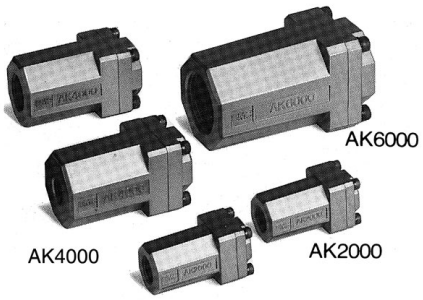
Check Valve
Series AK

High flow capacity

Low cracking pressure: 0.02MPa

Compact and light weight



JIS symbol

How to Order

N AK 2 000 — [ ] 02

Area Code

Nil	Japan, Asia, Australia, UK
N	U.S.A.

Body size

2	1/4
4	1/2
6	1

Port thread

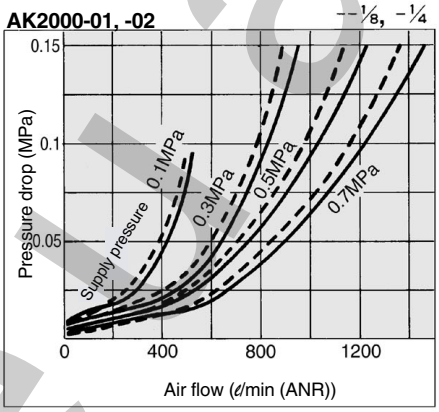
Nil	Rc
N	NPT
F	G

Port size

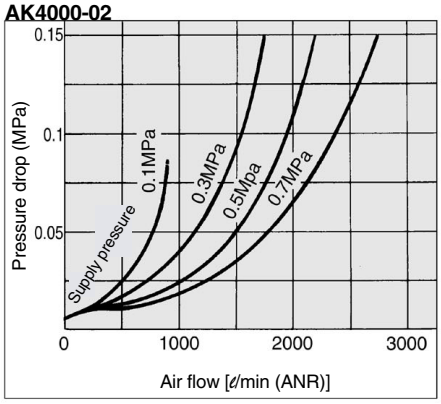
Port size		Applicable series
01	1/8	AK2000
02	1/4	AK2000, 4000
03	3/8	AK4000
04	1/2	AK4000
06	3/4	AK6000
10	1	AK6000

Flow Characteristics

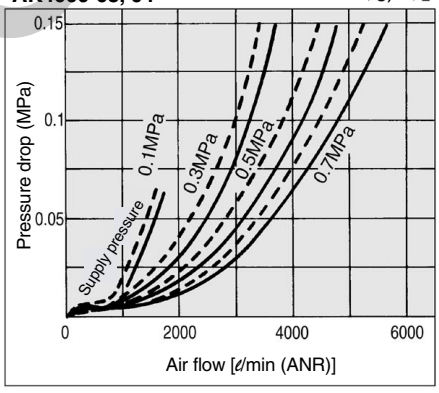
AK2000-01, -02 --1/8, -1/4



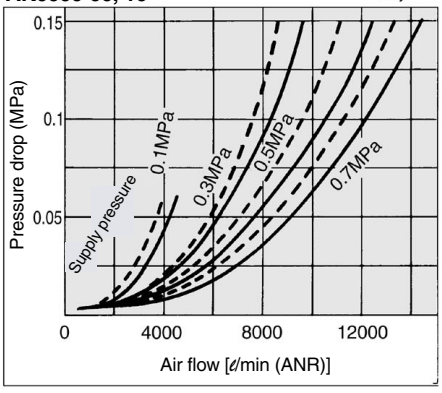
AK4000-02



AK4000-03, 04 --3/8, -1/2



AK6000-06, 10 --3/4, -1



Model

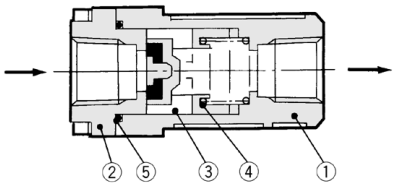
Model	Port size	Effective area (mm²)	Weight (g)
AK2000-01	1/8	25	105
AK2000-02	1/4	27.5	100
AK4000-02	1/4	47	155
AK4000-03	3/8	85	150
AK4000-04	1/2	95	140
AK6000-06	3/4	200	345
AK6000-10	1	230	315

