

Plug-in-type block manifolds
Pilot operated 3, 5-port valve

TVG1/TVG2 Series

Manifold common specifications

Item			Description
Manifold			Block manifold
Mounting method			Direct mounting
Air supply and exhaust method			Common supply/Common exhaust (With internal exhaust check valve)
Pilot exhaust method			Main valve/pilot valve common exhaust
Internal pilot		(*5)	(Pilot exhaust check valve built-in)
Piping direction			Side direction of base
Valve and operation			Pilot operated soft spool valve
Working fluid			Compressed air
Max. working pressure		MPa	0.7
Internal pilot Minimum working pressure	2-position double	MPa	0.1 (*7)
	2-position single, 3-position		0.2
	3-port valve Two valves integrated		0.2
External pilot min. working pressure		kPa	-100 (Pilot pressure at 0.2MPa or more)
Proof pressure		MPa	1.05
Ambient temperature		°C	−5 to 55 (no freezing)
Fluid temperature		°C	5 to 55
Manual override			Non-locking/Locking common (standard)
Lubrication		(*1)	Not required
Degree of protection		(*2)	IP65, IP67
Vibration resistance		m/s^2	50 or less
Shock resistance		m/s^2	300 or less
Atmosphere			Cannot be used in corrosive gas environments

Electrical specifications

Item		Common terminal block EA1□	Serial transmission JA□□, JB□□
Rated voltage V		24 DC	24 DC
Voltage fluctuation range (*3)		±10%	+10%, -5%
Holding current A	Standard	0.017	
	With low exoergic/energy circuit	0.005	
Power consumption W	Standard	0.4	
	With low exoergic/energy circuit	0.1	
Thermal class		B	
Surge suppressor (*4)		Zener diode	
Indicator		LED	

*1: Use turbine oil Class 1 ISO VG32 for lubrication. Excessive or intermittent lubrication results in unstable operation.
*2: Tested according to the test method for IP65 and IP67 (IEC 60529: 2001) standards. Refer to page 144 for details.
*3: As the voltage drop occurs depending on the internal circuit of the serial transmission, pay attention to the voltage fluctuation range.
*4: If low exoergic/energy circuit or surgeless types are selected, then it will be a diode.
*5: The pilot exhaust method differs with the supply and exhaust block specification. Refer to page 48 for details.
*6: Select the external pilot when using at low vacuum. Refer to page 146 for details.
*7: At 0.2MPa with low exoergic/energy circuit.

Individual specifications

Item			TVG1 Common terminal block EA1□	TVG1 Serial transmission JA□□, JB□□	TVG2 Common terminal block EA1□	TVG2 Serial transmission JA□□, JB□□
Max. station No.	Standard wiring (double wiring)		10 stations	16 stations	10 stations	16 stations
	Single solenoid, double solenoid layout specification (Single wiring)		20 stations	24 stations	20 stations	24 stations
Max. number of solenoids			20 points	32 points	20 points	32 points
Port size	Metric fitting	Port A/B	Push-in fitting ø1.8, ø4, ø6		Push-in fitting ø4, ø6, ø8	
		Port P/R	Push-in fitting ø8		Push-in fitting ø10	
	Inch fitting	Port A/B	Push-in fitting ø1/8", ø5/32"		Push-in fitting ø1/4", ø5/16"	
		Port P/R	Push-in fitting ø5/16"		Push-in fitting ø3/8"	

Performance/characteristics by model

Item	Solenoid position		TVG1 at ON	TVG1 at OFF	TVG2 at ON	TVG2 at OFF
Response time ms	Two 3-port valves integrated		15	25	20	37
	2-position	Single	15	20	22	24
		Double	15	15	26	26
	3-position		20	30	25	35

The response times are values with supply pressure of 0.5 MPa at 20°C and without lubrication. They depend on the pressure and the lubricant quality.

Flow characteristics

Model No.	Solenoid position		P ➡ A/B C [dm^3/(s·bar)]	P ➡ A/B b	A/B ➡ R C [dm^3/(s·bar)]	A/B ➡ R b
TVG1	Two 3-port valves integrated		0.77	0.37	1.1 (0.56)	0.34 (0.37)
	2-position		1.0	0.29	1.2 (0.59)	0.36 (0.41)
	3-position	All ports closed	0.96	0.33	1.0 –	0.35 –
		ABR connection	0.96	0.32	1.3 (0.60)	0.38 (0.40)
		PAB connection	1.1	0.35	1.0 –	0.36 –
TVG2	Two 3-port valves integrated		1.7	0.44	2.2 (1.8)	0.43 (0.20)
	2-position		2.4	0.32	2.8 (2.0)	0.34 (0.19)
	3-position	All ports closed	2.2	0.35	2.5 –	0.38 –
		ABR connection	2.2	0.32	2.9 (2.1)	0.40 (0.21)
		PAB connection	2.6	0.34	2.5 –	0.37 –

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 × C.
*2: Values in ( ) are with the exhaust check valve.

Reduced wiring specifications

* PNP specifications are Special-order product.

