

**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**<sup>\*1</sup> • **Aluminum**

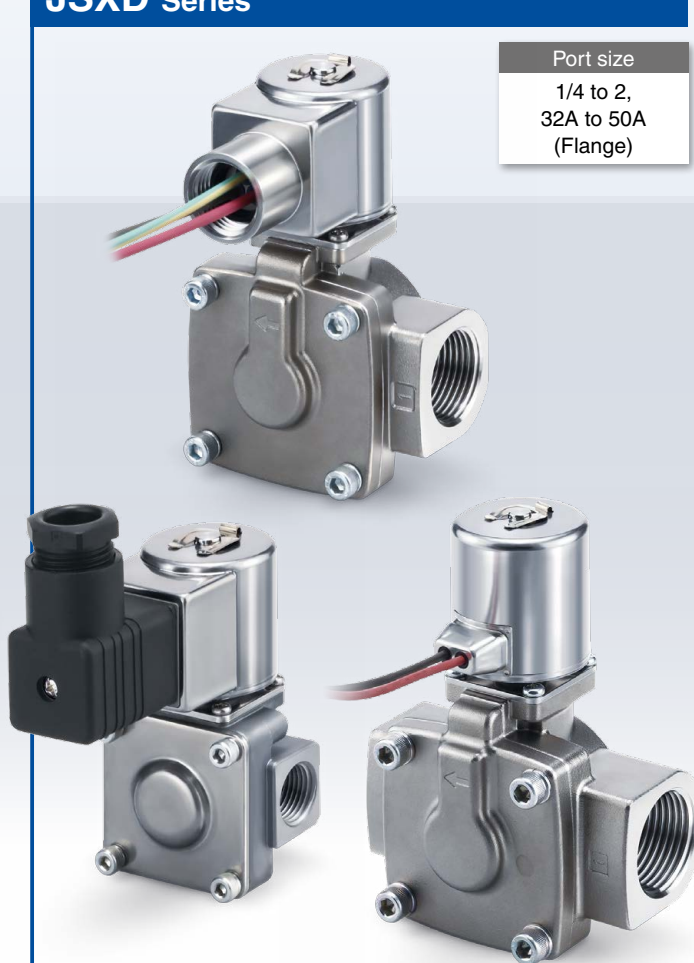
**Environmental resistance** **Enclosure: IP67**<sup>\*2</sup>

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

## **Direct Operated 2-Port Solenoid Valve** **JSX Series**

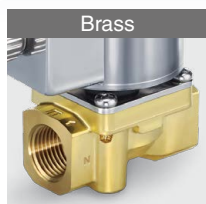


## **New Pilot Operated 2-Port Solenoid Valve** **JSXD Series**



**New** • **Modular mounting type 2-port solenoid valve**

**New** • **Body material: Brass/Aluminum**  
• **M12 connector**



**JSX/JSXD Series**



CAT.ES70-56B

# Space saving

# Compact

Valve volume: **25% reduction**\*1

# Lightweight

Weight: **30% reduction**\*1

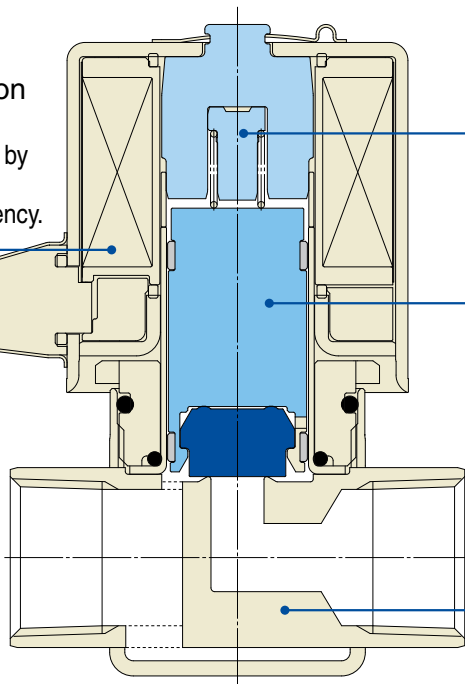
\*1 Compared with the existing model

## 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.

## 360° lead wire insertion and removal is possible.

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



## 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.

## 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

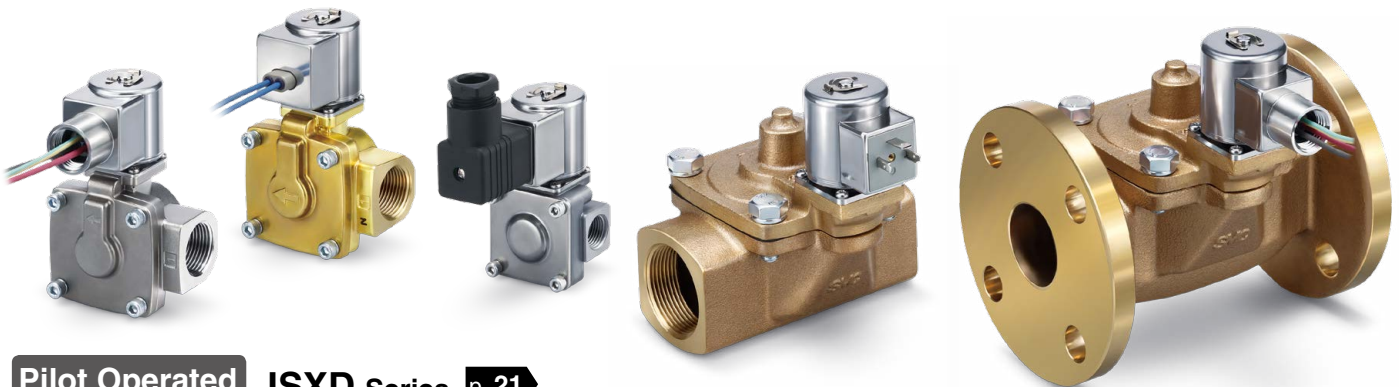
## Series Variations



### Direct Operated **JSX Series** pp. 5, 7

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

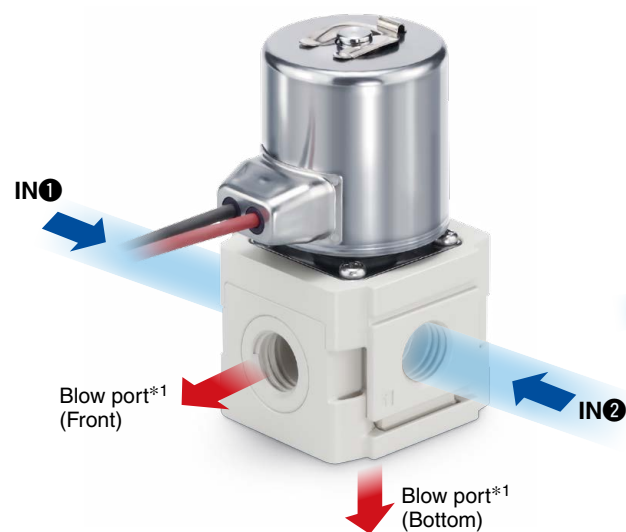
\*1 At the max. operating pressure differential (Fluid: Water)



### Pilot Operated **JSXD Series** p. 21

Model	Port size	Orifice diameter [mmø]	Flow rate*1 [L/min]			Fluid	Body material	Seal material	Electrical entry
			200	400	1000				
<b>JSXD30 Series</b>	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
<b>JSXD40 Series</b>	3/8, 1/2	15	200						
<b>JSXD50 Series</b>	3/4	20		430					
<b>JSXD60 Series</b>	1	25			580				
<b>JSXD70 Series</b>	1 1/4, 32A	35			1000				
<b>JSXD80 Series</b>	1 1/2, 40A	40			1400				
<b>JSXD90 Series</b>	2, 50A	50			2200				

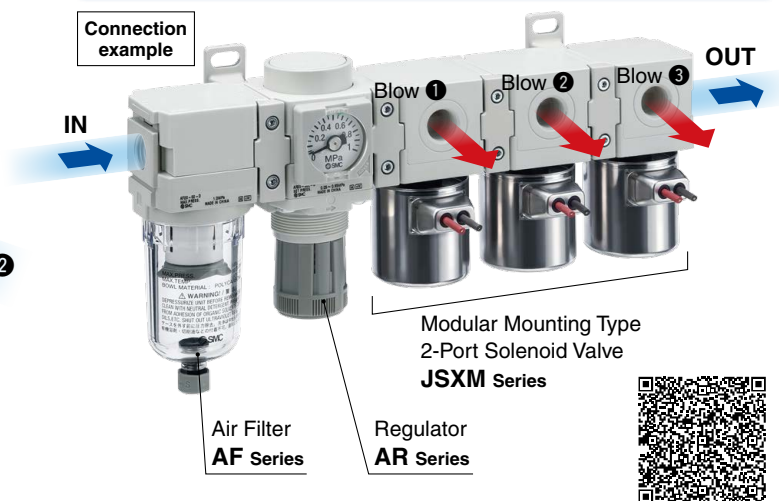
\*1 At the max. operating pressure differential (Fluid: Water)

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


\*1 The blow port position is selectable.

Coil: OFF	Coil: ON
IN1 ↔ IN2	IN1/IN2 → 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.

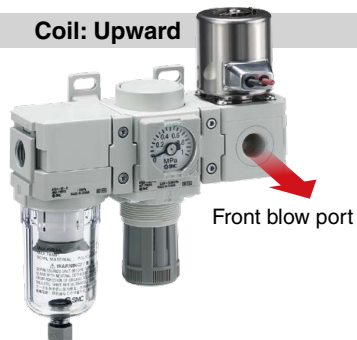
### Repeat orders

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.

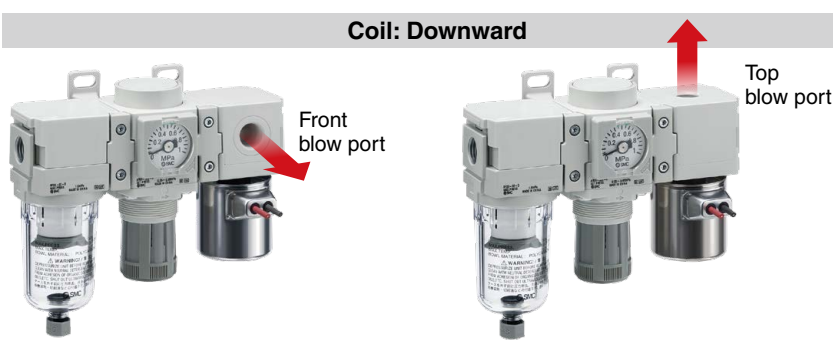
Please contact your local sales representative for more details.

## 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)]		Fluid	Body material	Seal material	Electrical entry
			500	1000				
JSXM20 Series	1/8, 1/4	3.2	<div><div></div></div> 650		Air	Aluminum	NBR FKM	Grommet DIN terminal Conduit M12 connector
JSXM30 Series	1/4, 3/8	4	<div><div></div></div> 1300					
JSXM40 Series	1/4, 3/8, 1/2	4	<div><div></div></div> 1300					

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



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

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For **Air** **Body Material** **Aluminum**

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Dimensions

**JSX10** **Port Size** 1/8 **Body Material** **Stainless Steel, Brass** ..... p. 9

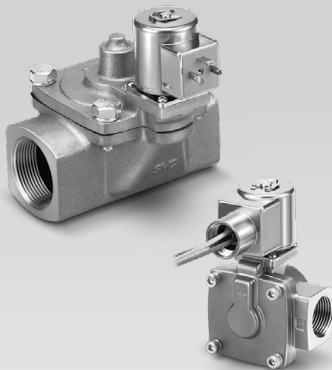
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Dimensions

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**JSXD70, 80, 90** **Applicable Flange** 32A, 40A, 50A **Body Material** **Bronze** ..... p. 30



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JSX Series

JSXD Series

JSXM Series

Table of UL-compliant Products

Option

Glossary of Terms

Flow Rate Characteristics

Specific Product Precautions

# 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 8 below.



Refer to page 38 for details.

RoHS

For **Water** **Air** **Oil**

## How to Order

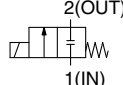
JSX **2** **1** - **S** **N** **302** **R** - **5** **G** - **B**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

### ① Size

Symbol	Size
<b>1</b>	10
<b>2</b>	20
<b>3</b>	30









### ② Valve type

Symbol	Valve type
<b>1</b>	N.C. 

### ③ Body material

Symbol	Body material
<b>S</b>	Stainless steel
<b>C</b>	Brass

### ⑧ Electrical entry

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

### ④ Seal material

Symbol	Seal material
<b>N</b>	NBR
<b>F</b>	FKM
<b>E</b>	EPDM

### ⑥ Thread type

Symbol	Thread type
<b>R</b>	Rc
<b>N</b>	NPT
<b>F</b>	G

### ⑤ Orifice diameter and port size

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

### ⑦ Rated voltage

AC				DC	
Symbol	Rated voltage	Symbol	Rated voltage	Symbol	Rated voltage
<b>1</b>	100 VAC	<b>7</b>	240 VAC	<b>5</b>	24 VDC
<b>2</b>	200 VAC	<b>8</b>	48 VAC	<b>6</b>	12 VDC
<b>3</b>	120 (110) VAC	<b>B</b>	24 VAC		
<b>4</b>	220 VAC	<b>J</b>	230 VAC		

### ⑨ Option











Symbol	Option
<b>Nil</b>	None
<b>B</b>	With bracket*1 (Stainless steel)

\*1 Bracket assembly part nos. (page 50)

\*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* <sup>1</sup>					Max. operating pressure differential [MPa]	Model	Weight* <sup>2</sup> [g]		
			Air			Water, Oil				Stainless steel body* <sup>3</sup>	Brass body	
			C [dm³/(s·bar)]	b	Cv	Kv	Conversion Cv					
10	1/8	1.6	0.36	0.58	0.08	0.07	0.08	0.9	JSX11- 	160	160	
		2.4	0.62	0.45	0.15	0.13	0.15	0.4	JSX11- 	160	160	
20	1/8	3.2	1.35	0.48	0.35	0.30	0.35	0.7	JSX21- 	320	330	
		3.2	1.35	0.48	0.35	0.30	0.35	0.7	JSX21- 	320	330	
	1/4	4.0	2.02	0.48	0.52	0.45	0.52	0.3	JSX21- 	320	330	
		5.6	2.62	0.43	0.73	0.63	0.73	0.2	JSX21- 	320	330	
		7.1	3.15	0.44	0.88	0.76	0.88	0.1	JSX21- 	320	330	
		3/8	3.2	1.35	0.48	0.35	0.30	0.35	0.7	JSX21- 	320	360
			4.0	2.02	0.48	0.52	0.45	0.52	0.3	JSX21- 	320	360
	5.6		2.62	0.43	0.73	0.63	0.73	0.2	JSX21- 	320	360	
	30	1/4	7.1	3.15	0.44	0.88	0.76	0.88	0.1	JSX21-	320	360
			4.0	2.02	0.48	0.52	0.45	0.52	1.0	JSX31-	450	490
5.6			2.62	0.43	0.73	0.63	0.73	0.5	JSX31-	450	490	
7.1			3.15	0.44	0.88	0.76	0.88	0.2	JSX31-	450	490	
4.0			2.02	0.48	0.52	0.45	0.52	1.0	JSX31-	450	520	
3/8		5.6	2.62	0.43	0.73	0.63	0.73	0.5	JSX31-	450	520	
		7.1	3.15	0.44	0.88	0.76	0.88	0.2	JSX31-	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

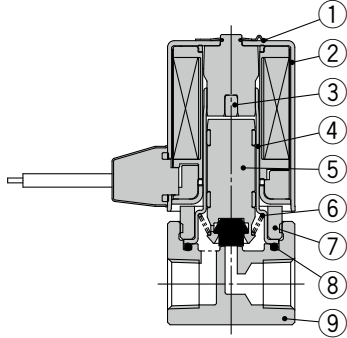
Applicable fluid	Seal material		
	NBR	FKM	EPDM
Air	●	●	●
Water	●	●	●
Oil	—	●	—

\* 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

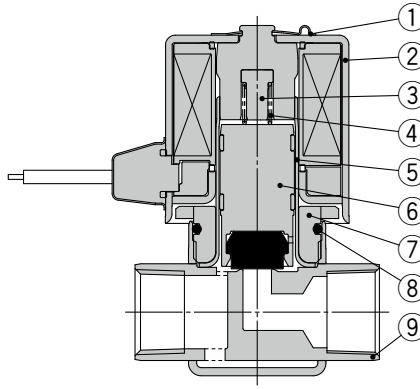


#### Component Parts

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

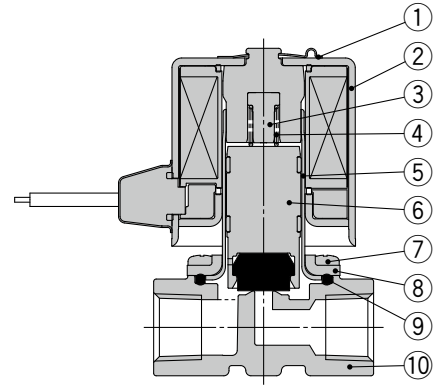
Body material: Stainless steel



#### 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		
Coil specifications	Body material		Stainless steel, Brass		
	Seal material		NBR, FKM, EPDM		
	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**



Differs depending on the voltage and electrical entry. For details, refer to table 8 below.

RoHS

For **Air**

## How to Order

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


① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨



### ① Size

Symbol	Size
<b>2</b>	20
<b>3</b>	30

### ② Valve type

Symbol	Valve type
<b>1</b>	N.C. 

### ③ Body material

Symbol	Body material
<b>A</b>	Aluminum

### ④ Seal material

Symbol	Seal material
<b>N</b>	NBR
<b>F</b>	FKM

### ⑥ Thread type

Symbol	Thread type
<b>R</b>	Rc
<b>N</b>	NPT
<b>F</b>	G

### ⑤ Orifice diameter and port size

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

### ⑦ Rated voltage

AC		DC	
Symbol	Rated voltage	Symbol	Rated voltage
<b>1</b>	100 VAC	<b>7</b>	240 VAC
<b>2</b>	200 VAC	<b>8</b>	48 VAC
<b>3</b>	120 (110) VAC	<b>B</b>	24 VAC
<b>4</b>	220 VAC	<b>J</b>	230 VAC








Symbol	Rated voltage
<b>5</b>	24 VDC
<b>6</b>	12 VDC

### ⑨ Option

Symbol	Option
<b>Nil</b>	None
<b>B</b>	With bracket*1

\*1 Bracket assembly part nos. (page 50)

### ⑧ Electrical entry

Symbol	Electrical entry		Size		CE-compliant
			20	30	
<b>G</b>	Grommet*1		●	●	24 VDC
					12 VDC
<b>GS</b>	Grommet with PCB (With surge voltage suppressor)		●	●	100 VAC
					24 VDC
					12 VDC
					48 VAC
					24 VAC
<b>CS</b>	Conduit (With surge voltage suppressor)		●	●	All voltages
<b>DS</b>	DIN terminal (With surge voltage suppressor)		●	●	All voltages
<b>DZ</b>	DIN terminal with light (With surge voltage suppressor)		●	●	All voltages
<b>DN</b>	DIN terminal without connector (With surge voltage suppressor)		●	●	All voltages
<b>WN</b>	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			Max. operating pressure differential [MPa]	Model	Weight*2 [g]
			C [dm <sup>3</sup> /(s·bar)]	b	Cv			
<b>20</b>	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
<b>30</b>	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

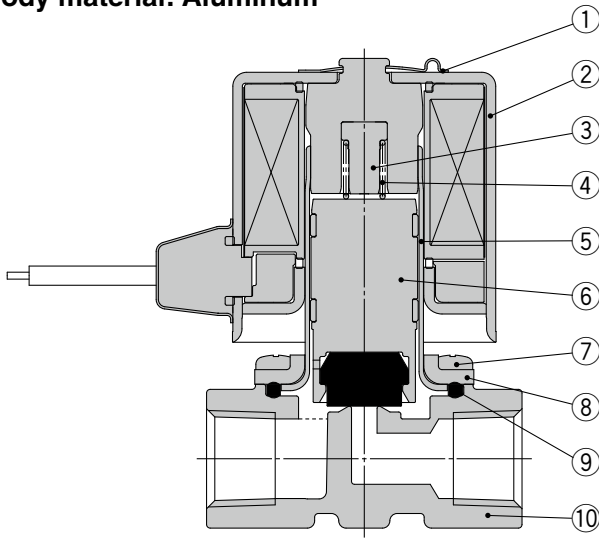
Add 20 g for grommet with PCB, 70 g for conduit, 50 g for DIN terminal, and 15 g for M12 connector.



