4 Channel Bi-Directional Contact Closure Fiber Optic Converter

Transmit 4 Contact Closure signals in both directions over Fiber with maximum reliability

Introduction

The RLH 4 Channel Bi-Directional Contact Closure Fiber Optic Converter transmits contact closure signals in both directions over fiber cable. Applications include alarm event triggering, building automation, environmental control systems, fire & alarm systems, gate control, traffic signal control equipment, and more.

The Contact Closure Inputs will either sense a dry contact closure or a wetting DC voltage signal depending on the model. The output relays have both normally closed and normally open terminals available for each relay. Each unit features an NC/NO system alarm contact for system monitoring, and convenient LED indicators to view system status.

This hardened, rugged system is designed for standard T35 DIN rail or wall mount applications. It is covered by our Lifetime Warranty.

4 Channel Bi-Directional Contact Closure Fiber Optic Converter

Features
Each output relay is rated for 60 Watts
Inputs are available with Dry contact sensors or Voltage sensing (wet) inputs
Each Input is optically isolated for maximum protection
Output relays can be wired either normally open or normally closed
Alarm contact for system status monitoring
Compatible with all MSA compliant Gigabit SFPs
Hardened to operate in -40°C to +70°C (-40°F to +158°F)
DIN rail or Wall Mount (Wall mount ears included)
Redundant Power Inputs (12~48VDC)
Designed, Engineered, and Assembled in the USA
Lifetime Warranty

General Safety Practices

Intended Audience

This guide is intended for use by knowledgeable installation, operation and repair personnel. Every effort has been made to ensure the accuracy of the information in this guide. However, due to constant product improvement, specifications and information contained in this document are subject to change without notice.

Conventions

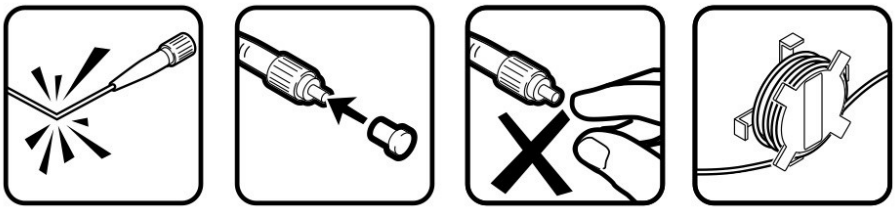
Symbols for notes, attention, and caution are used throughout this manual to provide readers with additional information, advice when special attention is needed, and caution to prevent injury or equipment damage.

The equipment discussed in this document may require tools designed for the purpose being described. RLH recommends that service personnel be familiar with the correct handling and use of any installation equipment used, and follow all safety precautions including the use of protective personal equipment as required.

Caution - Severe Shock Hazard

- Never install during a lightning storm or where unsafe high voltages are present
- Active phone lines may carry high DC voltages. Use caution when handling copper wiring
- Do not open the enclosure, there are no user serviceable parts

Guidelines for handling terminated fiber cable



- Do not bend fiber cable sharply. Use gradual and smooth bends to avoid damaging glass fiber
- Keep dust caps on fiber optic connectors at all times when disconnected
- Do not remove dust caps from unused fiber
- Keep fiber ends and fiber connectors clean and free from dust, dirt and debris. Contamination will cause signal loss
- Do not touch fiber ends
- Store excess fiber on fiber spools at site

Laser Safety

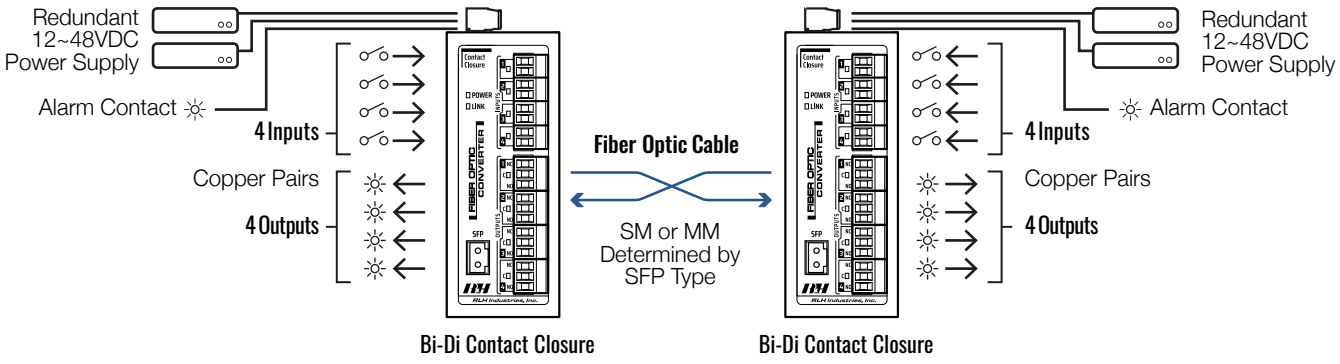
Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cable connected to a transceiver emit laser light that can cause eye damage.

