CKD

G108-3810-A 2023.6.30

Handing Precautions

DeviceNet Compatible Serial Transmission Device TVG series JA1* (OPP8-A2D/OPP8-A2D-P)

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

⚠ CAUTION

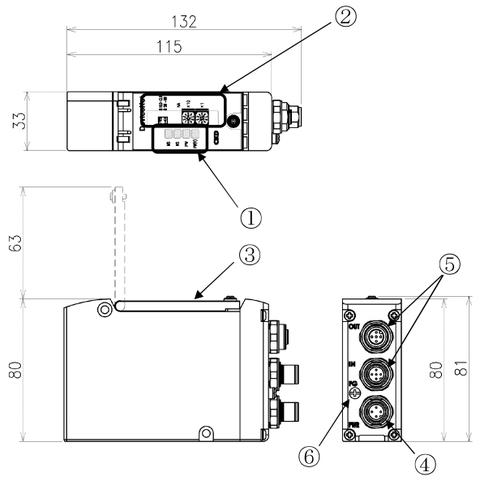
- Do not touch the live part with bare hands or the electrical wiring (bare live part), as an electric shock may occur.
- Read the instruction manual of the communication system before using the product.
- This product is DC dedicated. Use the product within the specified power supply voltage.

1. Device Specification : Always operate the device within its specifications.

Item	Specification	
Single unit model no.	OPP8-A2D	OPP8-A2D-P
Network power supply voltage	11.0 VDC to 25.0 VDC	
Network power current consumption	50 mA or less	
Valve power supply voltage	22.8 VDC to 26.4 VDC (24 VDC +10%, −5%)	
Valve power current consumption	10 mA or less (all points OFF) 15 mA or less (under no load with all points ON)	
Output type	+COM(NPN)	-COM (PNP)
Output points	32 output points	
Node address setting	0-63 (Dec)	
Output setting when communication error occurs	Hold (Hold all points output)/ Clear (Clear all points output)	
Insulation resistance	Between external terminals and the case: 30 MΩ or more with 500 VDC	
Withstanding voltage	Between external terminals and the case: 500 VAC for one minute	
Shock resistance	294.0 m/s2 for 3 times in 3 directions	
Storage ambient temperature	−20℃ to 70℃	
Storage humidity	30% to 85% RH (no dew condensation)	
Ambient temperature	−5℃ to 55℃	
Ambient humidity	30% to 85% RH (no dew condensation)	
Atmosphere	No corrosive gas	
Communication protocol	DeviceNet compliant	
Transfer rate (Baud rate)	Auto setting (125 kbps /250 kbps /500 kbps)	
Output insulation	Photo coupler insulation	
Leakage current	0.1 mA or less	
Residual voltage	0.5 V or less	
Fuse rating	Communication power supply: 24 V, 2 A / Valve power supply 24 V, 3 A (Both fuses are non-replaceable)	
Action indicator	LED (communication status, communication power supply and valve power supply *1)	

*1 Power status can be monitored only when the voltage within the specified range is supplied to communication power supply.

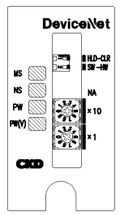
2. Dimensional outline drawing



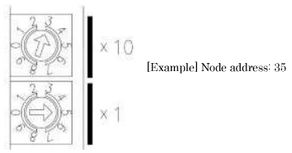
No.	Part name	Description
①	LED indicators	Indicate the status of the device unit and network with MS, NS, PW, and PW(V).
②	Switches	Rotary switches: Set the node address of the device unit. DIP switches: Set the output when a communication error occurs and the operation mode.
③	Cover	Protects the LEDs and setting switches.
④	Valve power plug (M12□1 port【PWR】 4-pin, A-cord)	Connects valve power socket (24 V).
⑤	Network connector (M12□2 ports【IN, OUT】 5-pin, A-cord)	IN: Input port for DeviceNet communication (plug) OUT: Output port for DeviceNet communication (socket)
⑥	FG terminal	Connects to FG.

3. Node address setting and LED indicators

3.1 Node address setting
Set the node address of the product.
The node address setting is read when the power is turned on.
The node address cannot be set in duplicate.



Switches	Settings
NA: (node address) ×10 : Sets tens place digit of the address × 1 : Sets ones place digit of the address	0 to 63 (In decimal)



[Example] Node address: 35

3.2 Other switch settings
Set output mode and operation mode when communication error occurs.
The setting is read into memory at power-up.

Switches	Settings
HLD-CLR (Output mode setting)	Set the output mode when a communication error occurs. (such as communication disconnection with PLC or timeout) CLR: Clear mode HOD: Hold mode
SW-HW (Operation mode setting)	Sets the operation mode. HW: Operates in hardware mode SW: Operates in software mode

3.3 Software mode
Node address and output mode can be set by software.
However, when setting the node address with software, set the NA switch value to 64 or higher.
* The node address at start-up will be the one that was last established for communication.
The factory default node address value is 1.

