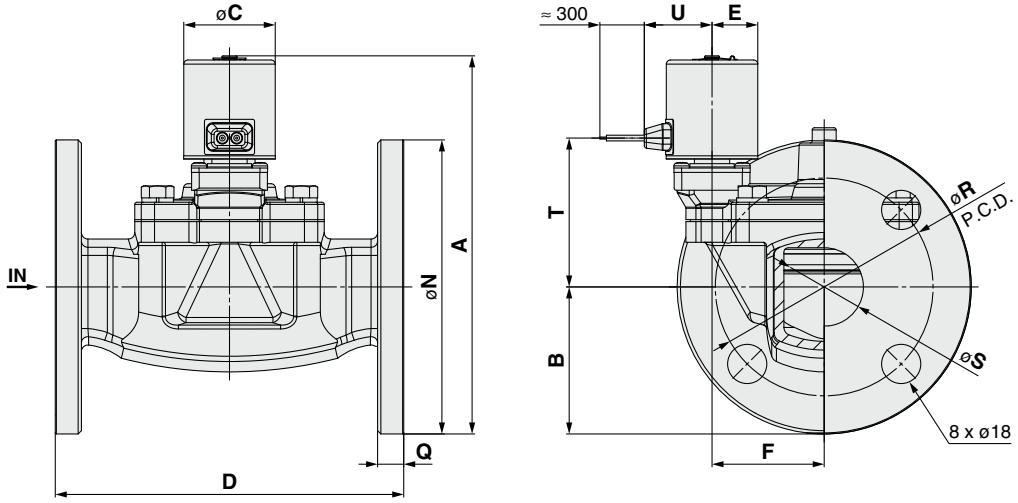
[mm]

Size	Port size	A	B	C	D	E	F	I	K	L	M
70	1 1/4	132.6	26.5	42	125	21	51.5	43.5	67.5	57.5	53
80	1 1/2	139.3	30	42	132	21	54.5	46.5	72	60	60
90	2	150.3	35.5	42	150	21	59	52	81	69	71

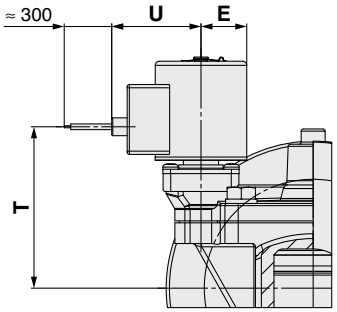
Size	Port size	Grommet		Grommet with PCB		Conduit		DIN terminal			DIN terminal without connector		M12 connector	
		T	U	T	U	T	U	T	U	V	T	U	T	U
70	1 1/4	68.4	31.1	74.1	41	75.7	51.9	77.2	58.3	70	77.2	34.3	76	44.1
80	1 1/2	71.6	31.1	77.3	41	78.9	51.9	80.4	58.3	70	80.4	34.3	79.2	44.1
90	2	77.1	31.1	82.8	41	84.4	51.9	85.9	58.3	70	85.9	34.3	84.7	44.1

Dimensions: JSXD70, 80, 90 Applicable Flange 32A, 40A, 50A Body Material Bronze

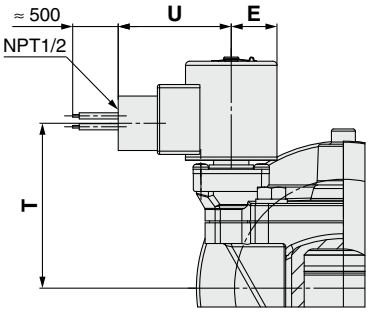
G: Grommet



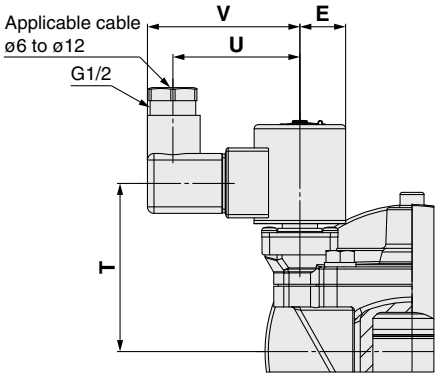
GS: Grommet with PCB



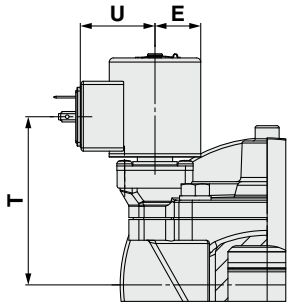
CS: Conduit



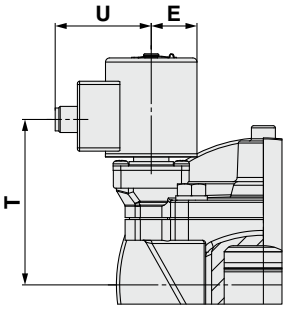
DS: DIN terminal
DZ: DIN terminal with light



DN: DIN terminal without connector



WN: M12 connector



[mm]

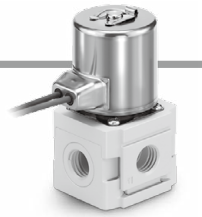
Size	Applicable flange	A	B	C	D	E	F	N	Q	R	S
70	32A	173.6	67.5	42	160	21	51.5	135	12	100	36
80	40A	179.3	70	42	170	21	54.5	140	14	105	42
90	50A	192.3	77.5	42	180	21	59	155	14	120	52

Size	Applicable flange	Grommet		Grommet with PCB		Conduit		DIN terminal			DIN terminal without connector		M12 connector	
		T	U	T	U	T	U	T	U	V	T	U	T	U
70	32A	68.4	31.1	74.1	41	75.7	51.9	77.2	58.3	70	77.2	34.3	76	44.1
80	40A	71.6	31.1	77.3	41	78.9	51.9	80.4	58.3	70	80.4	34.3	79.2	44.1
90	50A	77.1	31.1	82.8	41	84.4	51.9	85.9	58.3	70	85.9	34.3	84.7	44.1

Modular Mounting Type
2-Port Solenoid Valve
JSXM Series

CE

Differs depending on the voltage and electrical entry. For details, refer to table ❽ below.



How to Order

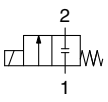
JSXM 2 1 – A N 301 R – 5 G – U – F – D

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫

❶ Size

Symbol	Size
2	20
3	30
4	40

❷ Valve type

Symbol	Valve type
1	N.C. 

❸ Body material

Symbol	Body material
A	Aluminum

❹ Seal material

Symbol	Seal material
N	NBR
F	FKM

❺ Orifice diameter and port size

Symbol	Orifice diameter [mmø]	Port size	Size 20	Size 30	Size 40
301	3.2	1/8	●	—	—
302		1/4	●	—	—
402	4.0	1/4	—	●	●
403		3/8	—	●	●
404		1/2	—	—	●

❻ Thread type

Symbol	Thread type
R	Rc
N	NPT
F	G

❼ Rated voltage

AC

Symbol	Rated voltage	Symbol	Rated voltage
1	100 VAC	**7**	240 VAC
2	200 VAC	**8**	48 VAC
3	120 (110) VAC	**B**	24 VAC
4	220 VAC	**J**	230 VAC

DC

Symbol	Rated voltage
5	24 VDC
6	12 VDC

❽ Electrical entry

Symbol	Electrical entry		CE-compliant
G	Grommet*1		12 VDC 24 VDC
GS	Grommet with PCB (With surge voltage suppressor)		100 VAC 24 VDC 12 VDC 48 VAC 24 VAC
CS	Conduit (With surge voltage suppressor)		All voltages
DS	DIN terminal (With surge voltage suppressor)		All voltages
DZ	DIN terminal with light (With surge voltage suppressor)		All voltages
DN	DIN terminal without connector (With surge voltage suppressor)		All voltages
WN	M12 connector without cable (With surge voltage suppressor)*2		All voltages

*1 DC voltage only

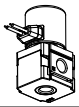
*2 A cable for the M12 connector is not included with the product. Refer to "Option" on page 39 to order it separately.

❾ Coil orientation

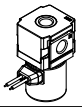
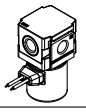
Symbol	Orientation
Nil	Upward
U	Downward

❿ Blow port position

Coil orientation: Upward (When "Nil" is selected for ❾)

Symbol	Position
Nil	Bottom 
F	Front 

Coil orientation: Downward (When "U" is selected for ❾)

Symbol	Position
Nil	Top 
F	Front 

⓫ Oil-free option

Symbol	Option
Nil	None
D	Oil-free

Simple Specials System

A system designed to respond quickly and easily to your special ordering needs

For modular connection units (shipped assembled), the simple specials system can be used.

Simple Specials System

Short lead times

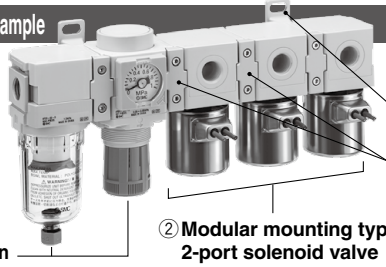
This system enables us to respond to your special needs (additional machining, accessory assembly, or the designing of a modular unit) and deliver your personalized products as quickly as standard products.

Repeat orders

Once we receive a simple special part number from one of your previous orders, we will process the order, manufacture the product, and deliver it to you as quickly as possible.

Please contact your local sales representative for more details.

Connection Example



Ordering Example

① **Air combination AC20B-02E-D** ····· **1 pc.**
② **Modular mounting type 2-port solenoid valve JSXM21-AN302R-5G-U-F** ····· **3 pcs.**
③ **Spacer with bracket Y200T-D** ····· **1 pc.**
④ **Spacer Y200-D** ····· **2 pcs.**

SMC

Flow Rate Characteristics

Size	Port size	Orifice diameter [mmø]	Flow rate characteristics*1			Max. operating pressure differential [MPa]	Model	Weight*2 [g]
			Air					
			C [dm³/(s·bar)]	b	Cv			
20	1/8	3.2	1.36	0.47	0.40	0.7	JSXM21-A□01	300
	1/4						JSXM21-A□02	300
30	1/4	4.0	1.55	0.59	0.50	1.0	JSXM31-A□02	500
	3/8						JSXM31-A□03	500
40	1/4	4.0	1.55	0.59	0.50	1.0	JSXM41-A□02	630
	3/8						JSXM41-A□03	630
	1/2						JSXM41-A□04	630

∗1 The flow rate characteristics of this product have variations.
∗2 Indicates case of grommet type
Add 20 g for grommet with PCB, 70 g for conduit, 50 g for DIN terminal, and 15 g for M12 connector.

