

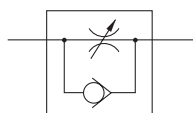
Speed Controller for Low Speed Operation

Series AS-M

Standard Type (Metal Body)



JIS Symbol



Model/Specifications

Model		AS12□0M		AS22□0M-□01		AS22□□0M-□02	
Port size	Cylinder side	M5 x 0.8	10-32 UNF	R 1/8	NPT 1/8	R 1/4	NPT 1/4
	Tubing side			Rc 1/8		Rc 1/4	
Applicable cylinder bore size (mm)		6, 10, 15, 20, 25		20, 25, 32, 40			
Proof pressure		1.5 MPa					
Max. operating pressure		1.0 MPa					
Min. operating pressure		0.1 MPa					
Ambient and fluid temperature		-5 to 60°C (No freezing)					
Number of needle rotation		20 turns		10 turns			
Option		—		With seal			
Weight (g)		11.5		36		74	
Controlled flow	Flow rate (ℓ/min (ANR))	7		12		38	
	Effective area (mm²)	0.1		0.2		0.6	
Free flow	Flow rate (ℓ/min (ANR))	105		280		420	
	Effective area (mm²)	1.6		4.3		6.5	

Note 1) Flow rate values are measured at 0.5 MPa and 20°C.

Note 2) Meter-out and meter-in types can be visually differentiated by the flow direction symbol on the resin body. Meter-out type is electroless nickel plated, while meter-in type is black zinc chromate plated.

Note 3) Brass parts are all electroless nickel plated. The handle on all types and the lock nut on the meter-in type are black zinc chromate plated.

How to Order

AS 2 2 0 0 M — 01 —

Body size

1	M5 standard
2	1/8, 1/4 standard

Type

2	Direct cylinder elbow type
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Control type

0	Meter-out
1	Meter-in

For low speed control

Thread type

Symbol	Cylinder side	Tube side
Nil	R	Rc
	Metric thread (M5)	
	Unified thread (10-32 UNF)	
N	NPT	

Option

Nil	None
S	With seal

* M5 and U10/32 are not available with seal.

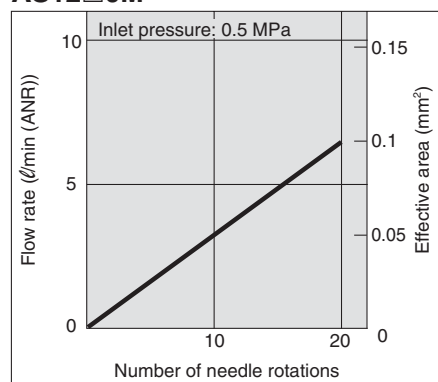
Port size

Symbol	Port size	Applicable series
M5	M5 x 0.8	AS12□0M-M5
U10/32	10-32 UNF	AS12□0M-U10/32
01	1/8	AS22□0M-01
02	1/4	AS22□0M-02

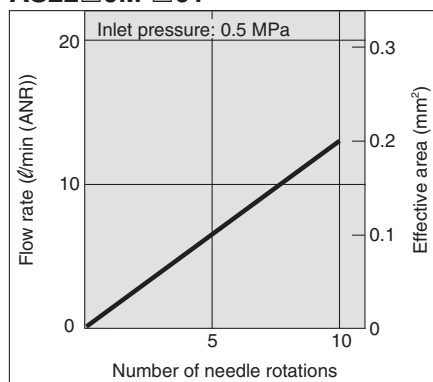
Made to Order P. 15-11-3

Needle Valve/Flow Characteristics

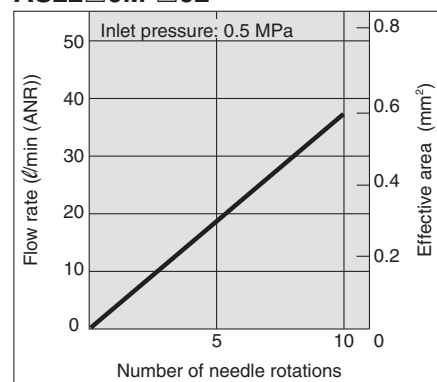
AS12□0M



AS22□0M-□01



AS22□0M-□02

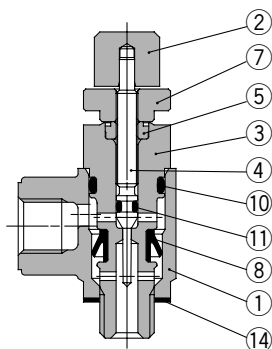


Speed Controller for Low Speed Operation Standard Type (Metal Body) **Series AS-M**

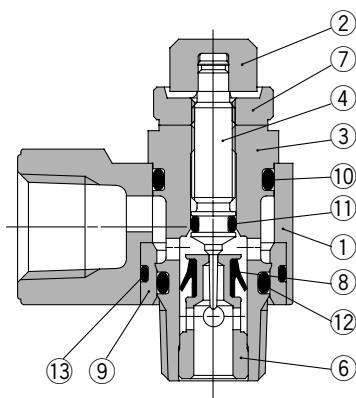
Construction

Meter-out type

AS1200M

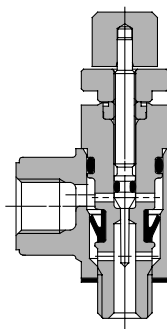


AS2200M

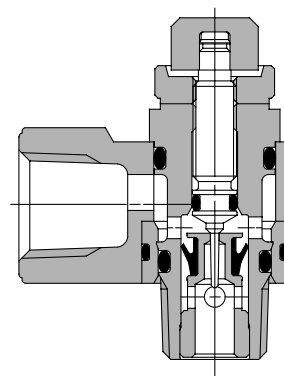


Meter-in type

AS1210M



AS2210M



Component Parts

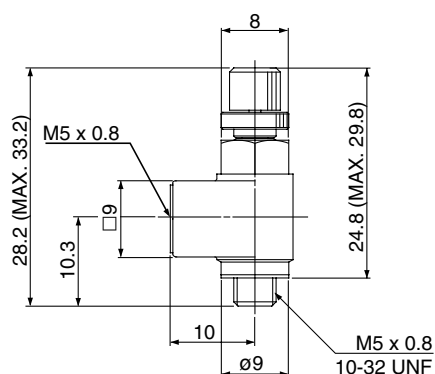
No.	Description	Material	Note
①	Body A	Zinc alloy	
②	Handle	Brass	Black zinc chromate plated
③	Body B	Brass	Electroless nickel plated
④	Needle	Brass	Electroless nickel plated
⑤	Needle guide	Brass	Electroless nickel plated
⑥	Seat ring	Brass	Electroless nickel plated
⑦	Lock nut	Brass ⁽¹⁾	Electroless nickel plated ⁽²⁾
⑧	U seal	NBR	
⑨	Bushing	PBT	
⑩	O-ring	NBR	
⑪	O-ring	NBR	
⑫	O-ring	NBR	
⑬	O-ring	NBR	
⑭	Gasket	NBR/Stainless steel	

Note 1) AS22□0M type is made of steel.

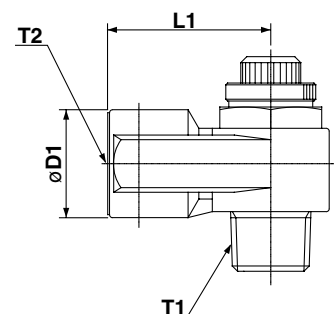
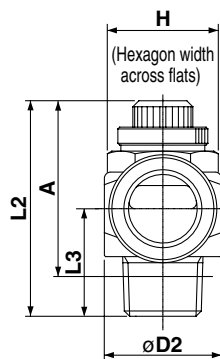
Note 2) Meter-in type is black zinc chromate plated.

