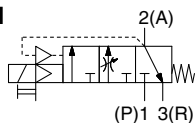


Soft Start-up Valve

AV2000-A/3000-A/4000-A/5000-A Series

Symbol



How to Order



AV **20** **00** - **02** **B** - **1** **D** **B** - **1** - A

1 2 3 4 5 6 7 8 9

*1 CE compliant

	Electrical entry	
	Grommet	DIN terminal
AC	—	●
DC	●	●

			Symbol	Description	1					
					Body size					
					20	30	40	50		
2	Thread type		Nil	Rc	●	●	●	●		
			N	NPT	●	●	●	●		
			F	G	●	●	●	●		
+										
3	Port size 1(P), 2(A)		02	1/4	●	—	—	—		
			03	3/8	—	●	—	—		
			04	1/2	—	—	●	—		
			06	3/4	—	—	—	●		
			10	1	—	—	—	●		
+										
4	Option	a	Mounting	Nil	Without mounting option	●	●	●	●	
				B	With bracket	●	●	●	●	
	+									
	b	Pressure gauge	Nil	Without pressure gauge	●	●	●	●		
			G	Round type pressure gauge (with limit indicator)	●	●	●	●		
	+									
c	Silencer	Nil	Without silencer	●	●	●	●			
		S	Silencer (Built-in)	●	●	●	●			
+										
5	d	Rated coil voltage	AC (50/60 Hz)	1	100 VAC	●	●	●	●	
				2	200 VAC	●	●	●	●	
				3	110 VAC [115 VAC]*1	●	●	●	●	
				4	220 VAC [230 VAC]*1	●	●	●	●	
				DC	5	24 VDC	●	●	●	●
					6	12 VDC	●	●	●	●
+										
6	e		Electrical entry	G	Grommet (Lead wire length: 300 mm)	●	●	●	●	
				D	Type D (DIN terminal/With connector)	●	●	●	●	
				Y	Type Y (DIN terminal/With connector)*2	●	●	●	●	
				DO	Type D (DIN terminal/Without connector)	●	●	●	●	
				YO	Type Y (DIN terminal/Without connector)	●	●	●	●	
+										
7	f	Light/ surge voltage suppressor	Nil	None	●	●	●	●		
			Z	With light/surge voltage suppressor	○*3	○*3	○*3	○*3		
+										
8	g		Manual override	Nil	Non-locking push type	●	●	●	●	
				B	Push-turn locking slotted type	●	●	●	●	
				C	Push-turn locking lever type	●	●	●	●	
+										
9	Semi-standard	h	Flow direction	Nil	Flow direction: Left to right	●	●	●	●	
				R	Flow direction: Right to left	●	●	●	●	
	+									
	i	Pressure unit	Nil	Name plate and pressure gauge in SI units: MPa	●	●	●	●		
Z			Name plate and pressure gauge in imperial units: psi	○*4	○*4	○*4	○*4			

*1 The 110 VAC and 115 VAC are interchangeable. The 220 VAC and 230 VAC are interchangeable as well. The allowable voltage fluctuation is -15% to +5% of the rated voltage for the 115 VAC or 230 VAC.

*2 Type "Y" is a DIN terminal conforming to EN-175301-803C (former DIN43650C).

*3 When the electrical entry is DO or YO, light/surge voltage suppressor cannot be selected.

*4 Only for the NPT thread

• Option: Select one each for a to c.
• Option symbol: When more than one specification is required, indicate in alphabetical order.
Example) AV2000-02BGS-1DB-A

Soft Start-up Valve **AV2000-A/3000-A/4000-A/5000-A Series**

Specifications

Series		AV2000-A	AV3000-A	AV4000-A	AV5000-A	
Port size	1(P), 2(A)	1/4	3/8	1/2	3/4	1
	3(R)	1/4	3/8	1/2	3/4	
Pressure gauge port size		1/8				
Fluid		Air				
Ambient and fluid temperature		0 to 50°C*1				
Proof pressure		1.5 MPa				
Operating pressure range		0.2 to 1.0 MPa				
Weight [kg]		0.43	0.45	0.80	1.30	1.25
Enclosure		Dust-protected (DIN terminal: IP65*2)				

*1 If the temperature is low, use the product with dry air to prevent it from freezing.

