Standard system table

1. Common exhaust

Series	Solenoid valve port size	System No.	Speed Controller	Cylinder piping Pipe length 1 m	Common exhaust piping	Composite effective sectional area (mm²)
TVG1	C4	A1	SC3W-M5-4	ø4 x ø2.5	ø8 × ø6×3m	1.0
	C6	A2	SC3W-6-6	ø6 x ø4	ø8 × ø6×3m	2.7
	C6	A3	SC1-8	ø6 x ø4	ø8 × ø6×3m	3.8
TVG2	C6	B1	SC1-8	ø6 x ø4	ø10× ø7.5×3m	4.9
	C8	B2	SC1-8	ø8 x ø6	ø10× ø7.5×3m	7.5
	C10	B3	SC1-10	ø10 x ø7.5	ø10× ø7.5×3m	9.3

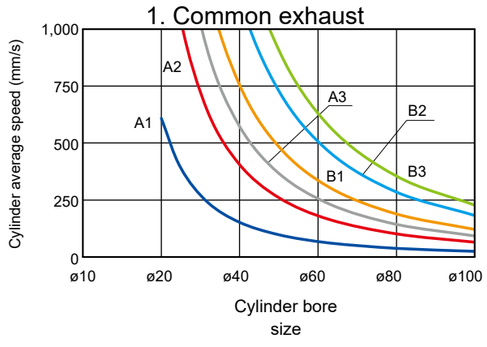
2. Atmospheric release exhaust (silencer integrated)

Series	Solenoid valve port size	System No.	Speed Controller	Cylinder piping Pipe length 1 m	End supply and exhaust block	Composite effective sectional area (mm²)
TVG1	T1 2	T1 2	SC3W-M5-4	ø4 x ø2.5	TVG1P-EB-08CS-X	1.0
	C6	A5	SC3W-6-6	ø6 x ø4		2.8
	C6	A6	SC1-8	ø6 x ø4		4.1
TVG2	C6	B4	SC1-8	ø6 x ø4	TVG2P-EB-10CS-X	5.1
	C8	B5	SC1-8	ø8 x ø6		8.2
	C10	T1 2	SC1-10	ø10 x ø7.5		10.8

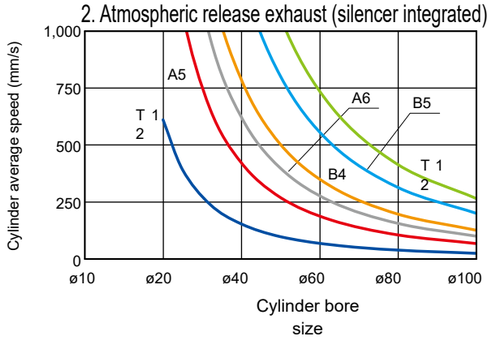
3. Exhaust with silencer

Series	Solenoid valve port size	System No.	Speed Controller	Cylinder piping Pipe length 1 m	Silencer	Composite effective sectional area (mm²)
TVG1	C4	A7	SC3W-M5-4	ø4 x ø2.5	SLW-H8	1.0
	C6	A8	SC3W-6-6	ø6 x ø4		2.6
	C6	A9	SC1-8	ø6 x ø4		3.7
TVG2	C6	B7	SC1-8	ø6 x ø4	SLW-H10	4.9
	C8	B8	SC1-8	ø8 x ø6		7.4
	C10	B9	SC1-10	ø10 x ø7.5		9.2

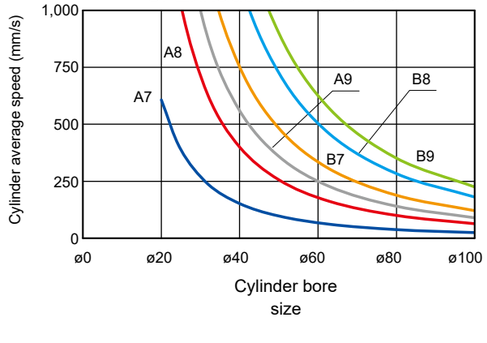
1. Common exhaust



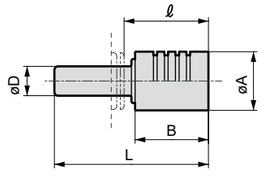
2. Atmospheric release exhaust (silencer integrated)



3. Exhaust with silencer



●Silencer



Model No.	D	L	A	B	ℓ
SLW-H8	ø8	42	16	20	23
SLW-H10	ø10	53	20	27	31.5

Device selection guide is used to select the optimum model at a glance.

● Fluid control components selection

Whether the cylinder bore size and cylinder being used are driven with relative high or low speed is determined as a condition. Using the table shown below as a reference, select the theoretical reference speed of the cylinder.

Degree of cylinder speed	Theoretical reference speed (mm/s)
Low speed	250
Medium speed	500
High speed	750
Ultra high speed	1,000

Components selection guide 1 table (P. 141) Select the equivalent bore size of cylinder tube and the proper standard system No. corresponding to theoretical reference speed.

● Theoretical reference speed: Indicates the degree of cylinder speed, expressed as the following formula. (This value matches speed with no load. When load is applied, speed drops considerably.)

$$vo=1920\times\frac{S}{A}=2445\times\frac{S}{D^2} \quad \text{——————} \quad (1)$$

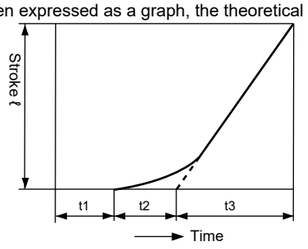
vo: Theoretical reference speed (mm/s)

(A) Cylinder sectional area (cm^2)

S: Composite effective cross-sectional area of circuit (exhaust air side) (mm^2)

D: Cylinder bore size (cm)

When expressed as a graph, the theoretical reference speed is the speed within the range where the cylinder moves at a uniform speed:



$$vo=\frac{\ell}{t3}\ (mm/s)$$

t1: Time until movement starts

t2: Time of primary delay

t3: Operating time with constant velocity

ℓ Stroke

● Note: t1 and t2 differ depending on load. Can be effectively ignored with no load.

● Required flow rate: Instantaneous flow rate for operating a cylinder with velocity vo, expressed with the following formula. Values in the table are when P = 0.5 MPa. The required flow rate is a value necessary to select clean air system components.

$$Q=\frac{Avo\ (P+0.101)\times 60}{0.101\times 104} \quad \text{——————} \quad (2)$$

Q: Required flow rate (ℓ/min) (ANR)

P: Supply Pressure (MPa)

● Required effective sectional area: Composite effective cross-sectional area for the exhaust circuit required for moving the cylinder at speed vo. (Composite effective cross-sectional area of solenoid valve, speed controller, silencer or piping) The ratio of the effective cross-sectional area S and sonic conductance C is S≈5.0×C.

● Proper standard system: The most appropriate combination of solenoid valve, speed controller, silencer and bore size for operating a cylinder with velocity vo. The combination in the table is for a pipe length of 1 m.

Expressed as follows using practical units.

$\frac{P_2+0.1}{P_1+0.1}$ When ≤ b, Choked flow

$$Q=600\times C(P_1+0.1)\sqrt{\frac{293}{273+t}} \quad .....(1)$$

$\frac{P_2+0.1}{P_1+0.1}$ When > b, subsonic flow

$$Q=600\times C\ (P_1+0.1)\sqrt{1-\left(\frac{\frac{P_2+0.1}{P_1+0.1}-b}{1-b}\right)^2}\sqrt{\frac{293}{273+t}} \quad .....(2)$$

Q: Air flow rate [dm^3/min(ANR)], SI unit dm^3 (cubic decimeter) can also be expressed with ℓ (liter). 1 dm^3 = 1 ℓ

C: Sonic conductance [dm^3/(s/bar)]

b: Critical pressure ratio [−]

P1: Upstream pressure [MPa]

P2: Downstream pressure [MPa]

t: Temperature [°C]

When calculating using the effective area S, substitute the value C obtained from C = S/5 into the above formula.

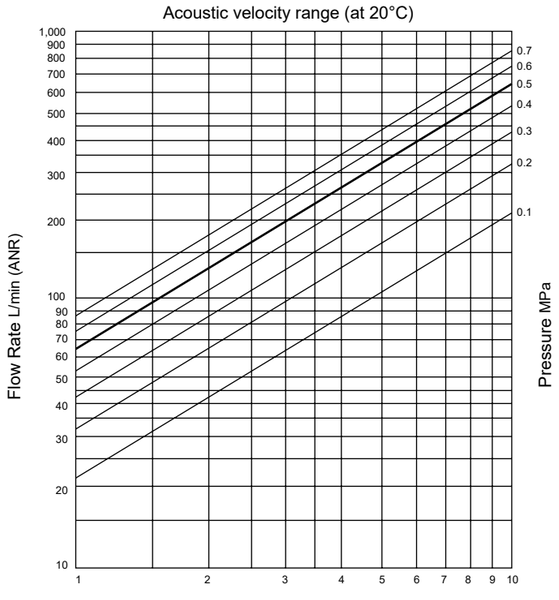
For subsonic flow, substitute b = 0.5 into formula (2).

