

User manual

ADA-7021

Multimode Fibre-Optic to Current Loop Converter



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1. GENERAL INFORMATION

Thank you for your purchase of **CEL-MAR Company** product. This product has been completely tested and is covered by a two year warranty on parts and operation from date of sale.

If any questions or problems arise during installation or use of this product, please do not hesitate to contact Technical Support at +48 41 362-12-46 or e-mail support@cel-mar.pl.

1.1. WARRANTED INFORMATION

CEL-MAR Company gives two-year guarantees on the **ADA-7021 converter**. The warranty does not cover damage caused from improper use, materials consumption or any unauthorized changes. If the product does not function accordance with the instructions will be repaired. All warranty and no warranty repairs must be returned with paid transport and insuring to the **CEL-MAR Company**.

CEL-MAR Company under no circumstances won't be responsible for ensuing damage from improper using the product or as a result of random causes: the lightning discharge, the flood, the fire and the like.

CEL-MAR Company is not be held responsible for damages and loss including: loss of profits, loss of data, pecuniary losses ensuing from using or the impossibility of using this product.

In specific cases **CEL-MAR Company** discontinue all warranties and in particular do not follow the user manual and do not accept terms of warranty by the user.

1.2. GENERAL CONDITIONS FOR SAFE USE

The device should be installed in a safe and stable places (eg, electroinstallation cabinet), the powering cable should be arranged so as not to be exposed to trampling, attaching, or pulling out of the circuit.

Do not put device on the wet surface.

Do not connect devices for nondescript powering sources,

Do not damage or crush powering wires.

Do not make connection with wet hands.

Do not adapt, open or make holes in casings of the device!

Do not immerse device in water or no other liquid.

Do not put the fire opened on device sources: candles, an oil lamps and the like.

Complete disable from the supply network is only after disconnecting the power supply circuit voltage.

Do not carry out the assembly or dis-assembly of the device if it is enabled. This may result to short circuit and damage the device.

The device can not be used for applications that determine human life and health (eg. Medical).



ATTENTION!!!

The device is equipped in the laser transmitter.

The radiation emitted by the laser transmitter is harmful to the eyes!

Under no circumstances should never look to at the uncovered slot, to which it is not connected the fiber optic connector.

The manufacturer is not responsible for used not in accordance with the instruction manual.

The user manual is an integral part of the device and with it is delivered to users.

1.3. CE LABEL



The CE symbol on the device CEL-MAR means compatibility with electromagnetic compatibility Electromagnetic Compatibility Directive **EMC 2014/30/WE**.

Declaration of Conformity is delivered with purchased device



1.4. ENVIRONMENTAL PRESERVATION

This sign on the device inform about putting expended device with other waste materials. Device should send to the recycling. (In accordance with the act about the Electronic Appliance Expended from day 29 of July 2005)

1.5. SERVICE AND MAINTENANCE

ADA-7021 converter doesn't require the servicing and maintenance.

Technical support is available at number +48 41 362-12-46 in 8.00-16.00, from Monday to Friday or e-mail support@cel-mar.pl.

1.6. PACK CONTENTS

ADA-7021 converter; user manual; CE declaration.

2. PRODUCT INFORMATION

2.1. PROPERTIES

- Fibre-Optic – Current Loop conversion,
- Operating on 4-wire network in Current Loop 0-20mA / 12VDC standard,
- Fibre-Optic connection via two fibre connectors type: ST® * or SC – transmitter and receiver for an optical wavelength from 792nm to 865 nm or SMA – transmitter and receiver for an optical wavelength from 640nm to 675nm.
- Fibre Optic line: 2 mutimode optical fibres eg. type 50/125 µm, 62,5/125 µm, 100/140 µm, 200 µm HCS, 1mm POF,
- Signals conversion: RX,TX,
- Baud rate up to 38,4 kbps,
- Transparent for all protocols: MODBUS, DNP, PROFIBUS and other,
- External power supply from 10 to 30 VDC (standard) stabilized, min. 2W,
- 1kV= or 3kV= galvanic isolation between Current Loop & FO interfaces and power supply,
- up to 5kV= optoisolation between FO and Current Loop in the signal channels,
- Connection Current Loop line and power supply via screw terminal block,
- Connection Fiber Optic network via 2 fibres optic connectors type: ST® *(850nm), SC(850nm), SMA(650nm)

