

Power Over Fiber

SYSTEM INSTALLATION INFORMATION

Description

Our patented Power Over Fiber (PoF) system provides power transmission over three multimode (62.5/125) optical fibers. The PoF system is able to provide true isolated power to a remote location utilizing Laser Light at the transmitter and a photovoltaic power converter at the remote location. The remote location device utilizes super capacitors to ensure a smooth and constant voltage is supplied to the remotely powered devices. RLH patented PoF system utilizes state of the art photonic technology and safety interlock systems to provide a convenient method of remote powering RLH's low power consumption Fiber Link Cards or other low power consumption devices.

PoF Transmitter Unit

The PoF Transmitter unit is a self contained housing that may be 19/23" rack or wall mounted. The housing is constructed of powder coated aluminum with LED and LCD indicators located on the front panel to report system status and operation. The PoF transmitter requires a 24~56 VDC power source. The transmitter unit contains two high power laser diodes and one fiber receiver for signal feedback.

PoF Receiver Card

The PoF receiver card may be installed into any Fiber Optic Link card housing. The PoF receiver card has two fiber ST photovoltaic power converters (PPC) and one fiber ST transmitter. The PPC converts laser light into electricity. The PoF Receiver will also transmit a fiber signal to the PoF transmitter unit for voltage monitoring and safety shutoffs in case of a break in fiber continuity. The PoF receiver will provide up to 1 Watt of 24 Volt DC Power, power output attenuates over distance. For higher power or voltage applications systems can be use together with the receiver cards connected in series or parallel.



PoF Transmitter Unit



PoF Receiver Card

Key Features

Send Power Over Fiber

Environmentally Rugged Receiver Card:
-40°F to +158°F (-40°C to +70°C)

Available with ST connectors for multi-mode fiber

LCD Display and LED Status Indicators

Power RLH Fiber Link Cards: T1, 4W Audio Data,
56K DDS, Contact Closure, and 4~20mA

Made in the USA

General Safety Practices

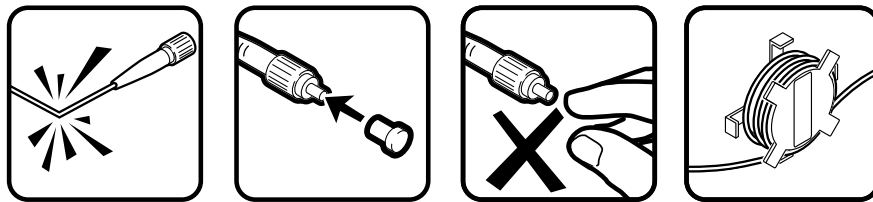
The equipment discussed in this document may require tools designed for the purpose being described. RLH recommends that service personnel be familiar with the correct handling and use of any installation equipment used, and follow all safety precautions including the use of protective personal equipment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

Warning: Never splice or patch fiber cables between the PoF Transmitter Unit and Receiver Card.

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.
- **Do Not turn system on before the fiber optic cable is connected on BOTH ends.**

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 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

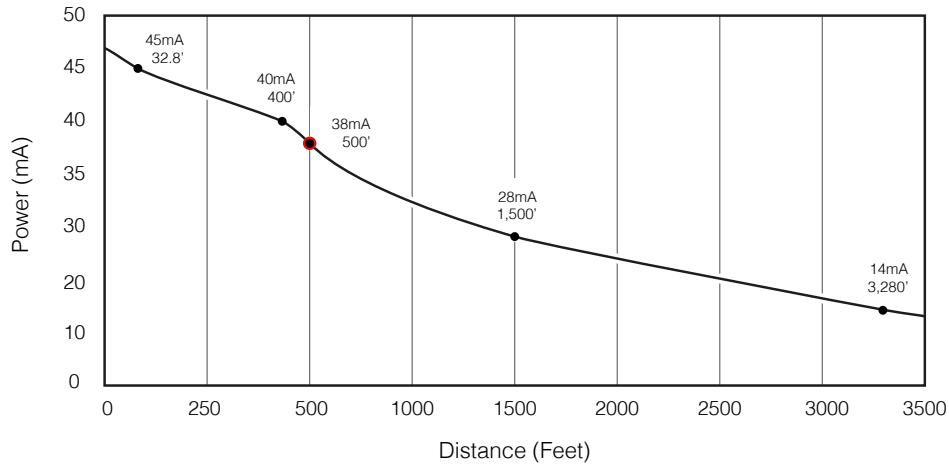
Acronyms

Commonly used acronyms and abbreviations

Acronym/Abbreviation	Description
TX	Transmit
RX	Receive
PWR	Power
CH	Dry Contact Channel
NO	Normally Open
NC	Normally Closed
ORJ	Orange
BLU	Blue

Power Transmission Derating Curve

The Power Over Fiber system requires 62.5/125 multimode fiber optic cable. The amount of electrical power delivered at the remote location will be affected by the distance or attenuation of the fiber optic cable. Refer to the graph below for average power output to fiber distance comparison.



