

User manual

ADA-13021MG

Current Loop to ETHERNET converter with MODBUS GATEWAY



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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

ADA-13021MG 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.

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).

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 converter.

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-13021MG 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-13021MG converter; user manual; CE declaration; CD with ADANet software.

2. PRODUCT INFORMATION

2.1. PROPERTIES

- Operating on ETHERNET network- IEEE 802.3 standard,
- 10/100BaseT physical layer,
- Connecting via Rj45 connector,
- Baud rate 10/100Mbps (auto-sensing),
- Full or half duplex (auto-sensing) operate modes,
- Protocols: TCP, UDP, DHCP, SNMP, SSL/TLS, Telnet, Rlogin, LPD, HTTP/HTTPS, SMTP, ICMP, IGMP, ARP,
- Integrated WWW sever for converter configuration,
- Configuration of net services according to user personal setting,
- Static or dynamic IP address (added by DHCP server),
- Diagnostics of serial and network port,
- Encoded transmission: DES (56-bit), 3DES (168-bit), AES (128/256-bit),
- Operating modes: virtual serial port, serial bridge TCP, serial bridge UDP, TCP sockets, UDP sockets, MODBUS Data Gateway,
- Operating on 4-wire line in Current Loop standard,
- Current Loop baud rates (bps): 50, 75, 110, 134, 150, 200, 300, 600, 1200, 1800, 2400, 4800, 9600, 14400, 19200, 28800, 38400,
- Current Loop data format - Number of data bits: 5, 6, 7, 8; Parity checking: None, Odd, Even, Constantly 1, Constantly 0; Stop Bits:

1, 2,

- Transparent for all protocols, which the data format is compatible with the above specifications of Current Loop interface eg MODBUS,
- Integrated protocols converter MODBUS-TCP to MODBUS-RTU/ASCII (MODBUS Data Gateway),
- Operating in modes: MODBUS-RTU Master/Slave and MODBUS-ASCII Master/Slave,
- Power supply 10 - 30 VDC stable min. 3W,
- ~ 3000V= optoisolation in signal channel between ETHERNET and Current Loop interfaces,
- 1000V= or 3000V= galvanic isolation between ETHERNET interface and power supply - depends on version,
- 1000V= or 3000V= galvanic isolation between Current Loop interface and power supply - depends on version,
- Connection Current Loop interface via screw terminal block,
- Implemented short circuit protection and over-voltage protection on Current Loop lines,
- Protection against power supply reverse connection,
- DIN 43880 standard - mounting in typical electro-installation unit,
- Rail mounting according to DIN35 / TS35 standard,
- Dimensions (W x D x H) 53mm x 62mm x 90mm.

2.2. DESCRIPTION

ADA-13021MG converter is used for data transmission between devices equipped with Current Loop interface via LAN/WAN network. In the ETHERNET network converter can operate in Virtual Serial Port mode, TCP serial bridge mode, UDP serial bridge mode, TCP sockets, UDP sockets, MODBUS Data Gateway. The MODBUS Data Gateway converts MODBUS-RTU master/slave and MODBUS-ASCII master/slave protocol to MODBUS-TCP and inversely. This allows for integrate MODBUS-RTU/ASCII with MODBUS-TCP devices within one network.

Can be configured and managed via Internet browser – converter has implemented WWW server. ADA-13021MG has plug-in screw terminal block for connecting the Current Loop interface and power supply and RJ45 modular connector for ETHERNET network connection. The converter transmits data via Current Loop interface with maximum baud rate up to 38,4 kbps and uses signals RX+,RX-,TX+,TX- of CL interface.

To Current Loop line based on ADA-13021MG can be connected in point-to-point topology devices operate in half duplex or full duplex mode. 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. Has galvanic isolation between power supply and Ethernet interface and Current Loop and optoisolation between Current Loop and Ethernet interfaces.

The converter is adapted for powering from the regular voltage external source which value should contain from 10V to 30V.

We provide with converter the drivers which installed in the operating systems (Windows 98ME,2000,XP,2003,Vista,7, 8.x, 10 ; Linux), will create an additional COM/TTY port. This port is the next free number eg COM3, can be used like a standard COM port.

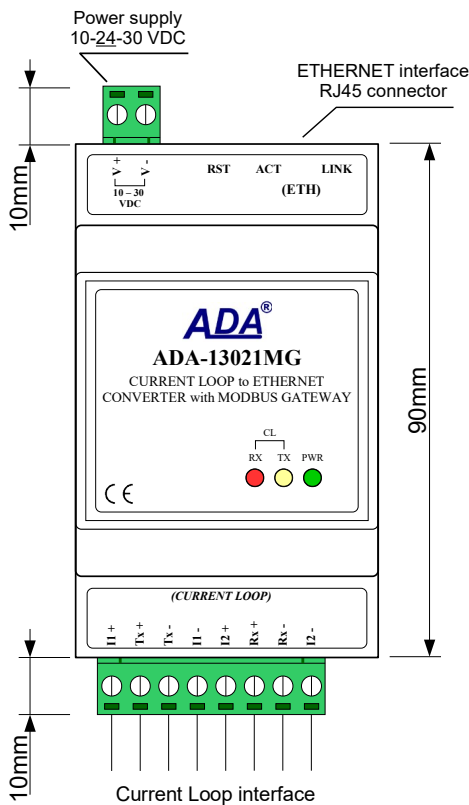


Fig. 1. ADA-13021 view

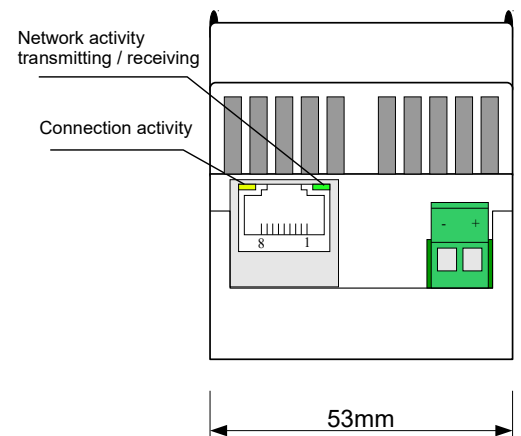
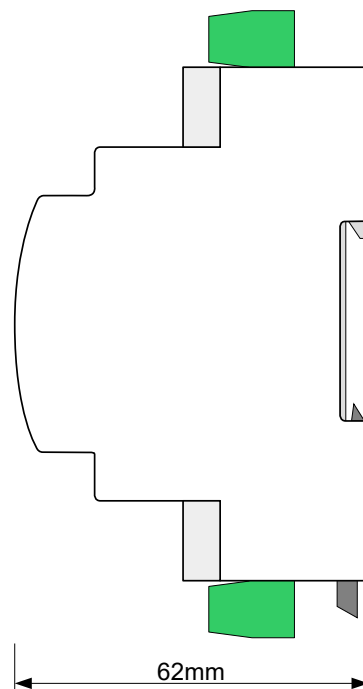


Fig. 2. ETHERNET & power connectors

2.3. ETHERNET NETWORK COMMUNICATION

2.3.1. TCP/UDP SOCKED MODE COMMUNICATIONS

Communication in the mode TCP/UDP sockets allows an application SCADA, MMI e.t.c., to transfer data to the serial port of the converter via Ethernet network by the use of client and server TCP/UDP services.

2.3.2. COMMUNICATIONS IN THE VIRTUAL SERIAL PORT MODE (RealPort)

Communication in the virtual serial port mode allows an application SCADA, MMI e.t.c., to transfer data to the serial port of the converter via Ethernet network, by the use virtual COM port, created in an operating system.

2.3.3. COMMUNICATIONS IN THE SERIAL BRIDGE MODE

Communication in the serial bridge mode allows transferring data via Ethernet network between serial port of the converter's ports in one-to-one topology or one-to-many by the use of client and server TCP/UDP services.

2.3.4. COMMUNICATIONS IN THE INDUSTRIAL AUTOMATION MODE (Modbus Gateway)

Communication in the MODBUS Gateway (IA) allows conversion of MODBUS-RTU master/slave protocol and MODBUS-ASCII master/slave protocol to MODBUS-TCP protocol and inversely. It's let to integrate MODBUS-RTU/ASCII devices with MODBUS-TCP devices in a single network.

2.3.5. OTHER COMMUNICATION TYPES

ADA-13021MG converter can be configured in other communication types, like:

- terminal mode,
- modem emulation mode,
- console mode,
- user mode.

However, in the case of the Current Loop converter, it will not be able to work properly in these modes, as they relate to the full RS232 interface.

2.4. CURRENT LOOP INTERFACE

2.4.1. CURRENT LOOP TRANSMITTER

The Current Loop transmitter in ADA-13021MG was made as a passive 0-20mA(TTY), 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.

2.4.2. CURRENT LOOP RECEIVER

ADA-13021 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 receiver has signalization of non current flow through optocoupler. It is indicated by the red LED RX on front panel of the converter. This LED lit 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.

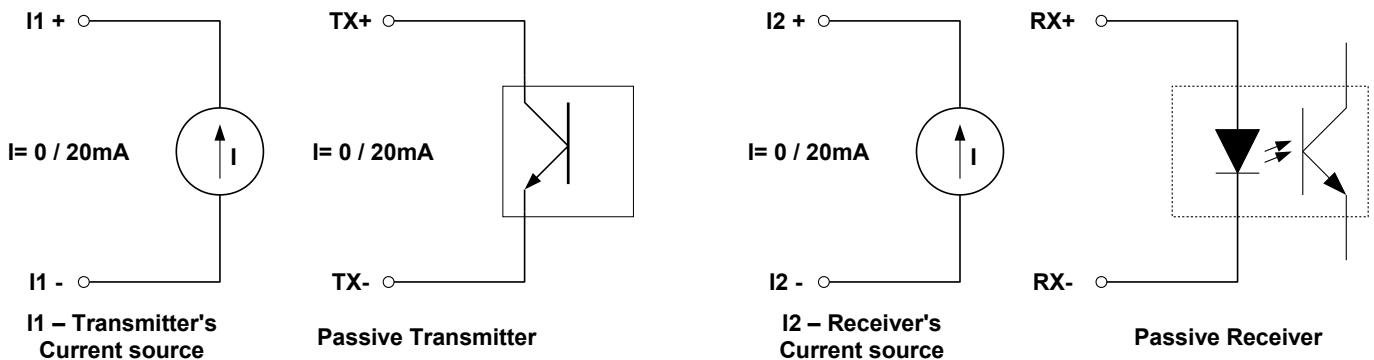


Fig. 3. Diagram of the transmitter & receiver ADA-13021MG Current Loop

2.5. ISOLATION

Converter ADA-13021MG has 3-way galvanic isolation on level 1kV= or 3kV=, depend on version described in section *VERSIONS*.

