

Valve Unit

Series CCVS/CCVL



How to Order



CCV **S** **1** **1** - **1** - **U1** -

Valve unit size

S	Small flow
L	Large flow

Control valve

0	None
1	Flow control valve (With pressure compensation)
2	Throttle valve
3	Timid flow control valve (Series CCVS only)

Combined valve

0*	None
1	Stop valve + Skip valve
2	Stop valve
3	Skip valve

* For the one without combined valve (0), solenoid valve does not come with.
<Example> CCVS10-U1

CE-compliant

Nil	—
Q	CE-compliant (Refer to Table 1.)

Suffix

S	Single valve
U₁	Unit for CC63 (Unit mounted to CCT63)
U₂	Unit for CC100 and CC160 (Unit mounted to CCT100 and 160)

Electrical entry of solenoid valve

Nil	Air operated
G	Grommet
C	Conduit
D	DIN terminal

Solenoid valve rated voltage

Nil	No combined valve
1	100 VAC (50/60 Hz)
2	200 VAC (50/60 Hz)
5	24 VDC
0	Air operated
9*	Other
3*	110 VAC (50/60 Hz)
4*	220 VAC (50/60 Hz)

* Option

CCVS/CCVL Valve Unit Part No. Combinations

Valve unit size	Control valve	Combined valve
S	0	2
	1	0, 1, 2, 3
	2	0, 1, 2, 3
	3	0, 1, 2, 3
L	0	2
	1	0, 1, 2, 3
	2	0, 1, 2, 3

Specifications

Specifications	Combined valve		Control valve						
	Stop valve, Skip valve		Throttle valve		Flow control valve				
	Small flow	Large flow	Small flow	Large flow	Timid flow	Small flow	Large flow		
Operating pressure	0 to 0.7 MPa		0 to 0.7 MPa		0.3 to 0.7 MPa				
External pilot pressure	0.3 to 0.7 MPa		—		—				
Proof pressure	1.05 MPa								
Ambient and Fluid temperature	5 to 50°C								
Fluid	Turbine oil (40 to 100 mm ² /s)								
Effective area (mm²)	Stop valve, Skip valve		40	88	—				
	Control valve free open		—	—	35	77	18	24	60
	Control valve free flow		—	—	30	80	23	30	80
Minimum control flow (dm³/min)	—		0.3		0.04			0.06	
Pressure compensating ability	—		—		±10%				
Pressure compensating range	—		—		Load ratio: 60% compared to theoretical output.				
Valve type	N.C.		—		—				

Table 1 CE-compliant

Applicable model	CE marking applicable standard
CCV□□□□-□D-□	EMC Directive 89/336/EEC Low Voltage Directive 93/68/EEC

Valve Unit *Series CCVS/CCVL*

Solenoid Valve Specifications of Combined Valve (Stop valve/Skip valve)

Solenoid valve model		V0301-00**
External pilot pressure		0.3 to 1.0 MPa
Rated voltage	Standard	100/200 VAC, 24 VDC
	Option	110/220 VAC, 6/12/48/100 VDC
Apparent power	AC	Start-up 50 Hz: 14 VA 60 Hz: 13 VA Holding 50 Hz: 9 VA 60 Hz: 8 VA
	DC	6.5 W
Electrical entry		Grommet (Standard), Conduit, DIN terminal