- Protection against power supply reverse connection,
- Integrated short circuit protection and over-voltage protection on Current Loop lines,
- DIN 43880 standard - mounting in typical electro-installation unit,
- Rail mounting according to DIN35 / TS35 standard,
- Dimensions (W x D x H) 53mm x 58mm x 90mm.

2.2.DESCRPTION

Fibre-Optic converter ADA-7021 is a device used to connect devices with Current Loop interface without interfering with the data format. The use of fibre-optic provides complete isolation between connected devices and resistance to interference on the transmission bus. The fibre connection is implemented by a line consisting of two fibres - one fiber for the TX signal and one for RX signal. Using two this type converters, can be use for communication with devices quite distant from each other eg. controllers, scales etc.

ADA-7021 is equipped with screw terminal block for Current Loop and power supply connections. To Current Loop bus built on the ADA-7021 can be connected 2 devices operating in half duplex mode or full duplex mode in point-to-point topology.

Overvoltage protection was made on base safety diodes and fuses on each Current Loop lines.

This converter has internal, low energy surge protection for each Current Loop lines however it is recommended to use the external lightning arresters (typical protection of telephone line) for the lightning protection of lines.

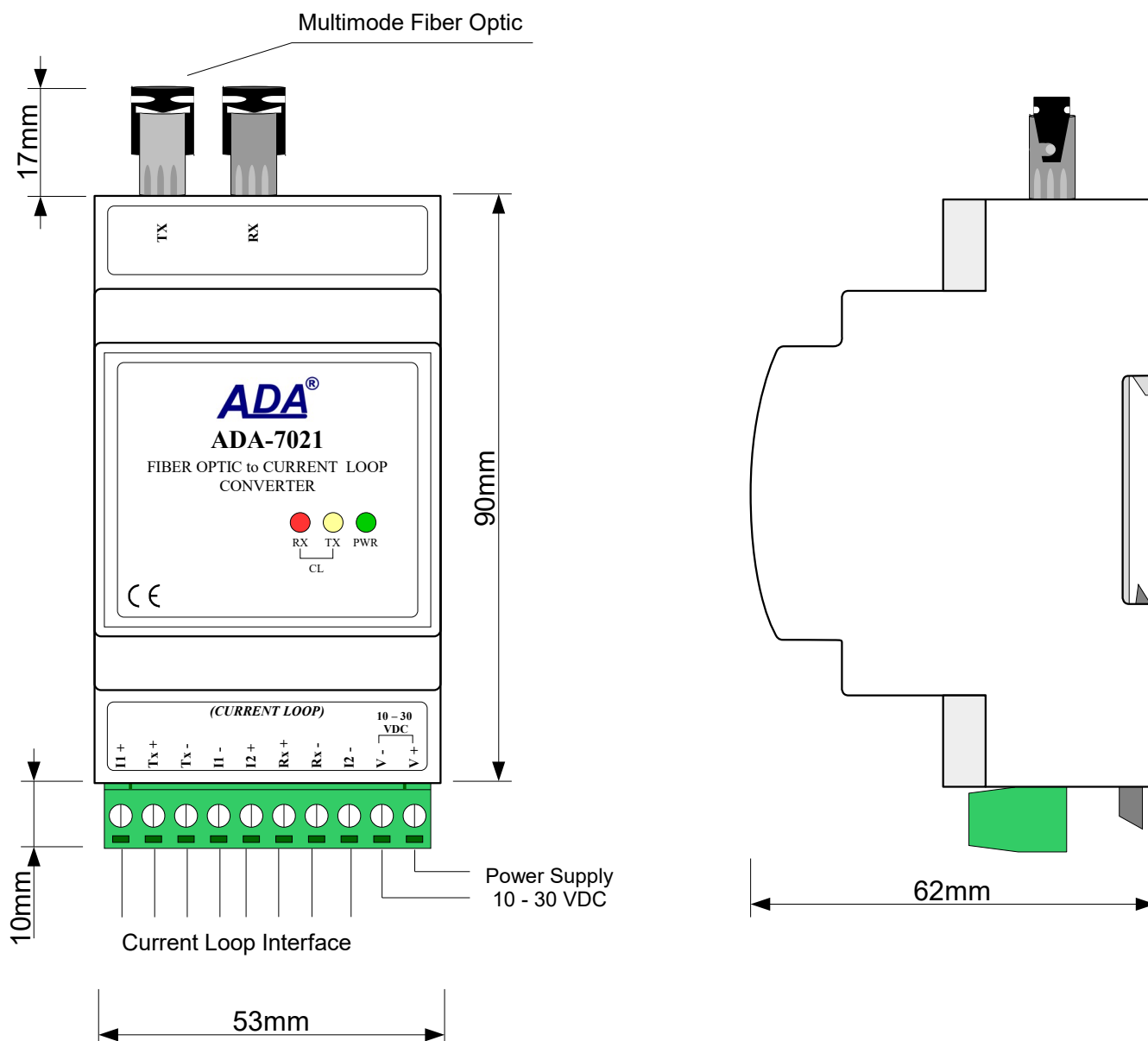


Fig. 1. View

2.3.CURRENT LOOP TRANSMITTER

The Current Loop transmitter in the ADA-7021 was made as a passive 0-20mA, having low energy short circuit protection on TX+ and TX- lines. By the correct connection of the transmitter with power source I1, Current Loop transmitter 0-20mA can operate as active. The transmitter diagram is shown on figure below.

2.4.CURRENT LOOP RECEIVER

The ADA-7021 converter has passive RX receiver having low energy short circuit protection on TX+ and TX- lines. By the correct connection of the receiver with power source I2, Current Loop receiver 0-20mA can operate as active. The RX red LED on front panel of the converter is a signalization of NO current flow through optocoupler. This LED is ON when it is:

- not connect transmitter to receiver,
- wrong connection of transmitter to receiver,
- broken connection of transmitter to receiver.

The diagram is shown on figure below.

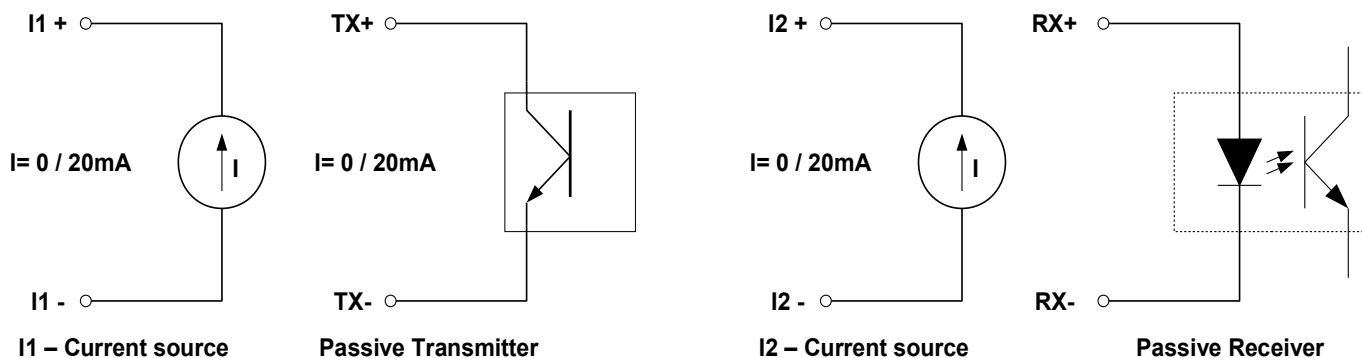


Fig 2. Diagram of the transmitter & receiver ADA-7021Current Loop

2.5.ISOLATION

ADA-7021 has the 3-way galvanic isolation, on the level 1kV= or 3kV=, depend on version, described in section *VERSIONS*.

