User manual

Converter USB/RS-485

- USB / RS-485 signals convertion

CE

Read the user's manual carefully before starting to use the unit or software.
Producer reserves the right to implement changes without prior notice.

CONTENTS

Explanation of symbols used in the manual:

- This symbol denotes especially important guidelines concerning the installation and operation of the device. Not complying with the guidelines denoted by this symbol may cause an accident, damage or equipment destruction.

IF THE DEVICE IS NOT USED ACCORDING TO THE MANUAL THE USER IS RESPONSIBLE FOR POSSIBLE DAMAGES.

- This symbol denotes especially important characteristics of the unit.
Read any information regarding this symbol carefully

1. BASIC REQUIREMENTS AND USER SAFETY

⚠️

- **The manufacturer is not responsible for any damages caused by inappropriate installation, not maintaining the proper environmental conditions and using the unit contrary to its assignment.**

- Installation should be conducted by qualified personnel . During installation all available safety requirements should be considered. The fitter is responsible for executing the installation according to this manual, local safety and EMC regulations.

- The unit must be properly set-up, according to the application. Incorrect configuration can cause defective operation, which can lead to unit damage or an accident.

- **If in the case of a unit malfunction there is a risk of a serious threat to the safety of people or property additional, independent systems and solutions to prevent such a threat must be used.**

- Neighbouring and connected equipment must meet the appropriate standards and regulations concerning safety and be equipped with adequate overvoltage and interference filters.

- **Do not attempt to disassemble, repair or modify the unit yourself. The unit has no user serviceable parts. Defective units must be disconnected and submitted for repairs at an authorized service centre.**

⚠️

- In order to minimize fire or electric shock hazard, the unit must be protected against atmospheric precipitation and excessive humidity.

- Do not use the unit in areas threatened with excessive shocks, vibrations, dust, humidity, corrosive gasses and oils.

- Do not use the unit in areas where there is risk of explosions.

- Do not use the unit in areas with significant temperature variations, exposure to condensation or ice.

- Do not use the unit in areas exposed to direct sunlight.

- Make sure that the ambient temperature (e.g. inside the control box) does not exceed the recommended values. In such cases forced cooling of the unit must be considered (e.g. by using a ventilator).

⚠️

The unit is designed for operation in an industrial environment and must not be used in a household environment or similar.

2. GENERAL CHARACTERISTICS

The **Converter USB/RS-485** module is designed to connect a USB host to slave devices equipped with RS-485 interface. The PC with special software can be used as a host. The **Converter USB/RS-485** unit guarantees full galvanic isolation between USB and RS-485 circuits. Warning - only one **Converter USB/RS-485** can be connected to RS-485 line.

The converter can work with any devices equipped with RS-485 interface. The module contains FT232BM integrated circuit produced by FTDI Chip company, and it supports USB 1.1 and USB 2.0 standards.

The main purpose of **Converter USB/RS-485** is connection of PC host computer with industrial data acquisition and visualisation systems based on RS-485 interface.

3. TECHNICAL DATA

Power supply voltage	From USB interface (4,4V - 5,25V DC)
Supply current	max. 150 mA
Galvanic separation	between RS-485 line and USB interface.
USB connector	1x USB B type, USB type A-B cable (length about 1,5 m) is delivered with the unit.
Baud rate	300 bit/s - 115200 bit/s
Housing dimensions	40 x 55 x 100 mm
Weight	170 g
Operating temperature (depending on version)	0°C to +50°C or -20°C to +50°C
Storage temperature (depending on version)	-10°C to +70°C or -20°C to +70°C
Humidity	5 to 90% no condensation
Altitude	up to 2000 meters above sea level
Screws tightening max. torque	0,5 Nm
Max. connection leads diameter	2,5 mm^2
EMC	PN-EN 61326-1
Supported systems	Windows 98/ ME/ 2000/ XP/ Vista / 7

⚠ **This is a class A unit. In housing or a similar area it can cause radio frequency interference. In such cases the user can be requested to use appropriate preventive measures.**

4. DEVICE INSTALLATION

The unit has been designed and manufactured in a way assuring a high level of user safety and resistance to interference occurring in a typical industrial environment. In order to take full advantage of these characteristics installation of the unit must be conducted correctly and according to the local regulations.

