CKD

G109-5274-A 2023.9.5

Handling Instructions

Remote I/O RT series
Valve I/F unit
for TVG series
TVG*P-TB-*-KA1C/KA1D

Thank you for purchasing CKD product.
Please review the precautions in this Handling Precautions thoroughly for safe operation of this product.
Incorrect usage may result in malfunction and dangers.
Keep this Precautions in a safe and convenient place for future reference.
For further information, refer to the instruction manual and product catalog.

Refer to the Handling Precautions of End unit for assembling and installing devices, and the Handling Precautions of Power supply unit for wiring power supply.

⚠ CAUTION

- An electric shock may occur by touching the electrical wiring connection (bare live part). Make sure to power off before wiring. Also, do not touch the live parts with bare hands.
- This product is DC dedicated. Use the product within the specified power voltage.
- Fully understand the contents of other units connected to this product before use.
- For details on the entire remote IO system including this product, refer to the "Remote I/O RTX Series Instruction Manual: System Construction".
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

1 Specifications

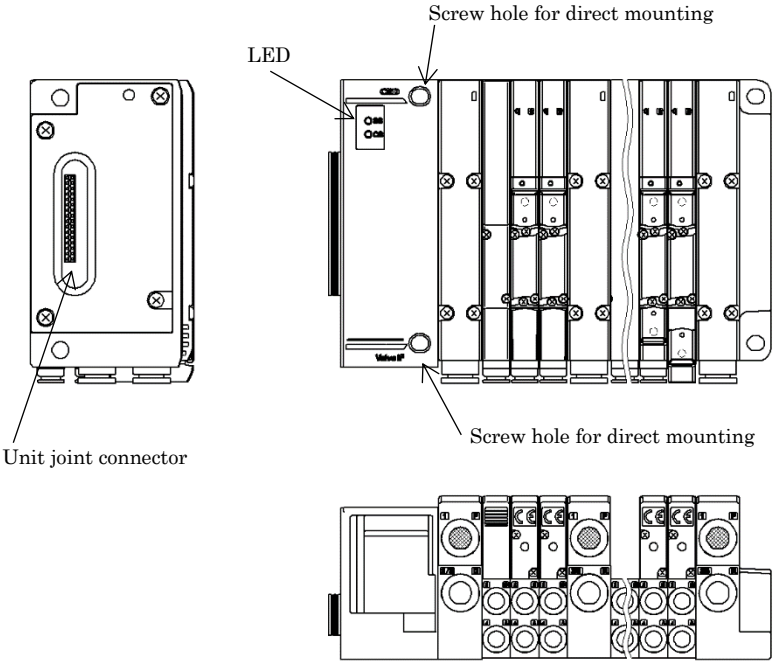
Always use the product within its specifications.

Item		Specifications	
Model No.		TVG*P-TB-*-KA1D	TVG*P-TB-*-KA1C
Net weight	g	TVG1 Approx. 280,TVG2 Approx.356	
Degree of protection		IP65 / IP67 (when connected) *1	
Working temperature range	℃	-10 to +55	
Relative humidity	%RH	30 to 85	
Ambient atmosphere		No corrosive gases or heavy dust	
Installation location		Indoor use	
Altitude	m	Up to 2000	
Pollution degree		3	
Polarity		PNP	NPN
Corresponding valve		TVG series	
Number of points		32 points (4 bytes)	
Response time	ms	ON: 0.5 or less / OFF: 1.0 or less	
Protection /Error detection functions		Yes	
Forced output setting		Output can be set regardless of process data	
Maximum load current	A	0.25/point, 2/unit	
Leakage current	mA	0.1 or less	
Power supply (for output)	V	DC24	
Internal current consumption (For Control/ input)	mA	15 or less	

Internal current consumption (for output)	mA	75 or less
LED		For indicating device and input status/ 2 pieces
Mounting method		Direct (using M5 screws)

* 1 The degree of protection structure of the entire manifold conforms to the degree of protection of the valve.