Dimensions

AS12□0M



AS22□0M-□⁰¹/₀₂



Dimensions

Model	T1	T2	H	L1	L2		L3	D1	D2	A*	
					Max.	Min.				Max.	Min.
AS12□0M-M5	M5 x 0.8		8	10	33.2	28.2	10.3	9	9	29.8	24.8
AS12□0M-U10/32	10-32 UNF										
AS22□0M-01	R 1/8	Rc 1/8	12	18	36.4	31.4	14.1	14.3	14.6	32.4	27.4
AS22□0M-N01	NPT 1/8		12.7								
AS22□0M-02	R 1/4	Rc 1/4	17	27.2	39.9	35.9	18	18	19.5	34.9	29.9
AS22□0M-N02	NPT 1/4		17.5								

* Dimensions of R and NPT threads after installation.

Speed Controller for Low Speed Operation with One-touch Fitting

Series AS-FM

Elbow Type/Universal Type (Resin Body)

Ideal for low speed control at 10 to 50 mm/sec

Since the effective area of the controlled flow is approximately 1/10 that of the standard model, it is ideal for speed control of low speed cylinders at 10 to 50 mm/sec. The dual type is particularly suitable for low speed control of small bore cylinders.

Low speed operating stroke and high speed return stroke drive

Effective area of free flow is the same as that of standard model.

10 needle turns (20 turns for M5 type)

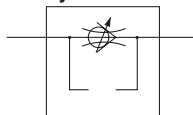
Speed control is easy, and uniform speed control is possible.

Applicable tubing: Inch sizes standardized

Inch sizes are now available for all models.



JIS Symbol



Flow Direction Symbols on Body

	Meter-out type	Meter-in type
Symbol		
JIS Symbol		

Model

Elbow type	Universal type	Port size	Applicable tubing O.D.											
			Metric size					Inch size						
			3.2	4	6	8	10	1/8"	5/32"	3/16"	1/4"	5/16"	3/8"	
AS12□1FM-M5	AS13□1FM-M5	M5 x 0.8	●	●	●									
AS22□1FM-01	AS23□1FM-01	R 1/8	●	●	●	●								
AS22□1FM-02	AS23□1FM-02	R 1/4		●	●	●	●							
AS12□1FM-U10/32	AS13□1FM-U10/32	10-32 UNF						●	●	●	●			
AS22□1FM-N01	AS23□1FM-N01	NPT 1/8						●	●	●	●	●		
AS22□1FM-N02	AS23□1FM-N02	NPT 1/4							●	●	●	●	●	

Specifications

Fluid	Air
Proof pressure	1.5 MPa
Max. operating pressure	1.0 MPa
Mini. operating pressure	0.1 MPa
Ambient and fluid temperature	-5 to 60°C (No freezing)
Number of needle rotations	10 turns (20 turns ⁽¹⁾)
Applicable tubing material ⁽²⁾	Nylon, Soft nylon, Polyurethane, Soft polyurethane
Option ⁽³⁾	With seal

Note 1) In the case of AS12□1FM and AS13□1FM types

Note 2) Use caution regarding the max. operating pressure when soft nylon or polyurethane, or soft polyurethane tubing is used.

(Refer to pages 15-6-3 to 15-6-5 for details.)

Note 3) M5 and 10-32UNF type ports are not available with seal.

Note 4) Brass parts are all electroless nickel plated. The handle of the M5 type and the lock nut of the meter-in type are black zinc chromate plated.

Flow Rate and Effective Area

Model		AS12□1FM AS13□1FM	AS22□1FM-□01 AS23□1FM-□01	AS22□1FM-□02 AS23□1FM-□02
Tubing O.D.	Metric size	ø3.2, ø4, ø6	ø3.2, ø4, ø6, ø8	ø4, ø6, ø8, ø10
	Inch size	ø1/8", ø5/32", ø3/16", ø1/4"	ø1/8", ø5/32", ø3/16", ø1/4", ø5/16"	ø5/32", ø3/16", ø1/4", ø5/16", ø3/8"
Controlled flow	Air flow (ℓ/min(ANR))	7	12	38
	Effective area (mm ²)	0.1	0.2	0.6
Free flow	Flow rate (ℓ/min(ANR))	100	180	230
	Effective area (mm ²)	1.5	2.7	3.5
			4	6
				7

Note) Flow rate values are measured at 0.5 MPa and 20°C.

AS

ASP

ASN

AQ

ASV

AK

ASS

ASR

ASF

How to Order

AS 2 2 0 1 F M — 01 — 06 —

Body size

1	M5 standard
2	1/8, 1/4 standard

Type

2	Elbow
3	Universal

Control type

0	Meter-out
1	Meter-in

With One-touch fitting

For low speed control

Thread type

Nil	Metric thread (M5)
	Unified thread (10-32 UNF)
	R
N	NPT

Option

Nil	None
S	With seal

* M5 and U10/32 are not available with seal.

Applicable tubing O.D.

Metric size		Inch size	
23	ø3.2 *	01	ø1/8"
04	ø4	03	ø5/32"
06	ø6	05	ø3/16"
08	ø8	07	ø1/4"
10	ø10	09	ø5/16"
		11	ø3/8"

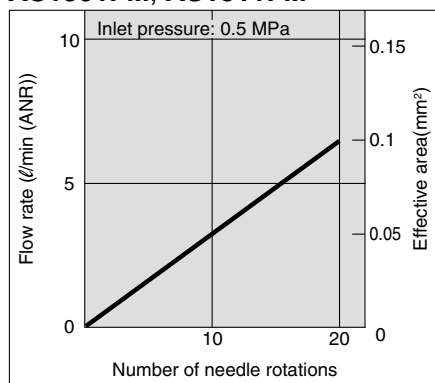
* Use ø1/8" tube.

Port size

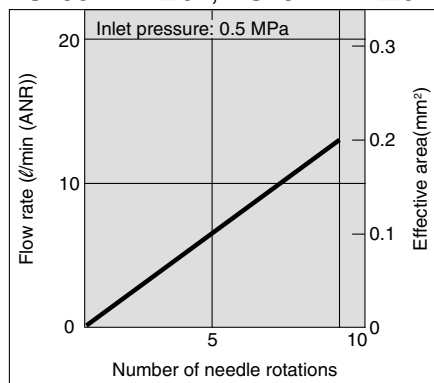
M5	M5 x 0.8
U10/32	10-32 UNF
01	1/8
02	1/4

Needle Valve/Flow Characteristics

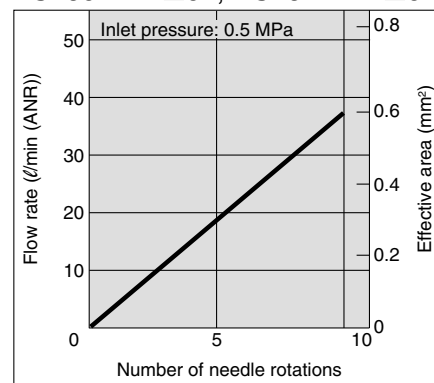
AS1201FM, AS1211FM
AS1301FM, AS1311FM



AS2201FM-□01, AS2211FM-□01
AS2301FM-□01, AS2311FM-□01



AS2201FM-□02, AS2211FM-□02
AS2301FM-□02, AS2311FM-□02

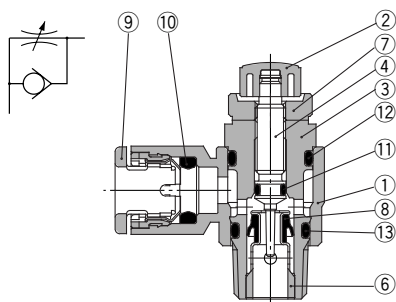


Speed Controller for Low Speed Operation With One-touch Fitting, Elbow Type/Universal Type (Resin Body) **Series AS-FM**

