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CEL-MAR ADA-4040PC9 Modbus RTU Protocol Converter

Specifications

TECHNICAL DATE		
Transition Parameters		
Protocol	**Kyma* KDU-110**	**Modbus-RTU**
Interface	RS-485/RS-422 (**KDU**)	RS-485/RS-422 (**RTU**)
Connector	Screw terminal, wire max. Ø 2,5mm^2	Screw terminal, wire max. Ø 2,5mm^2
Line length	1200 m	1200 m
Max. number of connected device	32	32
Transmission line	Twisted cable 1-pair or 2-pair , UTP Nx2x0,5 (24AWG), shield inside large interferences STP Nx2x0,5(24AWG)	Twisted cable 1-pair or 2-pair , UTP Nx2x0,5 (24AWG), shield inside large interferences STP Nx2x0,5(24AWG)
Standards	EIA-485, CCITT V.11	EIA-485, CCITT V.11
Baud rates (bps)	Up to 230,4 kbps	
Transmission type	Asynchronism full duplex, half duplex.	
Optical signalisation	• PWR – green LED power supply, • RX - red LED data receiving from RS485/RS422 (RTU) interface, • TX - yellow LED data transmission through RS485/RS422 (RTU) interface.	
Electrical Parameters		
Power requirements	10 - 24 – 30 V DC	
Power Cable	Recommended length of power cable - up it is 3m.	
Power	<2W	
Protection from reverse power polarization	YES	
Galvanic Isolation	1kVDC or 3kVDC – between power circuit and signal lines RS485 and RS485/RS422	
Optoisolation	~3kVDC - between signal line RS485 (KDU) and RS485/RS422(RTU).	
Electromagnetic compatibility	Resistance it disruptions according to PN-EN 61000-2 norm. Emission of disruptions according to PN-EN 61000-4 norm.	
Safety requiring	According it the PN-EN 61010-1 norm.	
Environment	Industrial	

Environmental Parameters	
Operating temperature	-30 ÷ 60°C
Humidity	5 ÷ 95% - non-condensing
Storage temperature	-40 ÷ 70 °C
Casing	
Dimensions	53 x 90 x 62 mm
Material	Noryl UL. 94 V-O
Degree of casing protection	IP40
Degree of terminal protection	IP20
Weight	0,10 kg
According is a standard	DIN EN50022, DIN EN43880
Position during operation	Free
Mounting	Rail mounting according it is DIN35 standard / TS35.

GENERAL INFORMATION

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

WARRANTED INFORMATION The

ADA-4040PC9 converter is covered by a two-year warranty from the date of sale. In case of being damaged, it will be repaired, or the damaged component will be replaced. The warranty does not cover damage caused by improper use, materials consumption, or any unauthorized changes. If the product does not function (is damaged)or does not operate according to the instructions, it will be repaired or replaced. All warranty and no warranty repairs must be returned with paid transport and insurance to the CEL-MAR Company. CEL-MAR Company under no circumstances won’t be responsible for ensuing damage from improper use of the product or as a result of random causes, lightning discharge, flood, fire, and the like. CEL-MAR Company is not 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 discontinues all warranties and, in particular, does not follow the user manual and does not accept the terms of warranty by the user.

GENERAL CONDITIONS FOR SAFE USE

The device should be installed in a safe and stable place (eg, an electroinstallation cabinet), and the powering cable should be arranged so as not to be exposed to

trampling, attaching, or pulling out of the circuit.

- Do not put the device on a wet surface.
- Do not connect devices to nondescript power sources,
- Do not damage or crush power wires.
- Do not make a connection with wet hands.
- Do not adapt, open, or make holes in he casings of the device!
- Do not immerse the device in water or any other liquid.
- Do not put the fire open on device sources: candles, oil lamps, and the like.
- Complete disable from the supply network is only after disconnecting the power supply circuit voltage is disconnected.
- Do not carry out the assembly or disassembly of the device if it is enabled. This may result tinshort circuit and damage the device.
- The device can not be used for applications that determine human life and health (eg, Medical).

CE LABEL

The CE symbol on the device CEL-MAR means compatibility with electromagnetic compatibility Electromagnetic Compatibility Directive EMC 2014/30/WE. The Declaration of Conformity is delivered with the purchased device.

ENVIRONMENTAL PRESERVATION

This sign on the device informs about putting he expended device with other waste materials. The device should be sent for recycling. (By the act about the Electronic Appliance Expended from day 29 of July 2005)

SERVICE AND MAINTENANCE

Converter ADA-4040PC9 does not require servicing and maintenance. Technical support is available at +48 41 362-12-46 from 8.00 to 16.00 Monday through Friday or by e-mail at support@cel-mar.pl.

PACK CONTENTS

ADA-4040PC9 converter; User Manual; CE declaration; Line terminators 120W (2 szt.).