## 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 cm³/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%)

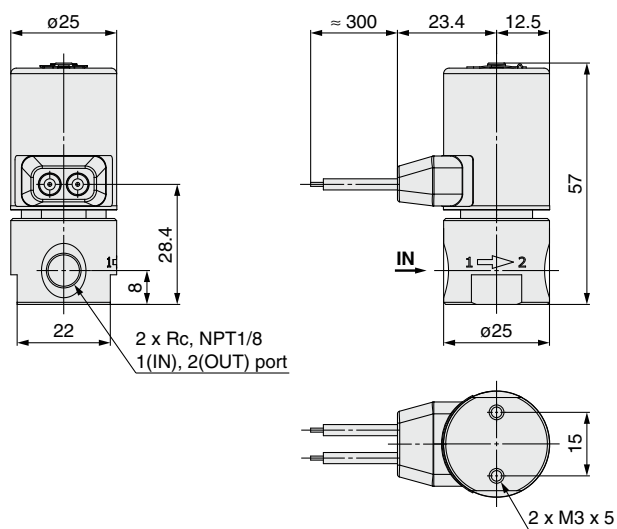
\*5 There is no difference in the frequency and the inrush and energized apparent power, since a rectifying circuit is used in the AC.

\*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.

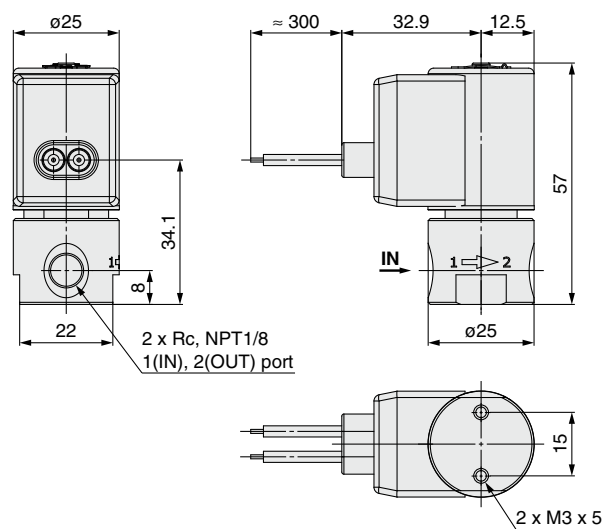
**Be sure to read "Specific Product Precautions" before handling.**

Dimensions: JSX **10** Port Size **1/8** Body Material **Stainless Steel, Brass**

## G: Grommet

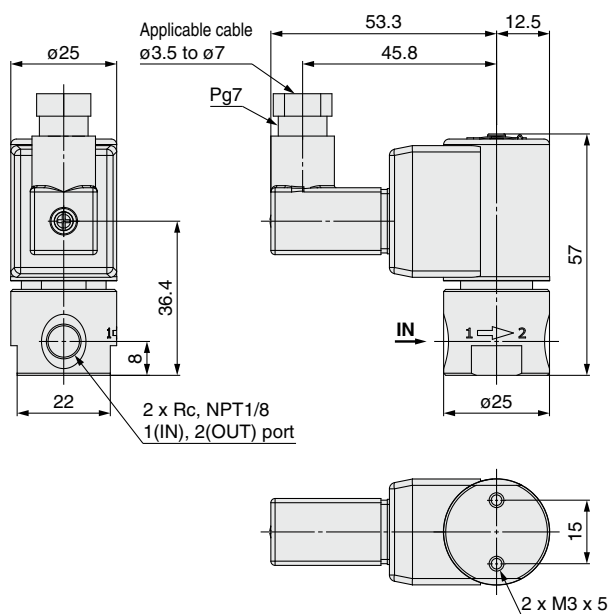


## GS: Grommet with PCB



## DS: DIN terminal

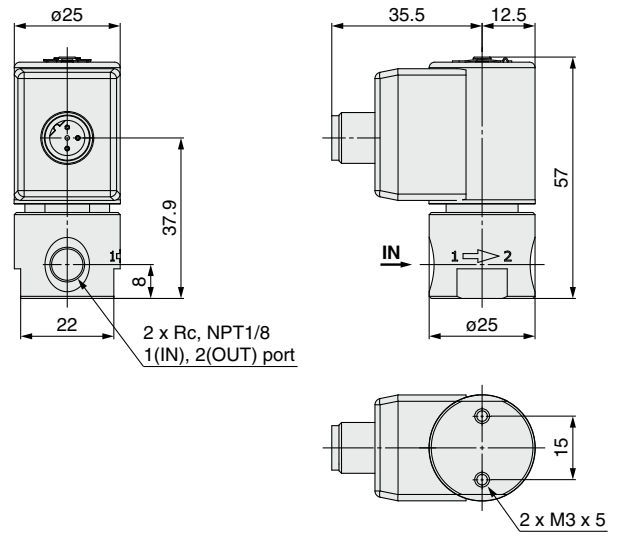
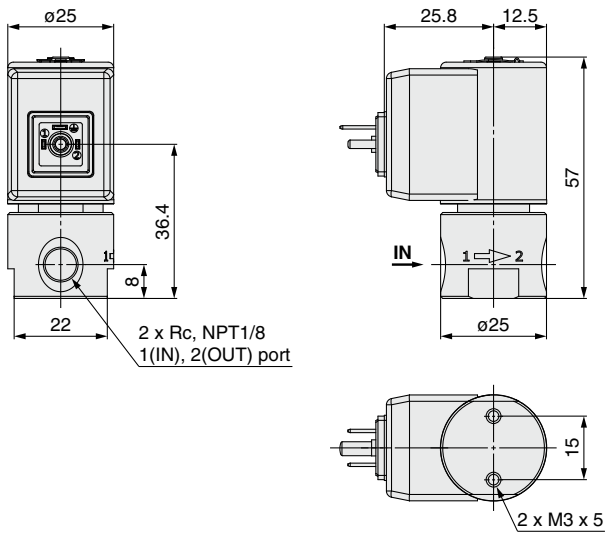
## DZ: DIN terminal with light



Dimensions: JSX **10** Port Size **1/8** Body Material **Stainless Steel, Brass**

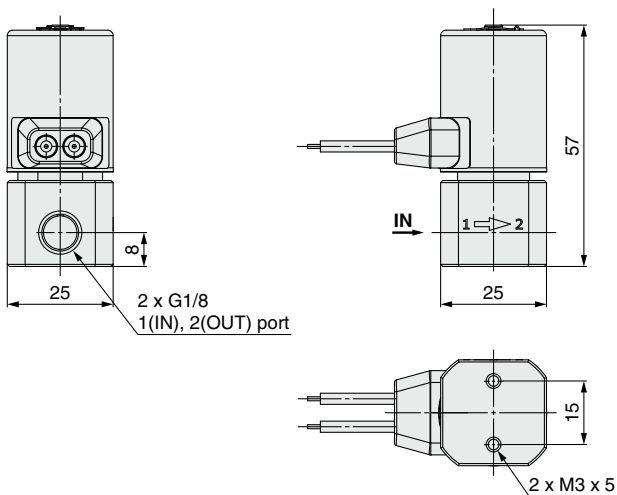
**DN: DIN terminal without connector**

**WN: M12 connector**



**G thread type**

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



JSX Series

JSXD Series

JSXM Series

Table of UL-compliant Products

Option

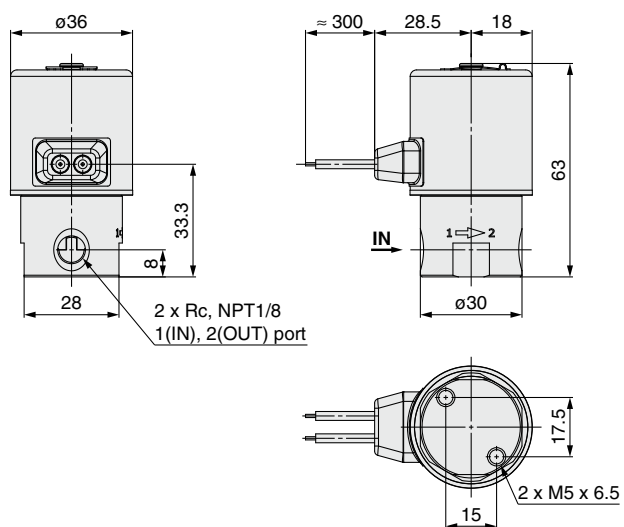
Glossary of Terms

Flow Rate Characteristics

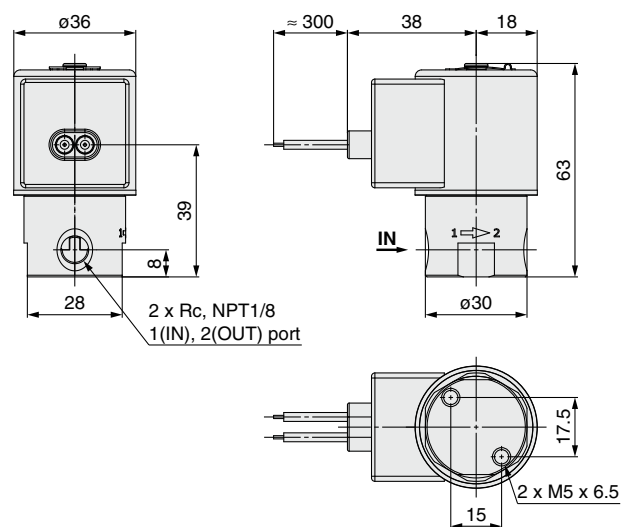
Specific Product Precautions

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

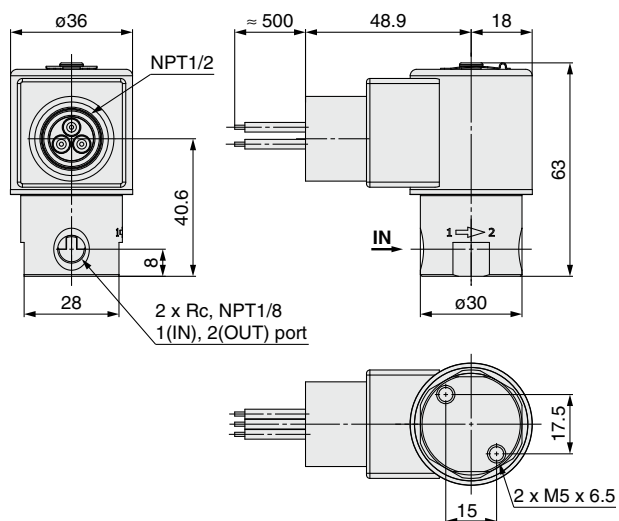
## G: Grommet



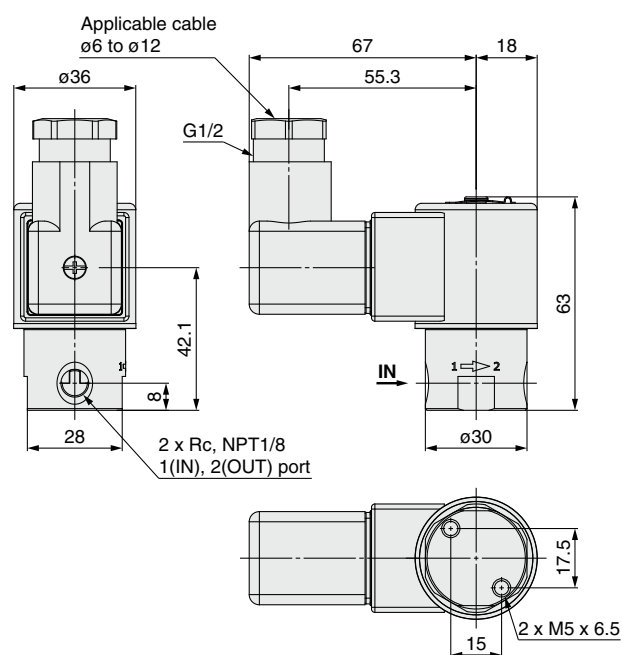
## GS: Grommet with PCB



## CS: Conduit



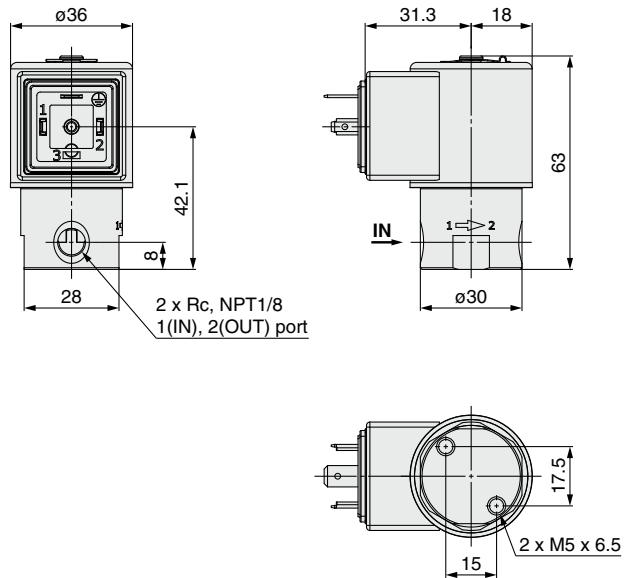
## DS: DIN terminal DZ: DIN terminal with light



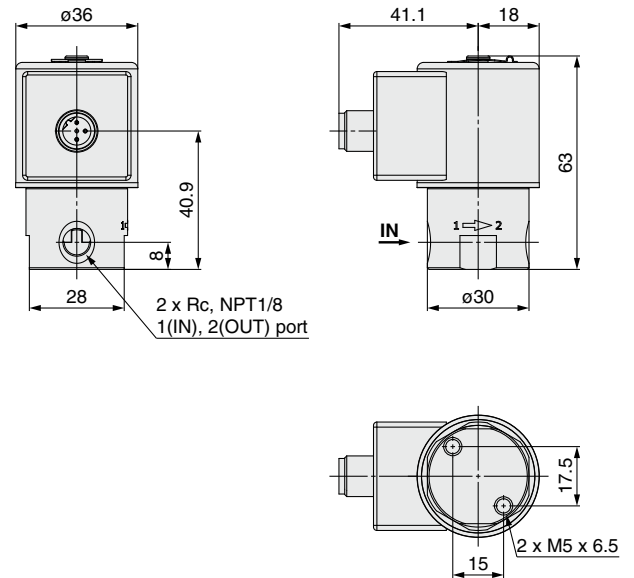


Dimensions: **JSX20** Port Size **1/8** Body Material **Stainless Steel**

**DN: DIN terminal without connector**

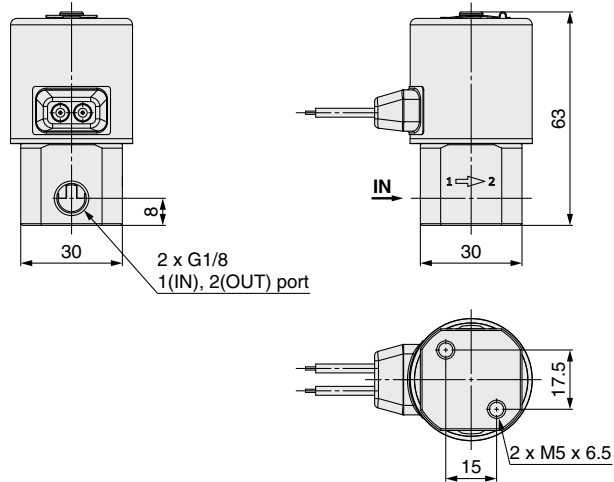


**WN: M12 connector**



**G thread type**

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



JSX Series

JSXD Series

JSXM Series

Table of UL-compliant Products

Option

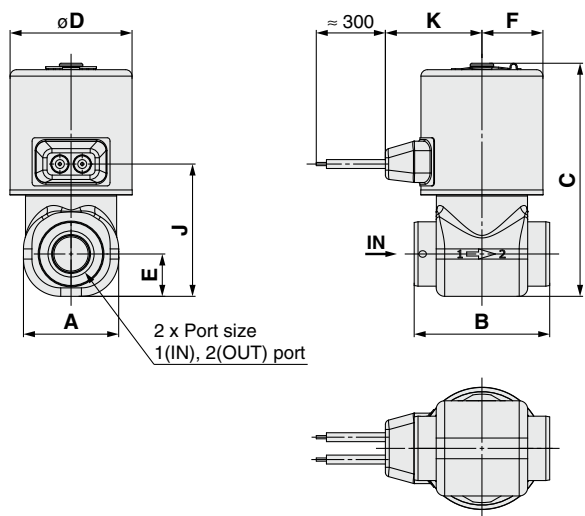
Glossary of Terms

Flow Rate Characteristics

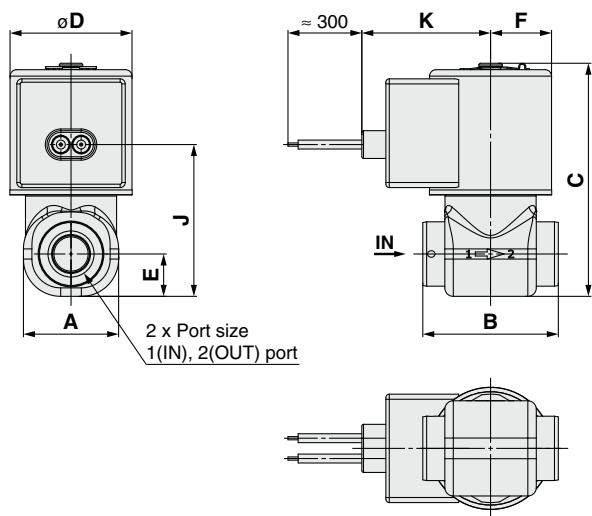
Specific Product Precautions

Dimensions: JSX**20, 30** Port Size **1/4, 3/8** Body Material **Stainless Steel**