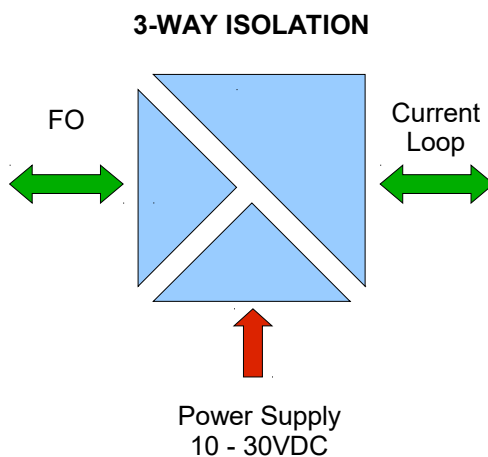


Fig 3. Isolation structure

3.INSTALLATION

This chapter will show how, to connect ADA-7021 to Current Loop bus, FO and power supply and how to use it.

In the purpose of minimization of disruptions from environment is being recommended to:

- apply multipair type shielded cables, which shield can be connected to the earthing on one end of the cable,
- arrange signal cables in the distance not shorter than 25 cm from powering cables,
- apply cable of adequate cross-section due to voltage drops for converter powering,
- use Interference suppression filters for power supply converters that are installed within a single object.
- not supply converter from power circuit device that generates large impulse interference such as transmitters, contactors,

3.1.ASSEMBLING

ADA-7021 enclosure is adapted to assembly on TS-35 (DIN35) rail. To install converter, should the upper part of casing hang hooks on the rail, than push the lower part until to hearing characteristic "Click" sound.

3.2.CONNECTION TO CURRENT LOOP DEVICE

Current Loop line is connected to TX+, TX-, I1+, I1-, RX+, RX-, I2+, I2- terminals of converter as below.

3.2.1. CONNECTION TO DEVICE WITH PASSIVE TRANSMITTER & PASSIVE RECEIVER

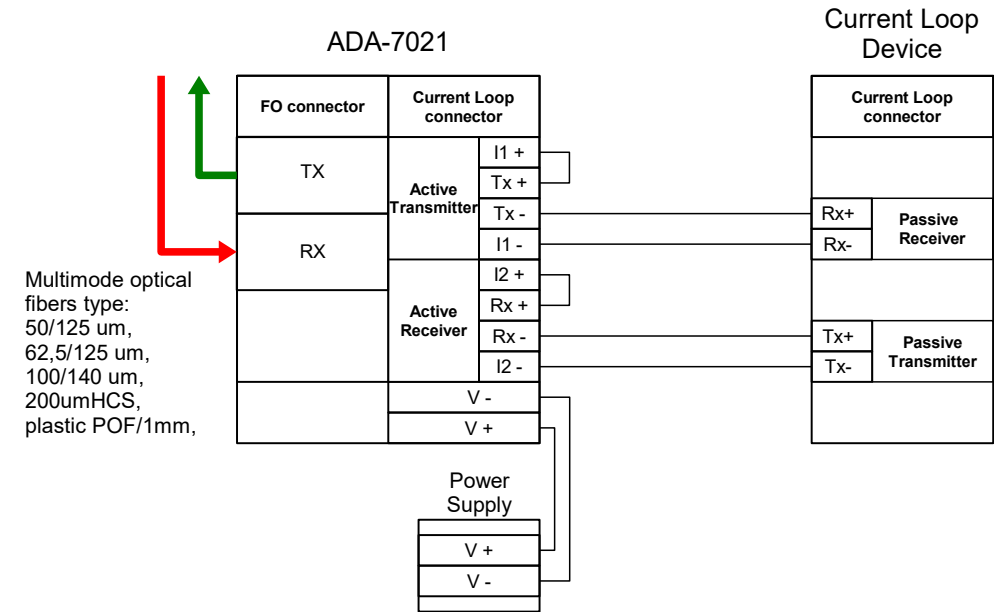


Fig 4. Example connection of device with passive transmitter and passive receiver to ADA-7021