TVG Series [Components Selection Guide]

Cylinder Bore size (mm)	Theoretical reference Speed (mm/s)	Required flow rate (L/min)(ANR)	Required effective Cross-sectional area (mm^2)	Proper standard system No.		
				1. Common exhaust	2. Atmospheric release exhaust	3. Exhaust with silencer
ø6	(500)	–	(0.1)	A1	A4	A7
ø10	500	–	(0.2)	A1	A4	A7
ø16	(500)	–	(0.5)	A1	A4	A7
ø20	250	28	0.4	A1	A4	A7
	500	56	0.8	A1	A4	A7
	750	84	1.2	A2	A5	A8
	1,000	110	1.6	A2	A5	A8
ø25	250	44	0.6	A1	A4	A7
	500	88	1.3	A2	A5	A8
	750	130	1.9	A2	A5	A8
	1,000	180	2.6	A2	A5	A8
ø32	250	72	1.0	A2	A5	A8
	500	140	2.1	A2	A5	A8
	750	220	3.1	A3	A6	A9
	1,000	290	4.2	B1	B4	B7
ø40	250	110	1.6	A2	A5	A8
	500	220	3.3	A3	A6	A9
	750	340	4.9	B1	B4	B7
	1,000	450	6.5	B2	B5	B8
ø50	250	180	2.6	A2	A5	A8
	500	350	5.1	B2	B4	B8
	750	530	7.7	B3	B5	B9
	1,000	700	10.2	–	B6	–
ø63	250	280	4.1	B1	A6	B7
	500	560	8.1	B3	B5	B9
	750	830	12.2	–	–	–
	1,000	1.100	16.2	–	–	–
ø80	250	450	6.5	B2	B5	B8
	500	900	13.1	–	–	–
	750	1,300	19.6	–	–	–
	1,000	1,800	26.2	–	–	–
ø100	250	700	10.2	–	B6	–
	500	1,400	20.5	–	–	–
	750	2,100	30.7	–	–	–
	1,000	2,800	40.9	–	–	–

* Please see **P. 139** for the System No..

[Effective Area]



(When the value of effective cross-sectional area is ×10^{-1} or ×10 n, multiply the value of flow rate by the same value.)

[Clean air system components]

[Clean air system components]

Part name	Model No.	Connection Port Size	Max. Flow Rate (ℓ/min atmospheric pressure conversion)
F.R.L. kit	**C1000-6-W**	Rc1/8	450
	C1000-8-W	Rc1/4	630
	C3000-8-W	Rc1/4	1,280
	C3000-10-W	Rc3/8	1,750
	C4000-8-W	Rc1/4	1,430
	C4000-10-W	Rc3/8	2,400
	C4000-15-W	Rc1/2	3,000
F.R. unit	**W1000-6-W**	Rc1/8	830
	W1000-8-W	Rc1/4	1,150
	W3000-8-W	Rc1/4	2,150
	W3000-10-W	Rc3/8	2,430
	W4000-8-W	Rc1/4	2,500
	W4000-10-W	Rc3/8	4,350
	W4000-15-W	Rc1/2	4,750
Air filter (F)	**F1000-6-W**	Rc1/8	460
	F1000-8-W	Rc1/4	610
	F3000-8-W	Rc1/4	1,230
	F3000-10-W	Rc3/8	1,500
	F4000-8-W	Rc1/4	1,320
	F4000-10-W	Rc3/8	2,140
	F4000-15-W	Rc1/2	3,000
Regulator (R)	**R1000-6-W**	Rc1/8	770
	R1000-8-W	Rc1/4	1,350
	R3000-8-W	Rc1/4	2,000
	R3000-10-W	Rc3/8	2,600
	R4000-8-W	Rc1/4	2,500
	R4000-10-W	Rc3/8	4,400
	R4000-15-W	Rc1/2	5,000
Lubricator (L)	**L1000-6-W**	Rc1/8	550
	L1000-8-W	Rc1/4	700
	L3000-8-W	Rc1/4	1,100
	L3000-10-W	Rc3/8	2,250
	L4000-8-W	Rc1/4	1,000
	L4000-10-W	Rc3/8	1,700
	L4000-15-W	Rc1/2	2,700

Note) Max. flow rate: For F.R.L., FR and R, flow rate at 0.7 MPa primary pressure, 0.5 MPa set pressure, 0.1 MPa pressure drop. For air filter, flow rate at 0.7 MPa primary pressure, 0.02 MPa pressure drop. For lubricator, flow rate at 0.5 MPa primary pressure, 0.03 MPa pressure.

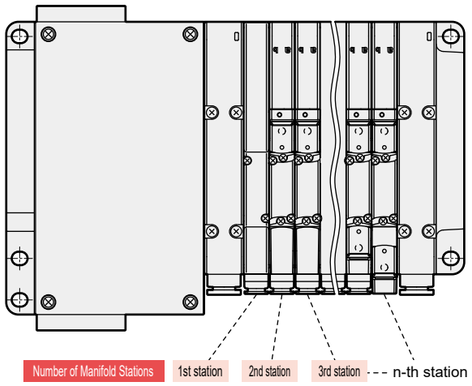
MEMO

Common terminal block (wiring method EA1A, EA1B)

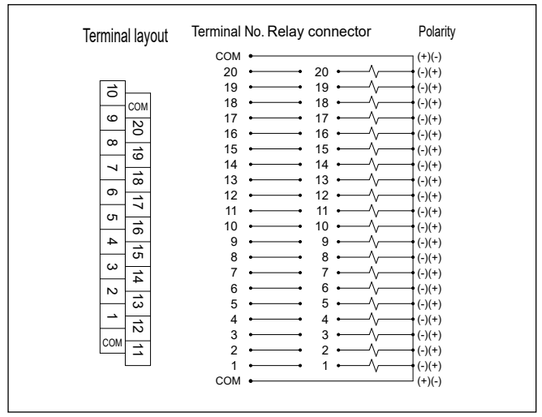
Notes on wiring

[Precautions for common terminal box (EA1*)]

①With the common terminal box, the common wiring is internal processed beforehand. When using the independent contact PLC output unit, wire the common wires at the contact section.
②Check the correspondence of the number of stations with solenoid positions to prevent incorrect wiring. (Refer to the table below.)
③Note that the correspondence will not function if the number of solenoid stations exceeds 20.
④The manifold station numbers are set in order from left with the piping port facing forward.
⑤A voltage drop may occur due to simultaneous energizing or cable length. Confirm that the voltage drop for the solenoid is within 10% of the rated voltage.



Wiring method Internal wiring of EA1 * (up to 20 solenoid stations)



Terminal array of wiring method EA1* (example)

*1: Valve No. 1a, 1b, 2a, 2b...The numbers in indicate the 1st and 2nd stations, and the letters a and b indicate the a side solenoid and the b side solenoid. The manifold's max. station number differs depending on the model. Check the specifications of each model.
*2: When using a single solenoid with standard wiring (double wiring), applying power to the (empty) part of the table below will light up the operation lamp. However, this is not an abnormality.

Terminal No.

	COM	20	19	18	17	16	15	14	13	12	11
10	9	8	7	6	5	4	3	2	1	COM	

[Standard wiring (double wiring)]

● For single solenoid valve

(MF station No. max. 10 stations)

Terminal block No.	COM	20	19	18	17	16	15	14	13	12	11
Valve No.	COM	(Blank)	10a	(Blank)	9a	(Blank)	8a	(Blank)	7a	(Blank)	6a
Terminal block No.	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**COM**
Valve No.	(Blank)	5a	(Blank)	4a	(Blank)	3a	(Blank)	2a	(Blank)	1a	COM

● For double solenoid valve

(MF station No. max. 10 stations)

Terminal block No.	COM	20	19	18	17	16	15	14	13	12	11
Valve No.	COM	10b	10a	9b	9a	8b	8a	7b	7a	6b	6a
Terminal block No.	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**COM**
Valve No.	5b	5a	4b	4a	3b	3a	2b	2a	1b	1a	COM

● For mixed use (single/double mixture)

(Number of solenoid valves up to 20 points)

Terminal block No.	COM	20	19	18	17	16	15	14	13	12	11
Valve No.	COM	10b	10a	9b	9a	8b	8a	7b	7a	(Blank)	6a
Terminal block No.	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**COM**
Valve No.	5b	5a	4b	4a	(Blank)	3a	(Blank)	2a	(Blank)	1a	COM

[Single solenoid, double solenoid layout specification]

(MF station No. max. 20 stations)

Terminal block No.	COM	20	19	18	17	16	15	14	13	12	11
Valve No.	COM	20a	19a	18a	17a	16a	15a	14a	13a	12a	11a
Terminal block No.	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**COM**
Valve No.	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a	COM

(MF station No. max. 10 stations)

Terminal block No.	COM	20	19	18	17	16	15	14	13	12	11
Valve No.	COM	10b	10a	9b	9a	8b	8a	7b	7a	6b	6a
Terminal block No.	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**COM**
Valve No.	5b	5a	4b	4a	3b	3a	2b	2a	1b	1a	COM

(Number of solenoid valves up to 20 points)