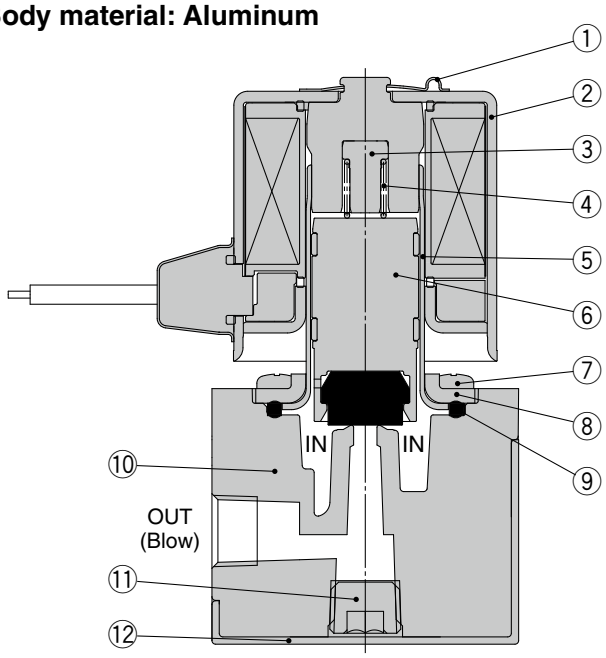
Common Specifications

Size			20	30	40
Valve specifications	**Valve construction**		Direct operated poppet		
	Valve type		Normally closed (N.C.)		
	Fluid and fluid temperature		Air: −10 to 60°C (Dew point temperature: −10°C or less)		
	Withstand pressure		2 MPa		
	Max. system pressure		1 MPa		
	Ambient temperature		−20 to 60°C		
	Valve leakage*1/External leakage*1	**Air**	1 cm³/min (ANR) or less		
	Mounting orientation		Unrestricted		
	Enclosure*2		IP67 (IP65 for the DIN terminal)		
	Standards*3		CE		
	Operating environment		Indoors, Location without the presence of corrosive gases, explosive gases, or constant fluid adhesion		
	Body material		Aluminum		
	Seal material		NBR, FKM		
Coil specifications	**Rated voltage**	**AC**	24 V, 48 V, 100 V, 110 V, 120 V, 200 V, 220 V, 230 V, 240 V		
		DC	12 V, 24 V		
	Allowable voltage fluctuation		±10% of rated voltage		
	Allowable leakage voltage	**AC**	5% or less of rated voltage		
		DC	2% or less of rated voltage		
	Apparent power*4, *5	**AC**	8 VA	9.5 VA	
	Power consumption*4	**DC**	6 W	8 W	
	Temperature rise*6	**AC/DC**	70/65°C		

∗1 The leakage amount value at a differential pressure of 0.01 MPa or higher and an ambient temperature of 20°C
∗2 This product ensures IP67, but if water enters the product, it may result in operation failure or breakage.
Therefore, take appropriate measures to prevent water from entering the product when used in an environment where it is constantly exposed to water.
∗3 Conformance to standards varies depending on the model. For details, refer to page 31.
∗4 Power consumption/Apparent power: The value at an ambient temperature of 20°C and when the rated voltage is applied (Variation: ±10%)
∗5 There is no difference in the frequency and the inrush and energized apparent power, since a rectifying circuit is used in the AC.
∗6 Temperature rise: The value at an ambient temperature of 20°C and when the rated voltage is applied. The value depends on the ambient environment. This is for reference.
Be sure to read "Specific Product Precautions" before handling.

Construction

JSXM20, 30, 40, Normally closed (N.C.)
Body material: Aluminum

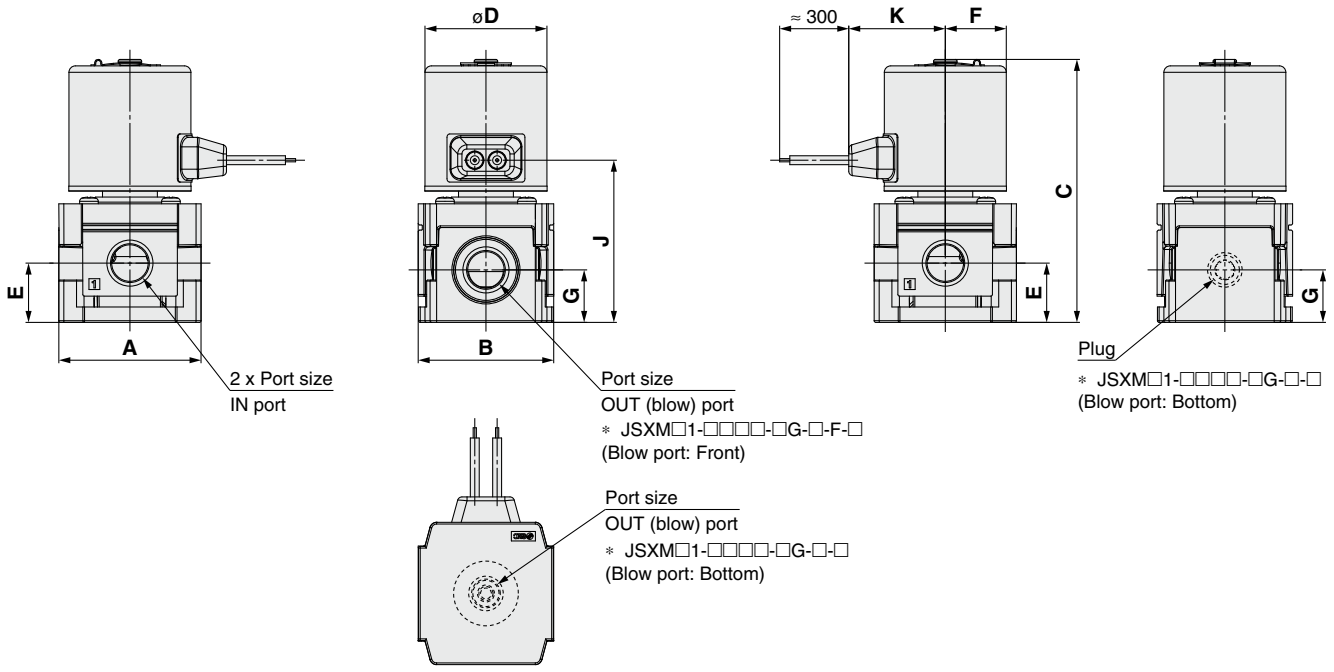


Component Parts

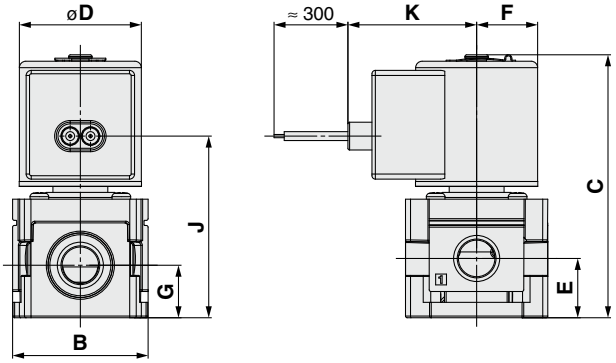
No.	Description	Material
1	**Clip**	Stainless steel
2	**Solenoid coil**	Stainless steel, Cu, Resin
3	**Stopper**	PPS
4	**Spring**	Stainless steel
5	**Tube assembly**	Stainless steel
6	**Armature assembly**	Stainless steel, PPS, NBR, (FKM)
7	**Screw**	Fe
8	**Bonnet**	Stainless steel
9	**Gasket**	NBR, (FKM)
10	**Body**	Aluminum
11	**Plug**	Fe
12	**Cover**	POM

Dimensions

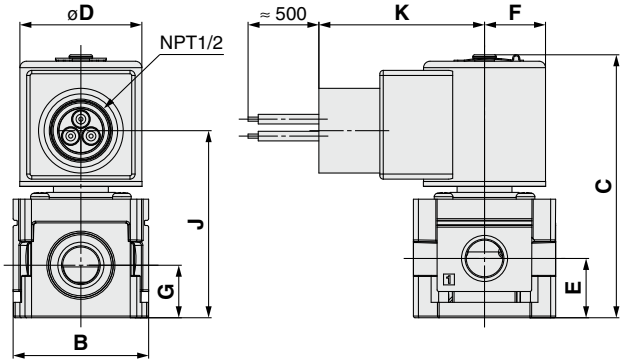
G: Grommet



GS: Grommet with PCB



CS: Conduit



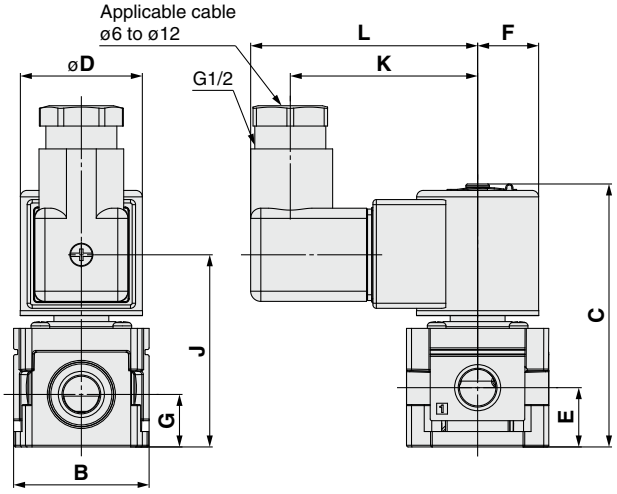
[mm]

Size	Port size	A	B	C	D	E	F	G
20	1/8, 1/4	42	40	77.6	36	17.5	18	15.5
30	1/4, 3/8	53	53	94.5	42	21.5	21	18
40	1/4, 3/8, 1/2	71	70	102.5	42	25.5	21	22.5

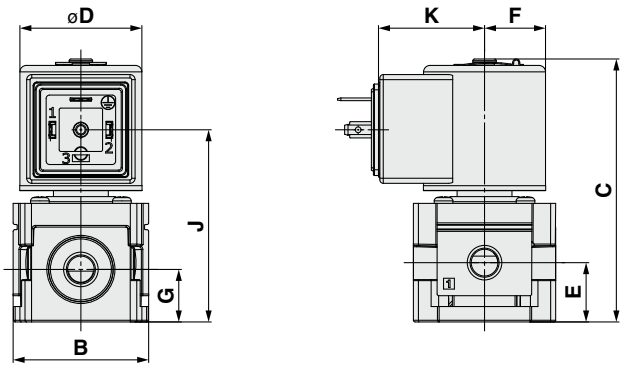
Size	Port size	Grommet		Grommet with PCB		Conduit	
		J	K	J	K	J	K
20	1/8, 1/4	47.9	28.5	53.6	38	55.2	48.9
30	1/4, 3/8	56.8	31.1	62.5	41	64.1	51.9
40	1/4, 3/8, 1/2	64.8	31.1	70.5	41	72.1	51.9

Dimensions

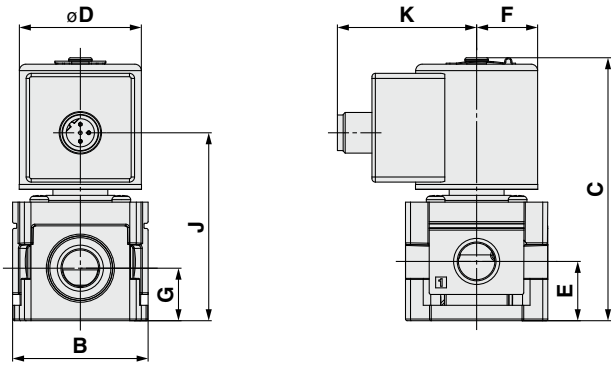
DS: DIN terminal
DS: DIN terminal with light



DN: DIN terminal without connector



WN: M12 connector



[mm]

Size	Port size	A	B	C	D	E	F	G
20	1/8, 1/4	42	40	77.6	36	17.5	18	15.5
30	1/4, 3/8	53	53	94.5	42	21.5	21	18
40	1/4, 3/8, 1/2	71	70	102.5	42	25.5	21	22.5

Size	Port size	DIN terminal			DIN terminal without connector		M12 connector	
		J	K	L	J	K	J	K
20	1/8, 1/4	56.7	55.3	67	56.7	31.3	55.5	41.1
30	1/4, 3/8	65.6	58.3	70	65.6	34.3	64.4	44.1
40	1/4, 3/8, 1/2	73.6	58.3	70	73.6	34.3	72.4	44.1

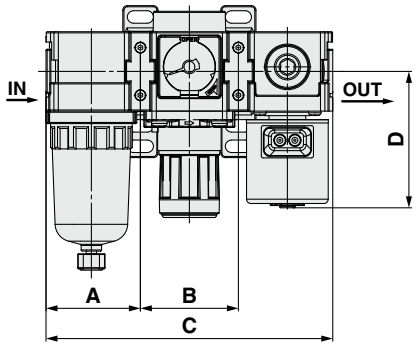
JSXM Series
Modular Connection Examples (Dimensions)

Please note that products do not come assembled. They should be ordered separately and assembled by the customer.

For modular connection units (shipped assembled), the simple specials system can be used. For details, refer to page 3.

