



Digital Converter USB-i485



Presentation

USB-i485 Converter is a fast and safe solution to be used as an interface between the computer and the RS485 or RS422 industrial communication buses. By connecting the USB-i485 Converter to a computer USB port, it will be automatically detected and installed as a native COM port, compatible with any serial communication application.

By using USB hubs, multiple converters can be installed. This allows you to easily set up a multi-serial system, without worrying about IRQ or DMA settings.

1500 Vdc galvanic isolation between the USB port and RS485/RS422 protects the computer from tension peaks or possible misconnections in the communication bus.

Features and Specifications

USB-i485 Converter can be configured to connect to RS422 networks, 4-wire RS485 networks (Full Duplex) or 2-wire RS485 networks (Half Duplex). It is possible to connect 2 2-wire RS485 buses to the converter. This allows you to double the number of remote devices that can be installed.

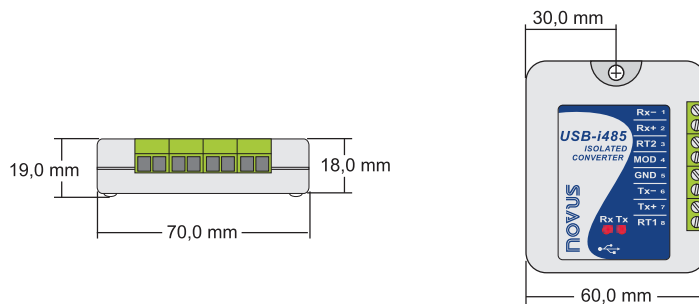
- Automatic flow control for Half Duplex RS485.
- Computer Interface: Plug and Play USB (Compatible with V 1.1 and V 2.0).
- Virtual serial port driver for operating systems: Windows, MAC, and Linux.
- RS485/RS422 selection by jumper.
- Internal 120 Ohms termination resistors enabled by jumper.
- Communication rate: 300 bps to 250 kbps.
- Maximum RS485/RS422 cable length: 1200 m.
- Maximum number of devices on the RS485 network:

- Half Duplex: 2 x 32 devices

- Full Duplex: 32 devices

- LEDs to indicate data transmission and reception.
- Power supply: Through USB bus. Consumption: <100 mA.
- Isolation: 1500 Vdc between USB interface and RS485/RS422 interface.
- RS485/RS422 bus protection: ± 60 Vdc, 15 kV ESD.
- USB Connection: Mini-B connector. Included 1.5 m cable with Mini-B and A plugs.
- RS485/RS422 Connection: Connector for wires up to 1.5 mm² (16 AWG).
- Housing: In ABS with 70 x 60 x 18 mm.
- Operating environment: 0 to 70 °C (32 to 158 °F), 10 to 90 % RH non-condensing.

Dimensions

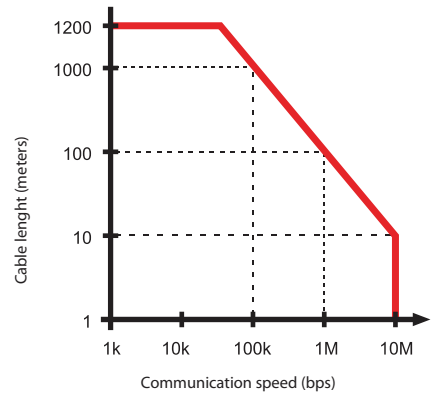


Speed and distance limits

RS422 and RS485 specify a maximum length of 1200 meters for communication cables. The maximum communication speed (in bits per second (bps)) depends on the features of the installed device, the communication cables capacitance, and the installed termination resistors.

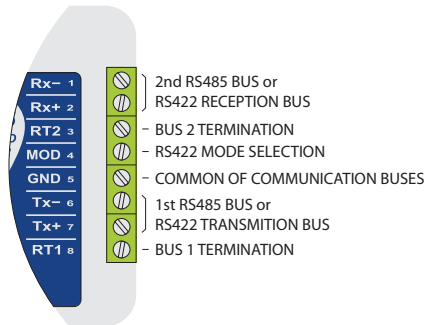
As a general rule, the longer the cables, the lower the communication speed should be. You should not expect communication problems when the difference between the cable length (in meters) and the communication speed (in bits per second) is less than 108 (100,000,000).

The following figure shows the communication speed and maximum cable length. The system performance will vary depending on cable type, terminations, network topology, environment interferences, and the quality of the transmitters and receivers of each device in the network.



Electrical Connections

The device connections are made according to the type of network to be implemented: RS422, 2-wire RS485, or 4-wire RS485. The following figure describes the USB-i485 Converter terminals.



To connect the communication buses between the converter and all network devices, you should use twisted-pair cable and grounded shielding mesh and/or connected to the "Common" terminals of all network devices. The recommended minimum gauge for communication conductors is 24 AWG (0.2 mm²).

RS485 or RS422 devices of different manufacturers and models identify the communication terminals differently. The following table shows the equivalences of the most common terms.

USB-i485 CONVERTER IDENTIFICATION	Rx+ ou Tx+	Rx- ou Tx-
MOST POPULAR IDENTIFICATIONS FOR RS485 AND RS422	D	\bar{D}
	D1	D0
	A	B
	D+	D-

GENERAL GUIDELINES

To ensure voltage balance between the devices, the common terminal (GND pin 5) must be connected to the corresponding terminals of each device. If the common conductor is not installed between all devices, they must be grounded according to the manufacturer's recommendations. In this case, you must ground the common terminal (GND pin 5) of the converter.

The need to use termination resistors depends on the total length of the communication bus and the communication speed used. USB-i485 Converter has an internal termination resistor, which can be connected by including the dotted connection shown in the following figures.

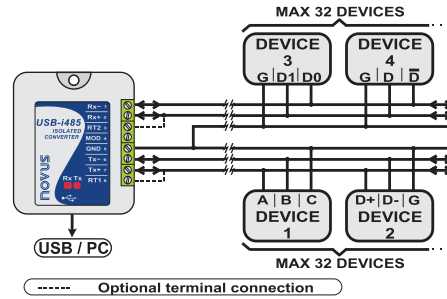
RS485 HALF DUPLEX (2-WIRE)

To operate in this mode, the MOD terminal (pin 4) should be left unconnected.

This is the most popular way to use RS485. A single pair of wires is used to transmit and receive data. Multiple devices are connected in a bus form, as shown in the following figure.

Different RS485 devices use different notations to indicate the correct way to connect the differential communication pair. The following figure shows some of the notations used and the correct way to connect to the converter in each case. You can connect RS485 devices to either of the 2 buses of the converter.

RS485 Half Duplex



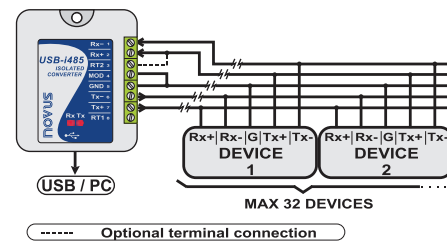
RS485 FULL DUPLEX (4-WIRE)

To operate in this mode, the MOD terminal (pin 4) must be connected to the GND terminal (pin 5).

This connection mode uses two pairs of wires for communication. One pair of wires carries data transmitted in the direction Converter → Network devices (converter transmission pair); the other pair of wires carries data transmitted in the direction Network devices → Converter (converter reception pair).

You can connect multiple devices in a bus form, as shown in the following figure.

RS485 Full Duplex ou RS422



RS422

The already described RS485 Full Duplex (4-wire) connection meets and exceeds the RS422 interface specifications. Use this connection system method to apply the USB-i485 Converter in an RS422 communication system.