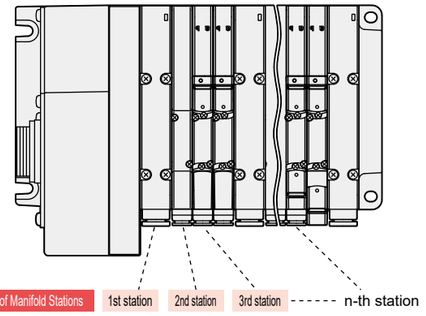
Terminal block No.	COM	20	19	18	17	16	15	14	13	12	11
Valve No.	COM	(Blank)	(Blank)	(Blank)	(Blank)	10b	10a	9b	9a	8b	8a
Terminal block No.	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**COM**
Valve No.	7b	7a	6a	5b	5a	4b	4a	3a	2a	1a	COM

Multi-connector (wiring method FA1A, FA1B)

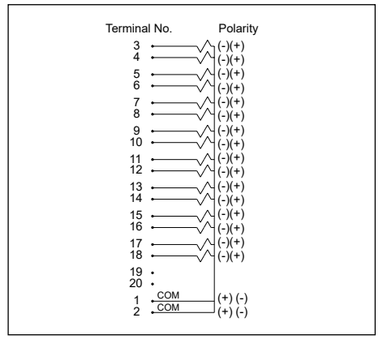
Notes on wiring

[Precautions for multi-connector (FA1 *)]

①With the common terminal box, the common wiring is internal processed beforehand. When using the independent contact PLC output unit, wire the common wires at the contact section.
②Check the correspondence of the number of stations with solenoid positions to prevent incorrect wiring. (Refer to the table below.)
③Note that the correspondence will not function if the number of solenoid stations exceeds 16.
④The manifold station numbers are set in order from left with the piping port facing forward.
⑤A voltage drop may occur due to simultaneous energizing or cable length. Confirm that the voltage drop for the solenoid is within 10% of the rated voltage.



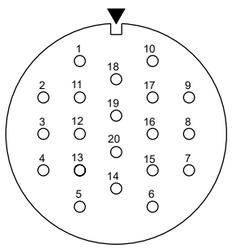
Internal wiring of FA1* (up to 16 solenoid stations)



Terminal array of wiring method FA1 * (example)

*1: Valve No. 1a, 1b, 2a, 2b...The numbers in indicate the 1st and 2nd stations, and the letters a and b indicate the a side solenoid and the b side solenoid. The manifold's max. station number differs depending on the model. Check the specifications of each model.
*2: When using a single solenoid with standard wiring (double wiring), applying power to the (empty) part of the table below will light up the operation lamp. However, this is not an abnormality.

Terminal No.



[Standard wiring (double wiring)]

● For single solenoid valve

(MF station No. max. 8 stations)

Terminal No.	20	19	18	17	16	15	14	13	12	11
Valve No.	(None)	(None)	(Blank)	8a	(Blank)	7a	(Blank)	6a	(Blank)	5a
Terminal No.	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Valve No.	(Blank)	4a	(Blank)	3a	(Blank)	2a	(Blank)	1a	COM	COM

● For double solenoid valve

(MF station No. max. 8 stations)

Terminal No.	20	19	18	17	16	15	14	13	12	11
Valve No.	(None)	(None)	8b	8a	7b	7a	6b	6a	5b	5a
Terminal No.	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Valve No.	4b	4a	3b	3a	2b	2a	1b	1a	COM	COM

● For mixed use (single/double mixture)

(Number of solenoid valves up to 16 points)

Terminal No.	20	19	18	17	16	15	14	13	12	11
Valve No.	(None)	(None)	8b	8a	(Blank)	7a	6b	6a	5b	5a
Terminal No.	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Valve No.	4b	4a	(Blank)	3a	2b	2a	(Blank)	1a	COM	COM

[Single solenoid, double solenoid layout specification]

(MF station No. max. 16 stations)

Terminal No.	20	19	18	17	16	15	14	13	12	11
Valve No.	(None)	(None)	16a	15a	14a	13a	12a	11a	10a	9a
Terminal No.	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Valve No.	8a	7a	6a	5a	4a	3a	2a	1a	COM	COM

(MF station No. max. 8 stations)

Terminal No.	20	19	18	17	16	15	14	13	12	11
Valve No.	(None)	(None)	8b	8a	7b	7a	6b	6a	5b	5a
Terminal No.	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Valve No.	4b	4a	3b	3a	2b	2a	1b	1a	COM	COM

(Number of solenoid valves up to 16 points)

Terminal No.	20	19	18	17	16	15	14	13	12	11
Valve No.	(None)	(None)	10b	10a	9b	9a	8b	8a	7b	7a
Terminal No.	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Valve No.	6a	5b	5a	4b	4a	3a	2a	1a	COM	COM

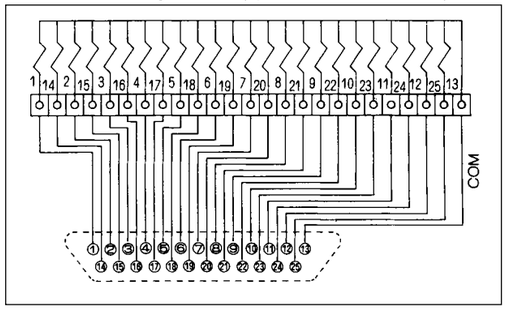
D-sub-connector (wiring method GA1A, GA1B)

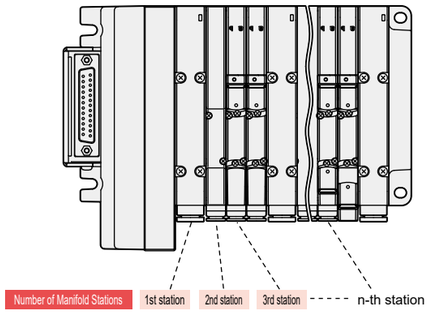
Notes on wiring

[GA1* connector]
The connector used for GA1* wiring, called a D-sub-connector, is used widely for FA and OA components components. 25P in particular is also an RS-232-C Standards designated connector, used for personal computer communication. The manifold station numbers are set in order from left with the piping port facing forward.

[Precautions for connector GA1*]
①Signal arrays of the PLC output unit must match signal arrays on the valve side.
②The working power is 24 VDC dedicated.
③A voltage drop may occur due to simultaneous energizing or cable length. Confirm that the voltage drop for the solenoid is within 10% of the rated voltage.

Internal wiring of GA1 * (up to 24 solenoid stations)

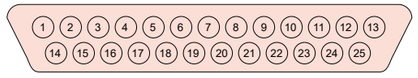




GA1 * connector pin array (example)

*1:The numbers on valves No. 1a, 1b, 2a, 2b ... indicate the 1st and 2nd stations, and alphabets "a" and "b" indicate the "a" side and "b" side solenoids. The manifold's max. station number differs depending on the model. Check the specifications of each model.
*2: When using a single solenoid with standard wiring (double wiring), applying power to the (empty) part of the table below will light up the operation lamp. However, this is not an abnormality.

Connector pin No.



[Standard wiring (double wiring)]

● For single solenoid valve

(MF station No. max. 12 stations)

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Valve No.	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a	COM
Pin No.	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	
Valve No.	(Blank)	(Blank)	(Blank)	(Blank)	(Blank)	(Blank)	(Blank)	(Blank)	(Blank)	(Blank)	(Blank)	(Blank)	

(MF station No. max. 24 stations)

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Valve No.	1a	3a	5a	7a	9a	11a	13a	15a	17a	19a	21a	23a	COM
Pin No.	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	
Valve No.	2a	4a	6a	8a	10a	12a	14a	16a	18a	20a	22a	24a	

● For double solenoid valve

(MF station No. max. 12 stations)

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Valve No.	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a	COM
Pin No.	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	
Valve No.	1b	2b	3b	4b	5b	6b	7b	8b	9b	10b	11b	12b	

(MF station No. max. 12 stations)

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Valve No.	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a	COM
Pin No.	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	
Valve No.	1b	2b	3b	4b	5b	6b	7b	8b	9b	10b	11b	12b	

● For mixed use (single/double mixture)

(Number of solenoid valves up to 24 points)

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Valve No.	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a	COM
Pin No.	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	
Valve No.	(Blank)	(Blank)	3b	4b	(Blank)	(Blank)	7b	(Blank)	(Blank)	(Blank)	11b	12b	

(Number of solenoid valves up to 24 points)

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Valve No.	1a	3a	4a	5a	7a	8a	10a	11b	12b	14a	15b	17a	COM
Pin No.	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	
Valve No.	2a	3b	4b	6a	7b	9a	11a	12a	13a	15a	16a	17b	

[Single solenoid, double solenoid layout specification]

(MF station No. max. 24 stations)

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Valve No.	1a	3a	5a	7a	9a	11a	13a	15a	17a	19a	21a	23a	COM
Pin No.	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	
Valve No.	2a	4a	6a	8a	10a	12a	14a	16a	18a	20a	22a	24a	

(MF station No. max. 12 stations)

