

Ci-AF/DF/OF Serial CAN/DeviceNet/CAN Open Optical Fiber Repeater(protocol type)

ShenZhen Comark Technology Co., Ltd.

Tel: 86-755-26055466

Fax: 86-755-22630031

Post : 518126

Addr: Floor 4, Building G, No.2 Tangxi Industrial

Zone, No. 21, Xijing Road, Gu Shu, Xi Xiang, Bao'An

District, Shenzhen, 518126, P. R. China.

Website: <http://www.comark.cn>

Summary

Can/DeviceNet/CANOpen Fieldbus repeater Support Long distance transmission, various connectors, flexible Networking, stable performance, Anti-battery interference etc functions, suitable to the use of Power systems, Traffic, Energy monitoring etc industrial control field. Support Can2.0 A/B protocol CAN, DeviceNet, CANOpen, SDS, NMEA2000, SAEJ1939, SAE J2284 etc standards, And, Ci-AF series is the product based on CAN standard, can be compatible different kinds of Fieldbus, band rate can be set by the DIP switch, support 32 common rate. Ci-DF/OF Series is for the DeviceNet, CanOpen , support the all band rate required by the standard, can be set by DIP switch or auto negotiation. This series support 1~2 fieldbus ports and 1~2 Fiber ports, can deploy the ports according to the needs. Support redundant dual fieldbus structure and Ring fiber function, support point to point, Daisy chain, star topology, Redundancy optical fiber ring network topology and mixed networking. The product is Industrial grad designed, Casing: IP40 protection, wave grain aluminum reinforce case option, DIN rail mounting, DC(9~36v) power input, support optical fiber link failure and bus error alarm output, dual redundant power input and isolation protection. -40~75°C Operating Temperature, can meet various Industrial situation.

Characteristic

- Support independent logic dual CAN bus; support including CAN 2.0A&CAN2.0B 32 kinds of reserve rate of communication
- Support Dial switch for setting communication rate or rate adaptive
- Support 1~2 constant CAN bus, constant voltage 1000V
- The unit has 120 ohms, use corresponding switch to make it to be enable, support the protection function of 4000V anti-lightning
- Support 1~2 155Mbps Fiber Optic Ports, support Redundancy optical fiber ring network, solution cycle time < 20ms
- Support 5 pcs of LED status indicators with

More Reliable Connection, More Intelligent Life

dual-color, optical fiber link failure and bus error alarm output and LED indication

- DC (9~36V) dual redundant power input, With DC1500V voltage isolation and reverse connect protection
- IP40 protection, Metal case (wave grain aluminum reinforce case option), 35mm DIN-Rail Installation
- Operating Temperature: -40°C to 75°C suitable to various Industrial work situation

Ring Network

CAN/DeviceNet/CANOpen bus Optical Fiber Repeater Networking topology can achieve the net link below: point to point communication, chain network, star network, redundancy dual networks and fiber optic ring network self-healing protection, etc. The product uses flexibly, can make up many kinds of fiber optic networks. Logically independent dual bus electric interface, can achieve electric interface backup or single equipment access dual redundancy bus system; adopt point to point network can achieve connecting two segments of CAN/DeviceNet/CANOpen by fiber optic; adopt dual optical ports chain-shaped network fiber optic bus achieve multi-network-segments CAN/DeviceNet/CANOpen connection (maximum 200 pcs); meanwhile, the product adopt dual optical ports to achieve the function of dual fiber ring network redundancy, when fiber optic error somewhere, the system will rebuild the network link within 20ms, to guarantee the normal system communication, achieve the function of signal transmission self-healing protection, the system will recovery automatically after the network troubleshooting; this series products adopt Comark own R&D professional network protocol Ci-ring, no need any set, no need root knot, quickly finishing the network function of ring closing and ring opening, this series products can plug and play, no configuration, to simplify the user installation procedure at utmost.