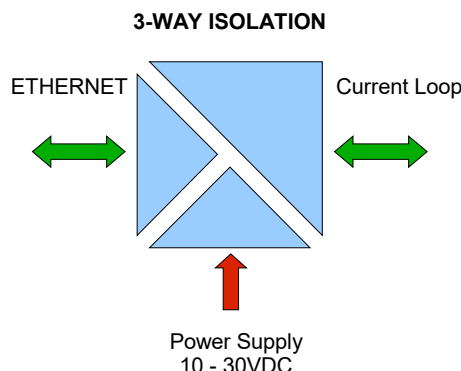


Fig. 4. Isolation structure

3. INSTALLATION

This chapter will show how to connect ADA-13021MG to Current Loop bus, LAN/WAN network 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-13021MG converter case is adapted to assembly on TS-35 (DIN35) rail. To install the device on TS-35 should be the upper part of the casing put hooks on the terminal and then press the bottom of the cover until you hear a characteristic "Click" sound.

3.2. ETHERNET NETWORK CONNECTION

ADA-13021 has to be connected to ETHERNET network by the use of the switch, the HUB or directly to the PC network adapter. The table below shows preparing of the straight cable for converter connection to switch or hub.

Table 1. The straight cable for connection to switch or hub.

RJ45 Pin No.	Signal	Wire Color EIA/TIA 568B	Straight cable UTP 4x2x0,5	Wire Color EIA/TIA 568B	Signal	RJ45 Pin No.
1	TX+	White-Orange		White-Orange	TX+	1
2	TX-	Orange		Orange	TX-	2
3	RX+	White-Green		White-Green	RX+	3
4	Not used	Blue		Blue	Not used	4
5	Not used	White-Blue		White-Blue	Not used	5
6	RX-	Green		Green	RX-	6
7	Not used	White-Brown		White-Brown	Not used	7
8	Not used	Brown		Brown	Not used	8

The table below shows preparing of cross-over cable for the converter connection to PC network adapter or connections converters together for functioning as point-to-point serial bridge.

Table 2. The cross-over cable for connection to PC network adapter or connections converters together for functioning as point-to-point serial bridge.

RJ45 Pin No.	Signal	Wire Color EIA/TIA 568B	Cross-Over Cable UTP 4x2x0,5	Wire Color EIA/TIA 568B	Signal	RJ45 Pin No.
1	TX+	White-Orange		White-Green	TX+	1
2	TX-	Orange		Green	TX-	2
3	RX+	White-Green		White-Orange	RX+	3
4	Not used	Blue		Blue	Not used	4
5	Not used	White-Blue		White-Blue	Not used	5
6	RX-	Green		Orange	RX-	6
7	Not used	White-Brown		White-Brown	Not used	7
8	Not used	Brown		Brown	Not used	8

In the modular socket ETHERNET interface of converter, are implemented two LED's (Fig. 2):

- Green ACT signaling state of sending or receiving data,
- Orange LINK signaling active network connection.

ADA-13021MG converter can function in the ETHERNET network as:

- virtual serial bridge [RealPort],
- TCP serial bridge,
- UDP serial bridge.
- Protocol converter (ModbusGateway).

Additional information about Ethernet connection will be describe in chapters below.

3.2.1. CONNECTING TO NETWORK ADAPTER OF PC

If there is not the switch or the HUB, it is possible to connect the ADA-13021MG directly to a network adapter of PC using the cross-over cable (Table 2). This connection can be used for converter configuration.

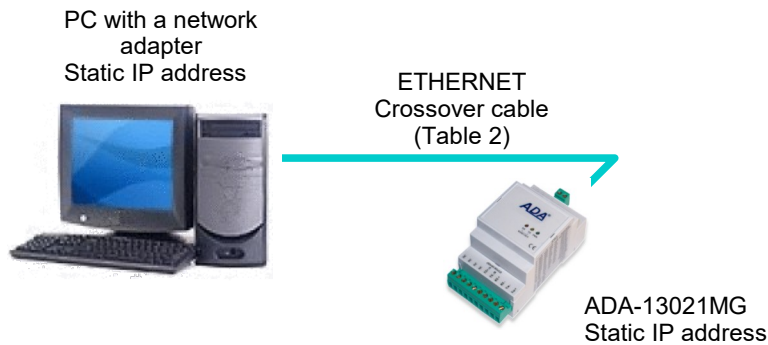


Fig. 5. Direct connection to PC

3.2.2. CONNECTING FOR OPERATING IN REALPORT MODE

Fig. 5 (above) and 6, 7 below show how correctly connect the ADA-13021 to LAN, WAN network or PC, to operating in virtual serial port mode (RealPort).

For direct connection of the converter to PC network adapter, use the cross-over cable (see Table 2) and for connection by the use of switch or HUB use the straight cable (see Table 1).

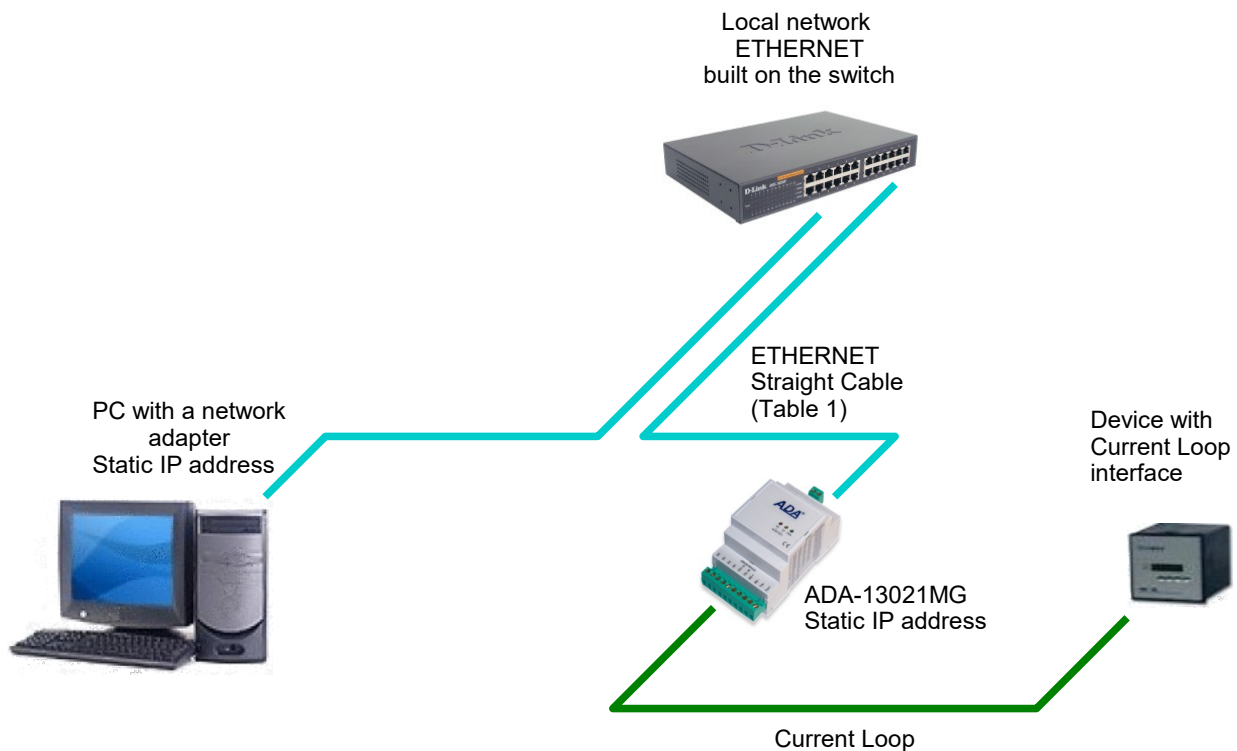


Fig. 6. The LAN connection via switch/hub to operating in the Real Port mode

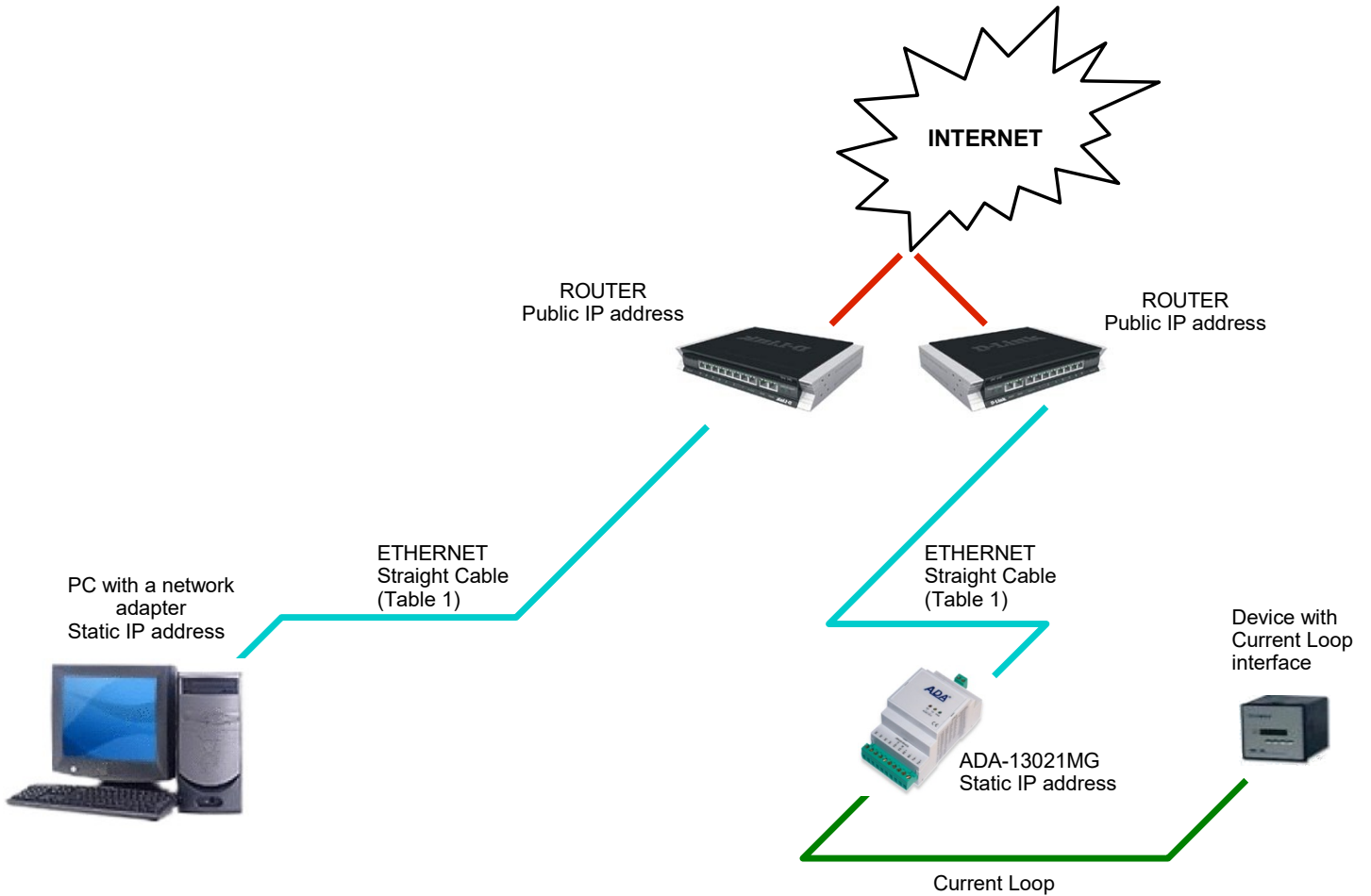


Fig. 7. The WAN connection to operating in the Real Port mode

3.2.3. CONNECTION FOR OPERATING IN TCP & UDP SERIAL BRIDGE MODE

Pictures below show how correctly connect the ADA-13021MG to ETHERNET network to operating in TCP and UDP serial bridge mode.