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Valve No.	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a	COM
Pin No.	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	
Valve No.	1b	2b	3b	4b	5b	6b	7b	8b	9b	10b	11b	12b	

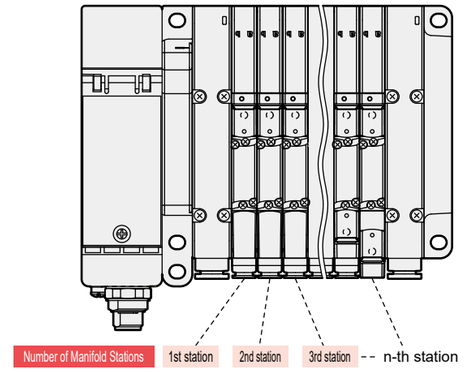
(Number of solenoid valves up to 24 points)

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Valve No.	1a	3a	4a	5a	7a	8a	10a	11b	12b	14a	15b	17a	COM
Pin No.	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	
Valve No.	2a	3b	4b	6a	7b	9a	11a	12a	13a	15a	16a	17b	

Serial transmission: Wiring Method

J** serial transmission

- The device unit's output No. differs with the manufacturer. The internal connector pin No. and the manifold solenoid correspond as shown below.
- The manifold station numbers are set in order from left with the piping port facing forward regardless of the wiring block position.
- Internal connectors are wired in order, so there may be some blank numbers depending on the number of stations. These blank outputs cannot be used to drive other than the solenoid manifolds in use.
- The working power is 24 VDC dedicated.
- Securely fix the attached connector with fixing screws. (Proper tightening torque 0.3 N·m)



Valve No. Arrangement Corresponding to Solenoid Output No. for Wiring Method J□□ (Example)

*: Valve No.1a, 1b, 2a, 2b,...The numbers in indicate the 1st and 2nd stations, and the letters a and b indicate the a side solenoid and the b side solenoid. The manifold's max. station number differs depending on the model. Check the specifications of each model.

[Standard wiring (double wiring)]

● For single solenoid valve

Solenoid Output No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Valve No.	1a	(Blank)	2a	(Blank)	3a	(Blank)	4a	(Blank)	5a	(Blank)	6a	(Blank)	7a	(Blank)	8a	(Blank)
Solenoid Output No.	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Valve No.	9a	(Blank)	10a	(Blank)	11a	(Blank)	12a	(Blank)	13a	(Blank)	14a	(Blank)	15a	(Blank)	16a	(Blank)

● For double solenoid valve

Solenoid Output No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Valve No.	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b
Solenoid Output No.	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Valve No.	9a	9b	10a	10b	11a	11b	12a	12b	13a	13b	14a	14b	15a	15b	16a	16b

● For mixed use (single/double mixture)

Solenoid Output No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Valve No.	1a	(Blank)	2a	(Blank)	3a	3b	4a	4b	5a	(Blank)	6a	(Blank)	7a	7b	8a	(Blank)
Solenoid Output No.	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Valve No.	9a	(Blank)	10a	10b	11a	11b	12a	(Blank)	13a	(Blank)	14a	14b	15a	15b	16a	(Blank)

* Do not use (Blank).

[Single/double mixed wiring]

Solenoid Output No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Valve No.	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a	13a	14a	15a	16a
Solenoid Output No.	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Valve No.	17a	18a	19a	20a	21a	22a	23a	24a	(Blank)	(Blank)	(Blank)	(Blank)	(Blank)	(Blank)	(Blank)	(Blank)

Solenoid Output No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Valve No.	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b
Solenoid Output No.	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Valve No.	9a	9b	10a	10b	11a	11b	12a	12b	13a	13b	14a	14b	15a	15b	16a	16b

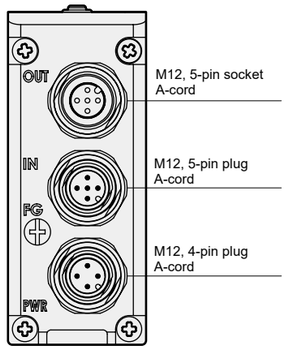
Solenoid Output No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Valve No.	1a	(Blank)	2a	(Blank)	3a	3b	4a	4b	5a	(Blank)	6a	(Blank)	7a	7b	8a	(Blank)
Solenoid Output No.	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Valve No.	9a	(Blank)	10a	10b	11a	11b	12a	(Blank)	13a	(Blank)	14a	14b	15a	15b	16a	(Blank)

Solenoid Output No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Valve No.	1a	2a	3a	3b	4a	4b	5a	6a	7a	7b	8a	9a	10a	10b	11a	11b
Solenoid Output No.	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Valve No.	12a	13a	14a	14b	15a	15b	16a	17a	18a	18b	19a	20a	21a	21b	22a	22b

JA1* DeviceNet

MS ☐
NS ☐
PW ☐
PW(V) ☐

LED name	Indicator description
MS	Status of the device unit body related to DeviceNet is indicated by the LED color (green/red) and state (ON/blinking)
NS	Status of the network related to DeviceNet is indicated by the LED color (green/red) and state (ON/blinking)
PW	Lights when communication power is ON. Green lamp is ON when normal
PW(V)	Lights when valve power is ON. Green lamp is ON when normal (Cannot be monitored when the communication power is not turned ON)



Communication connector pin array

Port	Pin	Signal name	Functions
IN OUT	1	Drain	Shield terminal
	2	V+	Communication power supply (+)
	3	V-	Communication power supply (-)
	4	CAN_H	Communication terminal (H)
	5	CAN_L	Communication terminal (L)

Power supply connector pin array

M12 4-pin		Signal name	Functions
PWR	1	Unit power	+ side: 24 V
	2	Valve power supply	+ side: 24 V
	3	Unit power	−side: 0 V
	4	Valve power supply	−side: 0 V

● Wiring of communication line

Please purchase communication cables or connectors that are compatible with the specifications of this product.
For wiring method, refer to the following communication connector pin array and communication cable wiring example.

Connector with cable for both sides : Type DCA1-5CN**W1 (socket/plug) OMRON Corporation
IN connector with cable for one side : Type DCA1-5CN**F1 (socket) OMRON Corporation
For OUT : Type DCA1-5CN**H1 (plug) OMRON Corporation

● Wiring to the power supply socket

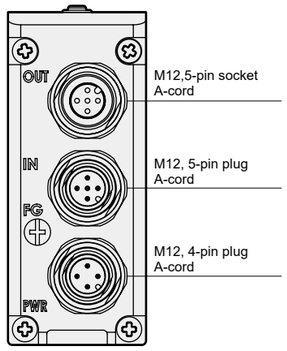
Please purchase power cables or connectors that are compatible with the specifications of this product.

Recommended M12-loose wire type power cable : Type XS2F-D421-☐8☐-☐ straight OMRON
Recommended communication plug and power cable : Part No. 2103 212 2305 Assembly M12 connector Manufactured by HARTING
Electric wire size: AWG22-18, Applicable cable diameter: ø6-8
*☐differs depending on the cable specifications

JA2* CC-LINK Ver1.10

RUN ☐
ERR ☐
PW ☐
PW (V) ☐

LED name	Indicator description
L RUN	Show data link status
L ERR	Displays data link error status
PW	Lights when unit power is ON.
PW(V)	Lights when valve power is ON. (Cannot be monitored when the unit power is not turned ON)



Communication connector pin array

Port	Pin	Signal name	Wire insulation color/others
IN OUT	1	SLD	Ground wire (shield)
	2	DB	White
	3	DG	Yellow
	4	DA	Blue
	5	No.	Vacant

Power supply connector pin array

M12 4-pin		Signal name	Functions
PWR	1	Unit power	+ side: 24 V
	2	Valve power supply	+ side: 24 V
	3	Unit power	−side: 0 V
	4	Valve power supply	−side: 0 V

● Wiring of communication line

Please purchase communication cables or connectors that are compatible with the specifications of this product.
For wiring method, refer to the following communication connector pin array and communication cable wiring example. (☐differs with cable length.)

Connector with cable for both sides : SAC-4P-M12MS/☐☐☐☐☐☐-990/M12FS (socket/plug) FENIX CONTACT CO., LTD.
TVGP-CABLE-G-M12M12-1 (socket/plug) CKD (refer to page 55)
IN connector with cable forone side : SAC-4P-☐☐☐☐☐☐-990/M12FS (socket) Manufactured by PHOENIX CONTACT CO., LTD.
(Specify a 5-pole M12 connector for the IN socket.)
TVGP-CABLE-G-M12FS-5 (socket) CKD Corporation (Refer to page 55)
For OUT: SAC-4P-M12MS/☐☐☐☐☐☐-990 (plug) Manufactured by FENIX CONTACT Co., Ltd.
TVGP-CABLE-G-M12MS-5 (plug) CKD Co., Ltd. (refer to page 55)

* terminating resistor can be set from switch above the product. Connect the following terminating resistor to the OUT side if not using switches.
Terminating resistor M12 connector : SAC-4P-M12MS CCL TR Manufactured by Phoenix Contact Co., Ltd.