Switch settings by software mode

Switches	Description
NA	0 to 63: Switch settings-Enable 64 or more: Switch settings Disable (software settings-Enable)
HLD-CLR	Switch settings-Disable (software settings-Enable)

3.4 LED indicators

These LEDs indicate the status of the product and network.

LED	Details
MS	Indicates the status of the device related to DeviceNet with the LED (green and red) lighting. (On, blinking)
NS	Indicates the status of the network related to DeviceNet with the LED (green and red) lighting. (On, blinking)
PW	Green on when the communication power is on. (Off at error)
PW(V)	Green on when the valve power is on. (Off at error) This indicator is possible when the communication power is on.

MS･NS LED indicators

These LEDs indicate the status of the DeviceNet.
Refer to the following table for the description of LED indicators.

MS LED	NS LED	Details	Remark
Green ☼	Green ☼	I/O communication in progress	I/O data is being communicated between the controller and device unit.	Operating normally.
Green ☼	●	Node address duplication checking	Waiting for node address duplication checking to be completed at the controller.	In case only the certain device unit is in this condition, restart the unit after checking if the baud rate is the same as the controller.
Green ☼	Green ☼	Connection waiting	Waiting for connection establishment from the controller.	
Red ☼	●	Watchdog timer error	Watchdog timer error occurred in the device unit.	Replace the device unit.
Red ☼	Green ☼	Switch setting change during I/O communication	The status in which Rotary and DIP switch settings during I/O communication had been changed.	The switch settings had been changed during I/O communication. Red blinking of MS LED will become green (light) by putting back the switch to the former position or restarting and updating the device unit settings.
Red ☼	●	Improper switch setting	Rotary switch setting is not correct.	Restart the device unit after checking the switch setting.
Green ☼	Red ☼	Duplicate node address	Controller unit and Node address is duplicated	After re-setting the node address to avoid duplicate, restart the device unit.
Green ☼	Red ☼	Bus-off detection	Bus-off (communication stop status by multiple data errors)	Check the following and restart the device unit. *Matching controller and device baud rates *Proper cable lengths (trunk and branch lines) *Broken or loose cables *Installation of terminators at both ends of the trunk line *Excessive noise
Green ☼	Red ☼	Communication time out		
●	●	No communication power supply		After checking both node address and baud rate are set properly, supply the communication power supply.

☼: On ◐: Blinking ●: Off

⚠ CAUTION

- Set switches while the communication power is turned off.
- Keep the cover of serial transmission device closed except when setting the switches. The cover may get damaged or foreign matters may enter inside and cause unexpected failure.
- The setting switch is very precise and may be damaged in case of rough handling. The internal circuit board can be easily damaged.

4. Wiring

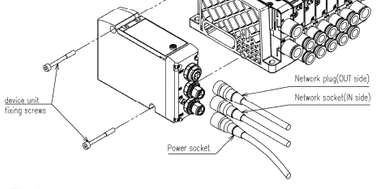
Function description and connection of the terminal are as following.

⚠ CAUTION

- Check the working voltage and polarity before wiring and energizing.
- If power is supplied to more than one device from one power supply, consider the voltage drop due to cables when selecting and wiring the cables.
- Since the device has no resistance to lightning surges, take measures against surges on the equipment side. For AC power model, use it in an installation category II environment.

4.1 Communication distance and wiring
Although the DeviceNet uses a dedicated DeviceNet communication cable.
Always understand their specifications thoroughly before wiring.
For details, refer to the instruction manual of the Controller unit manufacturer or ODVA.

4.2 Connecting and wiring to the valve power plug
In this product, the communication power supply and the valve power supply are separated.
Valve power supply is connected by an M12 4pin plug.
Follow the steps below to connect the valve power supply cable to the DeviceNet.
(Valve power supply cable 4pin DC)
＜Power cable＞
① After confirming safety, stop network communication and turn off all peripheral equipment.
② Refer to the figure below and wire the cables to the correct terminals on the power socket (24 V to 24 V, 0 V to 0 V).



Recommended M12 connector (socket): loose wire type power cable
XS2F-D421-□8□-□ M12 power cable Straight type Mfd by Omron Corporation
Note: □ differs depending on the cable specifications.

Recommended assembly type M12 connector and power cable
21 03 212 2305 M12 Assembly type connector Mfd by HARTING
* Pins 1 and 3 are not used.

⚠ CAUTION

- Check the polarity of the device and the cable terminal before connecting.
- Select the power cable by calculating the current consumption.