⚠️ - Read the basic safety requirements on page 3 prior to starting the installation.

- All installation works must be conducted with a disconnected power supply.

- Protecting the power supply clamps against unauthorized persons must be taken into consideration.

4.1. UNPACKING

After removing the unit from the protective packaging, check for transportation damage. Any transportation damage must be immediately reported to the carrier. Also, write down the unit serial number on the housing and report the damage to the manufacturer.

Attached with the unit please find:
- user's manual for **Converter USB/RS-485** device

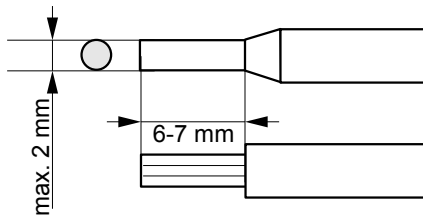### 4.2. CONNECTION METHOD

Caution

⚠️ - Installation should be conducted by qualified personnel . During installation all available safety requirements should be considered. The fitter is responsible for executing the installation according to this manual, local safety and EMC regulations.

- Wiring must meet appropriate standards and local regulations and laws.

- In order to secure against accidental short circuit the connection cables must be terminated with appropriate insulated cable tips.

- Tighten the clamping screws. The recommended tightening torque is 0.5 Nm. Loose screws can cause fire or defective operation. Over tightening can lead to damaging the connections inside the units and breaking the thread.

- In the case of the unit being fitted with separable clamps they should be inserted into appropriate connectors in the unit, even if they are not used for any connections.

- Unused clamps (marked as n.c.) must not be used for connecting any connecting cables (e.g. as bridges), because this can cause damage to the equipment or electric shock.

Due to possible significant interference in industrial installations appropriate measures assuring correct operation of the unit must be applied. To avoid the unit of improper indications keep recommendations listed below.

- Avoid common (parallel) leading of signal cables and transmission cables together with power supply cables and cables controlling induction loads (e.g. contactors). Such cables should cross at a right angle.
- Contactor coils and induction loads should be equipped with anti-interference protection systems, e.g. RC-type.
- Use of screened signal cables is recommended. Signal cable screens should be connected to the earthing only at one of the ends of the screened cable.
- In the case of magnetically induced interference the use of twisted couples of signal cables (so-called "spirals") is recommended. The spiral (best if shielded) must be used with RS-485 serial transmission connections.
- In the case of interference from the power supply side the use of appropriate anti-interference filters is recommended. Bear in mind that the connection between the filter and the unit should be as short as possible and the metal housing of the filter must be connected to the earthing with largest possible surface. The cables connected to the filter output must not run in parallel with cables with interference (e.g. circuits controlling relays or contactors).

   Connections are made using the screw connections on the back of the unit's housing. The connections should be made accordingly to sticker on the top of converter's housing. (Figure 4.1 - 4.2).

max. 2 mm

6-7 mm

Figure 4.1. Method of cable insulation replacing and cable terminals

LEDs functions:

LED **ON** (yellow)   - signalises that unit is connected to the host, powered, and the USB drivers installed

LED **TX** (red)   - signalises that unit is sending data to RS-485 line

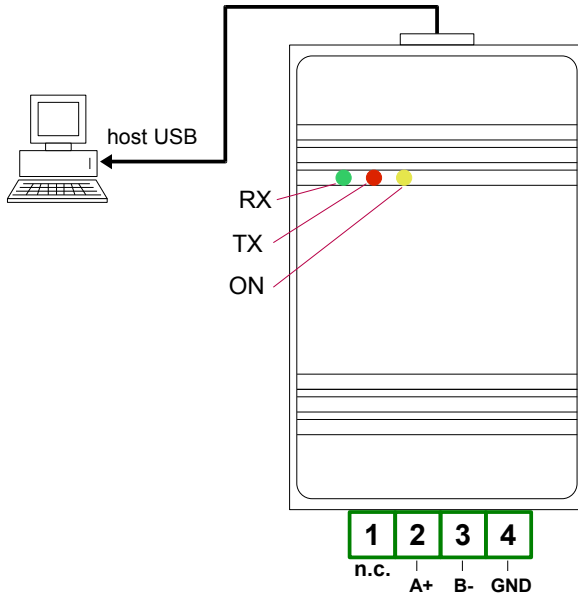LED **RX** (green)   - signalises that unit is receiving data from RS-485 line