Combination example ❶

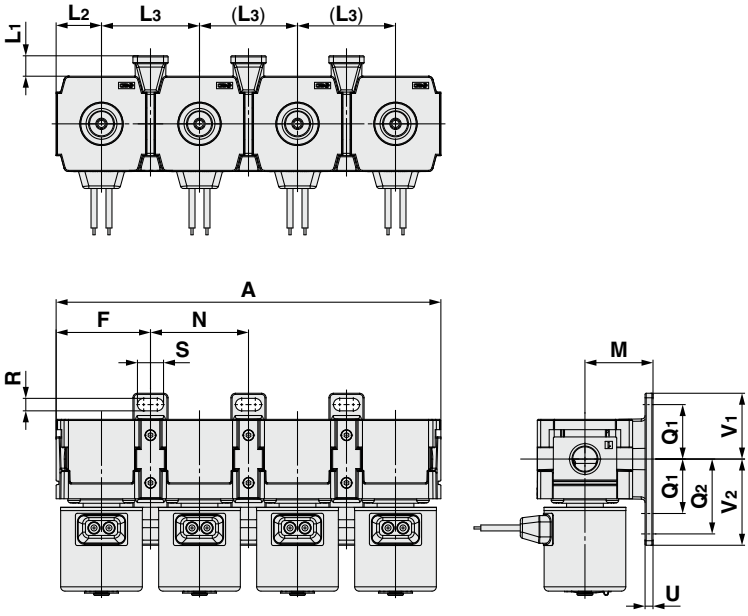
Air combination AC20B-02E-D ——— 1 pc.
Spacer with bracket Y200T-D ——— 1 pc.
Modular mounting type 2-port solenoid valve
JSXM21-AN301R-5G-U-F ——— 1 pc.



Applicable air combination model	A	B	C	D
AC20-D	41.6	43.2	126.4	60.12
AC30-D	55.1	57.2	167.4	73.01
AC40-D	72.6	75.2	220.3	77.01

Combination example ❷

Modular mounting type 2-port solenoid valve
JSXM21-AN301R-5G-U ——— 4 pcs.
Spacer with bracket Y300T-D ——— 3 pcs.



Series						Bracket mount dimensions								
	A	F	L_1	L_2	L_3	M	N	Q_1	Q_2	R	S	U	V_1	V_2
JSXM20	169.6	41.6	9	20	43.2	30	43.2	24	33	5.5	11.5	3.5	29	38
JSXM30	224.6	55.1	14.5	26.4	57.2	41	57.2	35	—	7	14	6	42.5	42.5
JSXM40	295.3	72.55	14.5	34.9	75.1	50	75.1	40	55	9	18	7	50	65

JSXM Series
Spacer / Spacer with Bracket

Spacer / Spacer with Bracket

Y 300 □ – D

❶ ❷

	Symbol	Description	❶ Body size [Applicable size] 200 [JSXM20]	300 [JSXM30]	400 [JSXM40]
❷ Bracket	Nil	Spacer	●	●	●
	T	Spacer with bracket	●	●	●

Spacer (Y□-D)

Spacer with bracket (Y□T-D)

Standard Specifications

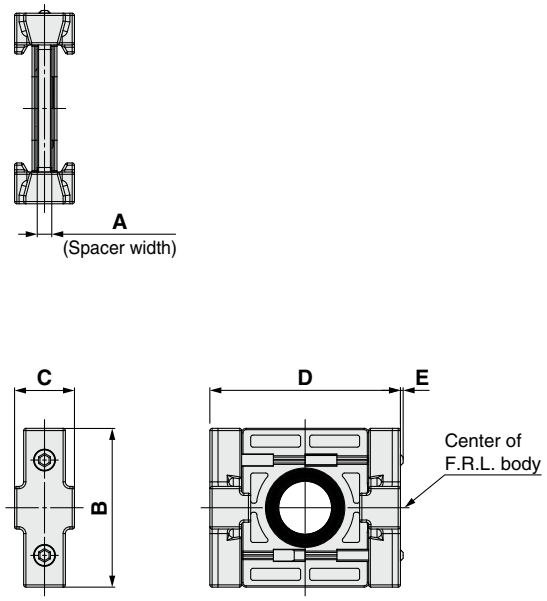
Fluid	Air
Ambient and fluid temperatures	–5 to 60°C (No freezing)
Proof pressure	1.5 MPa
Max. operating pressure	1.0 MPa

Replacement Parts

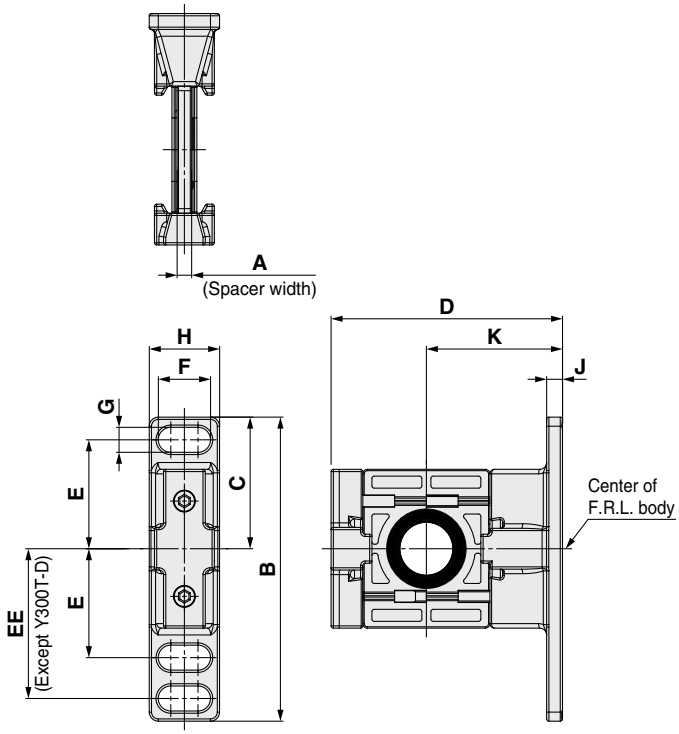
Description	Material	Part number Y200-D Y200T-D	Y300-D Y300T-D	Y400-D Y400T-D
Seal	HNBR	Y220P-050S	Y320P-050S	Y420P-050S

Dimensions

Spacer



Spacer with bracket



Part no.	A	B	C	D	E	Applicable size
Y200-D	3.2	35	13.2	42	0.6	**JSXM20**
Y300-D	4.2	43	16.2	53	—	**JSXM30**
Y400-D	5.2	51	19.2	71	—	**JSXM40**

Part no.	A	B	C	D	E	EE	F	G	H	J	K	Applicable size
Y200T-D	3.2	67	29	51	24	33	11.5	5.5	15.5	3.5	30	**JSXM20**
Y300T-D	4.2	85	42.5	67.5	35	—	14	7	20	6	41	**JSXM30**
Y400T-D	5.2	115	50	85.5	40	55	18	9	26	7	50	**JSXM40**

JSX10, 20, 30 Series
Table of UL-compliant Products

∗ Refer to the table below for UL-compliant products.

c UL us Recognized

G Grommet 

GS Grommet with PCB 

DN DIN terminal without connector 

JSX11

Series/Valve type	Body material	Seal material	Orifice diameter/Port size	Thread type	Rated voltage	Electrical entry	Option
JSX11	S	N	101	R	1	G∗1	∗
		F	201	N	2	GS	
		E		F	3	DN	
					4		
					5		
					6		
					7		
					8		
					B		
					J		

JSX21

Series/Valve type	Body material	Seal material	Orifice diameter/Port size	Thread type	Rated voltage	Electrical entry	Option
JSX21	S	N	301	R	1	G∗1	∗
		F	302	N	2	GS	
		E	303	F	3	DN	
			402		4		
			403		5		
			502		6		
			503		7		
			702		8		
			703		B		
					J		

JSX31

Series/Valve type	Body material	Seal material	Orifice diameter/Port size	Thread type	Rated voltage	Electrical entry	Option
JSX31	S	N	402	R	1	G∗1	∗
		F	403	N	2	GS	
		E	502	F	3	DN	
			503		4		
			702		5		
			703		6		
					7		
					8		
					B		
					J		

∗1 Only applicable to rated voltage symbols “5” and “6”

c UL us LISTED Listed

CS Conduit 

JSX21

Series/Valve type	Body material	Seal material	Orifice diameter/Port size	Thread type	Rated voltage	Electrical entry	Option
JSX21	S	N	301	R	1	CS	∗
		F	302	N	2		
		E	303	F	3		
			402		4		
			403		5		
			502		6		
			503		7		
			702		8		
			703		B		
					J		

JSX31

Series/Valve type	Body material	Seal material	Orifice diameter/Port size	Thread type	Rated voltage	Electrical entry	Option
JSX31	S	N	402	R	1	CS	∗
		F	403	N	2		
		E	502	F	3		
			503		4		
			702		5		
			703		6		
					7		
					8		
					B		
					J		

Option

Cable for M12 Connector (Female Connector with Cable)

The solenoid valve does not come with a cable for the M12 connector.
Please order it separately if necessary.

JSX022 − 30 − 1 − 1

Specification

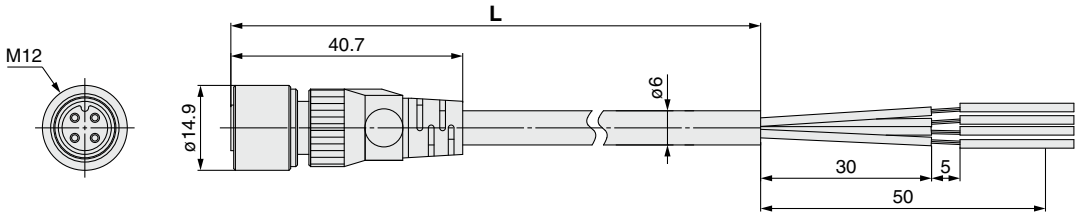
1	For DC voltages
2	For AC voltages

Cable length L [mm]

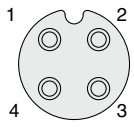
1	1000
2	2000
5	5000

Specifications

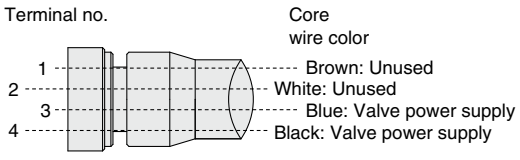
Part number		JSX022-30-1-□	JSX022-30-2-□
Key type		A-coded	B-coded
Rating/Performance	**Rated current**	4 A	
	Rated voltage	250 V	
	Contact resistance	40 mΩ or less	
	Insulation resistance	1000 MΩ or more	
	Withstand voltage	1500 VAC	
	Operating temperature range	−25 to 70°C	
	Min. bending radius (Fixed)	50 mm	
	Protection class	IP67 (Only with screw tightened)	
	Allowable repeated insertion/withdrawal	200	
Material	**Material of knurl**	Brass (Ni plating)	
	Contact (Surface treatment)	Copper alloy (Au plating)	
	Connector material	PBT	
	Cover	Soft PBT	



For DC voltages (A-coded)

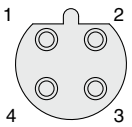


Socket connector pin arrangement

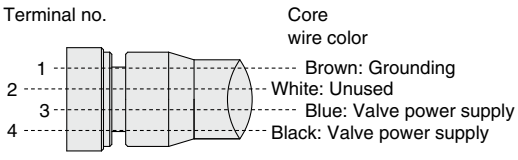


Connections

For AC voltages (B-coded)



Socket connector pin arrangement



Connections

∗ The solenoid valve has no polarity for DC voltages.

JSX/JSX□ Series
Glossary of Terms

Pressure Terminology

1. Max. operating pressure differential

The max. pressure differential (the difference between the inlet and outlet pressure) which is allowed for operation. When the outlet pressure is 0 MPa, this becomes the max. operating pressure.

2. Min. operating pressure differential

The min. pressure differential (the difference between the inlet pressure and outlet pressure) required to keep the main valve fully open.

3. Max. system pressure

The max. pressure that can be applied inside the pipelines (line pressure).

[The pressure differential of the solenoid valve portion must not exceed the max. operating pressure differential.]

4. Withstand pressure

The pressure in which the valve must be withstood without a drop in performance after holding for one minute under prescribed pressure and returning to the operating pressure range. (value under the prescribed conditions)

Electrical Terminology

1. Apparent power (VA)

Volt-ampere is the product of voltage (V) and current (A).

Power consumption (W): For AC, $W = V \cdot A \cdot \cos\theta$.

For DC, $W = V \cdot A$.