System Description

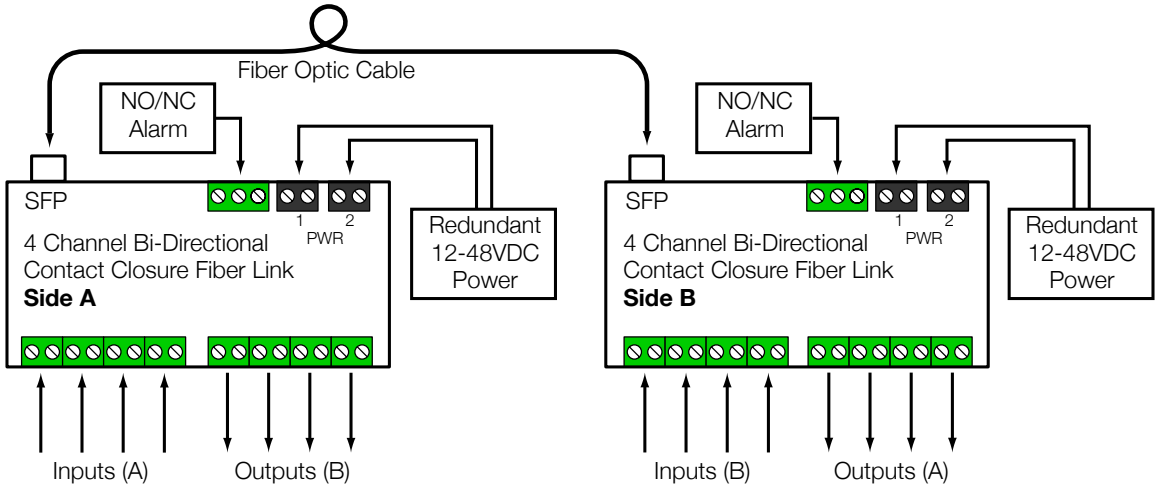
Applications

By utilizing fiber optic cable, the 4 Channel Bi-Directional Contact Closure DIN Fiber Link system provides absolute electrical isolation between both ends of the network. It is immune to EMI/RF interference, ground loops, and high voltage surges from lightning or ground faults, and is ideal in electrically noisy environments such as near large power sources, electrical motors, and radio communications equipment.

Additionally, the contact closure system allows the use of fiber cable infrastructure to transport relay alarms to and from locations over distances of up to 120km, depending on the SFP transceiver being used. Using a fiber optic contact closure system can simplify messaging and eliminate the need for a PLC or IED to transport the status of remote alarms and IO.



System Diagram



System Connection Diagram

Commonly Used Acronyms & Abbreviations

Name	Description
TX	Transmit
RX	Receive
PWR	Power
CH	Channel
DRY	Input does not require voltage to sense a Dry contact
WET	Input expects DC Voltage IN
Digital Input	An ON or OFF (1 or 0)
NO	Normally Open
NC	Normally Closed

Installation

Prior to Installation

Check for shipping damage:

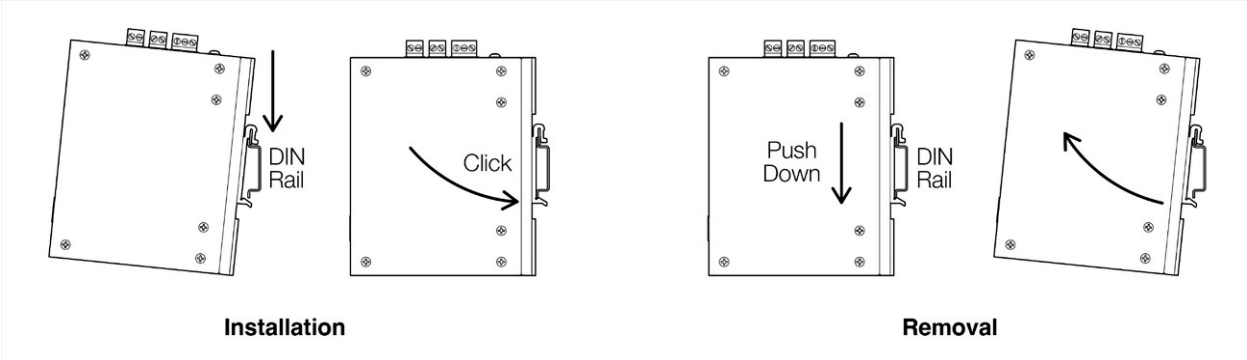
- Check the contents to ensure correct model and fiber type
- Have a clean, dry, installation environment ready

Required for installation:

- 12-48 VDC Power Source
- T35 DIN rail or suitable wall mount location
- A weatherproof enclosure is required for outdoor use

DIN Rail Mounting

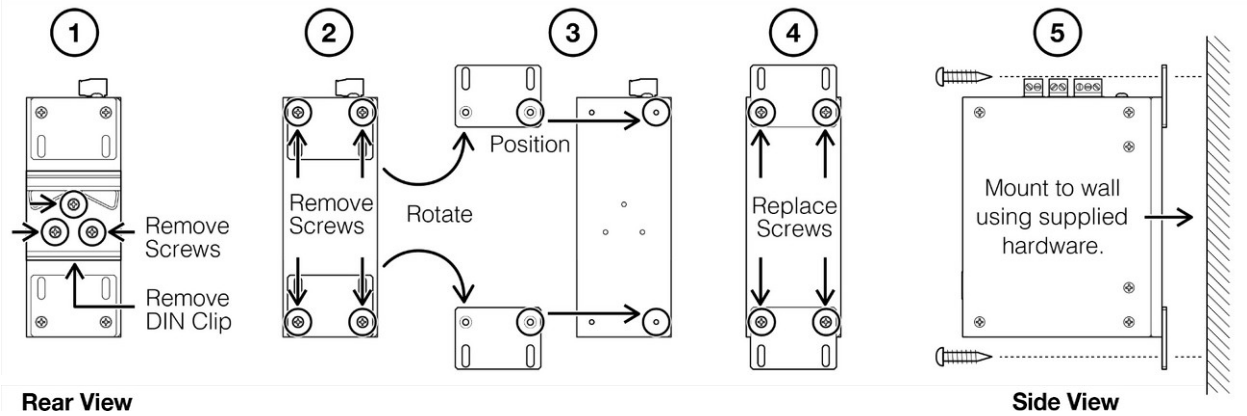
The DIN clip for mounting the system is mounted onto the rear panel. Hook the DIN clip on the top flange of the DIN rail, press down and rotate to the locked position to install. To remove, push down to depress the spring latch and rotate off of the DIN rail.



