Handling Instructions

IO-Link Compatible Serial Transmission Device

T8KC* / T8KCP*
(OPP7-*KC / OPP7-*KC-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

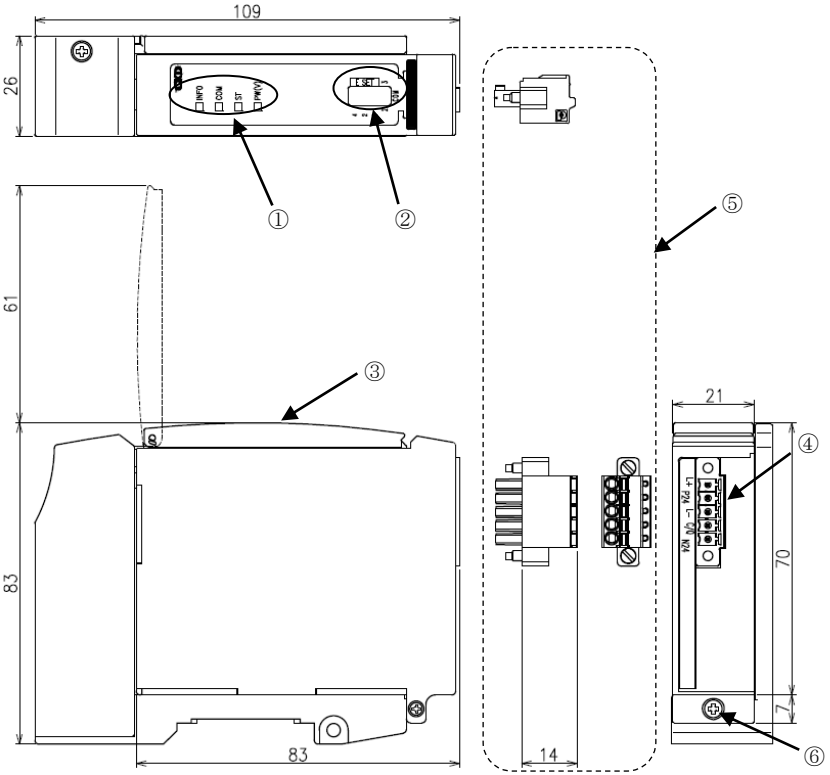
- An electric shock may occur by touching the electrical wiring connection (bare live part). Carry out wiring with the power turned off.
- Do not touch with wet hands when installing.
- Read the instruction manual of the communication system before using the product.
- This product is DC dedicated. Use the product within the specified power supply voltage.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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

Item	Specifications			
Model No	-T8KC1	-T8KC2	-T8KCP1	-T8KCP2
Single device model No.	OPP7-1KC	OPP7-2KC	OPP7-1KC-P	OPP7-2KC-P
Voltage rating	DC24V(±25%)			
Unit power voltage fluctuation range	DC18V～30V (IO-Link specifications)			
Unit power current consumption	50 mA or less (at 24.0 VDC with all points ON)			
Valve power voltage	22.8 VDC to 26.4 VDC (24 VDC+10%, -5%)			
Valve power current consumption	10mA or less (with all points OFF) 15mA or less (with all points ON at no load)			
Output type	+COM(NPN)		-COM(PNP)	
Number of output points	16 points	32 points	16 points	32 points
Output setting when communication error occurs	Selected by switch			
Insulation resistance	Between external terminals and the case: 30 MΩ or more with 500 VDC			
Withstand 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°C to 70°C			
Storage humidity	30 to 85%RH （no dew condensation）			
Ambient temperature	−5°C to 55°C			
Ambient humidity	30 to 85%RH （no dew condensation）			
Atmosphere	No corrosive gas			
Installation location	Indoor use			
Altitude	Up to 2000 m			
Pollution degree	2			
Communication protocol	IO－Link V1.1			
Transfer rate（Baud rate）	Selected by switch			
Output insulation	Photo coupler insulation			
Leakage current	0.1 mA or less			
Residual voltage	0.5 V or less			
Fuse	Valve power: 24V, 3A / Unit power 24V, 2A(Both fuses are not replaceable）			
Operation indicator	LED (communication status, Unit power and valve power status) Note 1			

Note 1: Status can be monitored when the unit power is supplied with the voltage within the specified range.

2. Dimensional outline drawing



① LED
Indicates the status of the slave unit and network with INFO, COM, ST and PW(V).