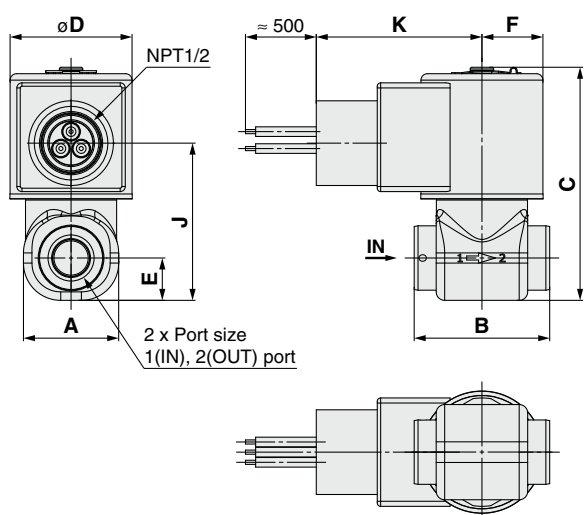
G: Grommet



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			72	
	G3/8						
30	1/4	28.1	40	78	42	12.5	21
	3/8		48			81	
	G3/8						

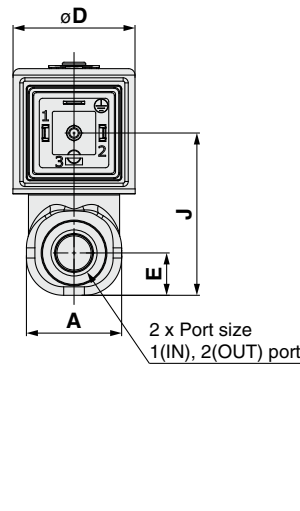
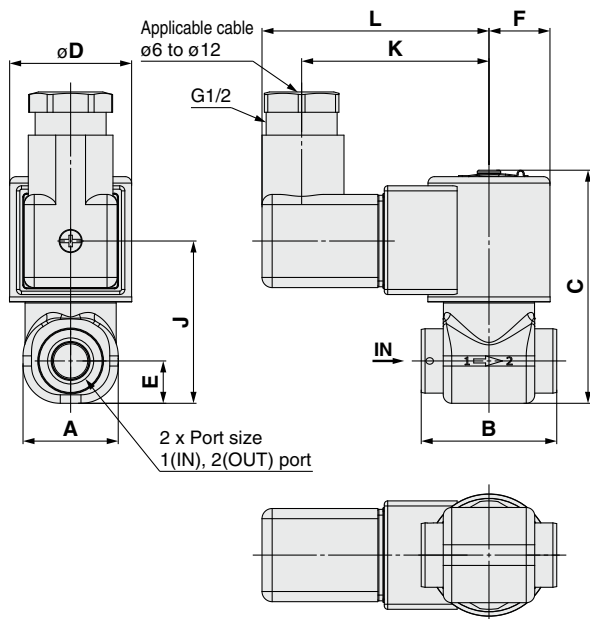
Size	Port size	Grommet		Grommet with PCB		Conduit				
		J	K	J	K	J	K			
20	1/4	39	28.5	44.8	38	46.4	48.9			
	3/8			47.8		49.4				
	G3/8	42								
30	1/4	40	31.1	45.8	41	47.4	51.9			
	3/8			43		48.8		50.4		
	G3/8									

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

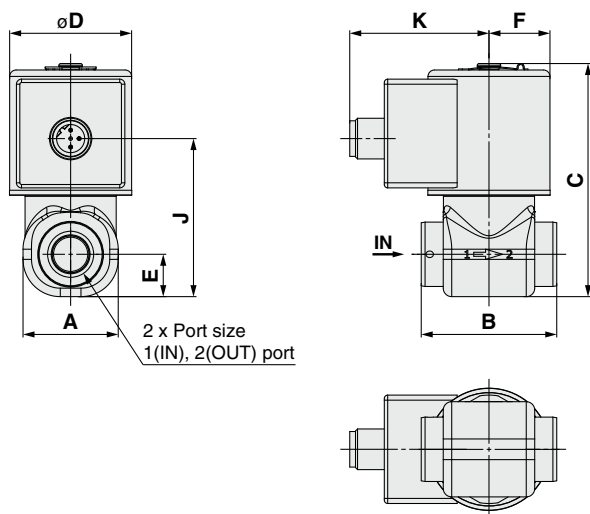
**DS:** DIN terminal

**DZ:** DIN terminal with light

**DN:** DIN terminal without connector



**WN:** M12 connector



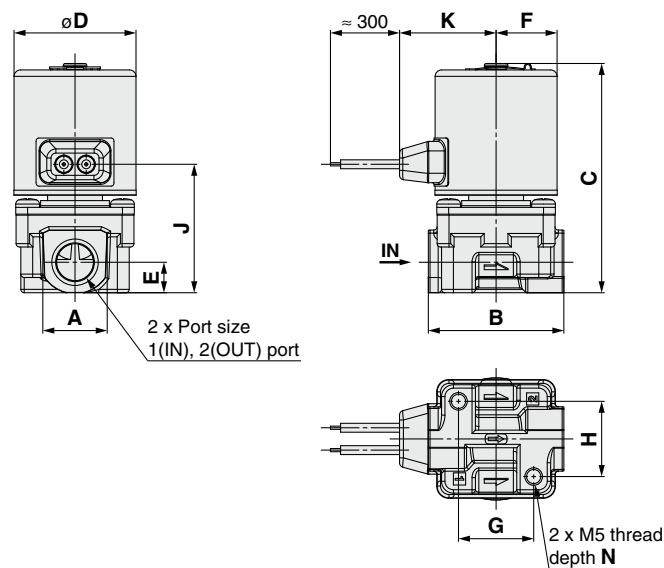
[mm]							
Size	Port size	A	B	C	D	E	F
20	1/4	28.1	40	69	36	12.5	18
	3/8		48				
	G3/8		72			14	
30	1/4	28.1	40	78	42	12.5	21
	3/8		48				
	G3/8		81			14	

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						49.7	
	G3/8						50.9	
30	1/4	48.9	58.3	70	48.9	34.3	47.7	44.1
	3/8						50.7	
	G3/8						51.9	

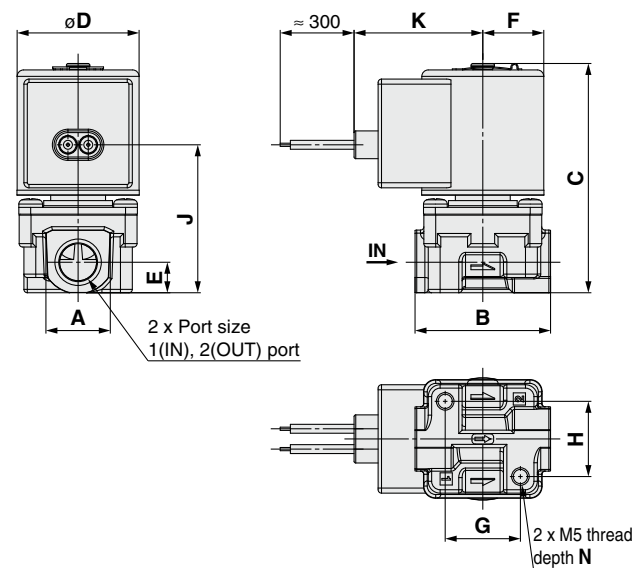
# JSX Series

Dimensions: JSX**20, 30** Port Size **1/8, 1/4, 3/8** Body Material **Brass**

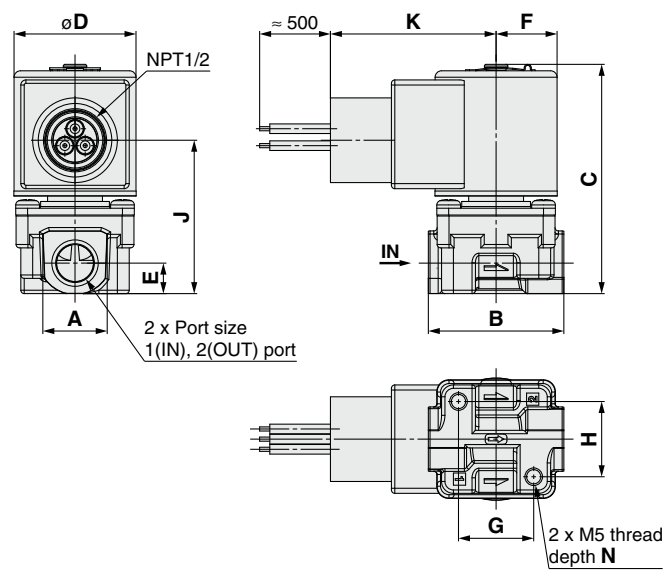
## G: Grommet



## 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	

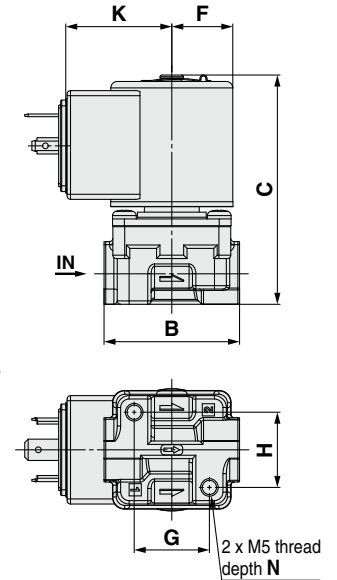
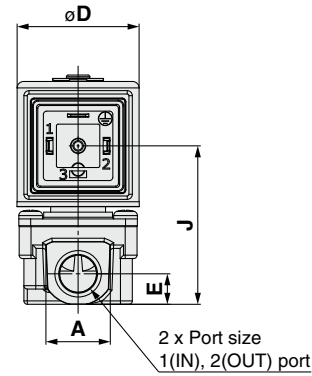
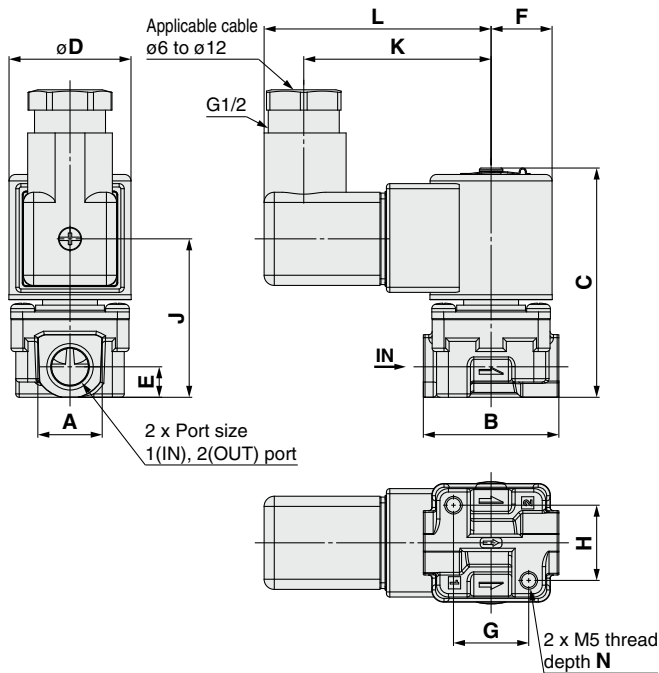


**Dimensions: JSX20, 30** **Port Size** 1/8, 1/4, 3/8 **Body Material** Brass

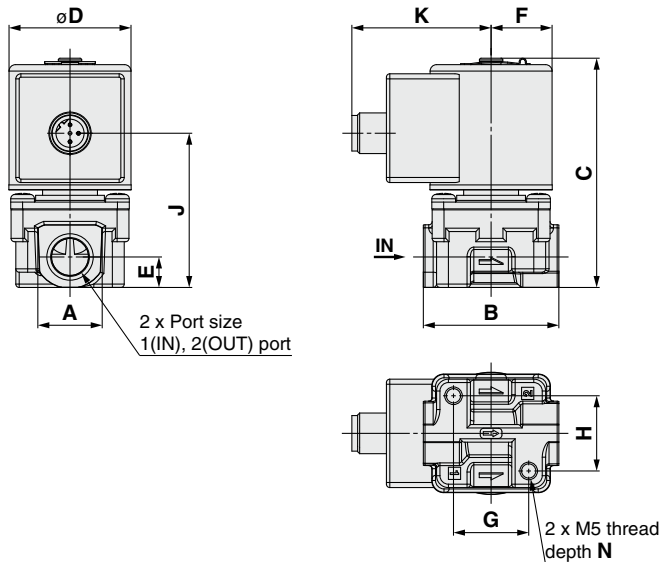
**DS:** DIN terminal

**DZ:** DIN terminal with light

**DN:** DIN terminal without connector



**WN:** M12 connector

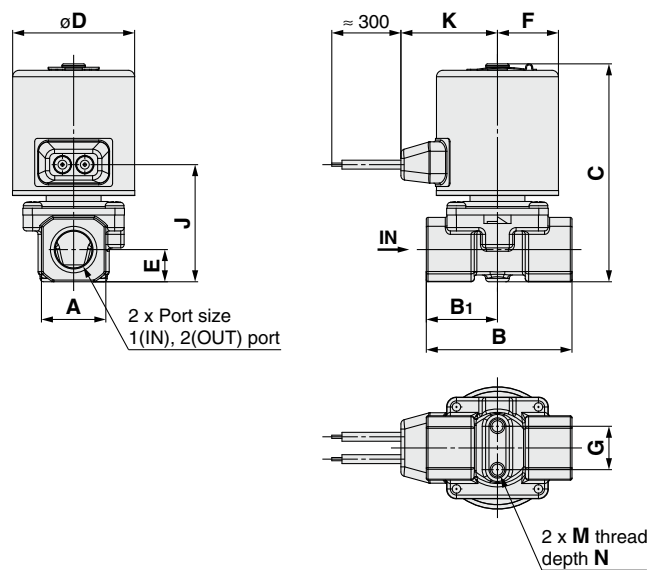


[mm]										
Size	Port size	A	B	C	D	E	F	G	H	N
20	1/8	14	30	69.2	36	9	18	15	17.5	6.4
	1/4	19	40	67.7				22.2	22.2	7.6
	3/8	22	48	70.7				19	20.6	6
30	1/4	19	40	76.7	42	9	21	22.2	22.2	7.6
	3/8	22	48	79.7				19	20.6	6

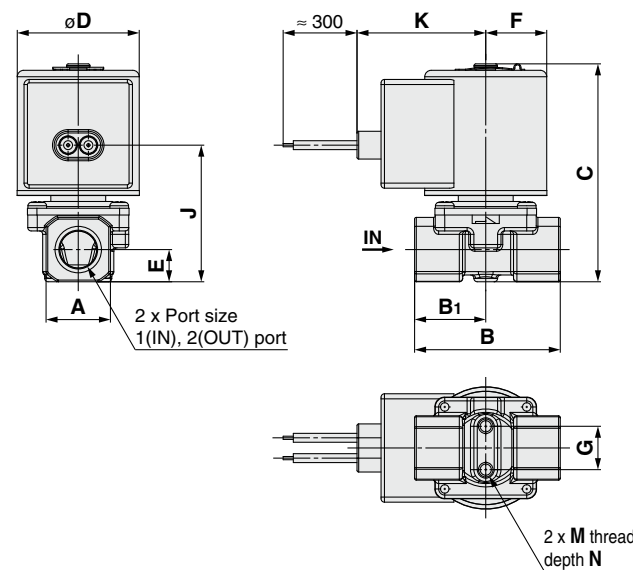
Size	Port size	DIN terminal			DIN terminal without connector		M12 connector	
		J	K	L	J	K	J	K
20	1/8	48.3	55.3	67	48.3	31.3	47	41.1
	1/4	46.8			46.8		45.5	
	3/8	49.8			49.8		48.5	
30	1/4	47.8	58.3	70	47.8	34.3	46.6	44.1
	3/8	50.8			50.8		49.6	

Dimensions: JSX**20, 30** Port Size **1/8, 1/4, 3/8** Body Material **Aluminum**

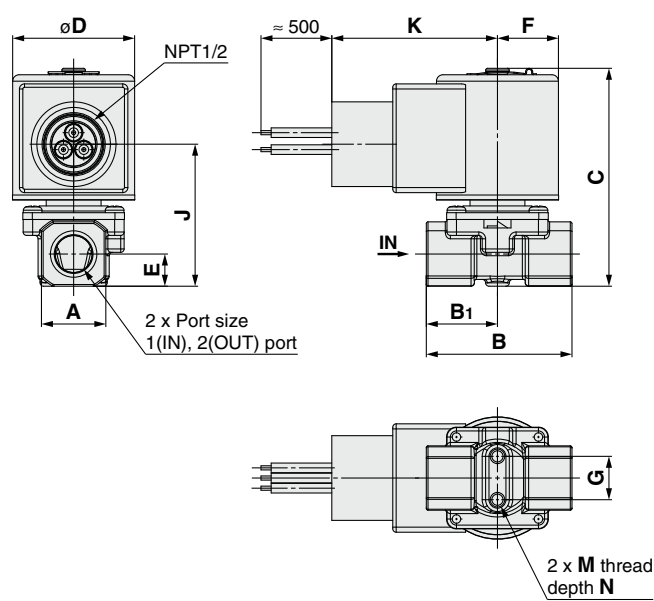
G: Grommet



GS: Grommet with PCB



CS: Conduit



[mm]											
Size	Port size	A	B	B <sub>1</sub>	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

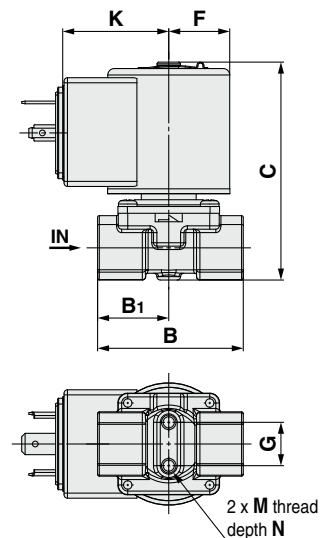
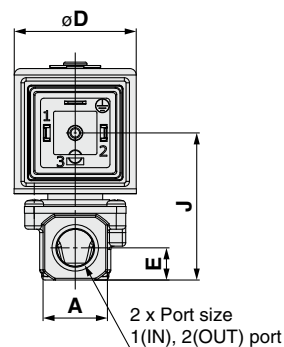
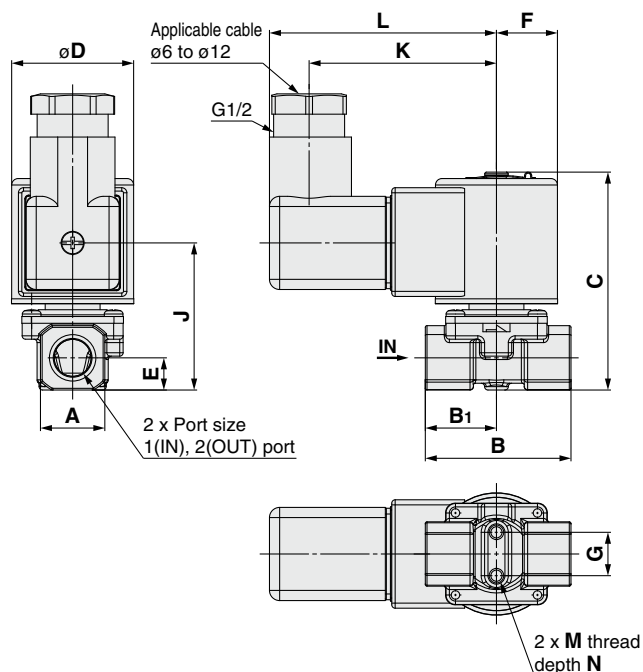
Size	Port size	Grommet		Grommet with PCB		Conduit	
		J	K	J	K	J	K
20	1/8, 1/4	34.6	28.5	40.3	38	41.9	48.9
30	1/4, 3/8	43	31.1	48.7	41	50.3	51.9