For connection by the use of network devices (router, switch or HUB) use the straight cable (see Table 1).

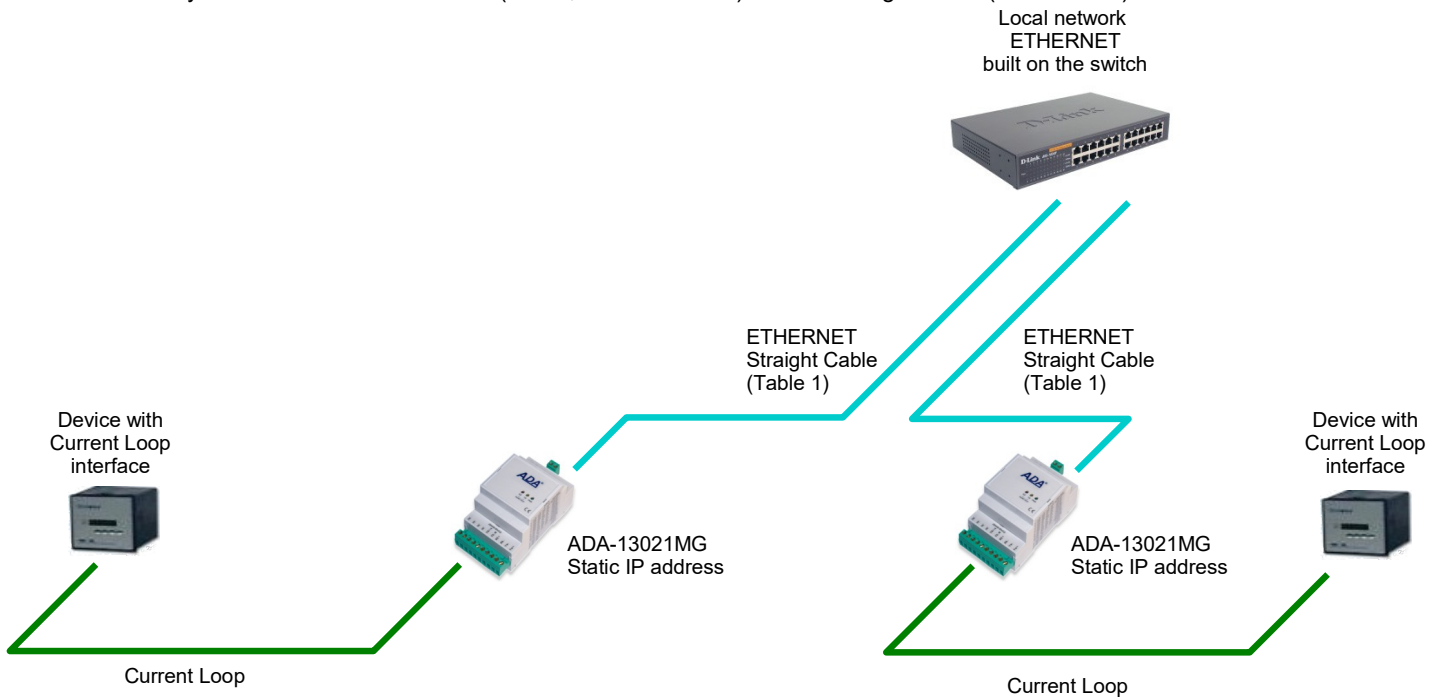


Fig. 8. The LAN connection to operating in the TCP/UDP serial bridge mode, one-to-one

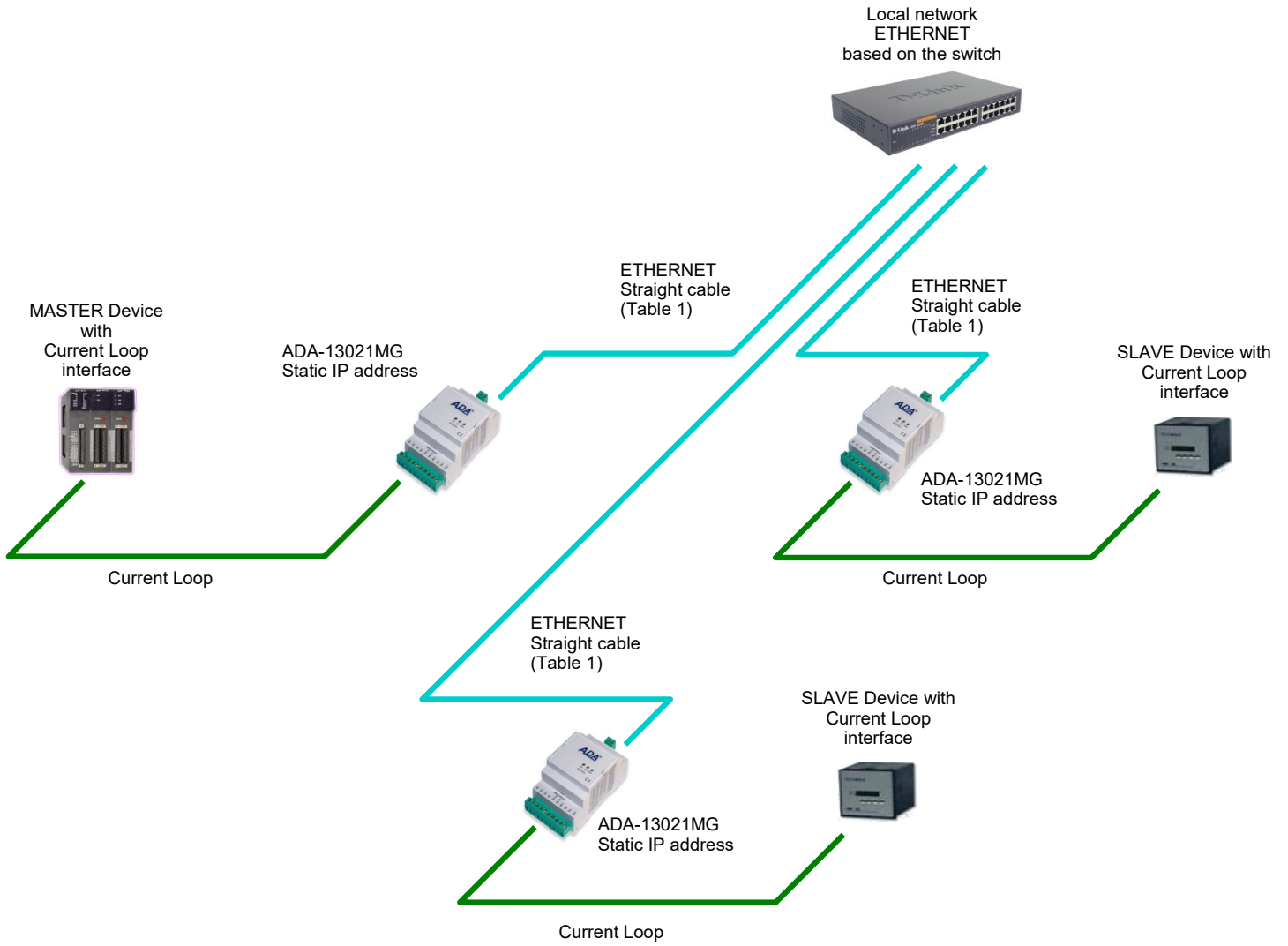


Fig. 9. The LAN connection to operating in the UDP serial bridge mode, one-to-many

3.2.4. CONVERTERS CONNECTION AS MODBUS GATEWAY

Figure below shows connection of ADA-13110MG to ETHERNET network ETHERNET(LAN) to operating in **Industrial Automation Mode (MODBUS Gateway)**. This type of connection allows integrating MODBUS-TCP devices and MODBUS-RTU/ASCII devices in one network.

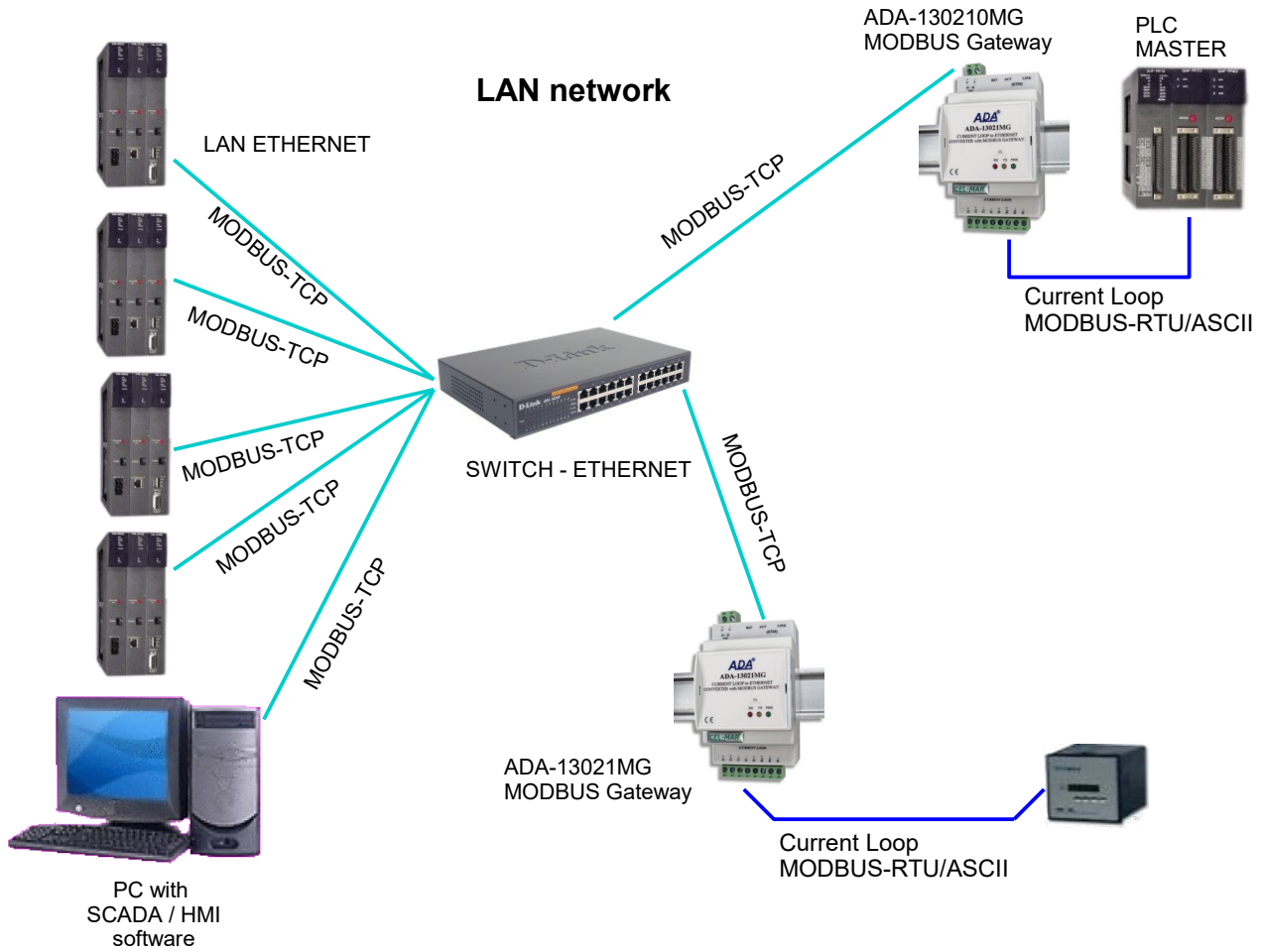


Fig. 10. Integration of Modbus-TCP MODBUS-RTU/ASCII into a single network using ADA-13110MG with MODBUS Gateway