3.2.2. CONNECTION TO DEVICE WITH ACTIVE TRANSMITTER & ACTIVE RECEIVER

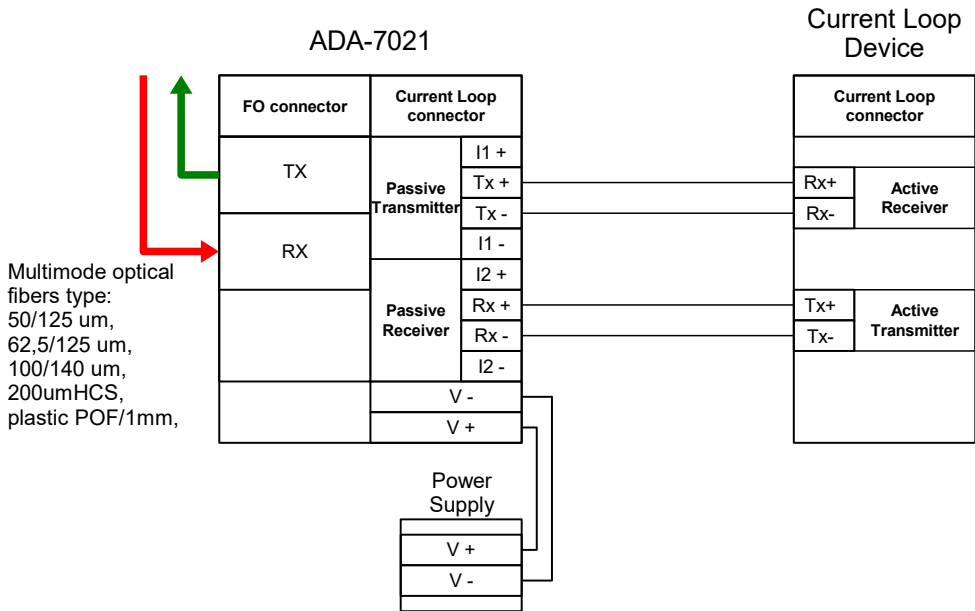


Fig 5. Example connection of device with active transmitter and active receiver to ADA-7021