Specification

Bus data interface

- 1~2 5PIN industrial terminal, conform to CiA&ODVA protocol standard
- Support CAN/DeviceNet/CANOpen bus standard

- Baud Rates: DeviceNet/CANOpen all rate level, up to 1Mbps
- Have the protection function of 4000V anti-lightning
- The unit has 120 ohms, use corresponding switch to make it to be enable(default disable)

Optical Interface

- Wave length: multi-mode 850nm、1310 nm; single mode 1310 nm、1550nm
- Fiber type: multi-mode 50/125um、62.5/125um、100/140um; single mode 8.3/125 um、9/125um、10/125um
- Transmission distance: multi-mode 2km, single mode 20km.
- Fiber interface type: ST/SC/FC (optional); ST (standard configuration).
- Single Fiber wavelength: A: Transmit wavelength is single mode 1310nm, then Receive wavelength is 1550nm; B: Transmit wavelength is single mode 1550nm, then Receive wavelength is 1310nm
- The optical line BER: 10^{-9}
- Signal Delay (optical interface): $\leq 2.3\mu\text{s}/\text{node}$

Power

- DC (9~36V) dual redundant power input, industrial standard voltage DC24V, consumption is less than 4W, With DC1500V voltage isolation and reverse connect protection, adopt 5 cores 5.08mm industrial terminal port (please use industrial standard power, otherwise it will occur unit error or damage).

Protection

- Relay: optical fiber link failure and bus error alarm output
- Contact rating: 1A @24V DC, Industrial Terminal port

Mechanical

- Dimensions (H×D×W): 136mm×104.8mm×52.8mm
- Weight: 800g
- Casing: IP40 protection, wave grain aluminum reinforce case option
- Installation: Wall mounting or DIN rail mounting

Environmental

- Operating Temperature: -40 °C ~75 °C (-40 °C ~85 °C optional)
- Storage Temperature: -40°C~85°C
- Ambient Relative Humidity: 5%~95%(non-condensing)

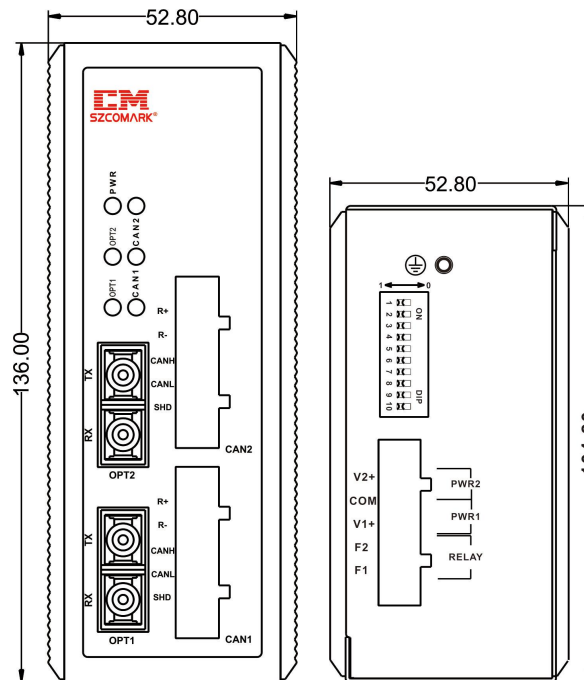
Warranty

- Warranty Period: 5 years

Certifications

- IEC61000-4-2(ESD): Power $\pm 4\text{KV}$ Contact, $\pm 15\text{KV}$ Air; Relay $\pm 6\text{KV}$ Contact, $\pm 15\text{KV}$ Air; Data Cable $\pm 15\text{KV}$ Air
- IEC61000-4-4(EFT): Power $\pm 4\text{KV}$, Data Cable $\pm 4\text{KV}$
- IEC61000-4-5(Surge): Power $\pm 2\text{KV}$ CM/ $\pm 1\text{KV}$ DM, Relay $\pm 2\text{KV}$ CM/ $\pm 1\text{KV}$ DM
- IEC60068-2-27(Shock)
- IEC60068-2-32(Free Fall)
- IEC61000-6-2(General Industrial Standard)
- EN50121-4 (rail transit)