Figure 4.2 Connection method

4.3. MAINTENANCE

The unit does not have any internal replaceable or adjustable components available to the user. Pay attention to the ambient temperature in the room where the unit is operating. Excessively high temperatures cause faster ageing of the internal components and shorten the fault-free time of unit operation.

In cases where the unit gets dirty do not clean with solvents. For cleaning use warm water with small amount of detergent or in the case of more significant contamination ethyl or isopropyl alcohol.

⚠ Using any other agents can cause permanent damage to the housing.

☒ Product marked with this symbol should not be placed in municipal waste. Please check local regulations for disposal and electronic products.

5. PREPARATION OF THE UNIT TO WORK

ⓘ Before the first connection of **Converter USB/RS-485** to RS-485 line, host drivers should be prior installed. Drivers are delivered to the user on installation CD. User should download device drivers from producer website.

5.1. INSTALLATION OF DEVICE DRIVERS

To install device driver user should follow the instructions bellow:

1) Connect USB B-type plug to unit's USB socket
2) Connect USB A-type plug to PC USB socket.
   After connection, computer detect new device and will start **Found New Hardware Wizard** (Figure 5.1).

Figure 5.1 Detection of new device (Windows XP)

3) After **Found New Hardware Wizard** run, user should follow the instructions given on particular screens.
   To select the directory of driver's files check **Install from a list or specific location** (Figure 5.1) and point it using **[Browse]** button (Figure 5.2). The directory where the drivers has been downloaded from producer website should be pointed.
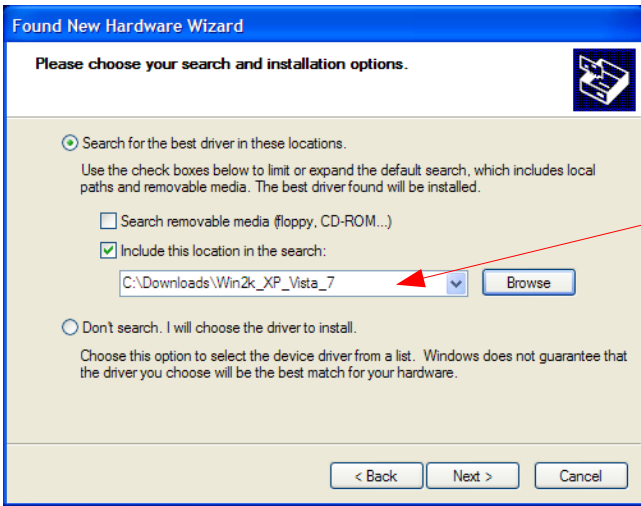
device driver directory example

Figure 5.2 Device driver directory (Windows XP)

After proper installation appropriate information will be displayed (Figure 5.3) and LED „**ON**" of converter module will light. This led signalises proper installation.

For **Windows 2000** operation system (after restart) and **Windows XP** the point 3 should be repeated. After that LED „**ON**" will signalising the ready to use.
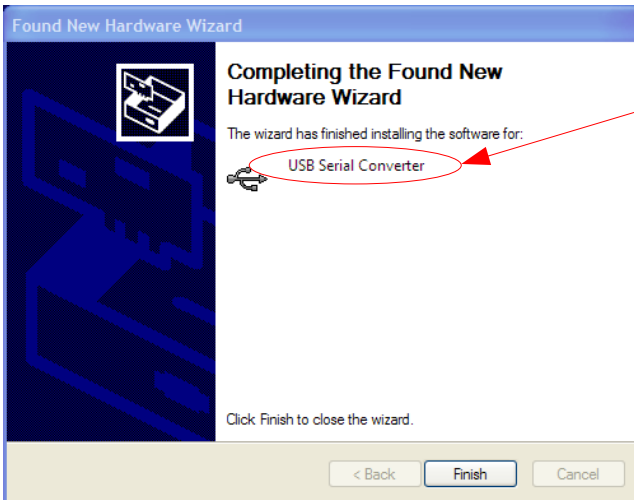
properly identified device