2 Names and functions of each part



3 LED indicators

These LEDs indicate the status of each point.

Name	Color	Description
SS	Green, yellow, red	Signal line Status: Indicates the status of the signal line.
CS	Green, yellow, red	Counter Status: Indicates the Off_On cycle counter status.

Name	Status	Meaning
SS	Red on	Internal bus communication disconnected
	Red blinking (fast)	Hardware error
	Red blinking (slow)	Signal line error detection
	Yellow on	Output power supply voltage error (detected by the device unit)
	Yellow blinking (fast)	Off_On cycle threshold over detection
	Green on	Normal
	OFF	Power OFF state
CS	Red on	Internal bus communication disconnected
	Red blinking (fast)	Off_On cycle threshold over detection point: 25 to 32
	Red blinking (slow)	Off_On cycle threshold over detection point: 17 to 24
	Yellow blinking (fast)	Off_On cycle threshold over detection point: 9 to 16
	Yellow blinking (slow)	Off_On cycle threshold over detection point: 1 to 8
	Green on	Off_On cycle threshold over detection point: 0
	OFF	Power OFF state

4 Wiring

There is no wiring on the product. For the wiring of the valves connected, refer to the instruction manual for each valve.

5 Maintenance

Refer to the "Remote I/O RT Series Instruction Manual: System Construction" for installing and removing this product.

⚠ CAUTION

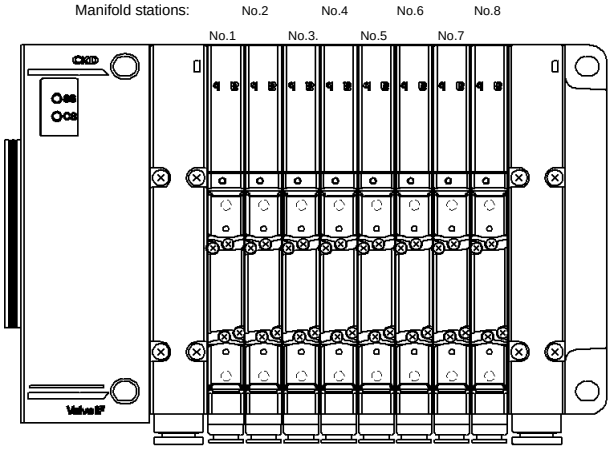
- Do not remove valve from the product by pulling cable or connector as it may cause cable disconnection or damage.
- An electric shock may occur by touching the electrical wiring connection (bare live part).
- Do not install the unit with dirt or dust on the unit opening, gasket, O-ring, etc.

6 Function List

Function	Description	Related settings
Power supply to manifold solenoid valves (via the internal bus)	Supplies power to connected manifold solenoid valves from the Valve I/F unit via the internal bus.	-
Signal line error detection	Detects short circuits, disconnections, and overheating in the power supply line (signal line) from the Valve I/F unit to connected manifold solenoid valves. Whether detection is performed depends on the "Signal line error detection" setting.	[Signal line error detection]
Signal line error recovery operation setting	Specifies whether to maintain the same behavior as during the signal line error when it has been recovered from, or return to normal from the most recent data update after recovery. If it maintains the same behavior as during the error, it will wait for the user to turn the power off and on again.	[Signal line error recovery operation]
Off_On cycle counts/over detection	Counts the number of times the Valve I/F unit's output signal has changed from OFF to ON. The counted number is stored in non-volatile memory once every 30 minutes (Note1). It can also detect when the set threshold is exceeded. Note 1: For EtherCAT communication, the Off_On cycle value can be found by reading the Off_On cycle value in the object dictionary.	[Output Off_On cycle threshold]
Forced output setting	Forces the Valve I/F unit's output signal to be either ON or OFF (regardless of the actual control data) from the PC software.	-
Output setting in the event of a communication error	If the device unit's DIP switch setting SW3 is OFF (set individually for each unit), this function determines whether to maintain the valve output of the Valve I/F unit, or turn it ON or OFF in the event of a communication error (industrial network communication or internal bus communication).	[Communication error operation]
Point diagnostic information for the unit	The diagnostic information for each of the valve I/F unit's points. 16 bits per point, and each bit corresponds to an error type. If an error is detected, the corresponding bit is 1 (ON). The information can be read from the PC software or upper master. The types of errors are as follows: Bit: Error description (genres of device diagnostics) 15: Signal line error (unit output) 14: Over output Off_On cycle threshold (unit output) 13: Hardware error (hardware) 12: On signal line error recovery, signal line error maintained (operation waiting)	-

