

## USER GUIDE

### Analog Signal 4~20mA Fiber Link System

#### Transmits a 4~20mA Analog Signal over Fiber

The Analog Signal DIN Fiber Link system transmits a 4~20mA analog signal over one optical fiber. It also offers a 12 bit signal resolution and less than 0.2% source signal variance.

Compatible with most PLC's, Sensors (2, 3, or 4 wire), and other types of equipment where a precise current measurement must be taken and transmitted over fiber. The system comprises of a transmitter (Analog Input) and a receiver (Analog Output), each device has a compact DIN and wall mountable housing.

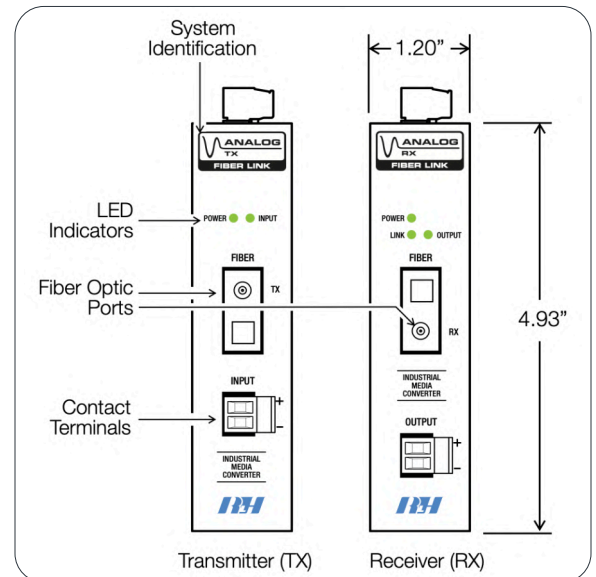
This compact and rugged system provides convenient and easy to read LEDs, supports both single-mode and multimode fiber applications, and includes an alarm the receiver side for monitoring system power and fiber health. Designed to operate over an extreme temperature range, providing reliability in harsh environments. Designed and Made in the USA and covered by our Limited Lifetime Warranty.

#### Key Features

- Rugged design – Extreme operating temperature rating
- Convenient LEDs for power, fiber, and 4~20mA signal
- Single and dual fiber models available
- Available with ST or SC connectors & single or multimode fiber
- Transmit a 4~20mA signal over fiber
- Update rate: 1,300 samples a second
- 12 Bit signal resolution
- 99.8% accuracy or better
- Alarm contact for status monitoring
- Built-in surge, over current, and polarity reversal protection
- DIN rail or wall mount (Includes wall mount ears)
- Limited Lifetime Warranty
- Made in USA



Analog Signal 4~20mA Fiber Link System



Dimensions

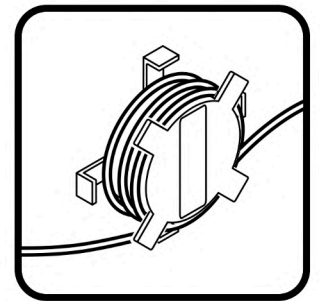
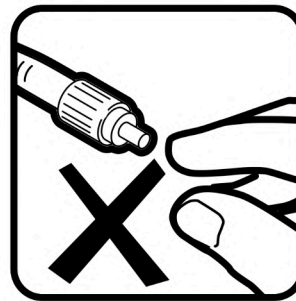
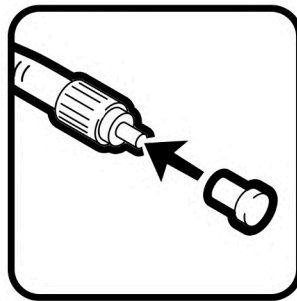
## General Safety Practices