② Switches
Set the valve operation at communication error and transmission (baud) rate by slide switches.

③ Cover
Protects the LED indicators and setting switches.

④ Network socket
Connect the IO-Link network cable and unit/ valve power cable to this socket.

⑤ Network plug (supplied item)
Connect the IO-Link network cable and unit/ valve power cable to this plug

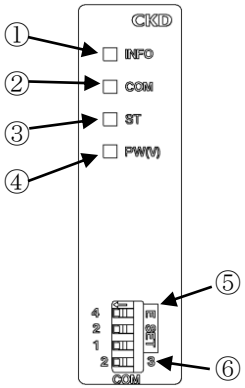
⑥ Slave unit fixing screw (M2.5 tapping screw)
Secures the slave unit to the slave unit connecting block.

3. LED indicators and Switches

3.1 LED indicators

These LEDs indicate slave unit status and network status.

Refer to the following table for the description.



No.	LED	Indication
①	INFO	Off（no used）
②	COM	Off ： Unit power OFF Green on ： Unit power ON (IO-Link communication has not started) Green blinking ： Unit power ON(In IO-Link communication)
③	ST	Off ： Operating normally Red blinking ： Needs maintenance Red on ： Hardware error (disconnection, memory error, etc.)
④	PW（V）	Off ： Valve power OFF Green on ： Valve power ON (This indicator is disable when the unit power is off.)

3.2 Switch settings

The switch setting is read when the power is turned on.

No.	name
⑤	Output setting in the event of communication error
⑥	Transmission (baud) rate setting

⑤Output setting in the event of communication error

E SET			Output mode	Valve operation at communication error
1 (4)	2(2)	3(1)		
OFF	OFF	OFF	Hardware mode	All points OFF
	OFF	ON		Final output data
	ON	OFF		All points ON
	ON	ON		The value of Process Data Out last received.
ON	-	-	Software mode	Set by IO-Link Network

⑥Transmission (baud) rate setting

COM	**Output mode**
OFF	COM3
ON	COM2

⚠ CAUTION

- Set switches while the unit power is turned off.
- The cover of serial transmission device can be opened and closed with one touch.
  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.
- Switches are precisely built and can be damaged if mishandled. Make sure not to touch the internal circuit board when setting the switches.

4. Wiring

Function description and connection of the terminal are as following.

⚠ CAUTION

- There is a risk of electric shock if the electric wiring connections (exposed live sections) are touched.always turn the power OFF before starting wiring work.Do not touch the live sections with wet hands.
- Do not apply tension or shocks to the power cable or network cable.
  If the wiring is long, the cable weight or shocks may cause an unexpected force and result in damage to the connector or device.
  Take appropriate measures; for example, secure the wiring to the machine or device midway.
- When wiring, be careful of the following points to prevent problems caused by noise.
  ① If noise could have an effect, prepare power for each manifold solenoid valve and wire independently.
  ② Wire the power cable as short as possible.
  ③ Wire the power cables for the product separately from the power cables for noise-generating devices such as inverter motors.
  ④ Wire the power cable and network cable away from other power lines as much as possible.
- Before handling an IO-Link device, touch a grounded metal part to discharge static electricity from your body.Static electricity may cause damage to the product.
- When conformity to UL is required, the unit must be used with a power supply which classified as "LIM (Limited Energy Circuit) or UL 1310 Class 2" which is insulated from MAINS by double or reinforced insulation.
- When conformity to UL is required, separate power supplies should unit and valve.

4.1 Communication distance and wiring

Although the IO-Link network uses a standard Common cable and has flexible wiring methods, there are limits depending on the wiring material, master, etc. used. Always understand their specifications thoroughly before wiring.

（For details, refer to the instruction manual of the master unit manufacturer or IO-Link Community.）

4.2 Connecting and wiring to the network connector plug

An IO-Link plug is supplied to this product. It can be connected to the IO-Link socket on the slave unit by wiring the unit power supply cable, valve power supply cable and network cable.