3.3. CONNECTION TO CURRENT LOOP DEVICES

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

3.3.1. CONNECTION TO DEVICE WITH PASSIVE TRANSMITTER & PASSIVE RECEIVER

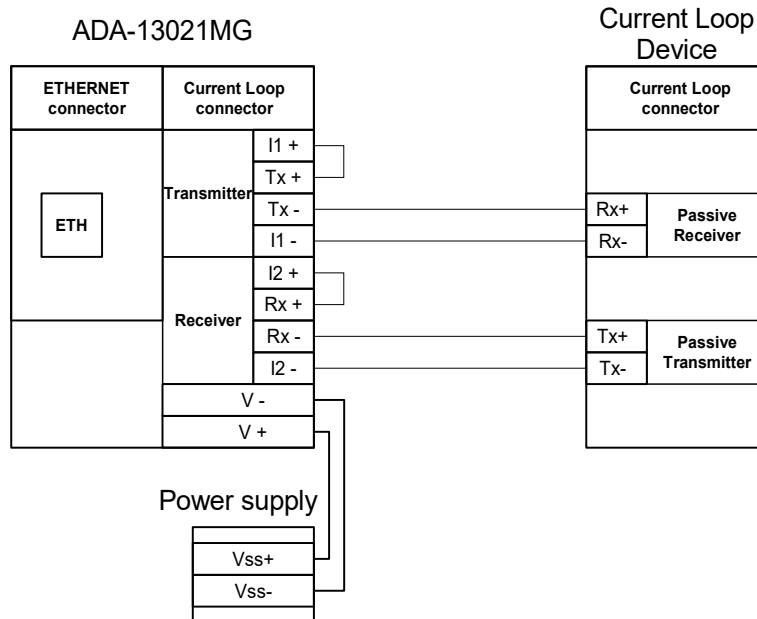


Fig. 11. Example connection of device with passive transmitter and passive receiver to ADA-13021MG

3.3.2. CONNECTION TO DEVICE WITH ACTIVE TRANSMITTER & ACTIVE RECEIVER

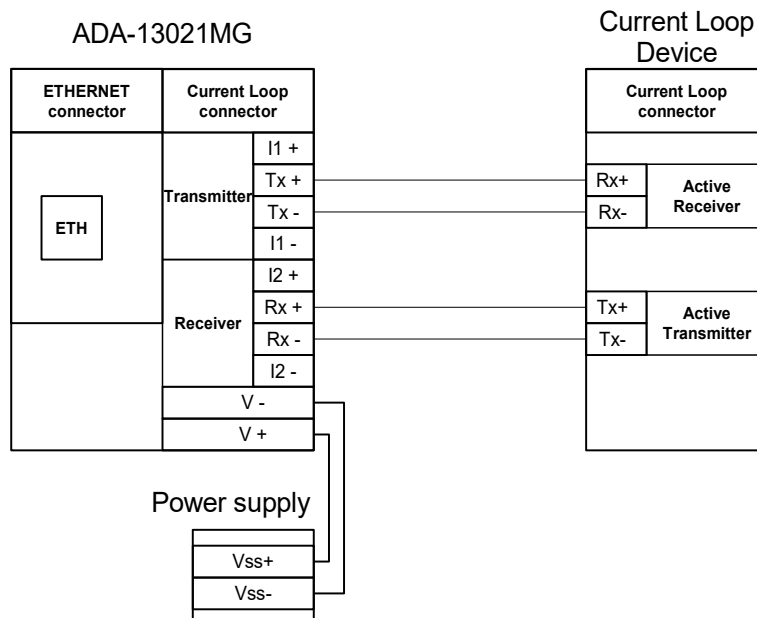


Fig. 12. Example connection of device with active transmitter and active receiver to ADA-13021MG

3.3.3. CONNECTION TO DEVICE WITH ACTIVE TRANSMITTER & PASSIVE RECEIVER

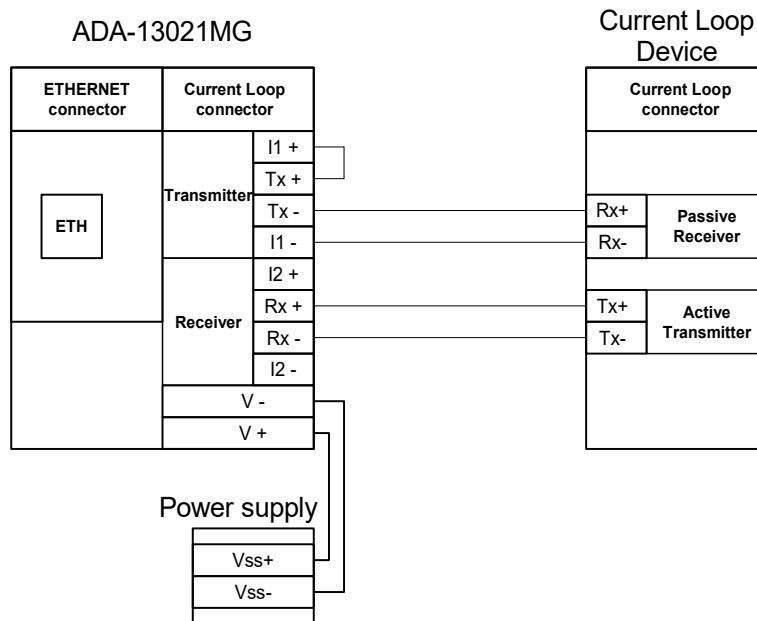


Fig. 13. Example connection of device with active transmitter and passive receiver to ADA-13021MG

3.3.4. CONNECTION TO DEVICE WITH PASSIVE TRANSMITTER & ACTIVE RECEIVER

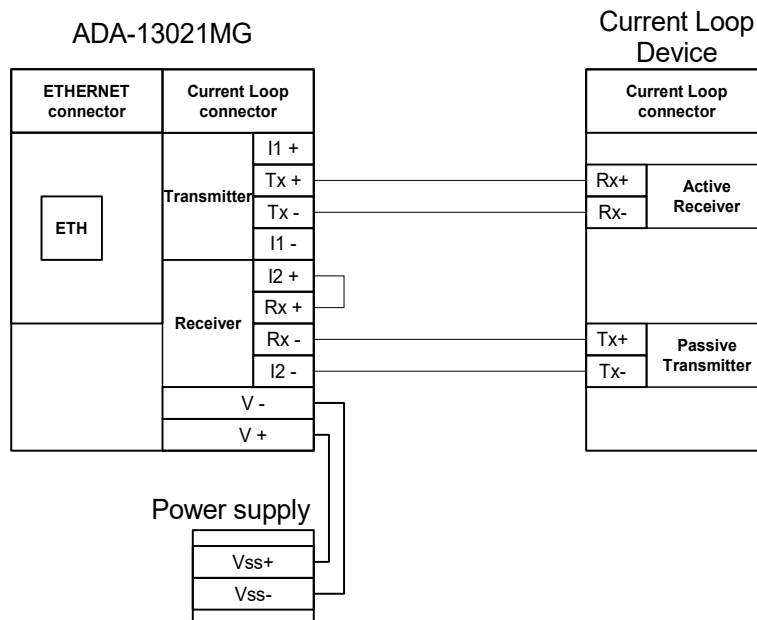


Fig. 13. Example connection of device with passive transmitter and active receiver to ADA-13021MG

3.4. POWER SUPPLY CONNECTION

The power supply to ADA-13021MG converter should be DC (regulated) from 10 V= to 30V=. Nominal power is typically 3W, 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-13021MG has the protection from opposite connection power supply.

4. ACTIVATION

Converter can be powered after proper connection according to step above. If the connection was made properly green LED PWR on front panel of converter should lit, if not check polarization of power connection. During proper data transmission through converter the LEDs Tx and Rx on the front panel and on RJ45 connector of Ethernet interface should blink. This LED are described below:

LED	Description
Current Loop interface & Power	
PWR	Signalization of power supply
RX	Signalization of data receiving by ADA-13021MG from Current Loop.
TX	Signalization of data transmission from ADA-13021MG converter through Current Loop
ETHERNET interface	
yellow LINK	Signaling a valid connection to the network
green ACT	Signaling data transmission

5. CONFIGURATION

ADA-13021MG converter like most of network devices should be configured for proper functioning, it's needed configuration of network services and network setting.

Below are described the stages of software installation and network setting configuration of converter.

5.1. INITIAL CONFIGURATION USING ADAFINDER SOFTWARE

5.1.1. ADAFINDER INSTALLATION

The initial configuration of network setting at the converter can be made by using ADAFinder or ADAWiz software. The installation is automatically after insert the CD (compact disc) to an optical drive. If the autorun doesn't start, should run the file setup.exe located in main CD catalogue. After installation the software ADAFinder and ADAWiz are available in **Start->Programs->CEL-MAR->ADANet**.

5.1.2. NETWORK SETTING

ADAFinder is use for initial configuration of converter's network setting.

Before running ADAFinder should be disabled the System FireWall!

After running, the program is searching local network and if find ADA-13021MG, will add them to the list of available converters **[Devices:]** Fig. 15.

To change the network setting of ADA-13021MG, should:

- select the converter from the list **[Devices:]** and press **[Configure IP Settings]**,
- in windows **[Set IP Address]** select option **'Automatically obtain network settings via DHCP'** (default setting) or **'Manually configure network setting'**. In case of manual configuration should be enter IP Address of the converter, Subnet Mask, Default Gateway and the Password (default: dbps) of the ADA-13021MG administrator for authorization of changes.
- press **[Apply]**, configuration will be saved to the converter and will restart. After message **'Operation made successfully'**, press **[Refresh List]** in ADAFinder window. After re-searching the lists of available converters **[Devices:]** will be refreshed.