Dimensions: JSX **20, 30** Port Size **1/8, 1/4, 3/8** Body Material **Aluminum**

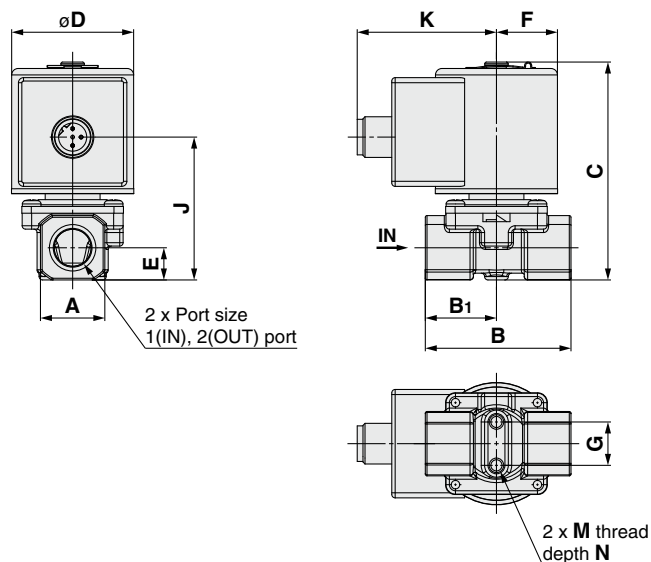
DS: DIN terminal

DZ: DIN terminal with light

DN: DIN terminal without connector



WN: M12 connector



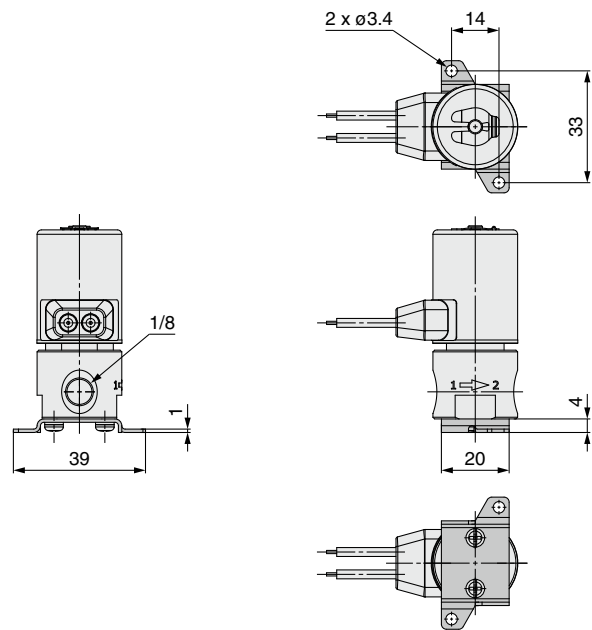
[mm]											
Size	Port size	A	B	B <sub>1</sub>	C	D	E	F	G	M	N
20	1/8, 1/4	19	43	21	64.3	36	9.5	18	12.8	M4	6
30	1/4, 3/8	24	45	22.5	80.7	42	12	21	19	M5	8

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

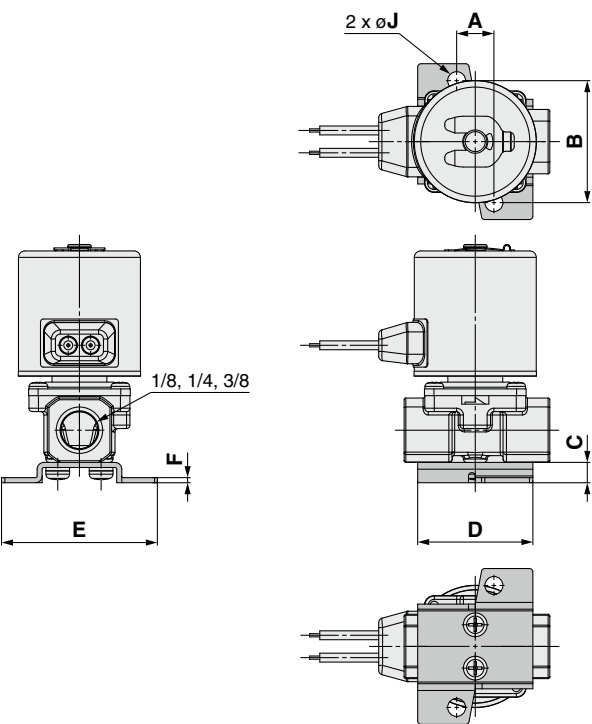
# JSX Series

## Dimensions: Bracket Options

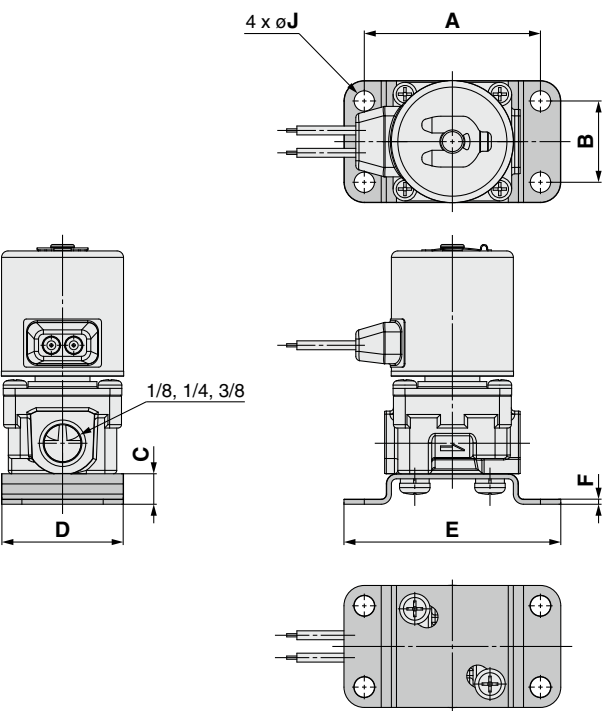
### JSX10 Body Material Stainless Steel, Brass



### JSX20, 30 Body Material Aluminum



### JSX20, 30 Body Material Brass



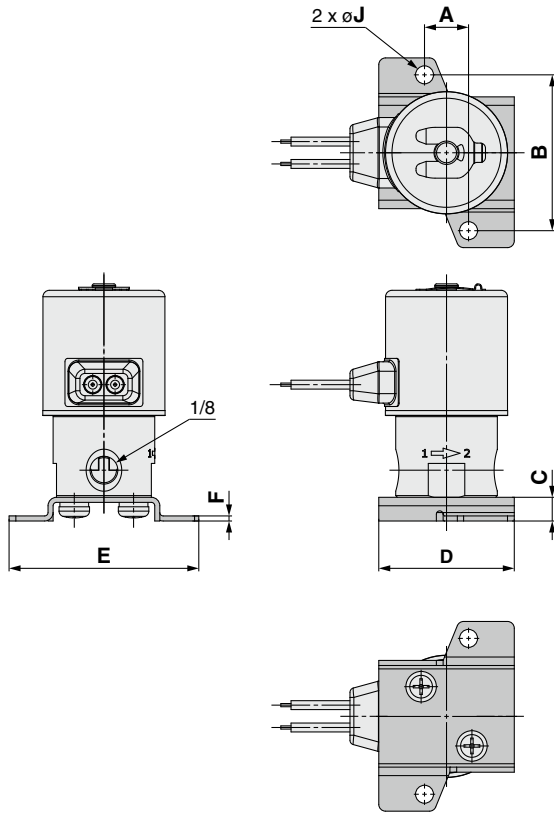
Body Material: Brass								[mm]
Size	Port size	A	B	C	D	E	F	øJ
20	1/8	52	24	9	36	64	1.5	6
20, 30	1/4	52	24	9	36	64	1.5	6
	3/8							

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	

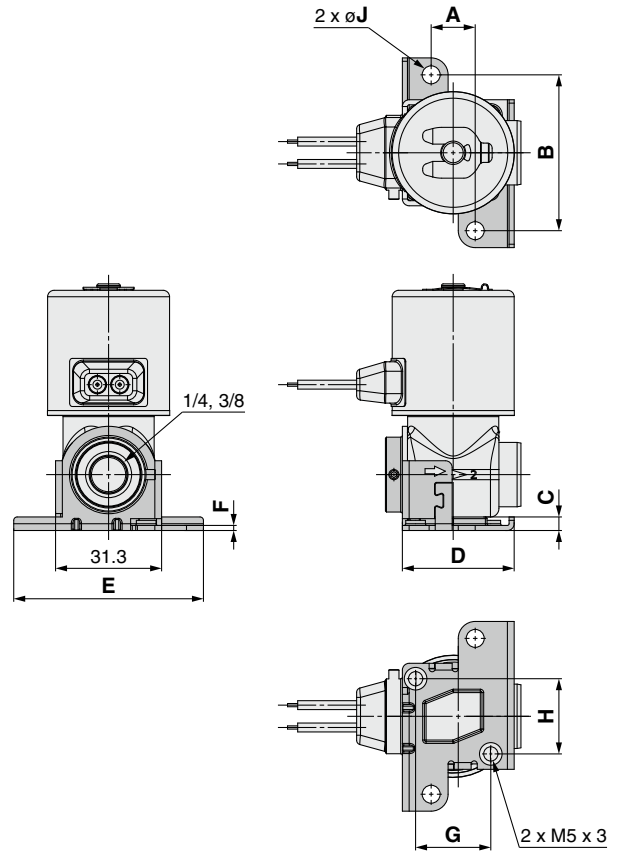


## Dimensions: Bracket Options

**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

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

JSX Series

JSXD Series

JSXM Series

Table of UL-compliant  
Products

Option

Glossary  
of Terms

Flow Rate  
Characteristics

Specific Product  
Precautions

# Pilot Operated 2-Port Solenoid Valve *JSXD Series*



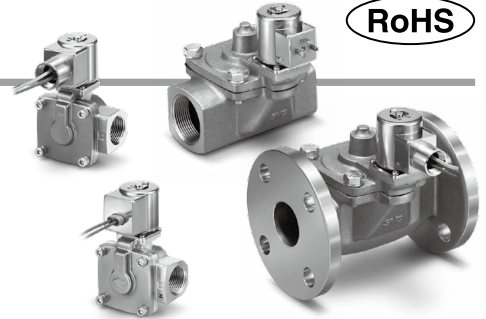
Differs depending on the voltage and electrical entry. For details, refer to table 8 below.

RoHS

## How to Order

**JSXD** **3** **1** - **C** **N** **02** **R** - **5** **G** - **D** - **B**

1 2 3 4 5 6 7 8 9 10



### 1 Size

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

### 2 Valve type

Symbol	Valve type
<b>1</b>	N.C.

### 3 Body material

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

### 4 Seal material

Symbol	Seal material
<b>N</b>	NBR
<b>F</b>	FKM
<b>E</b> *1	EPDM

\*1 Cannot be used in combination with the aluminum body

### 5 Port size

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

### 6 Thread type

Symbol	Thread type
<b>R</b>	Rc
<b>N</b>	NPT
<b>F</b>	G

### 7 Rated voltage

AC				DC	
Symbol	Rated voltage	Symbol	Rated voltage	Symbol	Rated voltage
<b>1</b>	100 VAC	<b>7</b>	240 VAC	<b>5</b>	24 VDC
<b>2</b>	200 VAC	<b>8</b>	48 VAC	<b>6</b>	12 VDC
<b>3</b>	120 (110) VAC	<b>B</b>	24 VAC		
<b>4</b>	220 VAC	<b>J</b>	230 VAC		

### 9 Oil-free option

Symbol	Option
<b>Nil</b>	None
<b>D</b>	Oil-free

### 10 Bracket

Symbol	With bracket	Size			
		30	40, 50, 60	70, 80, 90	
<b>Nil</b>	None	●	●	●	
<b>B</b>	With bracket	●	●	—*1	

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

### 8 Electrical entry

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

## 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	0.35	3.9	4.5	0.03	1.0	JSXD41-S□03	720	
		1/2		20		0.35	4.6	5.5			JSXD41-S□04	720	
50	Brass/Stainless steel	3/4	20	38	0.30	9.5	8.2	9.5	0.03	1.0	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	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			1 cm³/min 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.

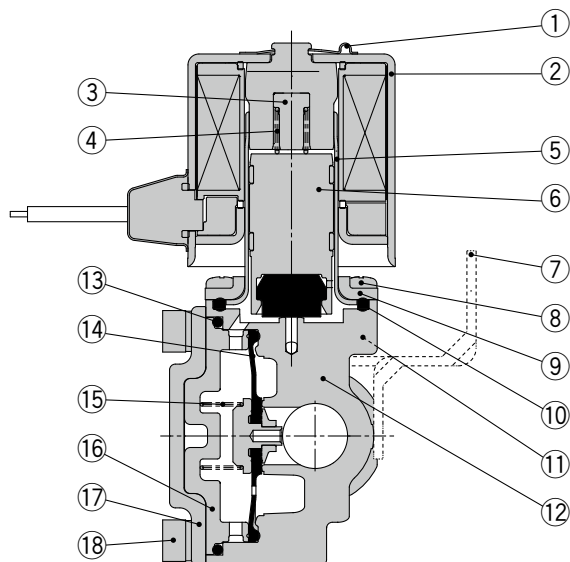
\*7 Temperature rise: The value at an ambient temperature of 20°C and when the rated voltage is applied. The value depends on the ambient environment. This is for reference.

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

## Construction

### JSXD30, Normally closed (N.C.)

Body material: Brass, Stainless steel, Aluminum

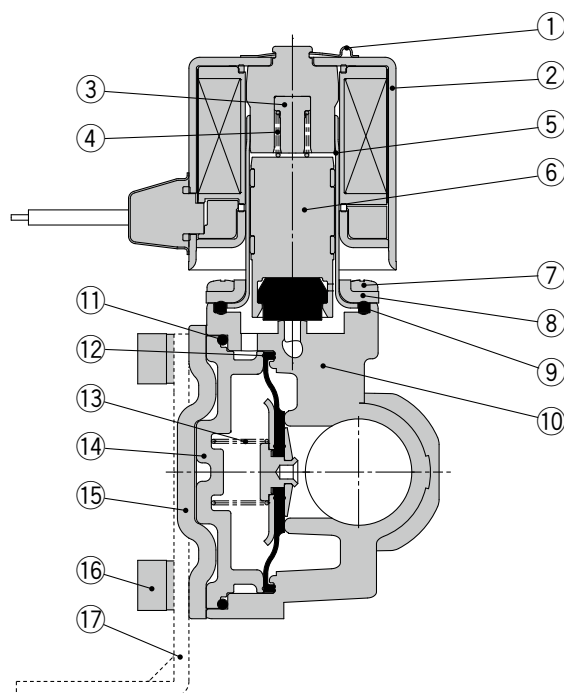


### Component Parts

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

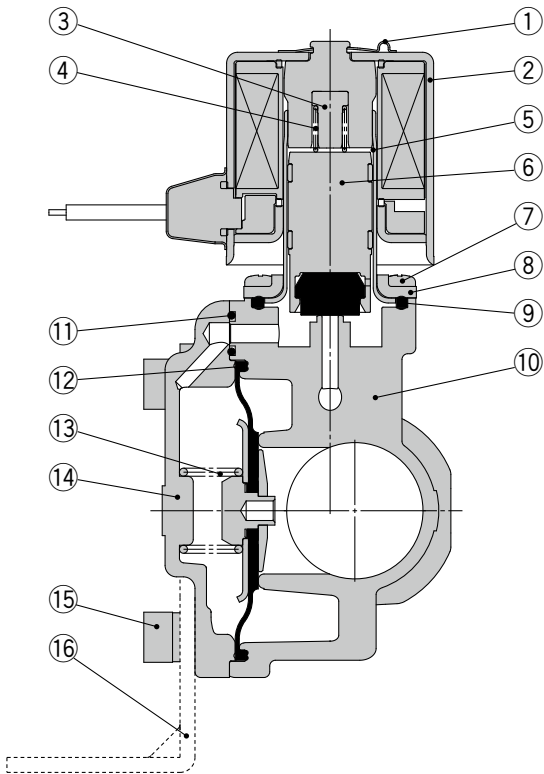


### Component Parts

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**

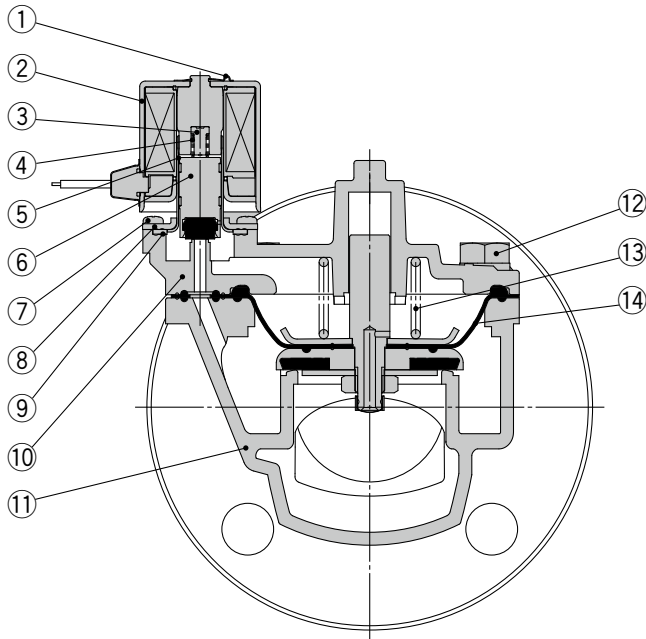
**JSXD50, 60, Normally closed (N.C.)**  
**Body material: Brass, Stainless steel**



**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	
		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	Bonnet	Bronze	
11	Body	Bronze	
12	Bolt	Fe	
13	Valve spring	Stainless steel	
14	Diaphragm assembly	Stainless steel, NBR, (FKM, EPDM)	

JSX Series

JSXD Series

JSXM Series

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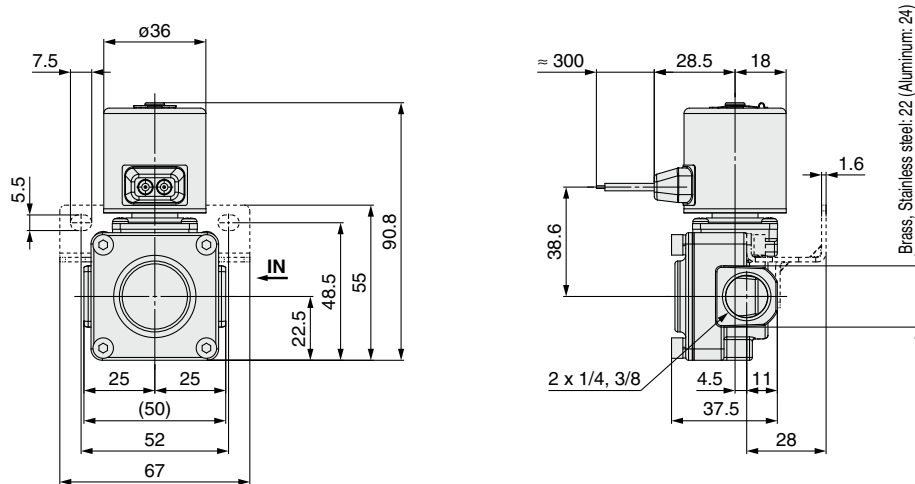
Flow Rate  
Characteristics