PRODUCT INFORMATION

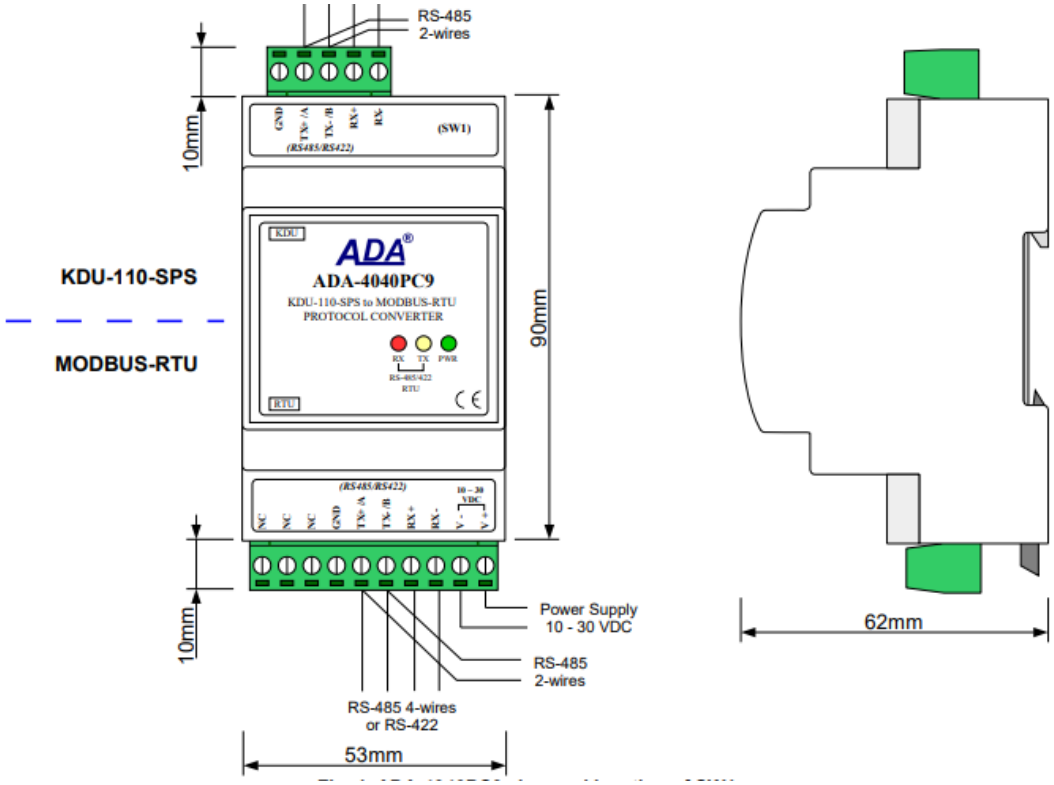
PROPERTIES

- Conversion of protocols KDU-110-SPS (RS485) to MODBUS-RTU (RS485/RS422),
- Parameters, baud rate, and data format conversion on RS485/RS422 and RS485 converter's ports,
- Operating on 2 or 4 wire buses in RS485/RS422 standard in point-to-point and multipoint mode,
- Conversion TX, RX signals of RS485 standard to RS485/RS422 standard and inversely,
- Operation up to 32 devices on the RS485 bus,
- Baud rate set on RS485 (KDU) & RS485/RS422 (RTU) (bps): 300, 600, 1200, 1800, 2400, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 57600, 76800, 115200, 230400,
- Data format set on RS232 & RS485/RS422 interfaces: data bit: 5, 6, 7, 8; parity: None, Odd, Even; number of stop bits: 1, 2,
- Power supply 10 – 30 VDC stable, min. 2W,
- ~3kV= optoisolation in signal channel between RS485 and RS485/422 interfaces,
- 1kV= or 3kV= galvanic isolation between RS485 & RS485/422 interfaces and power supply (depends on version),
- Implemented short circuit protection and over-voltage protection on RRS-485/ RS-422 network,
- Implemented ESD 15kV surge protector of RS485 interface,
- Connection MODBUS-RTU RS485 / RS422 network and power supply via screw terminal block 2.5 mm2.
- Connection KDU-110 via screw terminal block 2.5 mm2
- Cover compatible with DIN 43880 standard– mounting in the typical electro-installation unit,
- Cover adapts to rail mounting according to DIN35 / TS35 standard,
- Cover dimensions (W x D x H) 53mm x 63mm x 90mm,

DESCRIPTION

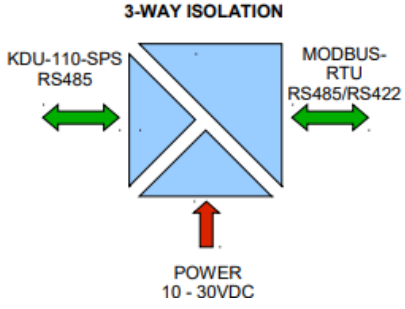
Protocol converter KDU-110-SPS to MODBUS-RTU ADA-4040PC9 is a device that allows connecting Kyma* KDU-110 Shaft Power Meter (SPS) devices, equipped with RS485 interface, to a multipoint RS-485 bus, to which are connected devices that

communicate by MODBUS-RTU protocol. Simultaneously, the converter converts RS-485 to RS-485/422 standards, with the setting of data format. Depending on configurations, can be set baud rate, data bits, parity, and number of stop bits. The setting can be different for (KDU)RS485 I (RTU)RS485/RS422 ports. The converter supports the asynchronous transmission of data with a baud rate of 230,4 kbps. Through one or two pairs of twisted-pair cables of RS-485 or RS-422222 interface. ADA-4040PC9 has screw terminal blocks for connection of RS485 interface KDU-110-SPS device, MODBUS RS485/422 bus and power supply. ADA-4040PC9 uses Tx, Rx for communication with the RS-485 interface. Overvoltage protection was made on base safety diodes and fuses on each RS-485/RS-422 line.



ISOLATION

Converter ADA-4040PC9 has 3-way galvanic isolation on the levels 1kV= or 3kV=, depending on the version described in section VERSIONS.



INSTALLATION

This chapter will show how to use and connect the ADA-4040PC9 to the KDU-110 device, RS-485RS-4222 network, and power supply. To minimize disruptions from the environment is recommended to:

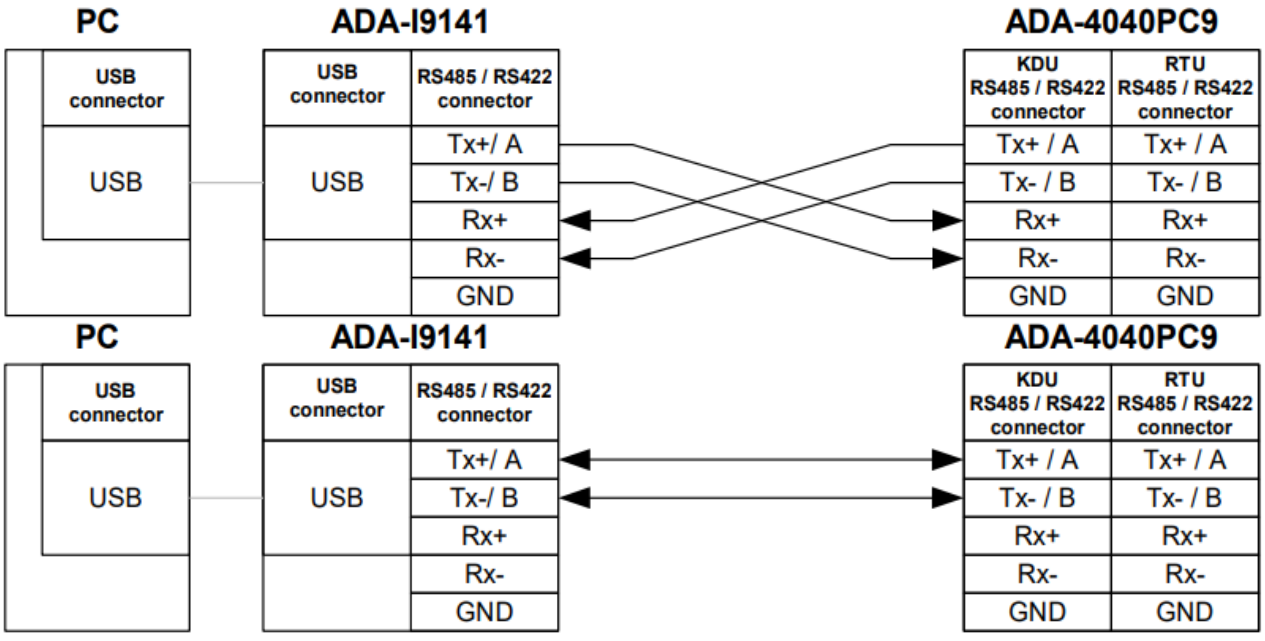
- Apply multipair type shielded cables, whose shield can be connected to the earthing on one end of the cable.
- Arrange signal cables at a distance not shorter than 25 cm from powering cables.
- Apply a cable of adequate cross-section due to voltage drops for converter powering.
- Use suppression filters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

ASSEMBLING

The cover of the ADA-4040PC9 converter is adapted to assembly on the TS-35 (DIN35) rail. To install the converter, it should be mounted on the upper part of the cover, then press the bottom part to hear the characteristic „Click” sound.