Applicable Converter

Valve unit	Nominal size (mm)
Small flow	63, 100
Large flow	100, 160

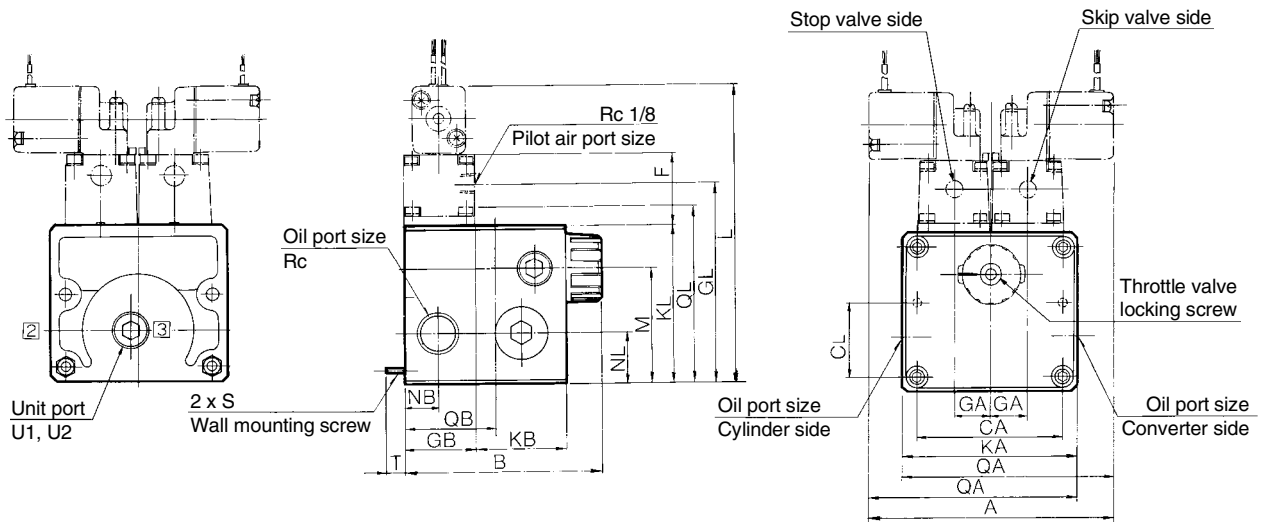
Solenoid Valve Function Plate

Solenoid valve type		N.C.*	N.O.**
Valve type	Stop valve	CL	OP
	Skip valve	OP	CL

* Valve opens when solenoid valve conducts electricity.

** Valve opens when solenoid valve stops conducting electricity.

Dimensions



Model	Oil port size Rc	A	B	CA*	CL*	F	GA	GB	GL	KA	KB	KL	L	M	NB	NL	QA	QB	QL	R	S	T
CCVS02-□G-S	1/2	—	—	72	36	35	18	35	101	86	45	80	148.5	—	17.5	25	103.9	45	88.2	1	M5 x 0.8	5.4 to 7.5
CCVS□1-□G-S	1/2	121.8	98	72	36	35	18	35	101	86	45	80	148.5	57	17.5	25	—	—	—	2		
CCVS□2-□G-S	1/2	—	98	72	36	35	18	35	101	86	45	80	148.5	57	17.5	25	103.9	—	88.2	1		
CCVS□3-□G-S	1/2	—	98	72	36	35	18	35	101	86	45	80	148.5	57	17.5	25	103.9	—	88.2	1		
CCVS□0-S	1/2	—	98	72	36	—	—	35	—	86	45	80	—	57	17.5	25	—	—	88.2	—		
CCVL02-□G-S	3/4	—	—	100	40	40	24	50	135	116	66	107	180.5	—	27	28	124.9	62	115	1	M6 x 1	10.5 to 12.5
CCVL□1-□G-S	3/4	132.8	135	100	40	40	24	50	135	116	66	107	180.5	80	27	28	—	—	—	2		
CCVL□2-□G-S	3/4	—	135	100	40	40	24	50	135	116	66	107	180.5	80	27	28	124.9	—	115	1		
CCVL□3-□G-S	3/4	—	135	100	40	40	24	50	135	116	66	107	180.5	80	27	28	124.9	—	115	1		
CCVL□0-S	3/4	—	135	100	40	—	—	50	—	116	66	107	—	80	27	28	—	—	115	—		

* Pitch of mounting on the wall is CA and CL.