Specifications

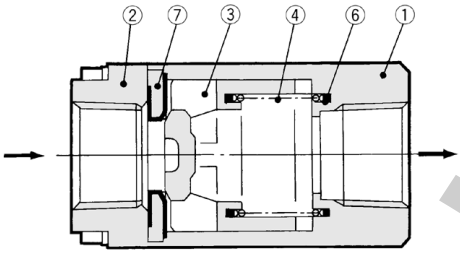
Fluid	Air
Proof pressure	1.5MPa
Maximum operating pressure	1MPa
Minimum operating pressure	0.02MPa
Ambient and fluid temperature	-5° to 60°C (No freezing)

Construction

AK2000



AK4000/6000



Component parts

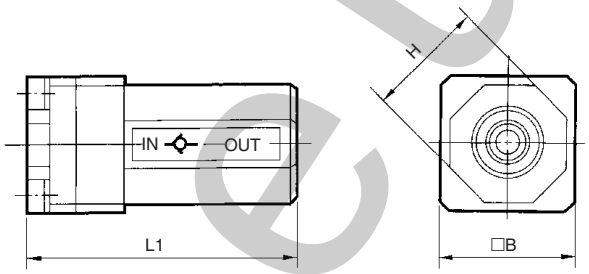
No.	Description	Material
①	Cover	Aluminum die casted Note 1)
②	Body	Aluminum die casted Note 1)

Note 1) AK2000: Zinc alloy

Replacement parts

No.	Description	Material	Part No.		
			AK2000	**AK4000**	**AK6000**
③	Valve	POM	19033	19014	19024
④	Spring	Stainless steel	19037	19015	19025
⑤	O-ring	NBR	20 x 17 x 1.5	—	—
⑥	Ring	NBR	—	19016	19026
⑦	Seat ring	Brass, NBR	—	19013	19023

Dimensions



Model	Port size	L1	□B	H
AK2000-01, 02	1/8, 1/4	50	25	22
AK4000-02, 03, 04	1/4, 3/8, 1/2	67	36	36
AK6000-06, 10	3/4, 1	95	50	50

⚠ Caution

Read carefully before handling.
Refer to page 64 and 65 for Safety Instructions and common precautions on the products mentioned in this catalog, refer to page 66 through 68 for precautions for every series.

Slow Start Control Valve
Series ASS
Meter-out Type

Meter-out control type:
A control valve with cylinder speed control function, fixed throttle, and rapid air supply function

Meter-in-control type:
A control valve with cylinder speed control function and rapid air supply function

PAT.PEND

How to Order

N | ASS | 3 | 00 | □ | 02 | B

Area Code

Nil	Japan, Asia, Australia, UK*
N	U.S.A.

*Special order only

S.S.C. valve

Body size

1	1/8
3	3/8
5	3/4
6	1

Meter-out type

Port thread

Nil	Rc
N	NPT
F	G

Port size

Port size		Applicable series
01	1/8	ASS100, 110
02	1/4	ASS300, 310
03	3/8	ASS300, 310
04	1/2	ASS500
06	3/4	ASS500, 600
10	1	ASS600

Accessory

Nil	Without bracket
B	With bracket

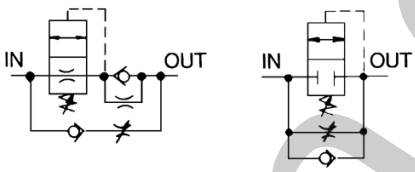
Specifications

Fluid	Air
Maximum operating pressure	0.7MPa
Ambient and fluid temperature	–5° to 60°C (No freezing)
Setting pressure	0.1 to 0.5MPa