Other buttons of the program main menu:

- selecting the converter from the list and pressing **[Reboot Device]**, will make programmable reset of the converter – new configuration of network setting will be activated,
- selecting the converter from the list and pressing **[Device Information]**, will show an information about setting of the converter,
- selecting the converter from the list and pressing **[Open Web Interface]**, will run Internet browser and open the configuration page of the converter.

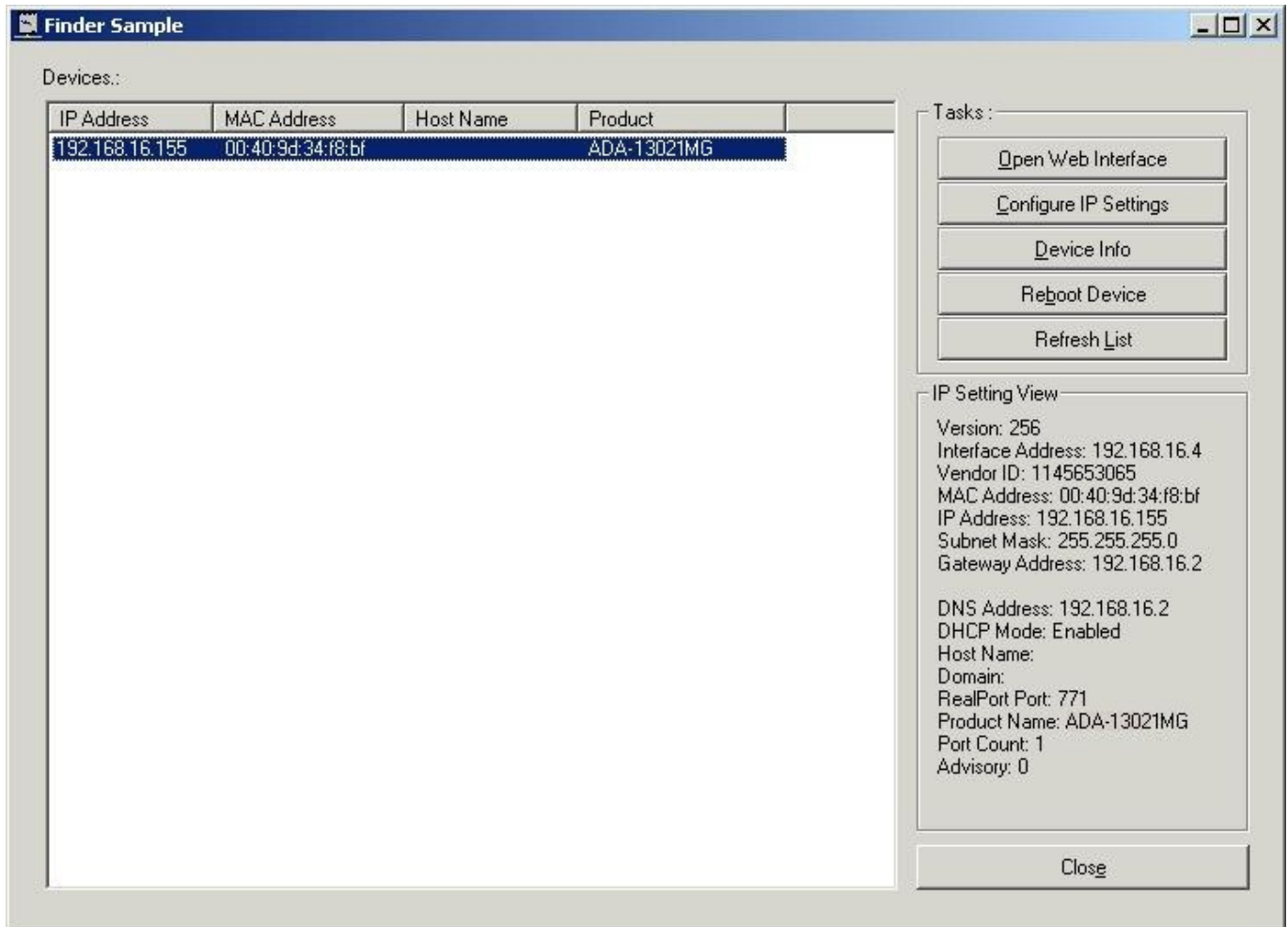


Fig. 15. Base configuration network by the use ADAFinder software

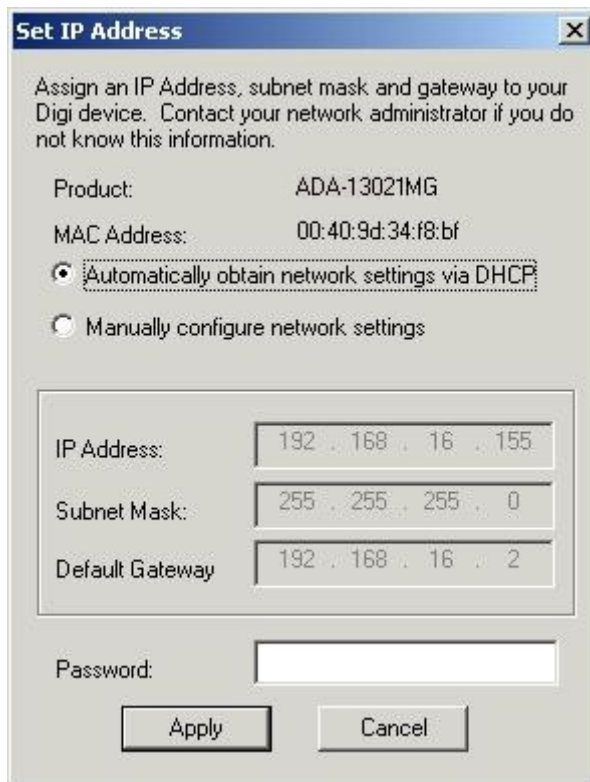


Fig. 16. ADAFinder configuration of IP network address

5.2. CONFIGURATION AND MANAGEMENT BY THE USE OF INTERNET BROWSER

Integrated WWW server to ADA-13021MG enable to easy configuration and diagnostics of LAN and WAN network devices by the use Internet browser.

For configuration open the Internet Browser and type the address <http://<converter-ip-address>/admin/administration.htm>. The login windows will open. Enter User name and Password as follows:

User name: root

Password: dbps

If the User name and the Password are correct, will open the page as below.

The screenshot displays the 'ADA-13021MG Configuration and Management' web page. On the left, a navigation menu lists options: Home, Configuration (Network, Serial Ports, System, Users), Management (Serial Ports, Connections), Administration (File Management, Backup/Restore, Update Firmware, Factory Default Settings, System Information, Reboot), and Logout. The main content area is titled 'Home' and includes a 'Getting Started' section with a 'Tutorial' link. Below this is a 'System Summary' table:

Model:	ADA-13021MG
IP Address:	192.168.10.21
MAC Address:	00:40:9D:27:1C:6A
Description:	None
Contact:	None
Location:	None
Device ID:	00000000-00000000-00409DFF-FF271C6A

At the bottom of the main content area, there is a 'User Interface' section with two buttons: 'Set as Default' and 'Launch'.

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Fig. 17. The web page for configuration and management of ADA-13021MG

5.2.1. NETWORK CONFIGURATION

To make changes of default setting or new configuration of ADA-13021MG, select on left panel **Configuration -> Network** and then on right **[IP Settings]** (Fig.17) and make the selection: **Obtain an IP address automatically using DHCP** or **Use the following IP address** (in this option, enter IP Address of the converter, Subnet Mask, Default Gateway), press **[Apply]** for save. After the message **Changes have been saved successfully**, from left menu select **Administrator -> Reboot** on right press **[Reboot]**, will be programmable reset of the converter and new configuration of network setting will be activated.

Network Configuration

▼ IP Settings

Obtain an IP address automatically using DHCP *

Use the following IP address:

* IP Address:

* Subnet Mask:

Default Gateway:

* Changes to DHCP, IP address and Subnet Mask require a reboot to take effect.

Apply

▶ Network Services Settings

▶ Advanced Network Settings

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Fig. 18. The web page for network setting of ADA-13021MG

5.2.2. SERIAL PORT CONFIGURATION

The configuration of serial port (Current Loop) of ADA-13021MG converter includes: port description, setting of port profile (operating mode) and setting of serial transmission parameters (baud rate, data bits, parity, stop bits).

Select on left panel **Configuration** -> **Serial Ports** and then on a page **Serial Port Configuration** select **[Port 1]**, will open the configuration details page, includes:

- Port Profile Settings,
- Basic Serial Settings,
- Advanced Serial Settings,

5.2.2.1. SERIAL PORT PROFILE CONFIGURATION (OPERATING MODE)

Select on right panel **Serial Port Configuration** -> **Port Profile Settings** and then press **Change Profile...** will open the page **Select Port Profile** for selection of available port profiles (fig. 19).

Configuration of profile used in typical solutions will be presented in next chapters.

ADA-13021MG operates properly in profiles as follows:

- RealPort
- TCP Sockets
- UDP Sockets
- Serial Bridge

Configuration of profiles will be presented in next chapters.

Select Port Profile...

Profiles allow you to easily configure serial ports by only displaying those items that are relevant to the current profile. Select the profile below that best matches your configuration.

- RealPort**
The RealPort Profile allows you to map a COM or TTY port to the serial port. [More...](#)
- Console Management**
The Console Management Profile allows you to access a device's console port over a network connection. [More...](#)
- TCP Sockets**
The TCP Sockets Profile allows a serial device to communicate over a TCP network. [More...](#)
- UDP Sockets**
The UDP Sockets Profile allows a serial device to communicate using UDP. [More...](#)
- Serial Bridge**
The Serial Bridge Profile configures one side of a serial bridge. A bridge connects two serial devices over the network as if they were connected with a serial cable. [More...](#)
- Local Configuration**
The Local Configuration Profile allows you to connect standard terminals or terminal emulation programs to the serial port in order to use the serial port as a console to access the command line interface. [More...](#)
- Industrial Automation**
The Industrial Automation (IA) Profile allows you to control and monitor various IA devices and PLCs. [More...](#)
- Modem Emulation**
The Modem Emulation Profile allows you to configure the serial port to act as a modem. [More...](#)
- PPP Server**
The PPP Server Profile allows a serial device to connect and communicate over the TCP/IP network. [More...](#)
- Custom**
The Custom Profile is an advanced option to allow full configuration of the serial port. [More...](#)

Fig. 19. Selection serial port profile web

5.2.2.1.1. REALPORT (VIRTUAL PORT) CONFIGURATION

Choosing **RealPort** (Virtual Port, Fig. 19) is configured the serial port of ADA-13021MG, for communication with virtual port COM of computer. Press **[Apply]** for save. After installation driver (RealPort) of virtual port COM (see chapter 6) in operating system, data sending by application to this port are transferred through WLAN/WAN to ADA-13021MG converter and are present on his serial port. The driver **RealPort** installation is presented in chapter 6. Normally **RealPort** service allows for one connection through WLAN/WAN, between computer and server port.