5. Maintenance

5.1 Mounting the product (Device unit)
① Set the node address, action taken in the event of an output mode and operation mode of the product.
② Assemble the product to the electrical component block and screw it with the device fixing screws.
③ Turn off the power (for communication /valve) and connect the communication connectors and power socket.
The system may start operating suddenly if they are connected while the power is turned on.
Be careful of the surroundings and secure safety before performing work.
④ After confirming safety, turn on each power supply.

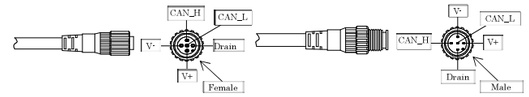
5.2 Removing the product (Device unit)
① After confirming safety, stop communication as necessary and turn off all peripheral equipment.
② After confirming safety, turn off the communication power and valve power as necessary.
③ Unscrew the device fixing screws and slowly remove the device from the electrical component block.

⚠ CAUTION

- Do not remove the device by pulling cable or connector that may cause cable disconnection or damage.
- An electric shock may occur by touching the electrical wiring connection (bare live part).

6. Settings by EDS file
In order for a DeviceNet device to participate in a network, it must be registered on the network using an EDS file that describes the device's communication specifications.
Refer to the instruction manual issued by the controller unit manufacturer for registering the EDS file.
Also, to ensure a suitable network configuration, use the latest EDS file complying with the model or product version.

4.3 Connecting and wiring to the communication connector (M12 connector)
The M12 connector for communication cable is not supplied with this product. Separately purchase a communication connector that satisfies the specifications.Wiring the communication cable enables the connector to connect to the communication connector on the device unit.
Follow the steps below to connect the communication cable to the communication connector.
＜Communication cable＞
① After confirming safety, stop communication and turn off all peripheral equipment.
② Refer to the following figure and wire the DeviceNet -compliant cable to the M12 connector (DeviceNet compliant).



Recommended M12 assembly type connector: A code 5Pin
2103 319 1501 M12 Assembly type connector (male) Mfd by HARTING
2103 319 2501 M12 Assembly type connector (female) Mfd by HARTING

Recommended network cable: DeviceNet dedicated cable
DCA2-5CN series DeviceNet Compatible cable Mfd by Omron Corporation

Pin	Signal	Function
1	Drain (none / bare wire)	Connect to the communication cable “Drain” of the controller unit or other device.
2	V+ (red)	Use 11 VDC to 25 VDC power with the least noise.
3	V- (black)	Use 11 VDC to 25 VDC power with the least noise.
4	CAN_H (white)	Connect to the communication cable “CAN_H” of the controller unit or other devices.
5	CAN_L (blue)	Connect to the communication cable “CAN_L” of the controller unit or other devices.

⚠ CAUTION

- Use a dedicated communication cable that complies with DeviceNet specifications.
- Provide sufficient bending radius for the communication cable and do not bend it forcibly.
- Separate the communication cable from power lines and high-voltage lines.

6.1 Registering the device
Check the address and Product Name of the device before registering, as both the device and EDS file will need to be matched first.
Refer to the following table for the device specifications and EDS file.

Specifications and the EDS files

Item	Specifications	
Model No.	OPP8-A2D	OPP8-A2D-P
Product Name	OPP8-2D	OPP8-2D-P
Output type	+COM (NPN)	−COM (PNP)
I/O points	32 points out put	
Name of EDS file	CKD_OPP8_2D_v2101.eds	CKD_OPP8_2D_P_v2101.eds

6.2 Output mapping
This device unit acts as an output device which transmits output data to valves after receiving.
Refer to the following table for data mapping the controller unit.

Data mapping

Output points	Output deta	Output Bit 00-15														Output Bit 16-31													
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
32 points	4 bytes	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

PRECAUTIONS
- To correspond with the requirements of the relevant EC Directive, use AC/DC adapter (e.g., switching power supplies) complying with EMC standards for the communication power and valve power supplies.
- The system or solenoid valve (cylinder) may operate suddenly when powering on and off. Be careful of the surroundings and secure safety before performing work.
- For the delay time, refer to the instruction manual of the master unit. Transmission delay as a system varies depending on the PLC scan time and other devices connected to the same network.
- For the Response time of the solenoid valve, check the solenoid valve specifications.
- Solenoid valve OFF time is delayed by approximately 20 msec due to the surge absorbing circuit integrated in the device.
- Wire the power cable and network cable properly within its specifications to avoid any incorrect wiring.
- Do not apply tension or impact to the power cable or network cable.
- 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.

CKD Corporation

Head Office and Plant
250, Ouji 2-chome, Komaki, Aichi, 485-8551, Japan
Phone: +81-(0)568-77-1111 /Fax: +81-(0)568-75-1123
Overseas Sales Administration Department
250, Ouji 2-chome, Komaki, Aichi, 485-8551, Japan
Phone: +81-(0)568-74-1338 /Fax: +81-(0)568-77-3461
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