

FBR850 – Fiber Optic Transceiver

**FBR850-420RX, FBR850-420TX,
FBR850-IORX, FBR850-ISORX, FBR850-IOTX,
FBR850-ANRX, FBR850-ANTX,
FBR850-RELAY, FBR850-RS232**

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1 – Introduction

FBR850 is a series of fiber optics receptors and transmitters. It was developed to be used in industrial, commercial applications and any other noisy environment where coaxial or twisted pair cables cannot be used. FBR850 series has some options with analog and digital inputs, outputs, relay outputs and digital communication. Options are:

FBR850-420RX – 4-20mA analog input
FBR850-420TX – 4-20mA analog output
FBR850-IORX – Digital input
FBR850-ISORX – Isolated Digital Input
FBR850-IOTX – Digital output
FBR850-ANRX – Analog input
FBR850-ANTX – Analog output
FBR850-RELAY – Relay output
FBR850-RS232 – RS232 interface

FBR850 series allows communications up to 2.7km between transmitter and reception. It is recommended to use multimode fiber optics, 850nm, 50/125µm, 62.5/125µm, 100/140µm or 200µm HCS cores. Connector used is ST type.

Models FBR850-420RX, FBR850-420TX, FBR850-IORX, FBR850-ISORX, FBR850-IOTX, FBR850-ANTX, FBR850-ANRX and FBR850-RELAY need only one fiber. They have an electrical signal in one side for input or output and a fiber optic receiver or transmitter in the other side. Model FBR850-RS232 needs two fiber optics, one for signal transmission and one for signal reception. It is the only model that allows bidirectional communication.

2 – Detailed Description

2.1 – FBR850-420RX

FBR850-420RX was specially designed to receive signals from industrial sensors because it has a 4-20mA analog input. It works with supply voltages up to 28V. It can be used together with FBR850-420TX model.



2.2 – FBR850-420TX

FBR850-420TX was specially designed to transmit signals to industrial controllers, such as, a PLC, because it has a 4-20mA analog output. It works with supply voltages up to 28V. It can be used together with FBR850-420RX model.



2.3 – FBR850-IORX

FBR850-IORX was specially designed to receive digital signals up to 24V. It is compatible with 3.3V, 5V, 10V, 12V, 15V and 24V systems. Circuit input is isolated from other circuits. Input shares same ground with other circuits. Maximum

input signal frequency is 1MHz, square wave. Signal threshold is 1.5V maximum.



2.4 FBR850-ISORX

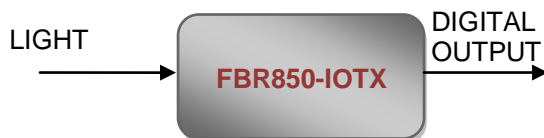
FBR850-ISORX is very similar to FBR850-IORX. The difference between both versions is that FBR850-ISORX has an input that is isolated from other circuits. It is compatible with 3.3V, 5V, 10V, 12V, 15V and 24V systems. Maximum input signal frequency is 20kHz, square wave. Signal threshold is 1.5V maximum.



2.5 – FBR850-IOTX

FBR850-IOTX was specially designed to transmit digital signals with 5V output, only. Output is open-drain with 10kohms pull-up resistor. 3.3V, 10V, 12V and 24V outputs are not allowed in this version*. Maximum output frequency is 1MHz, square wave.

* A version without the output resistor, which allows higher output voltages are available under request. User must provide the pull-up resistor in its own circuit.



2.6 – FBR850-ANRX

FBR850-ANRX has a DC single-ended analog input up to 28V. Input signal is converted to digital for fiber optic transmission. Resolution is

12bits. Maximum input frequency is 10kHz. Input impedance is 10kohms.



2.7 – FBR850-ANTX

FBR850-ANTX has a DC single-ended analog output up to 5V. Output signal is converted to analog from fiber optic transmission. Resolution is 12bits. Maximum output frequency is 10kHz. Maximum output current is 20mA.