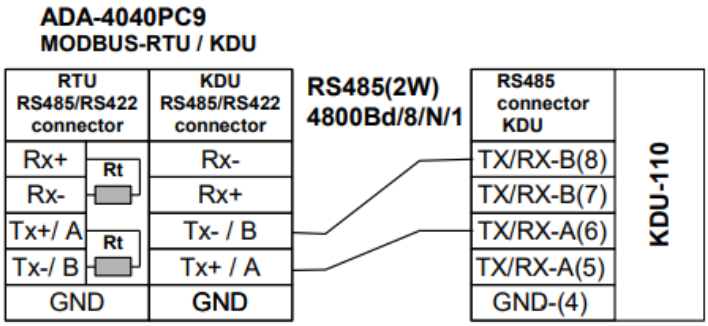
CONNECTION TO COMPUTER

To connect ADA-4040PC9 to the computer additional converter is needed, e.g,. ADA-I9141 USB to RS485/RS422 converter; connected to KDU-110-SPS (5-pin connector) port of the converter. Typical connections of ADA-4040PC9 to PC are shownbeloww



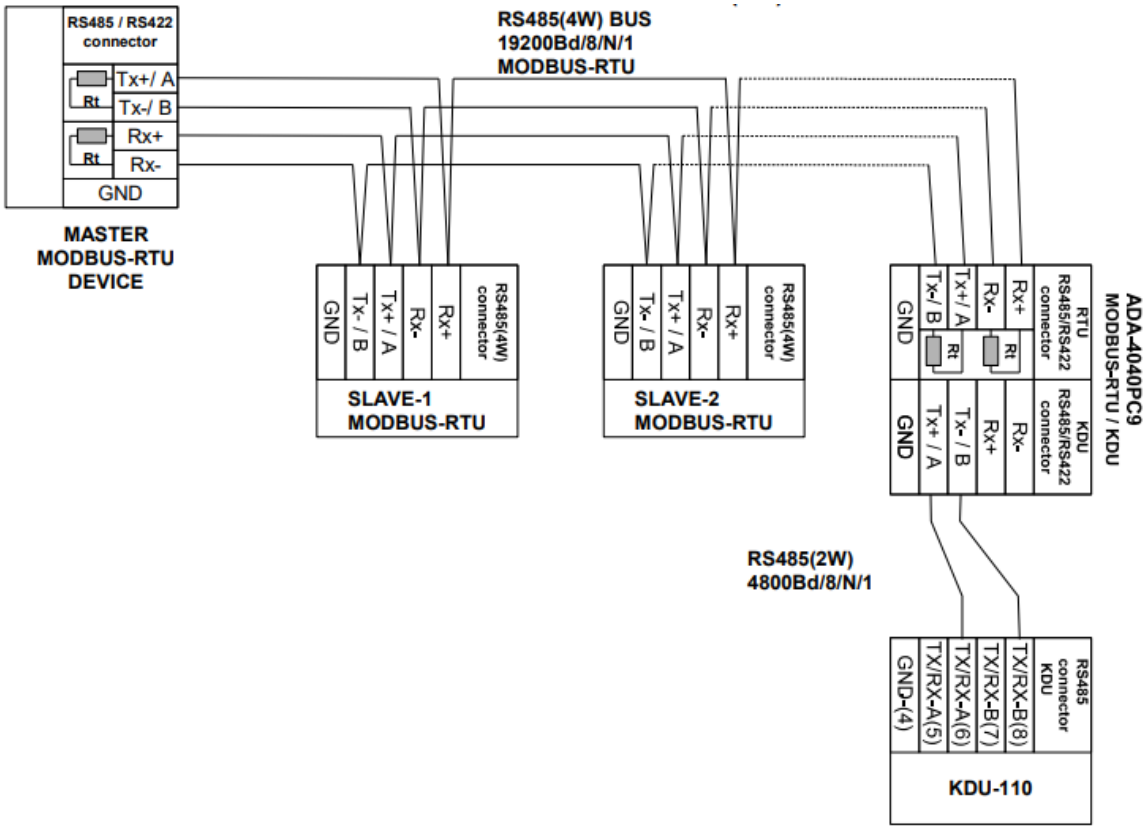
CONNECTION TO KDU-110 DEVICE

In case of connecting the DA-4040PC9 converter to the communication port of the KDU-110 device, a cable should be made according to the diagram below.