Connection from other computers to the converter will be not taken, what will cause the error message.

5.2.2.1.2. TCP SOCKETS CONFIGURATION

Choosing **TCP Sockets** is configured the serial port of ADA-13021MG, for direct communication with PC or other network device by the use of TCP socked. Data sending by application/device to TCP socked are transferred through network to ADA-13021MG converter and are present on his serial port. To save selected configuration, press the button **[Apply]**.

5.2.2.1.2.1. TCP SERVER & CLIENT CONFIGURATION

After saving the profile in section **TCP Server Settings**, set parameters:

- port for Telnet service, in standard 2001,
- port for serial port service, in standard 2101 (via this port the data are sent to serial port of server),
- port for safe access to serial port service, in standard 2601 (via this port the data are sent to serial port of server),

Additionally, there is the possibility of selection **Enable TCP Keep Alive** – connection will be kept, even if the data is not transmitted

over the network.

Fig. 20. Example configuration of TCP server

For configuration of **TCP Client Settings** (TCP Client Setting, fig. below), select **Automatically establish TCP connections**, connection between client and TCP server will be automatically. Then select **Always connect and maintain connection** option and in section **Establish connection to the following network service** enter IP address of device to which TCP client will send data, select service and enter port. There is also possible to select an option **Enable TCP Keep-Alive** – connection will be kept, even if the data is not transmitted over the network.

For saving the configuration press **[Apply]**.

Fig. 21. Example configuration of TCP client

ATTENTION !

Default port of serial port service is 2101.

If on the local network is conflict with other network service using the same port, in the converter's port configuration change number of port into another for the server and client service.

5.2.2.1.2.2. THE 'ENABLE TCP KEEP-ALIVE' OPTION CONFIGURATION

Option **Enable TCP Keep-Alive** keeps connection between server and client, even if the data is not transmitted over the network and reconnection in case of interruption.

Configuration of this option can be made by selection **Configuration -> Network -> Advanced Network Settings -> TCP Keep-Alive Settings**. In this section can be configured:

- **Idle Time** – specifies the period (scope 10 sec. - 24 hours) that a TCP connection has to be idle before a keep-alive is sent.
- **Probe Interval** – the time in seconds between each keep-alive probe (scope 10 – 75 sec.),
- **Probe Count** – the number of times TCP probes the connection to determine (scope 5 – 30 trials).

5.2.2.1.2.3. SERIAL PORT TRANSMISSION PARAMETERS CONFIGURATION

For proper operation of ADA-13021MG with device connected to his serial port (Current Loop), should be set the same transmission parameters for both devices.

Select **Basic Serial Settings** and enter **Baud Rate, Data Bits, Parity, Stop Bits**, the same parameter like has device connected to the serial port of the converter.

5.2.2.1.3. UDP SOCKETS CONFIGURATION

Choosing **UDP Sockets** is configured the serial port of ADA-13021MG converter for direct communication with PC or other device connected to the network by the use of UDP socked. Data sending by application or other device/s to this port are transferred through LAN/WAN to ADA-13021MG converter and are present on his serial port. Press **[Apply]** for save the configuration.

5.2.2.1.3.1. UDP CLIENT & SERVER CONFIGURATION IN CASE OF MASTER DEVICE

After saving the **UDP Sockets profile**, will open section **UDP Server Settings** with operating parameters like on picture below. Set access to UDP server on e.g. 2101 port. Then select **Automatically send serial data** in section **UDP Client Settings**, this automatically send received data by the use UDP client service to the SLAVE device connected to LAN/WAN through e.g. ADA-13021MG, ADA-13040, ADA-13110, ADA14040, ADA-14040.

On lists **Send data to the following network services** are addresses of network devices and ports to which will be send data. In fields:

- **Description** - enter e.g. location of the converter and SLAVE device,
- **Send To** - enter IP address of e.g. converter, connected to SLAVE device,
- **UDP Port** - enter the number of port on which is working UDP Server of converter connected to SLAVE device

In the section **Send data under any of the following conditions** is recommended to set parameters like on picture bellow. For saving the configuration of UDP client and server for MASTER device, press **[Apply]**.

UDP Server Settings

The serial device receives data from one or more devices or systems on the network using UDP sockets.

Enable UDP access using UDP Port:

UDP Client Settings

Automatically send serial data to one or more devices or systems on the network using UDP sockets.

Automatically send serial data

Send data to the following network services:

Description	Send To	UDP Port	
HALA-1	192.168.10.131	2101	Remove
HALA-2	192.168.10.132	2101	Remove
<input style="width: 100%;" type="text" value="HALA-3"/>	<input style="width: 100%;" type="text" value="192.168.10.133"/>	<input style="width: 60px;" type="text" value="2101"/>	Add

Send data under any of the following conditions:

Send when data is present on the serial line

Match string:

Strip string before sending

Send after following number of idle milliseconds

ms

Send after the following number of bytes

bytes

Fig. 22. Example configuration of the UDP server&client on converter connected to MASTER device

5.2.2.1.3.2. UDP CLIENT & SERVER CONFIGURATION IN CASE OF SLAVE DEVICE

Set operating parameters of UDP server on the converter connected to SLAVE device eg. like on picture below. Set access to UDP server on e.g. 2101 port. Then select **Automatically send serial data** in section **UDP Client Settings**, this automatically send received data by the use UDP client service to the MASTER device connected to LAN / WAN through e.g. ADA-13021MG, ADA-13040, ADA-13110, ADA14040, ADA-14040.

On lists **Send data to the following network services** are addresses of network devices and ports to which will be send data. In field:

- **Description** - enter e.g. location of the converter and MASTER device,
- **Send To** - enter IP address of converter connected to MASTER device,
- **UDP Port** - enter the number of port on which is working UDP Server of converter connected to MASTER device

In the section **Send data under any of the following conditions** is recommended to set parameters like on picture bellow.

For saving the configuration of UDP client and server for SLAVE device, press **[Apply]**.

UDP Server Settings

The serial device receives data from one or more devices or systems on the network using UDP sockets.

Enable UDP access using UDP Port:

UDP Client Settings

Automatically send serial data to one or more devices or systems on the network using UDP sockets.

Automatically send serial data

Send data to the following network services:

Description	Send To	UDP Port	
CENTRALA	192.168.10.121	2101	Remove
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text" value="0.0.0.0"/>	<input style="width: 40px;" type="text" value="0"/>	<input type="button" value="Add"/>

Send data under any of the following conditions:

Send when data is present on the serial line

Match string:

Strip string before sending

Send after following number of idle milliseconds

ms

Send after the following number of bytes

bytes

Fig.23. Example configuration of the UDP server&client on converter connected to SLAVE device

ATTENTION !
Default port of serial port service is 2101.
If on the local network is conflict with other network service using the same port, in the converter's port configuration change number of port into another for the server and client service .

5.2.2.1.3.3. SERIAL PORT TRANSMISSION PARAMETERS CONFIGURATION

For proper operation of ADA-13021MG with device connected to his serial port (Current Loop), should be set the same transmission parameters for both devices.

Select **Basic Serial Settings** and enter **Baud Rate, Data Bits, Parity, Stop Bits**, the same parameter like has device connected to the serial port of the converter.

5.2.2.1.4. SERIAL BRIDGE PROFILE CONFIGURATION

Choosing the **Serial Bridge profile** enable direct communication between two devices connected to two ADA-13021MG converters over the network as if they were connected with a serial cable. A properly configured ADA-13021MG will start automatically communication with each other. Press **[Apply]** for save the configuration

After saving the Serial Bridge profile, will open section **Serial Bridge Settings** (fig. below) with operating parameters like on picture below. Select **Initiate serial bridge to the following device** option and enter IP address and 2101 port of the converter with which to

create the serial bridge over the network. Additionally, can be selected **[Enable TCP Keep-Alive]** option which keeps connection even if the data is not transmitted. Select **Allow other devices to initiate serial bridge** and enter 2101 port on which other the converter will automatically start communication and can be set also **[Enable TCP Keep-Alive]** option which keeps connection even if the data is not transmitted.

Fig. 24. Example configuration of TCP Serial Bridge

ATTENTION !

Default port of serial port service is 2101.

If on the local network is conflict with other network service using the same port, in the converter's port configuration change number of port into another for the server and client service.

5.2.2.1.4.1. SERIAL PORT TRANSMISSION PARAMETERS CONFIGURATION

For proper operation of ADA-13021MG with device connected to his serial port (Current Loop), should be set the same transmission parameters for both devices.

Select **Basic Serial Settings** and enter **Baud Rate, Data Bits, Parity, Stop Bits**, the same parameter like has device connected to the serial port of the converter.

5.2.2.1.5. INDUSTRIAL AUTOMATION (MODBUS GATEWAY) CONFIGURATION

Choosing the **Industrial Automation (Modbus Gateway, Fig.16)** profile, will be possible to configure ADA-13110MG for communication by the use of MODBUS-RTU master/slave or MODBUS-ASCII master/slave protocol. The converter converts frames of MODBUS-RTU/ASCII protocol to MODBUS-TCP and send via WLAN/LAN/WAN to devices with MODBUS-TCP protocol or other servers (ADA-14040, ADA-14110, ADA-13040MG, ADA-13110MG) operating in **Industrial Automation (MODBUS Gateway)** mode with connected MODBUS-RTU/ASCII devices. Press **[Apply]** for saving this profile.

5.2.2.1.5.1. CONFIGURATION FOR COMMUNICATION WITH DEVICES MODBUS-MASTER TYPE

In section **Industrial Automation Settings**, press **[Change Protocol]** link. Then in section **Select IA Protocol** (figure below) select type of device, connected to serial port of ADA-13021MG, as **Serial Master** and MODBUS-RTU or MODBUS-ASCII protocol for communication between connected devices. Press **[Apply]** for saving configuration.

Fig. 25. Example configuration for communication with MODBUS-MASTER devices – choice of devices and protocols
Set the options in section **Modbus RTU Settings** like on the figure below and press **[Apply]**.



Fig. 26. Example configuration for communication with MODBUS-MASTER devices – Modbus RTU setting

Then select section **Slave Destinations (Packet Routing)** – figure below.

In this section press **[Add]**, enter the IP address of **Slave** type devices, to which **Master** will send requests and receive responses.



Fig. 27. Example configuration for communication with MODBUS-MASTER devices – table configuration of SLAVE type devices

In section **Destination Settings** (fig. below) set the options of requests from **Master** device to **Slave** device, in fields:

- **Host name** - enter IP address of **Slave** device.
- **Protocol** - set protocol which will be send to **Slave** device – in this case will be Modbus/TCP.
- **Transport** - set TCP protocol .
- **Network port**- set port 502.

Press **[Apply]** for saving configuration. Then press again **[Add]** for adding another **Slave** device.

Then select section **Slave Destinations (Packet Routing)**, when all **Slave** devices are added and set, press **[Apply]**.