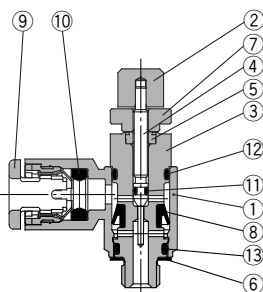
Construction: Elbow Type

Meter-out type

JIS Symbol

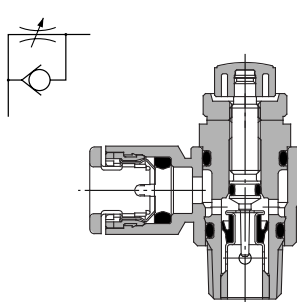


**M5 type
U10/32 type**

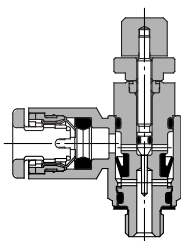


Meter-in type

JIS Symbol



**M5 type
U10/32 type**



Component Parts

No.	Description	Material	Note
①	Body A	PBT	White
②	Handle	PBT	Black ⁽¹⁾
③	Body B	Brass	Electroless nickel plated
④	Needle	Brass	Electroless nickel plated
⑤	Needle guide	Brass	Electroless nickel plated, M5 type only
⑥	Seat ring	Brass	Electroless nickel plated
⑦	Lock nut	Brass ⁽²⁾	Electroless nickel plated ⁽³⁾
⑧	U seal	HNBR	
⑨	Cassette	POM, Stainless steel	
⑩	Seal	NBR	
⑪	O-ring	NBR	
⑫	O-ring	NBR	
⑬	O-ring	NBR	
⑭	Gasket	NBR, Stainless steel	M5 type only

Note 1) M5 and U10/32 types are black zinc chromate plated.

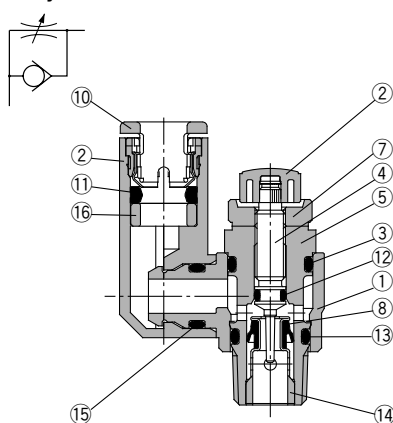
Note 2) AS22□1FM type is made of steel.

Note 3) Meter-in type is black zinc chromate plated.

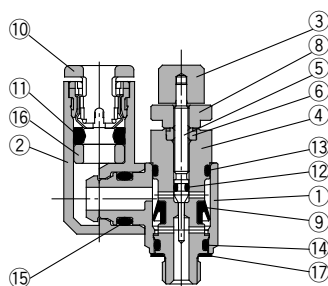
Construction: Universal Type

Meter-out type

JIS Symbol

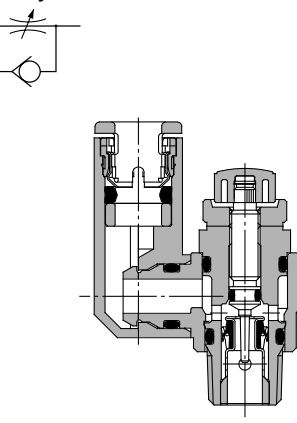


**M5 type
U10/32 type**

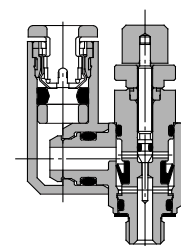


Meter-in type

JIS Symbol



**M5 type
U10/32 type**



Component Parts

No.	Description	Material	Note
①	Body A	PBT	White
②	Elbow body	PBT	White
③	Handle	PBT	Black ⁽¹⁾
④	Body B	Brass	Electroless nickel plated
⑤	Needle	Brass	Electroless nickel plated
⑥	Needle guide	Brass	Electroless nickel plated, M5 type only
⑦	Seat ring	Brass	Electroless nickel plated
⑧	Lock nut	Brass ⁽²⁾	Electroless nickel plated ⁽³⁾
⑨	U seal	HNBR	
⑩	Cassette	POM, Stainless steel	
⑪	Seal	NBR	
⑫	O-ring	NBR	
⑬	O-ring	NBR	
⑭	O-ring	NBR	
⑮	O-ring	NBR	
⑯	Spacer	PBT ⁽⁴⁾	
⑰	Gasket	NBR, Stainless steel	M5 type only

Note 1) M5 and U10/32 types are black zinc chromate plated.

Note 2) AS23□1FM type is made of steel.

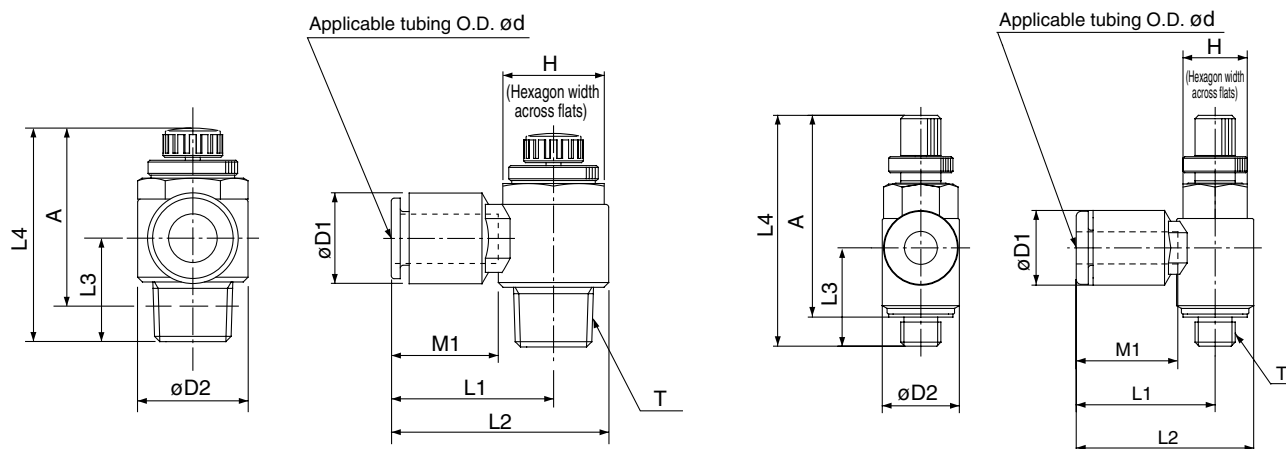
Note 3) Meter-in type is black zinc chromate plated.

Note 4) AS13□1FM(ø3.2, ø4, ø6, ø1/8", ø5/32", ø1/4") AS23□1FM-□01(ø3.2, ø4, ø6, ø1/8", ø5/32") is POM.
AS13□1FM(ø3/16"), AS23□1FM(ø3/16", ø3/8") is brass.