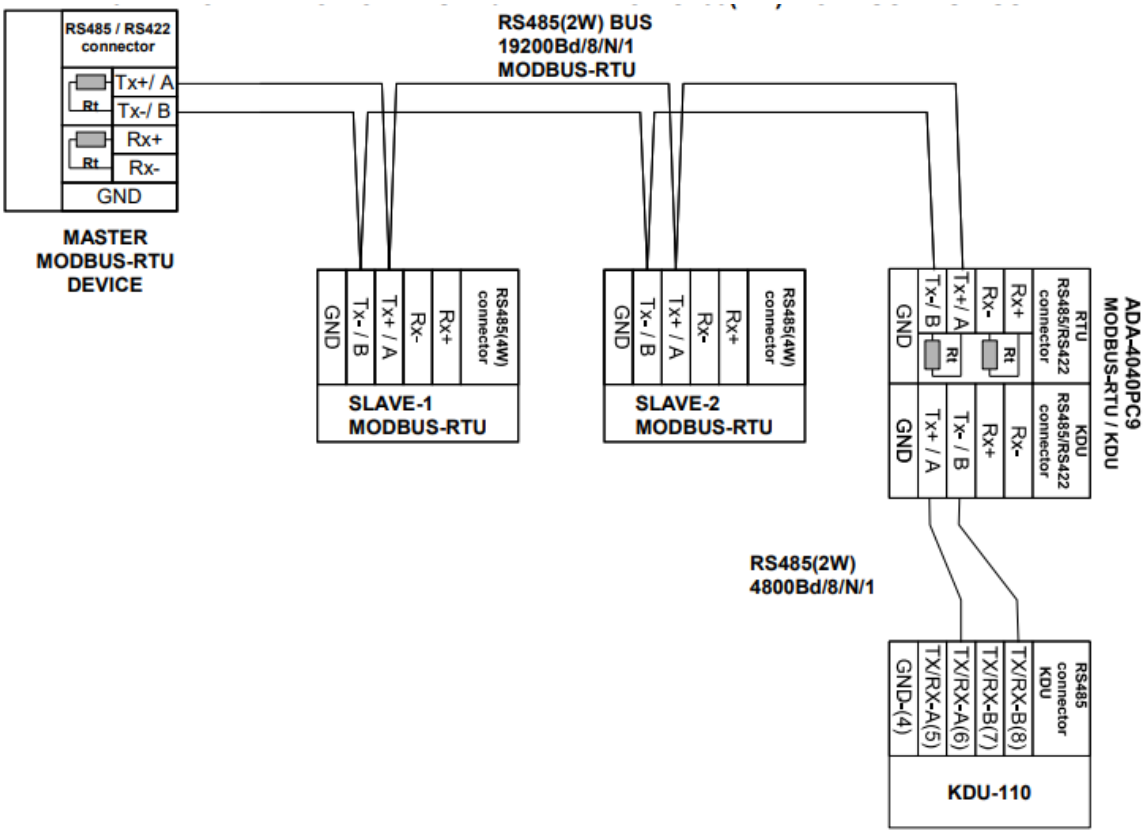
CONNECTION TO RS485 BUS

RS485/RS422 interface in ADA-4040PC9 converter is available on screw terminal block and is described as: Tx+/A, Tx-/B, Rx+, Rx-, GND. Connection of ADA-4040PC9 to RS485(4W) and RS485(2W) network are shown bellow.



Example connection of the KDU-110 device by the use of ADA-4040PC9 to RS485(4W) 4-wire bus.

CONNECTION OF KDU-110 DEVICE TO RS485(2W) MODBUS-RTU BUS



Example connection of KDU-110 device by the use of ADA-1040PC9 to RS485(2W) 2-wire bus.

GND TERMINAL CONNECTION

Connection of the GND terminals of RS485/422 interfaces, devices connected to the RS485/422 bus, should be done in the case of a
potential difference of the signals grounds on interfaces RS485 / RS422, which prevents proper data transmission.
Cannot connect to the GND terminal – cables, screens, PE circuit of electrical installation, signal,s grounds of other devices.

LINE TERMINATION Rt

The application of Line Termination (terminator) Rt = 120 ohms will reduce electrical reflection in data line at high baud rate. It is not needed below 9600Bd. The Line Termination resistor should be used if the distance is over 1000m @ 9600Bd or 700m @ 19200Bd, and if the disturbance in transmission will appearFigsg.. 5 and 6 show examples of Rt connections. The converter delivers two Rt = 120 W, 5%, and 0,25W.

POWER SUPPLY CONNECTION

To connect the power supply to the converter, it should have a DC power supply (regulated) output voltage from 10 V= to 30V=, min. nominal power 2W, e.g. HDR-15-24.

The power cable from the DC power supplies to the device can not be longer than 3m. Should connect the positive (+) end of DC power supplies to the V+ device terminal and the negative (-) end to the V- terminal block. ADA-4040PC9 has protection against power supply reverse connection.

ACTIVATION

The converter can be powered on after proper connection, according to the section above. If after connecting the power supply on the front panel does not light green led PWR, check the correctness of the power supply connection (polarization). When data is present, the LEDs Tx and Rx should blink.
ATTENTION!! AT BAUD RATE ABOVE 38.4 KBPS, THE LED'S TX, RX WILL LIGHT WEAKLY DURING DATA TRANSMISSION

DESCRIPTION OF SIGNALLING LEDS

LED	*Description*
PWR	Signalling of Power Supply
RX	Signalling of data receiving through ADA-4040PC9 from RS485/RS422 port – MODBUS-RTU
TX	Signalling of data transmitting from ADA-4040PC9 through RS485/RS422 port – MODBUS-RTU
Yellow LED by SW1	Not light – signalling of normal operating mode (RUN)
	Blinking at frequency 1 Hz - signalling of configuration mode or software data flowing to the converter
	Blinking at frequency 2 Hz - signalling of factory default mode
	Lit continuously – signalling of emergency firmware update

TROUBLESHOOTING

Problem	Solutions
PWR LED is not light	Check polarization and parameters of connected power supply.
Rx LED lights continuously	RS485(4W) /422 network. Wrong polarization on terminals: Rx+, Rx-; change polarization.
No transmission Tx LED is blinking	RS485(4W) / RS422 network. Check correctness of connection to terminals Tx, Rx; according to point 3 and the converter configuration.

CONFIGURATION

OPERATIONMODE TheeThe The

ADA-4040PC9 converter can operate in a few modes :

- run,
- configuration,
- factory default,

- emergency firmware update

Those modes can be set by use SW1 located by screw terminal block KDU port. To set the switch section, remove the cover marked as SW1 and make the appropriate settings by using a small, flat screwdriver. All available adjustments to the SW1 switch are shown in the table below.

Converter operation modes

SW1- 1	*SW1- 2*	*Mode*
OFF	OFF	Run
ON	OFF	Configuration
OFF	ON	Factory default
ON	ON	Emergency Firmware Update

CONFIGURATION BY USING ADACONFIG

The configuration of the ADA-4040PC9 converter can be made by the use of ADAConfig Software, which should be downloaded from the web side of the ADA-4040PC9 converter (www.cel-mar.pl/en/rs485rs422_rs485rs422_kdu110_rtu_4040pc9.htm), tab Download, and then extract the adaconfig.zip file and run setup.exe. After installation ADAConfig software is available in the menu Win10 Start > CEL-MAR > ADAConfig and the icon ADAConfig on the Desktop. To make the configuration, connect the converter to the computer and power supply. If, after power, on the front panel is not lit green LED PWR, check the power connection (polarity). If the PWR LED lights, set the section of the SW1 switch to configuration mode as in the table below.