Destination Settings

Protocol Addresses:

Send requests using any protocol address to the following destination
 Send only requests using specific protocol address(es) to the following destination

0 to 255

Slave Destination

Send messages to network device

Hostname: 192.168.0.102
 Protocol: Modbus/TCP
 Transport: TCP
 Network port: 502

Character timeout: 50 ms
 Slave timeout: 2500 ms

Enable idle timeouts for idle connections
 Idle timeout: 300 s

Replace last octet of IP address with protocol address
 Override the Modbus unit address on incoming requests with specified unit address
 Fixed address: 0

Map message as if it originated from another protocol address
 Protocol address: 0

Ignore message and do not send to any slave devices

Discard message and send error response to master device

Apply Cancel

Fig. 28. Example configuration for communication with MODBUS-MASTER devices – table entry configuration for SLAVE type devices

On section **Advanced Protocol Settings** (fig. below), set the time out by entry:

- **Character timeout** - value in ms., maximum delay or gap between bytes of a message – default 20 ms.
- **Message timeout** - value in ms., maximum delay or gap between bytes of a message – default 2500ms; this time must be less than the Timeout set on SLAVE and MASTER MODBUS-RTU devices.

For saving the **Advanced Protocol Settings** press [Apply].

▼ Advanced Protocol Settings

Character timeout: 20 ms *(maximum delay or gap between bytes of a message)*

Message timeout: 2500 ms *(maximum time to wait for processing, including multi-master queuing delays)*

Apply

▶ Basic Serial Settings

▶ Advanced Serial Settings

Fig. 29. Example configuration for communication with MODBUS-MASTER devices – configuration of timeout parameters for MASTER type device

5.2.2.1.5.2. CONFIGURATION FOR COMMUNICATION WITH MODBUS-SLAVE TYPE DEVICE

In section **Industrial Automation Settings**, press **[Change Protocol]** link. Then in section **Select IA Protocol** (figure below) select type of device, connected to serial port of ADA-13021MG as **Serial Slave** and MODBUS-RTU or MODBUS-ASCII protocol for communication between connected devices. Press **[Apply]** for saving configuration.

Select IA Protocol...

Please select the best matching scenario that closely matches your environment:

- Serial Slave:** My device or PLC accepts incoming requests from other systems, often referred to as masters. My PLC, then, acts as a slave device. This scenario accepts connections over the network.
- Serial Master:** My device or PLC initiates connections and sends requests to one or more systems, often referred to as slaves. My PLC, then, acts as a master. This scenario uses routing to determine where to send requests, which can be a device on a different serial port, another ADA-14040 RS485/RS422 to Wi-Fi Wireless Serial Server acting as a serial bridge between two serial PLC's, or any other networked device.

Please select the best matching IA serial protocol that your device or PLC communicates with:

- Modbus RTU
- Modbus ASCII

Apply Cancel

Fig. 30. Example configuration for communication with MODBUS-SLAVE devices – choice of devices and protocols

Set options in section **[Modbus RTU Settings]** eg. As on picture below. Press **[Apply]** for saving configuration.

Industrial Automation Settings

Current Protocol: **Modbus/RTU Serial Slave** Change Protocol...

My PLC or other IA device is connected to this serial port and needs to communicate with another PLC, device, or system on the network.

Modbus RTU Settings

Forward incoming network requests using the following unit addresses

to

Override the Modbus unit address on incoming requests with specified unit address

Apply

Fig. 31. Example configuration for communication with MODBUS-SLAVE devices – Modbus RTU setting

Go to section **Modbus/TCP Network Settings [Global]**, configuration options set as on the figure below. Press **[Apply]** for saving configuration.

Fig. 28. Example configuration for communication with MODBUS-SLAVE devices

ATTENTION !

Default port of Industrial Automation (Modbus Gateway) service is 502.

If on the local network is conflict with other network service using the same port, in the converter's port configuration change number of port into another for the server and client service.

On section **Advanced Protocol Settings** (fig. below), set the time out by entry:

- **Character timeout** - value in ms., maximum delay or gap between bytes of a message – default 20 ms.
- **Message timeout** - value in ms., maximum delay or gap between bytes of a message – default 2500ms; **this time not must be less than the timeout set on MODBUS MASTER devices / SCADA/HMI software.**

For saving the **Advanced Protocol Settings** press **[Apply]**.

Fig. 33. Example configuration for communication with MODBUS-SLAVE devices – configuration of timeout parameters for SLAVE type device

5.2.2.1.5.3. SERIAL PORT TRANSMISSION PARAMETERS

For proper operation of ADA-13021MG with devices Modbus-Master or Modbus-Slave types, connected to his serial port, should be set the same transmission parameters for both devices.

Select **Basic Serial Settings** and enter **Baud Rate, Data Bits, Parity, Stop Bits**, the same parameter like has device connected to the serial port of the converter.

5.2.3. SYSTEM SETTINGS

Select on left panel menu **Configuration -> System** and then on right will be selections as follows:

- **Device Identity Settings** – allows adding name of converter, describe the location and add identification number,
- **Simple Network Management Protocol Settings (SNMP)** – allows making the configuration of management protocol SNMP.

5.2.4. USERS CONFIGURATION

On the configuration page **Users** are two sections:

- **Users**
- **Configure Users**

The section **Users** allows configuring the method of login to ADA-13110MG. Selecting the option **Enable user logins** means that after enter the address <http://<ip-converter-address>/admin/administration.htm> to internet browser, will open login window and will be necessary to enter user name and password.

Section **Configure Users** allows adding additional user, change password, configure access and permissions for each defined users.

5.2.4.1. CHANGING USER MANE AND PASSWORD

Changing the default user root and password, can be done as follows :

1. press user mane **root** in section **Users Configuration->Configure Users**,
2. enter new user name and password.
3. press **[Apply]** for saving.

5.2.4.2. ADDING NEW USER WITH LIMITED PERMISSIONS FOR CONFIGURATION OR MANAGEMENT

For adding new user with limited permissions for configuration or management of the converter, follow the steps below:

1. From menu **Configuration** select **Users**,
2. In section **Configure Users**, press **[New...]**,
3. Enter user mane (eg. **admin**) and password – twice, and press **[Apply]**,

Will open the page **Users Configuration**, where in section **Configure Users**, will be new user name.

Now it is possible to configure access permissions to the converter and permissions for configuration of this new user.

Configuration of access to converter:

1. From menu **Configuration** select **Users**,
2. In section **Configure Users**, select added user eg. **admin**,
3. Will open the page **User Configuration** – admin, where are sections:

A/ **User Configuration** – possibility of rename user and password,

B/ **User Access** - method of access to converter from the network:

Allow command line access – access using the Command Line Interface - **telnet**,

Allow web interface access – access using the internet browser.

C/ **User Permissions** - user permissions to configuration and management of the ADA-13021MG converter, where are options:

None - no permission,

Read - permission to read,

Read Self - permission to read own settings, but not other users.

Read/Write - full permission to read and write the setting.

Read/Write Self - permission to read and write own setting, but not other users.

Read All/Write Self - permission to read the setting for all users and modify only own setting (not other users).

Execute - permission to execute (start).

4. All changes are saved by pressing **[Apply]**.

5.2.5. MANAGEMENT

On left panel in menu **Management** are to sections :

- **Serial Ports**

- **Connections**

5.2.5.1. SERIAL PORTS MANAGEMENT

Section **Serial Ports** allows to identification connections/disconnection to the serial port of the converter through the network.

5.2.5.2. CONNECTIONS MANAGEMENT

Section **Connections** allows to identification connections/disconnection to the converter through the network.

5.2.6. ADMINISTRATION

The menu **Administration** allows :

- to delete/upload files with Java applet,
- to backup/restore configuration of converter,
- to update Firmware,
- to restore the factory default settings,
- to display system details information,
- to reboot the converter.

5.2.6.1. FILE MANAGEMENT

Section **File Management** enables upload and delete Web provided by manufacturer. Uploaded index.htm or index.html allows to automatically run the page in the web browser after entering <http://ip-converter-address/FS/WEB/index.htm> and login to ADA-13021MG.

5.2.6.2. BACKUP & RESTORE CONFIGURATION

Section **Backup/Restore** enables backup to file or restore from file the user configuration of the converter.

5.2.6.3. FIRMWARE UPDATE

Section **Update Firmware** enables to make the update firmware from the file. Firstly should be done update the POST software before updating the firmware – more details available on the web page <http://www.cel-mar.pl>

5.2.6.4. FACTORY DEFAULT SETTINGS

The converter was configured by the manufacturer.

To restore factory default settings, select from menu **Factory Default Settings**. After that the converter will automatically reboot.

5.2.6.5. SYSTEM INFORMATION

Section **System Information** displays:

- **General** – device model, MAC address, firmware version, Boot version, POST version and more.
- **GPIO** – not applicable in ADA-13021MG.
- **Serial** – port description, current settings of serial port, status of controlling lines and the statistics data transfer through serial port.
- **Network** – show statistics of ETHERNET interface for IP, TCP, UDP, ICM protocols.

5.2.6.6. REBOOT

Section **Reboot** allows making software reset of ADA-13021MG. Pressing [**Reboot**] will start rebooting of server during 1 min.

5.2.6.7. LOGOUT – ENDING MANAGEMENT AND CONFIGURATION

After completion of the configuration or administration should be pressing **Logout** on left panel – logout from WWW server of ADA-13021MG converter.

6. USING VIRTUAL PORT SERVICE [REALPORT]

6.1. VIRTUAL PORT DRIVER INSTALLATION IN WINDOWS XP

The installation of virtual serial port drivers should be done for the CD, by choosing:

- Drivers/Win-98-ME, for Windows 98, Windows 98SE, Windows ME,
- Drivers/Win-2000, for Windows2000,
- Drivers/Win Server-2003-2008-2012 for Windows Server 2003, 2008, 2012,
- Drivers/Win-Vista for Windows Vista.
- Drivers\Windows\Win XP-7-8-8.1-10 for Windows XP, 7, 8.x, 10.

Installation of Virtual serial port drivers is as follows:

1. Connect ADA-13021MG to ETHERNET and power,
2. Press [**Start**] and select [**Run...**],
3. In the dialog window [**Run**] press [**Browse**],
4. Select „**My computer**” and CD-Rom with „**ADANET_DRV**”,
5. Select catalog **Drivers/WinXP2003Vista_x86_x64**,
6. Select file „**Setup32.exe**” for 32-bits system or „**Setup64.exe**” for 64-bits and press [**Open**],
7. When the installation window will appear press [**Next**],
8. Will start the searching for converters in the network, found devices will be added to the list.
9. Select the converter from the list for installation of virtual port driver and press [**Next**].
10. In window Describe the device select or not the Starting Com port and press [**Finish**]. The driver will be installed.

