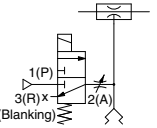
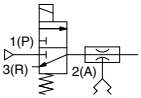
Vacuum System Peripherals:
Directional Control Valve

A guide for selecting the solenoid valve model to accommodate the system
An array of solenoid valves (2/3 port valve) for controlling the ejector/external vacuum supply system

How to read the chart

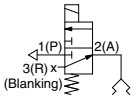
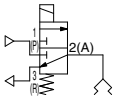
The solenoid valves are available in the following constructions: the standard product (for general use), the external pilot specification, and the vacuum specification. Select the optimal model in accordance with your circuit configuration and the effective area. For detailed specifications of these products, refer to the respective catalog that is available separately.

System	Ejector System					
	Vacuum release valve			Supply valve		
Circuit construction						
Solenoid valve / Valve construction	Standard	External pilot spec. (R)	Vacuum spec. (V)	Standard	External pilot spec. (R)	Vacuum spec. (V)
Compact 3 port solenoid valve **V100, SYJ** Compact size: 10 mm (V100, SYJ300) 15 mm (SYJ500) 18 mm (SYJ700) Low power consumption: 0.1 W — V100	●	–	–	●	–	–
SYJ300/500/700	–	●	–	–	●	–
3 port solenoid valve **VQZ** 10 mm: VQZ100 15 mm: VQZ200 18 mm: VQZ300 — VQZ100/200/300	–	●	–	–	●	–
3 port solenoid valve **VK** **VKF**	●	–	●	●	–	–
Compact 2 port solenoid valve **VX2**	●	–	●	●	–	–
Compact 3 port solenoid valve **VX31/32/33**	●	–	●	●	–	–
3 port solenoid valve **VT** VT307/317/325	●	–	●	●	–	–
3 port solenoid valve **VP** VP300/500/700	–	●	–	–	●	–
3 port solenoid valve **VG342**	–	●	–	–	●	–
Vacuum pilot 2 port valve **VNB□□□□V**	–	●	●	–	●	●
3 position valve **VEX3**	–	●	●	–	●	●
3/4 port solenoid valve **VQD** VQD1000/VQD100 — VQD1000	–	–	–	●	–	–
VQD100	–	–	●	●	–	●
Vacuum/release unit **VQD1000-V**	–	–	–	–	–	–
Vacuum release valve with throttle valve **SJ3A6**	–	●	–	–	●	–

Caution on Model Selection

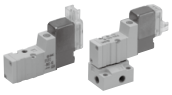
⚠ Caution

- Use a plug cap at R port of 2 port valve and 3 port valve for vacuum release valve and vacuum switching valve. (Except VEX3)
  1) Applications are different from vacuum holding valve.
  2) Refer to Best Pneumatics No. 1 for flow characteristics.

Vacuum Pump System							
Vacuum switching valve			Divider valve of vacuum supply air				
							
Standard	External pilot spec. (R)	Vacuum spec. (V)	Standard	External pilot spec. (R)	Vacuum spec. (V)	Port size	Best Pneumatics No.
●	–	–	●	–	–	M3 x 0.5 M5 x 0.8 1/8, 1/4	No.1
–	●	–	–	●	–		
–	●	–	–	●	–	M5 x 0.8 1/8, 1/4	No.1
–	–	●	–	–	●	M5 x 0.8 1/8	No.1
●	–	●	–	–	–	1/8 to 3/8	No.7
●	–	●	●	–	●	1/8 to 3/8	No.7
–	–	●	–	–	●	1/8 to 3/8	No.1
–	●	–	–	●	–	1/8 to 1/2	No.1
–	●	–	–	●	–	1/2 to 3/4 1	No.1
–	●	●	–	●	●	3/8 to 2	No.7
–	●	●	–	●	●	1/8 to 1/2	No.1
–	–	●	–	–	●	M5 x 0.8	No.1
–	–	●	–	–	●		
–	–	–	●	–	–	M5 x 0.8	No.1
–	●	–	–	●	–	M5 x 0.8	No.1

Vacuum System Peripherals:
Directional Control Valve/Solenoid Valve

Compact 3 Port Solenoid Valve V100, SYJ



Body ported Base mounted

Possible to use with vacuum up to at –100 kPa
Compact size: Width 10 mm (V100, SYJ300)
Width 15 mm (SYJ500)
Width 18 mm (SYJ700)
Low power consumption 0.1W (With energy saving circuit)

Refer to Best Pneumatics No. 1 for details.