IO-Link plug (supplied item) :

FMC1,5/5-STF-3,5（1966127）	5-pin connector	PHOENIX CONTACT

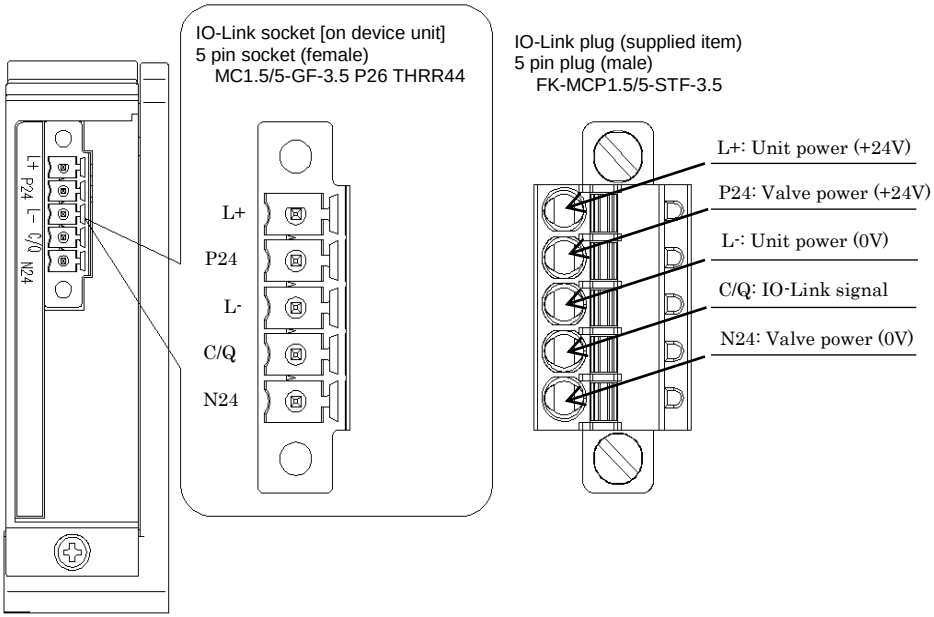
Recommended ferrules and crimp tools

Ferrule (without sleeve)	: A0.5～1,5-10	PHOENIX CONTACT
Ferrule (with sleeve)	: AI0.25～0.75-10	PHOENIX CONTACT
Crimping tool (in common)	: CRIMPFOX6（1212034）	PHOENIX CONTACT

Follow the steps below to connect the network cable, unit/valve power cables to the Network plug.

＜network / unit/valve power cables＞

(1) After confirming safety, stop network communication and turn off all peripheral equipment.
(2) Stripping length of wire coating is 10mm. As necessary, attach a terminal such as a ferrule to the cable to be connected.
(3) Refer to the figure below and wire by matching the polarity symbols.



Device unit

⚠ CAUTION

- Check the polarity of the device and the cable terminal before connecting.
- Select the power cable by calculating the current consumption.
- Consider the voltage drop due to cables when selecting and wiring the cables if power is supplied to more than one device from one power supply.
- Take measures to secure the specified power supply voltage if voltage drop cannot be avoided. For example, wire the power cables in multiple systems or install other power supplies to secure the specified power supply voltage.
- Install a terminal block if multi-drop wiring of the power cables is needed. Install the terminal block so that it comes before the power plug.

5. Maintenance

5.1 Mounting the product (device)

① Set the switches of the product.

② Turn off the power (for unit/valve) and connect the network plug.
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.

③ Hold this product and slowly insert it into the Device station connection block from the front along the side wall.

④ Make sure the Device Unit and the connecting block are connected and tighten the Device Unit mounting screw firmly. (Adequate tightening torque: 0.5N·m)

⑤ After confirming safety, turn on each power supply.

5.2 Removing the product (device)

① After confirming safety, stop network communication and turn off all peripheral equipment as necessary.

② After confirming safety, turn off Unit power and Valve power as necessary.

(If the Device Unit is the last Device and its power is turned off, the power supply to terminating resistance will stop and communication throughout the whole system may become unstable or even stop.)