Figure 5.3 The Finish screen of device driver installation process (Windows XP)

5.2. SERIAL PORT CONFIGURATION

Installed device will be detected as additional COM port. (Figure 5.4). The parameters of this port can be changed. Both transmission parameters and port number can be changed. User can do this using **Device manager** (Figure 5.5, 5.6).
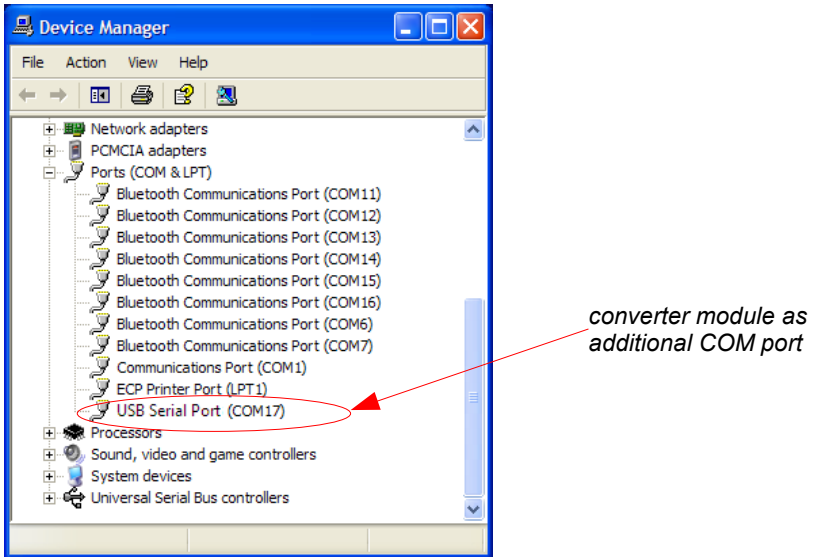

converter module as additional COM port

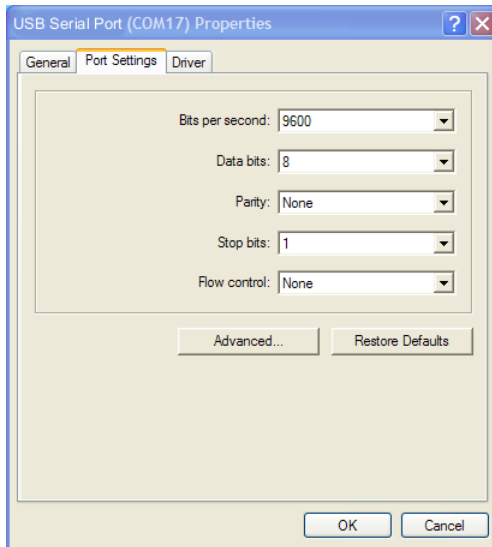*Figure 5.4 Identification of the device as additional COM port (Windows XP)*

Figure 5.5 Properties of detected port can be changed (Windows XP)

Basic parameters except the baud rate, are available in main tab of **Port Settings** (Figure 5.5), and these settings does not matter.

The serial port parameters are usually available in application using these ports, and can be set independently of system settings.

Maximal permissible baud rate of **Converter USB/RS-485** equals 115200 bit/sec., and this value must be fixed in detected COM port settings

