



KKU

USB converters to:
RS-485FD, RS-485HD, RS-232,
fiber-optic ST, USB (isolated)



**POWER SYSTEM PROTECTION
EQUIPMENT**

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1. MANUFACTURER COMMENTS

1.1. General safety rules

**WARNING!**

During normal operation of the device, some of its parts are under hazardous voltage. Inappropriate or improper use of the device can pose a danger to persons serving, also leads to damage of the device.

1.2. List of applied standards

The device described in this manual has been designed and manufactured for industrial purposes. In the process of development and production, compliance with the standards has been assumed, the fulfilment of which ensures the implementation of the assumed principles and safety measures, provided that the user complies with the installation, commissioning and operating instructions.

This device complies with the essential requirements of the Low Voltage Directive (2014/35/UE) and the Electromagnetic Compatibility Directive (2014/30 / EU), in compliance with the following standards:

- **PN-EN 60664-1:2011** Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests
- **PN-EN 61010-1:2011** Safety requirements for electrical equipment for measurement, control, and laboratory use -- Part 1: General requirements



1.3. Storage and transport

The devices are packed in individual packages to protect them from damage during transport and storage. Equipment should be stored in transport packs, indoors, free of vibration and direct atmospheric, dry, airy, free from harmful vapors and gases. Ambient air temperature should not be below -20 ° C and above + 70 ° C and relative humidity should not exceed 80%.

1.4. Place of installation

The equipment should work in areas free of water, dust and gases and explosive, flammable and chemically active gases where the mechanical exposure is moderate. Installation height should not exceed 2000 m above sea level at an ambient temperature of -5 ° C to + 40 ° C and relative humidity not exceeding 80%.

The device terminal marked with the PE symbol should be connected to ground potential. It is recommended to use stranded wire of cross section min. 2,5 mm² and insulation strength min. 500 V with a length of no more than 3 m.

1.5. Device documentation

The device comes with:

- Operating manual
- Test protocol
- Warranty Card

1.6. Disposal

The device has been manufactured mostly from materials that can be recycled or disposed of without endangering the environment. A recalled device may be recaptured for re-processing, provided that its condition corresponds to normal wear and tear. All components that are not regenerated will be removed in an environmentally friendly manner. The device should be disposed of in accordance with local law or passed on to an electronic waste disposal company.

1.7. Warranty and service

The warranty period is 24 months from the date of sale, unless a longer period agreed in the contract or the sales contract.

The warranty covers free of charge removal of defects revealed during use, under the conditions specified in the warranty card.

ZEG-ENERGETYKA SP. Z O.O. gives a guarantee subject to the following conditions:

- the installation and operation of the device should be in accordance with that manual
- the seal on the device's housing must not be affected
- no corrections or changes can be made to the warranty card

The warranty does not cover:

- defects caused in result of inappropriate transport or storage conditions
- defects caused in result of inappropriate installation or operation of the device
- defects caused in result of tampering within the unit, structural modifications, alterations and repairs carried out without the consent of the manufacturer

BUYER TIPS:

- Proper and trouble-free operation of the device requires proper transport, storage, mounting and commissioning, as well as proper operation, maintenance and service.
- The equipment must be handled by properly trained and qualified personnel
- When complaining, please state the reason for the complaint (symptoms related to malfunction) and factory serial number
- After receiving of the complaint confirmation, send the complaint device with the warranty card to the manufacturer's address
- The warranty period is extended by the time of successful complaint filling

1.8. How to order

The order should specify the full name of the device and all the necessary parameters:

- KKU-1 – ST (fiber-optic)
- KKU-2 – RS-485HD (two wires [A, B])
- KKU-3 – RS-485FD (four wires [TA, TB, RA, RB])
- KKU-4 – RS-232 (RxD, TxD, GND)
- KKU-5 – TTL (3V/5V standard)
- KKU-6 – TTL (3V/5V standard with 5V led out)
- KKU-7 – Isolated USB to USB converter (USB_A -> USB_B)

Example of order:

- KKU with USB to ST (fiber-optic) conversion

1.9. Manufacturer's data

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2. TECHNICAL DESCRIPTION

2.1. Application

KKU-1 is USB-to-fiber optic converter. It enables to connect the PC computer to protection and control devices equipped with fiber-optic ports. It fulfills both physical and software layer (device is supported by FTDI232 interface). After installation the virtual COM-PORT appears in computer operating system.