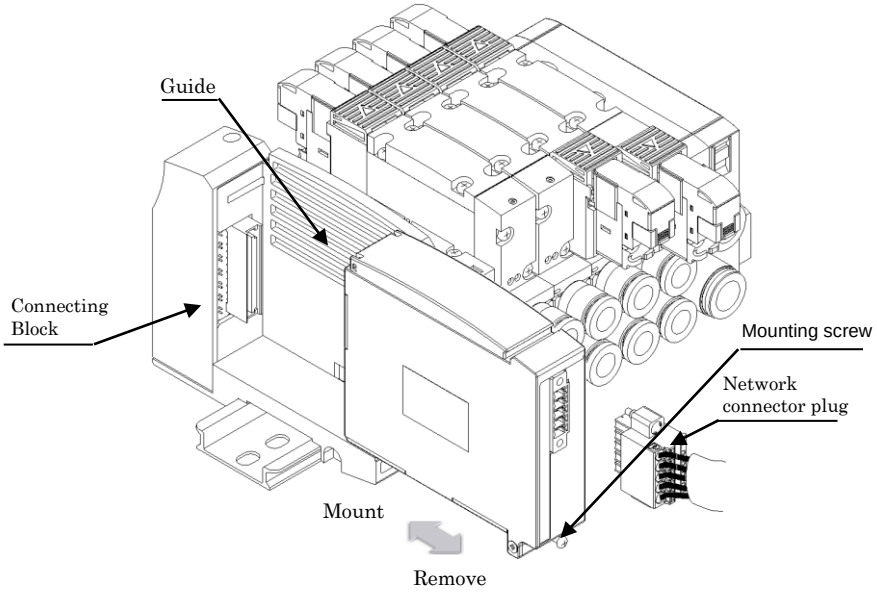
③ Remove the Device Unit mounting screw. Since this mounting screw is a fall-prevention type, stop loosening it as soon as it detaches from the Device Unit connecting block.

④ Hold the Device Unit and pull it toward you.

⑤ Remove the network connector plug.

⚠ CAUTION

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



6. IODD file setting

The IODD file describes the communication specifications of the device. Registering the IODD file may be necessary for connecting the device to the master unit. Refer to the instruction manual issued by the master unit manufacturer for registering the IODD file. Use the latest IODD file for proper network configuration.

6.1 How to register your device

Check the specifications (model name) of the slave unit and transmission (baud) rate before registering, as both the unit and IODD file need to be matched. Refer to the following table for the specifications and IODD file.

Specifications and model names in the IODD file

Item	Specifications			
Model No.	T8KC1		T8KCP1	
Single device model No.	OPP7-1KC		OPP7-1KC-P	
Output type	+COM（NPN）		－COM（PNP）	
Number of output points	16 output points		16 output points	
Transmission rate (Baud rate)	COM2	COM3	COM2	COM3
Device ID	0x200002	0x200003	0x200004	0x200005
Model name in the IODD file	CKD-OPP7_1KC _COM2-********	CKD-OPP7_1KC _COM3-********	CKD-OPP7_1KC_ P_COM2-********	CKD-OPP7_1KC_ P_COM3-********

Item	Specifications			
Model No.	T8KC2		T8KCP2	
Single device model No.	OPP7-2KC		OPP7-2KC-P	
Output type	+COM（NPN）		－COM（PNP）	
Number of output points	32 output points		32 output points	
Transmission rate (Baud rate)	COM2	COM3	COM2	COM3
Device ID	0x200006	0x200007	0x200008	0x200009
Model name in the IODD file	CKD-OPP7_2KC _COM2-********	CKD-OPP7_2KC _COM3-********	CKD-OPP7_2KC_ P_COM2-********	CKD-OPP7_2KC_ P_COM3-********

* ******** : According to IO-Link regulations, the date is listed.

6.2 Output data mapping

There is process data communication for the communication between the master and the device unit (this product). This product generally is a device that controls the valve using Process Data OUT communication. Refer to the following table for the Process Data OUT output mapping.

process data out mapping (16-point output)

Number of output points		process data out							
		bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
16 points	Octet 0	15	14	13	12	11	10	09	08
	Octet 1	07	06	05	04	03	02	01	00

* With the standard wiring of the double solenoid valve, the a-side solenoid close to this product is assigned Octet1_bit0 data 00, and the b-side solenoid is assigned Octet1_bit1 data 01 in order.

process data out mapping (32-point output)

Number of output points		process data out (bit)							
		bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
32 points	Octet 0	31	30	29	28	27	26	25	24
	Octet 1	23	22	21	20	19	18	17	16
	Octet 2	15	14	13	12	11	10	09	08
	Octet 3	07	06	05	04	03	02	01	00

* With the standard wiring of the double solenoid valve, the a-side solenoid close to this product is assigned Octet3_bit0 data 00, and the b-side solenoid is assigned Octet3_bit1 data 01 in order.

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 unit 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 the product, please contact the following or the nearest sales office.

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