Power Output to Fiber Distance Derating Curve

Fiber Link Card Power Compatibility

The following list of Fiber Link Cards can be powered by our PoF system at a distance of 500 feet.

Circuit Type	Card Type
T1	Low Powered T1 Card (-LP)
4W Audio Data	RLH CO Card
2W Audio Data	RLH CO Card
56K & 64K DDS	RLH CO Card
Contact Closure	RLH Transmitter Card
4-20mA	RLH Transmitter Card

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:

- OM1 (62.5 Micron) multimode fiber
- Direct fiber cable path between the Transmitter and Receiver.
- 24-56VDC, 75 Watt minimum, Power source for powering the transmitter.
- Multimeter

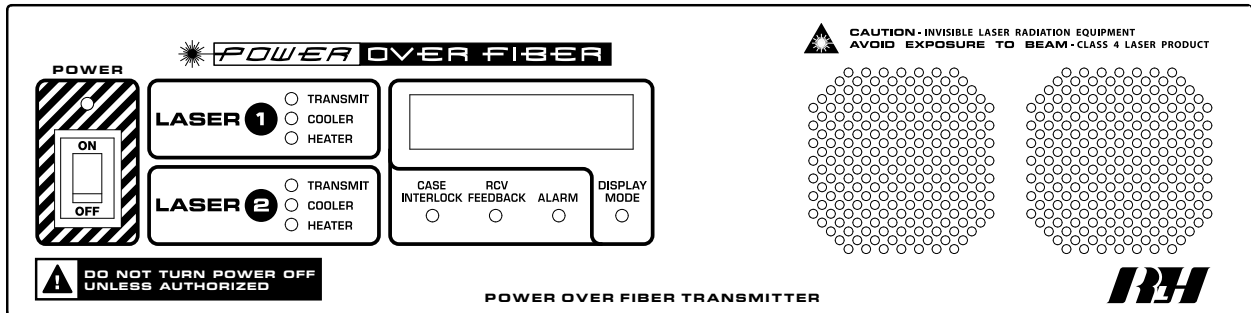
Measure the DC voltage of the source power to ensure that it is 24-56VDC.

PoF Transmitter Unit - Front Panel

The PoF transmitter front panel is the user interface for the system. The power switch, LED Indicators, and LCD display are located here. The PoF transmitter will indicate an alarm condition when the DC output from the receiver card is off. Causes of alarm conditions include:

- Case interlock opened
- Fiber not connected
- No feedback signal from receiver
- Receiver card in test mode
- Laser temp out of operational range
- Power is removed from transmitter

WARNING! Do not turn the system on until all connections are made.



PoF Transmitter Unit Front Panel

Component Environmental Sensitivity

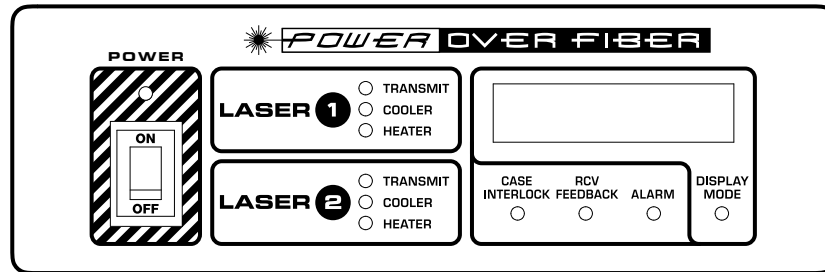
The PoF transmitter contains high power laser diode components. These components are sensitive to changes in ambient temperature. To avoid out of service conditions and extend the life of the unit it must be installed in a controlled environment. The PoF transmitter will shut off the laser diode if an out of thermal operation range condition persists for more than 1 minute, the laser diode will turn on when it returns to normal operating temperature. In the case of a laser diode thermal shutdown the LED indicators will provide event reporting.