Model

Type	Model	Port size	Effective area (mm²)		Weight (g)
			Controlled flow	Free flow	
Meter-out control	**ASS100**	1/8	2.4	9.5	97
	ASS300	1/4, 3/8	14.5	22.0	220
	ASS500	1/2, 3/4	52.0	55.0	580
	ASS600	3/4, 1	80.0	90.0	950
Meter-in control	**ASS110**	1/8	2.4	5.4	97
	ASS310	1/4, 3/8	16.5	23.0	220

Symbol



Meter-out control　　Meter-in control

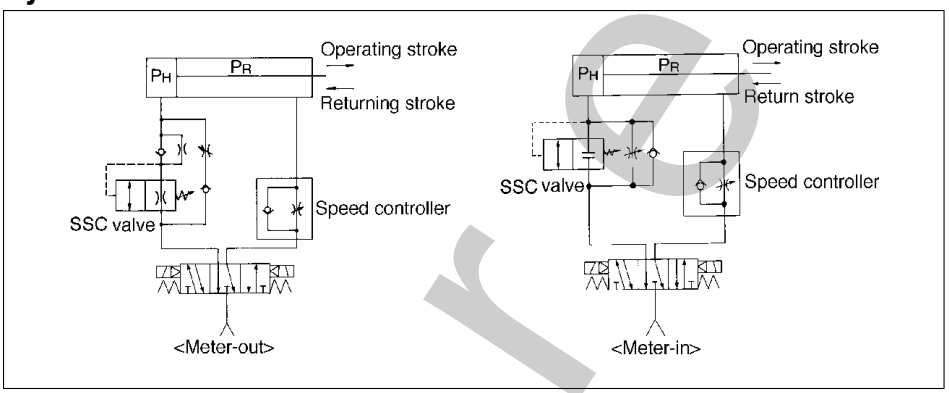
⚠Caution

Be sure to read before handling.
Refer to page 64 and 65 for Safety Instructions and common precautions on the products mentioned in this catalog, and page 66 through 68 for precautions on every series.

Prevents accidents caused by the cylinder rod sudden extensions

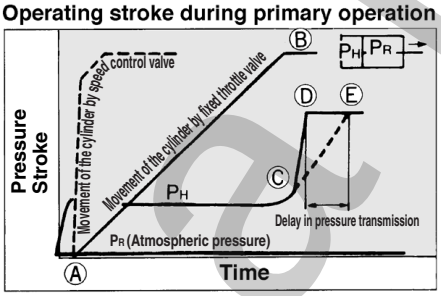
If pressure is applied only to one side of the cylinder, the rod could get out of control, leading to accidents that could involve injury to humans or damage to the product or jigs. The meter-out type SSC valve prevents the sudden extensions by effecting meter-in control when there is no pressure, and resumes the ordinary meter-out control after the cylinder has been pressurized. With the meter-in type, there is no risk of sudden extensions because the cylinder speed is constantly under meter-in control.

System circuit



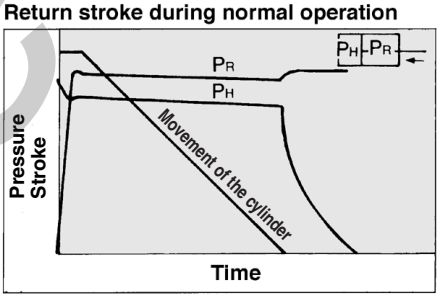
⟨Meter-out⟩ Graph/Pressure to time

Operating stroke during primary operation

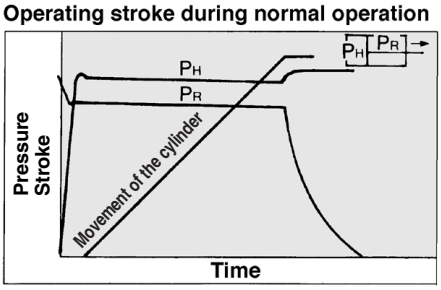


During the operating stroke at initial actuation, the cylinder moves at a slow speed from A to B due to the fixed throttle of the SSC valve. When it reaches B, the head pressure (PH) rises quickly as indicated by the line from C to D. Therefore, there is no time loss associated with the pressure transmission lag indicated by the line from C to E, as in the case of meter-in control that is effected through the use of a speed controller. During normal operation after the cylinder has been pressurized, the cylinder's speed control is effected by the ordinary meter-out control.