Specific Product  
Precautions

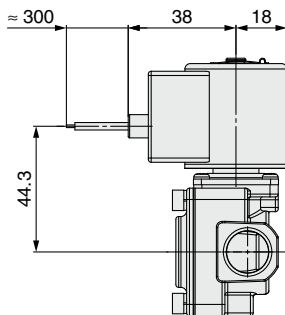
# JSXD Series

Dimensions: JSXD**30** Port Size **1/4, 3/8** Body Material **Aluminum, Brass, Stainless Steel**

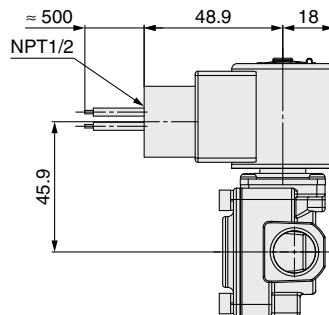
G: Grommet



GS: Grommet with PCB

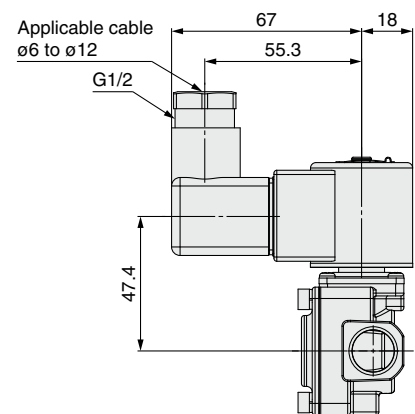


CS: Conduit

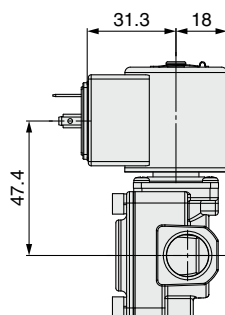


DS: DIN terminal

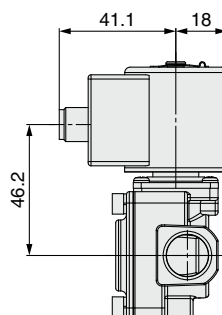
DZ: DIN terminal with light



DN: DIN terminal without connector

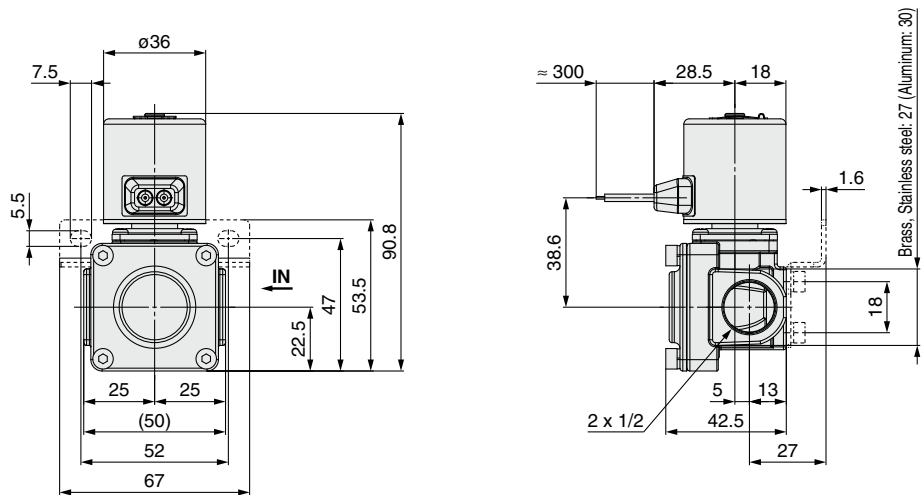


WN: M12 connector

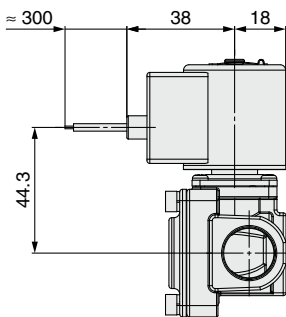


Dimensions: **JSXD30** Port Size **1/2** Body Material **Aluminum, Brass, Stainless Steel**

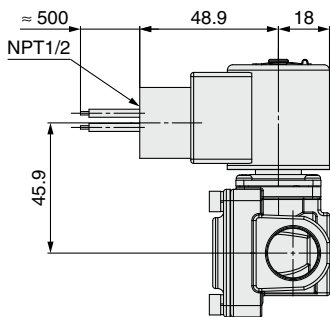
G: Grommet



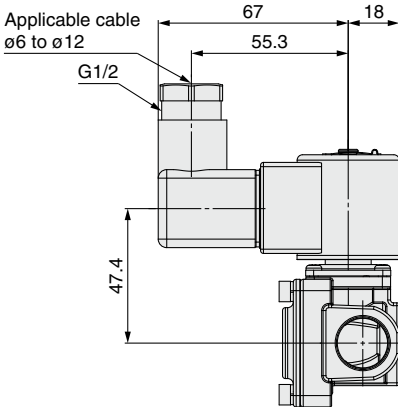
GS: Grommet with PCB



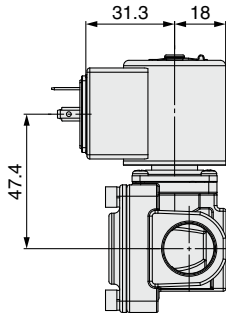
CS: Conduit



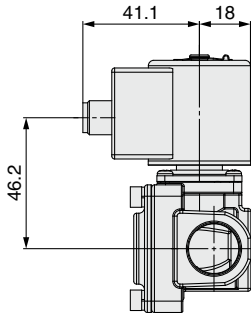
DS: DIN terminal  
DZ: DIN terminal with light



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.

2 x M4 x 0.7 Thread depth 8

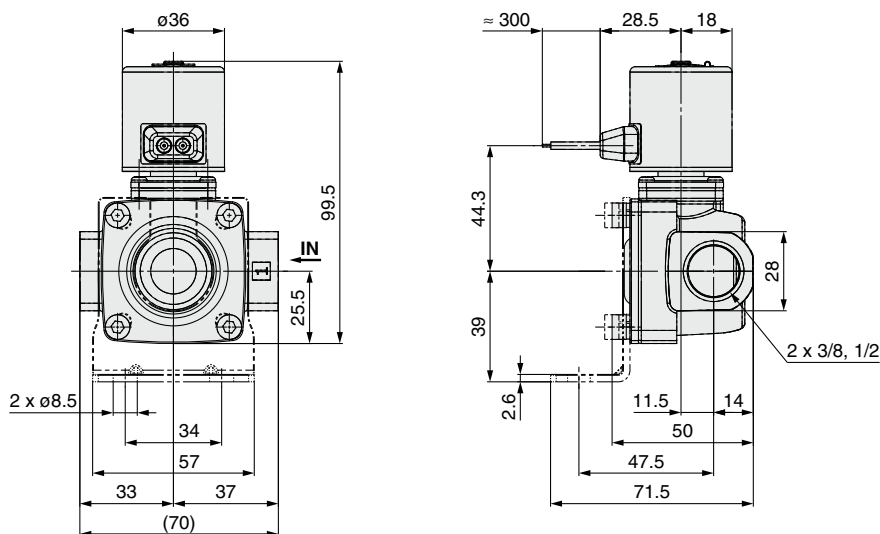
JSX Series
JSXD Series
JSXM Series
Table of UL-compliant Products
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Specific Product Precautions



# JSXD Series

Dimensions: JSXD**40** Port Size **3/8, 1/2** Body Material **Brass, Stainless Steel**

G: Grommet

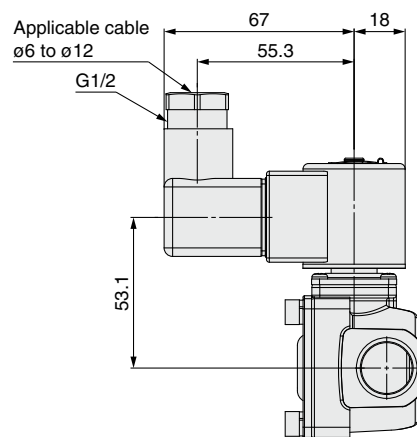
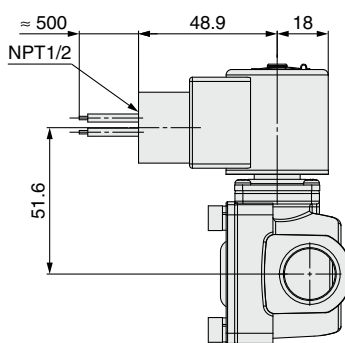
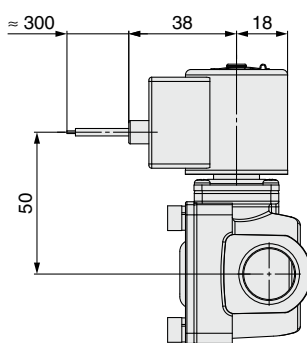


GS: Grommet with PCB

CS: Conduit

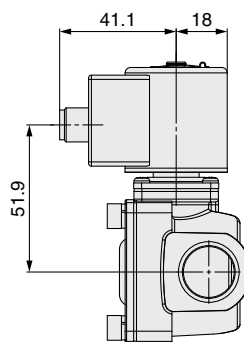
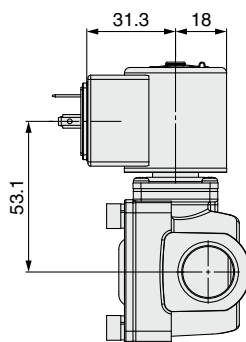
DS: DIN terminal

DZ: DIN terminal with light



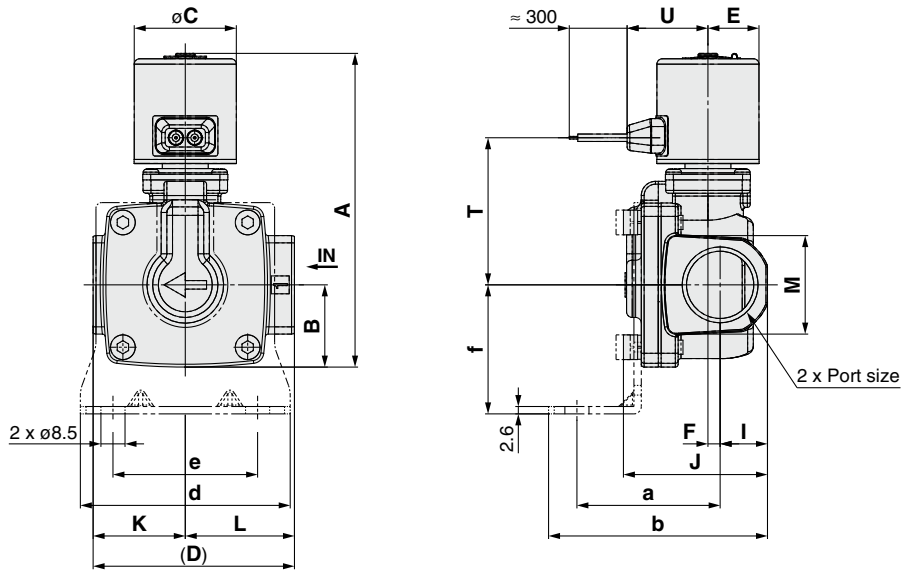
DN: DIN terminal without connector

WN: M12 connector



Dimensions: JSXD**50, 60** Port Size **3/4, 1** Body Material **Brass, Stainless Steel**

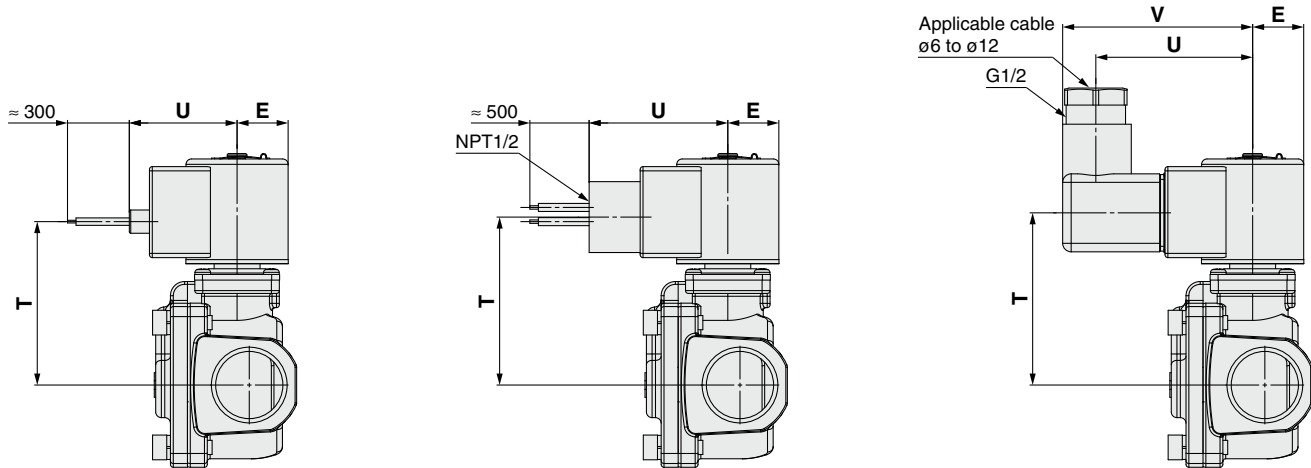
G: Grommet



GS: Grommet with PCB

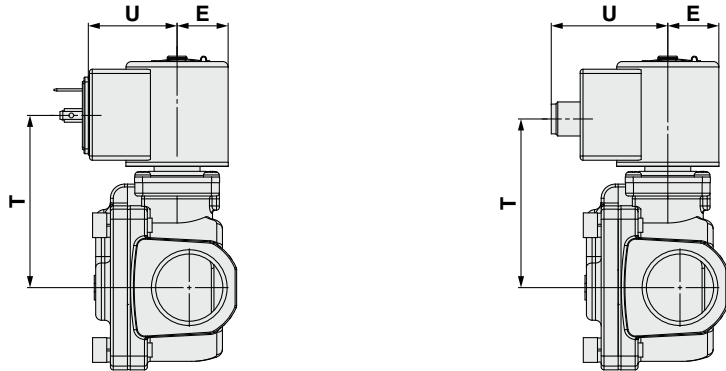
CS: Conduit

DS: DIN terminal  
DZ: DIN terminal with light



DN: DIN terminal without connector

WN: M12 connector



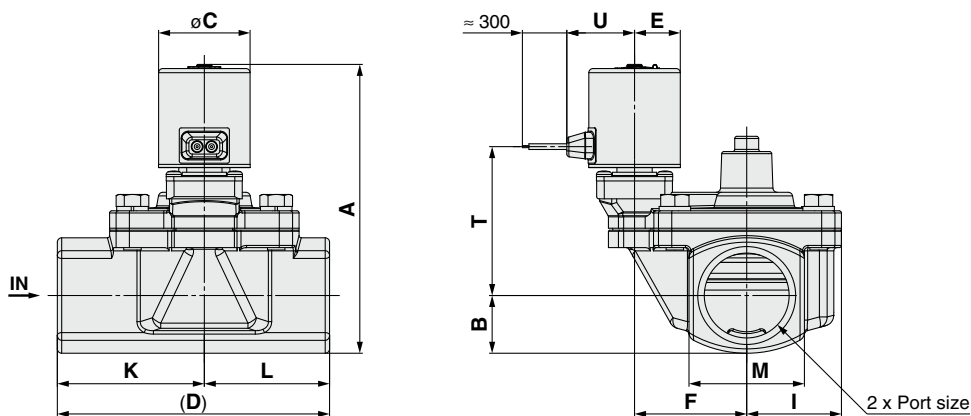
Size	Port size	A	B	C	D	E	F	I	J	K	L	M	Grommet		Grommet with PCB	
													T	U	T	U
50	3/4	110.6	29	36	71	18	4.5	17	51	32.5	38.5	35	51.9	28.5	57.6	38
60	1	131	33	42	95	21	4.5	20	59.5	45.5	49.5	42	60.4	31.1	66	41

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

# JSXD Series

Dimensions: JSXD**70, 80, 90** Port Size **1 1/4, 1 1/2, 2** Body Material **Bronze**