3.2.3. CONNECTION TO DEVICE WITH ACTIVE TRANSMITTER & PASSIVE RECEIVER

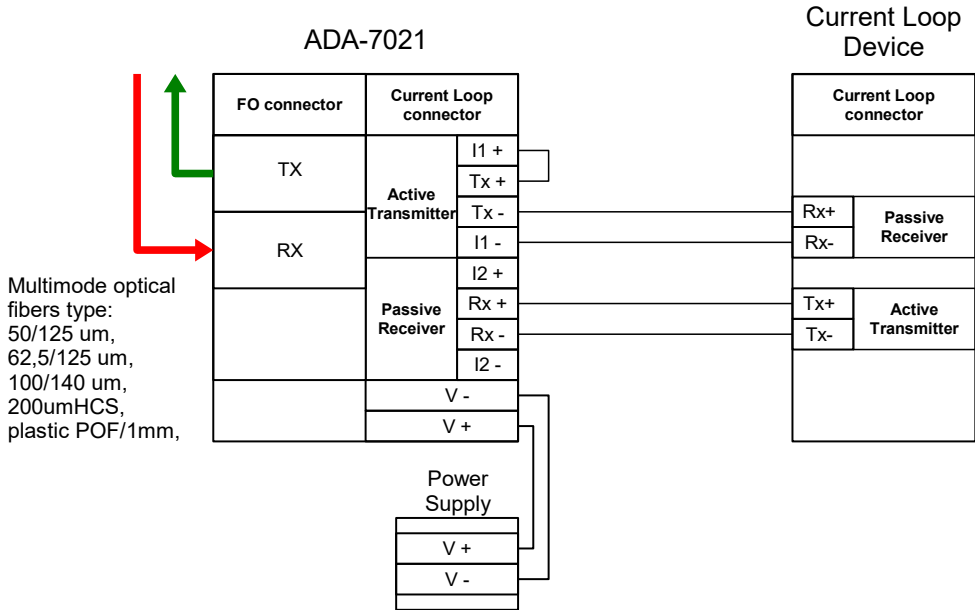


Fig 6. Example connection of device with active transmitter and passive receiver to ADA-7021

3.2.4. CONNECTION TO DEVICE WITH PASSIVE TRANSMITTER & ACTIVE RECEIVER

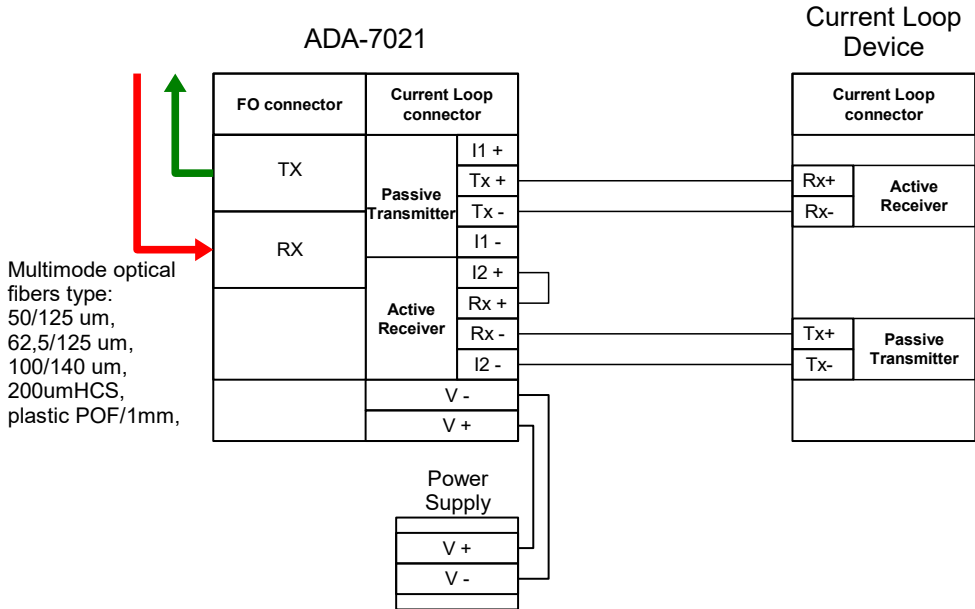


Fig 7. Example connection of device with passive transmitter and active receiver to ADA-7021

3.3.CONNECTION FIBRE-OPTIC BUS

The multimode Fibre-Optic with connectors type: ST®, SC or SMA, connect into their corresponding converter's connectors type: ST®, SC or SMA like on a figure below. Connecting the fiber optic cables should be cautious and careful not to damage them or dirty. If it is necessary to lay the cable at an angle, must be created the appropriate bends

