User manual

ADA-7020

Multimode Fibre-Optic to Current Loop Converter

Contents

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

ADA-7020 converter is covered by a two year warranty from date of sale. In case of being damaged it will be repair or the damaged component will be replace. The warranty does not cover damage caused from improper use, materials consumption or any unauthorized changes. If the product does not function (is damaged), or not operate in accordance with the instructions, will be repaired or replaced.
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-7020 converter does not 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-7020 converter; user manual; CE declaration.

2. PRODUCT INFORMATION

2.1. PROPERTIES

- Fibre-Optic to Current Loop conversion,
- Operating on 4-wire bus of Current Loop standard,
- Fibre-Optic connection via fore 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 e.g. type 50/125 μm, 62,5/125 μm, 100/140 μm, 200 μm HCS, 1mm POF,
- Transmission of RX, TX signals,
- Baud rate up to 38,4 Kbps,
- Transparent for all protocols: MODBUS, DNP, PROFIBUS and other,
- Any format of byte referred to RS232 interface specification,
- External power supply 10 – 30 VDC stable min. 2W,
- 1kV= or 3kV= galvanic isolation between Current Loop interface and power supply,

- up to 5kV= optoisolation between FO and Current Loop in the signal channels,
- Connection Current Loop network and power supply via screw terminal block,
- Connection Fiber Optic network via fibres optic connectors type: ST® *(850nm), SC(850nm), SMA(650nm),
- Protection against power supply reverse connection,
- Implemented overvoltage protection on Current Loop network,
- DIN 43880 standard - mounting in typical electro-installation unit,
- Rail mounting according to DIN35 / TS35 standard,
- Dimensions of casing contour (W x H x D) 53mm x 90mm x 62mm,

2.2. DESCRIPTION

Fiber Optic ADA-7020 is a device used to connect units with Current Loop interface without interfering with the data format. The use of fiber optics provides complete isolation between connected devices and resistance to interference on the transmission bus. The fiber connection is implemented by a line consisting of two fibers - one fiber for the TX signal and one for RX signal.
The converter is equipped with screw terminal block for Current Loop and power connections. To Current Loop bus built on the ADA-7020 can be connected two converters operating in full duplex or half duplex point-to-point and 15 converters operating in half duplex mode topology multipoint.
Surge protection on each line Current Loop have been based on diodes and fuses.
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.