● Wiring to the power supply socket

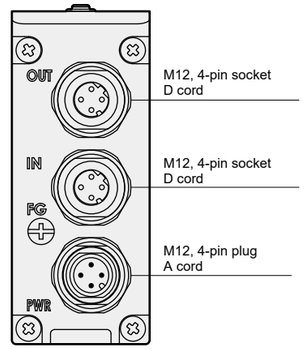
Please purchase power cables or connectors that are compatible with the specifications of this product.

Recommended M12-loose wire type power cable : Type XS2F-D421-☐8☐-☐ Straight OMRON
TVGP-CABLE-M12SAC-5 CKD Corporation (Refer to page 55)
Recommended communication plug and power cable: Part No. 2103 212 2305 Assembly M12 connector Manufactured by HARTING
Electric wire size: AWG22-18, Applicable cable diameter: ø6-8
*☐Differs depending on the cable specifications

JA3* EtherCAT

RUN ☐
ERR ☐
L/A IN ☐
L/A OUT ☐
INFO ☐
PW ☐
PW (V) ☐

LED name	Indicator description
RUN	Communication status of EtherCAT is indicated by the LED (green) is indicated by the ON state (OFF/ON/blinking) (Green lamp is ON during normal communication)
ERR	Abnormal status of EtherCAT is indicated by the LED (red) is indicated by the ON state (OFF/ON/ blinking) (Lamp is OFF during normal communication)
L/A IN	Status of the Ethernet port (IN side) is Indicated by the LED (green) state (OFF/ON/blinking)
L/A OUT	Status of the Ethernet port (OUT side) is Indicated by the LED (green) state (OFF/ON/ blinking)
INFO	Error status of the device unit is indicated by the LED (red) (OFF during normal communication)
PW	Lights when unit power is ON. Green lamp is ON when normal
PW(V)	Lights when valve power is ON. Green lamp is ON when normal (When the unit power is not turned ON, cannot be monitored)



Communication connector pin array

M12 pins		Signal name	Functions
IN OUT	1	TD+	Transmitted data, positive
	2	RD+	Received data, positive
	3	TD-	Transmitted data, negative
	4	RD−	Received data, negative

Power supply connector pin array

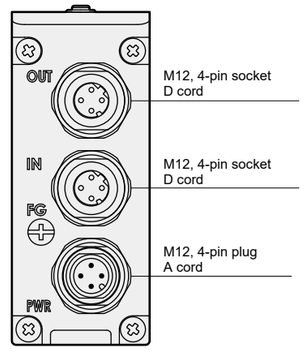
M12 4-pin		Signal name	Functions
PWR	1	Unit power	+ side: 24 V
	2	Valve power supply	+ side: 24 V
	3	Unit power	−side: 0 V
	4	Valve power supply	−side: 0 V

- The unit power supply and the valve power supply are separate power supplies. Supply power from the power supply connector (24 VDC).
- Connect the EtherCAT cable from the previous station to the communication connector (IN).
- Prepare a connector to be used on the wiring end.
- Refer to page 153 for details on connectors and power supplies.

JA4* EtherNet/IP

MS ☐
NS ☐
L/A IN ☐
L/A OUT ☐
ST ☐
PW(V) ☐

LED name	Indicator description
MS	Status of the device unit body related to EtherNet/IP is indicated by the LED color (green/red) and state (ON/blinking)
NS	Status of the network related to EtherNet/IP is indicated by the LED color (green/red) and state (ON/blinking)
L/A IN	Status of the Ethernet port (IN side) is is indicated by the LED color (green/yellow)
L/A OUT	Status of the Ethernet port (OUT side) is is indicated by the LED color (green/yellow)
ST	Status of the device unit body is indicated by the LED color (green/yellow) and blinking/ON status
PW(V)	Indicates the power status of the valve power supply. Lit in green when powered ON (When the unit power is not turned ON cannot be monitored)



Communication connector pin array

Port	Pin	Signal name	Functions
IN OUT	1	TD+	Transmitted data, positive
	2	RD+	Received data, positive
	3	TD-	Transmitted data, negative
	4	RD−	Received data, negative

Power supply connector pin array

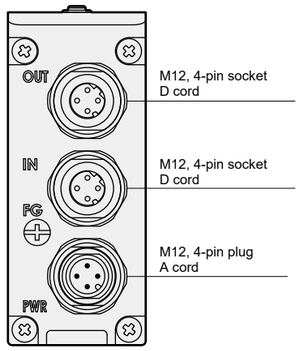
M12 4-pin		Signal name	Functions
PWR	1	Unit power	+ side: 24 V
	2	Valve power supply	+ side: 24 V
	3	Unit power	−side: 0 V
	4	Valve power supply	−side: 0 V

- The unit power supply and the valve power supply are separate power supplies. Supply power from the power supply connector (24 VDC).
- Connect the communication cable to IN or OUT.
- Prepare a connector to be used on the wiring end.
- * Refer to page 153 for details on connector and power supply.

JA5* CC-Link IEF Basic

RUN ☐
ERR ☐
L/A IN ☐
L/A OUT ☐
INFO ☐
PW ☐
PW (V) ☐

LED name	Indicator description
RUN	Connection status of CC-Link IEF Basic is indicated by the LED state (ON/blinking)
ERR	Abnormal connection status of CC-Link IEF Basic is indicated by the LED state (ON/blinking)
L/A IN	Status of the Ethernet port (IN side) is indicated by the LED state (ON/blinking)
L/A OUT	Status of the Ethernet port (OUT side) is indicated by the LED state (ON/blinking)
INFO	Status of the device unit body is indicated by the LED state (ON/blinking)
PW	Indicates the power status of the unit power supply. Lit in green when powered ON
PW(V)	Indicates the power status of the valve power supply. Green lamp ON when power turned ON (Cannot be monitored when unit power supply is OFF)



Communication connector pin array

Port	Pin	Signal name	Functions
IN OUT	1	TD+	Transmitted data, positive
	2	RD+	Received data, positive
	3	TD-	Transmitted data, negative
	4	RD−	Received data, negative

Power supply connector pin array

M12 4-pin		Signal name	Functions
PWR	1	Unit power	+ side: 24 V
	2	Valve power supply	+ side: 24 V
	3	Unit power	−side: 0 V
	4	Valve power supply	−side: 0 V

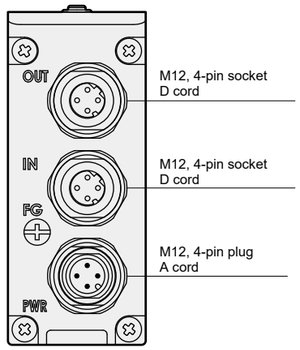
- The unit power supply and the valve power supply are separate power supplies. Supply power from the power supply connector (24 VDC).
- Connect the communication cable to IN or OUT.
- Prepare a connector to be used on the wiring end.

* Refer to page 153 for details on connector and power supply.

JA6* PROFINET

RUN ☐
ERR ☐
L/A IN ☐
L/A OUT ☐
INFO ☐
PW ☐
PW (V) ☐

LED name	Indicator description
RUN	Connection status of PROFINET is indicated by the LED state (ON/blinking)
ERR	Abnormal connection status of PROFINET is indicated by the LED state (ON/blinking)
L/A IN	Status of the Ethernet port (IN side) is indicated by the LED state (ON/blinking)
L/A OUT	Status of the Ethernet port (OUT side) is indicated by the LED state (ON/blinking)
INFO	Status of the device unit body is indicated by the LED state (ON/blinking)
PW	Indicates the power status of the unit power supply. Lit in green when powered ON
PW(V)	Indicates the power status of the valve power supply. Green lamp ON when power turned ON (Cannot be monitored when unit power supply is OFF)



Communication connector pin array

Port	Pin	Signal name	Functions
IN OUT	1	TD+	Transmitted data, positive
	2	RD+	Received data, positive
	3	TD-	Transmitted data, negative
	4	RD−	Received data, negative

Power supply connector pin array

M12 4-pin		Signal name	Functions
PWR	1	Unit power	+ side: 24 V
	2	Valve power supply	+ side: 24 V
	3	Unit power	−side: 0 V
	4	Valve power supply	−side: 0 V

- The unit power supply and the valve power supply are separate power supplies. Supply power from the power supply connector (24 VDC).
- Connect the communication cable to IN or OUT.
- Prepare a connector to be used on the wiring end.

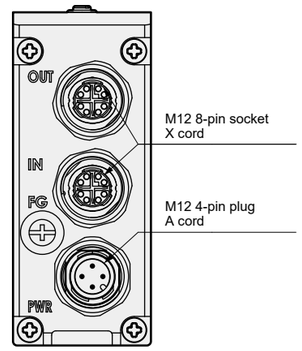
* Refer to page 153 for details on connector and power supply.