SW1-1	*SW1-2*
ON	OFF

In the configuration mode, the yellow LED located by the SW1 micro-switch will blink with a frequency of 1 Hz. Start the ADAConfig Software and make the configuration of transmission parameters for each converter iinterface First should be set the number of [COM port] [1] for communication with the converter, then read out the configuration from ADA-4040PC9 memory, using the button [Read configuration] [2] and make the proper chchanges to each interface’s settings, as below. [3] Setting converter address from the side RS485 MODBUS-RTU bus, in the section [Converter Address] select the field [Enable] and in the field [Address] enter the address of the SLAVE MODBUS-RTU converter, from the scope 1-247. [4] Setting of transmission parameters for the KDU110

(RS485) port:

- baud rate (kbps): 0.3, 0.6, 1.2, 1.8, 2.4, 4.8, 7.2, 9.6, 14.4, 19.2, 28.8, 38.4, 57.6, 76.8, 115.2, 230.4,
- number of data bits: 5, 6, 7, 8,
- control parity: no control, parity control, control of non-parity
- number of stop bits: :1, 2,
- frame spacing – range from 1 to 255 (time silence as frame's end),

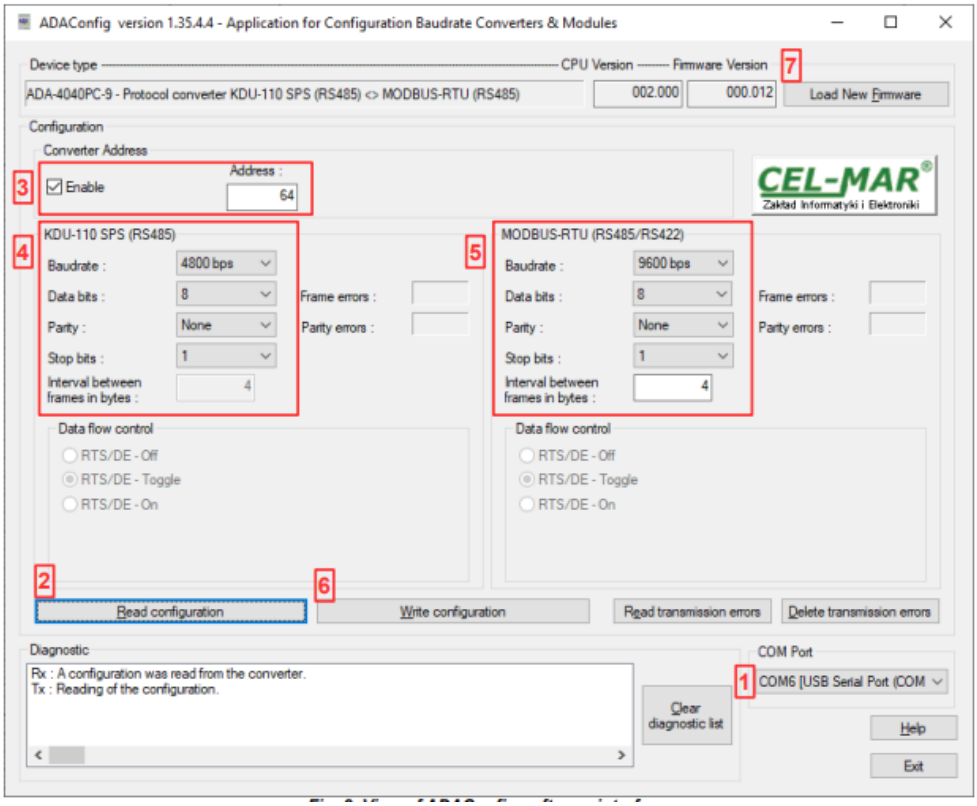
[5] Setting transmission parameters for the RTU (MODBUS-RTU) port:

- baud rate (kbps): 0.3, 0.6, 1.2, 1.8, 2.4, 4.8, 7.2, 9.6, 14.4, 19.2, 28.8, 38.4, 57.6, 76.8, 115.2, 230.4,
- number of data bbits5, 6, 7, 8,
- control parity: no control, parity control, control of non-parity number of stop bits 1, 2,
- frame spacing – range from 1 to 255 (time silence as frame's end),

After configuration, the settings should be saved in converter memory by using the button [Write configuration] [6]. Return to work in run mode is made by using the W1 switch as below.

SW1-1	***SW1-2***
OFF	OFF

The yellow LED (located near the SW1) will turn off in the RUN mode.



FACTORY DEFAULT

In case of faulty functioning of ADA-4040PC9, the factory default setting of the converter internal registers can be restored.. Set the W1 microswitch mode as in the table below.

SW1-1	***SW1-2***
OFF	ON

Disconnect the power and after waaile connect agthe power againAfter that, will be loaded the factory default setting to the internal registers. After this operation, the converter parameters should be set again for operating in the application. Set micro switch SW1 to run mode as shown in the table below.

SW1-1	***SW1-2***
OFF	OFF

The yellow LED (located near the SW1) will turn off in the RUN mode.

Factory Default

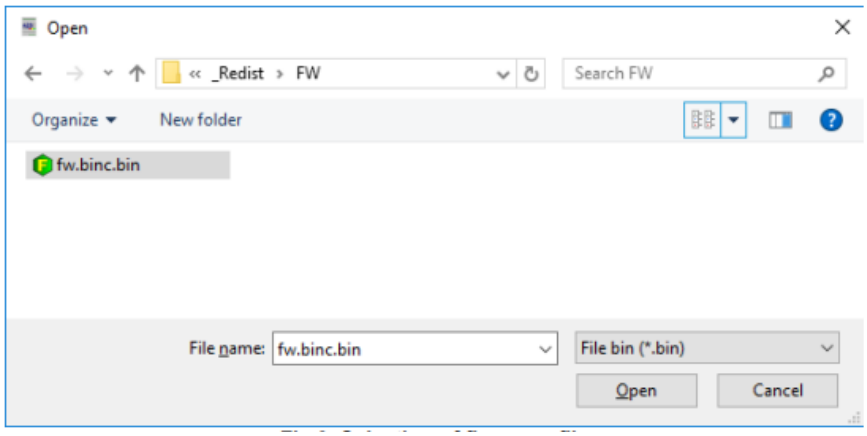
Parameter	***KDU RS485 Interface***	***RTU RS485/RS422 Interface***
Baud rate	4800bps	9600bps
Number of data bites	8	8
Control parity	No	No
Stop bits	1	1
Frame spacing	4	4

FIRMWARE UPDATE

Set the W1 micro switch to configuration mode as in the table below.

SW1-1	SW1-2
ON	OFF

In the configuration mode, the yellow LED will blink frequency 1Hof 1Hz. Press a button [Load New Firmware] [7] to change the software delivered by the manufacturer. The Select File window will open (fig. below) and select the *.bin file, then click [Open] – the software will be loaded to the DAConfig buffer storage and will be checked. If the ADAConfig ndoes ot detect errors in the loaded file, change the converter software. The process of updating is visualized by ADAConfig in the Progress Wind now, and after proper changes are confirmed by an appropriate message.



