

# 4 Channel 4~20mA/0~10VDC Analog Data Fiber Link System

## SYSTEM INSTALLATION INFORMATION

### Description

The 4 Channel 4~20mA / 0~10VDC Analog Data Fiber Link Card system provides a transmission of up to four independent analog signals over one optical fiber. This system is designed to operate in harsh industrial environments and is temperature hardened for reliability. These cards are compatible with any RLH card housing or shelf, and are covered by our **Limited Lifetime Warranty**.

#### Analog Transmitter Card

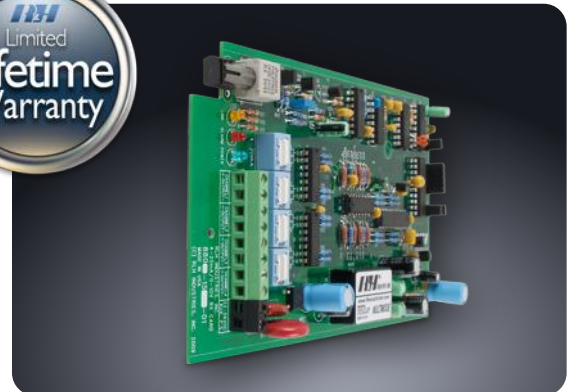
The transmitter card provides the electrical-to-optical interface between four independent analog 4~20mA or 0~10VDC inputs and a fiber strand. Each channel may be selected for 4~20mA or 0~10V signal protocols. The transmitter requires a 22-56VDC local power source for operation, and has an LED for power status.

**Note:** The transmitter card may be configured for use with 0~5VDC or 0~20mA signals. Consult RLH for additional information.

#### Analog Receiver Card

The receiver card provides the optical-to-electrical interface between a fiber strand and four independent analog 4~20mA or 0~10VDC outputs. Each channel may be selected for 4~20mA or 0~10V signal protocols. The receiver card requires a 22-56VDC local power source for operation, and has LED indicators to display power, alarm, and fiber link status.

**Note:** The receiver card may be configured for use with 0~5VDC or 0~20mA signals. Consult RLH for additional information.



4 Channel 4~20mA / 0~10VDC Analog RX Card

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### Standard Features

Environmentally rugged with wide operating range:  
-40°F to +158°F (-40°C to +70°C)

Convenient LED status indicators

4 Channels on each card

DC power is not polarity sensitive

Up to 12 cards in a RLH 12 card housing

### Limited Lifetime Warranty

## General Safety Practices

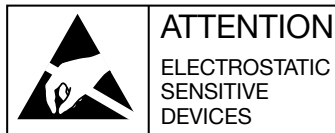
The equipment discussed in this document may require tools designed for the purpose being described. RLH recommends that service personnel be familiar with the correct handling and use of any installation equipment used, and follow all safety precautions including the use of protective personal equipment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

### Caution - Severe Shock Hazard

- Never install during a lightning storm or where unsafe high voltages are present.
- Use caution when handling copper wiring and follow appropriate safety regulations.

## Special handling requirements

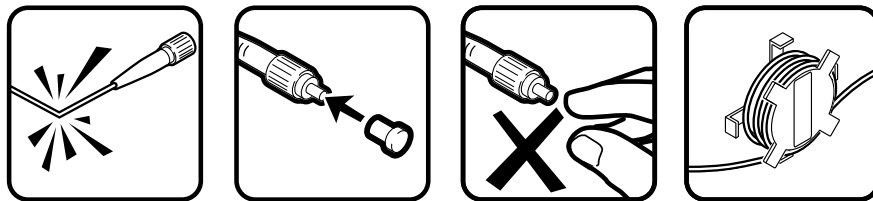
### Be careful when handling electronic components



- This product contains static sensitive components.
- Handle Fiber Link cards at their edges only.
- Use only with RLH Fiber Link Card housings
- Follow proper electrostatic discharge procedures.

This card utilizes circuitry that can be damaged by static electricity. When transporting the card, carry it in an ESD safe container such as the antistatic bag provided with the card. Before handling cards, discharge yourself of static electricity by physical bodily contact with earth ground. When handling cards, hold by outer edges and avoid touching circuitry. Failure to follow ESD precautions may cause serious damage to the card and prevent proper operation.

### 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 housing spools or fiber spools at site

# Acronyms

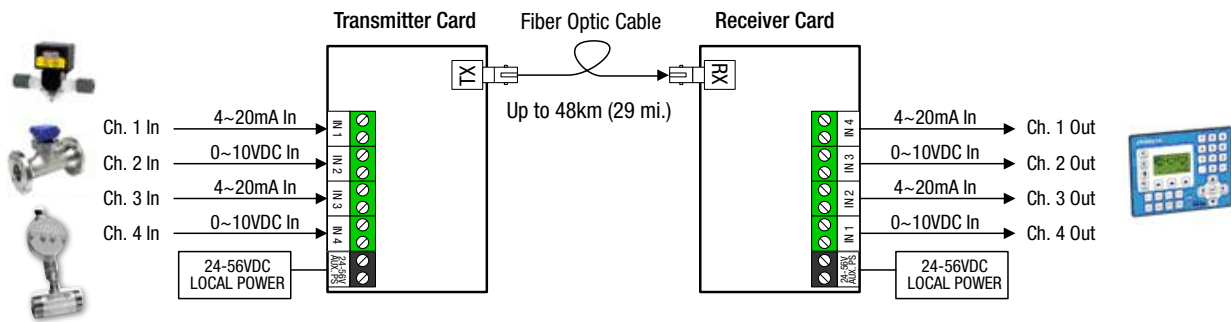
Commonly used acronyms and abbreviations.