*2 Based on IEC60529

Solenoid Specifications

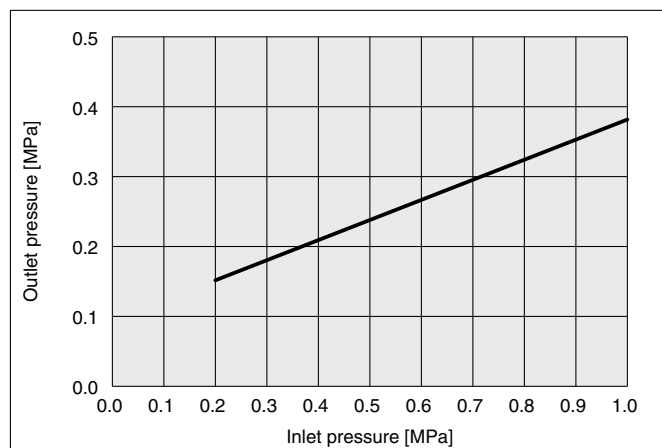
Electrical entry			Grommet	DIN terminal
Rated coil voltage [V]	DC		24, 12 V	
	AC	50/60 Hz	100, 200, 110 [115], 220 [230]*1	
Allowable voltage fluctuation	DC	24 V	±10% of the rated voltage	
		12 V	±10% of the rated voltage	
	AC	100 V	±10% of the rated voltage	
		110 V*1	±10% of the rated voltage	
		[115 V]	[−15% to +5% of the rated voltage]	
		200 V	±10% of the rated voltage	
		220 V*1	±10% of the rated voltage	
		[230 V]	[−15% to +5% of the rated voltage]	
Power consumption [W]	DC		0.35 (With light: 0.4)	0.35 (With light: 0.45)
Apparent power [VA]	AC	100 V	0.78 (With light: 0.81)	0.78 (With light: 0.87)
		110 V	0.86 (With light: 0.89)	0.86 (With light: 0.97)
		[115 V]	[0.94 (With light: 0.97)]	[0.94 (With light: 1.07)]
		200 V	1.18 (With light: 1.22)	1.15 (With light: 1.30)
		220 V	1.30 (With light: 1.34)	1.27 (With light: 1.46)
		[230 V]	[1.42 (With light: 1.46)]	[1.39 (With light: 1.60)]
Surge voltage suppressor			Refer to the Specific Product Precautions 4 on page 13.	
Indicator light			LED	LED (Neon bulb for AC)

*1 The 110 VAC and 115 VAC are interchangeable. The 220 VAC and 230 VAC are interchangeable as well.

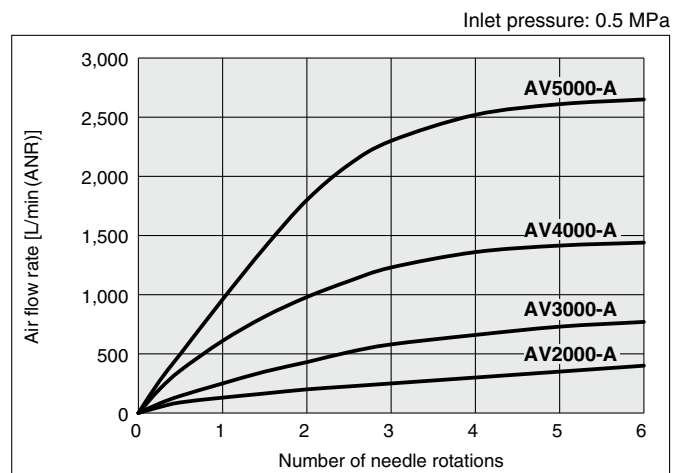
Flow Rate Characteristics

Series		AV2000-A	AV3000-A	AV4000-A	AV5000-A	
Port size	1(P), 2(A)	1/4	3/8	1/2	3/4	1
	3(R)	1/4	3/8	1/2	3/4	
Flow rate characteristics	1(P) → 2(A)	C[dm ³ /(s·bar)]	9.2	13.1	19.2	34.8
		b	0.36	0.27	0.32	0.66
		Cv	2.4	3.1	5.1	12.6
	2(A) → 3(R)	C[dm ³ /(s·bar)]	8.8	9.2	10.1	23.7
		b	0.46	0.48	0.55	0.67
		Cv	2.5	2.6	3.2	9.2

Pressure for switching from low speed air supply to rapid air supply



Needle flow characteristics at low speed air supply * Representative values



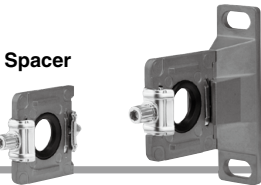
AV2000-A/3000-A/4000-A/5000-A Series

Optional Part Nos.