Overall Dimension



Front view

Top view

LED Indicators

LED	state	Description	Alarm
PWR	off	Non-connect or error	No

OPT1-2	Green light	Power is ok	No
	Red light	Power Error	No
	off	Non-connect or error	No
	Red light	The following conditions are called optical link failure: 1. No optical signal. 2. Optical port fault.	Yes
	Red shine	Optical failure, but has data sending	Yes
CAN1-2	Green light	Fiber link is normal	No
	Green shine	Fiber link is normal, have Signal	No
	off	Fieldbus is closed	No
	Red light	The following conditions are called copper link failure: 1. No data received within 2 seconds on corresponding electric port. 2. Wrong setted.	Yes
CAN1-2	Red shine	Electric port fault but has data sending	Yes
	Green light	Copper port is normal	No
	Green shine	Copper port is normal, can received data	No

Terminal Resistor

Resistor is to eliminate the effect of the signal reflected in communication cable, can be connected in the two terminal nodes of the cable as needed. Photoelectric converter is to make cable bus segment, each segment on both ends of the cable can be an external resistor as needed. Please refer to the bus standard resistor connection mode, such as using splitter.

The equipment has 120 Ω termination resistor whose default setting is invalid. If the field needs, please put the short circuit wire between the R+ and R- to

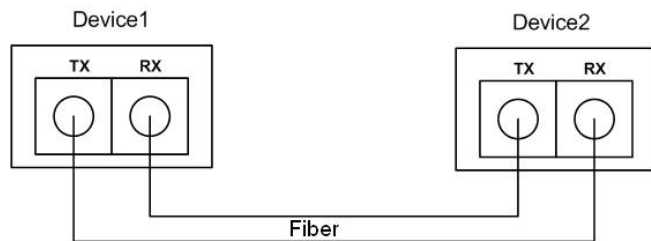
enable it. If you need other resistance, please extend it between CANH and CANL.

Connection

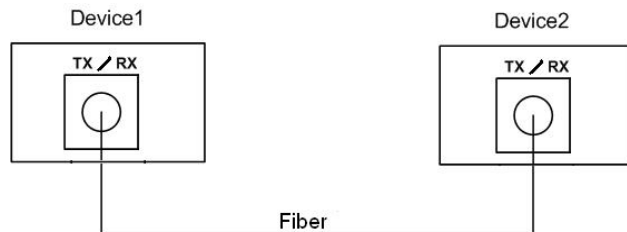
1. Bus cable wiring methods: connect bus cable CANL with 5 pin terminal CANL and CANH with bus cable CANH, make Brain shield cable connected with SHD and fixed the screw of the terminal. (The use of terminal resistance, refer to the above description)

2. Fiber connection methods:

as shown in the figure below, the optical fiber must cross connection, namely the RX connect other side TX, and TX to RX accordingly. Ci-AF11 is one fiber port device, suitable for point-to-point connection; Ci-AF12 is dual fiber port device, suitable for bus network topology, one optical port (OPT1) to connect with front-end equipment, the other optical port (OPT2) with back-end equipment, optical fiber must cross connection.



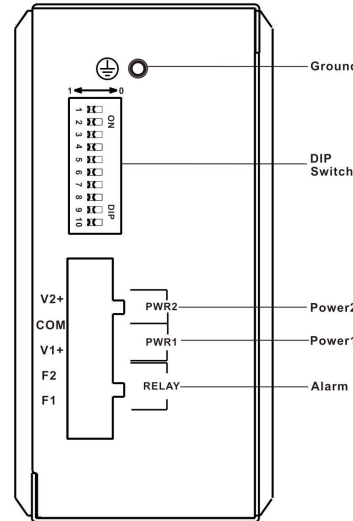
Single Fiber module(single fiber device), as shown in the figure below, single fiber can transmit and receive Signal,. Note, Single fiber use 2 different wavelength to transmit and receive signal, and its paired module transmit and receive wavelength is opposite.(Device1 transmit wavelength is 1310nm, receive one is 1550nm; device2 receive wavelength is 1310nm, transmit wavelength is 1550nm.)



3. Power connection as shown in the figure below, this device supports dual redundant input, V1 +, V2 +

respectively connect the anode of power supply (DC9 ~36V), COM with cathode (double power sharing).