The Virtual Serial Port Drivers can be installed without connection of ADA-13021MG to ETHERNET and it is as follows:

1. Press [**Start**] button, select [**Run...**]
2. In the dialog window [**Run**] press [**Browse**]
3. Select „**My computer**” and CD-Rom with „**ADANET_DRV**”.
4. Select catalog **Drivers/WinXP2003Vista_x86_x64**.
5. Select file „**Setup32.exe**” for 32-bits system or „**Setup64.exe**” for 64-bits and press [**Open**].
6. When the installation window will appear press [**Next**].
7. Will start the searching for converters in the network.
8. If no devices were not found press [**Next**].
9. Should be set in the window Describe the device:
 - IP address for converter,
 - number of installing COM port (No. Ports)
 - Starting COMand press [**Finish**]. The driver will be installed.

In this way installed virtual port can require the configuration in case of connecting the converter to network.

6.2. REALPORT CONFIGURATION IN WINDOWS XP

After installation of RealPort drivers, can be done configuration by the use the Device Manager of Windows and it is as follows:

1. Press [**Start**], select [**Properties/Setting**], press [**Control Panel**].
2. Double click icon [**Administrative Tools**] and [**Device Manager**]
3. Press [**Ports (COM & LPT)**]. On fig. 34 is shown available serial ports COM1, COM2 and **COM3** marked as **ADA-13021MG** which was created after installation of RealPort driver.
4. Then select [**Multi-port Serial Adapter**], there will be the name **ADA-13021MG**.
5. Double click the name and the window [**Properties**] will appear.
6. Select [**Advanced**] and press [**Properties**].
7. Enter **new name of virtual port for converter**. In the window [**Advanced Properties**] click [**ADA-13021MG**] and then select [**Properties**], press [**Rename Ports**], now it is possible to change the name of virtual port driver for example COM5, COM11 etc. To accept the changes press [**OK**].
8. **Select IP address, MAC, DNS server for communication with virtual port driver**. In the window [**Advanced Properties**] click [**ADA-13021MG**] and then select [**Network**] (Fig. 35), and set the **IP address, MAC Address** or **DNS name** of converter for communication with virtual port driver.
9. In the next window press [**OK**] to accept the changes.

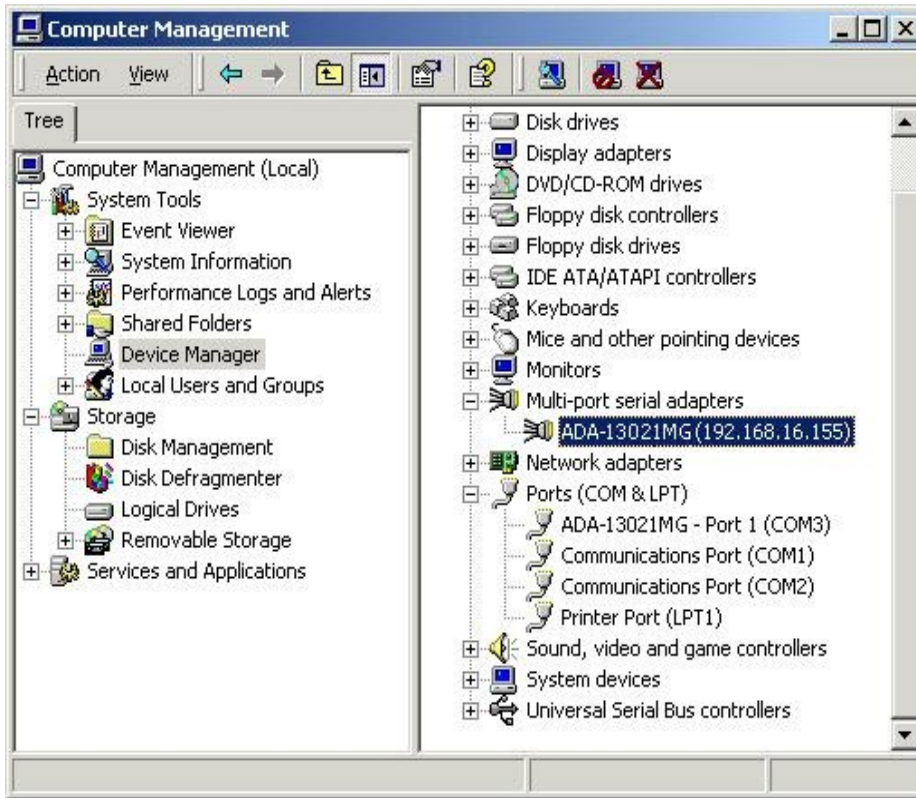


Fig. 34. Devices view on Windows XP

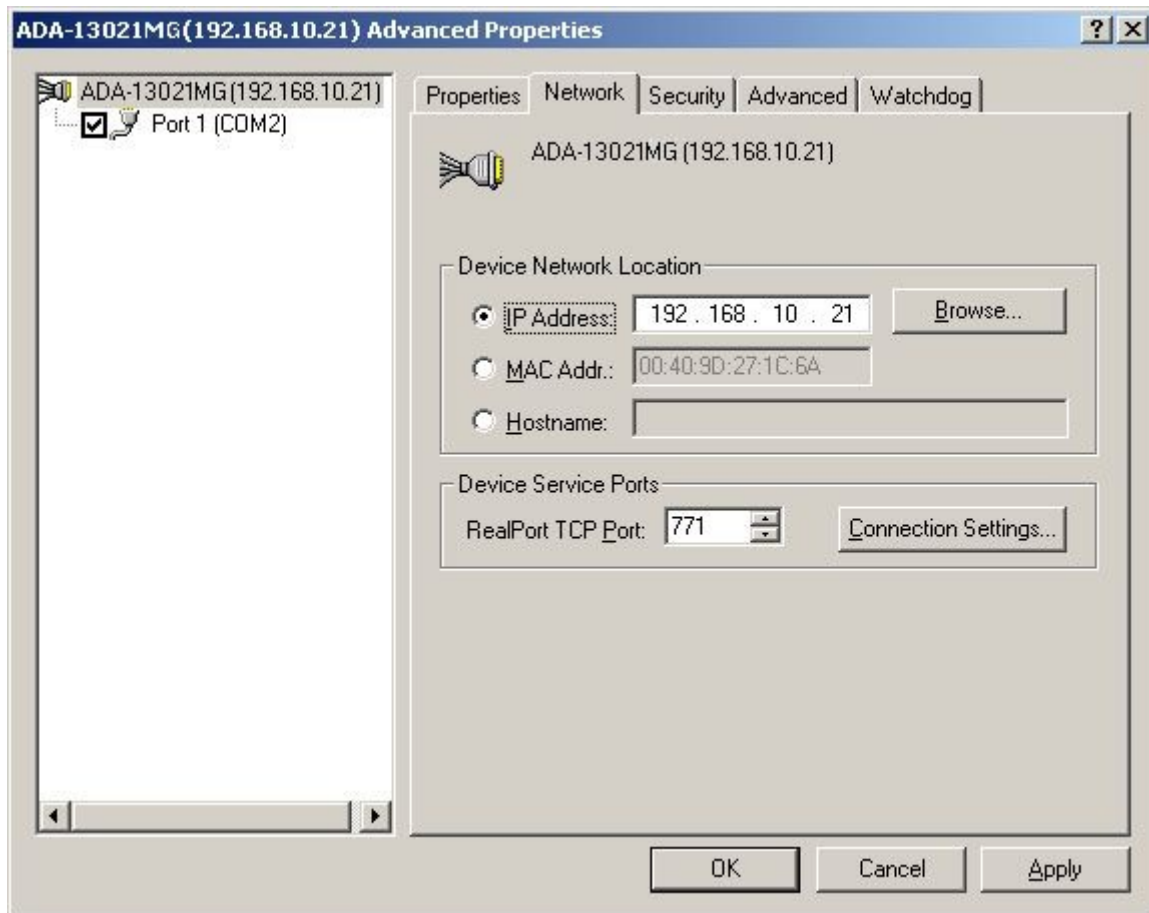


Fig. 35. Example configuration of multi-port serial adapter

7. FACTORY DEFAULT

<i>Parameter</i>	<i>Value</i>
User name	root
Password	dbps
IP address	Obtain an IP address automatically using DHCP
Operating mode	RealPort
Bout rate[bits/sec]	9600
Number of data bits	8
Parity Control	no
Number of stop bits	1
Flow Control	no

8. TROUBLESHOOTING

<i>Problem</i>	<i>Solution</i>
I forgot the password	Restoring Default Settings according to steps below: 1. Disconnect the power of the converter, 2. Remove the cover of ETHERNET connector, 3. Press RESET "RST" and holding the button, connect the power of the converter, 4. Release the button after 20 sec. when the converter will start with default settings. Restoring Default Settings deletes existing configuration and the proper configuration should be loaded to the converter from the backup.
I changed the configuration and the converter isn't functioning.	1. Enter in the Internet browser http://converter-ip-address , 2. Select the menu [Factory Default Settings] press [Restore] .

9. VERSIONS

ADA-13021MG -					
Electronic versions:					
Basic		1			
Current Loop Voltage:					
24VDC			1		
12VDC (standard version)			2		
Current Loop Current:					
0 – 20 mA (standard version)				1	
0 – 30 mA				2	
Galvanic isolation:					
1kV= 3-way					2
3kV= 3-way					3

Order example:

Product symbol: **ADA-13021MG-1-2-1-2**

- 1 – standard electronics version,
- 2 – current loop voltage 12VDC,
- 1 – current loop current 0-20mA,
- 2 – galvanic isolation 1kV=,

10. SPECIFICATION

TECHNICAL DATA

Transmission Parameters

Net/ Interface	ETHERNET	Current Loop
Connector	RJ45	Screw terminal, wire max. Ø 2,5mm ² .
Max. Line length	LAN up to 150 m	Depend on baud rate, up to few kilometres
Max. baud rate	10/100 Mbit/s	Do 38,4 kbps (depend on current loop line length)
Transmission line	4-pair twisted cable, UTP 4x2x0,5 (24AWG), shield inside large interferences STP 4x2x0,5 (24AWG)).	2-pair twisted cable eg UTP Nx2x0,5 (24AWG), shield inside large interferences eg STP Nx2x0,5 (24AWG).
Standards	IEEE 802.3	current signal, 0-20mA (TTY)
Transmission type	Current Loop asynchronous half duplex or full duplex	
Optical Signalization	<ul style="list-style-type: none"> • 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 – up to 3m
Power	3W
Protection from reverse power polarization	yes
Galvanic Isolation	1kV= or 3kV= (between power circuit and ETHERNET signal line) 1kV= or 3kV= (between power circuit and Current Loop signal line)
Optoisolation	~3kV= (between signal lines Current Loop and ETHERNET)
Electromagnetic compatibility	Resistance to disruptions PN-EN 55024. Emission of disruptions PN-EN 55022.
Safety requiring	According to the PN-EN60950 norm.
Environment	Commercial and light industrial.

Environmental Parameters

Operating temperature	-30 ÷ 60°C
Humidity	5 ÷ 95% - non-condensing
Storage temperature	-40 ÷ 70°C

Casing

Dimensions	53mm x 90mm x 62mm
Material	PC/ABS
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.

Dear Customer,

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

We hope that this user manual helped connect and start up the **ADA-13021MG 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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