DIN Rail Mounting

Wall Mounting

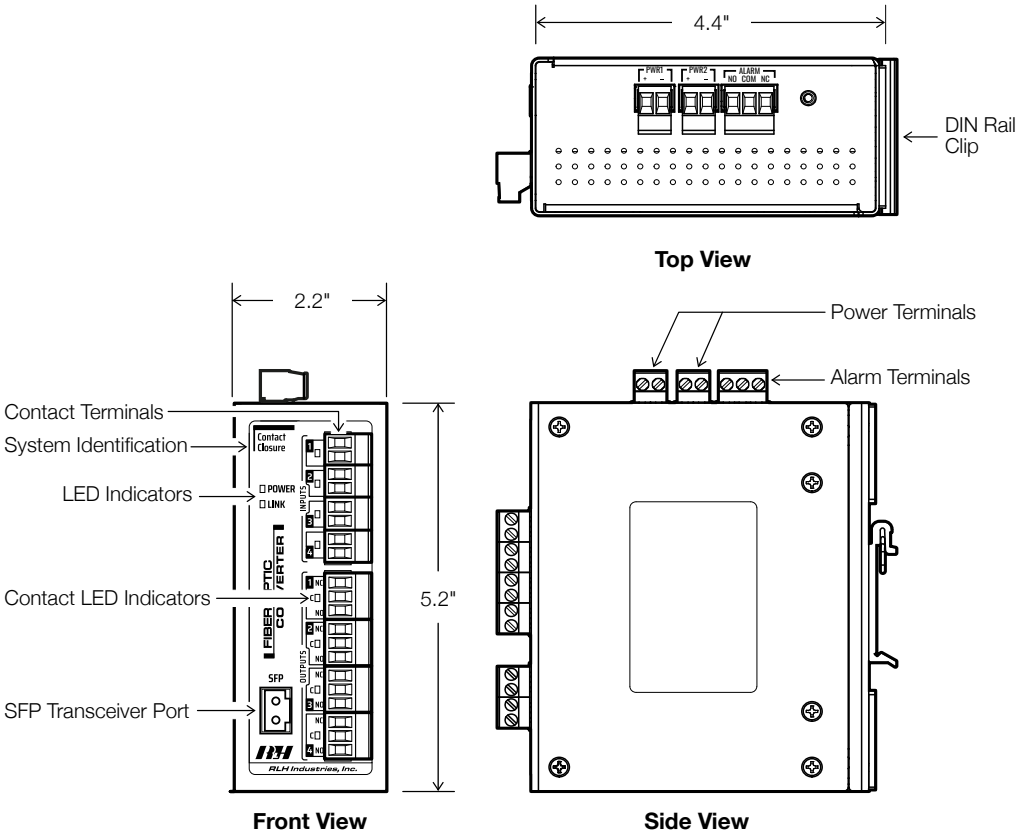
The system can be easily wall mounted by using the provided wall mount ears and hardware. Attach the wall mount ears by following the instructions below. Use a #6 or equivalent screw to mount the unit to the wall or panel.



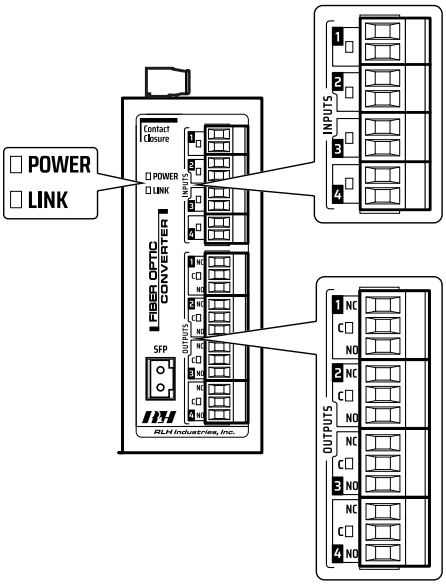
Wall Mounting

Front Panel

The front panel contains the input and output contact terminals, LEDs, and the SFP Transceiver fiber port.



Front Panel LEDs

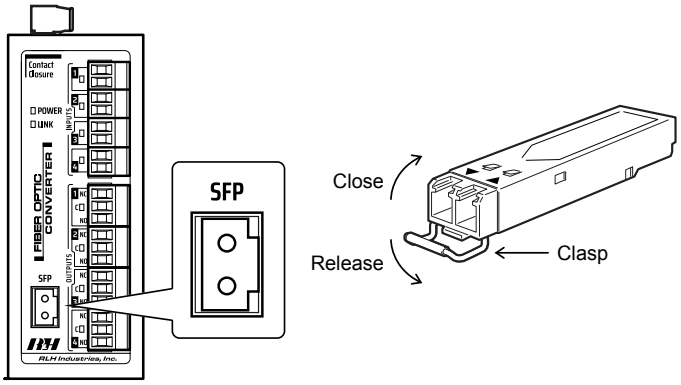


LED	Name	Status	Condition
Power	Power Indicator	ON	DC input power OK
		OFF	DC Input power failed
Link	System Link	Flashing	Fiber Link OK
		OFF	Fiber Link Failed
Inputs 1-4	Input Sensors	ON	Signal Present
		OFF	No Signal Present
Outputs 1-4	Output Relays	ON	Signal Present
		OFF	No Signal Present

SFP Transceiver

This system requires MSA compliant Gigabit fiber optic SFP transceivers. An Industrial grade SFP is recommended to enable reliable operation throughout the entire operational range. SFP transceivers are sold separately.