Series	AV2000-A	AV3000-A	AV4000-A	AV5000-A
Bracket assembly*1	AV22P-210AS	AV32P-210AS	AV42P-210AS	AV52P-210AS
Silencer assembly*2	AV22P-250AS	AV32P-250AS	AV42P-250AS	AV52P-250AS
Pressure gauge*3	G36-10-□01			

- *1 Bracket: 1 pc., Mounting screw: 2 pcs. (3 pcs. for AV5000-A)
*2 Element, Element O-ring, Element cover: 1 pc. for each
*3 □ of the pressure gauge part number will indicate the connecting screw type. No indication is necessary for R; however, indicate N for NPT.
Please contact SMC regarding the pressure gauge supply for psi unit specifications.

Spacer with bracket

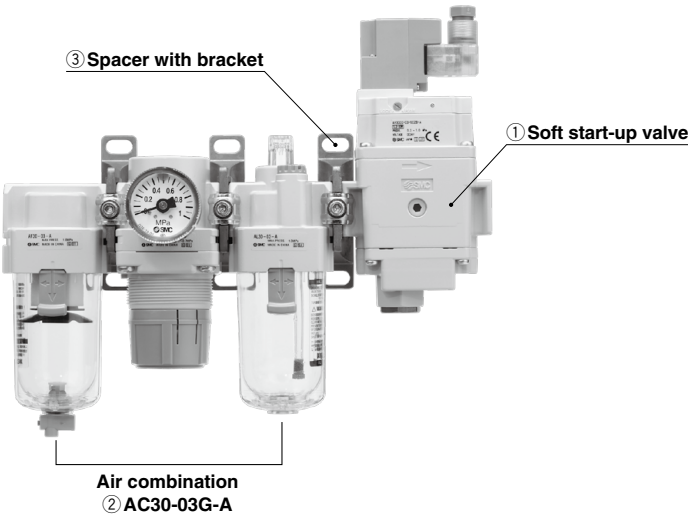


Connecting Spacer for Modular Type F.R.L. Unit

Series	AV2000-A	AV3000-A	AV4000-A	AV5000-A
Spacer	Y200-A	Y300-A	Y400-A	Y600-A
Spacer with bracket	Y200T-A	Y300T-A	Y400T-A	Y600T-A
Applicable model	AC20-A AC20-B	AC25-A, AC30-A AC25-B, AC30-B	AC40-A*1 AC40-B*1	AC50-B, AC55-B AC60-B