2.8 – FBR850-RELAY

FBR850-RELAY was specially designed to control power loads with a relay. Loads up to 10A are allowed in 24V DC or 110V AC or 240V AC systems. The product has two outputs: one normally open (NO or NA) and one normally closed (NC or NF). Load is connected to the outputs from a common contact (CM).



2.9 – FBR850-RS232

FBR850-RS232 is actually a RS232 to fiber optics transceiver. It is the only product that needs two fibers for communication. Three RS232 pins are used for full-speed, bidirectional communication: RX, TX and GND. Other signals are not connected to the DB9 female connector. The use of USB to RS232 adapter is possible.



3 – Pinout

Pinout used is specific for each product. Bad or improper connection to input or output pins may cause interference, malfunction and even product burn. Pins named VPWR are shorted internally. Pin number 1 is the first one on the left.

| FBR850-420RX | |
|--------------|--------------------------------|
| 1 | VPWR – Power Supply |
| 2 | GND – Ground |
| 3 | VPWR – Power Supply – Optional |
| 4 | IIN – 4-20mA current input |
| 5 | VPWR – Alimentação – Optional |
| 6 | NC – No Connection |
| 7 | NC – No Connection |
| 8 | NC – No Connection |
| 9 | NC – No Connection |
| 10 | NC – No Connection |
| 11 | NC – No Connection |
| 12 | NC – No Connection |

| FBR850-420TX | |
|--------------|--------------------------------|
| 1 | VPWR – Power Supply |
| 2 | GND – Ground |
| 3 | VPWR – Power Supply – Optional |
| 4 | NC – No Connection |
| 5 | VPWR – Power Supply – Optional |
| 6 | NC – No Connection |
| 7 | NC – No Connection |
| 8 | IO – 4-20mA current output |
| 9 | IRET – 4-20mA current return |
| 10 | NC – No Connection |
| 11 | NC – No Connection |
| 12 | NC – No Connection |

| FBR850-IORX | |
|-------------|--------------------------------|
| 1 | VPWR – Power Supply |
| 2 | GND – Ground |
| 3 | VPWR – Power Supply - Optional |
| 4 | DIN – Digital Input |
| 5 | VPWR – Power Supply - Optional |
| 6 | NC – No Connection |
| 7 | NC – No Connection |
| 8 | NC – No Connection |
| 9 | NC – No Connection |
| 10 | NC – No Connection |
| 11 | NC – No Connection |
| 12 | NC – No Connection |

| FBR850-ISORX | |
|--------------|--------------------------------|
| 1 | VPWR – Power Supply |
| 2 | GND – Ground |
| 3 | VPWR – Power Supply - Optional |
| 4 | DIN – Digital Input |
| 5 | VPWR – Power Supply - Optional |
| 6 | NC – No Connection |
| 7 | NC – No Connection |
| 8 | NC – No Connection |
| 9 | NC – No Connection |
| 10 | NC – No Connection |
| 11 | DGND – Digital Ground |
| 12 | NC – No Connection |

| FBR850-IOTX | |
|-------------|--------------------------------|
| 1 | VPWR – Power Supply |
| 2 | GND – Ground |
| 3 | VPWR – Power Supply - Optional |
| 4 | NC – No Connection |
| 5 | VPWR – Power Supply - Optional |
| 6 | NC – No Connection |
| 7 | DIGIOUT – Digital Output |
| 8 | NC – No Connection |
| 9 | NC – No Connection |
| 10 | NC – No Connection |
| 11 | NC – No Connection |
| 12 | NC – No Connection |

| FBR850-ANRX | |
|-------------|--------------------------------|
| 1 | VPWR – Power Supply |
| 2 | GND – Ground |
| 3 | VPWR – Power Supply – Optional |
| 4 | IIN – Analog Input |
| 5 | VPWR – Power Supply – Optional |
| 6 | NC – No Connection |
| 7 | NC – No Connection |
| 8 | NC – No Connection |
| 9 | NC – No Connection |
| 10 | NC – No Connection |
| 11 | NC – No Connection |
| 12 | NC – No Connection |