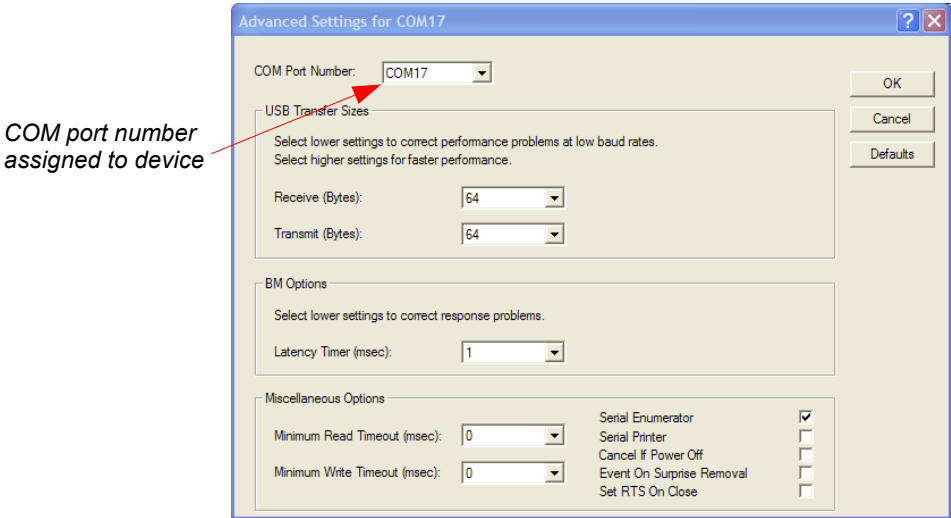COM port number can be changed in **Advanced Port Settings** panel (Figure 5.6).

*Figure 5.6 Changing of **COM Port Number** (Windows XP)*

All parameters available by **Advanced Settings** panel, except of **COM Port Number**, should be unaffected. All modifications of these parameters can be made on risk of the user.

5.3. REMOVING OF DEVICE DRIVERS

Removing of **Converter USB/RS-485** device drivers from operation system should be made if it is essential. Device drivers removing specialised software is available for **Windows 98** and **Windows ME** only. Before driver removing all the units must be disconnected from the host computer (USB cables unplugged). To remove device drivers use „Ftdiunin.exe" from directory created on hard drive after unpacking of drivers downloaded from producer website.

6. EXAMPLE OF THE RS-485 NETWORK CONNECTION

The **Converter USB/RS-485** module is not equipped with internal terminator. If the unit is installed on one end of RS-485 line external terminator must be installed (Figure 6.1).
The RS-485 line should be equipped with terminators on both it's ends(Figure 6.2), RS-485 line can't be branched and longer than 1 km.
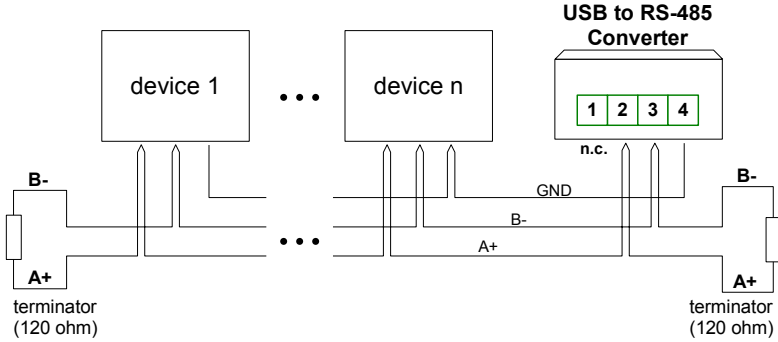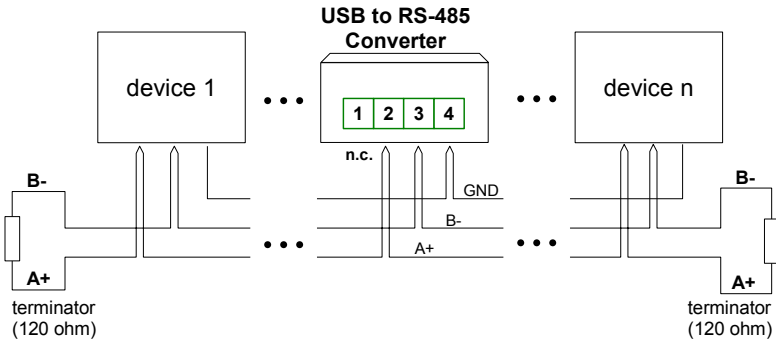

Figure 6.1 Proffered connection method

Figure 6.2 Accepted connection method