- Dual fiber systems require identical SFP transceivers
- Single fiber systems require a matching pair, side A and side B
- Close clasp and slide the SFP transceiver into the port
- To remove, pull the clasp back to release it, and then slide it out



SFP Transceiver

Connect Fiber Optic Cable

The optical ports are for use with SFP transceivers only. Remove the dust caps from the SFP transceiver and fiber connectors. Plug the cable(s) securely into the SFP.

- Dual fiber systems require the fiber port to be connected to the fiber port on the other end
- Once the system is properly connected and power is applied, the LINK LED should FLASH

Connect Copper Wire Pairs

The wire pairs from the sensor or controller equipment connect to the green screw-down terminals on the transmitter and receiver modules labeled Input and Output.

- Do not apply voltage to the Input terminals when using a dry input model (FBX-CC-BIDI-DR-1)
- The contact terminals may be removed and accept wire sizes 16~26 AWG
- Fully seat the terminal block back into the connector before operating the system

Receiver Alarm Contact Wiring

The contact will alarm when the fiber link is down or due to a power failure.

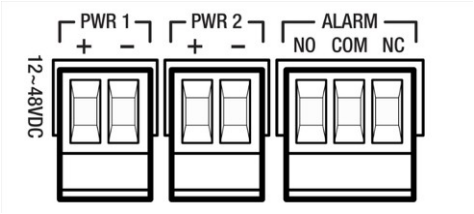
- Use the NO or NC contact positions as required
- The alarm terminal block may be removed and accepts wire sizes 16~26AWG
- Fully seat the terminal block back into the connector before operating the system
- An alarm terminal is present on both the Transmitter and Receiver

Connect Power Cable

Ensure power supply is OFF prior to wiring the system. Connect a 12-48VDC power supply to the screw down terminals located on the top of the unit.

- Requires one (1) 12-48VDC power supply. Use a second power source for redundant power
- The terminal blocks are removable and accept wire sizes 16~26 AWG
- Fully seat the terminal blocks back into the connector before operating the system

Note: The power inputs are polarity insensitive. Be sure to convert the appropriate power source is being used before wiring.



Power and Alarm Terminals

Troubleshooting

Ensure power supply is OFF prior to wiring the system. Connect a 12-48VDC power supply to the screw down terminals located on the top of the unit.

- Requires one (1) 12-48VDC power supply
- Use a second power source for redundant power
- The terminal blocks are removable and accept wire sizes 16~26 AWG
- Fully seat the terminal blocks back into the connector before operating the system

If trouble is encountered, verify all copper, serial cable and fiber connections, signal and voltage levels, if the alarm is on, check the fiber cable and connections, or the power supply and connections of the unit on the other end. If trouble persists, contact technical support at RLH Industries, Inc.

support@fiberopticlink.com
Toll Free: 1-855-754-2497

System Specifications

Inputs 1~4:	**Model: FBX-CC-BIDI-DR-1**	Dry (0-100 ohms) contact closure
	Model: FBX-CC-BIDI-05-1	Wet 5V (3.3~10VDC / 5mA)
	Model: FBX-CC-BIDI-24-1	Wet 12/24V (8~27VDC / 5mA)
	Model: FBX-CC-BIDI-48-1	Wet 24/48V (20~52VDC / 5mA)
	Optical Isolation	3.5kV
Outputs 1~4:	**Relay Type**	Mechanical, SPDT Relay, Form C
	Max. Power	60W / 125VA
	Max. Voltage	220VDC / 250VAC
	Max. Current	2A AC/DC
System Response Time:	5ms typical, 10ms maximum	