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 HAZZARD

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

### 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

## Commonly Used Acronyms & Abbreviations

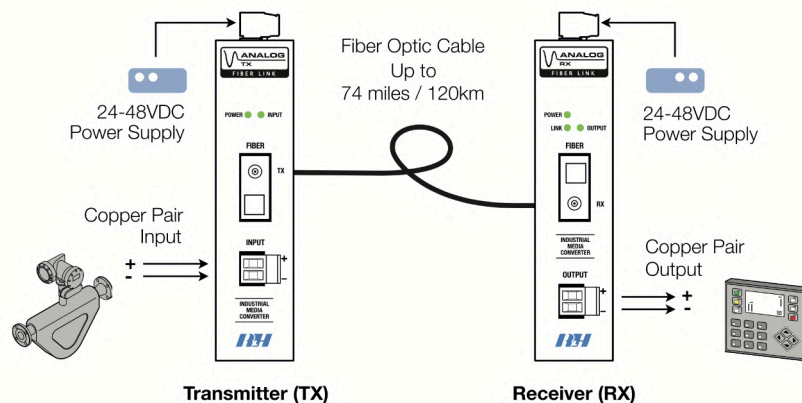
Name	Description
TX	Transmit
RX	Receive
PWR	Power
NC	Normally Closed
Com	Common
NO	Normally Open
TRX	4~20mA Transmitter
RCV	4~20mA Input/Receiver
Sinking	Does not provide signal voltage or current, expects the voltage and current to be present on the signal line
Sourcing	Provides signal voltage and current

## Applications

By utilizing fiber optic cable, the 4~20mA Analog Signal system provides absolute electrical isolation between both ends of the communications 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.

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) completely eliminates the presence of a remote ground, which dramatically increases safety of personnel and reliability of equipment.

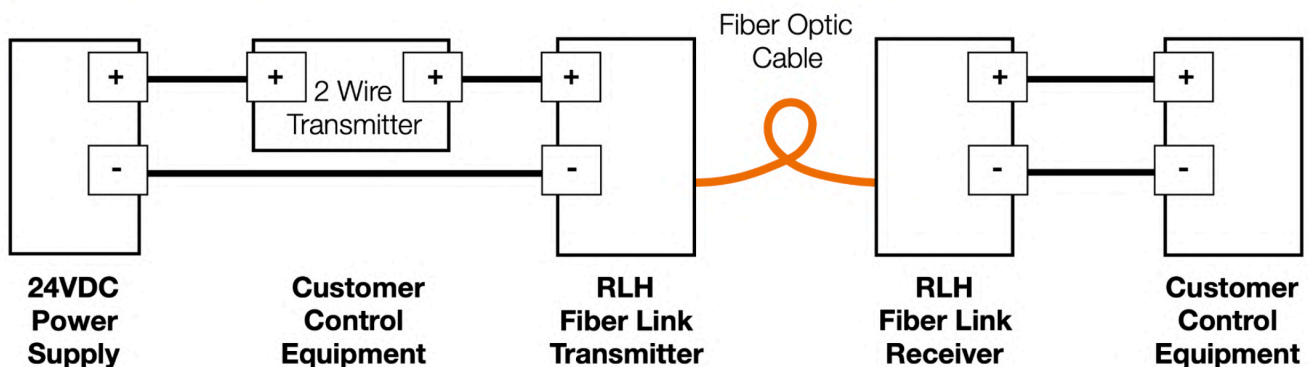
## System Diagram



Typical System Diagram

## 4~20mA System – 2-Wire Transmitter Wiring

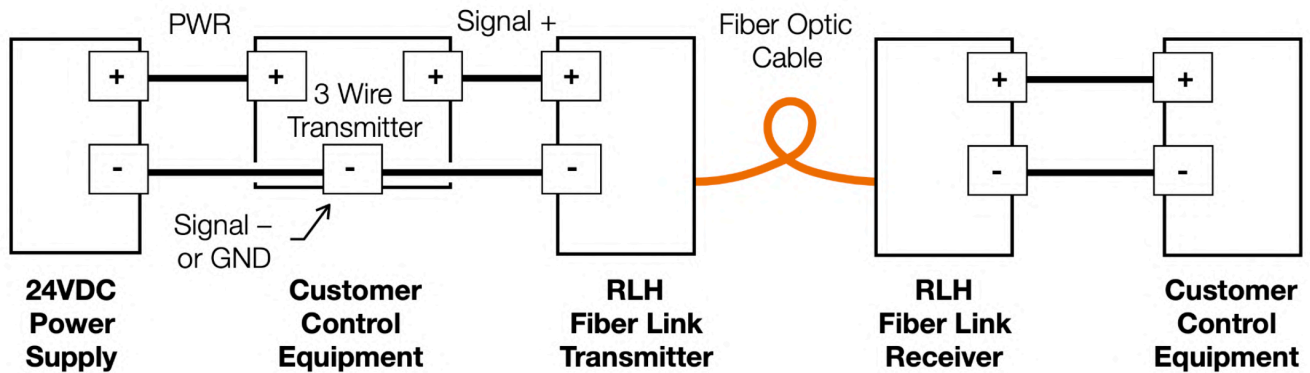
When connecting a 2-wire transmitter to the RLH fiber transmitter (AD-420TX-XX-X), the RLH transmitter is always a sinking input, expecting the source current to be supplied by the remote device. In this example, the 2-wire transmitter has 24VDC loop voltage provided by a separate power supply.