Series AS-FM

Dimensions: Elbow Type

M5 type U10/32 type



Metric Size

Model	d	T	H	D1	D2	L1	L2	L3	L4		A*		M1	Weight (g)
									Max.	Min.	Max.	Min.		
AS12□1FM-M5-23	3.2	M5 x 0.8	8	8.4	9.6	17.3	22.1	12.3	33.8	28.8	30.1	25.1	12.7	7
AS12□1FM-M5-04	4			9.3		17.3	22.1						13.5	
AS12□1FM-M5-06	6			11.6		18.1	22.9						13.5	
AS22□1FM-01-23	3.2	R 1/8	12	9.3	14.2	20.4	27.5	14.3	36.1	31.1	32.1	27.1	12.7	17
AS22□1FM-01-04	4			9.3		20.4	27.5						13.5	
AS22□1FM-01-06	6			11.6		20.4	27.5						13.5	
AS22□1FM-01-08	8	R 1/4	17	15.2	18.5	25.3	32.4	18.2	40.4	35.4	34.4	29.4	18.5	19
AS22□1FM-02-04	4			10.4		25.2	34.4						16	32
AS22□1FM-02-06	6			12.8		25.2	34.4						17	
AS22□1FM-02-08	8			15.2		27.2	36.4						18.5	
AS22□1FM-02-10	10			18.5		33.9	43.2						21.0	36

* Reference dimensions for M5 and R threads after installation.

Inch Size

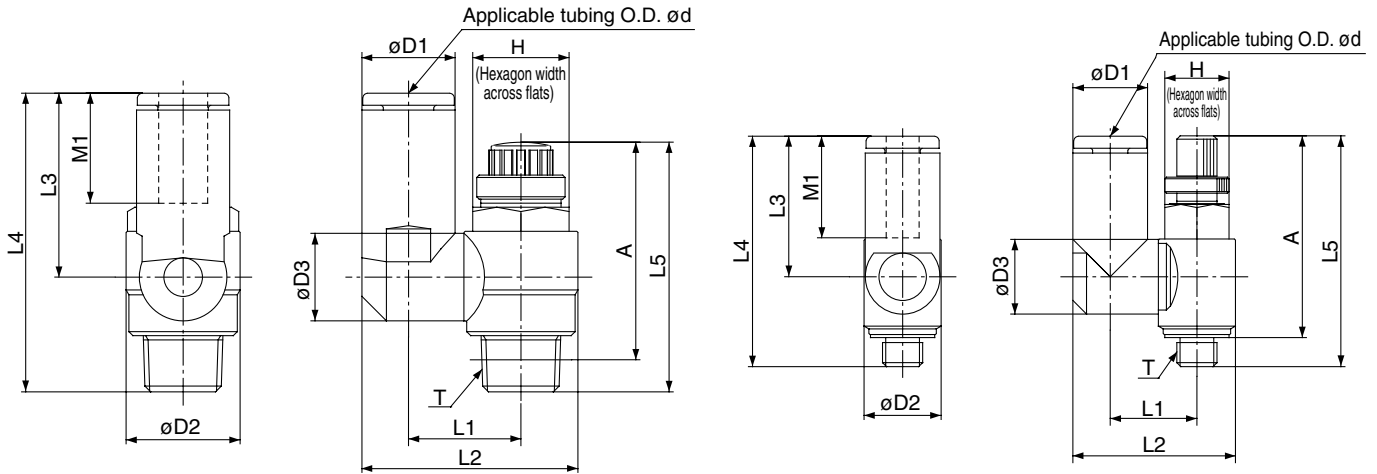
Model	d	T	H	D1	D2	L1	L2	L3	L4		A*		M1	Weight (g)
									Max.	Min.	Max.	Min.		
AS12□1FM-U10/32-01	1/8"	10-32 UNF	8	8.4	9.6	17.3	22.1	12.3	33.8	28.8	30.1	25.1	12.7	7
AS12□1FM-U10/32-03	5/32"			9.3		21.3	26.1						16.5	
AS12□1FM-U10/32-05	3/16"			11.4		21.3	26.1						13.5	
AS12□1FM-U10/32-07	1/4"			12		18.3	23.1							
AS22□1FM-N01-01	1/8"	NPT 1/8	12.7	9.3	14.2	20.4	27.5	14.3	36.1	31.1	32.1	27.1	12.7	16
AS22□1FM-N01-03	5/32"			11.4		23.1	30.2						16.5	17
AS22□1FM-N01-05	3/16"			13.2		23.9	31						18.5	
AS22□1FM-N01-07	1/4"			15.2		25.3	32.4						21	
AS22□1FM-N01-09	5/16"	NPT 1/4	17.5	15.2	18.5	25.3	32.4	15	40.4	35.4	34.4	29.4	21	21
AS22□1FM-N02-03	5/32"			10.4		25.2	34.4	18.2					16	32
AS22□1FM-N02-05	3/16"			11.4		24.9	34.2						17	
AS22□1FM-N02-07	1/4"			13.2		25.2	34.5						18.5	
AS22□1FM-N02-09	5/16"			15.2		27.2	36.4	20					21	36
AS22□1FM-N02-11	3/8"			17.9		33.9	43.2							

* Reference dimensions of 10-32 UNF and NPT threads after installation.

Speed Controller for Low Speed Operation
With One-touch Fitting, Elbow Type/Universal Type (Resin Body) Series AS-FM

Dimensions: Universal Type

M5 type



Metric Size

Model	d	T	H	D1	D2	D3	L1	L2	L3	L4	L5		A*		M1	Weight (g)
											Max.	Min.	Max.	Min.		
AS13□1FM-M5-23	3.2	M5 x 0.8	8	8.4	9.6	9.3	10.8	19.8	17.5	28.7	33.8	28.8	30.1	25.1	12.7	8
AS13□1FM-M5-04	4			9.3				20.3							13.5	
AS13□1FM-M5-06	6			11.6				21.4							13.5	
AS23□1FM-01-23	3.2	R 1/8	14.2	8.4	14.2	9.3	13.1	24.4	17.5	31.8	36.1	31.1	32.1	27.1	12.7	17
AS23□1FM-01-04	4			9.3		10.9	14	24.9							13.5	
AS23□1FM-01-06	6			11.6				26.9							18.5	
AS23□1FM-01-08	8	R 1/4	18.5	12.9	18.5	16.2	30.9	28.2	41.7	40.1	40.4	35.4	34.4	29.4	16	33
AS23□1FM-02-04	4			10.4		16.2	30.6	21.9							17	
AS23□1FM-02-06	6			12.8		18.4	34	25.2							18.5	
AS23□1FM-02-08	8			15.2		12.9	18.3	35.2							21	
AS23□1FM-02-10	10			18.5		20.2	38.7	31							21	40

* Reference dimensions for M5 and R threads after installation.

Inch Size

Model	d	T	H	D1	D2	D3	L1	L2	L3	L4	L5		A*		M1	Weight (g)
											Max.	Min.	Max.	Min.		
AS13□1FM-U10/32-01	1/8"	10-32 UNF	8	8.4	9.6	9.3	10.8	19.8	17.5	28.7	33.8	28.8	30.1	25.1	12.7	7
AS13□1FM-U10/32-03	5/32"			9.3				20.3							16.5	
AS13□1FM-U10/32-05	3/16"			11.4				21.3							13.7	
AS13□1FM-U10/32-07	1/4"	NPT 1/8	12.7	12	14.2	10.9	14	21.6	17.5	31.9	36.1	31.1	32.1	27.1	13.7	17
AS23□1FM-N01-01S	1/8"			8.4		9.3	13.1	24.4							12.7	
AS23□1FM-N01-03S	5/32"			9.3		12.9	16.2	24.9							16.5	
AS23□1FM-N01-05S	3/16"	NPT 1/4	17.5	11.4				26.8	23.9	37.2	40.4	35.4	34.4	29.4	18.5	19
AS23□1FM-N01-07S	1/4"			13.2		12.9	16.2	29.9							21	
AS23□1FM-N01-09S	5/16"			15.2				30.9							21	
AS23□1FM-N02-03S	5/32"	NPT 1/4	17.5	10.4	18.5	10.9	16.2	30.6	21.9	40.1	40.4	35.4	34.4	29.4	16	32
AS23□1FM-N02-05S	3/16"			11.4				31.1							17	
AS23□1FM-N02-07S	1/4"			13.2		12.9	16.2	34.2							18.5	
AS23□1FM-N02-09S	5/16"	NPT 1/4	17.5	15.2				35.2	28.2	48.4	40.4	35.4	34.4	29.4	39	40
AS23□1FM-N02-11S	3/8"			17.9				20.2							21	

* Reference dimensions of 10-32 UNF and NPT threads after installation.