During software, the yellow LED located beside the StheW1 micro-switch will blink, showing data flow to the converter. If the software was loaded correctly yellow LED will be blinkingfrequencyquency of 1 Hz. After that, set microswitch SW1 to run mode as shown in the table below.

SW1-1	SW1-2
OFF	OFF

The yellow LED (located near the SW1) will turn off in the RUN mode.

EMERGENCY FIRMWARE UPDATE

In case of the unsuccessful update of the converter software, try again according to the description in the above point. If the update is still incorrect, use the emergency firmware update. Set the W1 microswitch mode as in the table below.

SW1-1	SW1-2
ON	ON

After the microswitch setting, it should be restarted ADA-4040PC9, by turning OFF and then ON the power supply. The yellow LED will light continuously, nd the converter will be in Emergency Firmware Update mode. Now follow the description in the above point.

After the successful software update, set microswitch SW1 to the run mode as shown in the table below.

SW1-1	SW1-2
OFF	OFF

The yellow LED (located near the SW1) will turn off in the RUN mode.

DATA TRANSMISSION DIAGNOSTICS

To read out diagnostics, the SW1 microswitch should be set to the configuration mode.

SW1-1	SW1-2
ON	OFF

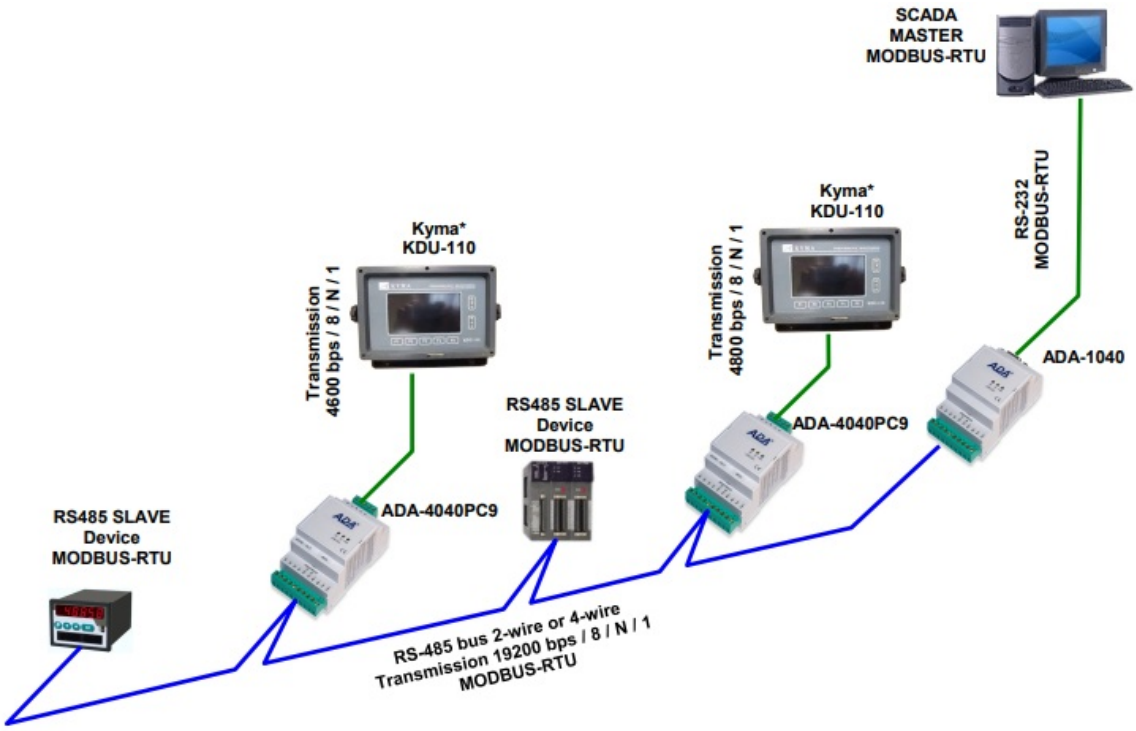
In the configuration mode, the yellow LED will blink with a frequency 1of Hz.. The correctness of transmission proceeds on KDU-110(RS485) and RTU (RS485) interface, and d nnnd s can be checked by reading the error list by ADAConfig Software from the converter memory. The frame error counter will be increased nimproper speedoperspeed set compared to the real speed of data transmission. Parity error counter will bound the errors that can arise in case of misrepresentations in the transmitted signal. This counter will not work in case of disabled control parity. To check those counters, press the button [Read transmission errors], and to delete (zeroing of counters in the memory of the converter), press [Delete transmission errors]. In case of parity errors or frame errors, she ADA-4040PC9 converter's configuration and the correct connection of the S485 bus to the TU and KDU-110 converter ports. After finishing the diagnostics, the SW1 microswitch should be set to the run mode as shown in the table below.

SW1-1	SW1-2
OFF	OFF

The yellow LED (located near the SW1) will turn off in the RUN mode.

OPERATION

ADA-4040PC9a is a protocol converter of KDU-110-SPS to MODBUS-RTU protocols, with the possibility of converting the baud rate, at the data format (number of data bits, parity bit, stop bits). Additionally, iiit's separator of RRS-485(KDU-110-SPS) port from RS485/RS422 (MODBUS-RTU) port. If KttheU-110 device is connected to the RS485 (KDU) port, to RS485/RS422 (RTU) port should be connected RS485/RS422 MODBUS-RTU bus. Frames of the ODBUS protocol with errors in the converter reject the CRC



IMPLEMENTATION OF MODBUS-RTU PROTOCOL

ADA-4040PC9 protocol converter allows connecting the DU-110 device as a slaveto RtheS485 MODBUS-RTU bus. The length of the S485 bus can be extended (another 1200m) by the use of ADA-4040 repeaters or ADA-4044H HUBs RS485. The MODBUS-RTU protocol used for communication between ADA-4040PC9 converters and SCADA system or PLC controller eenablesseasy integration of KDU-110 device in existing automation systems.