JA7* CC-Link IE Field

CC-Link IE Field

L ERR ☐
D Link ☐
RUN/ERR ☐
INFO ☐
L/A OUT ☐
L/A IN ☐
PW ☐
PW(V) ☐

LED name	Indicator description
L ERR	Communication port abnormal status of CC-Link IE Field is indicated by the LED (red) state (Lamp is OFF during normal communication)
D Link	Data link communication status of CC-Link IE Field is indicated by the LED (green) state (ON during normal communication)
RUN/ ERR	RUN: Product operation status is indicated by the LED (green) state ERR: Abnormal product operation status is indicated by the LED (red) state
INFO	Status of notification from device unit is indicated by the LED (red) state (OFF during normal communication)
L/A OUT (P1)	Status of the Ethernet port (OUT side) is indicated by the LED (green) state (OFF/blinking/blinking)
L/A IN (P2)	Status of the Ethernet port (IN side) is indicated by the LED (green) state (OFF/blinking/blinking)
PW	Lights when unit power is ON (Green lamp is ON when normal)
PW(V)	Lights when valve power is ON (Green lamp is ON when normal) *Cannot be monitored when the unit power is not turned ON.



Communication connector pin array

M12 8-pin		Signal name	Functions
IN OUT	1	BI_DA+	Transmit/receive data, positive
	2	BI_DA-	Transmit/receive data, negative
	3	BI_DB+	Transmit/receive data, positive
	4	BI_DC+	Transmit/receive data, positive
	5	BI_DC-	Transmit/receive data, negative
	6	BI_DB-	Transmit/receive data, negative
	7	BI_DD+	Transmit/receive data, positive
	8	BI_DD-	Transmit/receive data, negative

Power supply connector pin array

M12 4-pin		Signal name	Functions
PWR	1	Unit power	+ side: 24 V
	2	Valve power supply	+ side: 24 V
	3	Unit power	−side: 0 V
	4	Valve power supply	−side: 0 V

- The unit power supply and the valve power supply are separate power supplies. Supply power from the power supply connector (24 VDC).
- Connect the communication cable to IN or OUT.
- Prepare a connector to be used on the wiring end.

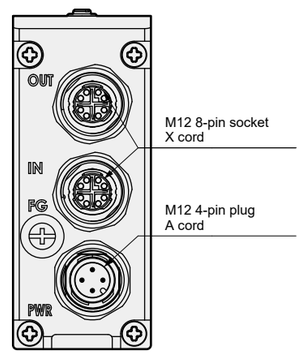
* Refer to page 154 for details on connector and power supply.

JA8* CC-Link IE TSN

CC-Link IE TSN

D Link ☐
RUN/ERR ☐
INFO ☐
L/A OUT ☐
L/A IN ☐
PW ☐
PW(V) ☐

LED name	Indicator description
D Link	Data link communication status of CC-Link IE TSN is indicated by the LED (green) state (ON during normal communication)
RUN/ ERR	RUN: Product operation status is indicated by the LED (green) state ERR: Abnormal product operation status is indicated by the LED (red) state
INFO	Status of notification from device unit is indicated by the LED (red) state (OFF during normal communication)
L/A OUT (P1)	Status of the Ethernet port (OUT side) is indicated by the LED (green) state (OFF/blinking/blinking)
L/A IN (P2)	Status of the Ethernet port (IN side) is indicated by the LED (green) state (OFF/blinking/blinking)
PW	Lights when unit power is ON (Green lamp is ON when normal)
PW(V)	Lights when valve power is ON (Green lamp is ON when normal) *Cannot be monitored when the unit power is not turned ON.



Communication connector pin array

M12 8-pin		Signal name	Functions
IN OUT	1	BI_DA+	Transmit/receive data, positive
	2	BI_DA-	Transmit/receive data, negative
	3	BI_DB+	Transmit/receive data, positive
	4	BI_DC+	Transmit/receive data, positive
	5	BI_DC-	Transmit/receive data, negative
	6	BI_DB-	Transmit/receive data, negative
	7	BI_DD+	Transmit/receive data, positive
	8	BI_DD-	Transmit/receive data, negative

Power supply connector pin array

M12 4-pin		Signal name	Functions
PWR	1	Unit power	+ side: 24 V
	2	Valve power supply	+ side: 24 V
	3	Unit power	−side: 0 V
	4	Valve power supply	−side: 0 V

- The unit power supply and the valve power supply are separate power supplies. Supply power from the power supply connector (24 VDC).
- Connect the communication cable to IN or OUT.
- Prepare a connector to be used on the wiring end.

Refer to page 154 for details on * connector and power supply.

Model No. / LED display / Wiring method

JA9* IO-Link

LED display

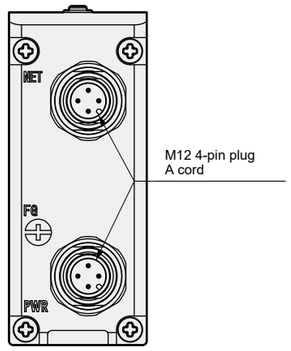
IO-Link Class A, Class B

PW(V) ☐
COM ☐
ST ☐
INFO ☐

LED name	Indicator description
PW(V)	Lights when valve power is ON. (Green lamp is ON when normal) *Cannot be monitored when the unit power is not turned ON.
COM	Unit power supply status and IO-Link communication status are indicated by the LED (green) Unit power supply OFF: OFF Unit power supply ON (IO-Link communication not implemented): ON Unit power supply ON (IO-Link in communication): Blinking
ST	Device unit status is indicated by the LED (red) Operating normally: OFF Maintenance Required: Blinking Hardware error (disconnection/memory error): ON
INFO	OFF (not used)

Wiring method

IO-Link Class A



M12 4-pin plug
A cord

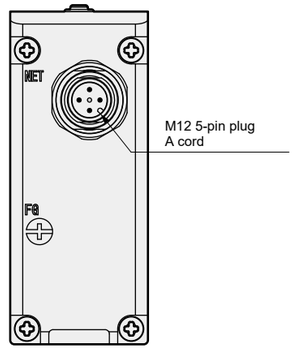
Communication connector pin array

M12 4-pin		Signal name	Functions
NET	1	L+	Unit power supply (+ side: 24 V
	2	NC	Vacant
	3	L4	Unit power supply (- side: 0 V)
	4	C/Q	IO-Link signal

Power supply connector pin array

M12 4-pin		Signal name	Functions
PWR	1	NC	Vacant
	2	P24	Valve power supply 24 V
	3	NC	Vacant
	4	N24	Valve power supply 0 V

IO-Link Class B



M12 5-pin plug
A cord

Communication connector pin array

M12 5-pin		Signal name	Functions
NET	1	L+	Unit power supply (+ side: 24 V
	2	P24	Valve power supply (+ side: 24 V)
	3	L4	Unit power supply (- side: 0 V)
	4	C/Q	IO-Link signal
	5	N24	Valve power supply (- side: 0 V)

• The unit power supply and the valve power supply are separate power supplies. Supply power from the power supply connector (24 VDC).
• Prepare a connector to be used on the wiring end.
* Refer to page 155 for details on connector and power supply.

JB1* IO-Link Wireless

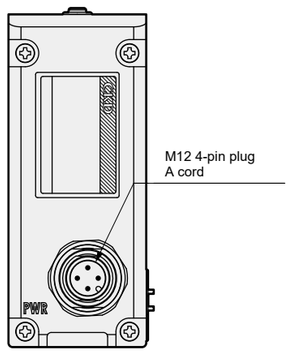
LED display

IO-Link Wireless

PW ☐
PW(V) ☐
LINK ☐
ST ☐
LQ ☐

LED name	Indicator description
PW	Lights when unit power is ON (Green lamp is ON when normal)
PW(V)	Lights when valve power is ON. (Green lamp is ON when normal) *Cannot be monitored when the unit power is not turned ON.
LINK	Communication status is indicated by the LED (green) (Power supply OFF: When OFF, power supply ON: ON, Normal communication: Blinking)
ST	Status of this product is indicated by the LED (red) state Normal operation: OFF Hardware error: ON When maintenance is required: Blinking
LQ	Communication quality is indicated by the ON status Communication quality "good": Green lit Communication quality "normal": Orange lit Communication error: Red lit

Wiring method



M12 4-pin plug
A cord

Power supply connector pin array

M12 4-pin		Signal name	Functions
PWR	1	Unit power	+ side: 24 V
	2	Valve power supply	+ side: 24 V
	3	Unit power	−side: 0 V
	4	Valve power supply	−side: 0 V

• The unit power supply and the valve power supply are separate power supplies. Supply power from the power supply connector (24 VDC).
• Prepare a connector to be used on the wiring end.
* Refer to page 156 for details on connector and power supply.