7 Examples of valve No. arrays corresponding to solenoid output No.

7.1 Example of the number of stations



As an example, the diagram on the left (shows) a double solenoid type solenoid valve equipped in 8 stations.
For the single solenoid type, there is no solenoid on the b side.

7.2 Standard wiring(Double wiring)

It corresponds to the wiring of the double solenoid regardless of the "switching position classification" of the solenoid valves that are mounted (single or double solenoid). If only double solenoids are mounted, the result is the same as standard wiring.

Note: In the table below, each valve number (Valve No.) consists of a number (1 for the first valve, 2 for the second valve, and so on) and an alphabet (a for the a-side solenoid, b for the b-side solenoid, and so on).

7.2.1 Single solenoid valve

Valve IF point No.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No.	1a	-	2a	-	3a	-	4a	-	5a	-	6a	-	7a	-	8a	-

Valve IF point No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Solenoid output No.	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No.	9a	-	10a	-	11a	-	12a	-	13a	-	14a	-	15a	-	16a	-

7.2.2 Double solenoid valve

Valve IF point No.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No.	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b

Valve IF point No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Solenoid output No.	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No.	9a	9b	10a	10b	11a	11b	12a	12b	13a	13b	14a	14b	15a	15b	16a	16b

7.2.3 Mixed (both single and double solenoid valves are mounted) [Example]

Valve IF point No.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No.	1a	-	2a	-	3a	3b	4a	4b	5a	-	6a	-	7a	7b	8a	-

Valve IF point No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Solenoid output No.	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No.	9a	-	10a	-	11a	11b	12a	12a	13a	-	14a	-	15a	15b	16a	-

7.3 Single solenoid, double solenoid arrangement designation

7.3.1 Single solenoid valve

Valve IF point No.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No.	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a	13a	14a	15a	16a

Valve IF point No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Solenoid output No.	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No.	17a	18a	19a	20a	21a	22a	23a	24a	25a	26a	27a	28a	29a	30a	31a	32a

7.3.2 Double solenoid valve

Valve IF point No.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No.	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b

Valve IF point No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Solenoid output No.	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No.	9a	9b	10a	10b	11a	11b	12a	12b	13a	13b	14a	14b	15a	15b	16a	16b

7.3.3 Mixed (both single and double solenoid valves are mounted) [Example]

Valve IF point No.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Solenoid output No.	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16
Valve No.	1a	2a	3a	3b	4a	4b	5a	6a	7a	7b	8a	9a	10a	10b	11a	11b

Valve IF point No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Solenoid output No.	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No.	12a	13a	14a	14b	15a	15b	16a	17a	18a	18b	19a	20a	21a	21b	22a	22b

PRECAUTIONS

- Make sure that cables and connectors are securely connected before turning on the power.
- Do not disassemble, modify, or repair the product as that may cause failure or malfunction.
- Do not drop or apply excessive vibrations or shocks to the product as the part inside are made precisely.
- Do not attach or detach the connector while the power is ON as that may cause a failure or malfunction.
- Mold and rust may develop on the product if it is exposed to high humidity during transportation. Include moisture absorbers and tightly seal the package.

For inquiries regarding this product, please contact the following or the nearest sales office.

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