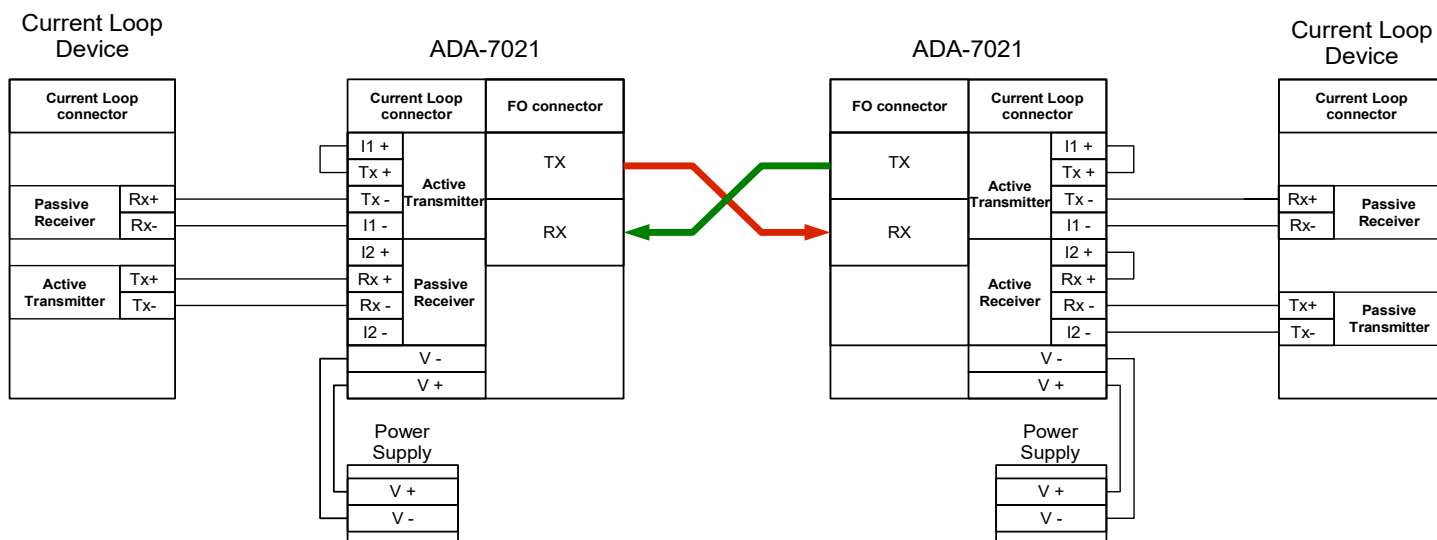


Fig 8. Example connection of Current Loop interface devices by the use of FO converters

ATTENTION!!!

The device is equipped in the laser transmitter.

The radiation emitted by the laser transmitter is harmful to the eyes!

Under no circumstances should never look to at the uncovered slot, to which it is not connected the fiber optic connector.

3.4.POWER SUPPLY CONNECTION

The power supply to ADA-7021 converter should be DC (regulated) from 10 V= to 30V=. Nominal power is typically 2W, e.g. HDR-15-24. Power cable from DC power supplies to device must not be longer than 3m.

Observe the polarity, connect positive (+) of DC power supplies to V+ and negative (-) end to V- terminal. ADA-7021 has the protection from opposite connection power supply. If after powering on the front panel is not lit green LED PWR, check the correctness of power connection (polarity).

4. ACTIVATION

Converter can be powered after proper connection according to steps above. If the connection was made properly green LED PWR on front panel of converter should lit, if not check polarization of power connection. If the red LED RX is lit check correctness of connection transmitting line of Current Loop Device. The lighting of RX LED indicates no current flow through the optocoupler in the receiver's circuit.

During proper data transmission through converter the LEDs Tx and Rx should blink.

4.1.LEDS DESCRIPTION

LED	Description
PWR	Signalization of Power Supply
RX	Signalization of data receiving by ADA-7021 from Current Loop.
TX	Signalization of data transmission from ADA-7021 converter through Current Loop

ATTENTION!