### Applications (cont'd)

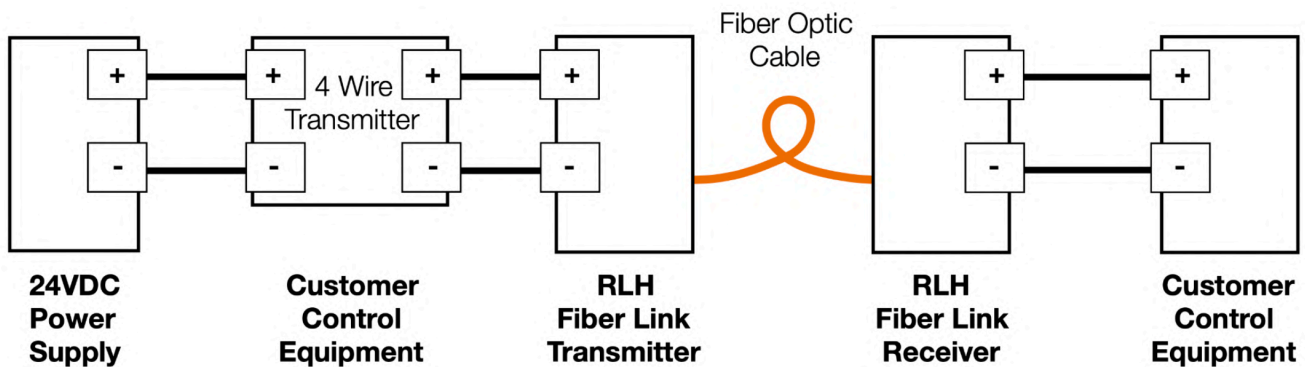
#### 4~20mA System – 3-Wire Transmitter Wiring

When connecting a 3-wire transmitter to the RLH fiber transmitter (AD-420TX-XX-X), the RLH transmitter is always a sinking input, expecting the source current to be supplied by the remote device. The common terminal can be used from the transmitter. If used, it should connect to the negative terminal of the fiber transmitter and the negative terminal of the power supply.



#### 4~20mA System – 4-Wire Transmitter Wiring

When connecting a 4-wire transmitter to the RLH fiber transmitter (AD-420TX-XX-X), the RLH transmitter is always a sinking input, expecting the source current to be supplied by the remote device.



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### Installation

Prior to installation:

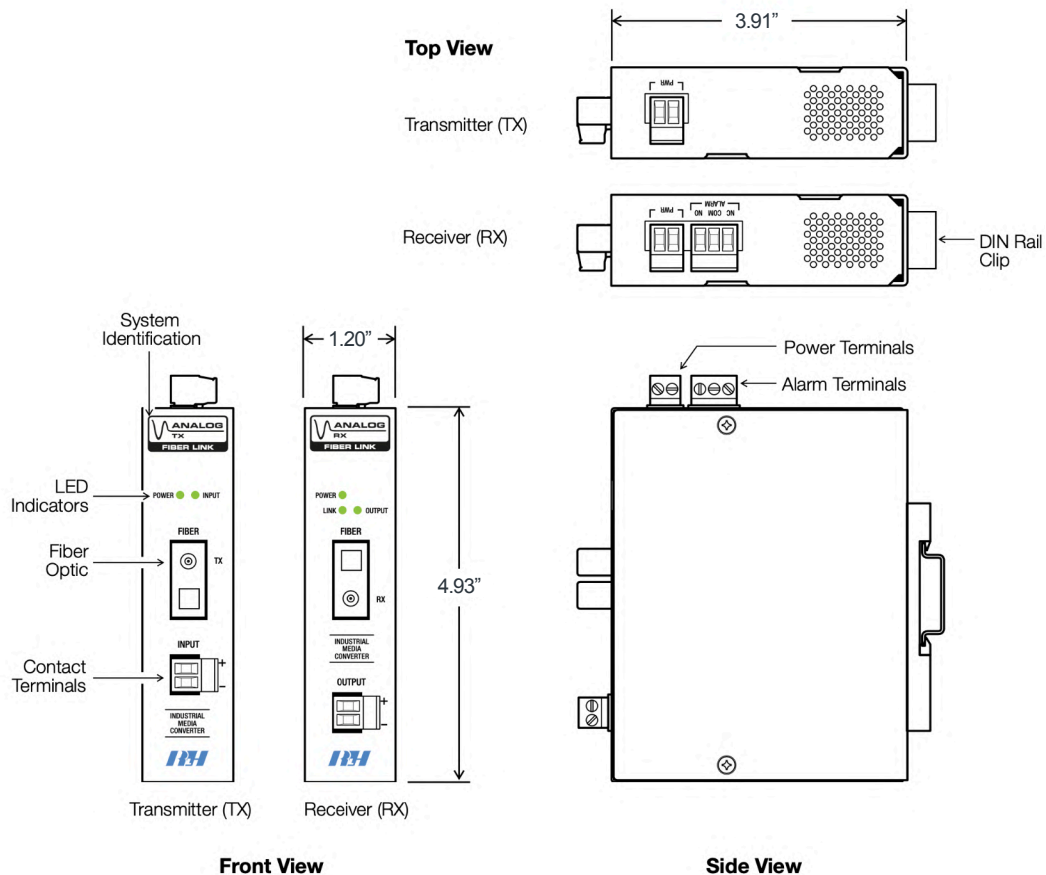
- Check for shipping damage
- Check the contents to ensure correct model and fiber type
- Have a clean, dry installation environment ready
- Ensure that the fiber type at the site matches the system type

Required for installation:

- 24VDC power source at both installation sites
- DIN rail for mounting or wall space for wall mounting
- Multimeter
- Measure the DC voltage of the source power to ensure that it is 24VDC

### Front Panel

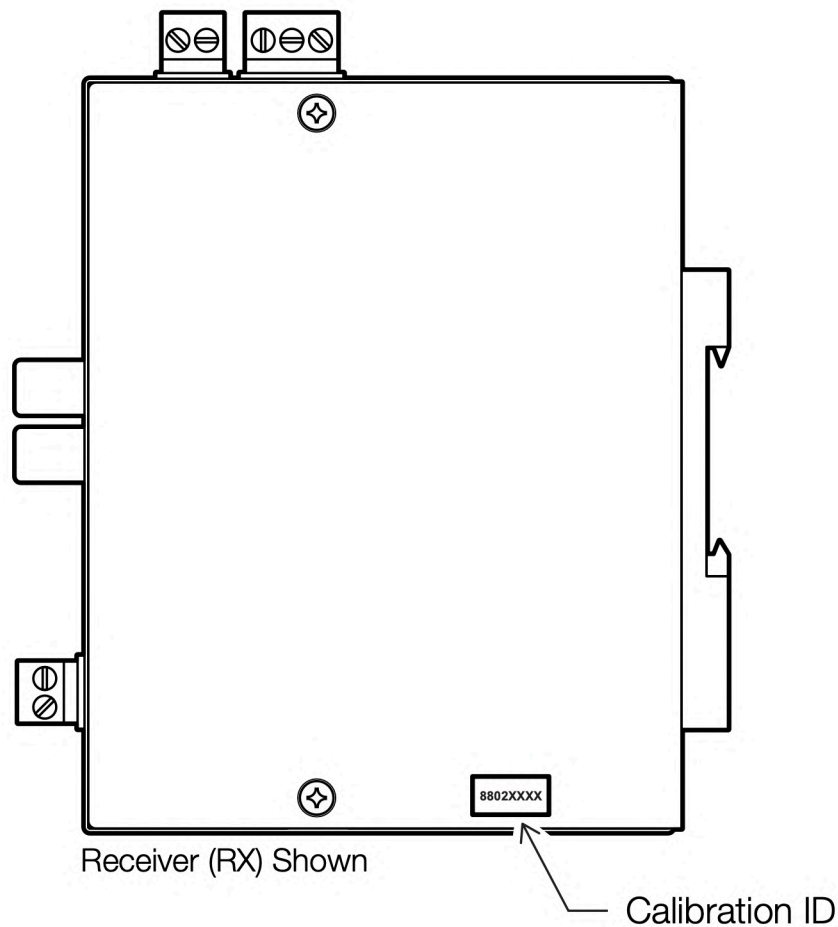
The front panel contains the input or output contact terminals, LED's, and the TX or RX fiber port.