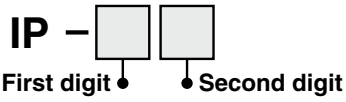
∗ $\cos\theta$ shows power factor. $\cos\theta \approx 0.9$

2. Surge voltage

A high voltage which is momentarily generated by shutting off the power in the shut-off area.

3. Degrees of protection

A degree defined in the "JIS C 0920: Waterproof test of electric machinery/appliance and the degree of protection against the intrusion of solid foreign objects."



● **First Digit:**
Degree of protection against solid foreign objects

0	Not protected
1	Protected against solid foreign objects of 50 mmø and larger
2	Protected against solid foreign objects of 12 mmø and larger
3	Protected against solid foreign objects of 2.5 mmø and larger
4	Protected against solid foreign objects of 1.0 mmø and larger
5	Dust protected
6	Dust-tight

● **Second Digit:**
Degree of protection against water

0	Not protected	—
1	Protected against vertically falling water droplets	Dripproof type 1
2	Protected against vertically falling water droplets when enclosure is tilted up to 15°	Dripproof type 2
3	Protected against rainfall when enclosure is tilted up to 60°	Rainproof type
4	Protected against splashing water	Splashproof type
5	Protected against water jets	Water-jet-proof type
6	Protected against powerful water jets	Powerful water-jet-proof type
7	Protected against the effects of temporary immersion in water	Immersible type
8	Protected against the effects of continuous immersion in water	Submersible type

Others

1. Material

NBR: Nitrile rubber

FKM: Fluororubber

EPDM: Ethylene propylene rubber

2. Symbol

In the symbol (), when the valve is closed, flow is blocked from port 1 to port 2. However, if the pressure in port 2 is higher than port 1, the valve will not be able to block the fluid and it will flow from port 2 to port 1.

JSX/JSX□ Series
Solenoid Valve Flow Rate Characteristics
(How to indicate flow rate characteristics)

Scan the QR code to access software for easy flow rate calculation. For details ▶

1. Indication of flow rate characteristics

The flow rate characteristics of equipment, such as a solenoid valve, etc., are indicated in their specifications as shown in Table (1).

Table (1) Indication of Flow Rate Characteristics

Corresponding equipment	Indication by international standard	Other indications	Compliant standards
Pneumatic equipment	***C*, *b***	—	ISO 6358:1989 JIS B 8390:2000
	—	***S***	JIS B 8390:2000 Equipment: JIS B 8379, 8381-1, 8381-2
		Cv	ANSI/(NFPA)T3.21.3 R1-2008
Process fluid control equipment	***Kv***	—	IEC 60534-1:2005 IEC 60534-2-3:1997 JIS B 2005-1:2012 JIS B 2005-2-3:2004 Equipment: JIS B 8471, 8472, 8473
	—	***Cv***	

2. Pneumatic equipment

2.1 Indication according to the international standards

(1) Compliant standards

ISO 6358:1989 : Pneumatic fluid power—Components using compressible fluids—Determination of flow rate characteristics

JIS B 8390:2000 : Pneumatic fluid power—Components using compressible fluids—How to test flow rate characteristics

(2) Definition of flow rate characteristics

The flow rate characteristics are indicated as a result of a comparison between the sonic conductance ***C*** and the critical pressure ratio ***b***.

Sonic conductance ***C*** : Value which divides the passing mass flow rate of a piece of equipment in a choked flow condition by the product of the upstream absolute pressure and the density in a standard condition.

Critical pressure ratio ***b*** : Pressure ratio (downstream pressure/upstream pressure) which will turn to a choked flow when the value is smaller than this ratio.

Choked flow : Flow in which the upstream pressure is higher than the downstream pressure and where sonic speed in a certain part of a piece of equipment is reached.
Gaseous mass flow rate is in proportion to the upstream pressure and not dependent on the downstream pressure.

Subsonic flow : Flow greater than the critical pressure ratio.

Standard condition : Air in a temperature state of 20°C, absolute pressure 0.1 MPa (= 100 kPa = 1 bar), relative humidity 65%.
It is stipulated by adding the "(ANR)" after the unit depicting air volume.
(Standard reference atmosphere)
Compliant standards: ISO 8778:1990 Pneumatic fluid power—Standard reference atmosphere, JIS B 8393:2000: Pneumatic fluid power—Standard reference atmosphere

(3) Formula for flow rate

It is described by the practical units as following.

When

$$\frac{P_2 + 0.1}{P_1 + 0.1} \leq b$$, **choked flow**

$$Q = 600 \times C\,(P_1 + 0.1)\sqrt{\frac{293}{273 + T}} \quad \cdots\cdots(1)$$

When

$$\frac{P_2 + 0.1}{P_1 + 0.1} > b$$, **subsonic flow**

$$Q = 600 \times C\,(P_1 + 0.1)\sqrt{1 - \left[\frac{\frac{P_2 + 0.1}{P_1 + 0.1} - b}{1 - b}\right]^2}\sqrt{\frac{293}{273 + T}} \quad \cdots\cdots(2)$$

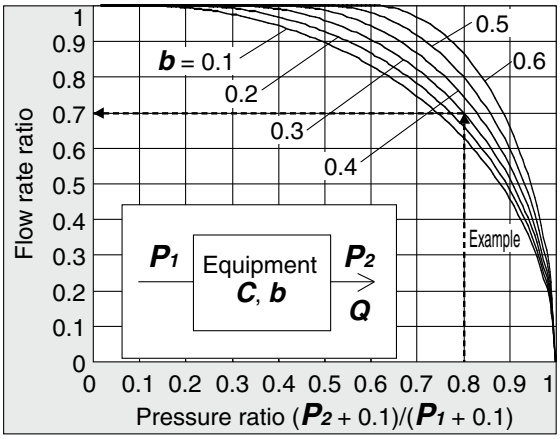
Q : Air flow rate [L/min (ANR)]
C : Sonic conductance [dm³/(s·bar)], dm³ (Cubic decimeter) of SI units = L (liter)
b : Critical pressure ratio [—]
P_1 : Upstream pressure [MPa]
P_2 : Downstream pressure [MPa]
T : Temperature [°C]
∗ Formula of subsonic flow is the elliptic analogous curve.
Flow rate characteristics are shown in Graph (1). For details, please use the calculation software available from the SMC website.

Example)
Obtain the air flow rate for P_1 = 0.4 [MPa], P_2 = 0.3 [MPa], ***T*** = 20 [°C] when a solenoid valve is performed in ***C*** = 2 [dm³/(s·bar)] and ***b*** = 0.3.

According to formula 1, the max. flow rate = $600 \times 2 \times (0.4 + 0.1) \times \sqrt{\frac{293}{273 + 20}} = 600$ [L/min (ANR)]

Pressure ratio = $\frac{0.3 + 0.1}{0.4 + 0.1} = 0.8$

Based on Graph (1), it will be 0.7 if the pressure ratio is 0.8 and the flow rate ratio is ***b*** = 0.3.
Hence, the flow rate = Max. flow x flow ratio = 600 x 0.7 = 420 [L/min (ANR)]



Graph (1) Flow rate characteristics

(4) Test method
Connect the piece of test equipment to the test circuit as shown in Fig. (1). While maintaining the upstream pressure at a fixed value above 0.3 MPa, measure the max. flow to be saturated initially. Next, measure this flow rate at 80%, 60%, 40%, and 20%, as well as the upstream and downstream pressure. The sonic conductance ***C*** can be calculated based on this max. flow rate. Use the data of the others and the subsonic flow formula to find ***b***, and calculate the critical pressure ratio ***b*** from that average.

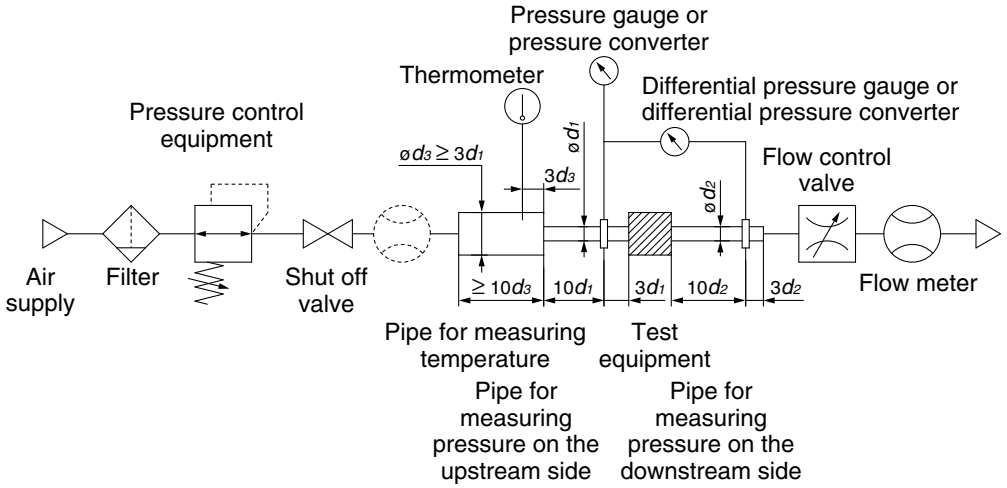


Fig. (1) Test circuit based on ISO 6358:1989, JIS B 8390:2000

2.2 Effective area *S*

(1) Compliant standards

JIS B 8390:2000: Pneumatic fluid power—Components using compressible fluids—How to test flow rate characteristics

Equipment standards: JIS B 8373: Solenoid valve for pneumatics
JIS B 8379: Silencer for pneumatics
JIS B 8381-1: Fittings for pneumatics—Part 1: Push-in fittings for thermoplastic resin tubing
JIS B 8381-2: Fittings for pneumatics—Part 2: Compression fittings for thermoplastic resin tubing

(2) Definition of flow rate characteristics

Effective area ***S***: Cross-sectional area that has an ideal throttle without friction or reduced flow. The value is derived by calculating pressure changes inside of an air tank when the compressed air is discharged from a piece of equipment mounted on the tank in a choked flow. The value of the effective area ***S***, like that of sonic conductance ***C***, expresses the "ease of flow."

(3) Formula for flow rate

When

$$\frac{P_2 + 0.1}{P_1 + 0.1} \leq 0.5$$, **choked flow**

$$Q = 120 \times S (P_1 + 0.1) \sqrt{\frac{293}{273 + T}} \quad \cdots\cdots(3)$$

When

$$\frac{P_2 + 0.1}{P_1 + 0.1} > 0.5$$, **subsonic flow**

$$Q = 240 \times S \sqrt{(P_2 + 0.1)(P_1 - P_2)} \sqrt{\frac{293}{273 + T}} \quad \cdots\cdots(4)$$

Conversion with sonic conductance ***C***:

$$S = 5.0 \times C \quad \cdots\cdots(5)$$

Q : Air flow rate [L/min (ANR)]
S : Effective area [mm²]
P_1 : Upstream pressure [MPa]
P_2 : Downstream pressure [MPa]
T : Temperature [°C]

∗ The formula for subsonic flow (4) is only applicable when the critical pressure ratio ***b*** is the unknown piece of equipment. In the sonic conductance ***C*** formula (2), it is the same formula as when ***b*** = 0.5.