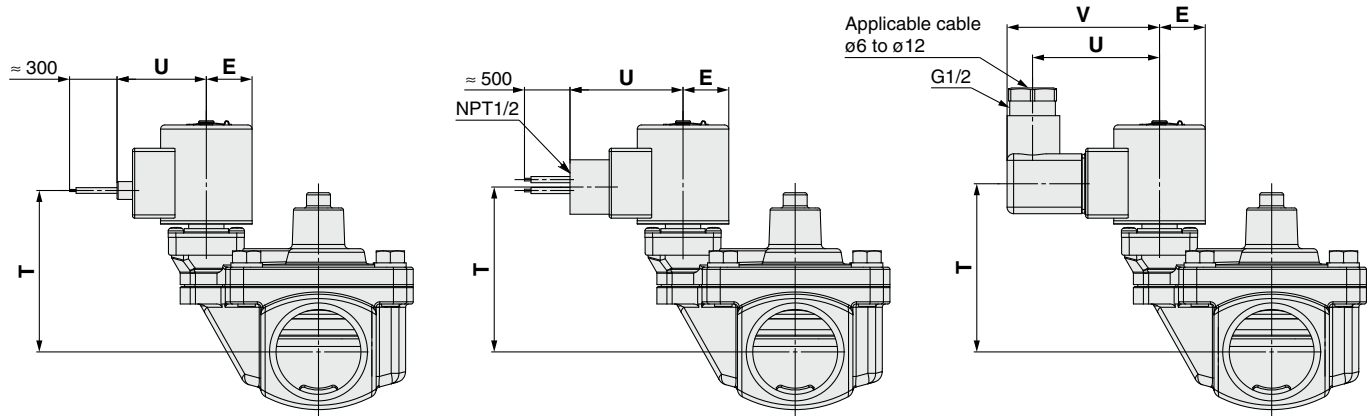
G: Grommet



GS: Grommet with PCB

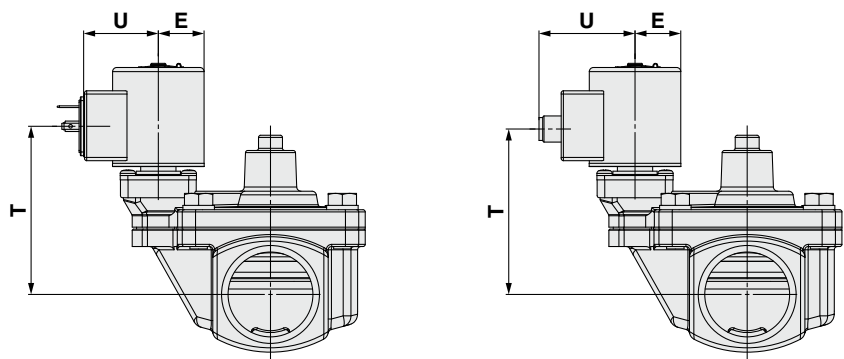
CS: Conduit

DS: DIN terminal  
DZ: DIN terminal with light



DN: DIN terminal without connector

WN: M12 connector

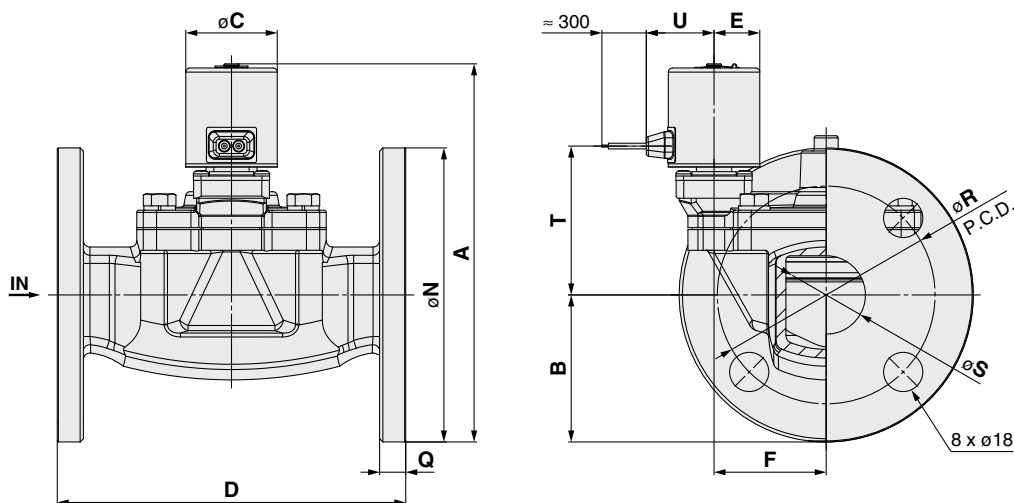


[mm]											
Size	Port size	A	B	C	D	E	F	I	K	L	M
70	1 1/4	132.6	26.5	42	125	21	51.5	43.5	67.5	57.5	53
80	1 1/2	139.3	30	42	132	21	54.5	46.5	72	60	60
90	2	150.3	35.5	42	150	21	59	52	81	69	71

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: JSXD **70, 80, 90** Applicable Flange **32A, 40A, 50A** Body Material **Bronze**

G: Grommet

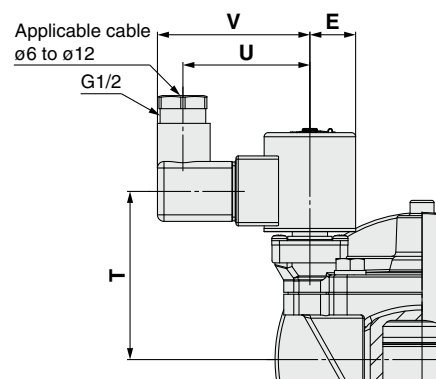
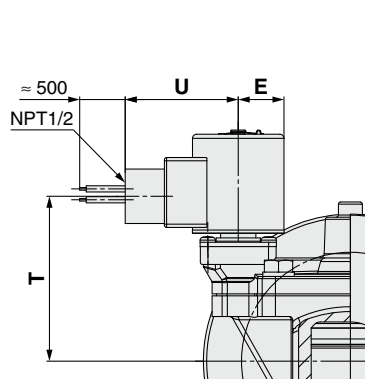
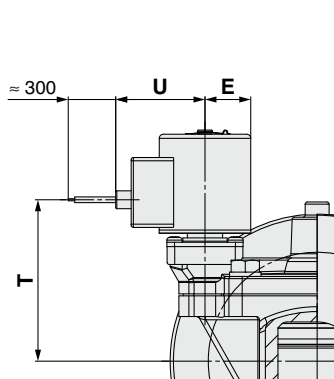


GS: Grommet with PCB

CS: Conduit

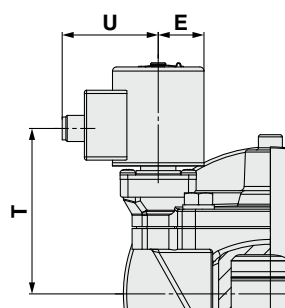
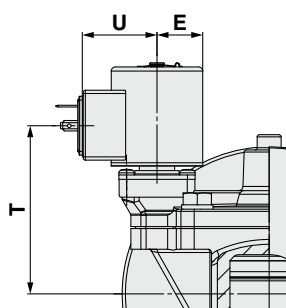
DS: DIN terminal

DZ: DIN terminal with light



DN: DIN terminal without connector

WN: M12 connector



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

[mm]

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*



Differs depending on the voltage and electrical entry. For details, refer to table 8 below.

## How to Order

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

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

### ① Size

Symbol	Size
2	20
3	30
4	40

### ② Valve type

Symbol	Valve type
1	N.C.

### ③ Body material

Symbol	Body material
A	Aluminum

### ④ Seal material

Symbol	Seal material
N	NBR
F	FKM

### ⑤ Orifice diameter and port size

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

### ⑥ Thread type

Symbol	Thread type
R	Rc
N	NPT
F	G

### ⑦ Rated voltage

AC				DC	
Symbol	Rated voltage	Symbol	Rated voltage	Symbol	Rated voltage
1	100 VAC	7	240 VAC	5	24 VDC
2	200 VAC	8	48 VAC	6	12 VDC
3	120 (110) VAC	B	24 VAC		
4	220 VAC	J	230 VAC		

### ⑧ 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.

### ⑨ Coil orientation

Symbol	Orientation
Nil	Upward
U	Downward

### ⑩ Blow port position

Coil orientation: Upward  
(When "Nil" is selected for ⑨)

Coil orientation: Downward  
(When "U" is selected for ⑨)

Symbol	Position	Symbol	Position
Nil	Bottom	Nil	Top
F	Front	F	Front

### ⑪ 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.



### Short lead times

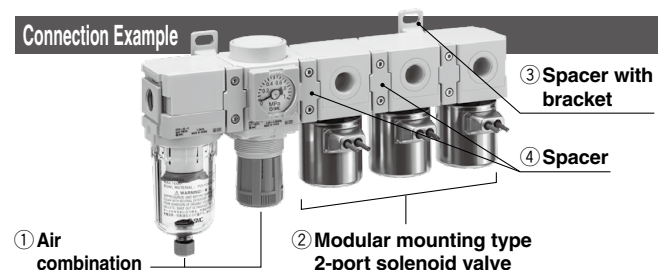
This system enables us to respond to your special needs (additional machining, accessory assembly, or the designing of a modular unit) and deliver your personalized products as quickly as standard products.

Please contact your local sales representative for more details.

### 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.

### 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.

## 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.**

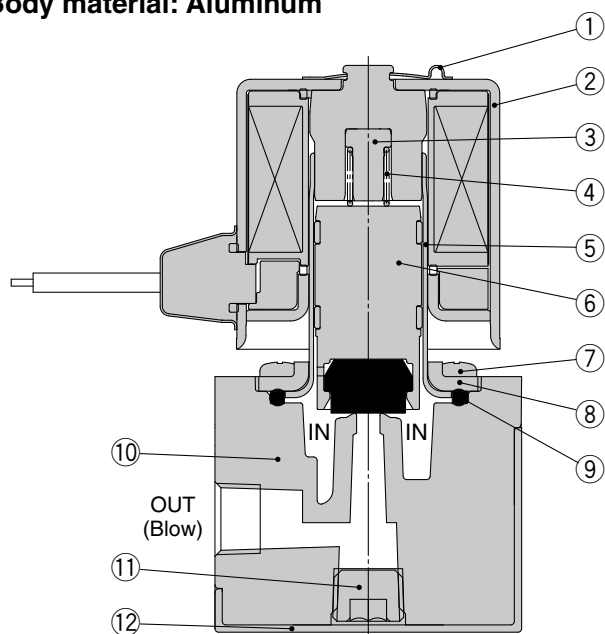


# JSXM Series

## Construction

JSXM20, 30, 40, Normally closed (N.C.)

Body material: Aluminum

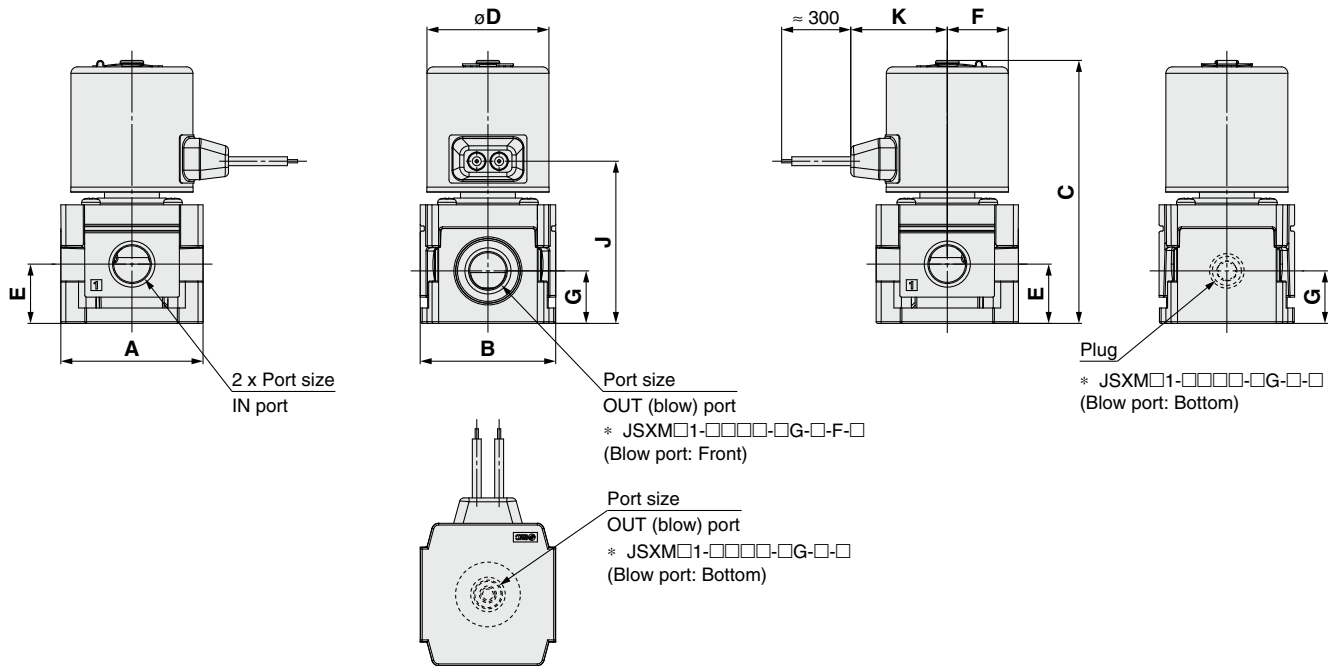


## Component Parts

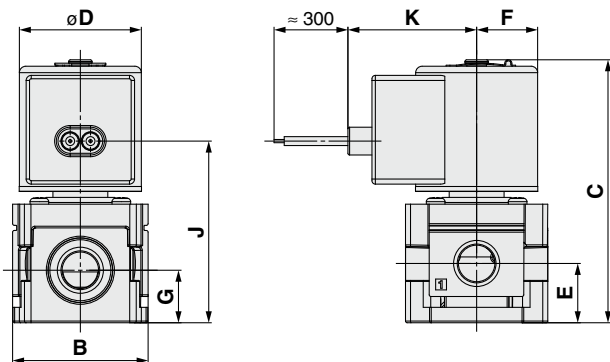
No.	Description	Material
1	Clip	Stainless steel
2	Solenoid coil	Stainless steel, Cu, Resin
3	Stopper	PPS
4	Spring	Stainless steel
5	Tube assembly	Stainless steel
6	Armature assembly	Stainless steel, PPS, NBR, (FKM)
7	Screw	Fe
8	Bonnet	Stainless steel
9	Gasket	NBR, (FKM)
10	Body	Aluminum
11	Plug	Fe
12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

## Dimensions

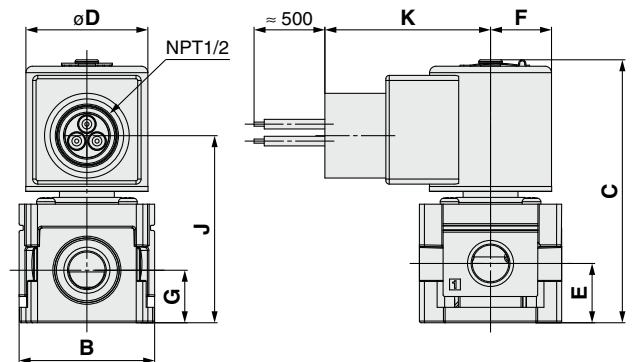
### G: Grommet



### 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

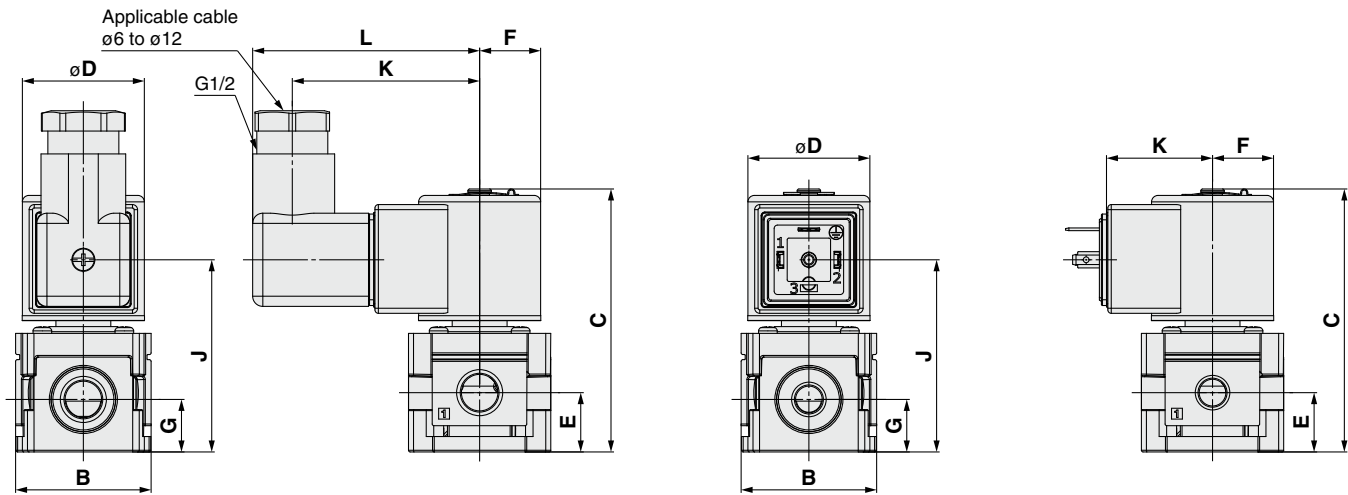
# JSXM Series

## Dimensions

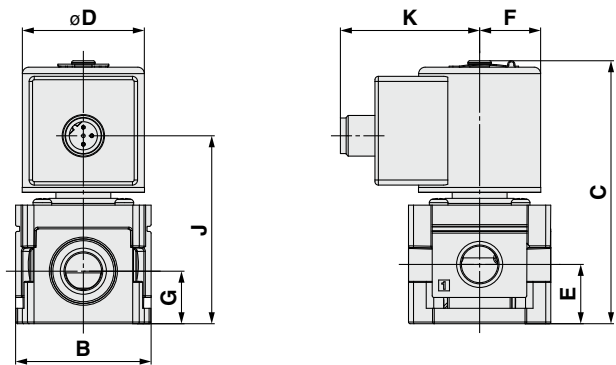
DS: DIN terminal

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

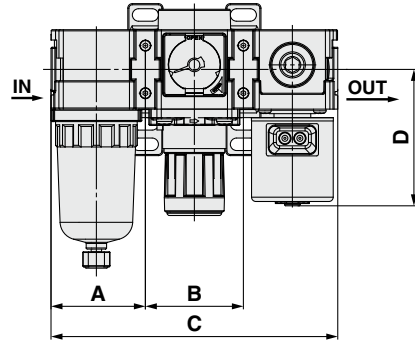
## Modular Connection Examples (Dimensions)

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 ①

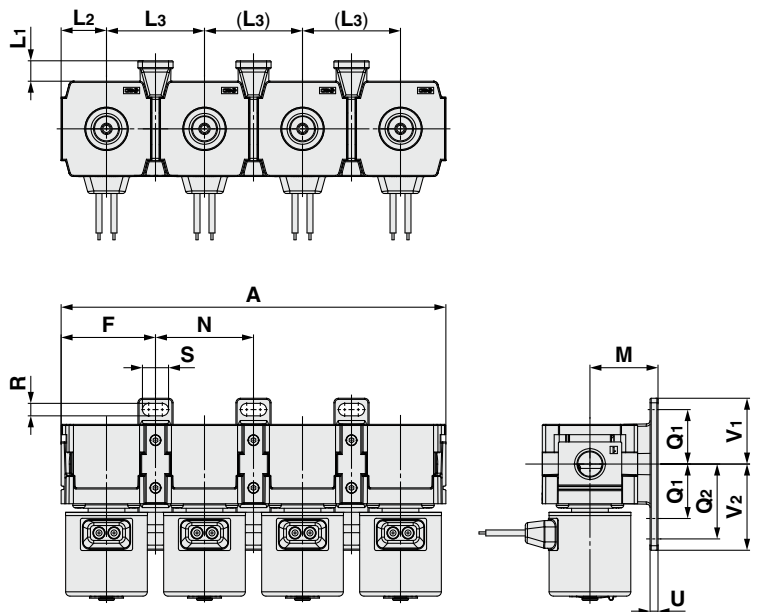
Air combination AC20B-02E-D ————— 1 pc.  
 Spacer with bracket Y200T-D ————— 1 pc.  
 Modular mounting type 2-port solenoid valve  
 JSXM21-AN301R-5G-U-F ————— 1 pc.