Speed Controller for Low Speed Operation with One-touch Fitting

Series **AS-FM**

In-line Type (Resin Body)



Model

Model	Applicable tubing O.D.									Applicable cylinder bore size (mm)
	Metric size				Inch size					
	3.2	4	6	8	1/8"	5/32"	3/16"	1/4"	5/16"	
AS1001FM	●	●	●		●	●	●	●		6, 10, 16, 20
AS2001FM		●	●			●	●	●		20, 25, 32
AS2051FM			●	●			●	●	●	20, 25, 32, 40

Specifications

Fluid	Air
Proof pressure	1.5 MPa
Max. operating pressure	1 MPa
Min. operating pressure	0.1 MPa
Ambient and fluid temperature	-5 to 60°C (No freezing)
Number of needle rotations	10 turns (20 turns ⁽¹⁾)
Applicable tubing material ⁽²⁾	Nylon, Soft nylon, Polyurethane, Soft polyurethane

Note 1) In the case of AS1001FM type

Note 2) Use caution regarding the max. operating pressure when soft nylon or polyurethane, or soft polyurethane tubing is used.

(Refer to pages 15-6-3 to 15-6-5 for details.)

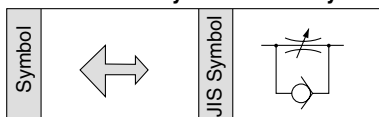
Note 3) Brass parts are all electroless nickel plated. The handle of the M5 type is black zinc chromate plated.

Flow Rate and Effective Area

Model		AS1001FM	AS2001FM		AS2051FM	
Tubing O.D.	Metric size	ø3.2, ø4, ø6	ø4	ø6	ø6	ø8
	Inch size	ø1/8", ø5/32", ø3/16" ø1/4"	ø5/32"	ø3/16", ø1/4"	ø3/16"	ø1/4", ø5/16"
Controlled flow	Flow rate (ℓ/min (ANR))	7	12		38	
	Effective area (mm ²)	0.1	0.2		0.6	
Free flow	Flow rate (ℓ/min (ANR))	100	130	230	290	460
	Effective area (mm ²)	1.5	2	3.5	4.5	7

Note) Flow rate values are measured at 0.5 MPa and 20°C.

Flow Direction Symbols on Body



How to Order

AS 200 1 F M 06

Body size

100	M5 standard
200	1/8 standard
205	1/4 standard

Applicable tubing O.D.

Metric size		Inch size	
23	ø3.2*	01	ø1/8"
04	ø4	03	ø5/32"
06	ø6	05	ø3/16"
08	ø8	07	ø1/4"
		09	ø5/16"

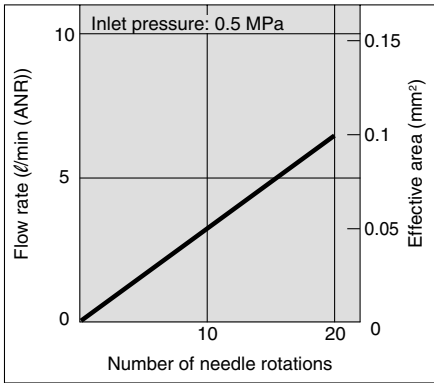
* Use ø1/8" tube.

With one-touch fitting

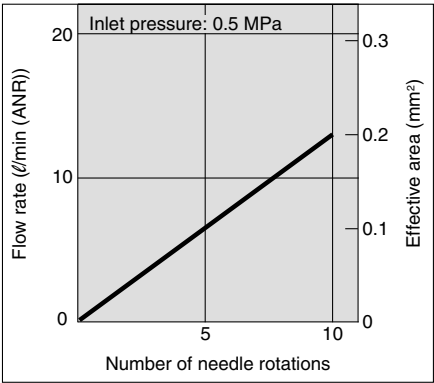
For low speed control

Needle Valve/Flow Characteristics

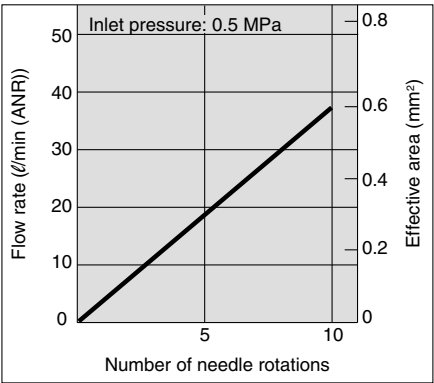
AS1001FM



AS2001FM



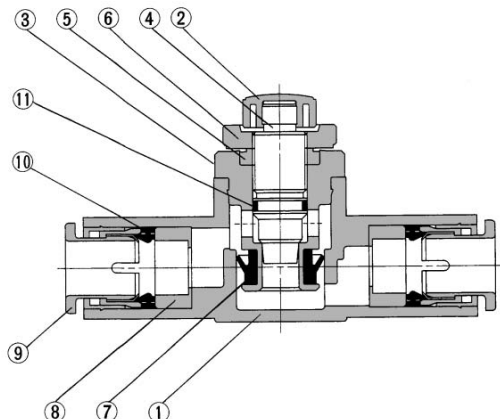
AS2051FM



- AS
- ASP
- ASN
- AQ
- ASV
- AK
- ASS
- ASR
- ASF

Series AS-FM

Construction



Component Parts

No.	Description	Material	Note
①	Body A	PBT	
②	Handle	PBT ⁽¹⁾	Black
③	Body B	Brass	Electroless nickel plated
④	Needle	Brass	Electroless nickel plated
⑤	Needle guide	Brass	Electroless nickel plated
⑥	Lock nut	Brass ⁽²⁾	Electroless nickel plated
⑦	U seal	HNBR	
⑧	Spacer	POM ⁽³⁾	
⑨	Cassette	POM, Stainless steel ⁽⁴⁾	
⑩	Seal	NBR	
⑪	O-ring	NBR	

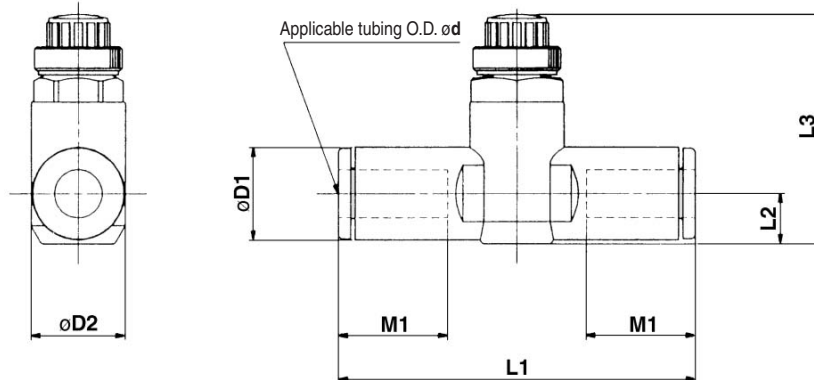
Note 1) AS1001FM type is made of brass (black zinc chromate plated).