Return stroke during normal operation

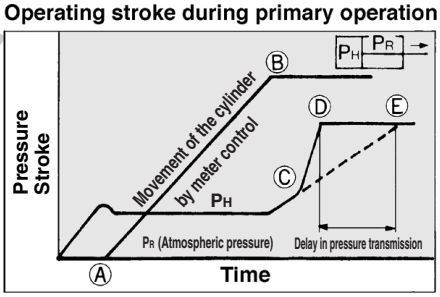


Operating stroke during normal operation



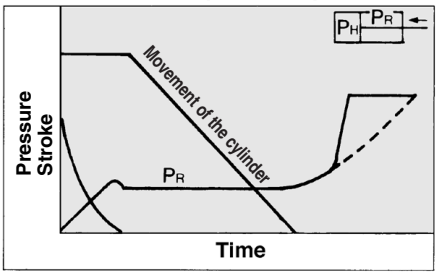
⟨Meter-in⟩ Graph/Pressure to time

Operating stroke during primary operation

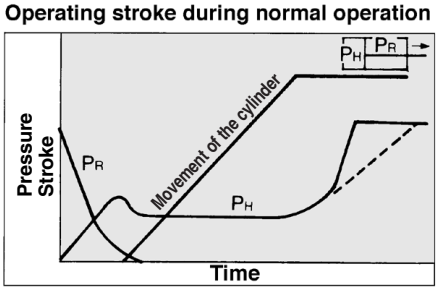


Due to meter-in control, the cylinder moves from A to B regardless of whether it is an initial operation or a normal operation. When it reaches B, the head pressure (PH) rises quickly as indicated by the line from C to D. Therefore, there is no time loss associated with the pressure transmission lag indicated by the line from C to E, as in the case of meter-in control that is effected through the use of a speed controller. During normal operation after the cylinder has been pressurized, the cylinder's speed control is effected also by the ordinary meter-in control.