LCD Display

The LCD reports laser diode temperatures, remote end voltage output, and alarm conditions. A push button, Display Mode, is used to scroll to different screens.

LED Status Indicators

The PoF Transmitter Unit has several L.E.D indicators located on the front panel. If trouble is encountered, verify all copper and fiber connections, signal and voltage levels. If the alarm is on, double check the alarm jumper, fiber cable and connections, or TX side power source and connections.

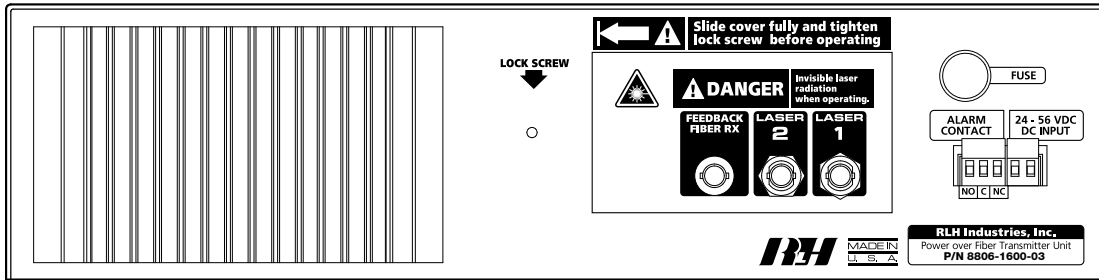


Transmitter Unit LED indicators and LCD Display

Indicator	Color	State	Description
POWER	BLU	ON	Power applied
		OFF	No power present
CASE INTERLOCK	BLU	ON	Case connector cover closed
		OFF	Case connector cover open
RCV FEEDBACK	ORG	ON	Feedback signal received from receiver card
		OFF	No feedback signal received from receiver
ALARM	RED	ON	Alarm Condition (Check LCD Display for Description)
		OFF	Normal Operation
LASER TRANSMIT	GRN	ON	Laser is ON
		FLASHING	Laser pulsing in low power mode
LASER COOLER	BLU	ON	Cooler is ON
		FLASHING	Cold thermal shutdown event recorded
LASER HEATER	GRN	ON	Heater is ON
		FLASHING	Hot thermal shutdown event recorded

PoF Transmitter Unit - Back Panel

The PoF transmitter back panel is used for equipment connections for the system. The fiber connectors, power terminals, and alarm terminals are located here.



PoF Transmitter Unit Back Panel

Connect fiber optic cable to TX Unit

The PoF system is equipped with ST connectors and requires 3-strands of multimode (62.5/125) fiber. The fiber must be routed loosely and have cleaned ends to ensure reliable operation. Contaminated connector ends may be damaged from excessive heating and will cause low power output.

Note: When the receiver card fiber cover is removed a safety toggle is enabled that disables the lasers.

WARNING!

The fiber cable must be connected directly from the transmitter unit to the receiver card with no patches or splices in between.

Connect Power to TX Unit

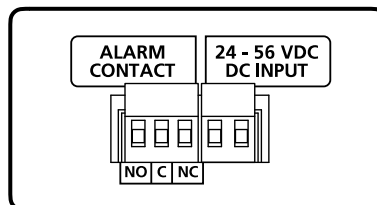
Connect a 24-56VDC (75 Watt min.) power source to the black screw-down terminal marked "INPUT". The power input is not polarity sensitive. The power input is protected by a 3A slow-blow fuse.

Warning: Before powering on the Transmitter Unit ensure all fiber connections are in place on both sides of the system. The Receiver Card must be properly installed in the a Card Housing.

Connect Alarm

There are normally open (NO) and normally closed (NC) contacts used with the common (C) contact provided at the alarm connector on the back panel.