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 ②

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	L1	L2	L3	M	N	Q1	Q2	R	S	U	V1	V2
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

# Spacer / Spacer with Bracket

## Spacer / Spacer with Bracket

Y **300** **□** - D

① ②

	Symbol	Description	① Body size [Applicable size]		
			200 [JSXM20]	300 [JSXM30]	400 [JSXM40]
② Bracket	Nil	Spacer	●	●	●
	T	Spacer with bracket	●	●	●

Spacer  
(Y□-D)



Spacer with bracket  
(Y□T-D)



### Standard Specifications

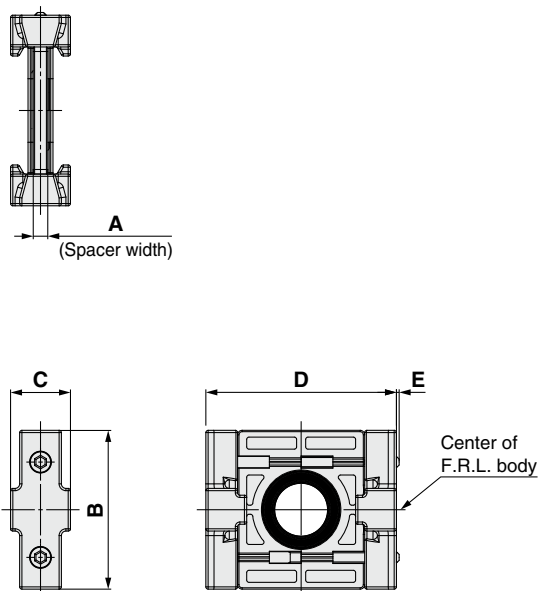
Fluid	Air
Ambient and fluid temperatures	-5 to 60°C (No freezing)
Proof pressure	1.5 MPa
Max. operating pressure	1.0 MPa

### Replacement Parts

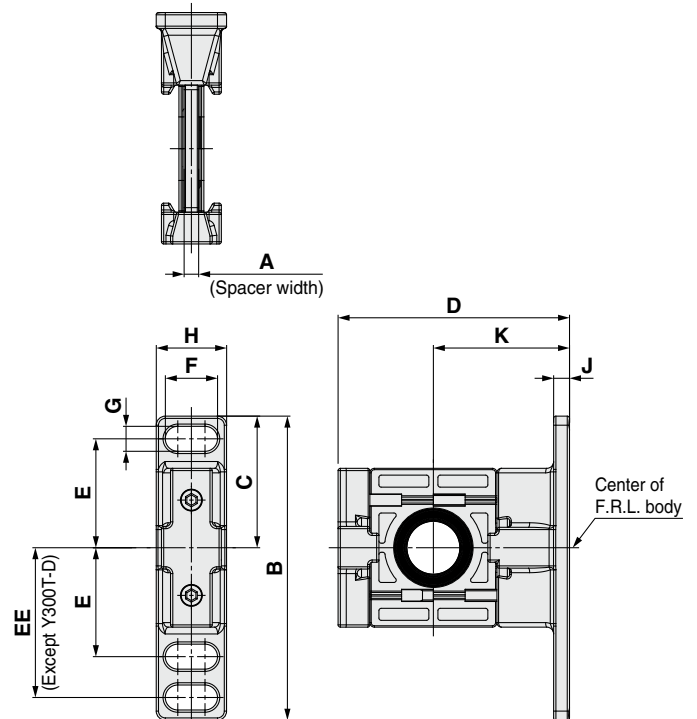
Description	Material	Part number		
		Y200-D Y200T-D	Y300-D Y300T-D	Y400-D Y400T-D
Seal	HNBR	Y220P-050S	Y320P-050S	Y420P-050S

### 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.

 <b>Recognized</b>						<b>G</b> Grommet  <b>GS</b> Grommet with PCB  <b>DN</b> DIN terminal without connector 		
<b>JSX11</b>	Series/Valve type <b>JSX11</b>	<b>S</b>	<b>N</b>	Orifice diameter/Port size <b>101</b>	Thread type <b>R</b>	Rated voltage <b>1</b>	Electrical entry <b>G*1</b>	Option *
			<b>F</b>	<b>201</b>	<b>N</b>	<b>2</b>	<b>GS</b>	
			<b>E</b>		<b>F</b>	<b>3</b>	<b>DN</b>	
						<b>4</b>		
						<b>5</b>		
						<b>6</b>		
						<b>7</b>		
						<b>8</b>		
						<b>B</b>		
						<b>J</b>		
<b>JSX21</b>	Series/Valve type <b>JSX21</b>	<b>S</b>	<b>N</b>	Orifice diameter/Port size <b>301</b>	Thread type <b>R</b>	Rated voltage <b>1</b>	Electrical entry <b>G*1</b>	Option *
			<b>F</b>	<b>302</b>	<b>N</b>	<b>2</b>	<b>GS</b>	
			<b>E</b>	<b>303</b>	<b>F</b>	<b>3</b>	<b>DN</b>	
				<b>402</b>		<b>4</b>		
				<b>403</b>		<b>5</b>		
				<b>502</b>		<b>6</b>		
				<b>503</b>		<b>7</b>		
				<b>702</b>		<b>8</b>		
				<b>703</b>		<b>B</b>		
						<b>J</b>		
<b>JSX31</b>	Series/Valve type <b>JSX31</b>	<b>S</b>	<b>N</b>	Orifice diameter/Port size <b>402</b>	Thread type <b>R</b>	Rated voltage <b>1</b>	Electrical entry <b>G*1</b>	Option *
			<b>F</b>	<b>403</b>	<b>N</b>	<b>2</b>	<b>GS</b>	
			<b>E</b>	<b>502</b>	<b>F</b>	<b>3</b>	<b>DN</b>	
				<b>503</b>		<b>4</b>		
				<b>702</b>		<b>5</b>		
				<b>703</b>		<b>6</b>		
						<b>7</b>		
						<b>8</b>		
						<b>B</b>		
						<b>J</b>		

\*1 Only applicable to rated voltage symbols "5" and "6"

 <b>Listed</b>						<b>CS</b> Conduit 		
<b>JSX21</b>	Series/Valve type <b>JSX21</b>	<b>S</b>	<b>N</b>	Orifice diameter/Port size <b>301</b>	Thread type <b>R</b>	Rated voltage <b>1</b>	Electrical entry <b>CS</b>	Option *
			<b>F</b>	<b>302</b>	<b>N</b>	<b>2</b>		
			<b>E</b>	<b>303</b>	<b>F</b>	<b>3</b>		
				<b>402</b>		<b>4</b>		
				<b>403</b>		<b>5</b>		
				<b>502</b>		<b>6</b>		
				<b>503</b>		<b>7</b>		
				<b>702</b>		<b>8</b>		
				<b>703</b>		<b>B</b>		
						<b>J</b>		
<b>JSX31</b>	Series/Valve type <b>JSX31</b>	<b>S</b>	<b>N</b>	Orifice diameter/Port size <b>402</b>	Thread type <b>R</b>	Rated voltage <b>1</b>	Electrical entry <b>CS</b>	Option *
			<b>F</b>	<b>403</b>	<b>N</b>	<b>2</b>		
			<b>E</b>	<b>502</b>	<b>F</b>	<b>3</b>		
				<b>503</b>		<b>4</b>		
				<b>702</b>		<b>5</b>		
				<b>703</b>		<b>6</b>		
						<b>7</b>		
						<b>8</b>		
						<b>B</b>		
						<b>J</b>		

# JSX/JSX□ Series 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

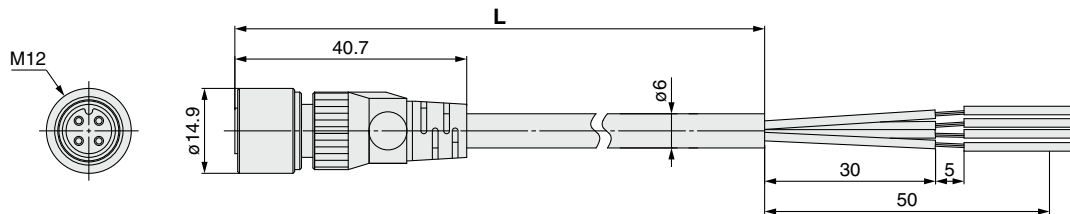
1	For DC voltages
2	For AC voltages

### Cable length L [mm]

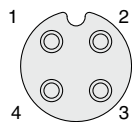
1	1000
2	2000
5	5000

## Specifications

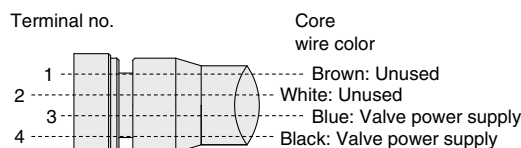
Part number		JSX022-30-1-□	JSX022-30-2-□
Key type		A-coded	B-coded
Rating/Performance	Rated current	4 A	
	Rated voltage	250 V	
	Contact resistance	40 mΩ or less	
	Insulation resistance	1000 MΩ or more	
	Withstand voltage	1500 VAC	
	Operating temperature range	-25 to 70°C	
	Min. bending radius (Fixed)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



### For DC voltages (A-coded)

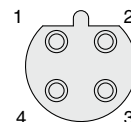


Socket connector  
pin arrangement

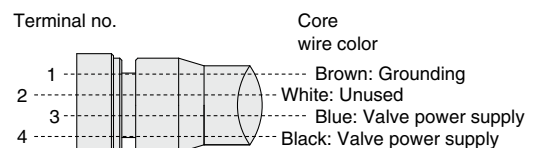


Connections

### For AC voltages (B-coded)



Socket connector  
pin arrangement



Connections

\* The solenoid valve has no polarity for DC voltages.



## 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."

IP — □ □

First digit      Second digit

##### ● 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.

# 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
	—	$C_v$	ANSI/(NFPA)T3.21.3 R1-2008
Process fluid control equipment	$K_v$	—	IEC 60534-1:2005 IEC 60534-2-3:1997 JIS B 2005-1:2012
	—	$C_v$	JIS B 2005-2-3:2004 Equipment: JIS B 8471, 8472, 8473

### 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

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

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

When

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

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

**Q** : Air flow rate [L/min (ANR)]

**C** : Sonic conductance [ $\text{dm}^3/(\text{s} \cdot \text{bar})$ ],  $\text{dm}^3$  (Cubic decimeter) of SI units = L (liter)

**b** : Critical pressure ratio [—]

**P<sub>1</sub>** : Upstream pressure [MPa]

**P<sub>2</sub>** : 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.

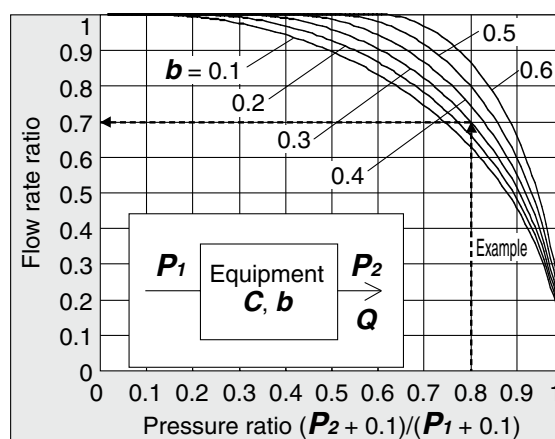
Example)

Obtain the air flow rate for **P<sub>1</sub>** = 0.4 [MPa], **P<sub>2</sub>** = 0.3 [MPa], **T** = 20 [°C] when a solenoid valve is performed in **C** = 2 [ $\text{dm}^3/(\text{s} \cdot \text{bar})$ ] 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)]

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

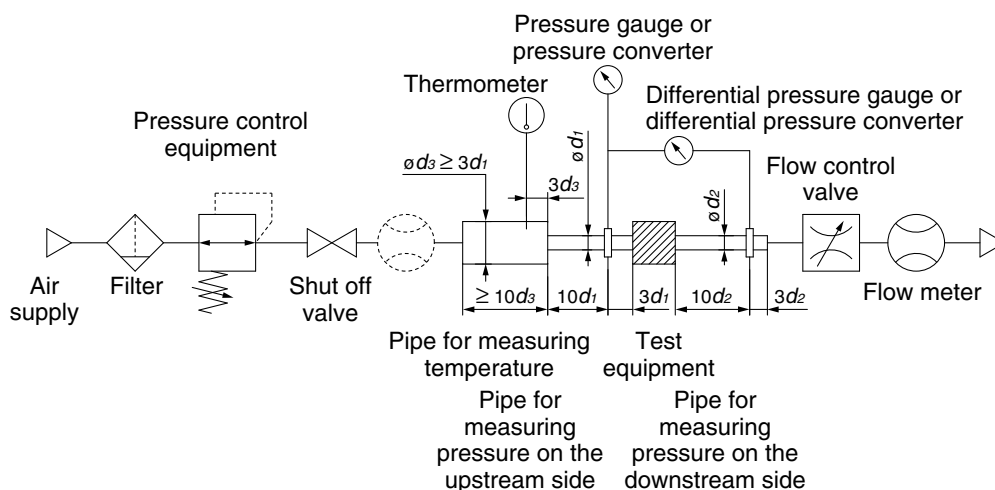
Based on Graph (1), it will be 0.7 if the pressure ratio is 0.8 and the flow rate ratio is **b** = 0.3.  
Hence, the flow rate = Max. flow x flow ratio =  $600 \times 0.7 = 420$  [L/min (ANR)]



**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

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

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

When

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

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

Conversion with sonic conductance **C**:

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

**Q** : Air flow rate [L/min (ANR)]

**S** : Effective area [mm<sup>2</sup>]

**P<sub>1</sub>** : Upstream pressure [MPa]

**P<sub>2</sub>** : 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.

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

**S** : Effective area [mm<sup>2</sup>]

**V** : Air tank capacity [L]

**t** : Discharging time [s]

**P<sub>s</sub>** : Pressure inside air tank before discharging [MPa]

**P** : Residual pressure inside air tank after discharging [MPa]

**T** : Temperature inside air tank before discharging [K]

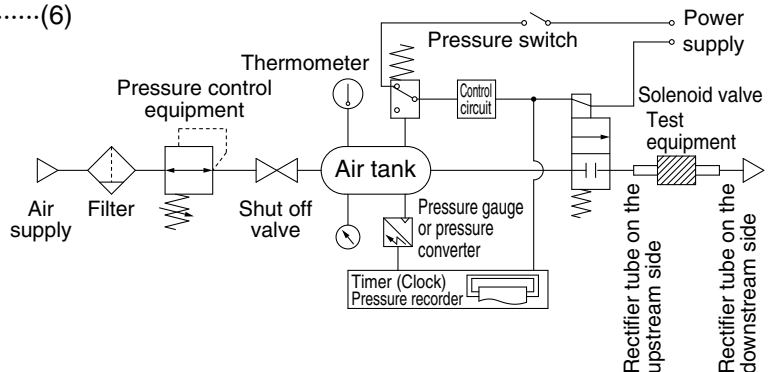


Fig. (2) Test circuit based on JIS B 8390:2000

### 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.

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

$\Delta P$  : 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,  $T_1 = 297 \pm 5K$ ,  $0.07 \text{ bar} \leq \Delta P \leq 0.14 \text{ bar}$ .

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 m<sup>3</sup>/h) which runs through a valve (test equipment) at 5 to 40°C when the pressure difference is 1 x 10<sup>5</sup> Pa (1 bar). It is calculated using the following formula.

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

**Kv**: Flow coefficient [m<sup>3</sup>/h]

$Q$  : Flow rate [m<sup>3</sup>/h]

$\Delta P$ : Pressure difference [Pa]

$\rho$  : Density of fluid [kg/m<sup>3</sup>]

#### (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:

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

$Q$  : Flow rate [L/min]

**Kv**: Flow coefficient [m<sup>3</sup>/h]

$\Delta P$ : Pressure difference [MPa]

$G$  : Relative density [water = 1]

In the case of saturated aqueous vapor:

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

$Q$  : Flow rate [kg/h]

**Kv**: Flow coefficient [m<sup>3</sup>/h]

$\Delta P$ : Pressure difference [MPa]

$P_1$  : Upstream pressure [MPa]:  $\Delta P = P_1 - P_2$

$P_2$  : Downstream pressure [MPa]

Conversion of flow coefficient:

$$K_v = 0.865 C_v \dots\dots\dots(11)$$

Here,

**C<sub>v</sub>** 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<sup>2</sup> (psi)

The values of **K<sub>v</sub>** and **C<sub>v</sub>** 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  $1 \times 10^5$ , 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 **K<sub>v</sub>**.

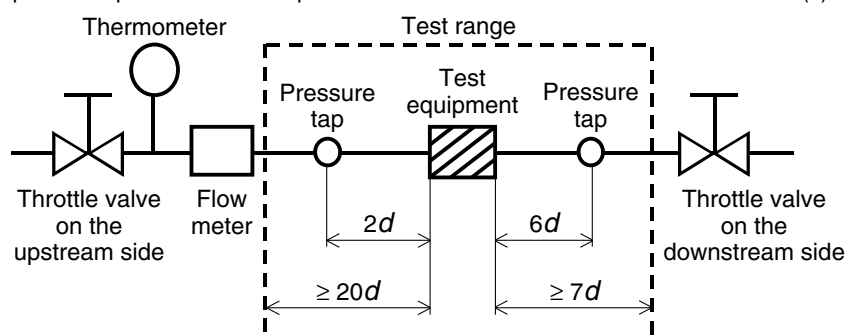
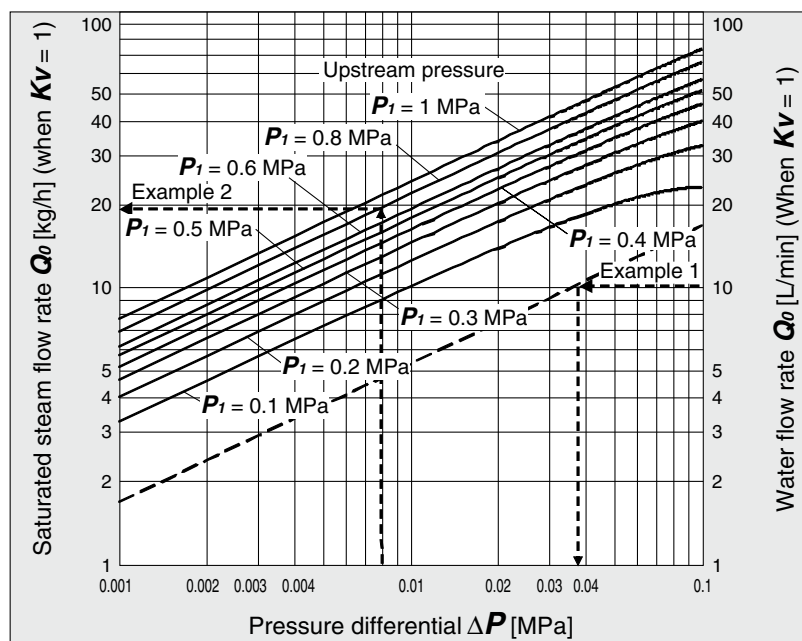


Fig. (3) Test circuit based on IEC 60534-2-3, JIS B 2005-2-3



Graph (2) Flow rate characteristics

#### Example 1)

Obtain the pressure difference when 15 [L/min] of water runs through a solenoid valve with a **K<sub>v</sub>** = 1.5 [m<sup>3</sup>/h]. As the flow rate when **K<sub>v</sub>** = 1 is calculated as the formula:  $Q_0 = 15 \times 1/1.5 = 10$  [L/min], read off  $\Delta P$  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 **K<sub>v</sub>** = 0.05 [m<sup>3</sup>/h]. Read off  $Q_0$  when  $P_1$  is 0.8 and  $\Delta P$  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].