| FBR850-ANTX | |
|-------------|--------------------------------|
| 1 | VPWR – Power Supply |
| 2 | GND – Ground |
| 3 | VPWR – Power Supply - Optional |
| 4 | NC – No Connection |
| 5 | VPWR – Power Supply - Optional |
| 6 | ANOUT – Analog Output |
| 7 | NC – No Connection |
| 8 | NC – No Connection |
| 9 | NC – No Connection |
| 10 | NC – No Connection |
| 11 | NC – No Connection |
| 12 | NC – No Connection |

FBR850-RELAY

| | |
|----|-------------------------------------|
| 1 | VPWR – Power Supply |
| 2 | GND – Ground |
| 3 | VPWR – Power Supply – Optional |
| 4 | NC – No Connection |
| 5 | VPWR – Power Supply – Optional |
| 6 | NC – No Connection |
| 7 | NC – No Connection |
| 8 | NC – No Connection |
| 9 | NC – No Connection |
| 10 | NA – Relay output – Normally Open |
| 11 | CM – Relay input - Common |
| 12 | NF – Relay output – Normally Closed |

FBR850-RS232

| | |
|----|--------------------------------|
| 1 | VPWR – Power Supply |
| 2 | GND – Ground |
| 3 | VPWR – Power Supply - Optional |
| 4 | NC – No Connection |
| 5 | VPWR – Power Supply - Optional |
| 6 | NC – No Connection |
| 7 | NC – No Connection |
| 8 | NC – No Connection |
| 9 | NC – No Connection |
| 10 | NC – No Connection |
| 11 | NC – No Connection |
| 12 | NC – No Connection |

The only product that uses DB9F connector is FBR850-RS232, to connect to a computer. Pinout is:

- PIN 1 – NC – No Connection
- PIN 2 – TX – RS232 Output
- PIN 3 – RX – RS232 Input
- PIN 4 – NC – No Connection
- PIN 5 – GND – Signal Ground
- PIN 6 – NC – No Connection
- PIN 7 – NC – No Connection
- PIN 8 – NC – No Connection
- PIN 9 – NC – No Connection

4 – Electrical Characteristics

All Products

Power Supply: 7-28V
 Supply Current: < 250mA
 Working Temperature: 0°C - 60°C
 Humidity: non condensing

FBR850-420TX and FBR850-420RX

Current Loop Voltage Range: 7-24V
 FBR850-420RX Resistor: 250ohms

FBR850-IORX

Input Voltage: 24V maximum

Input Voltage Threshold: 1.5V
 Maximum Frequency: 1MHz, square wave

FBR850-ISORX

Input Voltage: 24V maximum
 Input Voltage Threshold: 1.5V
 Frequency Range: 1MHz maximum, square wave
 Input Isolation: 500V

FBR850-IOTX

Output Voltage: 5V fixed *
 Input Voltage Threshold: 1.5V
 Frequency Range: 1MHz maximum, square wave
 * Contact CayennE-k Tecnologia for other output voltage possibilities with open-drain output

FBR850-ANRX

Input Voltage: 28V maximum
 Frequency Range: 10kHz maximum
 Input Impedance: 10kohms
 Converter Resolution: 10 bits

FBR850-ANTX

Output Voltage: 5V maximum
 Frequency Range: 10kHz, maximum
 Output Current: 20mA maximum