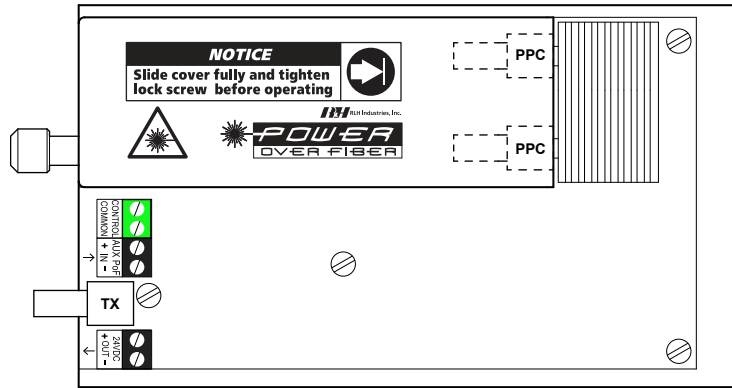
Note: When the alarm is on, or if power is removed, the connection between common (C) and normally open (NO) is shorted, and the contact between common (C) and normally closed (NC) is open.



PoF TX Unit Power and Alarm Terminals

Insert PoF Receiver Card in Housing

The PoF Receiver Card is installed into any Fiber Optic Link Card Housing via the card guide rails and retainer clip. The PoF Receiver Card occupies 2 slots in the housing.



PoF Receiver Card

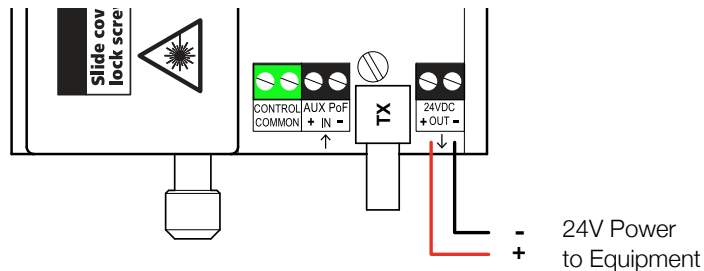
Connect fiber optic cable to RX Card

The two fiber strands carrying the laser light are routed through the panel opening into the PPC connector compartment. When the compartment is open the system will be idle, however if the transmitter unit is on with the fiber connected, the lasers will be pulsing at low power mode. In this case eye and skin exposure must be avoided. Care must be taken to avoid tight bends that could cause system failure and cable damage. Fiber cable must be connected directly from the transmitter to the receiver. The fiber must not be patched or spliced.

WARNING! Transmitter must not be turned on until the fiber is connected at both ends of system.

Connect Power to RX Card

The load is connected to the “24VDC OUTPUT” black screw down terminal located on the front edge of the PoF receiver card. Polarity is indicated with “+ /-“. Solid 18-24 gauge wire is recommended. To increase voltage or current two systems can be wired together. Application examples can be found on the next page.



PoF RX Card

PoF Receiver Card Power Connectors

Powering RX Card

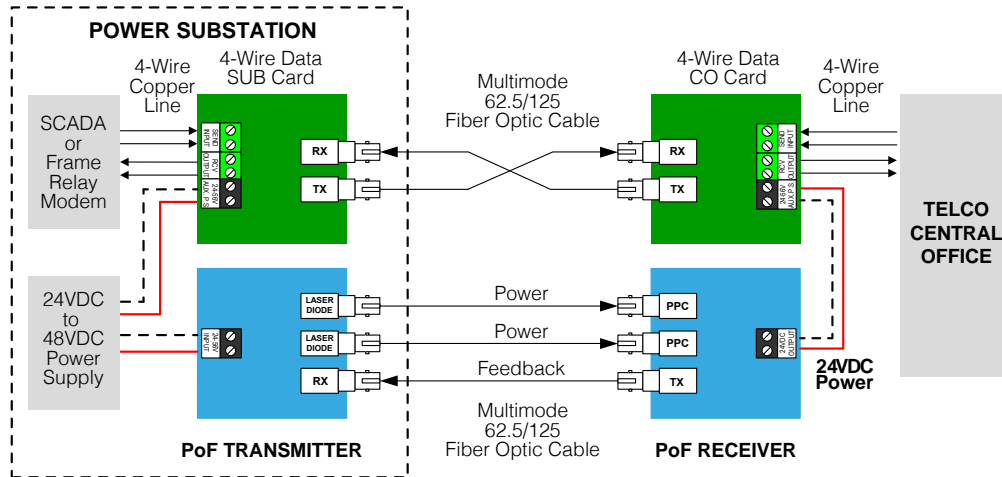
The receiver card utilizes super capacitors to ensure a steady and smooth voltage is supplied to the load. It may take up to 1-3 minutes of operation for the super capacitors to sufficiently charge. After charging the the receiver card will then supply a voltage to the connected load. Charging time will vary based on the distance of fiber between the receiver and transmitter units.