### **Installation (cont'd)**

#### **Calibration**

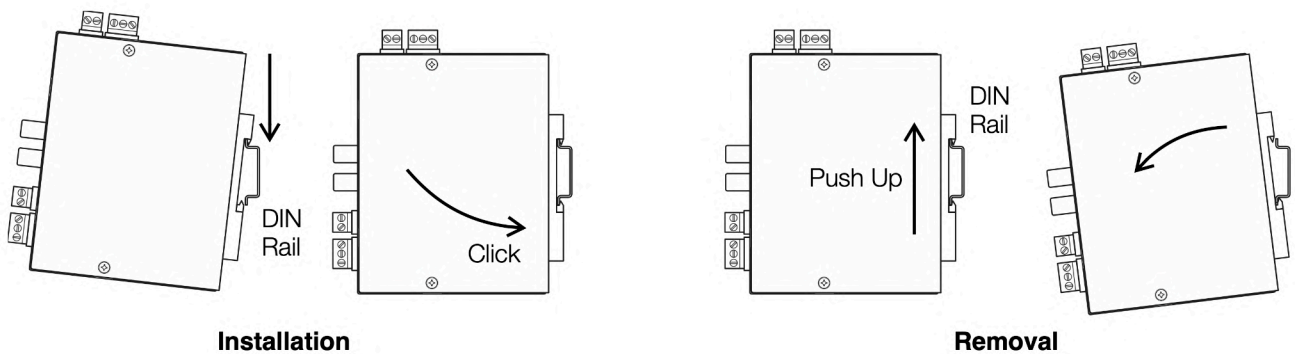
The system is calibrated in pairs. With a calibrated pair the transmitter device and receiver device will both share the same Calibration ID. To ensure best performance ensure a calibrated pair is being used together. See below graphic for how to identify the calibration ID on the unit.



## Installation (cont'd)

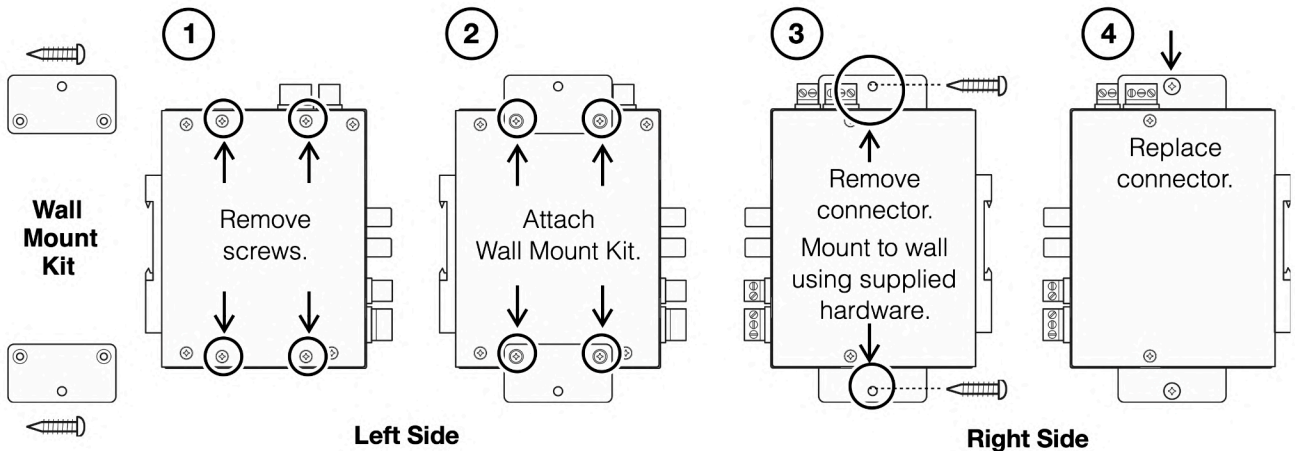
### DIN Rail Mounting

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 and rotate to the locked position to install. To remove, push up to depress the spring latch and rotate off of the DIN rail.