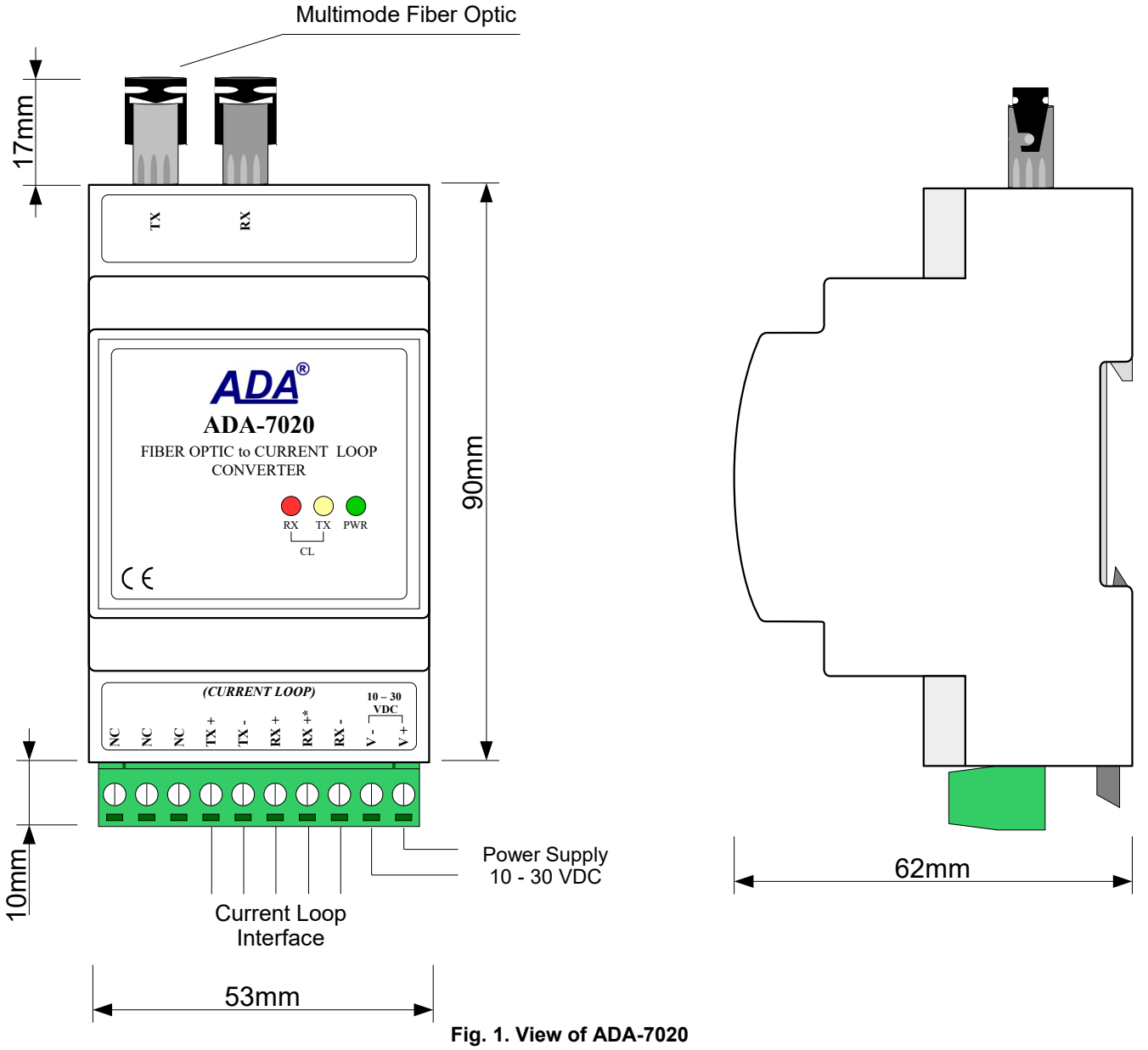

Fig. 1. View of ADA-7020

2.3. CURRENT LOOP TRANSMITTER

ADA-7020 converter has active current loop transmitter, on the base power source generate current +/- 20mA or 0-20mA (depend on converter's version). The transmitter has short circuit protection on TX+ and TX- lines.

2.4. CURRENT LOOP RECEIVER

In ADA-7020 converter has been used passive RX receiver consisting of optoisolator (optical coupler) and protective elements. The receiver circuit has RX+, RX- terminals as well as the terminal marked as RX-*. In the circuit with RX-* terminal has been used additional resistor 1k, to reduce power in the case of small impedance.
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.

2.5. ISOLATION

ADA-7020 has the 3-way galvanic isolation, on the level 1kV= or 3kV=, depend on version, described in section VERSIONS.

3-WAY ISOLATION

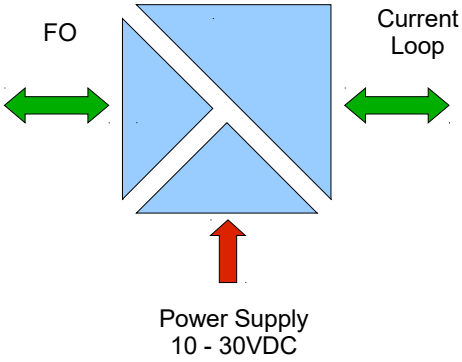

Fig.2. Isolation structure

3. INSTALLATION

This chapter will show how to connect ADA-7020 to Current Loop bus, Fibre-Optic 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-7020 converter case is adapted to assembly on TS-35 (DIN35) rail. To install converter should mount device on the rail upper part of the case then press bottom part to hearing characteristic „Click” sound.

3.2. CONNECTION TO CURRENT LOOP BUS

In the purpose of connection ADA-7020 to a device with Current Loop interface, the connection should be done as follows.