TABLE OF MODBUS-RTU ADDRESSES

REGISTERS OF CURRENT PARAMETER VALUES KDU-110 DEVICE – READOUT BY FUNCTION 04 (3X – REFERENCES) INPUT REGISTERS

Address 3X	*Registers Address*	*Register description*	*Attribute*	*Value*
30001	0	**TALKER ID = SA** BYTE HI = 0x54 = 84 (ASCII – S) BYTE LO = 0x41 = 65 (ASCII – A)	R	16-bit register U16
30002	1	**PARAMETER#1 – Module number** BYTE HI = 0x00 BYTE LO = 0x01 – Module number	R	16-bit register U16
30003	2	**PARAMETER#2 – Code : A (0x41) – normal, B(0x42) - overtorque** BYTE HI = 0x00 BYTE LO = 0x41 – A	R	16-bit register U16

Address 3X	Registers Address	Register description	Attribute	Value
30004	3	**TORQUE [Tm]** TORQUE DWORD = 1074 = 0x00 00 04 32 WORD LO = 0x04 32; BYTE HI = 0x04; BYTE LO = 0x32	R	16-bit register U32 LO DW=10
30005	4	TORQUE DWORD = 1074 = 0x00 00 04 32 WORD HI = 0x00 00; BYTE HI = 0x00; BYTE LO = 0x00	R	16-bit register U32 HI DW=10
30006	5	**THRUST [T]** THRUST DWORD = 1108 = 0x00 00 04 54 WORD LO = 0x204 54; BYTE HI = 0x04; BYTE LO = 0x54	R	16-bit register U32 LO DW=10
30007	6	THRUST DWORD = 1108 = 0x00 00 04 54 WORD HI = 0x00 00; BYTE HI = 0x00; BYTE LO = 0x00	R	16-bit register U32 HI DW=10
30008	7	**RPM [rpm]** RPM DWORD = 1045 = 0x00 00 04 15 WORD LO = 0x04 15; BYTE HI = 0x04; BYTE LO = 0x15	R	16-bit register U32 LO DW=1
30009	8	RPM DWORD = 1045 = 0x00 00 04 15 WORD HI = 0x00 00; BYTE HI = 0x00; BYTE LO = 0x00	R	16-bit register U32 HI DW=1
30010	9	**POWER [SHp]** POWER DWORD = 21450 = 0x00 00 53 CA WORD LO = 0x53 CA; BYTE HI = 0x53; BYTE LO = 0xCA	R	16-bit register U32 LO DW=1
30011	10	POWER DWORD = 21450 = 0x00 00 53 CA WORD HI = 0x00 00; BYTE HI = 0x00; BYTE LO = 0x00	R	16-bit register U32 HI DW=1
30012	11	**ENERGY [SHph]** ENERGY DWORD = 3456789 = 0x00 34 BF 15 WORD LO = 0xBF 15; BYTE HI = 0xBF; BYTE LO = 0x15	R	16-bit register U32 LO DW=1
30013	12	ENERGY DWORD = 3456789 = 0x00 34 BF 15 WORD HI = 0x00 34; BYTE HI = 0x00; BYTE LO = 0x34	R	16-bit register U32 HI DW=1
30014	13	**TOTAL REVOLUTIONS** TOTAL REVOLUTIONS DWORD = 343434 = 0x00 05 3D 8A WORD LO = 0x3D 8A; BYTE HI = 0x3D; BYTE LO = 0x8A	R	16-bit register U32 LO DW=1
30015	14	TOTAL REVOLUTIONS DWORD = 343434 = 0x00 05 3D 8A WORD HI = 0x00 05; BYTE HI = 0x00; BYTE LO = 0x05	R	16-bit register U32 HI DW=1

REGISTERS OF CURRENT PARAMETER VALUES KDU-110 DEVICE – READOUT BY FUNCTION 03 (4X – REFERENCES) HOLDING REGISTERS

Address 4X	Registers Address	Register description	Attribute	Value
40001	0	**TALKER ID = SA** BYTE HI = 0x54 = 84 (ASCII – S) BYTE LO = 0x41 = 65 (ASCII – A)	R	16-bit register U16
40002	1	**PARAMETER#1 – Module number** BYTE HI = 0x00 BYTE LO = 0x01 – Module number	R	16-bit register U16
40003	2	**PARAMETER#2 – Code : A (0x41) – normal, B(0x42) - overtorque** BYTE HI = 0x00 BYTE LO = 0x41 – A	R	16-bit register U16
40004	3	**TORQUE [Tm]** TORQUE DWORD = 1074 = 0x00 00 04 32 WORD LO = 0x04 32; BYTE HI = 0x04; BYTE LO = 0x32	R	16-bit register U32 LO DW=10

Address 4X	Registers Address	Register description	Attribute	Value
40005	4	TORQUE DWORD = 1074 = 0x00 00 04 32 WORD HI = 0x00 00; BYTE HI = 0x00; BYTE LO = 0x00	R	16-bit register U32 HI DW=10
40006	5	**THRUST [T]** THRUST DWORD = 1108 = 0x00 00 04 54 WORD LO = 0x204 54; BYTE HI = 0x04; BYTE LO = 0x54	R	16-bit register U32 LO DW=10
40007	6	THRUST DWORD = 1108 = 0x00 00 04 54 WORD HI = 0x00 00; BYTE HI = 0x00; BYTE LO = 0x00	R	16-bit register U32 HI DW=10
40008	7	**RPM [rpm]** RPM DWORD = 1045 = 0x00 00 04 15 WORD LO = 0x04 15; BYTE HI = 0x04; BYTE LO = 0x15	R	16-bit register U32 LO DW=1
40009	8	RPM DWORD = 1045 = 0x00 00 04 15 WORD HI = 0x00 00; BYTE HI = 0x00; BYTE LO = 0x00	R	16-bit register U32 HI DW=1
40010	9	**POWER [SHp]** POWER DWORD = 21450 = 0x00 00 53 CA WORD LO = 0x53 CA; BYTE HI = 0x53; BYTE LO = 0xCA	R	16-bit register U32 LO DW=1
40011	10	POWER DWORD = 21450 = 0x00 00 53 CA WORD HI = 0x00 00; BYTE HI = 0x00; BYTE LO = 0x00	R	16-bit register U32 HI DW=1
40012	11	**ENERGY [SHph]** ENERGY DWORD = 3456789 = 0x00 34 BF 15 WORD LO = 0xBF 15; BYTE HI = 0xBF; BYTE LO = 0x15	R	16-bit register U32 LO DW=1
40013	12	ENERGY DWORD = 3456789 = 0x00 34 BF 15 WORD HI = 0x00 34; BYTE HI = 0x00; BYTE LO = 0x34	R	16-bit register U32 HI DW=1
40014	13	**TOTAL REVOLUTIONS** TOTAL REVOLUTIONS DWORD = 343434 = 0x00 05 3D 8A WORD LO = 0x3D 8A; BYTE HI = 0x3D; BYTE LO = 0x8A	R	16-bit register U32 LO DW=1
40015	14	TOTAL REVOLUTIONS DWORD = 343434 = 0x00 05 3D 8A WORD HI = 0x00 05; BYTE HI = 0x00; BYTE LO = 0x05	R	16-bit register U32 HI DW=1