### Wall Mounting

The system can be easily wall mounted by attaching the provided wall mount ears and hardware. Attach the wall mount ears by following the instructions below.



## Installation (cont'd)

### Connect Fiber Optic Cable

Connect fiber to the transmit and receive optical connectors on the front of the units. Fiber cable should always be routed loosely avoiding tight bends.

- Once the system is properly connected the Link LED, on the receiver unit, should turn ON

### 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.

- Observe polarity on the input and output connectors
- 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 a power failure occurs.

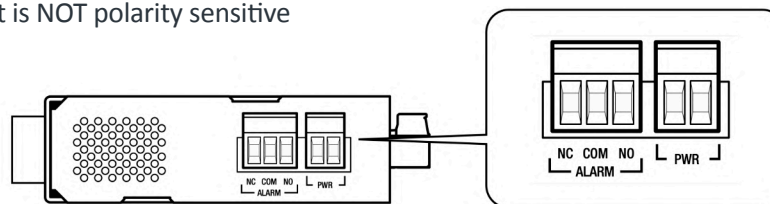
- Use the NO or NC contact positions as required
- The alarm terminal block may be removed and accept wire sizes 16~26 AWG
- Fully seat the terminal block back into the connector before operating the system

### Connect Power

Ensure power supply is OFF prior to wiring the system. Connect a 24VDC power supply to the screw-down terminals located on the top of the unit.

- Requires one (1) 24VDC power supply on each side of the system
- Fully seat the terminal block back into the connector before operating the system

**Note:** Power input is NOT polarity sensitive

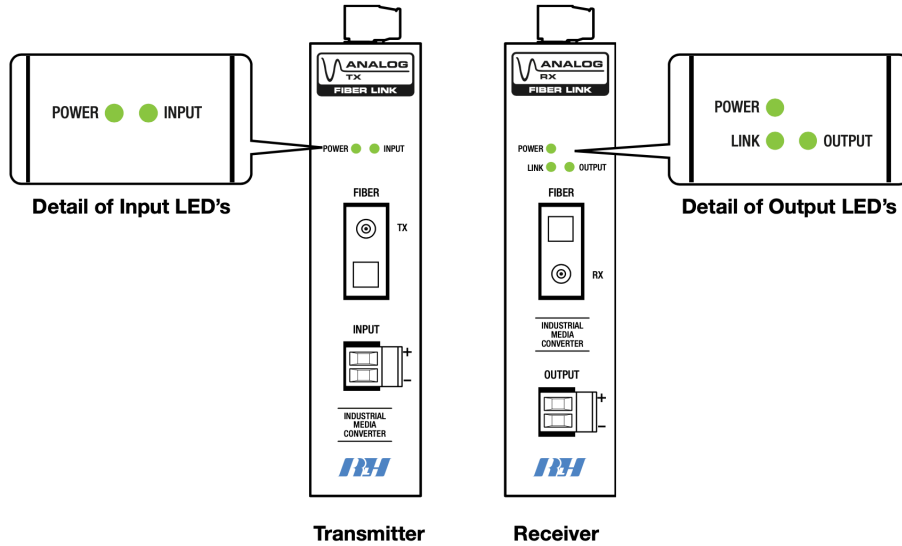


Top View of Power & RX Alarm Terminals



## Installation (cont'd)

### LED Identification



Analog Signal Fiber Link System

LED	Name	Status	Condition
Power	Power Failure	ON OFF	DC input power OK DC input power failed
Link	System Link	ON OFF	Fiber link OK Fiber link failed
Input	4~20mA Input	ON OFF Blinking	Signal present No signal present Signal over range
Output	4~20mA Output	ON OFF Blinking	Signal present No signal present Signal over range

## Troubleshooting

If trouble is encountered, verify all copper and fiber connections, signal and voltage levels. If the alarm is on, check the fiber cable and connections, or the other units power source and connections. If trouble persists, contact RLH Industries, Inc. technical support department\*.