FBR850-RELAY

Output Current: 10A maximum
 Working Voltages: 24Vdc or 240Vac maximum

FBR850-RS232

Baud Rate: 120kbit/s maximum

5 – Mechanical Information

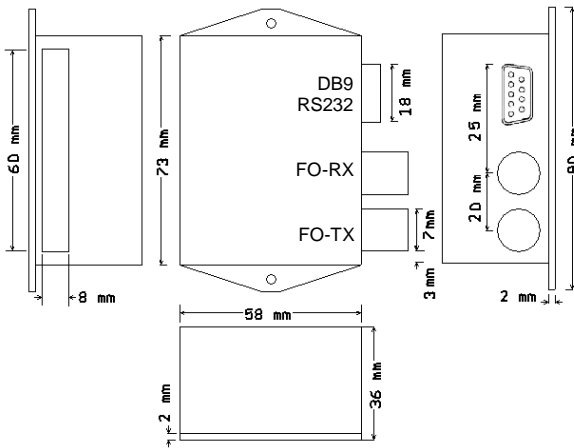
5.1 Case:

Length: 58mm
 Width: 73mm – Without Screw Tabs
 Total Width: 90mm – With Screw Tabs
 Height: 36mm

Screw Holes: 3mm diameter
 Screw Tab Thickness: 2mm

Material: Black PP - Polypropylene

** According to each product FO-TX (fiber optics output transmitter), FO-RX (fiber optics receiver) or DB9 (RS232 serial connector) may not be available.



5.2 Connectors

Electrical Input/Output:

Vias: 12 (2x 6)
 Type: Terminal Block
 Model: BR8
 Pitch: 5.08mm
 Current: 10A
 Usable wires: 28 to 12 awg
 Voltage: 28Vdc or 240Vac maximum

Fiber Optics:

Type: ST
 Material: Plastic
 Wavelength: 820nm – Compatible with 850nm systems
 Fiber Optic Type: Multimode
 Fiber Optic Core: 50/125µm, 62.5/125µm, 100/140µm or 200µm HCS

Serial:

Model: DB9
 Type: Female
 Pins Used: 2 – TX, 3 – RX, 5 – Ground

6 – Installation Procedures

Any product must not be exposed directly to weather. Its installation must provide protection

against humidity, rain and dust. Preferably use it indoor.

- 6.1 – Disconnect all equipments from electrical network before installing any FBR850 product.
- 6.2 – Mount FBR850 in adequate place, in a way that fiber optic cable is not bending or its curvature is higher than specified by cable manufacturer.
- 6.3 – Connect cables and signal wires in their places according each FBR850 product and application. Do not connect unused cables and plugs.
- 6.4 – Connect fiber optic cable in the appropriate ST connector: FOTX if a transmitter and FORX if a receiver.
- 6.5 – Verify if power supply is under electrical limits specified in the Electrical Specifications. Connect power supply cables to the product and turn supply on.

7 – Warnings

Attention:

These devices shall not be used in life-support or any other medical or military equipment.

These products description is believed to be correct and up to date with current device manufacturers. Nevertheless, consult us for last minute changes.

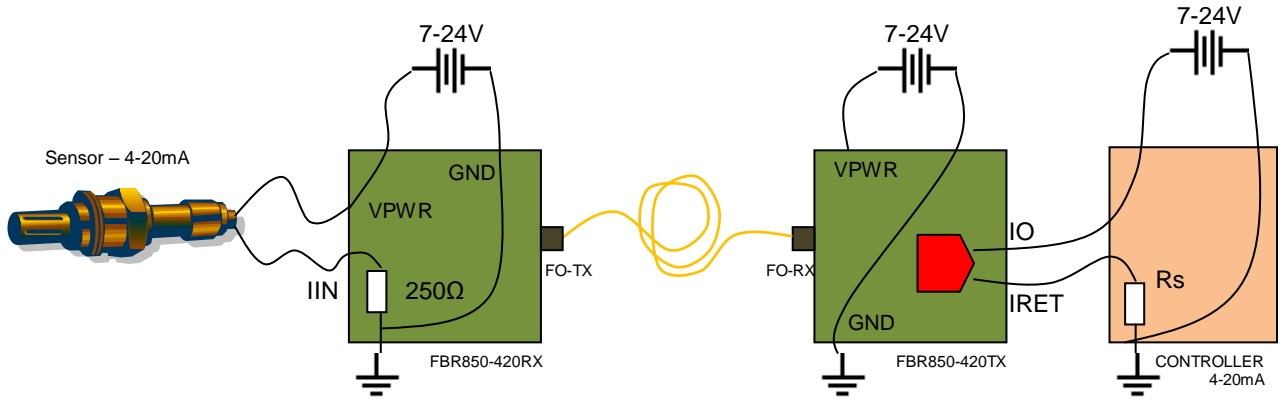
Caution:

NEVER look directly into fiber optic connector turned on. Light used in fiber optics communications has a wavelength in the range of unseen light, however the energy of the signal is enough to harm your eyes and even make you blind.

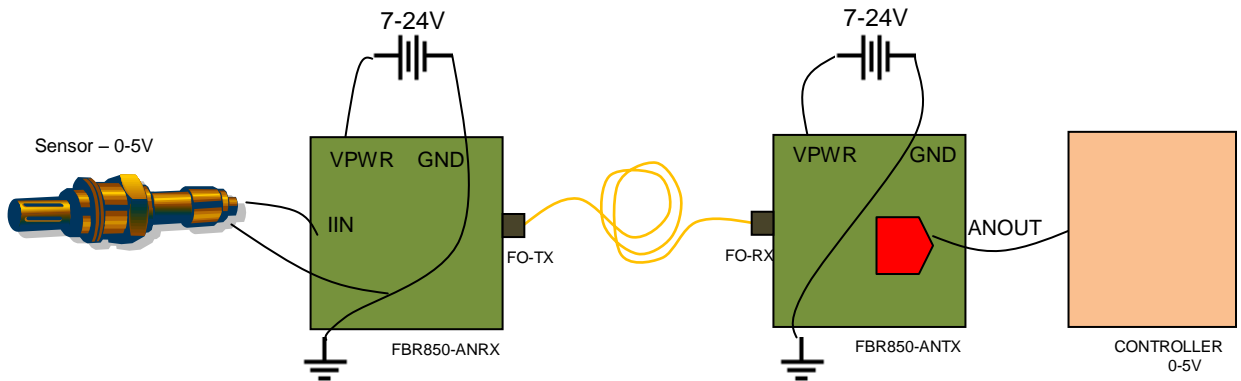
In case of doubts before turning on any FBR-850 family equipment consult CayennE-k Tecnologia by email info@cayenne.com.br or phone +55-41-30299113.

8 – Usage Examples

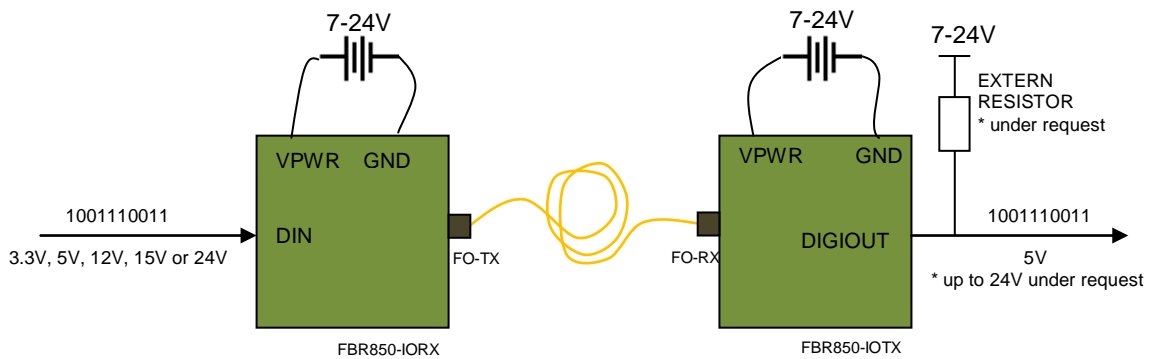
8.1 – Industrial Sensor Transmission – 4-20mA – Conversion error: 5%