Series CC

Air-hydro Unit Mass

Converter nominal size	Valve unit size	Control valve	Combined valve	Effective oil level stroke										
				50	100	150	200	300	400	500	600	700	800	
63	S	0	2	2.7	2.9	3.1	3.3	3.7	4.1	4.5	—	—	—	
			1	0	3.2	3.4	3.6	3.8	4.2	4.6	5.0	—	—	—
				1	3.4	3.6	3.8	4.0	4.4	4.8	5.2	—	—	—
		2		3.3	3.5	3.7	3.9	4.3	4.7	5.1	—	—	—	
		2	3	3.3	3.5	3.7	3.9	4.3	4.7	5.1	—	—	—	
			0	2	3.2	3.4	3.6	3.8	4.2	4.6	5.0	—	—	—
				1	3.4	3.6	3.8	4.0	4.4	4.8	5.2	—	—	—
				2	3.3	3.5	3.7	3.9	4.3	4.7	5.1	—	—	—
			3	0	3.2	3.4	3.6	3.8	4.2	4.6	5.0	—	—	—
				1	3.4	3.6	3.8	4.0	4.4	4.8	5.2	—	—	—
		2		3.3	3.5	3.7	3.9	4.3	4.7	5.1	—	—	—	
		100	S	0	2	—	4.5	—	5.2	5.9	6.6	7.3	8.0	—
1	0				—	5.0	—	5.7	6.4	7.1	7.8	8.5	—	—
	1				—	5.2	—	5.9	6.6	7.3	8.0	8.7	—	—
	2			—	5.1	—	5.8	6.5	7.2	7.9	8.6	—	—	
2	3			—	5.1	—	5.8	6.5	7.2	7.9	8.6	—	—	
	0			2	—	5.0	—	5.7	6.4	7.1	7.8	8.5	—	—
				1	—	5.2	—	5.9	6.6	7.3	8.0	8.7	—	—
				2	—	5.1	—	5.8	6.5	7.2	7.9	8.6	—	—
	3			0	—	5.0	—	5.7	6.4	7.1	7.8	8.5	—	—
			1	—	5.2	—	5.9	6.6	7.3	8.0	8.7	—	—	
2			—	5.1	—	5.8	6.5	7.2	7.9	8.6	—	—		
L	0		2	—	5.6	—	6.3	7.0	7.7	8.4	9.1	—	—	
			1	0	—	6.8	—	7.5	8.2	8.9	9.6	10.3	—	—
				1	—	7.2	—	7.9	8.6	9.3	10.0	10.7	—	—
	2			—	7.0	—	7.7	8.4	9.1	9.8	10.5	—	—	
	2		3	—	7.0	—	7.7	8.4	9.1	9.8	10.5	—	—	
			0	2	—	6.8	—	7.5	8.2	8.9	9.6	10.3	—	—
				1	—	7.2	—	7.9	8.6	9.3	10.0	10.7	—	—
		2		—	7.0	—	7.7	8.4	9.1	9.8	10.5	—	—	
		3	0	—	7.0	—	7.7	8.4	9.1	9.8	10.5	—	—	
1			—	7.2	—	7.9	8.6	9.3	10.0	10.7	—	—		
2	—		7.0	—	7.7	8.4	9.1	9.8	10.5	—	—			
160	L	0	2	—	—	—	12.6	14.4	16.2	18.0	19.8	21.6	23.4	
			1	0	—	—	—	13.8	15.6	17.4	19.2	21.0	22.8	24.6
				1	—	—	—	14.2	16.0	17.8	19.6	21.4	23.2	25.0
		2		—	—	—	14.0	15.8	17.6	19.4	21.2	23.0	24.8	
		2	3	—	—	—	14.0	15.8	17.6	19.4	21.2	23.0	24.8	
			0	2	—	—	—	13.8	15.6	17.4	19.2	21.0	22.8	24.6
				1	—	—	—	14.2	16.0	17.8	19.6	21.4	23.2	25.0
				2	—	—	—	14.0	15.8	17.6	19.4	21.2	23.0	24.8
			3	0	—	—	—	14.0	15.8	17.6	19.4	21.2	23.0	24.8
				1	—	—	—	14.2	16.0	17.8	19.6	21.4	23.2	25.0
		2		—	—	—	14.0	15.8	17.6	19.4	21.2	23.0	24.8	

Air-hydro Converter Mass

Converter nominal size	(kg)			
Effective oil level stroke	CCT40	CCT63	CCT100	CCT160
50	0.85	1.6	—	—
100	0.90	1.8	3.4	—
150	0.95	—	—	—
200	1.0	2.2	4.1	10.4
300	1.1	2.6	4.8	12.2
400	—	3.0	5.5	14.0
500	—	3.4	6.2	15.8
600	—	—	6.9	17.6
700	—	—	—	19.4
800	—	—	—	21.1


Air-hydro Valve Unit Mass

Small flow		Small flow		Large flow	
Mass	Mass	Mass	Mass	Mass	Mass
CCVS02-□□	1.1	CCVS30-□□	1.6	CCVL02-□□	2.2
CCVS10-□□	1.6	CCVS31-□□	1.8	CCVL10-□□	3.4
CCVS11-□□	1.8	CCVS32-□□	1.7	CCVL11-□□	3.8
CCVS12-□□	1.7	CCVS33-□□	1.7	CCVL12-□□	3.6
CCVS13-□□	1.7			CCVL13-□□	3.6
CCVS20-□□	1.6			CCVL20-□□	3.4
CCVS21-□□	1.8			CCVL21-□□	3.8
CCVS22-□□	1.7			CCVL22-□□	3.6
CCVS23-□□	1.7			CCVL23-□□	3.6

If intricate speed control is unnecessary and the changes in speed due to load fluctuations can be tolerated, the pneumatic speed controller can be used as a control valve.