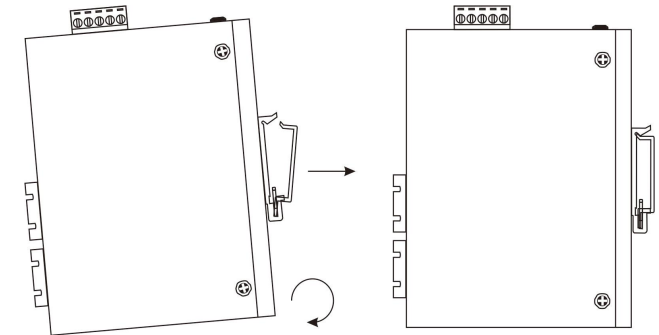
4. Relay alarm output connection: F1, F2 in normal open. When the alarm is closed, make F1, F2 both contacted in series with external alarm circuit (e.g., buzzer, etc.).(When there is no electricity on device, the relay is closed.)



DIN-Rail Installation

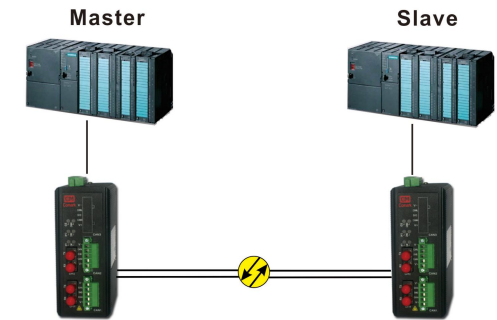
In order to use in industrial environments expediently, this series adopt 35mm DIN-Rail installation, the installation steps as follows:

- Step 1: Examine the DIN-Rail attachment
- Step 2: Examine DIN Rail whether be firm and the position is suitability or not.
- Step 3: insert the bottom of the DIN-RAIL into the slot, then insert the top of the DIN-RAIL into the slot.
- Step 4: after insert the DIN-RAIL into the slot, check the device is installed into the slot firmly.