General Specifications

Fiber Port:	1 Gigabit SFP Slot, Accepts MSA compliant 1.25Gbps SFPs (Sold separately)	
LED Indicators:	Power, Fiber, Input/Outputs 1~4	
Power Input:	Standard Model	12~48VDC (11~53V)
	-A powering option	125VDC (42~160V)
	Dual redundant power options - Polarity insensitive	
Power Consumption:	8 Watts Maximum	
DC Input Isolation (In/Out):	1.5KV	
Overcurrent Protection:	1.0A	Automatic Recovery
System Alarm:	Normally Open / Closed Relay	
Temperature:	Storage	-40°C to +85°C (-40°F to +185°F)
	Operating	-40°C to +70°C (-40°F to +158°F)
Dimensions:	H 5.2" x W 2.2" x D 4", (131mm x 56mm x 102mm) - not including DIN clip	
Weight:	1.6 lbs. (0.73kg)	
Mounting:	Includes standard T-35 DIN rail clip and wall mount ears	
Humidity:	95% non-condensing	
Compliance:	NDAA, TAA, FCC Class A, CE, RoHS, UL Listed	
Warranty:	Lifetime - Visit www.fiberopticlink.com for warranty information and coverage details	

Ordering Information

Description	Part Number
4 Channel Bi-Directional Contact Closure Fiber Optic Converter, Dry Contact Inputs, 1 SFP Slot, Powered by 12~48VDC	**FBX-CC-BIDI-DR-1**
4 Channel Bi-Directional Contact Closure Fiber Optic Converter, 5VDC Wet Inputs, 1 SFP Slot, Powered by 12~48VDC	**FBX-CC-BIDI-05-1**
4 Channel Bi-Directional Contact Closure Fiber Optic Converter, 12-24VDC Wet Inputs, 1 SFP Slot, Powered by 12~48VDC	**FBX-CC-BIDI-24-1**
4 Channel Bi-Directional Contact Closure Fiber Optic Converter, 24-48VDC Wet Inputs, 1 SFP Slot, Powered by 12~48VDC	**FBX-CC-BIDI-48-1**

- A complete system requires **TWO** units
- Add **-A** to the end of the part number for 125VDC powering option
- Single fiber (bi-directional) SFP transceivers must always be paired, side A and side B

RLH Certified SFP Transceivers

Description	Mode	Conn.	Distance	Fibers	Wavelength	Part Number
Multimode, LC, 550m/1804 feet, Dual Fiber, 850nm	MM	LC	550m/1804 feet	Dual Fiber	850nm	**SFP-1G-03-2**
Multimode, LC, 2km/1.2 miles, Dual Fiber, 1310nm	MM	LC	2km/1.2 miles	Dual Fiber	1310nm	**SFP-1G-04-2**
Singlemode, LC, 20km/12.4 miles, Dual Fiber, 1310nm	SM	LC	20km/12.4 miles	Dual Fiber	1310nm	**SFP-1G-30-2**
Singlemode, LC, 60km/37 miles, Dual Fiber, 1550nm	SM	LC	60km/37 miles	Dual Fiber	1550nm	**SFP-1G-31-2**
Singlemode, LC, 120km/74 miles, Dual Fiber, 1550nm	SM	LC	120km/74 miles	Dual Fiber	1550nm	**SFP-1G-34-2**
Singlemode, LC, 20km/12.4 miles, Single Fiber – Side A, Tx1310/Rx1550	SM	LC	20km/12.4 miles	Single Fiber Side A	T-1310/ R-1550	**SFP-1G-20-2**
Singlemode, LC, 20km/12.4 miles, Single Fiber – Side B, Rx1310/Tx1550	SM	LC	20km/12.4 miles	Single Fiber Side B	T-1550/ R-1310	**SFP-1G-21-2**
Singlemode, LC, 60km/37 miles, Single Fiber – Side A, Tx1310/Rx1550	SM	LC	60km/37 miles	Single Fiber Side A	T-1310/ R-1550	**SFP-1G-24-2**
Singlemode, LC, 60km/37 miles, Single Fiber – Side B, Rx1310/Tx1550	SM	LC	60km/37 miles	Single Fiber Side B	T-1550/ R-1310	**SFP-1G-25-2**

- Single fiber (bi-directional) SFP transceivers must always be paired, side A and side B

Contact

By Mail:	ATTN: Sales RLH Industries, Inc. 936 N. Main Street Orange, CA 92867	
By Phone:	Local	714-532-1672
Sales/Service	Toll Free	800-877-1672
Mon - Fri, 6am - 6pm, PST		866-DO-FIBER
By Email:	info@fiberopticlink.com	
By Fax:	714-532-1885	

Support

By Email:	support@fiberopticlink.com	
By Phone:	Toll Free	855-754-2497
		855-RLH-24X7