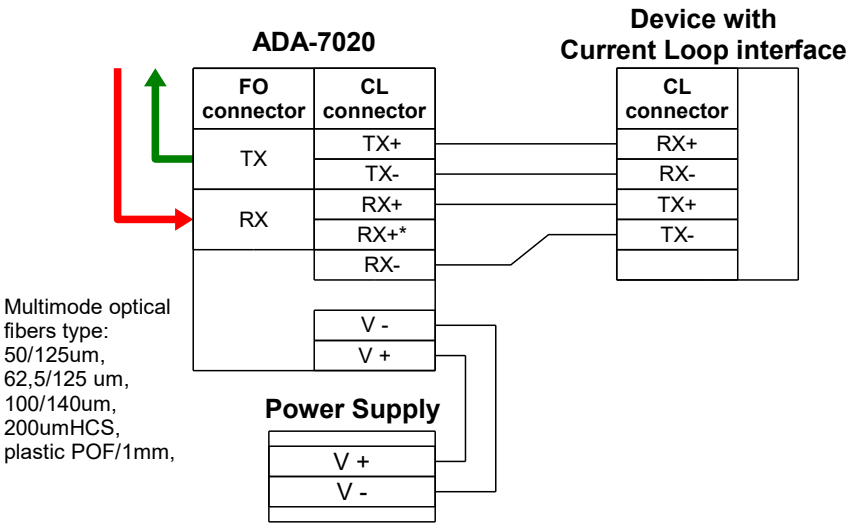

Fig. 3. Example connection of ADA-7020 to current loop device

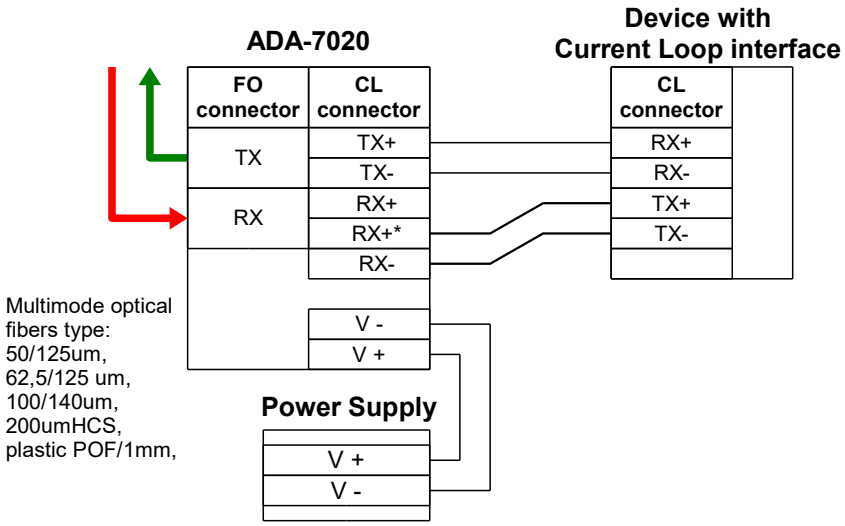

Fig. 4. Example connection of ADA-7020 to current loop device via additional resistor in the transmitter circuit (RX+* terminal)

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 the Fig. 6. 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.

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.