Note 2) AS20□1FM type is made of steel.

Note 3) $\phi 3/16"$ is made of brass (electroless nickel plated). AS2001FM-07, AS2051FM ($\phi 6$, $\phi 8$, $\phi 1/4"$, $\phi 5/16"$) are made of PBT.

Note 4) $\phi 3/16"$ is made of POM, stainless steel, and brass (electroless nickel plated).

Dimensions



Metric Size

Model	d	D1	D2	L1	L2	L3		M1	Weight (g)
						Max.	Min.		
AS1001FM-23	3.2	8.4	10	38	4.5	27.7	24.9	12.7	6
AS1001FM-04	4	9.3		39.2	5.2	28.5	25.5		7
AS1001FM-06	6	11.6		40.7	6.2	29.8	26.6		8
AS2001FM-04	4	9.3	11.8	40.7	5.2	32.6	27.6	12.7	12
AS2001FM-06	6	11.6		44.8	6.3	33.7	28.7		13
AS2051FM-06	6	12.8	14.8	53.2	6.7	35.2	30.2	17	26
AS2051FM-08	8	15.2		59.8	8.1	36.5	31.5		31

Inch Size

Model	d	D1	D2	L1	L2	L3		M1	Weight (g)
						Max.	Min.		
AS1001FM-01	1/8"	8.4	10	38	4.5	27.7	24.9	12.7	6
AS1001FM-03	5/32"	9.3		39.2	5.2	28.5	25.5		7
AS1001FM-05	3/16"	11.4		48.7	6.2	27.7	24.7	16.5	8
AS1001FM-07	1/4"	12		40.7				13.7	9
AS2001FM-03	5/32"	9.3	11.8	40.7	5.2	32.6	29.6	12.7	12
AS2001FM-05	3/16"	11.4		50	6.2	33.6	28.6	16.5	18
AS2001FM-07	1/4"	13.2		52.2	7.1	34.5	29.5	17	21
AS2051FM-05	3/16"	11.4	14.8	52.2	6.2	34.6	29.6	16.5	24
AS2051FM-07	1/4"	13.2		54.4	7.1	35.5	30.5	17	26
AS2051FM-09	5/16"	15.2		59.8	8.1	36.5	31.5	18	31

Flow Control Equipment Precautions



Be sure to read before handling. Refer to pages 15-18-3 to 15-18-4 for Safety Instructions and Common Precautions on the products mentioned in this catalog, and refer to main text for more detailed precautions on every series.

Precautions

Selection

Warning

1. Products mentioned in this catalog are not designed for the use as stop valve with zero air leakage.

A certain amount of leakage is allowed in the product's specifications.

Mounting

Warning

1. Check that the lock nut is tightened.

A loose lock nut may cause actuator speed changes.

2. Confirm the degree of rotation of the needle valve.

Products mentioned in this catalog are retainer type so that the needle is not removed completely. Over rotation will cause damage.

3. Do not use tools such as pliers to rotate the handle.

It can cause idle rotation of the handle or damage.

4. Confirm air flow direction.

Mounting backwards is dangerous, because the speed adjustment needle will not work and the actuator may lurch suddenly.

5. Adjust needle by opening the needle slowly after having closed it completely.

Loose needle valves may cause unexpected sudden actuator extension. When needle valve is turned clockwise, it is closed and cylinder speed decreases. When needle valve is turned counter clockwise, it is open and cylinder speed increases.

6. Do not apply excessive force or shock to the body or fittings with an impact tool.

It can cause damage or air leakage.

Series AS-F/FE/FG/FM

Selection

Warning

1. Confirm that PTFE can be used in application.

PTFE powder (Polytetrafluoroethylene resin) is included in the seal material. Confirm if the use of it may cause any adverse effect in the system.

Mounting

Warning

1. To install/remove the Flow Control Equipment, tighten/loosen at wrench flat B as close to the thread as possible using the appropriate wrench.

Do not apply torque at other points as the product may be damaged. Rotate Body A manually for positioning after installation.

2. Do not use universal type fittings for applications involving continuous rotation.

The fitting section may be damaged.

Tightening Torque

Caution

1. The tightening torque for pipe fittings is as shown in the table. As a rule, they should be tightened 2 to 3 turns with a tool after first tightening by hand.

Be careful not to cause damage by over-tightening.

Male thread	Suitable screw torque (N·m)	Hexagon width across flats (mm)	Adjustable spanner nominal (mm)
M3	1/4	4.5	—
M5 10/32-UNF	1/6 turn after hand tightening	8	100
1/8	7 to 9	14	150
1/4	12 to 14	17	200
3/8	22 to 24	21	200
1/2	28 to 30	24	200

Lock Nut Tightening Torque

Caution

1. Suitable screw torque for a hexagon lock nut is shown in the table below. For standard installation, turn 15 to 30° using tool, after fastening by hand. Pay attention not to over torque the product.

Body size	Suitable screw torque (N·m)
M3	0.07
M5	0.3
1/8	1
1/4	1.5
3/8	4
1/2	10

⚠ Precautions

Handling of One-touch Fittings

⚠ Caution

1. Refer to page 15-1-11 for One-touch Fitting.

Series ASD

Operation

⚠ Caution

1. Single acting cylinder

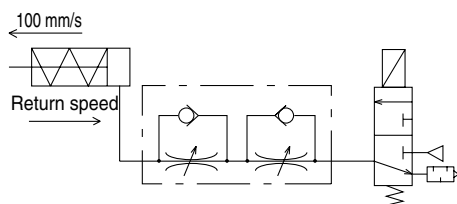
When controlling a single acting cylinder, the cylinder's return speed will differ depending on the operating conditions. Operate after confirming the maximum return speeds shown in the table below.

Speed Controller	Cylinder	Solenoid valve	Tubing	Silencer	Maximum return speed (mm/s)		
					100	200	300
ASD230F	CJ2	VJ500	TU0604 1 m	AN110-01			
ASD330F	CM2	VZ500	TU0604 1 m	AN110-01			

<Operating conditions>

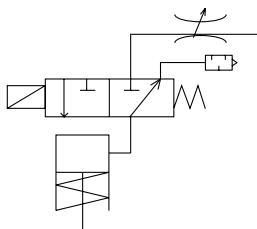
- Cylinder extension speed: 100 mm/s
- Meter-out needle fully open

* Values at 0.5 MPa and 20°C.



(Reference) Recommended circuit for high return speed

When low extension speed and high return speed are desired, the following circuit using 3-port is recommended.



Note) Use Series AS-F with -X214 for the throttle valve.

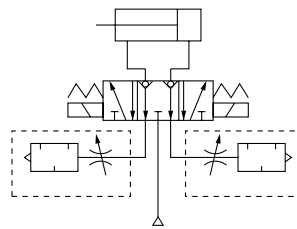
Series ASN2

Selection

⚠ Warning

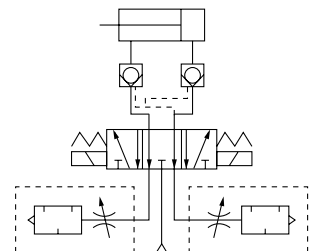
1. Inappropriate Circuits

(a) "Perfect Valve"
(VF66□□, VS7-6-FPG, VS7-8-FPG)



Residual pressure behind the exhaust needle may cause check valve malfunction in the "Perfect Valve".