PLC compatibility table

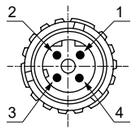
Model No.	Communication protocol		Recommended PLC model No. * 1	
	Association	Network name	Manufacturer	Host unit model No.
JA1*	ODVA	DeviceNet	OMRON Corporation	CJ1W-DRM21
JA2*	CC-Link Partner Association (CLPA)	CC-Link ver. 1.10	Mitsubishi Electric Corporation	RJ61BT11
JA3*	EtherCAT Technology Group (ETG)	EtherCAT	Connected to EtherCAT-compatible master	
			OMRON Corporation	NJ Series NX Series
JA4*	ODVA	EtherNet/IP	Connected to EtherNet/IP-compatible master	
			Rockwell Automation Co., Ltd.	ControlLogix5570
			OMRON Corporation	NJ Series NX Series
JA5*	CC-Link Partner Association (CLPA)	CC-Link IEF Basic	Connected to CC-Link IEF Basic-compatible master	
			Mitsubishi Electric Corporation	R Series CPU unit
JA6*	PROFIBUS & PROFINET International(PI)	PROFINET	Connected to PROFINET-compatible master	
			Mitsubishi Electric Corporation	RJ71PN92
			SIEMENS Corporation	S7-1200 S7-1500
JA7*	CC-Link Partner Association (CLPA)	CC-Link IE Field	Connected to CC-Link IE Field-compatible master	
			Mitsubishi Electric Corporation	RJ71GF11-T2
JA8*	CC-Link Partner Association (CLPA)	CC-Link IE TSN	Connected to CC-Link IE TSN-compatible master	
			Mitsubishi Electric Corporation	RJ71GN11-T2
JA9*	IO-Link Community	IO-Link	Connected to IO-Link-compatible master	
			OMRON Corporation	Contact the manufacturer
			Mitsubishi Electric Corporation	Contact the manufacturer
			Ballough Co., Ltd.	Contact the manufacturer
			Turk Japan Co., Ltd.	Contact the manufacturer
JB1*	IO-Link Community	IO-Link Wireless	Connected to IO-Link Wireless-compatible master CKD IO-Link Wireless components compatible Region: Japan, EU, USA	
			Core Tigo Technolody	Contact Toho Technology Co., Ltd.

*1 This is as of June 2023. For details, contact the PLC manufacturer.

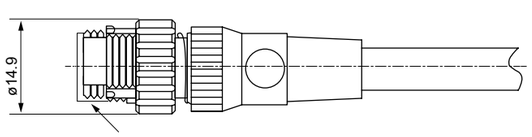
Water-proof connector

For EtherCAT, EtherNet/IP, PROFINET, CC-Link IEF Basic

● Connectors for EtherCAT, EtherNet/IP, PROFINET, CC-Link IEFBasic



(Plug)



Pin No.	Signal name	Functions
1	TD+	Transmitted data, positive
2	RD +	Received data, positive
3	TD-	Transmitted data, negative
4	RD−	Received data, negative

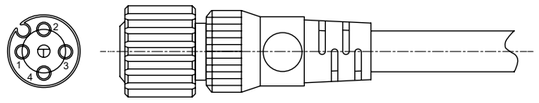
For wiring method, refer to the following communication connector pin array and communication cable wiring example.
Use CAT5 or higher for communication cable lines.

Recommended M12-RJ45 communication cable with connector
- TVGP-CABLE-M12R4-5 Straight CKD *Refer to P. 55 for details.
- Type XS5W-T421-□MC-K Straight OMRON
- Part No. 0945 700 50□□ Straight Manufactured by HARTING

Recommended M12-M12 communication cable with connector
- Refer to page 55 for TVGP-CABLE-M12M12-5 Straight CKD *Refer to P. 55 for details.

Recommended communication plug and cable
- Part No. 0945 600 01□□ Cable single unit Manufactured by HARTING
- Part No. 2103 281 1405 Assembly M12 connector Manufactured by HARTING

● Connector for power supply



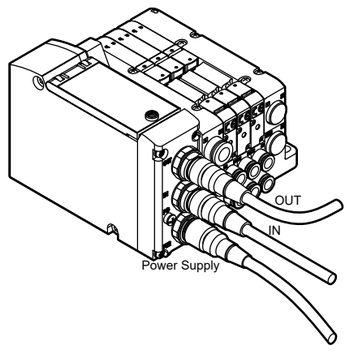
Pin No.	Signal name	Functions
1	Unit power	+ side: 24 V
2	Valve power supply	+ side: 24 V
3	Unit power	- side: 0 V
4	Valve power supply	- side: 0 V

Recommended M12-loose wire power cable
- Type XS2F-D421-□8□-□ Straight OMRON
- Refer to page 55 for TVGP-CABLE-M12SAC-5 Straight CKD *Refer to P. 55 for details.

Recommended communication plug and power cable
- Part No. 2103 212 2305 Assembly M12 connector Manufactured by HARTING
- Electric wire size: AWG22-18, Applicable cable diameter: ø6-8

*□differs depending on the cable specifications.

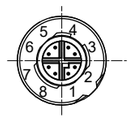
Connection method



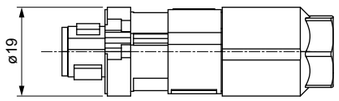
Water-proof connector

For CC-Link IE Field, CC-Link IE TSN

● Connector for CC-Link IE Field, CC-Link IE TSN



Plug



M12×1

Communication connector pin array

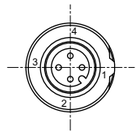
M12 8-pin		Signal name	Functions
IN OUT	1	BI_DA+	Transmit/receive data, positive
	2	BI_DA-	Transmit/receive data, negative
	3	BI_DB+	Transmit/receive data, positive
	4	BI_DC+	Transmit/receive data, positive
	5	BI_DC-	Transmit/receive data, negative
	6	BI_DB-	Transmit/receive data, negative
	7	BI_DD+	Transmit/receive data, positive
	8	BI_DD-	Transmit/receive data, negative

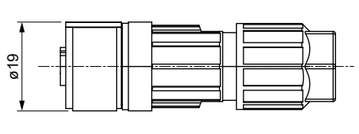
For wiring method, refer to the following communication connector pin array and communication cable wiring example.
Use CAT5 or higher for communication cable lines.

Recommended M12-RJ45 communication cable with connector
- SC-E5EW-□ Mitsubishi Electric System Services

Supports recommended communication plug (assembly) * SPEEDCON mating method
- 1411043 (SACC-MSX-8Q0) Phoenix Contact

● Connector for power supply





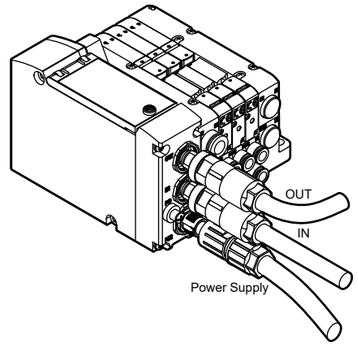
Power supply connector pin array

M12 4-pin		Signal name	Functions
PWR	1	Unit power	+ side: 24 V
	2	Valve power supply	+ side: 24 V
	3	Unit power	−side: 0 V
	4	Valve power supply	−side: 0 V

Recommended M12-loose wire type power cable
- XS2F-D421-□8□-□ straight OMRON

Supports recommended communication plug (assembly) * SPEEDCON mating method
- 1424655 (SACC-M12FS-4PL M) Phoenix Contact

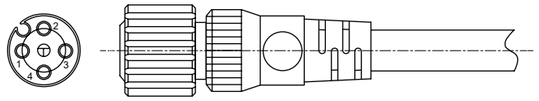
Connection method



Water-proof connector

For IO-Link

● Connector for IO-Link ClassA (NET, PWR)



Communication connector pin array

M12 4-pin		Signal name	Functions
NET	1	L+	Unit power 24 V
	2	NC	Vacant
	3	L4	Unit power 0 V
	4	C/Q	IO-Link signal

Power supply connector pin array

M12 4-pin		Signal name	Functions
PWR	1	NC	Vacant
	2	P24	Valve power supply 24 V
	3	NC	Vacant
	4	N24	Valve power supply 0 V

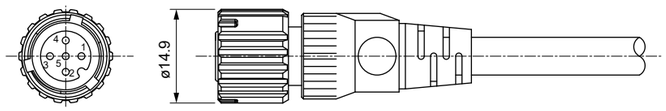
For wiring method, refer to the following communication connector pin array and communication cable wiring example. Use CAT5 or higher for communication cable lines.

Recommended M12-loose wire power cable
- Type XS2F-D421-□8□-□ Straight OMRON

Recommended M12 connector and power cable
- No. 2103 212 2305 Assembly M12 connector Manufactured by HARTING
- Electric wire size: AWG22-18, Applicable cable diameter: ø6-8

*□Differs depending on the cable specifications.

● Connector for IO-Link ClassB (NET)



Communication connector pin array

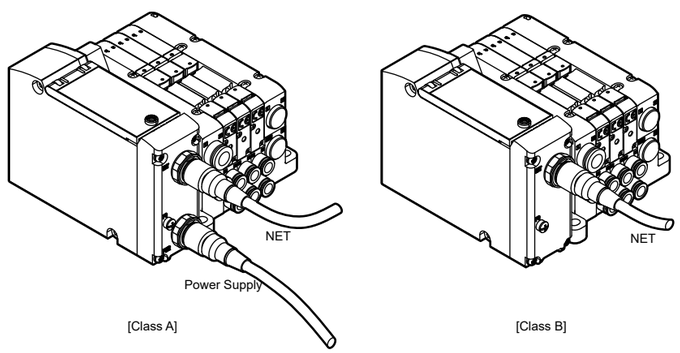
M12 5-pin		Signal name	Functions
NET	1	L+	Unit power supply (+ side: 24 V
	2	P24	Valve power supply (+ side: 24 V
	3	L4	Unit power supply (- side: 0 V)
	4	C/Q	IO-Link signal
	5	N24	Valve power supply (- side: 0 V)

Recommended M12-loose wire type power cable
- XS2F-D521-□8□-□ straight OMRON

Recommended M12 connector and power cable
- Part No. 2103 272 2505 Assembly M12 connector Manufactured by HARTING
- Electric wire size: AWG22-18, Applicable cable diameter: ø6-8

*□Differs depending on the cable specifications.