Note: When the transmitter device is turned off, the receiver card may still have voltage at the terminals for up to 3 minutes while the super capacitors will need to discharge.

Application Examples

Typical Power Over Fiber System Setup

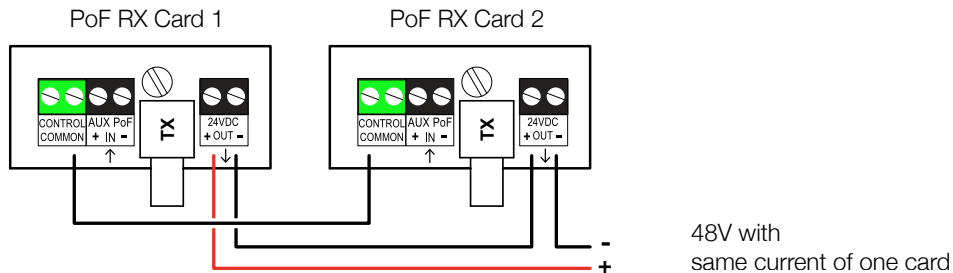
Below is a basic diagram of all the connections required for a successful deployment of the system.



Power Over Fiber System Diagram

Connect Power for 48V Output

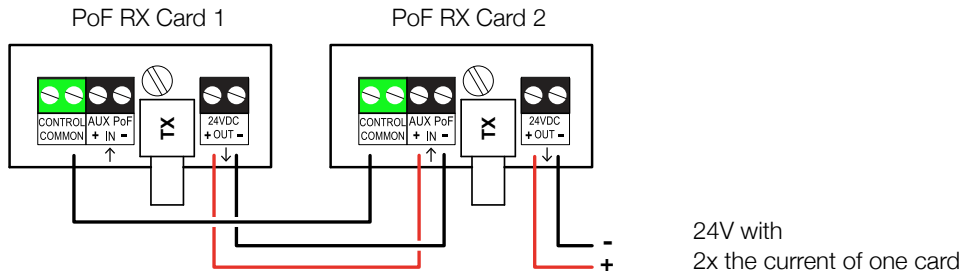
Use two PoF systems wired in series to double the voltage output to 48V. The two cards must also be connected using the Common Control green terminals as shown below.



Voltage Increase - Series Wiring Diagram

Connect Power to Increase Current Output

Use two PoF systems in parallel to double the current of one card. The two cards must also be connected using the Common Control green terminals as shown below.



Current Increase - Parallel Wiring Diagram

General Specifications

Transmission method	High power light via three optical fibers	
	Multimode: 830nm	62.5/125µm
Fiber Connectors	ST	
Power Connectors	Screw clamps 12-24 AWG wire	
Power Consumption	24 - 48 Volts DC, 75 Watts Maximum	
Power Output	24VDC & 45mA (1.08 Watts) at 32.8 Feet	
	<i>Power output declines over longer distances, see derating curve for details</i>	
Alarm Contact	Voltage Max. 220VDC/250VAC (60W)	
Operating Temperature	Transmitter Unit	-4°F to +104°F (-20°C to +40°C)
	Receiver Card	-40°F to +158°F (-40°C to +70°C)
Mounting	Transmitter Unit	19" or 23" Equipment Racks or Wall Mount
	Receiver Card	RLH Fiber Link Card Housing
Dimensions	Transmitter Unit	13" x 11" x 3.5", 6 lbs.
	Receiver Card	7" x 4" x 1", 1 lbs.
Humidity	95% non-condensing	
Warranty	Limited 1 Year	Visit www.fiberopticalink.com for warranty details

Ordering Information

The PoF system is identified with a part number for each side of the equipment.

Description	Part Number
Power Over Fiber Laser Transmitter Unit	8806-1600-03
Power Over Fiber Receiver Card	8806-1610-02
6 Fiber multimode (OM1/62.5) OSP fiber cable, ST connectors, 3mm break out, and 1 pulling sheet.	RLH-06COMM3-STST-XXXXF-1

- ▶ A complete system requires one (1) **Transmitter Unit** and one (1) **Receiver Card**.
- ▶ Compatible fiber cables are ordered to length by replacing **-XXXX** for the desired length in feet.
- ▶ Please contact your RLH sales representative for pricing and delivery information

Technical Support

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Please contact your RLH sales representative for pricing and delivery information.

Specifications subject to change without notice.