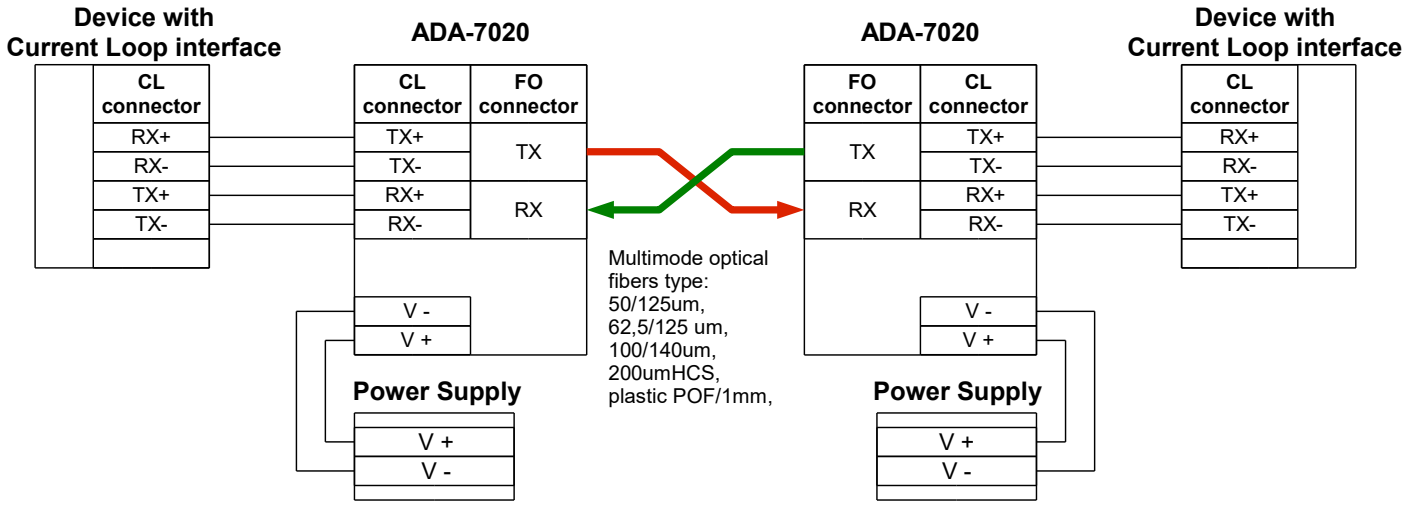

Fig. 5. Example of the connection devices with Current Loop interface using fiber optic converters.

3.4. POWER SUPPLY CONNECTION

The power supply to ADA-7020 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- screw terminal block. ADA-7020 has the protection from opposite connection power supply. If after power, on the front panel is not lit green LED PWR, check the power connection (polarity).

4. ACTIVATION

The converter can be power on after properly connection according to section above.
If after connection power supply on front panel will not light green led PWR, check correctness of power supply connecting (polarization). When data is present the LEDs Tx and Rx should blink.

4.1. DESCRIPTION OF SIGNALLING LEDS

LED	Description
PWR	Signalling of Power Supply
RX	Signalling of data receiving through ADA-7020 converter from Current Loop port
TX	Signalling of data transmitting from ADA-7020 converter through Current Loop port

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

5. VERSIONS

ADA-7020 - □ - □ - □ - □ - □

Current Loop Voltage:
- 24VDC **1**
- 12VDC **2**

Current Loop Type:
- ± 20mA **1**
- 0 – 20mA **2**

Galvanic isolation:
- 1kV= **2**
- 3kV= **3**

Terminal & Terminal Cover:
- Cover without inlets, screw terminal block **1**
- Cover with inlets, screw terminal block **2**
- Cover without inlets, plug-in screw terminal block **3**

Fibre connectors:
- **ST** – type 850nm **1**
- **SC** – type 850nm **2**
- **SMA** – type 650nm **3**

Order example:
Product Symbol: **ADA-7020-1-1-2-3-1**

1 – current loop voltage: 24VDC,
1 – current loop type: ± 20mA,
2 – galvanic isolation: 1kV=,
3 – cover without inlets, plug-in screw terminal block
1 – fibre connectors: ST 850 nm,

6. SPECIFICATION

TECHNICAL DATA		
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 2,5mm^2.
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	Depend on baud rate, several kilometres
Max. 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 UTP 4x2x0,5 (24AWG), shield inside large interferences eg STP 4x2x0,5 (24AWG)
Max. baud rate	38,4 kbps	

Transmission type	Asynchronous half duplex or full duplex
Standards	Current Loop: 0-20mA / 12VDC, 0-20mA / 24VDC, +/-20mA / 24VDC.
Optical signalisation	• PWR – green LED power supply, • RX - red LED data receiving from Current Loop side, • 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-7020 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.
Zakład Informatyki i Elektroniki
str. Ściegiennego 219C
25-116 Kielce, POLAND

Tel.....: +48 41 362-12-46
Tel/fax.....: +48 41 361-07-70
Web.....: http://www.cel-mar.pl/en
Office.....: office@cel-mar.pl
Sales department..... .: sales@cel-mar.pl
Technical information ....: support@cel-mar.pl