(b) Pilot check valve between Actuator and Valve



Residual pressure behind the exhaust needle may cause check valve to malfunction.

Mounting

⚠ Caution

1. If installing flow controls to valve ports, interference may occur with the fittings. Please consult the catalog before installing.

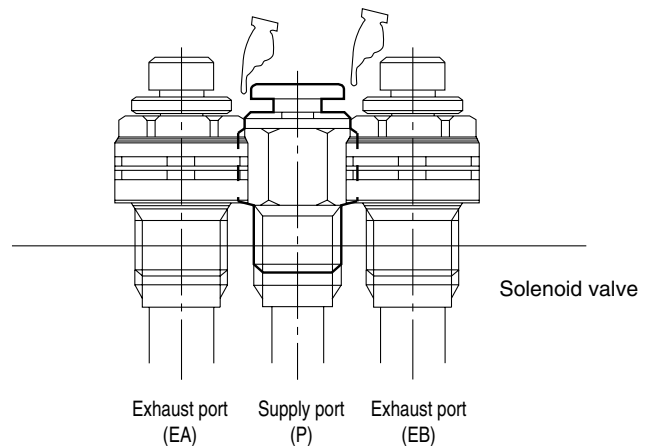


Fig. Example of the interference with fittings

Series AK

⚠ Caution

1. Vibrations may generate due to operating conditions, etc., even if the specifications are in the range mentioned in the catalog. Please consult with SMC.

2. Cracking pressure is a pressure at which the valve starts opening and not a pressure at which the valve is fully open.

Precautions

Series ASS

Selection

Warning

1. **Use meter-out controlling type after confirming the initial speed to prevent sudden actuator extension.**

Due to its specifications, the extension preventing function does not have speed control capability so that adjustments are limited. Use the meter-in controlling type if desired speed is less than set speed.

2. **Circuit pressure remaining in cylinder is not usable.**

Extension prevention works when pressure has been exhausted in cylinder. Therefore, prevent the extension by meter-in control using a speed controller in such a case.

Mounting

Warning

1. **Install Actuator and SSC valve as close as possible.**

Extensions prevention in the initial operation and standard speed control may not function.

2. **Do not use for relatively small capacity actuators. i.e. short stroke cylinders (less than 100 mm), rotary actuators, etc.**

SSC valve may not properly operate.

3. **Use in load factor less than 50%.**

Speed control under normal operations may not function.

Series AQ

Operation

Caution

1. **In the following cases, insufficient exhaust or vibration may cause noise.**

- a) With residual pressure or back pressure on the IN side
- b) When the differential pressure between the IN and OUT sides is smaller than the min. operating pressure.

Series ASP

Caution on Design

Warning

1. **This product cannot be used for accurate and precise intermediate stops of the actuator.**

Due to the compressibility of air as a fluid, the actuator will continue to move until it reaches a position of pressure balance, even though the pilot check valve closes with an intermediate stop signal.

2. **This product cannot be used to hold a stop position for an extended period of time.**

Pilot check valves and actuators are not guaranteed for zero air leakage. Therefore, it is sometimes not possible to hold a stop position for an extended period of time. In the event that holding for an extended time is necessary, a mechanical means for holding should be devised.

3. **Consider the release of residual pressure.**

Actuators may move suddenly due to residual pressure, which can be dangerous during maintenance procedures.

Selection

Warning

1. **When used in a balance control circuit, there are instances in which the check valve cannot release, even though the pilot pressure is 50% of the operating pressure. In these cases, the pilot pressure should be the same as the operating pressure.**

2. **For reference, SMC has conducted endurance tests in which ON, OFF operation of the check valve was performed at the maximum operating pressure, with a confirmed endurance of 10 million operations. Since the tests were performed under limited conditions, use caution in evaluating the results.**



Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of "Caution", "Warning" or "Danger". To ensure safety, be sure to observe ISO 4414 ^{Note 1)}, JIS B 8370 ^{Note 2)} and other safety practices.

⚠ Caution : Operator error could result in injury or equipment damage.

⚠ Warning : Operator error could result in serious injury or loss of life.

⚠ Danger : In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414: Pneumatic fluid power--General rules relating to systems.

Note 2) JIS B 8370: General Rules for Pneumatic Equipment

⚠ Warning

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

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

2. Only trained personnel should operate pneumatically operated machinery and equipment.

Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

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

1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driver objects have been confirmed.
2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc.

4. Contact SMC if the product is to be used in any of the following conditions:

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuits in press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.



Common Precautions

Be sure to read before handling.

For detailed precautions on every series, refer to main text.

Selection

Warning

1. Confirm the specifications.

Products represented in this catalog are designed for use in compressed air applications only (including vacuum), unless otherwise indicated.

Do not use the product outside their design parameters.

Please contact SMC when using the products in applications other than compressed air (including vacuum).

Mounting

Warning

1. Instruction manual

Install the products and operate them only after reading the instruction manual carefully and understanding its contents. Also keep the manual where it can be referred to as necessary.

2. Securing the space for maintenance

When installing the products, please allow access for maintenance.

3. Tightening torque

When installing the products, please follow the listed torque specifications.

Piping

Caution

1. Before piping

Make sure that all debris, cutting oil, dust, etc., are removed from the piping.

2. Wrapping of pipe tape

When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not get inside the piping. Also, when the pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.

Air Supply

Warning

1. Operating fluid

Please consult with SMC when using the product in applications other than compressed air (including vacuum).

Regarding products for general fluid, please ask SMC about applicable fluids.

2. Install an air dryer, aftercooler, etc.

Excessive condensate in a compressed air system may cause valves and other pneumatic equipment to malfunction.

Installation of an air dryer, after cooler etc. is recommended.

3. Drain flushing

If condensate in the drain bowl is not emptied on a regular basis, the bowl will over flow and allow the condensate to enter the compressed air lines.

If the drain bowl is difficult to check and remove, it is recommended that a drain bowl with the auto-drain option be installed.

For compressed air quality, refer to "Air Preparation Equipment" catalog.

4. Use clean air

If the compressed air supply is contaminated with chemicals, synthetic materials, corrosive gas, etc., it may lead to break down or malfunction.

Operating Environment

Warning

1. Do not use in environments where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.

2. Do not expose the product to direct sunlight for an extended period of time.

3. Do not use in a place subject to heavy vibrations and/or shocks.

4. Do not mount the product in locations where it is exposed to radiant heat.

Maintenance

Warning

1. Maintenance procedures are outlined in the operation manual.

Not following proper procedures could cause the product to malfunction and could lead to damage to the equipment or machine.

2. Maintenance work

If handled improperly, compressed air can be dangerous.

Assembly, handling and repair of pneumatic systems should be performed by qualified personnel only.

3. Drain flushing

Remove drainage from air filters regularly. (Refer to the specifications.)

4. Shut-down before maintenance

Before attempting any kind of maintenance make sure the supply pressure is shut of and all residual air pressure is released from the system to be worked on.

5. Start-up after maintenance and inspection

Apply operating pressure and power to the equipment and check for proper operation and possible air leaks. If operation is abnormal, please verify product set-up parameters.

6. Do not make any modifications to be product.

Do not take the product apart.

Quality Assurance Information (ISO 9001, ISO 14001)

Reliable quality of products in the global market

To enable our customers throughout the world to use our products with even greater confidence, SMC has obtained certification for international standards “ISO 9001” and “ISO 14001”, and created a complete structure for quality assurance and environmental controls. SMC products pursue to meet its customers' expectations while also considering company's contribution in society.