Return stroke during normal operation

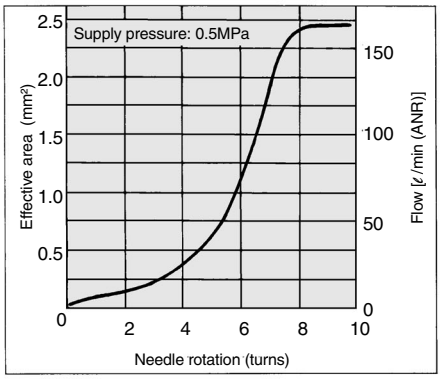


Operating stroke during normal operation

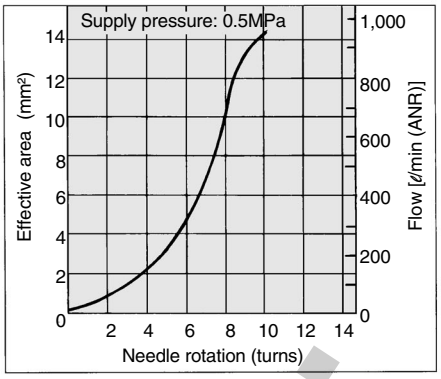


Flow Characteristics

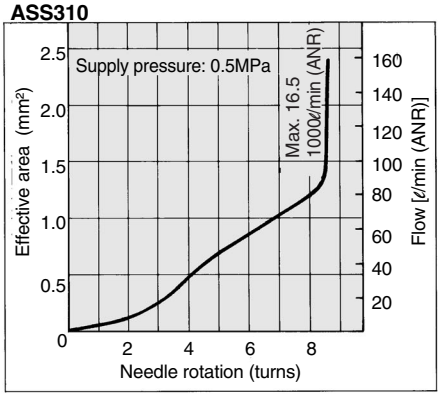
ASS100/ASS110



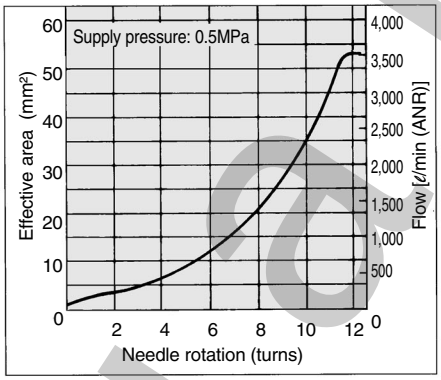
ASS300



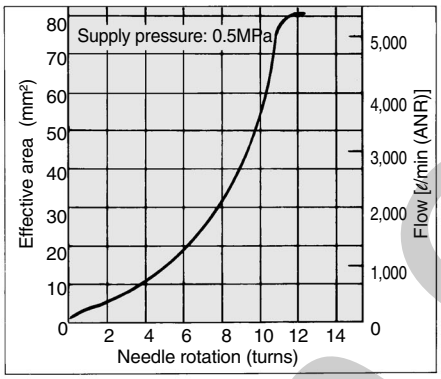
ASS310



ASS500

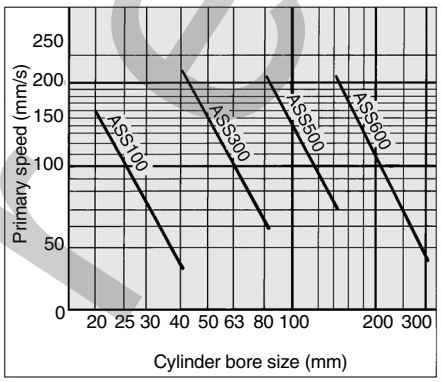


ASS600



Cylider Extension Prevention Primary Speed

Meter-out control



Conditions: Supply pressure at 0.5MPa, No load
* Primary speed of meter-in type can be controlled as likely as during normal operation.

Meter-out Control/Operation Principles

During primary operation (Piston rod extension prevention)

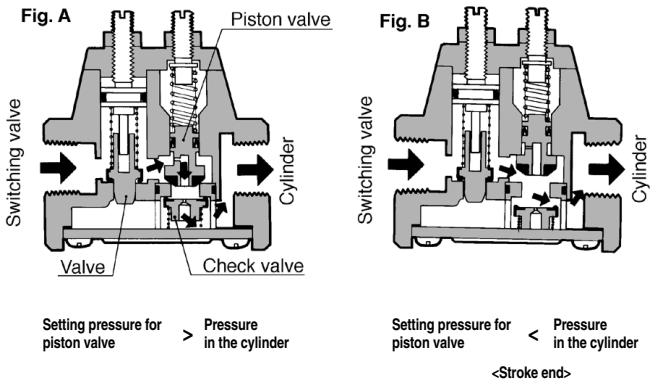


Fig. A

When air is supplied to the exhausted cylinder, the air causes the valve to close. Also, because the piston valve is fully closed due to the cylinder's low internal pressure, air is supplied gradually through the piston valve and the fixed throttle of the check valve. Therefore, the cylinder operates slowly under meter-in control.

Fig. B

As the piston moves and reaches the end of its stroke, the internal pressure in the cylinder rises. When this pressure becomes higher than the set pressure of the piston valve, the piston valve opens fully. Then, the air from the switching valve feeds rapidly into the cylinder by opening the check valve.

During normal operation

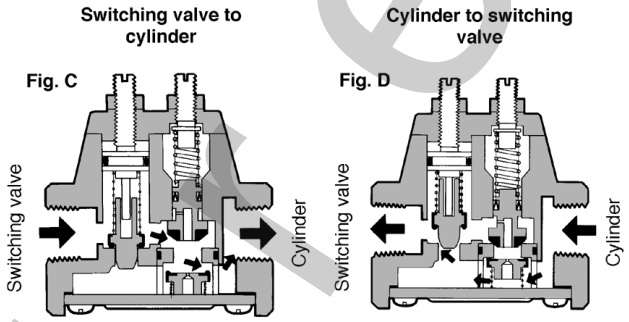


Fig. C

Because the pressure in the cylinder is higher than the set pressure, the air from the switching valve causes the piston valve to open fully and feeds rapidly into the cylinder by opening the check valve. Therefore, meter-out control of the cylinder speed is effected by the speed control valve in the exhaust conduit, regardless of the state of the SSC valve.