FRAME STRUCTURE OF MODBUS-RTU PROTOCOL

Device address (1-byte)	Function (1-byte)	Dane (n-bytes)	CRC-16Lo (1-byte)	CRC-16Hi (1-byte)

USED FUNCTIONS OF MODBUS-RTU PROTOCOL

Function code	Description
03 (0x03)	Readout parameters & value KDU-110 device from converter MODBUS-RTU registers
04 (0x04)	Readout parameters & value KDU-110 device from converter MODBUS-RTU registers

FUNCTION 0x03 / 0x04 – READOUT PARAMETERS VALUES FROM KDU-110

READOUT OF CURRENT PARAMETER VALUE STORED IN 16-BIT REGISTER [4X / 3X-REFERENCES]

Function 0x03 / 0x04 are used for readout of parameters values of KDU-110 from the converter. The parameter value is read from MODBUS-RTU register and is presented by

a 16-bit register. The registers with parameter value are in the integer format of 16-bit or 32-bit with the sign or without (in C/C++ short type int or unsigned int). The actual parameter value is obtained from the read register using the following algorithms, using the appropriate factor value DW (see table below).

Algorithm 1. Readout register is saved to a regular type variable (float) and then divided by the factor DW.

```
// Fragment of code in C language (VS6.0) presenting above algorithm
short int siRegParam;
float fValueParam;
……
fValueParam = (float)siRegParam;
fValueParam = fValueParam / DW;
```

Algorithm 2. Readout register is saved to a regular type variable 16-bit (short int) and then divided by the factor DW, receiving a change of the dividing number of hundredths of the parameter value.

```
// Fragment of code in C language (VS6.0) presenting the above algorithm
short int siRegParam;
div_t div_ValueParam;
……
div_ ValueParam = div((int)siRegParam, DW)
printf( “Total parameter value = %d\n, hundredth parts of the parameter value = %d\n”,
div_ValueParam .quot, div_ValueParam .rem );
```

Query about TORQUE

Byte no	***Designation***	***Size***	***Value [hex]***
00	ADA-4040PC9 address	1 Byte	**11 [1 to F7]**
01	Function code	1 Byte	**03 / 04**
02	Registry address Hi	1 Byte	**00**
03	Registry address Lo	1 Byte	**03**
04	Registry number Hi	1 Byte	**00**
05	Registry number Lo	1 Byte	**02**
06	CRC-Lo	1 Byte	**---**
07	CRC-Hi	1 Byte	**---**

Example. Query of TORQUE from register address 40003-40004 / address 30003-

30004

- 11-03-00-03-00-02-CRCLo-CRCHi
- 11-04-00-03-00-02-CRCLo-CRCHi

Response with TORQUE value

Byte no	*Designation*	*Size*	*Value [hex]*
00	ADA-4040PC9 address	1-Byte	**11 [1 to F7]**
01	Function code	1-Byte	**03 / 04**
02	Number of data bytes	N-Byte	**04**
03	Data1-Hi	1-Byte	**04**
04	Data1-Hi	1-Byte	**32**
06	Data1-Lo	1-Byte	**00**
07	Data1-Lo	1-Byte	**00**
08	CRC-Lo	1-Byte	**---**
09	CRC-Hi	1-Byte	**---**

Example. Readout of TORQUE from register address 40003-40004 / address 30003-30004

- 11-03-04-04-32-00-00-CRCLo-CRCHi
- 11-04-04-04-32-00-00-CRCLo-CRCHi

In rresponseTORQUE is presented as a 4-byte value with values:

- TORQUE = 1074 = 0x00 00 04 32 => 1074/10 => 107.4

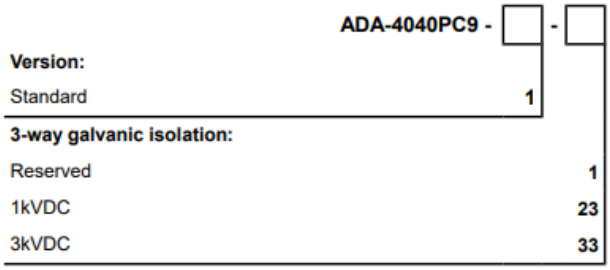
Response – in case of exception

Byte no	*Designation*	*Size*	*Value [hex]*
00	ADA-4040PC9 address	1-byte	**11 [1 to F7]**
01	Function code	1-byte	**83 / 84**
02	Exception code	1-byte	**01 – unknown function** **02 – unknown data address** **03 – unknown data value** **04 – KDU-110 device not respond or is faulty**
03	CRC-Lo	1-byte	
04	CRC-Hi	1-byte	

ATTENTION! TO ADA-4040PC9 CAN BE SSENT.ALSO MODBUS-RTU QUERY

ABOUT ALL OR SELECTED REGISTERS OF KDU-110 DEVICE.

VERSIONS



ADA-4040PC9 - [ ] - [ ]	
Version:	
Standard	**1**
3-way galvanic isolation:	
Reserved	**1**
1kVDC	**23**
3kVDC	**33**

Order example

- Product Symbol: ADA-4040PC9-1-23
- 1 – standard version,
- 23 – 1 kV =, 3-way galvanic isolation,

Dear Customer,

Thank you for purchasing CEL-MAR Company products. We hope that this user manual helped connect and start up the ADA-4040PC9 converter. We also wish to inform you that we are a manufacturer of the widest selection of data communications products in the world, such a data transmission converters with interface RS232, RS485, RS422, USB, Current Loop, Fibre-Optic Converters, and Ethernet or Wi-Fi. Please contact us to tell us how you like our products and how we can satisfy your present and future expectations.

CEL-MAR p.j.

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- **Web**……: http://www.cel-mar.pl/en
- **Office**……: office@cel-mar.pl
- **Sales department**…… sales@cel-mar.pl
- **Technical information** …… support@cel-mar.pl

FAQs

Q: Does the ADA-4040PC9 require regular maintenance?

A: No, the converter does not require servicing. For any technical assistance, contact our support team.

Q: What type of power supply does the ADA-4040PC9 support?

A: The ADA-4040PC9 supports a power supply range of 10 – 30 VDC.

Documents / Resources

	CEL-MAR ADA-4040PC9 Modbus Rtu Protocol Converter [pdf] User Manual ADA-4040PC9 Modbus Rtu Protocol Converter, ADA-4040PC9, Modbus Rtu Protocol Converter, Rtu Protocol Converter, Protocol Converter

References

- User Manual

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