*1 Except port size 06

Assembly Example



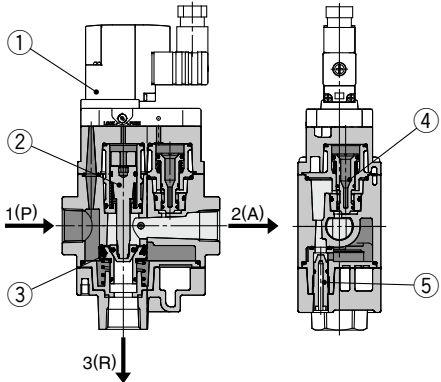
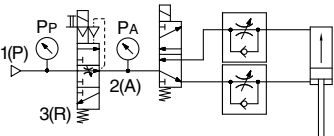
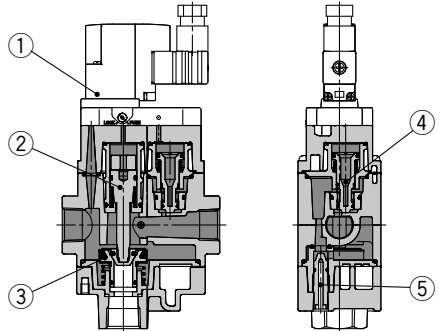
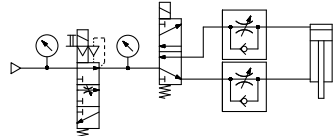
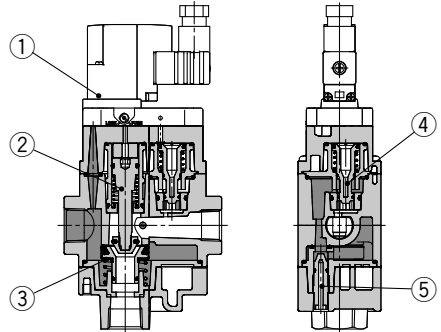
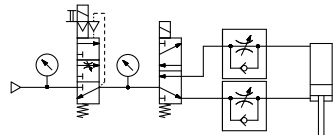
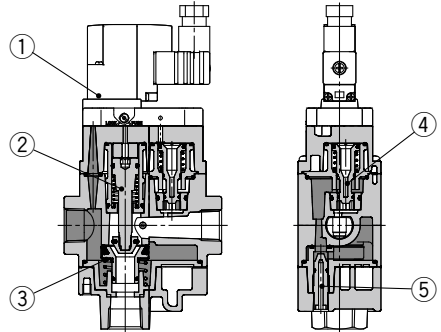
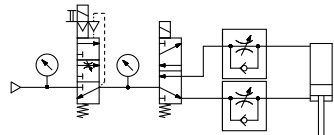
Products do not come assembled. They should be ordered separately and assembled by the customer.

* The Simple Specials System deals with product unification.
Please contact your local sales representative for more details.

Assembly example

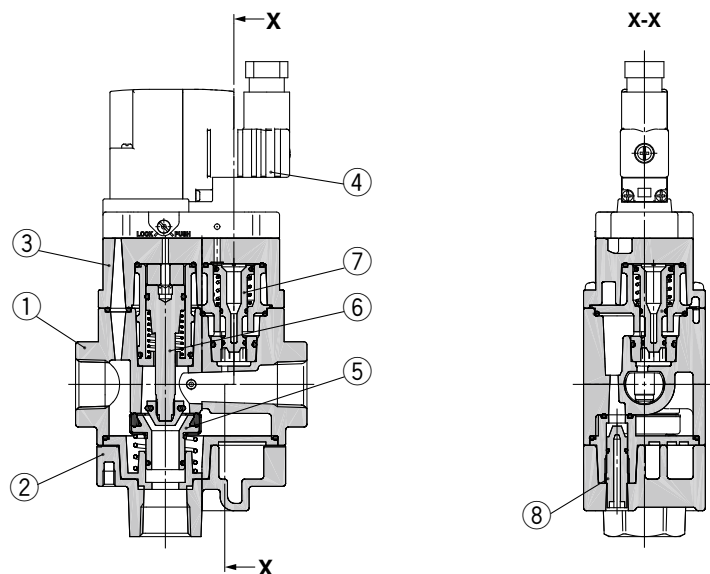
- ① Soft start-up valve: AV3000-03S-5DZB-A 1 pc.
② Air combination: AC30-03G-A 1 pc.
③ Spacer with bracket: Y300T-A 1 pc.