Item	EA1A	EA1B
Type	Common terminal block M3 thread	Common terminal block M3 thread
Output	NPN (plus common)	PNP (minus common)

Specifications of serial transmission device units (Refer to page 136 for the PLC compatibility table.)

* PNP specifications are Special-order product.

Item		JA1C	JA1D	JA2C	JA2D	JA3C	JA3D	JA4C	JA4D	JA5C	JA5D	JA6C	JA6D
Communication protocol		DeviceNet		CC-Link Ver.1.10		EtherCAT		EtherNet/IP		CC-Link IEF Basic		PROFINET	
Power supply voltage	Unit side	11 to 25 VDC*		24 VDC ±10%									
	Valve side	24 VDC±10%, -5%											
Current consumption	Unit side	50 mA or less (all points ON: at 24 VDC)				90 mA or less (all points ON: at 24 VDC)							
	Valve side	15 mA or less (excluding load current)											
No. of output points		32 points											
Occupied number		4 bytes		1 station									
Operation display		LED (power supply and communication status)											
Output		NPN (Plus common)	PNP (Minus common)	NPN (Plus common)	PNP (Minus common)	NPN (Plus common)	PNP (Minus common)	NPN (Plus common)	PNP (Minus common)	NPN (Plus common)	PNP (Minus common)	NPN (Plus common)	PNP (Minus common)

* Indicates the voltage range of the communication power supply.

Item		JA7C	JA7D	JA8C	JA8D	JA9C	JA9D	JA9G	JA9H	JB1C	JB1D
Communication protocol		CC-Link IE Field		CC-Link IE TSN		IO-Link				IO-Link Wireless	
Power supply voltage	Unit side	24 VDC ±10%				18 to 30 VDC				24 VDC ±10%	
	Valve side	24 VDC±10%, -5%									
Current consumption	Unit side	100 mA or less (all points ON: at 24 VDC)				50 mA or less (all points ON: at 24 VDC)				35 mA or less (All points ON: at 24 VDC)	
	Valve side	15 mA or less (excluding load current)									
No. of output points		32 points									
Occupied number		1 station									
Operation display		LED (power supply and communication status)									
Output		NPN (Plus common)	PNP (Minus common)	NPN (Plus common)	PNP (Minus common)	NPN (Plus common)	PNP (Minus common)	NPN (Plus common)	PNP (Minus common)	NPN (Plus common)	PNP (Minus common)

How to order

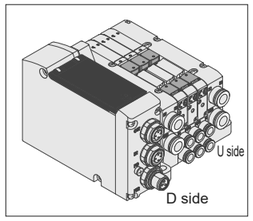
Manifold with solenoid valve

10 mm width (valve width)

Option

TVG1M - 1 B 06CS 3 JA4C - 06 U - HP1

- TVG1M: Model No.
- 1: ❶ Solenoid position
- B: ❷ Piping direction
- 06CS: ❸ Port size
- 3: ❹ Voltage
- JA4C: ❺ Electrical connections
- 06: ❻ Station No.
- U: ❼ Port P/R position
- ❽ Wiring method inside the base
- ❿ Electric circuit specifications
- ⓬ Ozone/coolant proof
- ⓮ Exhaust check valve
- HP1: ⓯ Port A/B filter



❶ Solenoid position

1	2-position single	
2	2-position double	
3	3-position all ports closed	
4	3-position ABR connection	
5	3-position PAB connection	
X	Mix manifold	
A	Two 3-port valves integrated*1	A valve side: Normally closed/B valve side: Normally closed
B		A valve side: Normally open/B valve side: Normally open
C		A valve side: Normally closed/B valve side: Normally open

*1: Only compatible with internal pilot. Dimensions is the same as the 2-position double.

❷ Piping direction

B	Side piping

❸ Port size (port A/B)

• Metric fitting

	0ACS	ø1.8 push-in fitting (compatible tube UP-9402-**)	
	04CS	ø4 push-in fitting	
	06CS	ø6 push-in fitting	
	0ACU	L-type upward	ø1.8 push-in fitting (compatible tube UP-9402-**)
	04CU		ø4 push-in fitting
	06CU	*2	ø6 push-in fitting
	0ACD	L-type downward	ø1.8 push-in fitting (compatible tube UP-9402-**)
	04CD		ø4 push-in fitting
	06CD		ø6 push-in fitting
*3	99CX	Push-in fitting mix	

*1 Single side plug specs	Port A	Port B
0ACA	ø1.8 push-in fitting (compatible tube UP-9402-**)	Plug
04CA	ø4 push-in fitting	
06CA	ø6 push-in fitting	
0ACF	Plug	ø1.8 push-in fitting (compatible tube UP-9402-**)
04CF		ø4 push-in fitting
06CF		ø6 push-in fitting
0ACB	L-type upward *2 ø1.8 push-in fitting (compatible tube UP-9402-**)	Plug
04CB	ø4 push-in fitting	
06CB	ø6 push-in fitting	
0ACG	Plug	L-type Upward *2 ø1.8 push-in fitting (compatible tube UP-9402-**)
04CG		ø4 push-in fitting
06CG		ø6 push-in fitting
0ACC	L-type Downward ø1.8 push-in fitting (compatible tube UP-9402-**)	Plug
04CC	ø4 push-in fitting	
06CC	ø6 push-in fitting	
0ACH	Plug	L-type Downward ø1.8 push-in fitting (compatible tube UP-9402-**)
04CH		ø4 push-in fitting
06CH		ø6 push-in fitting