(4) Test method

Connect the piece of test equipment to the test circuit as shown in Fig. (2). Discharge the air from the air tank filled with compressed air at a fixed value above 0.6 MPa (0.5 MPa) into the atmosphere until the pressure inside the tank falls to 0.25 MPa (0.2 MPa). Measure the discharge time and the residual pressure inside the tank after discharging until it has returned to the normal value. Then, calculate the effective area ***S*** using the following formula. Select an air tank with a volume within the specified range of the test equipment's effective area. For JIS B 8379, the pressure values are in parentheses and the coefficient of the formula is 12.9.

$$S = 12.1 \frac{V}{t} \log_{10} \left(\frac{P_s + 0.1}{P + 0.1} \right) \sqrt{\frac{293}{T}} \quad \cdots\cdots(6)$$

S : Effective area [mm²]
V : Air tank capacity [L]
t : Discharging time [s]
P_s : Pressure inside air tank before discharging [MPa]
P : Residual pressure inside air tank after discharging [MPa]
T : Temperature inside air tank before discharging [K]

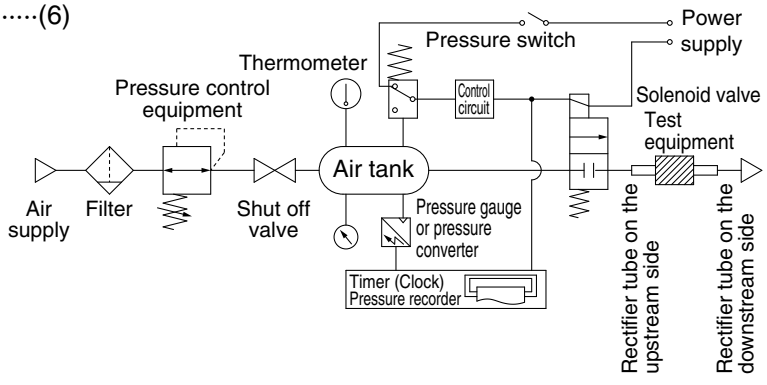


Fig. (2) Test circuit based on JIS B 8390:2000

2.3 Flow coefficient *Cv* factor

The United States Standard ANSI/(NFPA)T3.21.3:R1-2008R: Pneumatic fluid power—Flow rating test procedure and reporting method for fixed orifice components

This standard defines the ***Cv*** factor of the flow coefficient by the following formula that is based on the test conducted by the test circuit analogous to ISO 6358.

$$Cv = \frac{Q}{114.5\sqrt{\frac{\Delta P\,(P_2 + P_a)}{T_1}}} \quad \cdots\cdots (7)$$

ΔP : Pressure drop between the static pressure tapping ports [bar]
P_1 : Pressure of the upstream tapping port [bar gauge]
P_2 : Pressure of the downstream tapping port [bar gauge]: $P_2 = P_1 - \Delta P$
Q : Flow rate [L/s standard condition]
P_a : Atmospheric pressure [bar absolute]
T_1 : Upstream absolute temperature [K]

The test conditions are $P_1 + P_a = 6.5 \pm 0.2$ bar absolute, $T_1 = 297 \pm 5$K, 0.07 bar $\leq \Delta P \leq$ 0.14 bar.

This is the same concept as the effective area ***A*** which ISO 6358 stipulates as being applicable only when the pressure drop is smaller than the upstream pressure and the compression of air does not become a problem.

3. Process fluid control equipment

(1) Compliant standards

IEC 60534-1:2005: Industrial-process control valves. Part 1: Control valve terminology and general considerations
IEC 60534-2-3:1997: Industrial-process control valves. Part 2: Flow capacity, Section Three- Test procedures
JIS B 2005-1:2012: Industrial-process control valves – Part 1: Control valve terminology and general considerations
JIS B 2005-2-3:2004: Industrial-process control valves – Part 2: Flow capacity – Section 3: Test procedures
Equipment standards: JIS B 8471: Solenoid valve for water
JIS B 8472: Solenoid valve for steam
JIS B 8473: Solenoid valve for fuel oil

(2) Definition of flow rate characteristics

Kv factor: Value of the clean water flow rate (represented by m³/h) which runs through a valve (test equipment) at 5 to 40°C when the pressure difference is 1 x 10⁵ Pa (1 bar). It is calculated using the following formula.

$$Kv = Q\sqrt{\frac{1 \times 10^5}{\Delta P} \cdot \frac{\rho}{1000}} \quad \cdots\cdots (8)$$

Kv: Flow coefficient [m³/h]
Q : Flow rate [m³/h]
ΔP : Pressure difference [Pa]
ρ : Density of fluid [kg/m³]

(3) Formula of flow rate

It is described by practical units. Also, the flow rate characteristics are shown in Graph (2).

In the case of liquids:

$$Q = 53\,Kv\sqrt{\frac{\Delta P}{G}} \quad \cdots\cdots (9)$$

Q : Flow rate [L/min]
Kv: Flow coefficient [m³/h]
ΔP : Pressure difference [MPa]
G : Relative density [water = 1]

In the case of saturated aqueous vapor:

$$Q = 232\,Kv\sqrt{\Delta P\,(P_2 + 0.1)} \quad \cdots\cdots (10)$$

Q : Flow rate [kg/h]
Kv: Flow coefficient [m³/h]
ΔP : Pressure difference [MPa]
P_1 : Upstream pressure [MPa]: $\Delta P = P_1 - P_2$
P_2 : Downstream pressure [MPa]

Conversion of flow coefficient:

$Kv = 0.865\ Cv$ ·····(11)

Here,

Cv factor: Value of the clean water flow rate (represented by US gal/min) which runs through a valve at 40 to 100°F when the pressure difference is 1 lbf/in^2 (psi)

The values of ***Kv*** and ***Cv*** factors for pneumatic purposes are different due to different test methods.

(4) Test method

Connect the piece of test equipment to the test circuit as shown in Fig. (3), and run water at 5 to 40°C. Then, measure the flow rate with a pressure difference where vaporization does not occur in a turbulent flow (pressure difference of 0.035 MPa to 0.075 MPa when the inlet pressure is within 0.15 MPa to 0.6 MPa). However, as the turbulent flow is definitely caused, the pressure difference needs to be set with a large enough difference so that the Reynolds number does not fall below 1 x 10^5, and the inlet pressure needs to be set slightly higher to prevent vaporization of the liquid. Substitute the measurement results in formula (8) to calculate ***Kv***.

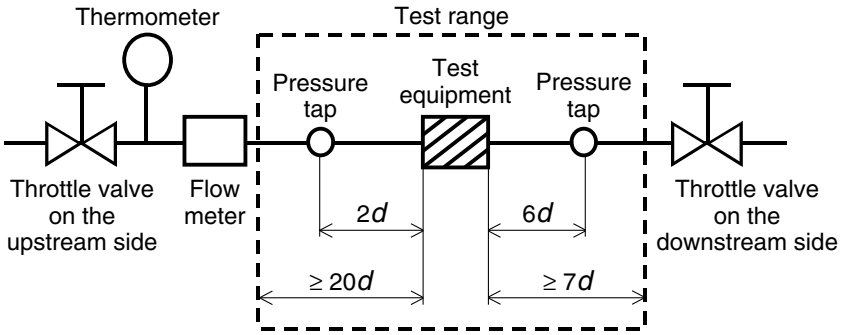
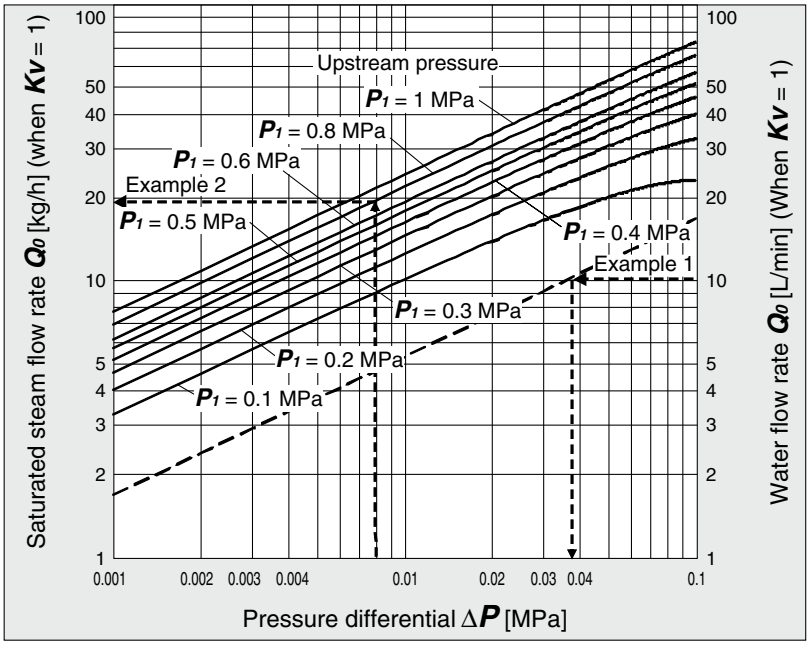


Fig. (3) Test circuit based on IEC 60534-2-3, JIS B 2005-2-3



Graph (2) Flow rate characteristics

Example 1)

Obtain the pressure difference when 15 [L/min] of water runs through a solenoid valve with a ***Kv*** = 1.5 [m^3/h]. As the flow rate when ***Kv*** = 1 is calculated as the formula: $Q_0 = 15 \times 1/1.5 = 10$ [L/min], read off ΔP when Q_0 is 10 [L/min] in Graph (2). The reading is 0.036 [MPa].

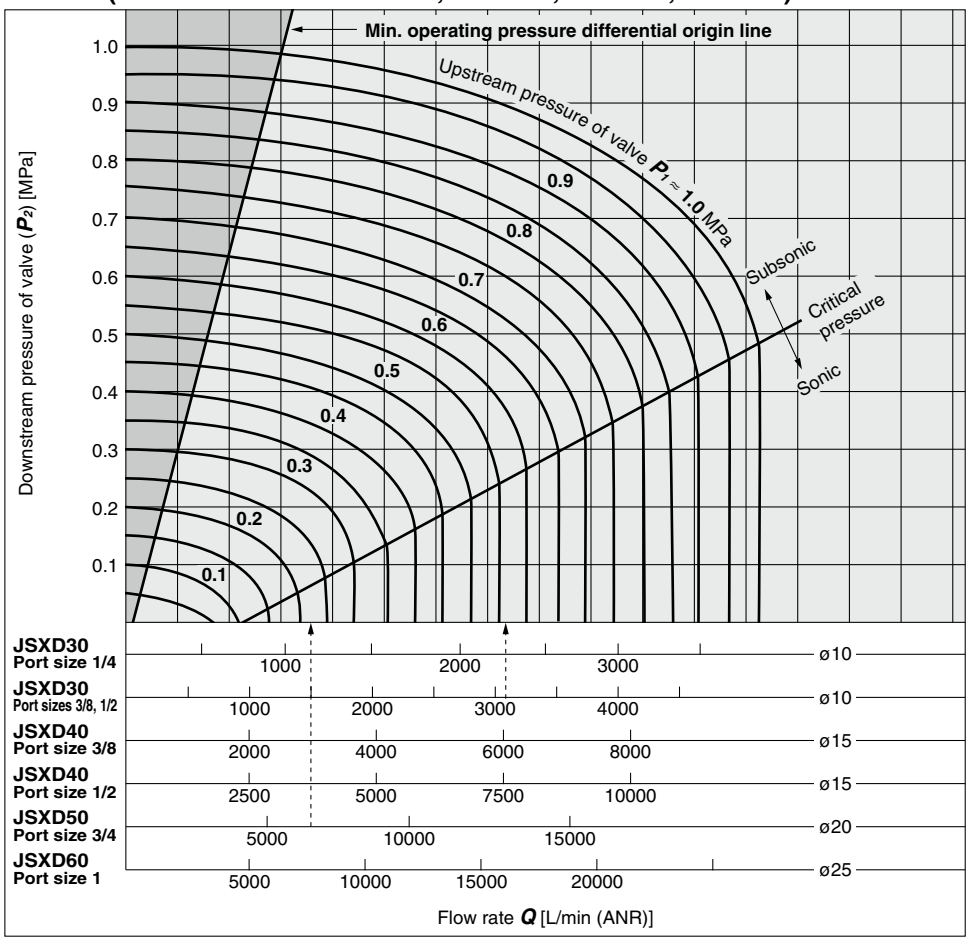
Example 2)

Obtain the saturated steam flow rate when $P_1 = 0.8$ [MPa] and $\Delta P = 0.008$ [MPa] with a solenoid valve with a ***Kv*** = 0.05 [m^3/h]. Read off Q_0 when P_1 is 0.8 and ΔP is 0.008 in Graph (2), the reading is 20 [kg/h]. Therefore, the flow rate is calculated as the formula: $Q = 0.05/1 \times 20 = 1$ [kg/h].

JSXD Series
Flow Rate Characteristics

* Use this graph as a guide. In the case of obtaining an accurate flow rate, refer to pages 41 to 45.