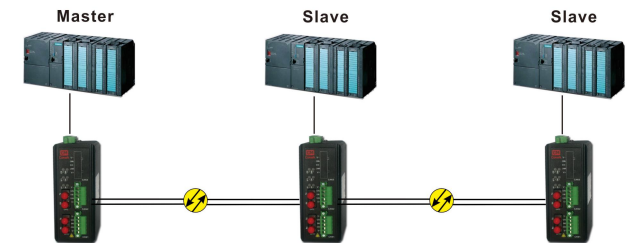


Typical Application

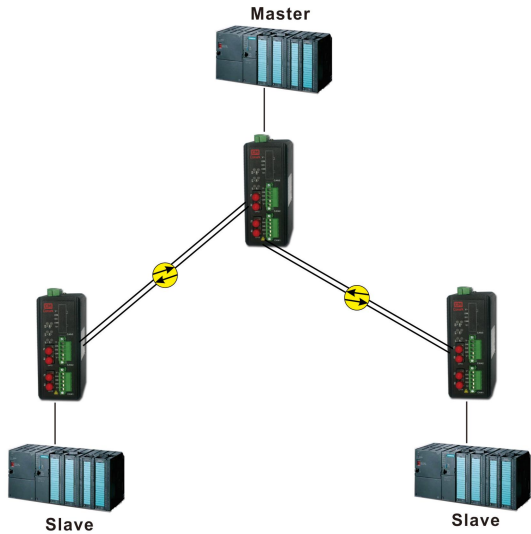
Point to Point



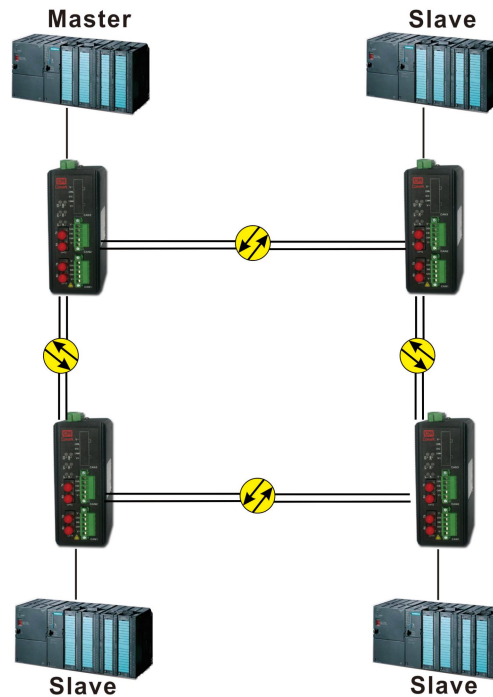
Daisy Chain



Star Topology



Redundancy optical fiber ring network topology



Troubleshooting

Fault Symptoms	What to Do
PWR off	Check and ensure the power supply meets the requirement, and terminal wiring is correct or not.
PWR Red light	Device working error
OPT1~2 light	Check the fiber port connection, the length and type is correct or not.
OPT1~2 Red Shine	Check the Fiber port connection, whether the port can receive data.
CAN1~2 off	CAN/DeviceNet/CANOpen data communication is abnormal, check the connector.
CAN1~2 Red shine	Check received data conform to transmit data from bus or not.

LED Normal, can't communicate

Check the systems time delay spec meet the fieldbus standard, please note the unit time delay addition effect, please modify PLC parameter.

Package Checklist

Please check accessories completely when open the box.

Packing list is as follows:

- CAN/DeviceNet/CANOpen Optical Fiber Repeater (with industrial terminal block for power equipment)
- Product specification
- Product warranty card

Cautions

- Please use DC24V Industrial standard power. Please use 0.75mm² above quality copper line.
- When relay alarm output, the voltage and current can exceed the rated one(1A@24VDC), otherwise, it will damage the unit.
- When the fiber port is not used, please use fiber cap to cover up to avoid pollute the fiber port.
- Please don't look the device fiber transmit port directly, avoid the light damage eyes.
- This device is precision communication instruction, please insure its ground connection well, the device ground connection is via the landing screw on the sideboard, please use the professional landing line, which is less than 2.5 mm², and landing resistor is less than 50ohms.

Order Information

Part No.	Product series	Description
Ci-AF11	1*copper,1*Fiber	CAN fiber-ring optic repeater, Dial switch for setting communication rate, CAN field bus standard, one electric port and one fiber port, 35mmDIN, Alert relay, MM/SM, ST/SC/FC optional.
Ci-AF12	1*copper,2*Fiber	CAN fiber-ring optic repeater, Dial switch for setting communication

		rate, CAN field bus standard, one electric port and two fiber port, 35mmDIN, Alert relay, MM/SM, ST/SC/FC optional.
Ci-AF21	2*copper,1*Fiber	CAN fiber-ring optic repeater, Dial switch for setting communication rate, CAN field bus standard, two electric port and one fiber port, 35mmDIN, Alert relay, MM/SM, ST/SC/FC optional.
Ci-AF22	2*copper,2*Fiber	CAN fiber-ring optic repeater, Dial switch for setting communication rate, CAN field bus standard, two electric port and two fiber port, 35mmDIN, Alert relay, MM/SM, ST/SC/FC optional.
Ci-DF11	1*copper,1*Fiber	DEVICENET fiber-ring optic repeater, Dial switch for setting communication rate, DEVICENET field bus standard, one electric port and one fiber port, 35mmDIN, Alert relay, MM/SM, ST/SC/FC optional.
Ci-DF12	1*copper,2*Fiber	DEVICENET fiber-ring optic repeater, Dial switch for setting communication rate, DEVICENET field bus standard, one electric port and two fiber port, 35mmDIN, Alert relay, MM/SM, ST/SC/FC optional.
Ci-DF21	2*copper,1*Fiber	DEVICENET fiber-ring optic repeater, Dial switch for setting communication rate, DEVICENET field