• Inch fitting

	03LS	ø1/8" push-in fitting	
	04LS	ø5/32" push-in fitting	
*4	03LU	L-type upward *2	ø1/8" push-in fitting
*4	04LU		ø5/32" push-in fitting
*3	99LX	Push-in fitting mix	

*1 Single side plug specs	Port A	Port B
03LA	ø1/8" push-in fitting	Plug
04LA	ø5/32" push-in fitting	
03LF	Plug	ø1/8" push-in fitting
04LF		ø5/32" push-in fitting
*4 03LB	L-type upward *2 ø1/8" push-in fitting	Plug
*4 04LB	ø5/32" push-in fitting	
*4 03LG	Plug	L-type upward *2 ø1/8" push-in fitting
*4 04LG		ø5/32" push-in fitting

❹ Voltage

3	24 VDC

❺ Electrical connections * PNP specifications are Special-order product.

• Reduced wiring connection

Common terminal block (M3 thread)	NPN	EA1A
	PNP	EA1B



• Serial transmission

Communication protocol		Output	No. of output points	Code
DeviceNet		NPN	32 points	JA1C
		PNP		JA1D
CC-LINK		NPN		JA2C
		PNP		JA2D
EtherCAT		NPN		JA3C
		PNP		JA3D
EtherNet/IP		NPN		JA4C
		PNP		JA4D
CC-Link IEF Basic		NPN		JA5C
		PNP		JA5D
PROFINET		NPN		JA6C
		PNP		JA6D
CC-Link IE Field		NPN		JA7C
		PNP		JA7D
CC-Link IE TSN		NPN		JA8C
		PNP		JA8D
IO-Link	Class A	NPN		JA9C
		PNP		JA9D
	Class B	NPN		JA9G
		PNP		JA9H
IO-Link Wireless		NPN		JB1C
		PNP		JB1D



*1: Ports A and B with one side plug specifications are available for 2-position single only.
*2: 3-position is not available for L-type upward push-in fittings.
*3: Port size mixtures of ports 4(A) and 2(B) are not available.
*4: Special-order product.

Specifications for rechargeable battery (Refer to page 80 for details.)

● For use in the rechargeable battery manufacturing process, materials used for air path and sliding section are limited

** - ** - ** - P4

❻ Station No.

	02	2 stations
	to	to
*1	24	24 stations (Max. □20 stations for EA1)

*1: EA1 □has up to 20 solenoid points.

❼ Port P/R position * Multiple selection is not possible.

	U	U side	
	D	D side	
	B	U side, D side	
*2	T	U side, D side, With intermediate supply and exhaust block	

*1: Fittings of port P/R are for the same direction as those of port A/B.
*2: Specify the specifications of the intermediate supply and exhaust block in the manifold specifications sheet.

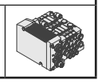
❽ Wiring method inside the base *1

Blank	Double wiring
S	Single solenoid, double solenoid layout specification

*1: Blank = Double solenoid wiring regardless of the type of valve used. If a single solenoid is mounted, an empty number for one solenoid will be generated. Refer to page 141 for details.

❾ Pilot operated

Blank	Internal pilot	
K	External pilot	



❿ Electric circuit specifications

* Multiple selection is not possible.

Blank	With surge suppressor and indicator lamp
E1	Low exoergic/energy circuit (surgeless specifications)
E2	Surgeless

*1: E1 is not compatible with PNP specifications.

⓫ Manual override

* Multiple selection is not possible.

Blank	Locking/Non-locking common, with misoperation prevention cover	
M1	Non-locking, with misoperation prevention cover	
M2	Locking/Non-locking common, tool operated, without cover	
M3	Non-locking, tool operated, without cover	

⓬ Ozone/Coolant proof

Blank	Standard specifications
A	Ozone/Coolant proof (main valve fluorine specification)

⓭ With/Without spacer

Blank	Without spacer
Z	With spacer (Type and location are specified in the MF specifications sheet)

*1: Specify the spacer type and mounting position in manifold specifications sheet. Stacking of spacers is not possible. Combination with the blanking plate is not supported. Cannot be selected together with L-type upward push-in fitting.

⓮ Exhaust check valve

Blank	None	
*1 H	With exhaust check valve	

*1: ❶Solenoid positions "3" and "5" cannot be selected. Refer to page 147 for details on the type with exhaust check valve.
*2: Specify the number of stations to install in the manifold specifications sheet.

⓯ Port A/B filter

Blank	None	
F	Port A/B filter built in	

*1: A filter is built into port P.