| Acronym/Abbreviation | Description     |
|----------------------|-----------------|
| <b>RU</b>            | Rack Unit (EIA) |
| <b>TX</b>            | Transmit        |
| <b>RX</b>            | Receive         |
| <b>PWR</b>           | Power           |
| <b>CH</b>            | Channel         |

# Application

Network and control equipment in high voltage areas can be at risk due to Ground Potential Rise (GPR). A copper network cable referenced to a remote ground can become a path for high voltages during a ground fault. Placement of all-dielectric fiber optic cable (instead of copper) eliminates the presence of a remote ground, which dramatically increases safety of personnel and reliability of equipment when high voltages are present. By utilizing fiber optic cable, the 4~20mA/0~10VDC Fiber Link System provides absolute electrical isolation between both ends of the network.

Fiber optic cable 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 such as generators, pumps, electrical motors, and radio communications equipment. Fiber optics is superior for long distance communications without the distance restrictions of copper wiring.



**4 Channel 4~20mA / 0~10VDC System Diagram**

# 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
- Ensure that the fiber type at the site matches the system type

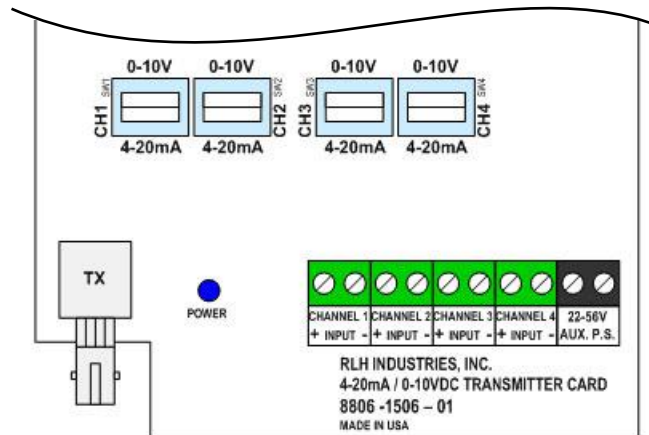
If damage is discovered file a claim immediately with the carrier, then contact RLH customer service.

## Required for installation:

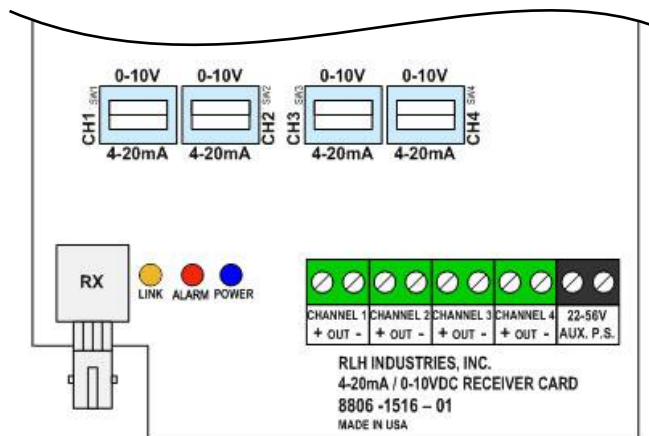
- 24-56VDC (15mA@24VDC minimum) power source at the TX side
- 24-56VDC (100mA@24VDC minimum) power source at the RX side
- RLH Fiber Link Card housing with available mounting slot
- Multimeter

Measure the DC voltage of the source power to ensure that it is 24-56VDC. All electrical and fiber optic connections are made directly onto the card.

The 4~20mA / 0~10VDC Fiber Link card is designed to be installed into any RLH card housing.



**Transmitter Card Connectors**



**Receiver Card Connectors**

### Connect fiber optic cable

Fiber Link Contact Closure Cards are equipped with an optical connector. Connect the fiber cable between the Transmitter card marked "TX" and Receiver card marked "RX" optics. Fiber cable should always be routed loosely avoiding tight bends.

### Connect copper pairs

Connect the wire pairs from the sensor or controller equipment to the green screw-down terminals on the Transmitter and Receiver Cards labelled CHANNEL 1 through CHANNEL 4. Observe polarity on the input and output connectors.

### Connect Power

Connect a 24-56VDC (15mA minimum) power source to the black "AUX. P.S." screw-down terminal on the Card. The power input is not polarity sensitive.