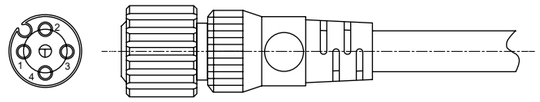
Connection method



Water-proof connector

For IO-Link Wireless

● Connector for power supply



Power supply connector pin array

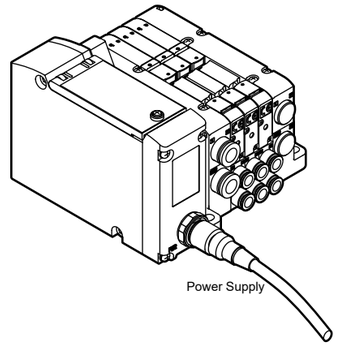
M12 4-pin		Signal name	Functions
PWR	1	Unit power	+ side: 24 V
	2	Valve power supply	+ side: 24 V
	3	Unit power	−side: 0 V
	4	Valve power supply	−side: 0 V

Recommended M12-loose wire power cable
- Type XS2F-D421-□8□-□ Straight OMRON

Recommended communication plug and power cable
- No. 2103 212 2305 Assembly M12 connector Manufactured by HARTING
- Electric wire size: AWG22-18, Applicable cable diameter: ø6-8

*□Differs depending on the cable specifications.

Connection method



Wiring structure between wiring block and valve block

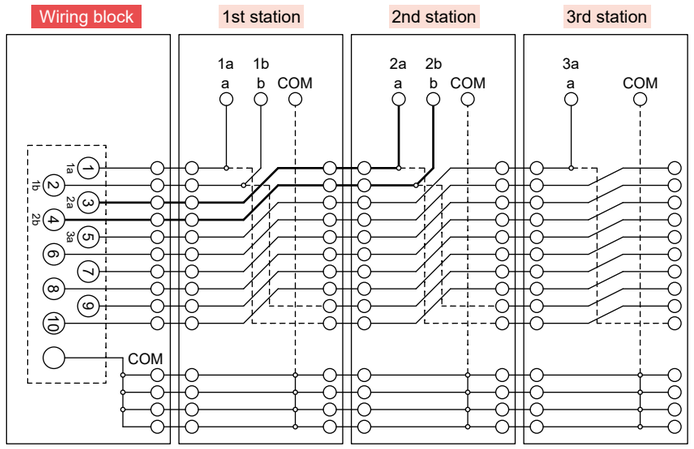
A part called a dedicated wiring connector is built into the valve block and intermediate supply and exhaust block, etc., This structure enables the wiring to be completed simultaneously with the disassembly and assembly of the block manifold. Special wiring work is not required during disassembly and assembly. There is regularity to the wiring block terminal block numbers and solenoid output numbers and wired valves. Refer to the section on the wiring method of each wiring block, and connect the wires between the valves and control equipment. Take special care when increasing or decreasing the number of valve blocks. In addition, an example of the wiring circuit when expanding stations is shown below.

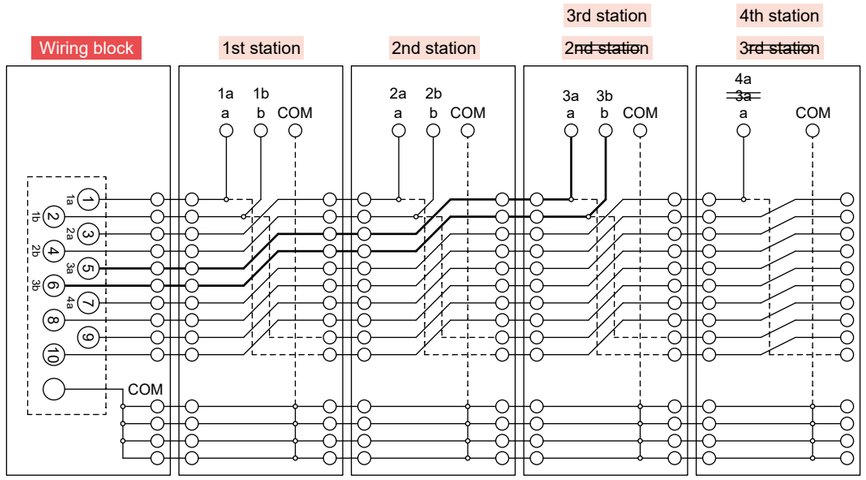
Example of wiring circuit

The diagram below shows the wiring circuit for TVG and differs from the actual specifications.

Standard wiring (double wiring)

When one station of a valve block has been expanded between the 2nd and 3rd station, the output that had been assigned to terminal block No.5 and No.6 of the wiring block will automatically shift for two solenoids and be assigned to terminal block No.7 and No.8.



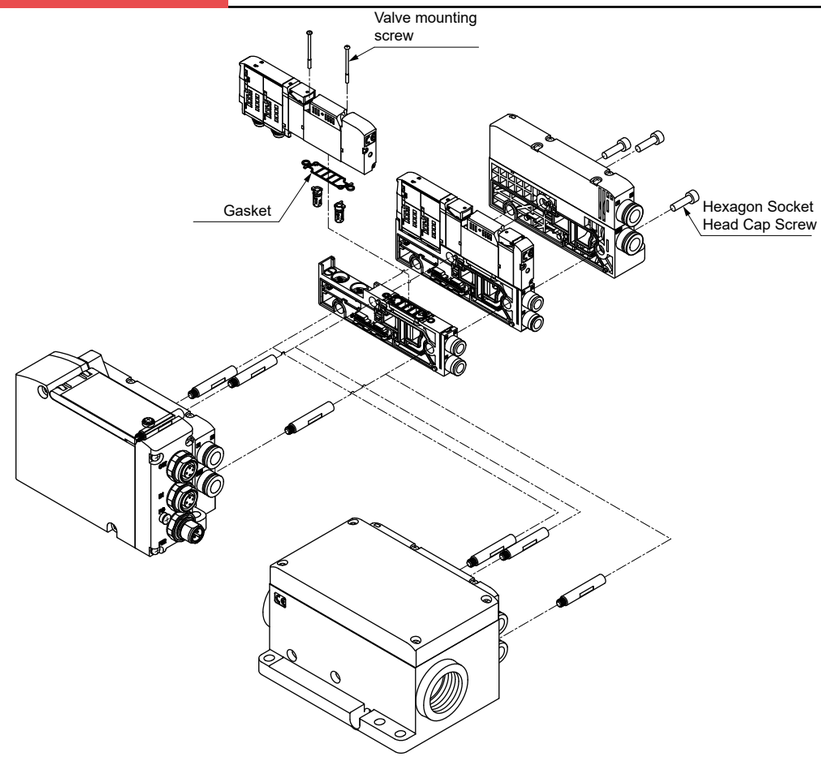


*For standard wiring (double wiring) When all points of the single solenoid valve are ON by a communication device unit, etc., the b side lamp lights because the operation lamp is built into the manifold base. However, this is not an error.

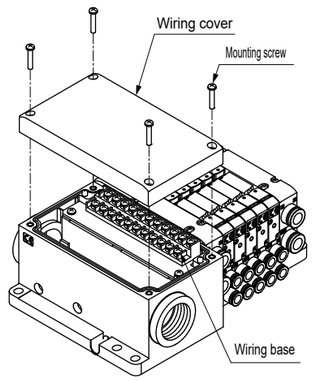
Single/Double mixed wiring

Similar to double wiring, the terminal block numbers will shift assignments. However, how they shift will depend on the solenoid valve. With types having one solenoid valve (2-position single), they shift for one valve position. With types having two solenoid valves (2-position double / 3-position), they shift for two valve positions.

Exploded view of block manifold



Removing the wiring cover



Increasing the valve blocks

①Remove the hexagon socket head cap screw.
②Remove all valve blocks and remove tie rods.
③Install a tie rod for the expansion stations to the wiring block. Be sure to install tie * to increase the number of stations on the wiring block. Install the original tie rod on the right side of the tie rod for the units being increased.
④Confirm that the gasket is flat in the groove and mount the valve block.
⑤Press so that there is no gap between blocks, and fasten with the hexagon socket head cap screw. Tightening Torque 1.1 to 1.3 N·m)

* Be sure to mount the tie rod before mounting the valve block.
* Take special care to prevent the gasket from getting caught in between blocks.

Replacing valves

Removing method

①Loosen the mounting screws (2-positions).
②Remove the valve from the valve block.

Installation method

Follow the removal procedure in reverse. Refer to the table below for the recommended tightening torque for the mounting screws.

Recommended tightening torque for the valve mounting screw

Model	Thread Size	Proper tightening torque (N·m)
TVG1	M1.7	0.19 to 0.21
TVG2	M2.5	0.35 to 0.40