KKU-2 is USB-to-RS-485HD communication port converter (halfduplex A, B). It enables to connect the PC computer to protection and control devices equipped with RS-485HD ports. It fulfills both physical and software layer (device is supported by FTDI232 interface). After installation the virtual COM-PORT appears in computer operating system.

KKU-3 is USB-to-RS-485FD communication port converter (full duplex TA, TB, RA, RB). It enables to connect the PC computer to protection and control devices equipped with RS-485FD ports. It fulfills both physical and software layer (device is supported by FTDI232 interface). After installation the virtual COM-PORT appears in computer operating system.

KKU-4 is USB-to-RS-232 communication port converter. It enables to connect the PC computer to protection and control devices equipped with RS-232 ports. It fulfills both physical and software layer (device is supported by FTDI232 interface). After installation the virtual COM-PORT appears in computer operating system.

KKU-5 is USB-to-TTL(3/5 V) channel converter. The converter is intended to be used by IT engineers and embedded programmers. It fulfills both physical and software layer (device is supported by FTDI232 interface). The KKU-5 converter enables to connect the PC computer to embedded systems. After installation the virtual COM-PORT appears in computer operating system.

KKU-6 is USB-to-TTL(3/5 V) channel converter with 5V terminals led out. The converter is intended to be used by IT engineers and embedded programmers. It fulfills both physical and software layer (device is supported by FTDI232 interface). The KKU-6 converter enables to connect the PC computer to embedded systems. It provides 5V supply voltage. After installation the virtual COM-PORT appears in computer operating system.

KKU-7 is converter providing galvanic isolation of USB port. It is equipped with 5V/500 mA power supply, which ensures galvanic isolation between the PC computer and connected device. Thanks to built-in voltage converter, no additional power supply is needed. The converter provides data transmission with maximum baud rate up to 12 Mb/s (full speed). The converter is fully transparent for the devices to which it is connected. It needs no installation of drivers and configuration. The installation of KKU-7 is necessary in case of powering devices by different voltage levels. The converter provides protection against overvoltages. It also provides signal gain at long transmission lines.

2.2. Main features

- KKU-1 – one USB port, ST (820 nm) port – multimode fibre
- KKU-2 – one USB port, screw terminal – 3 pins (RS-485 HD)
- KKU-3 – one USB port, screw terminal – 4 pins (RS-485 FD)
- KKU-4 – one USB port, screw terminal – 3 pins (RS-232)
- KKU-5 – one USB port, screw terminal – 3 pins (TTL3/5 V)
- KKU-6 – one USB port, screw terminal – 4 pins (TTL3/5V, +5V)
- KKU-7 – two USB ports (with galvanic isolation)

2.3. Construction

The converters are enclosed in ABS plastic case of dimensions 35x25x50 mm. The cases are equipped with a magnet which allows to easily mount them at metal surface. Each KKU converter is equipped with a USB port.

The manufacturer provides USB cable to each of them. To KKU-1 the optical-fibre of 3 m length is also added. The front view of converters is shown on figure 1.

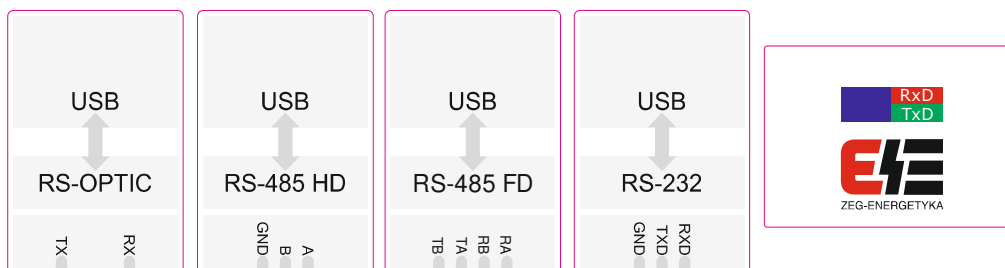


Fig. 1. Converter fronts

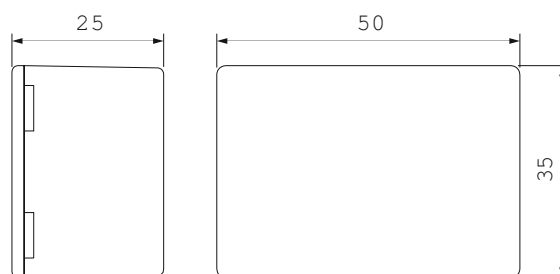


Fig. 2. Casing dimensions

3. TECHNICAL DATA

KKU	
Supply voltage	5V - by USB
Insulation	2500V (only USB insulation)
Dimensions	35x25x50mm
Casing material	ABS
Colour	light beige