For Air (Orifice diameter: ø10 mm, ø15 mm, ø20 mm, ø25 mm)



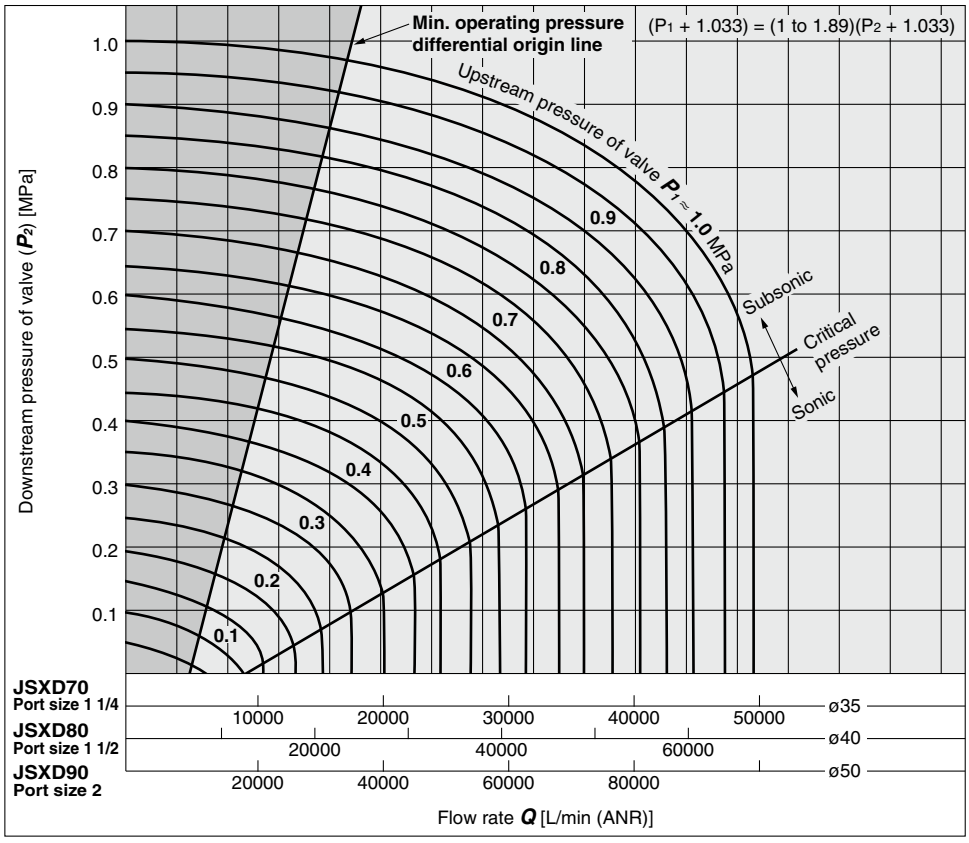
How to read the graph

The sonic range pressure to generate a flow rate of 6000 L/min (ANR) is as follows.
For a ø15 orifice (JSXD40/Port size 3/8),
$P_1 \approx 0.57$ MPa,
for a ø20 orifice (JSXD50/Port size 3/4),
$P_1 \approx 0.22$ MPa

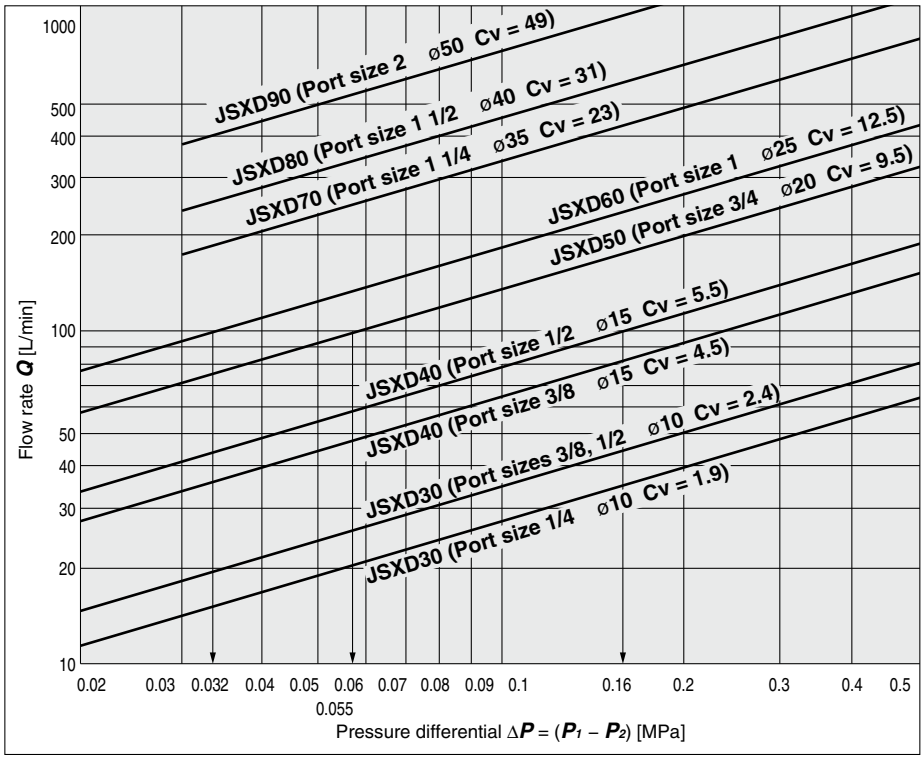
⚠Warning

In the area located left to the min. operating pressure differential origin line in the flow rate characteristics table, the min. operating pressure is not generated. Do not use the product in this area as this may cause operation failure (valve opening failure, valve closing failure) or damage of the valve. Select valves with suitable size.

For Air (Orifice diameter: ø35 mm, ø40 mm, ø50 mm)



For Water



How to read the graph

The pressure differential to generate a flow rate of 100 L/min water is as follows.
For a ø15 orifice (JSXD40/Port size 1/2),
$\Delta P \approx 0.16$ MPa,
for a ø20 orifice (JSXD50),
$\Delta P \approx 0.055$ MPa,
for a ø25 orifice (JSXD60),
$\Delta P \approx 0.032$ MPa

JSX/JSX□ Series
Specific Product Precautions 1

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For 2-port solenoid valve for fluid control precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com

Design

⚠Warning

1. Confirm the specifications.
Give careful consideration to the operating conditions, such as the application, fluid, and environment, and use within the specified operating ranges. If the product is used beyond the specification range, this may cause the product to break or malfunction. We do not guarantee against any damage if the product is used outside of the specification range.

2. Cannot be used as an emergency shutoff valve, etc.
This product is not designed for safety applications such as an emergency shutoff valve. If the valves are used in this type of system, other reliable safety assurance measures should also be adopted.

3. Cannot be used for pressure (including vacuum) holding
It is not usable for an application such as holding the pressure (including vacuum) inside of a pressure vessel because air leakage is entailed in valves.

4. Closed liquid circuit
In a closed circuit, when liquid is static, pressure could rise due to changes in temperature. This pressure rise could cause malfunction and damage to components such as valves. To prevent this, install a relief valve in the system.

5. Actuator drive
When an actuator, such as a cylinder, is to be driven using a valve, take appropriate measures to prevent potential danger caused by actuator operation.

6. Extended periods of continuous energization
The solenoid coil will generate heat when continuously energized. Avoid using in a tightly shut container. Install the valve in a well-ventilated area. Furthermore, do not touch it while it is being energized or right after it has been energized.

7. Water hammer
When an impact, such as water hammer, etc., caused by rapid pressure fluctuation is applied, the valve may be damaged. Install water hammer relief equipment (accumulator, etc.) or use an SMC water hammer relief valve (VXR series). Please contact SMC for details.

8. Reverse pressure
If there is a possibility that reverse pressure will be applied, take countermeasures by installing a check valve, etc., on the downstream side.

9. Do not disassemble the product and replacement parts or make any modifications, including additional machining.
Doing so may cause human injury and/or an accident.

Operating Environment

⚠Warning

Do not use the product in such locations as those described below.

1. Locations with atmospheres where water vapor is present or locations where corrosive fluids (chemicals), sea water, or water may come into contact with the product
Implement appropriate protective measures if water will be applied to the product for long periods of time, even for products which have IP65 or IP67 enclosures. Such water may enter through microscopic gaps in the product's external surfaces, resulting in fire damage or short-circuiting of the solenoid valve coils. If installing the product in close proximity to equipment, such as machine tools, processing machines, etc., which uses large amounts of liquids or oils, be sure to confirm that liquid dispersal or spatter from the peripheral equipment does not come into contact with the product.

2. Locations with explosive atmospheres

3. Locations subject to vibration or impact

4. Locations where radiated heat will be received from nearby heat sources

Operating Environment

⚠Warning

5. Locations that are outdoors (Excludes outdoor specification valves)
Although using an indoor specification product outdoors voids its product warranty, if outdoor use proves unavoidable, be sure to implement the protective measures mentioned below.
1) Install a protective cover, etc., to protect the product from direct sunlight.
2) Encase the product in an enclosure to protect it from rain and wind.
∗ If only a roof-type cover is provided for the product, it will not be sufficiently protected from side winds or rain splashing up from the ground, which will result in water adhering to and entering the product. In addition, when the product is encased in an enclosure, be sure to implement proper ventilation measures to prevent overheating due to long-term energizing of the product.
3) Be sure to confirm that the location is not one in which condensation is easily generated.
∗ If the product is used in an environment with large temperature changes, etc., condensation may be generated and water may adhere to the external surface of the product. Be sure to implement protective measures against condensation, such as ambient temperature control, in such locations where condensation is easily generated.

6. Locations where freezing may occur within piping lines
[When the fluid is liquid]
If the product is to be used in cold regions or in winter, be sure to implement measures to prevent the freezing of fluids.
If the fluid is likely to freeze, implement measures such as draining the water in the piping when the equipment is OFF, or installing a heater or insulation in the piping.
If warming the solenoid valve, be sure to avoid the coil portion as it will result in poor heat dissipation.
[When the fluid is air]
With large flow rates, drain may be generated due to adiabatic expansion, resulting in freezing.
Be sure to periodically drain the product or conduct drain removal using an air dryer.

Fluid

⚠Warning

1. Fluid selection
1) Compatibility between the components and fluids should be checked in the application before use.
2) Since the compatibility of the fluid used may vary depending on its type, additives, concentration, temperature, etc., give sufficient consideration when selecting the material. Please contact SMC if anything is unclear.
3) Use a fluid with a kinematic viscosity of 50 mm^2/s or less.

2. Do not use the product with the fluids shown below.
1) Fluids that are harmful to humans
2) Combustion-supporting or flammable fluids
3) Corrosive gas
4) Sea water, Saline solution

3. Take measures to prevent static electricity, since some fluids can cause static electricity.

4. Fluid temperature
Operate within the specified operating fluid temperature range.

5. Install a filter (strainer) to ensure clean fluids.
1) The use of a fluid that contains foreign matter can cause problems, such as malfunction and seal failure by promoting the wear of the valve seat and armature, by sticking to the sliding parts of the armature, etc. Install a filter (strainer) on the upstream side of the valve to remove foreign matter. Air: 5 μm or less Water: 100 mesh or more
2) Replace or clean the filter (strainer) when the pressure drop reaches 0.1 MPa to prevent them from getting clogged.

JSX/JSX□ Series
Specific Product Precautions 2

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For 2-port solenoid valve for fluid control precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com

Fluid Quality

⚠Warning

1. Air

1) Do not use compressed air that contains chemicals, synthetic oils that include organic solvents, salt, corrosive gases, etc., as it can cause malfunction or damage.
2) Compressed air that contains excessive drainage may cause the malfunction of valves and other pneumatic equipment. Install an aftercooler or an air dryer on the inlet side of the valve as a countermeasure against drainage.
3) If excessive carbon powder is generated by the compressor, it may adhere to the inside of the valves and cause malfunction. Install a mist separator on the inlet side of the valve as a countermeasure to remove any carbon powder.
4) For compressed air quality, refer to the Best Pneumatics No. 6 catalog.
5) When operating fluid air with a dew point of −70°C or lower, the inside of the valve may wear and the product life will be shortened.