## Configuration

The Transmitter card can accept 0~10VDC or 4~20mA inputs and the Receiver can output 0~10VDC, 2~10VDC, or 4-20mA signals. Each channel can be set individually. Refer to the following set up information:

### 4~20mA in and 4~20mA out (Factory Setting)

- Set switch labeled CH1, 2, 3 or 4 (SW1, SW2, SW3, SW4) on both cards to 4-20mA
- On Transmit card, set Range Limit jumper (J3, J4, J5, J6) to "B"

### 0~10VDC in and 0~10VDC out

- Set switch labeled CH1, 2, 3 or 4 on both cards to 0-10V
- On Transmit card, set Range Limit jumper to "A"

### 4~20mA in and 0~10VDC (or 2~10VDC) out

- Set switch labeled CH1, 2, 3 or 4 to 4~20mA on Transmit card, then set Range Limit jumper to "B"
- Set switch CH1, 2, 3 or 4 to 0~10VDC on Receive card

**Note:** The Receive card's output may be set to 2~10VDC instead of 0~10VDC by changing the Transmit card's Range Limit jumper to the "A" position.

### 0~10VDC in and 4-20mA out

- Set switch labeled CH1, 2, 3 or 4 on Transmit card to 0~10VDC, Range Limit jumper is set to "A"
- Set switch CH1, 2, 3 or 4 to 4~20mA on Receive card

## Troubleshooting

If trouble is encountered, verify all installer connections, signal and voltage levels. If trouble persists, replace the unit and retest. If technical assistance is required, contact RLH Industries, Inc. Technical Support.

## General Specifications

|   |  |
|---|--|
| <b>Transmission method</b>                    | Frequency modulated light via a single optical fiber   |
|   | Multimode: 850nm   |
|   | Single-mode: 1310nm  |
|   | Single-mode Long Haul: 1310nm  |
| <b>Maximum Fiber Attenuation / Distance *</b> | Multimode: 6dB / 1.2 miles (2km)   |
|   | Single-mode: 8dB / 9 miles (15km)  |
|   | Single-mode Long Haul: 24dB* / 29 mi. (48 km), min. required loss *-8dB  |
|   | *Note: Distances equated using industry standard fiber and connector attenuation of 3dB/Km. Fiber condition, splices and connectors may affect actual range. |
| <b>Fiber Type</b>                             | ST or SC connectors  |
|   | Multimode: 62.5/125µm, 50/125µm  |
|   | Single-mode: 8-9/125µm   |
| <b>Wire Connector</b>                         | Screw clamp terminal blocks, 16 ~ 26 AWG   |
| <b>Input 1-4 (TX Card)</b>                    | 4~20mA current loop or 0~10VDC   |
| <b>Output 1-4 (RX Card)</b>                   | +/- 2% accuracy 500 Ohm maximum loop resistance  |
| <b>Response Time</b>                          | 10ms   |
| <b>Surge Protection</b>                       | PTC thermistors, zener diodes and varistors  |
| <b>Power Requirements</b>                     | TX Card: 24-56VDC, 15mA min.<br>12V power option: 9~36VDC  |
|   | RX Card: 24-56VDC, 100mA minimum   |
| <b>Powering Method</b>                        | Local DC power source  |
| <b>Operating Temperature</b>                  | -40° to +158° F (-40° to +70° C), 95% non-condensing   |
| <b>Dimensions</b>                             | Standard RLH Fiber Link Card, L7" x W4"x H1"   |
| <b>Warranty</b>                               | Limited Lifetime <i>Visit <a href="http://www.fiberopticlink.com">www.fiberopticlink.com</a> for warranty details</i>  |

## Ordering Information

| Optics         | Fiber  | Distance                 | Description | Part Number            |
|----------------|--------|--------------------------|-------------|------------------------|
| Multimode SC   | 62.5µm | 2km / 1.2 mi.            | TX Card     | <b>8805-1506-01</b>    |
|                |        |                          | RX Card     | <b>8805-1516-01</b>    |
|                | 50µm   | 2km / 1.2 mi.            | TX Card     | <b>8805-1506-01-50</b> |
|                |        |                          | RX Card     | <b>8805-1516-01-50</b> |
| Multimode ST   | 62.5µm | 2km / 1.2 mi.            | TX Card     | <b>8806-1506-01</b>    |
|                |        |                          | RX Card     | <b>8806-1516-01</b>    |
|                | 50µm   | 2km / 1.2 mi.            | TX Card     | <b>8806-1506-01-50</b> |
|                |        |                          | RX Card     | <b>8806-1516-01-50</b> |
| Single-mode SC | 8~9 µm | 15km/ 9mi                | TX Card     | <b>8805-1526-01</b>    |
|                |        | 48km/ 29mi               | TX Card     | <b>8805-1526-01-LH</b> |
|                |        | 15km/ 9mi. & 48km/ 29mi. | RX Card     | <b>8805-1536-01</b>    |
| Single-mode ST | 8~9 µm | 15km/ 9mi                | TX Card     | <b>8806-1526-01</b>    |
|                |        | 48km/ 29mi               | TX Card     | <b>8806-1526-01-LH</b> |
|                |        | 15km/ 9mi. & 48km/ 29mi. | RX Card     | <b>8806-1536-01</b>    |

- ▶ A complete system requires 1 **TX** card and 1 **RX** card
- ▶ Please contact your RLH sales representative for pricing and delivery information



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Specifications subject to change without notice.