4. FUNCTIONALITY

4.1 Principle of operation

After the connection of the USB cable to the computer, the operating system detects new device. For the first connection of the converter it is required to instal the driver provided on CD. The manufacturer of the drivers is FTDI. Drivers can be also downloaded from www.ftdichip.com (FTDI-232). Properly installed drivers makes new virtual COM port appearance. The device and port number can be seen in device menager. In case of long frames and significant time intervals the FTDI driver settings should be modified by setting larger buffer times. Configuration window is shown on figure 3.

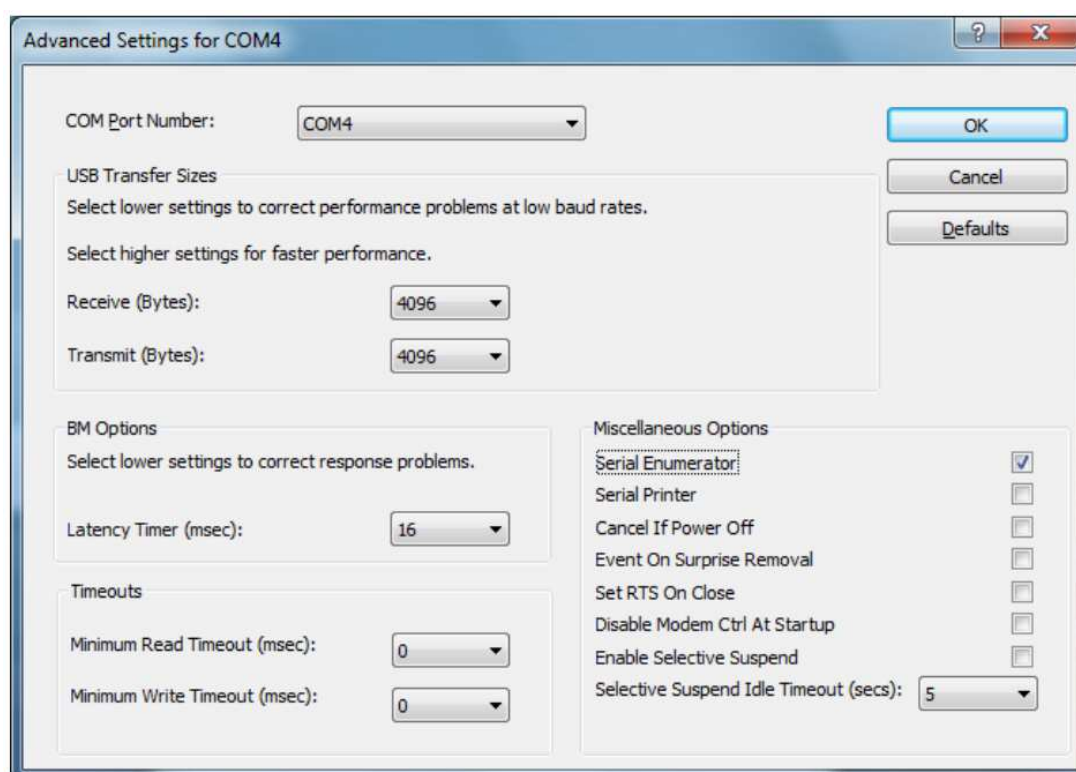


Fig. 3. Configuration of USB driver window

5. INSTALLATION AND COMMISIONING

5.1. Storage and preparation for operation

KKU converters are delivered to the customer in packs to ensure that devices are protected against external influences that could cause damage. Therefore, do not unpack them for storage. Transport packages should be transported and reloaded with care, avoiding shocks and maintaining the position specified on their packaging. Storage is possible in indoors, dry (relative humidity <80%), free of corrosive vapors at ambient temperature -20 °C to 70 °C.

This image shows a full page of a handwriting practice worksheet. It consists of numerous horizontal rows, each defined by two parallel dotted lines. The rows are evenly spaced and extend across the entire width of the page, providing a guide for letter height and placement. There is no text or other markings on the page.

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