Fig. D

Because the check valve closes due to the internal pressure of the cylinder, the air in the cylinder passes through the valve and discharges through the switching valve. Thus, meter-out control of the cylinder speed is effected by the opening of the valve, which is adjusted by the set needle.

Meter-in Control/Operation Principles

During primary operation (Piston rod extension prevention)

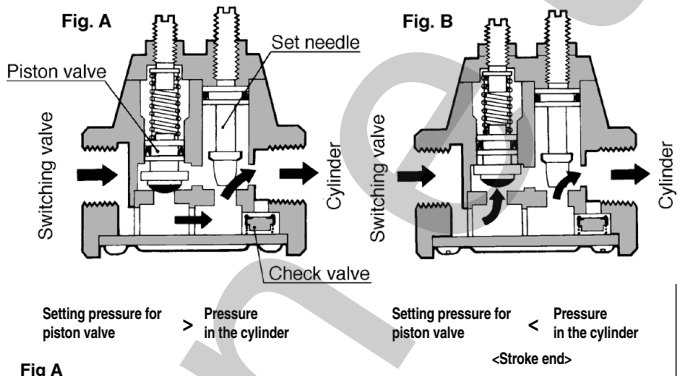


Fig A

When air is supplied to the exhausted cylinder, the air causes the check valve to close. Also, because the piston valve is fully closed due to the cylinder's low internal pressure, air is supplied gradually via the throttle of the set needle. Therefore, the cylinder operates slowly under meter-in control.

Fig. B

As the piston moves and reaches the end of its stroke, the internal pressure in the cylinder rises. When this pressure becomes higher than the set pressure of the piston valve, the piston valve opens fully. Then, the air from the switching valve feeds rapidly into the cylinder.

During normal operation

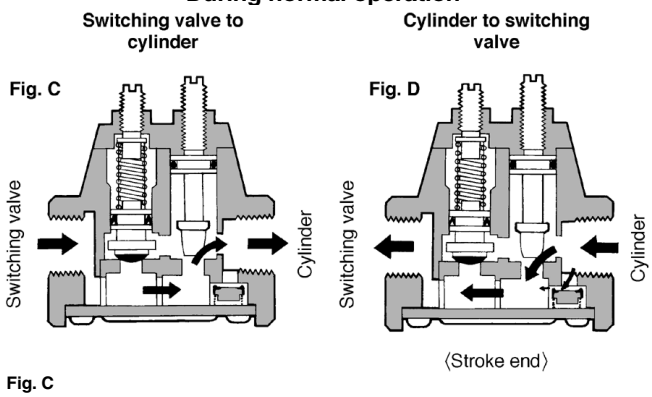


Fig. C

The air that has been supplied by the switching valve closes the check valve. Also, because the cylinder's internal pressure is lower than the set pressure, the piston valve closes fully, causing the air to be supplied gradually via the throttle of the set needle. Therefore, meter-out control of the cylinder speed is effected by the SSC valve, regardless of the state of the speed control valve in the exhaust conduit of the cylinder (Fig. C). Also, as the piston moves and reaches the end of its stroke, the internal pressure in the cylinder rises, causing the piston valve to open fully, and the air feeds rapidly into the cylinder (Fig. B).

Fig. D

The air in the cylinder initially opens the piston valve and the check valve and discharges rapidly through the switching valve. The fully opened piston valve closes as shown in Fig. D when the pressure in the cylinder is lower than the set pressure. Then the air passes through the check valve and becomes discharged (Fig. D). Thus, meter-in control of the cylinder speed is effected by the speed control valve of the supply conduit.