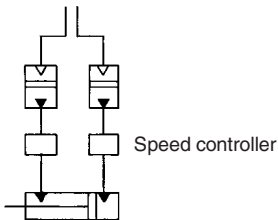
The minimum controllable flow volume of the speed controller is 3 dm³/min.

The speed controller and the converter must have individual pipe connections. They cannot be integrated into a unit.

 Refer to Best Pneumatics No. 6 for the details of speed controllers.



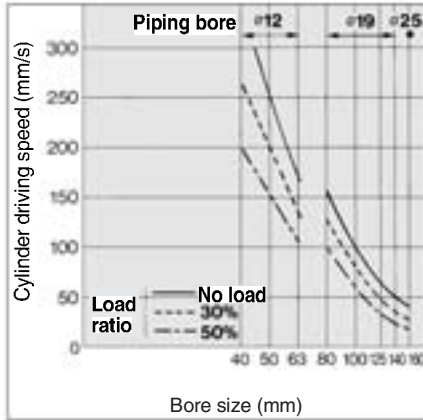
Circuit diagram



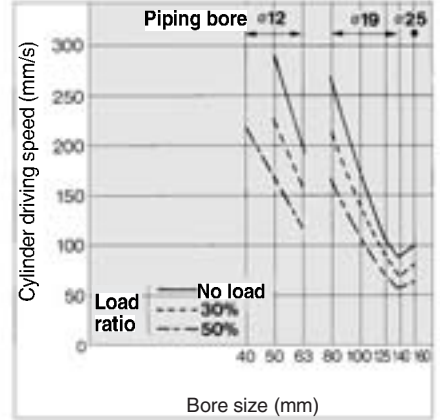
Maximum Driving Speed of Cylinders (Speed controller)

Conditions: Operating pressure — 0.5 MPa, Operating oil — Turbine oil Class 1 (ISO VG32), Piping length — 1 m

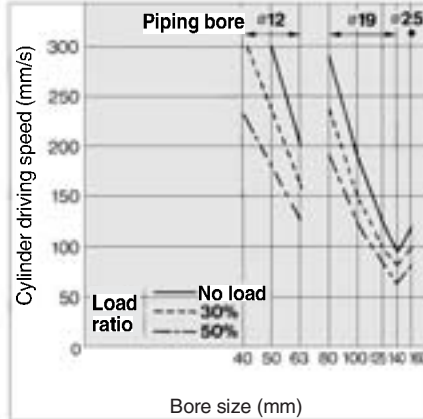
AS420-02/03/04



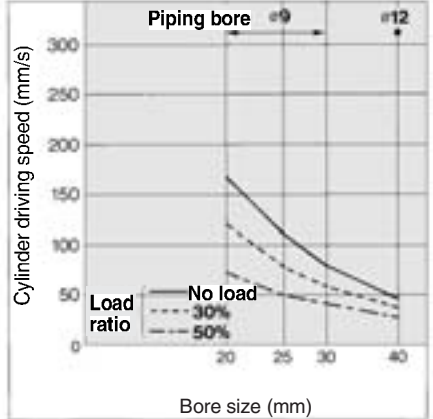
AS500-06



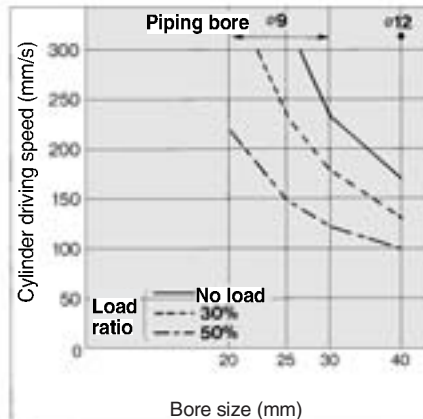
AS600-10



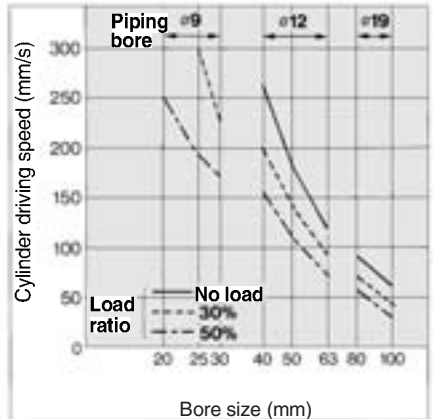
AS2000-01/02



AS3000-02/03



AS4000-02/03/04





Series CC Specific Product Precautions

Be sure to read before handling.