Quality management system ISO 9001

This is an international standard for quality control and quality assurance. SMC has obtained a large number of certifications in Japan and overseas, providing assurance to our customers throughout the world.

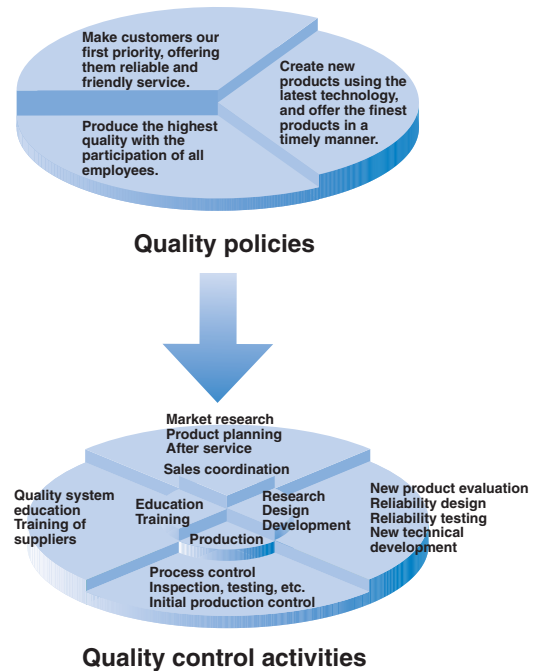


Environmental management system ISO 14001

This is an international standard related to environmental management systems and environmental inspections. While promoting environmentally friendly automation technology, SMC is also making diligent efforts to preserve the environment.



SMC's quality control system



SMC Product Conforming to Inter

SMC products complying with EN/ISO, CSA/UL standards are supporting



The CE mark indicates that machines and components meet essential requirements of all the EC Directives applied.

It has been obligatory to apply CE marks indicating conformity with EC Directives when machines and components are exported to the member Nations of the EU.

Once "A manufacturer himself" declares a product to be safe by means of CE marking (declaration of conformity by manufacturer), free distribution inside the member Nations of the EU is permissible.

■ CE Mark

SMC provides CE marking to products to which EMC and Low Voltage Directives have been applied, in accordance with CETOP (European hydraulics and pneumatics committee) guide lines.

■ As of February 1998, the following 18 countries will be obliged to conform to CE mark legislation

Iceland, Ireland, United Kingdom, Italy, Austria, Netherlands, Greece, Liechtenstein, Sweden, Spain, Denmark, Germany, Norway, Finland, France, Belgium, Portugal, Luxembourg

■ EC Directives and Pneumatic Components

• Machinery Directive

The Machinery Directive contains essential health and safety requirements for machinery, as applied to industrial machines e.g. machine tools, injection molding machines and automatic machines. Pneumatic equipment is not specified in Machinery Directive. However, the use of SMC products that are certified as conforming to EN Standards, allows customers to simplify preparation work of the Technical Construction File required for a Declaration of Conformity.

• Electromagnetic Compatibility (EMC) Directive

The EMC Directive specifies electromagnetic compatibility. Equipment which may generate electromagnetic interference or whose function may be compromised by electromagnetic interference is required to be immune to electromagnetic affects (EMS/immunity) without emitting excessive electromagnetic affects (EMI/emission).

• Low Voltage Directive

This directive is applied to products, which operate above 50 VAC to 1000 VAC and 75 VDC to 1500 VDC operating voltage, and require electrical safety measures to be introduced.

• Simple Pressure Vessels Directive

This directive is applied to welded vessels whose maximum operating pressure (PS) and volume of vessel (V) exceed 50 bar/L. Such vessels require EC type examination and then CE marking.

national Standards

you to comply with EC directives and CSA/UL standards.



■ CSA Standards & UL Standards

UL and CSA standards have been applied in North America (U.S.A. and Canada) symbolizing safety of electric products, and are defined to mainly prevent danger from electric shock or fire, resulting from trouble with electric products. Both UL and CSA standards are acknowledged in North America as the first class certifying body. They have a long experience and ability for issuing product safety certificate. Products approved by CSA or UL standards are accepted in most states and governments beyond question.

Since CSA is a test certifying body as the National Recognized Testing Laboratory (NRTL) within the jurisdiction of Occupational Safety and Health Administration (OSHA), SMC was tested for compliance with CSA Standards and UL Standards at the same time and was approved for compliance with the two Standards. The above CSA NRTL/C logo is described on a product label in order to indicate that the product is approved by CSA and UL Standards.

■ TSSA (MCCR) Registration Products

TSSA is the regulation in Ontario State, Canada. The products that the operating pressure is more than 5 psi (0.03 MPa) and the piping size is bigger than 1 inch. fall into the scope of TSSA regulation.

Products conforming to CE Standard

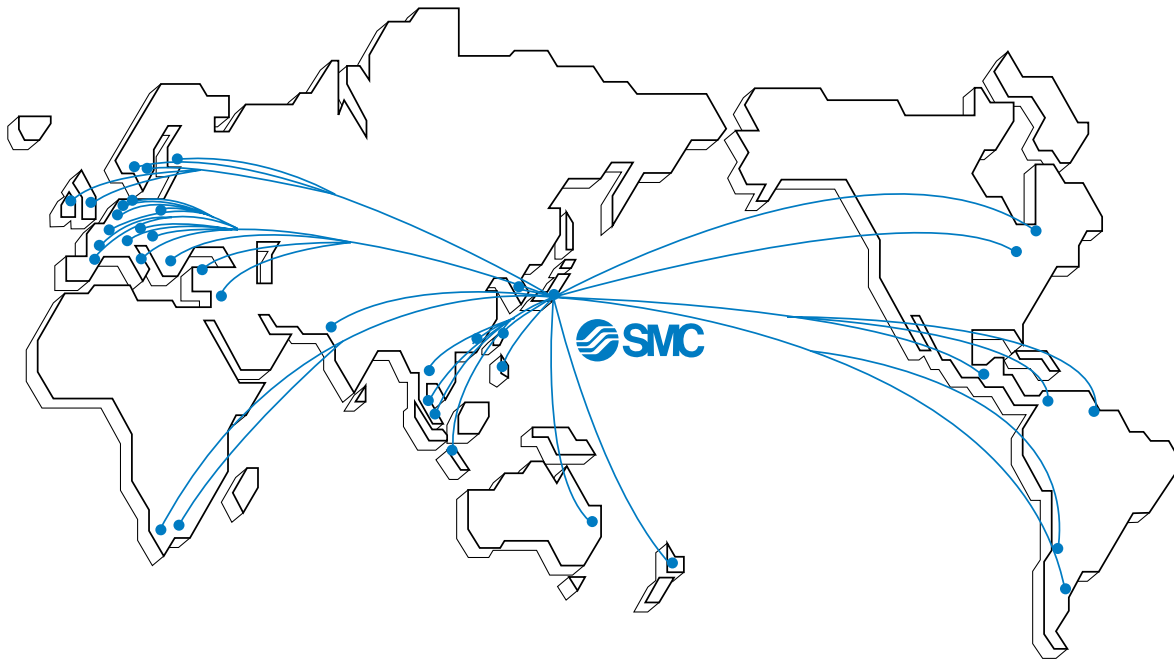


With CE symbol for simple visual recognition

In this catalog each accredited product series is indicated with a CE mark symbol. However, in some cases, every available models may not meet CE compliance. Please visit our web site for the latest selection of available models with CE mark.

<http://www.smcworld.com>

SMC's Global Service Network



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