AT BAUD RATE ABOVE 38.4 KBPS THE LED'S TX, RX WILL LIT WEAKLY DURING DATA TRANSMISSION

5. VERSIONS

	ADA-7021 -		-		-		-		-	
Electronic version:										
Standard		1								
Current Loop Voltage:										
24VDC			1							
12VDC (standard version)			2							
Current Loop Current:										
0 – 20mA (standard version)				1						
0 – 30mA				2						
Galvanic isolation:										
1kV= 3-way						2				
3kV= 3-way						3				
Fibre connectors:										
ST 850nm									1	
SC 850nm									2	
SMA 650nm									3	

Order example:

Product Symbol: **ADA-7021-1-2-1-2-1**

- 1 – standard electronic version,
- 2 – 12VDC CL voltage,
- 1 – 0 – 20mA CL current,
- 2 – 1kV 3-way galvanic isolation,
- 1 – ST-type 850nm fibre connectors,

6.SPECIFICATION

TECHNICAL DATA		
Transition Parameters		
Interface	Fibre-Optic	Current Loop
Connector	ST® * type - transmitter and receiver for an optical wavelength from 792nm to 865nm, SC type - transmitter and receiver for an optical wavelength from 792nm to 865nm, SMA type - transmitter and receiver for an optical wavelength from 640nm to 675nm.	Screw terminal, wire max. Ø 2,5mm².
Line length	- up to 2000m for fibre type 50/125 mm, optical power budget Tx/Rx 9,6[dB], - up to 2500m for fibre type 62,5/125 mm, optical power budget Tx/Rx 15[dB], - up to 2000m for fibre type 100/140 mm, optical power budget Tx/Rx 15[dB], - up to 1500m for fibre type 200 mm HCS, optical power budget Tx/Rx 20[dB], - up to 20m for fibre type POF/1mm	Depends on the baud rate, a few kilometres.
Maximum number of connected device	1	1
Transmission line	Two multimode fibres: - connectors ST-850, fibres type 50/125 µm, 62,5/125 µm, 100/140µm, 200µm HCS. - connectors SC-850 fibres type 50/125 µm, 62,5/125 µm, 100/140µm, 200µm HCS. - connectors SMA-650 plastic fibres type POF/1mm.	2-pair twisted cable eg UTPN _x 2x0,5(24AWG), shield inside large interferences eg (STP N _x 2x0,5(24AWG)).
Maximum baud rate	38,4 kbps	
Transmission type	Asynchronous, full duplex, half duplex.	
Standards	Current Loop TTY : 0-20mA / 12VDC.	
Optical signalization	• PWR – green LED power supply, • RX - red LED data receiving from Current Loop, • TX - yellow LED data transmission through Current Loop interface.	

Electrical Parameters	
Power requirements	10 - 24 – 30 V DC
Power cable	Recommended length of power cable < 3m
Power	< 3W
Protection from reverse power polarization	Yes
Galvanic isolation	1kV= or 3kV= between power circuit and signal lines FO & Current Loop.
Optoisolation	5kV – between signal lines FO & Current Loop
Electromagnetic compatibility	Resistance to disruptions according to the standard PN-EN 55024. Emission of disruptions according to the standard PN-EN 55022.
Safety requiring	According to the PN-EN60950 norm.
Environment	Commercial and light industrial.
Environmental Parameters	
Operating temperature	-30°C ÷ 60°C
Humidity	5 ÷ 95% - non-condensing
Storage temperature	-40 ÷ +70°C
Casing	
Dimensions	53 x 90 x 62mm,
Material	ABS/PC
Degree of casing protection	IP40
Degree of terminal protection	IP20
Weight	0,10 kg
According to standards	DIN EN50022, DIN EN43880
Location during work	Free
Mounting method	On the rail compliant with DIN35 / TS35 standard.

* ST is a trademark of AT&T company.

Dear Customer,

Thank you for purchasing **CEL-MAR Company** products.

We hope that this user manual helped connect and start up **ADA-7021 converter**. We also wish to inform you that we are a manufacturer of the widest selections of data communications products in the world such as: data transmission converters with interface RS232, RS485, RS422, USB, Current Loop, Fibre-Optic Converters and Ethernet or Wi-Fi.

Please contact us to tell how you like our products and how we can satisfy you present and future expectation.

CEL-MAR sp.j.

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