Model

Piping specifications	Solenoid valve	Port size
Body ported	**SYJ312/322**	M3 x 0.5
	SYJ512/522	M5 x 0.8
	SYJ712/722	1/8
Base mounted (With sub-plate)	**V114/124 (A)**	M5 x 0.8
	SYJ314/324	M5 x 0.8
	SYJ514/524	1/8
	SYJ714/724	1/8, 1/4

3 Port Solenoid Valve VK

Body ported Base mounted

Compact size: Width 18 mm
Possible to use with vacuum

Refer to Best Pneumatics No. 1 for details.

Model

Piping specifications	Solenoid valve	Port size
Body ported	**VK332**	M5 x 0.8
	For vacuum:VK332V *	M5 x 0.8
Base mounted (With sub-plate)	**VK334**	1/8
	For vacuum:VK334V *	1/8

* Vacuum specification: Operating pressure range –101.2 kPa to 0.1 MPa
* Low wattage style (2 W DC) and long period energized style available.

Compact 2 Port Solenoid Valve Series VX2 For Medium Vacuum

Refer to Best Pneumatics No. 7 for details.

Model

Size	Port size	Orifice dia. (mm ø)	Model
1	1/8, 1/4	2	**VX214**
		3	
		5	
2	1/4, 3/8	4	**VX224**
		7	
3	1/4, 3/8	5	**VX234**
		8	
		10	
	1/2	10	

3 Port Solenoid Valve VQZ100/200/300

Base mounted

Refer to Best Pneumatics No. 1 for details.

Model/Metal Seal, Rubber Seal

Piping specifications	Solenoid valve		Port size
Base mounted (With sub-plate)	**VQZ100**	**VQZ115**	1/8
	VQZ 200	**VQZ215**	1/8, 1/4
		VQZ235	
		VQZ225	
		VQZ245	
	VQZ 300	**VQZ315**	1/4, 3/8
		VQZ335	
		VQZ325	
		VQZ345	

3 Port Solenoid Valve VKF

Body ported Base mounted

Compact size: Width 18 mm
Possible to use with vacuum

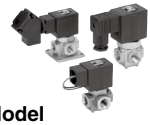
Refer to Best Pneumatics No. 1 for details.

Model

Piping specifications	Solenoid valve	Port size
Body ported	**VKF332**	M5 x 0.8
	For vacuum:VKF332V *	M5 x 0.8
Base mounted (With sub-plate)	**VKF334**	1/8
	For vacuum:VKF334V *	1/8

* Vacuum specification: Operating pressure range –101.2 kPa to 0.1 MPa
* Low wattage style (2 W DC) and long period energized style available.

Compact 3 Port Solenoid Valve Series VX3 Options V & M For Medium Vacuum, Non Leakage



Refer to Best Pneumatics No. 7 for details.

Model

Size	Port size	Orifice dia. (mm ø)	Model
1	1/8, 1/4	1.5	**VX31□□$^{M}_{V}$**
		2.2	
		3	
2	1/4, 3/8	2.2	**VX32□□$^{M}_{V}$**
		3	
		4	
3	1/4, 3/8	2.2	**VX33□□$^{M}_{V}$**
		3	
		4	

For Vacuum Pad

Model	Port size Rc	Orifice dia. (ø)	
		Pressurised side	Vacuum side
VXV313□	1/8, 1/4	1.5	3
VXV324□	1/4, 3/8	2.2	4
VXV334□		2.2	4

3 Port Solenoid Valve VT, VP


VP542


VT317


VT325

Refer to Best Pneumatics No. 1 for details.