Working Principle

Working conditions	Pilot valve	Pressure conditions	Operation description	Internal construction/Cylinder actuation circuit (Meter-out control) example
Low speed air supply	ON	$P_S > P_A$	<p>Operation description of the soft start-up valve</p> <p>When the pilot valve ① is energized or turned ON manually, the spool ② is pushed down due to the pilot air and gets into contact with the valve ③, closing the flow passage to port 3 (R). At this time, force that pushes the valve ③ \geq force that pushes down the spool ②. Therefore, the flow passage from the valve ③ to port 2 (A) is still closed.</p> <p>Furthermore, the piston ④ is pushed down due to the pilot air, and the flow passage from the needle ⑤ to port 2 (A) opens. And then, the air pressure whose flow rate is adjusted by the needle ⑤ flows to port 2 (A).</p> <p>Description of cylinder actuation</p> <p>The meter-in control of the needle ⑤ slowly moves the cylinder from A to B.</p> <p>P_P: Inlet pressure P_A: Outlet pressure</p>	 <p>Initial Operation Return Stroke</p> 
High speed air supply		$P_S \leq P_A$	<p>Operation description of the soft start-up valve</p> <p>When the outlet side is filled with pressure supplied from the needle ⑤, P_A increases. When P_A exceeds the specified pressure, the force that pushes up the valve ③ becomes smaller than the force that pushed down the spool ②. Then, the valve ③ is pushed down, opening the flow passage, and pressure is supplied to port 2 (A) rapidly.</p> <p>Description of cylinder actuation</p> <p>When $P_S < P_A$ after the cylinder reaches B, the main valve fully opens and P_A increases rapidly as shown from C to D and becomes the same pressure as P_P.</p> <p>P_S: Pressure for switching to rapid air supply</p>	 
Normal operation		$P_P \approx P_A$	<p>Operation description of the soft start-up valve</p> <p>The valve ③ holds the fully open condition.</p> <p>Description of cylinder actuation</p> <p>The cylinder operation is controlled by a meter-out circuit on the cylinder side.</p>	 
Exhaust	OFF	—	<p>Operation description of the soft start-up valve</p> <p>When the pilot valve ① is turned OFF, the pilot air of the spool ② is exhausted from the pilot valve ①, and the spool ② and valve ③ are returned upward due to the spring. This opens the flow passage to port 3 (R), exhausting the air pressure on the port 2 (A) side.</p> <p>The pilot air of the piston ④ is also exhausted from the pilot valve ①, and the piston ④ is returned upward due to the spring, closing the flow passage from the needle ⑤.</p>	 

AV2000-A/3000-A/4000-A/5000-A Series

Construction



Component Parts

No.	Description	Material
1	Body	Aluminum die-cast
2	Bottom cover	Aluminum die-cast
3	Top cover	Aluminum die-cast

Replacement Parts

No.	Description	Material	AV2000-A	AV3000-A	AV4000-A	AV5000-A
4	Pilot valve assembly*1	—	See below.		See below.	
5	Valve assembly	Rubber material: HNBR	AV22P-060AS		AV42P-060AS	AV52P-060AS
6	Control valve assembly	—	AV22P-110AS		AV42P-110AS	AV52P-110AS
7	Piston assembly	POM, NBR	AV22P-120AS		AV42P-120AS	AV52P-120AS
8	Needle assembly	POM, NBR	AV22P-150AS	AV32P-150AS	AV42P-150AS	AV52P-150AS
9	Plug assembly	POM, NBR	AR22P-320AS-□01			

*1 See below for How to Order of the pilot valve.

How to Order Pilot Valve Assembly

AV **2** 0 - **1** **G** **B** A

① ② ③ ④ ⑤

			Symbol	Description
①	Applicable model		2	AV2000-A, AV3000-A
			4	AV4000-A, AV5000-A
+				
②	Rated coil voltage	AC (50/60 Hz)	1	100 VAC
			2	200 VAC
			3	110 VAC [115 VAC]*1
			4	220 VAC [230 VAC]*1
	DC	5	24 VDC	
		6	12 VDC	
+				
③	Electrical entry		G	Grommet (Lead wire length: 300 mm)
			D	Type D (DIN terminal/With connector)
			Y	Type Y (DIN terminal/With connector)*2
			DO	Type D (DIN terminal/Without connector)
			YO	Type Y (DIN terminal/Without connector)
+				
④	Light/surge voltage suppressor		Nil	None
			Z	With light/surge voltage suppressor
+				
⑤	Manual override		Nil	Non-locking push type
			B	Push-turn locking slotted type
			C	Push-turn locking lever type

*1 The 110 VAC and 115 VAC are interchangeable. The 220 VAC and 230 VAC are interchangeable as well.

The allowable voltage fluctuation is -15% to +5% of the rated voltage for the 115 VAC or 230 VAC.

*2 Type "Y" is a DIN terminal conforming to EN-175301-803C (former DIN43650C).

* When the electrical entry is DO or YO, light/surge voltage suppressor cannot be selected.