		bus standard, two electric port and one fiber port, 35mmDIN, Alert relay, MM/SM, ST/SC/FC optional.
Ci-DF22	2*copper,2*Fiber	DEVICENET fiber-ring optic repeater, Dial switch for setting communication rate, DEVICENET field bus standard, two electric port and two fiber port, 35mmDIN, Alert relay, MM/SM, ST/SC/FC optional.
Ci-OF11	1*copper,1*Fiber	CANOPEN fiber-ring optic repeater, Dial switch for setting communication rate, CANOPEN field bus standard, one electric port and one fiber port, 35mmDIN, Alert relay, MM/SM, ST/SC/FC optional.
Ci-OF12	1*copper,2*Fiber	CANOPEN fiber-ring optic repeater, Dial switch for setting communication rate, CANOPEN field bus standard, one electric port and two fiber port, 35mmDIN, Alert relay, MM/SM, ST/SC/FC optional.
Ci-OF21	2*copper,1*Fiber	CANOPEN fiber-ring optic repeater, Dial switch for setting communication rate, CANOPEN field bus standard, two electric port and one fiber port, 35mmDIN, Alert relay, MM/SM, ST/SC/FC optional.
Ci-OF22	2*copper,2*Fiber	CANOPEN fiber-ring optic repeater, Dial switch for setting communication rate, CANOPEN field bus standard, two electric port

		and two fiber port, 35mmDIN, Alert relay, MM/SM, ST/SC/FC optional.
--	--	---

Attached List 1 (Ci-AF series Baud rate switch set)

CAN1speed	SW[1...5]	CAN2 speed	SW[6...10]
7813	00000	7813	00000
10000	00001	10000	00001
11111	00010	11111	00010
12500	00011	12500	00011
14652	00100	14652	00100
15625	00101	15625	00101
18018	00110	18018	00110
20000	00111	20000	00111
22222	01000	22222	01000
25000	01001	25000	01001
27211	01010	27211	01010
31250	01011	31250	01011
35714	01100	35714	01100
45455	01101	45455	01101
50000	01110	50000	01110
57143	01111	57143	01111
62500	10000	62500	10000
74074	10001	74074	10001
83333	10010	83333	10010
100000	10011	100000	10011
125000	10100	125000	10100
166667	10101	166667	10101
190476	10110	190476	10110
250000	10111	250000	10111
285714	11000	285714	11000
333333	11001	333333	11001
444444	11010	444444	11010
500000	11011	500000	11011

571429	11100	571429	11100
666667	11101	666667	11101
800000	11110	800000	11110
1000000	11111	1000000	11111

Notes: Electrical interface CAN1 rate set by DIP switch SW [1...5], Electric interface CAN2 rate set by DIP switch SW[6...10]. CAN1, CAN2 rate can be set to difference.

Attached List 2 (Ci-DF/OF series Baud rate switch set)

SW	Function
S1	=1(default) enable OPT1 Fiber port alarm output =0 disable OPT1 Fiber port error alarm output
S2	=1(default) enable OPT2 Fiber port alarm output =0 disable OPT2 Fiber port error alarm output
SW[3...6]	Set rate of electric port CAN1. =0000 set bus rate as 10Kbps =0001 set bus rate as 20Kbps =0010 set bus rate as 50Kbps =0011 set bus rate as 100Kbps =0100 set bus rate as 125Kbps =0101 set bus rate as 250Kbps =0110 set bus rate as 500Kbps =0111 set bus rate as 800Kbps =1000 set bus rate as 1000Kbps =1111 rate adaptive
SW[7...10]	Set rate of electric port CAN 2. =0000 set bus rate as 10Kbps =0001 set bus rate as 20Kbps =0010 set bus rate as 50Kbps =0011 set bus rate as 100Kbps =0100 set bus rate as 125Kbps =0101 set bus rate as 250Kbps =0110 set bus rate as 500Kbps =0111 set bus rate as 800Kbps =1000 set bus rate as 1000Kbps =1111 rate adaptive

Notes:

1. Electrical interface CAN1 rate set by DIP switch SW [3...6], Electric interface CAN2 rate set by DIP

- switch SW [7...10].
2. When it is Ci-DF series products, support DeviceNet standard rate 125Kbps、250Kbps、500Kbps and rate adaptive.
3. When it is Ci-OF series products, support CANOpen standard rate 10Kbps、20Kbps、50Kbps、100Kbps、125Kbps、250Kbps、500Kbps、800Kbps、1Mbps and rate adaptive.

Note: above rate need to be corresponding to the models.