Air Supply

- A mist separator prevents the intermixing of drainage, preventing the air-hydro unit from malfunctioning, and prolonging the life of the oil.

Environment

- Avoid use near fire.
- It cannot be used in the clean room.

Mounting

- Install the converter vertically.
- Install the converter at a position that is higher than the cylinder. If placed lower than the cylinder, air accumulates in the cylinder. Use the air bleed valve on the cylinder to bleed the air. If the cylinder is not provided with an air bleed valve, loosen the hydraulic pipe to bleed.
- Leakage associated with the sliding movement inevitably occurs. In particular, with the single side hydro unit, the operating oil that leaks to the pneumatic side will be discharged from the switching valve, thus soiling the switching valve. Thus, install an exhaust cleaner (Series AMC). (Fig. (6))
When the oil case of the exhaust cleaner becomes full, operating oil will blow out of the exhaust cleaner. Therefore, open the drain valve on a regular basis.

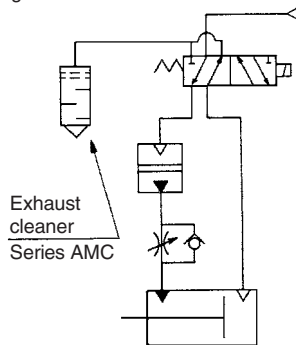


Fig. (6)

Piping

- Before connecting the pipes, remove any foreign matter.
- The (T Series W (white)) nylon tube can be used for hydraulic piping. Self-aligning fittings can be used for hydraulic piping, but one-touch fittings cannot be used.
- Make sure that there are no extreme differences in the bore of the pipes used for hydraulic piping. Also check for protrusions or burrs.
- Prevent air from being drawn into the hydraulic piping.
- When operating a stop valve or a skip valve with a solenoid valve, considering it is an external pilot, provide pneumatic piping with 0.3 to 0.7 MPa of air pressure. The pressure for the pilot must be set to the operating pressure of the cylinder or higher.
- When operating a stop valve or a skip valve with a solenoid valve, considering it is an external pilot, provide pneumatic piping with 0.3 to 0.7 MPa of air pressure. The pressure for the pilot must be set to the operating pressure of the cylinder or higher.
- The stop and skip valves must be "normally closed".

Piping

- Be aware that the specified speed might not be attained if there is restriction in the fittings or there are 90° bends.
- Air bubbles could form during operation due to cavitation. To prevent this:
 - 1) Configure the piping from the cylinder to the converter to have an ascending gradient.
 - 2) Shorten the hydraulic piping.
 - 3) Port position should not be vertically downward.

Maintenance

Double-side hydro

- Even as a double side hydro unit, leakage occurs with the sliding movement of the air-hydro cylinder, increasing the converter's operating fluid in one area and decreasing it in the other. Fig. (7) provides a countermeasure circuit. Maintain the converter's oil level at an appropriate level by opening valve A.

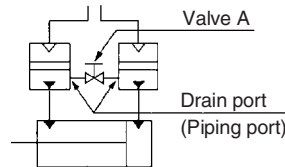


Fig. (7)

Single-side hydro

- The basic composition of the air-hydro system is the double side hydro; however, it can also be used as a single side hydro. The viscosity of the operating oil of the single side hydro is approximately one half of the double side hydro. The speed will be approximately 1.4 times the date given on page 10-17-3. When the system is used as a single side hydro, air could become intermixed with the operating oil, leading to the symptoms listed below:
 - 1) Cylinder's speed is not constant.
 - 2) Stopping accuracy of the stop valve decreases.
 - 3) Overrun of the skip valve increases.
 - 4) The flow control valve with pressure compensator knocks (even with a small flow rate).

Therefore, it is necessary to check periodically to prevent air from intermixing with the oil. If the symptoms described above occur, air must be bled. In particular, to prevent "4)", use a double side hydro.