\*Tech support contact info is at the end of this document

## Ordering Information

Transmitter/Receiver	Mode	Connector	Distance	Part Number
Transmitter	Multimode	SC	2km/1.2 miles	AD-420TX-03-1
Receiver	Multimode	SC	2km/1.2 miles	AD-420RX-03-1
Transmitter	Multimode	ST	2km/1.2 miles	AD-420TX-04-1
Receiver	Multimode	ST	2km/1.2 miles	AD-420RX-04-1
Transmitter	Singlemode	SC	20km/12.4 miles	AD-420TX-40-1
Receiver	Singlemode	SC	20km/12.4 miles	AD-420RX-40-1
Transmitter	Singlemode	ST	20km/12.4 miles	AD-420TX-50-1
Receiver	Singlemode	ST	20km/12.4 miles	AD-420RX-50-1
Transmitter	Singlemode	SC	60km/37 miles	AD-420TX-41-1
Receiver	Singlemode	SC	60km/37 miles	AD-420RX-41-1
Transmitter	Singlemode	ST	60km/37 miles	AD-420TX-51-1
Receiver	Singlemode	ST	60km/37 miles	AD-420RX-51-1
Transmitter	Singlemode	SC	120km/74 miles	AD-420TX-45-1
Receiver	Singlemode	SC	120km/74 miles	AD-420RX-45-1
Transmitter	Singlemode	ST	120km/74 miles	AD-420TX-55-1
Receiver	Singlemode	ST	120km/74 miles	AD-420RX-55-1

- A complete system requires a transmitter unit and a receiver unit

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### Key Specifications

<b>Transmission Method:</b>	Frequency modulated light via a single optical fiber
	<b>Multimode:</b> 1310nm (62.5/125μm, 50/125μm) <b>Singlemode:</b> 1310nm (8~9/125μm) <b>Singlemode Long Haul:</b> 1550nm (8~9/125μm)
<b>Maximum Fiber Attenuation/Distance:</b>	<b>Multimode:</b> 8dB / 1.2 miles (2km) +/-2dB <b>Singlemode:</b> 12dB~25dB (20km-120km) +/-2dB Note: Distances equated using industry standard fiber and connector attenuation. Fiber condition, splices, and connectors may affect actual range.
<b>Connector Type:</b>	ST or SC connectors
<b>System Accuracy:</b>	<0.2% @ 25C Note: Accuracy for Fiber Link System, Both Transmitter & Receiver <b>Ambient Temp Effect (0°C to +70°C):</b> < 0.2% <b>Ambient Temp Effect (-40°C to 0°C):</b> < 2.0% <b>Update Rate:</b> 1.3 KHz <b>Signal Resolution:</b> 12 Bits <b>Sensitivity:</b> 2 <sup>12</sup> (4096) Steps <b>Current Operating Range:</b> 0mA~22mA (DC)
<b>Analog Signal:</b>	4~20mA System
<b>Analog Input:</b>	1 Single-ended (unipolar) <b>Impedance:</b> 250 Ohms <b>Protection:</b> +/- 50mA
<b>Analog Output:</b>	1 Single-ended (unipolar) <b>Loop Voltage:</b> 23.7VDC <b>Maximum Loop Resistance:</b> 1000 Ohms <b>Maximum Output Signal (mA/VDC):</b> 24mA
<b>Power Requirements:</b>	24VDC, 4 Watts maximum power consumption per device
<b>Wire Connector:</b>	Screw clamp terminal blocks, 16~26 AWG
<b>DC Input Isolation:</b>	1.5KV
<b>Surge Protection:</b>	PTC thermistors, zener diodes and varistors
<b>Over Current Protection:</b>	0.5A (Automatic Recovery)
<b>Operating Temperature:</b>	-40°C to +70°C (-40°F to +158°F), 95% non-condensing
<b>Dimensions:</b>	1.2" (W) x 3.91" (D) x 4.93" (H), (31mm x 100mm x 126mm) *Not including connectors
<b>Warranty:</b>	Limited Lifetime

**USER GUIDE****Contact**

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By Mail:	Att: Sales RLH Industries, Inc. 936 N. Main St. Orange, CA 92867
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By Phone: Sales / Service Mon - Fri, 6am - 6pm, PST	Local	714-532-1672
	Toll Free	800-877-1672 866-DO-FIBER

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By Email:	<a href="mailto:info@fiberopticlink.com">info@fiberopticlink.com</a>
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By FAX:	714-532-1885
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**Tech Support**

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By Phone:	Toll Free	855-754-2497 855-RLH-24X7
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