2. Water

1) Be aware that rust stains, chloride separation, etc., from the piping may cause malfunction, leakage, or, in worse case scenarios, damage due to corrosion. Also, such damage may result in the spraying of fluids or scattering of parts. Please be sure to have protective measures in place in case such incidents should occur.
2) In the case that water contains substances such as calcium and magnesium, which generate hard scale and sludge, install water softening equipment and a filter (strainer) directly upstream from the valve to remove these substances, as this scale and sludge can cause the valve to malfunction.
3) The water pressure of tap water is usually 0.4 MPa or less, but the pressure can sometimes increase to 1.0 MPa in tall buildings. Therefore, pay attention to the max. operating pressure differential.

3. Oil

Generally, FKM is used as seal material, as it is resistant to oil. The resistance of the seal material may deteriorate depending on the type of oil, manufacturer, or additives. Check the resistance before use.

The kinematic viscosity must not exceed 50 mm^2/s.

Mounting

⚠Warning

1. Ensure sufficient space for maintenance and inspection.

2. When mounting the product, avoid sources of vibration, or adjust the arm from the body to the min. length so that resonance will not occur.

3. Do not install the product near a heat source and install it in locations where the product is not affected by radiant heat.

4. Do not apply external force to the coil section.

When the product is installed, apply a wrench to the outside of the piping connection while paying attention that it will not come into contact with the coil.

5. Do not warm the coil section with a heat insulator, etc.

When insulation is used as a countermeasure against freezing, the insulation should be limited to the piping and body only. Do not insulate the coil. This can cause the coil to burn out.

6. If air leakage increases or equipment does not operate properly, stop operation.

After installation or during maintenance, check that the product is correctly mounted with appropriate functional and leakage inspections by supplying compressed air and power supplies. Do not use the product when the equipment does not operate correctly.

7. Do not touch the valve while it is being energized or right after it has been energized.

Valves will reach high temperatures after operation. Use caution, as there is a danger of being burnt if a valve is touched directly.

⚠Caution

1. Painting and coating

Warnings or specifications printed or labeled on the product should not be erased, removed, or covered up.

JSX/JSX□ Series
Specific Product Precautions 3

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For 2-port solenoid valve for fluid control precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com

How to Assemble Brackets

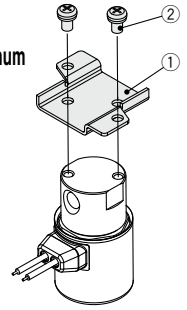
⚠Caution

1. JSX Series

Body material: Stainless steel (Port size 1/8), Brass, Aluminum

How to assemble

1) Mount the bracket ① to the bottom of the valve using mounting screws ②.
Tightening torque
JSX10: 0.6 N·m ±5%
JSX20, 30: 1.5 N·m ±5%



Bracket Assembly Part Nos. (With mounting screws)

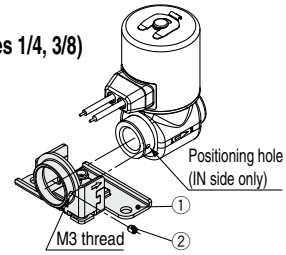
Size	Body material	Port size	Thread type	Bracket assembly part no.	Bracket material
10	Brass, Stainless steel	1/8	Rc NPT G	JSX021-12A-3	Stainless steel
20	Stainless steel			JSX022-12A-3	
20	Brass	1/8, 1/4, 3/8		JSX20-12A-4	
30		1/4, 3/8			
20	Aluminum	1/8, 1/4, 3/8		VX021N-12A	
30		1/4, 3/8		VX022N-12A	

2. JSX Series

Body material: Stainless steel (Port sizes 1/4, 3/8)

How to assemble

1) Insert bracket ① to the IN port side of the valve.
2) Secure it with the hexagon socket set screw ②.
Tightening torque: 0.4 N·m ±5%



Caution on assembly

1) Pay attention to the bracket inserting direction.
The positioning hole is on the IN port side only. The bracket cannot be mounted to the OUT port side.
2) The bracket should be mounted after connecting the fitting. (Refer to the "Piping" in the Specific Product Precautions.)

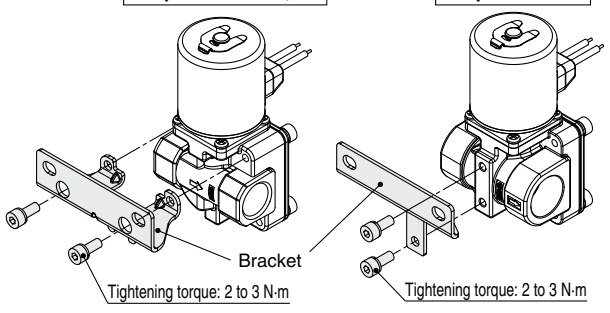
∗ The bracket is shipped together with the product.

Bracket Assembly Part Nos. (With set screw)

Size	Port size	Thread type	Bracket assembly part no. (With set screw)	Material
20, 30	1/4	Rc, NPT, G	JSX022-12A-2-1	Stainless steel
	3/8	Rc, NPT	JSX022-12A-2-1	
		G	JSX022-12A-2-2	

3. JSXD30 Series: How to assemble brackets

For port sizes 1/4, 3/8 **For port size 1/2**



Size	Port size	Bracket assembly part no. (With screws)
30	1/4, 3/8	VXD30S-14A-1
	1/2	VXD30S-14A-3

∗ For the JSXD30 series, the bracket is shipped together with the product.

Piping

⚠Warning

1. There may be cases in which the tubing detaches from the fitting and thrashes around uncontrollably due to tubing degradation or fitting breakage. To prevent this, fit the tubing with a protective cover or secure it in place.

2. If using tube piping, secure the product to a permanent fixture. Do not suspend it by the tubing.

⚠Caution

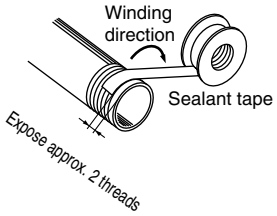
1. For handling One-touch fittings, refer to the "Fittings and Tubing Precautions" in the Handling Precautions for SMC Products.

2. Preparation before piping

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil, and other debris from inside the pipe. Install piping so that it does not apply pulling, pressing, bending, or other forces on the valve body.

3. Winding of sealant tape

When connecting pipes, fittings, etc., be sure that chips from the pipe threads and sealing material do not enter the valve. Furthermore, when sealant tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



4. Screw tightening torque for piping

When connecting piping to the valve, tighten with the proper tightening torque shown below.

Tightening Torque for Piping

Connection thread	Proper tightening torque [N·m]
Rc1/8	7 to 9
Rc1/4	12 to 14
Rc3/8	22 to 24
Rc1/2	28 to 30
Rc3/4	28 to 30
Rc1	36 to 38
Rc1 1/2	40 to 42
Rc2	48 to 50

5. When using a fitting other than an SMC fitting

Follow the instructions given by the fitting manufacturer.

6. Avoid connecting ground lines to piping, as this may cause the electric corrosion of the system.

7. When connecting piping to a product, avoid mistakes regarding the supply port, etc.

⚠ If the tightening torque is applied to the fitting while the valve is secured to the bracket, the bracket might be broken.

JSX/JSX□ Series
Specific Product Precautions 4

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Piping

⚠Caution

8. Recommended piping conditions

When connecting piping to the One-touch fitting, use a pipe length with sufficient margin, in accordance with the piping conditions shown in Fig. 1. Also, when using a tying band, etc., to bind the piping together, make sure that external force does not come to bear on the fitting. (See Fig. 2.)

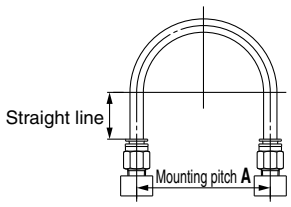


Fig. 1 Recommended piping

Unit: mm

Tubing size	Mounting pitch **A**			Straight line length
	Nylon tubing	Soft nylon tubing	Polyurethane tubing	
ø1/8"	44 or more	29 or more	25 or more	16 or more
ø6	84 or more	39 or more	39 or more	30 or more
ø1/4"	89 or more	56 or more	57 or more	32 or more
ø8	112 or more	58 or more	52 or more	40 or more
ø10	140 or more	70 or more	69 or more	50 or more
ø12	168 or more	82 or more	88 or more	60 or more

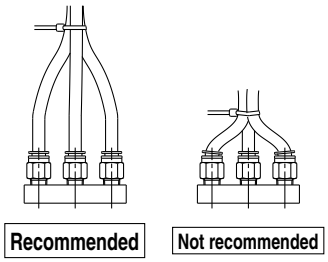
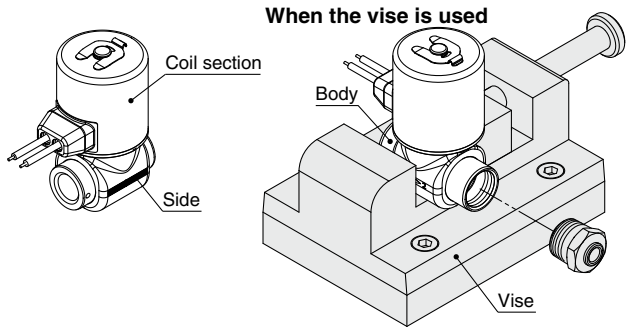


Fig. 2 When using a tying band to bind the piping together

9. When connecting a fitting to the valve, clamp the side of the body with a vise.



10. When using a bracket for 1/4 or 3/8 port size, connect the fitting in accordance with the following procedure.

Step 1) Connect the fittings to both the IN and OUT sides of the valve.
Step 2) Insert the IN side port of the valve into the bracket hole.
Step 3) Secure the valve to the bracket with the hexagon socket set screw.

⚠ **If the tightening torque is applied to the fitting while the valve is secured to the bracket, the bracket might be broken.**

Wiring

⚠Warning

The solenoid valve is an electrical product. For safety, install an appropriate fuse and circuit breaker before use.

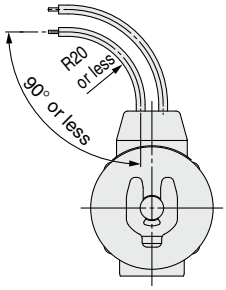
When using multiple solenoid valves, it is not sufficient to merely install one fuse. For protecting the equipment more safely, select an appropriate fuse to each circuit of the solenoid valve.

⚠Caution

1. As a rule, use electrical wire with a cross sectional area of 0.5 to 1.25 mm² for wiring.

2. External force applied to the lead wire

If an excessive force is applied to the lead wire, this may cause faulty wiring. Take appropriate measures so that a force of 10 N or more is not applied to the lead wire. Do not bend the lead wires beyond 90° with a radius of less than 20 mm or damage may occur.



3. Use electrical circuits which do not generate chattering in their contacts.

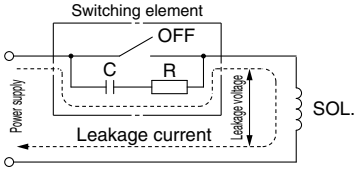
4. Use voltage which is within ±10% of the rated voltage. In cases with a DC power supply where importance is placed on responsiveness, stay within ±5% of the rated value. The voltage drop is the value in the lead wire section connecting the coil.

5. When a surge from the solenoid affects the electrical circuitry, install a surge voltage suppressor, etc., in parallel with the solenoid. Or, use the product with a surge voltage suppressor.

Residual voltage of the surge voltage suppressor
DC specification: Approx. 60 V
AC specification: Approx. 1 V

6. Leakage voltage

When the solenoid valve is operated using the controller, etc., the leakage voltage should be the product allowable leakage voltage or less. Particularly when using a resistor in parallel with a switching element and using a C-R element to protect the switching element, take note that leakage current will flow through the resistor, C-R element, etc., creating a possible danger that the valve may not turn off.