Lubrication

If the converter is positioned higher than the cylinder:

1. Make sure to move the cylinder's piston to the stroke end of the side that will be filled with oil.
2. Open the air bleeder valve on top of the cylinder.
3. If equipped with a stop valve, provide a pilot pressure of approximately 0.2 MPa to the stop valve, and maintain the stop valve in an open position through manual operation or by applying current.
4. Open the oil filler plug to fill with oil. When air no longer comes out intermixed with oil, close the cylinder's air bleeder valve. Make sure that the oil level is near the upper limit mark on the level gauge, and replenish with oil if needed.
5. Next, fill the opposite side with oil. Move the piston to the stroke end of the side that will be filled with oil, and perform steps 1 through 4 in the same sequence as described above.

If the converter is positioned lower than the cylinder:

After filling with oil as described in step 4 above, close the oil filler plug. Then, introduce air pressure of approximately 0.05 MPa into the converter's air port to push the oil into the cylinder. When air no longer comes out intermixed with oil, close the cylinder's air bleeder valve. Perform the remaining steps in the same way as when the converter is located higher than the cylinder, in order to fill it with oil.
* This operation necessarily causes air to accumulate in the cylinder during the operation of the cylinder. Therefore, air must be bled on a regular basis.

Fluid (Hydraulic fluid)

Use petroleum based turbine hydraulic operating oil. The use of non-combustible operating oil could lead to problems. An appropriate viscosity is about 40 to 100 mm²/s at the operating temperature. Using ISO VG32 oil, the temperature range will be between 15 and 35°C. To operate in a temperature range that exceeds that of the ISO VG32 oil, use ISO VG46 (25 to 45°C).

Turbine oil of ISO VG32

(Example)

<No additive>

Idemitsu Kosan Co., Ltd.: Turbine oil 32

Nippon Mitsubishi Oil Corp.:

Turbine oil 32, Mitsubishi turbine 32

<Additive>

Idemitsu Kosan Co., Ltd.: Dufny turbine oil 32

Nippon Mitsubishi Oil Corp.:

FBK turbine 32, Diamond turbine oil 32

Series VNA/Process Valve

2 Port Valve For Compressed Air and Air-hydro Circuit Control

Related Equipment

Exclusively for air pressure system and air-hydro circuit control

Universal 2 Port Valve

Cylinder actuation by external pilot air

The balance poppet permits normal and reverse flow.

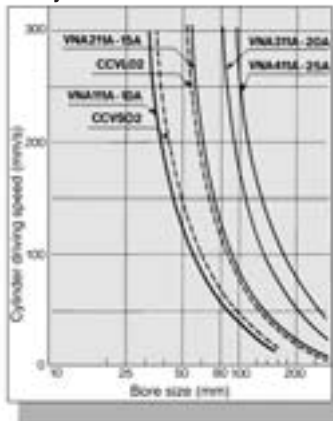
Operation from 0 MPa is possible.

Wide variations
N.C., N.O., C.O., types are available.
Threaded type from 6A to 50A is standardized.



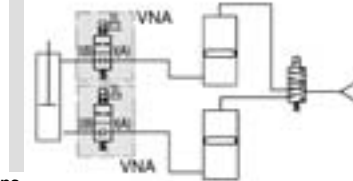
Air-hydro

Operation Capacity When Used in Air-hydro Units



This series can supplement the capacity of conventional air-hydro valve units. They are suited to operate large bore cylinders as well as to simultaneously operate multiple cylinders and suspend their operation. Thus they can be used in the same way as the conventional air-hydro units.

Air-hydro circuit: Application example Basic circuit



Conditions

Supply pressure	0.49 MPa	
Hydraulic fluid	ISO VG32	
Load	No load	
Piping length	1 m	
Piping diameter	VNA111A, CCVSO2	3/8B (9 mm)
	VNA211A, CCVLO2	1/2B (13 mm)
	VNA311A	3/4B (19 mm)
	VNA411A	1B (25 mm)

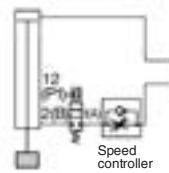
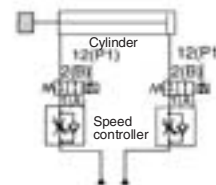


Refer to Best Pneumatics No. 7 for the details of valves.

Caution

When speed controller is mounted

Connect a speed controller (Series AS etc.) to A port (cast in body A) of VNA□11 (in order to protect the speed control valve from surges when cylinder operation is suspended, thus improving stopping accuracy).



Caution

Skip valve function

Combination of 2 or more valves of Series VNA provides a skip valve function. Connect the skip valve to the A port side of a stop valve as in the case of the speed control valve.