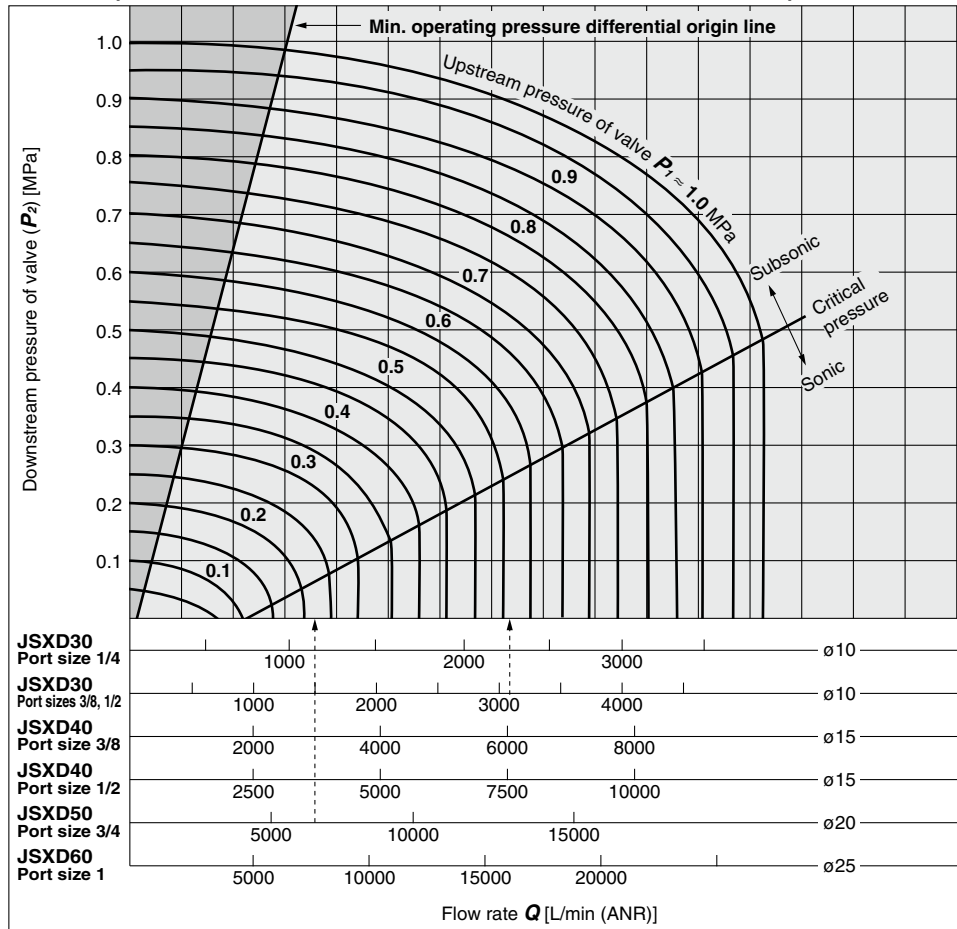


## JSXD Series

# 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:  $\phi 10$  mm,  $\phi 15$  mm,  $\phi 20$  mm,  $\phi 25$  mm)



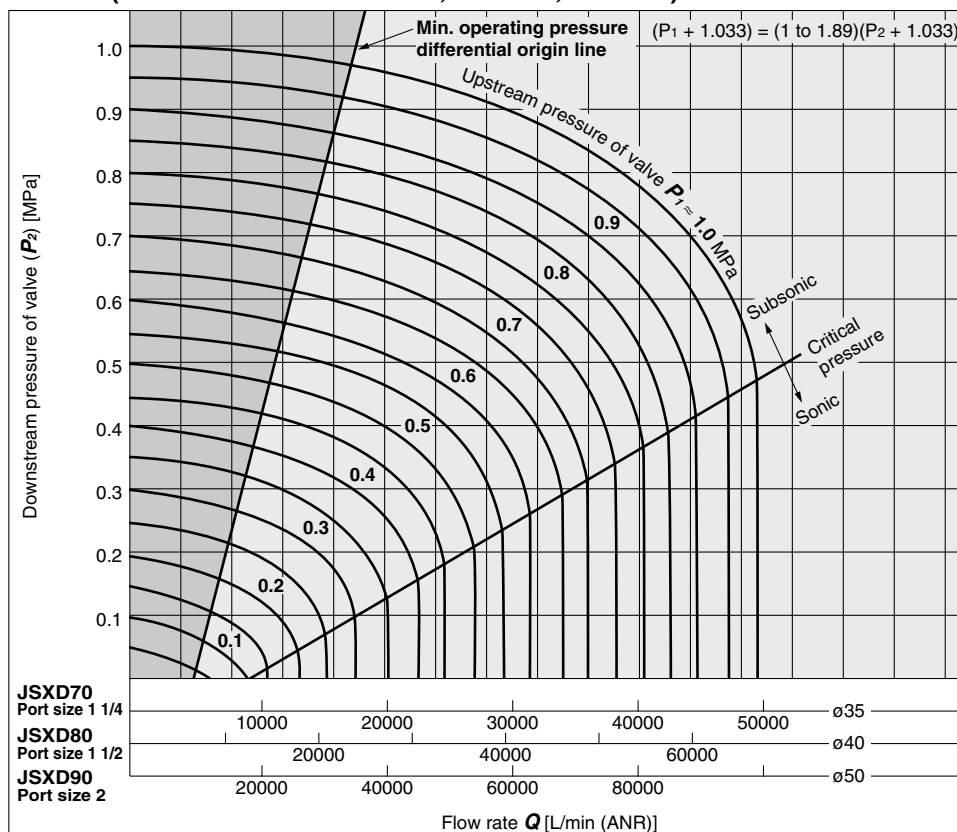
### How to read the graph

The sonic range pressure to generate a flow rate of 6000 L/min (ANR) is as follows.  
For a  $\phi 15$  orifice (JSXD40/Port size 3/8),  $P_1 \approx 0.57$  MPa,  
for a  $\phi 20$  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.

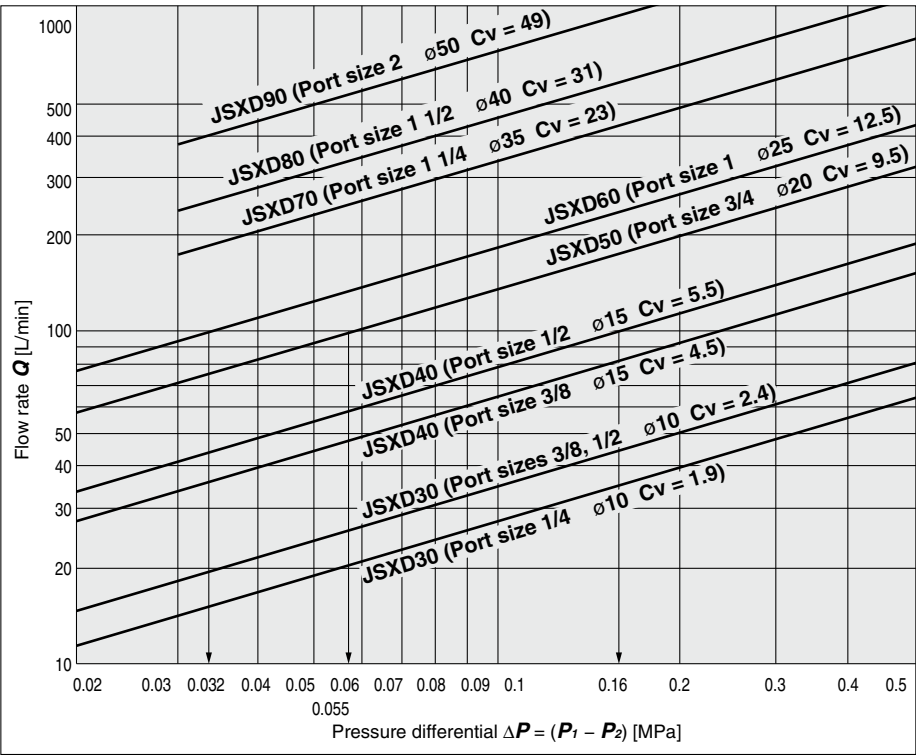
For Air (Orifice diameter:  $\phi 35$  mm,  $\phi 40$  mm,  $\phi 50$  mm)





# JSXD Series

## 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  $\phi 15$  orifice (JSXD40/Port size 1/2),  $\Delta P \approx 0.16$  MPa,  
for a  $\phi 20$  orifice (JSXD50),  $\Delta P \approx 0.055$  MPa,  
for a  $\phi 25$  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<sup>2</sup>/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  $-70^{\circ}\text{C}$  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  $50 \text{ mm}^2/\text{s}$ .

### 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

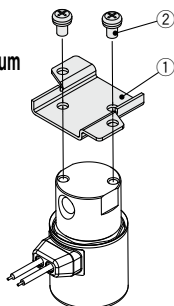
#### ⚠ Caution

##### 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)

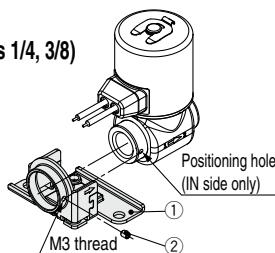
Size	Body material	Port size	Thread type	Bracket assembly part no.	Bracket material
10	Brass, Stainless steel	1/8	Rc NPT G	JSX021-12A-3	Stainless steel
20	Stainless steel			JSX022-12A-3	
30	Brass	1/8, 1/4, 3/8		JSX20-12A-4	
20	Aluminum	1/8, 1/4, 3/8		VX021N-12A	
30		1/4, 3/8		VX022N-12A	

##### 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.

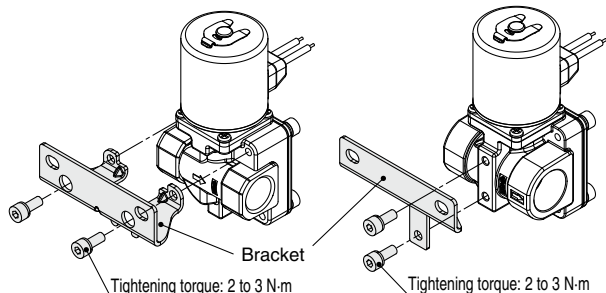
##### Bracket Assembly Part Nos. (With set screw)

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

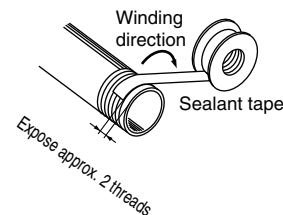
1. For handling One-touch fittings, refer to the “Fittings and Tubing Precautions” in the Handling Precautions for SMC Products.

##### 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 Series

JSXD Series

JSXM Series

Table of UL-compliant Products

Option

Glossary of Terms

Flow Rate Characteristics

Specific Product Precautions



# JSX/JSX□ Series

## Specific Product Precautions 4

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>

### 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.)

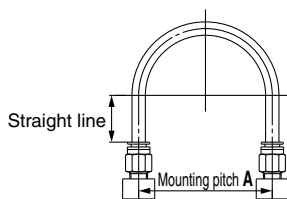


Fig. 1 Recommended piping

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

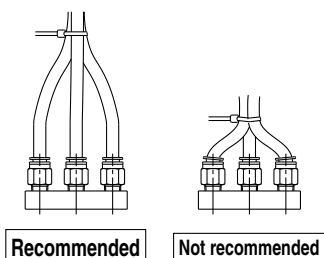
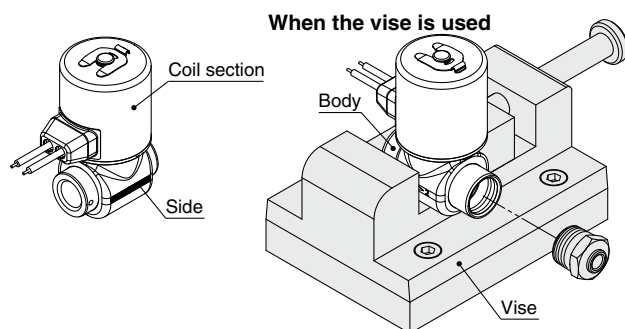


Fig. 2 When using a tying band to bind the piping together

##### 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

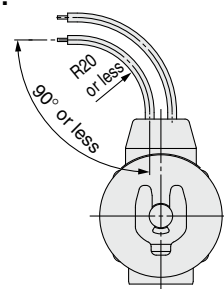
The solenoid valve is an electrical product. For safety, install an appropriate fuse and circuit breaker before use. When using multiple solenoid valves, it is not sufficient to merely install one fuse. For protecting the equipment more safely, select an appropriate fuse to each circuit of the solenoid valve.

#### ⚠ Caution

##### 1. As a rule, use electrical wire with a cross sectional area of 0.5 to 1.25 mm<sup>2</sup> 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.

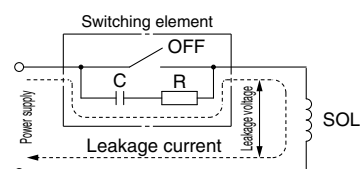
Residual voltage of the surge voltage suppressor

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





# JSX/JSX□ Series

## Specific Product Precautions 5

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

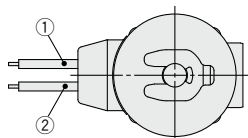
## ⚠ Caution

### 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.



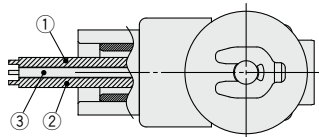
### 2. Conduit

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

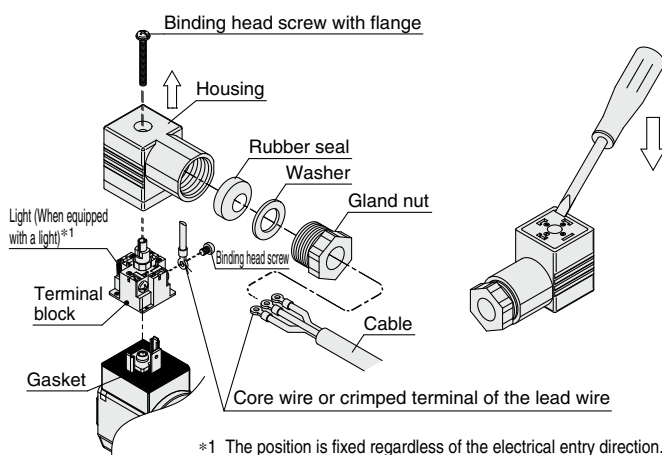
- After loosening the binding head screw with flange, then if the housing is pulled in the direction of the arrow, the connector will be removed from the solenoid valve.
- Pull out the binding head screw with flange from the housing.
- There is a cutout on the bottom of the terminal block. Insert a small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

#### Wiring

- Pass the cable through the gland nut, washer, and rubber seal in this order, and insert these parts into the housing.
- 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.:  $\phi 6$  to  $\phi 12$  mm
  - \*3 For an outside cable diameter of  $\phi 9$  to  $\phi 12$  mm, remove the internal parts of the rubber seal before use.

#### Assembly

- 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.)
- Insert the rubber seal and the washer in this order into the cable entry of the housing, and then tighten the gland nut securely.
- 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.

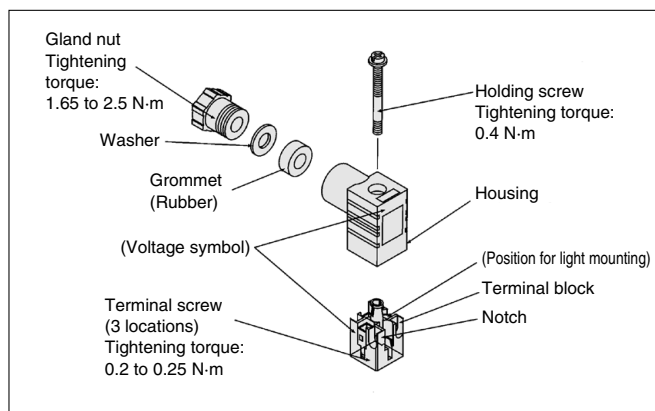


#### For the JSX10

#### Compatible cable

Cord O.D.:  $\phi 3.5$  to  $\phi 7$

(Reference) 0.5 mm<sup>2</sup>, 2-core or 3-core, equivalent to JIS C 3306



JSX Series

JSXD Series

JSXM Series

Table of UL-compliant Products

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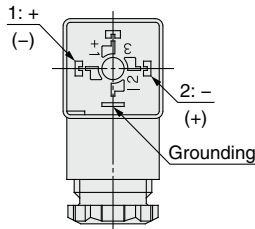
# JSX/JSX□ Series Specific Product Precautions 6

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.

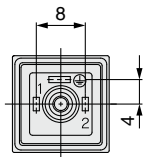


Terminal no.	1	2
DIN terminal	+ (-)	- (+)

\* There is no polarity.

### DIN (EN 175301-803) Terminal

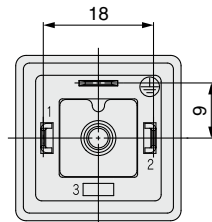
This DIN terminal corresponds to the Form C DIN connector with an 8 mm terminal pitch.



**Size: 10**

Applicable cable O.D.:  $\phi 3.5$  to  $\phi 7$

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



**Size: 20, 30**

Applicable cable O.D.:  $\phi 6$  to  $\phi 12$

### 4. M12 connector

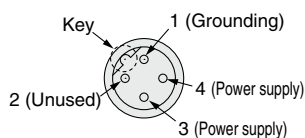
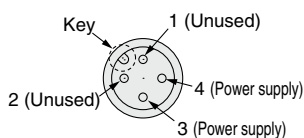
1. The IP67 (enclosure) rating of the valve can be obtained by using a cable with a female connector of IP67 specification. Please note that this product cannot be used in water.
2. Do not use a tool to mount the connector as this may cause damage. Only tighten it by hand. (0.39 to 0.49 N·m)
3. Avoid 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).

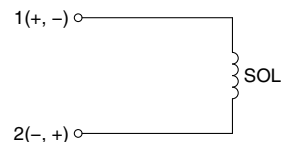
Be careful not to squeeze it in the wrong direction as pin damage, etc., may result.

## Electrical Circuits

### ⚠ Caution

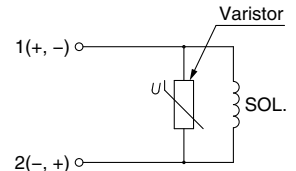
#### 1. DC circuit

##### ● Grommet



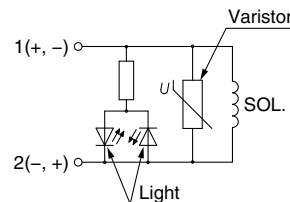
Without electrical option

##### ● Grommet, Conduit, DIN terminal



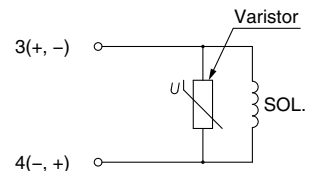
With surge voltage suppressor

##### ● DIN terminal



With light/surge voltage suppressor

##### ● M12 connector

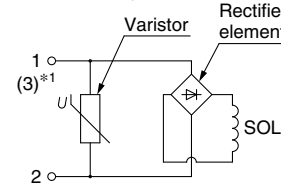


With surge voltage suppressor

#### 2. AC circuit

The standard product is equipped with a surge voltage suppressor.

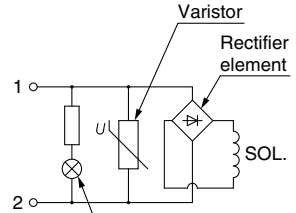
##### ● Grommet, Conduit, DIN terminal, M12 connector



\*1 For M12 connector

Without electrical option

##### ● DIN terminal



With light





# JSX/JSX□ Series

## 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

## Safety Instructions

Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.