Model/Rubber Seal

Piping specifications	Solenoid valve	Port size
Body ported	**VT325(V)**	1/4, 3/8
	VT307(V)∗	1/8, 1/4
	VT317(V)∗∗	1/4
Body ported	**VP342**	1/8, 1/4
	VP542	1/4, 3/8
	VP742	3/8, 1/2
Base mounted	**VP344**	1/8, 1/4
	VP544	1/4, 3/8
	VP744	3/8, 1/2
Body ported	**VP3145**	3/8, 1/2, 3/4
	VP3165	3/4, 1, 1 1/4
	VP3185	1 1/4, 1 1/2, 2

∗ Low wattage (2 W DC) type and long period energized type available.
∗∗ Long period energized type available.
V: Vacuum specification: Operating pressure range –101.2 kPa to 0.1 MPa

3 Port Solenoid Valve VG342


VG342

Model/Rubber Seal

Piping specifications	Solenoid valve	Port size
Body ported	**VG342**	1/2 to 3/4
		1
	For Vacuum: VG342R ∗	1/2 to 3/4
		1

∗ Operating pressure range: –101.2 kPa to 0.9 MPa

Refer to Best Pneumatics No. 1 for details.

Vacuum Pilot 2 Port Valve VNB□□□□V

It is used when the valve is to be operated by the main vacuum in the absence of pressurized air.

Refer to Best Pneumatics No. 7 for details.

Specifications (Vacuum pilot)

Fluid	Vacuum
Operating pressure range	–101 kPa to atmospheric pressure
Pilot pressure range	–101 to –47.9 kPa

Model

Model	Port size Screw-in	Orifice dia ø [mm]
VNB2□4□-10A	3/8	11
VNB2□□□-10A		15
VNB2□4□-15A	1/2	11
VNB2□□□-15A		15
VNB3□4□-20A	3/4	14
VNB3□□□-20A		20

Model	Port size		Orifice dia ø [mm]
	Screw-in	Flange	
VNB4□4□-25A	1	–	16
VNB4□□□-25A			25
VNB5□4□-32A	1 1/4	–	22
VNB5□□□-32A			32
VNB5□4□-32F	–	32	22
VNB5□□□-32F			32
VNB6□4□-40A	1 1/2	–	28
VNB6□□□-40A			40
VNB6□4□-40F	–	40	28
VNB6□□□-40F			40
VNB7□4□-50A	2	–	33
VNB7□□□-50A			50
VNB7□4□-50F	–	50	33
VNB7□□□-50F			50

3 Position Valve VEX3

Refer to Best Pneumatics No. 1 for details.


Air operated type


Internal/External pilot solenoid type

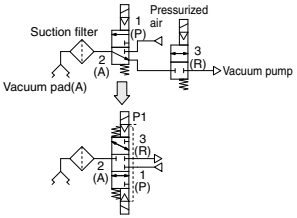
Vacuum suction and release

The 3 port, 3 position double solenoid that permits vacuum suction, release, and suspension (closed) is ideal for a system where many valves are used for a single circuit.

Model

Model		Port size
Body ported	**VEX312□-01**	1/8
	VEX312□-02	1/4
	VEX332□-02	1/4
	VEX332□-03	3/8
	VEX332□-04	1/2
	VEX350□-04	1/2
Base mounted (With sub-plate)	**VEX322□-01**	1/8
	VEX322□-02	1/4
	VEX342□-02	1/4
	VEX342□-03	3/8
	VEX342□-04	1/2

Model		Port size
Body ported	**VEX350□-06**	3/4
	VEX350□-10	1
	VEX370□-10	1
	VEX370□-12	1 1/4
	VEX390□-14	1 1/2
	VEX390□-20	2



- **Sequential switching operation prevents the inflow of pressurized air into the vacuum pump system.**

⚠Caution

- **To maintain the vacuum of port A via the closed center, be aware that the vacuum could be decreased due to leakage from the vacuum pad and the piping. Furthermore, it cannot be used as an emergency cutoff valve.**

3/4 Port Solenoid Valve VQD

Unprecedented high speed, with stable response times (ON: 4 ms, OFF: 2 ms, Dispersion accuracy ±1 ms) Available in vacuum applications (Up to –101.2 kPa)

Base mounted

Body ported

Model

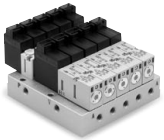
Refer to Best Pneumatics No. 1 for details.