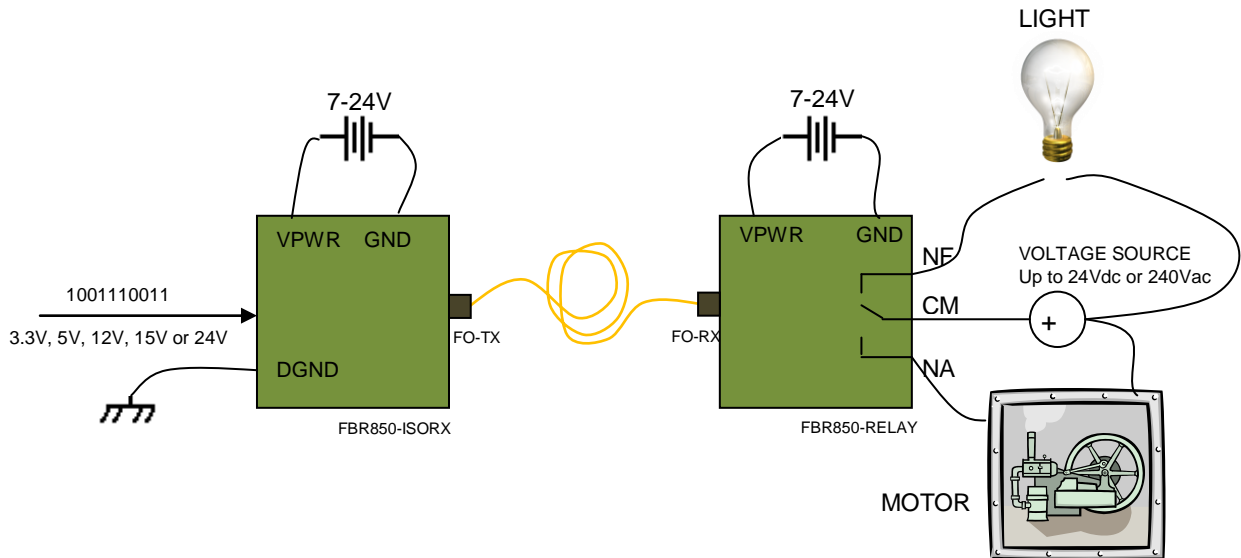
8.2 – Industrial Sensor Transmission – 0-5V Analog



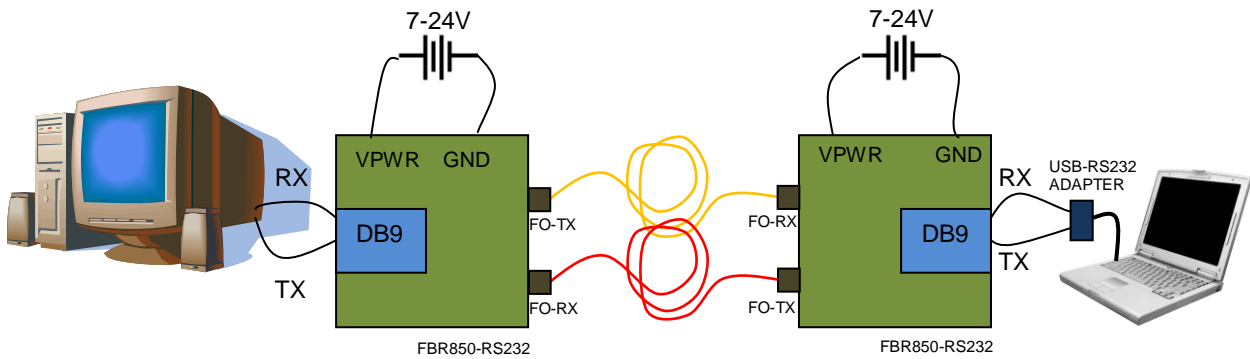
8.3 – Digital Transmission



8.4 Digital Transmission – Isolated Input + Relay Output



8.5 Computer Communication



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