AC coil: 5% or less of rated voltage
DC coil: 2% or less of rated voltage

Specific Product Precautions 5

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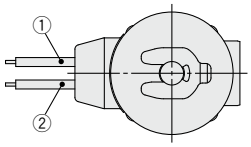
Electrical Connections

⚠Caution

1. Grommet

Lead wire: AWG20 Insulator O.D.: 2.6 mm

Rated voltage	Lead wire color	
	①	②
DC	Black	Red
100 VAC	Blue	Blue
200 VAC	Red	Red
Other AC	Gray	Gray

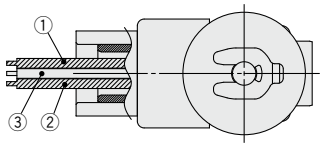


∗ There is no polarity.

2. Conduit

Lead wire: AWG18 Insulator O.D.: 2.8 mm

Rated voltage	Lead wire color		
	①	②	③
DC	Black	Red	Green/Yellow
100 VAC	Blue	Blue	Green/Yellow
200 VAC	Red	Red	Green/Yellow
Other AC	Gray	Gray	Green/Yellow



∗ There is no polarity.
∗ ③: Ground wire

3. DIN terminal

Disassembly

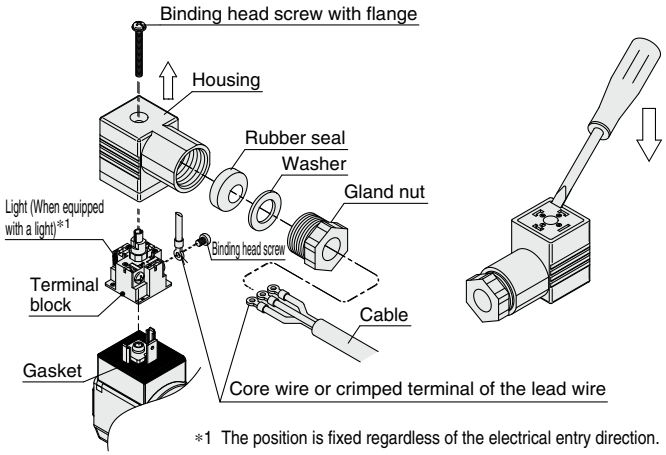
1. After loosening the binding head screw with flange, then if the housing is pulled in the direction of the arrow, the connector will be removed from the solenoid valve.
2. Pull out the binding head screw with flange from the housing.
3. There is a cutout on the bottom of the terminal block. Insert a small flat head screwdriver, etc., into this cutout, and remove the terminal block from the housing. (Refer to the figure to the right.)
4. Remove the gland nut, and pull out the washer and the rubber seal.

Wiring

1. Pass the cable through the gland nut, washer, and rubber seal in this order, and insert these parts into the housing.
2. Loosen the binding head screw of the terminal block, then insert the core wire or the crimped terminal of the lead wire into the terminal, and securely fix it with the binding head screw. The binding head screw of the terminal block is M3.
   ∗1 Tighten the screw to a torque of between 0.5 and 0.6 N·m.
   ∗2 Cable O.D.: ø6 to ø12 mm
   ∗3 For an outside cable diameter of ø9 to ø12 mm, remove the internal parts of the rubber seal before use.

Assembly

1. Pass the cable through the gland nut, washer, rubber seal, and the housing in this order, and connect to the terminal block. Then, set the terminal block inside the housing. (Push in the terminal block until it snaps into position.)
2. Insert the rubber seal and the washer in this order into the cable entry of the housing, and then tighten the gland nut securely.
3. Insert the gasket between the bottom part of the terminal block and the plug attached to the equipment, and then insert the binding head screw with flange from the top of the housing, and tighten it.
   ∗1 Tighten the screw to a torque of between 0.5 and 0.6 N·m.
   ∗2 The orientation of the connector can be changed in steps of 90° by changing the method of assembling the housing and the terminal block.



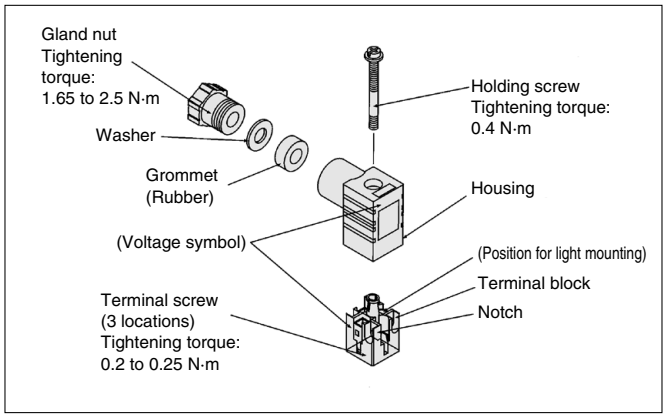
∗1 The position is fixed regardless of the electrical entry direction.

For the JSX10

Compatible cable

Cord O.D.: ø3.5 to ø7

(Reference) 0.5 mm², 2-core or 3-core, equivalent to JIS C 3306



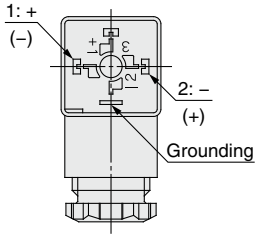
Specific Product Precautions 6

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For 2-port solenoid valve for fluid control precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com

Electrical Connections

⚠Caution

Internal connections are as shown below. Make connections to the power supply accordingly.

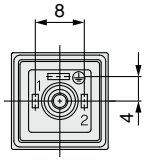


Terminal no.	1	2
DIN terminal	+ (–)	– (+)

∗ There is no polarity.

DIN (EN 175301-803) Terminal

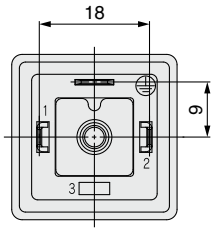
This DIN terminal corresponds to the Form C DIN connector with an 8 mm terminal pitch.



Size: 10

Applicable cable O.D.: ø3.5 to ø7

This DIN terminal corresponds to the Form A DIN connector with an 18 mm terminal pitch.



Size: 20, 30

Applicable cable O.D.: ø6 to ø12

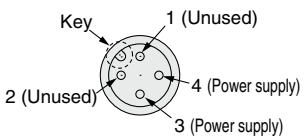
4. M12 connector

1. The IP67 (enclosure) rating of the valve can be obtained by using a cable with a female connector of IP67 specification. Please note that this product cannot be used in water.
2. Do not use a tool to mount the connector as this may cause damage. Only tighten it by hand. (0.39 to 0.49 N·m)
3. Avoid repeatedly bending or stretching the cable and applying heavy objects or force to it.
4. Do not pull the connector or cable unnecessarily.
5. Do not bend the cable at the root of the connector when installed.

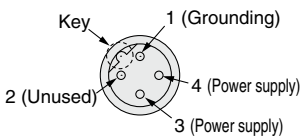
■ Coding and pin arrangement of the M12 connector on the valve side

The shape (coding) and pin arrangement of the M12 connector are as follows.

DC specification: A-coded, 4-pin



AC specification: B-coded, 4-pin



∗ The solenoid valve has no polarity for DC voltages.

When using the cable with a female connector, make sure that the coding is correct. When installing the cable, be sure to align the key on the cable side connector (female side) with the key on the valve side connector (male side).

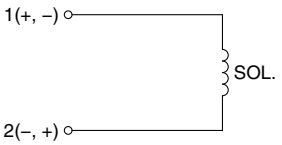
Be careful not to squeeze it in the wrong direction as pin damage, etc., may result.

Electrical Circuits

⚠Caution

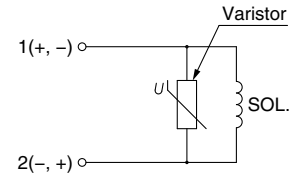
1. DC circuit

● Grommet



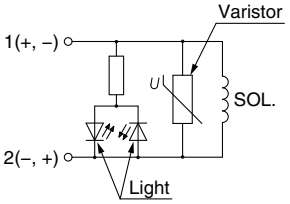
Without electrical option

● Grommet, Conduit, DIN terminal



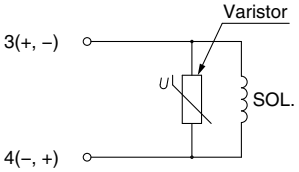
With surge voltage suppressor

● DIN terminal



With light/surge voltage suppressor

● M12 connector

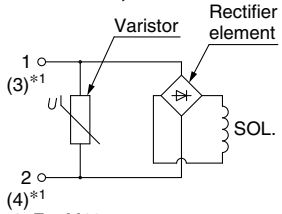


With surge voltage suppressor

2. AC circuit

The standard product is equipped with a surge voltage suppressor.

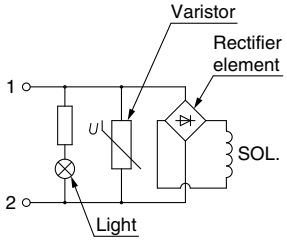
● Grommet, Conduit, DIN terminal, M12 connector



∗1 For M12 connector

Without electrical option

● DIN terminal



With light

Specific Product Precautions 7

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For 2-port solenoid valve for fluid control precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com

Maintenance

⚠Warning

1. Removal of product

1) Shut off the fluid supply and release the fluid pressure in the system.
2) Shut off the power supply.
3) Confirm that the valve temperature has dropped sufficiently before removing the product.

2. Replace or clean filters (strainers) periodically.

1) Replace filters after one year of use, or earlier if the pressure drop reaches 0.1 MPa.
2) Clean strainers when the pressure drop reaches 0.1 MPa.

3. Exhaust the drainage from air filters periodically.

If condensation in the drain bowl is not emptied on a regular basis, the bowl will overflow and allow the condensation to enter the compressed air lines. This causes the malfunction of pneumatic equipment. If the drain bowl is difficult to check and remove, the installation of a drain bowl with an auto drain option is recommended.

4. Low frequency operation

Switch valves at least once every 30 days to prevent malfunction. Also, in order to use them under the optimum state, conduct a regular inspection biannually.

5. Storage

In the case of long-term storage after use, thoroughly remove all moisture and store it in a location where the product is not exposed to sunlight and higher humidity to prevent rust and deterioration of rubber materials, etc.

6. Perform a maintenance and inspection periodically.

Confirm that the product is mounted correctly by conducting suitable function and leakage tests periodically. If air leakage increases or equipment does not operate properly, stop operation.

Return of Product

⚠Warning

If the product to be returned is contaminated or is possibly contaminated with substances that are harmful to humans, for safety reasons, please contact SMC beforehand and then employ a specialist cleaning company to decontaminate the product. After the decontamination prescribed above has been carried out, submit a Product Return Request Sheet or the Detoxification/Decontamination Certificate to SMC and await SMC's approval and further instructions before attempting to return the item.
Please refer to the International Chemical Safety Cards (ICSC) for a list of harmful substances.
If you have any further questions, please don't hesitate to contact your SMC sales representative.

JSXD Precautions

⚠Warning

1. For pilot operated 2-port solenoid valves, when the valve is closed, sudden pressure resulting from the startup of the fluid supply source (pump, compressor, etc.) may cause the valve to open momentarily and leakage to occur, so please exercise caution.

2. If the product is used in the conditions in which rapid decrease in the inlet pressure of the valve and rapid increase in the outlet pressure of the valve are repeated, excessive stress will be applied to the diaphragm, which causes the diaphragm to be damaged and dropped, leading to the operation failure of the valve. Check the operating conditions before use.

3. Min. operating pressure differential

Be aware that even if the pressure difference is above the min. operating pressure differential when the valve is closed, the pressure difference may fall below the min. operating pressure differential when the valve opens, depending on the capacity of the supply source (pumps, compressors, etc.,) or the type of pipe restrictions (the piping is bent continuously due to elbow or tee, or narrow tube nozzle is installed in the end). If the product is used below the min. operating pressure, the operation becomes unstable, which might cause valve opening or closing failure, or oscillation, leading to failure due to insufficient pressure differential. Select an appropriate valve size with reference to the flow rate characteristics and flow rate characteristics table on pages 41 to 47.

⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

⚠ Caution: **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

⚠ Warning: **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

⚠ Danger : **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots – Safety.
etc.

⚠ Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

⚠ Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

***2) Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

⚠ Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

Revision History

Edition B
* The JSXD and JSXM have been added.
* Brass and aluminum body materials have been added.
* An M12 connector electrical entry option has been added.
* Number of pages has been increased from 24 to 56.

ZV