Piping specifications	Solenoid valve		Port size
Body ported	VQD1000	VQD1121	M3 x 0.5
Base mounted (With sub-plate)		VQD1151	
		VQD1251	
	VQD100	VQD115	

∗ Operating pressure range: 0 to 0.7 MPa for standard products, - 101.2 kPa to 0.7 MPa for vacuum specification

Vacuum/Release Unit VQD1000-V

- **Response speed**
  13 msec (at 500 mm∗)/
  18.5 msec (at 1000 mm∗)
  ∗ Distance from a unit to a workpiece (Piping I.D. ø2.5)
- **Smooth removal of workpiece without overshoot**
  No blow off of workpiece by release air
- **No need to adjust the timing for switch-over vacuum and positive pressure.**
  (Single signal control)
- **No need to set a restriction circuit for release air**



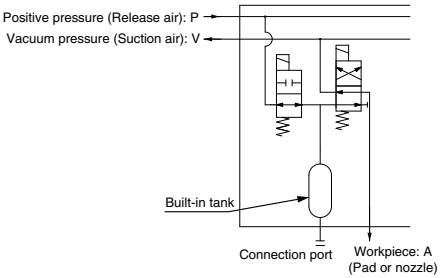
Specifications

Refer to Best Pneumatics No. 1 for details.

Valve construction			Direct operated poppet
Fluid			Air, Inert gas/Compatible with low ozone
Operating pressure range	Suction (Negative pressure)		0 to –100 kPa
	Release (Positive pressure)		0 to 0.7 MPa
Response time Note)	N.O. specifications	Suction (OFF)	2 ±1 msec
		Release (ON)	4 ±1 msec
	N.C. specifications	Suction (ON)	4 ±1 msec
		Release (OFF)	2 ±1 msec

Note) Based on JIS B 8375-1981 (Use clean air).

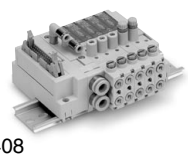
<N.O. specifications> 10-VQ110 (For filling release air) VQD1151W (For switch-over)

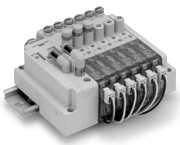


Vacuum Release Valve with Throttle Valve SJ3A6

2 spool valves included.
Possible to control vacuum adsorption and release by a valve.

- Current consumption 0.15 W (With energy saving circuit)
- Width 10 mm (Same as Series SJ3000)
- With throttle valve that can control the flow rate of release air
- Replaceable filters are built in the vacuum side and release side respectively
- With a pressure detection port that enables users to connect a pressure switch, etc.
- Can be mounted with a 4 port solenoid valve SJ2000/3000 (Made to Order). (Please contact SMC for details.)
- Possible to switch pressure of two wiring systems by applying different positive pressures to 1 (P) port and 3/5 (E). (In this case, flow rate is adjustable only at the P port side.)





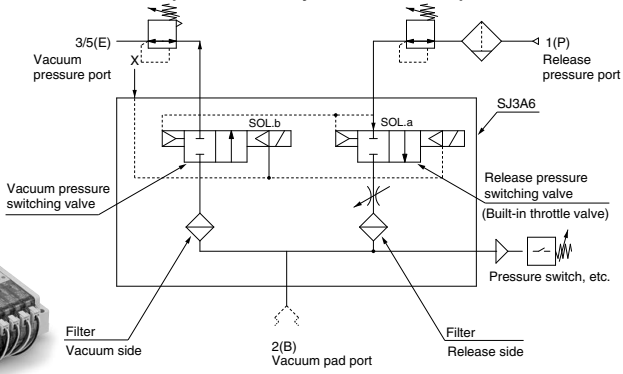
Specifications

Refer to Best Pneumatics No. 1 for details.

Valve construction		3 position, 3 port valve with throttle valve
Fluid		Air
Operating pressure range MPa	Release pressure port 1 (P)	0.25 to 0.7
	Vacuum pressure port 3/5 (E)	–100 kPa to 0.7 (1)
	Pilot X port	0.25 to 0.7 (2)

Note 1) Can be used with positive pressure depending on applications.
Note 2) Pressure of the pilot X port must be the same as that of the release port 1 (P) or more.

Adsorption Transfer System Circuit Example



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