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MBnano-10 m-bus converter **M-BUS Series**

Instruction Manual

MBnano-10 is microcontroller-based bidirectional half-duplex **M-bus** to **USB** converter. It can supply power to maximum of 10 m-bus slave devices. **MBnano-10** is used in building and industrial tax meters and/or sensors remote reading small networks. It is also very useful as a handy test device for system integrators and technicians to set and test single devices. Device has output short circuit protection and complies to all m-bus standard requirements.

1. General technical data

- max. number of m-bus slave devices	– 10
- max. output current	– 50 mA
- output current protection level	– > 50 mA
- nominal output voltage (mark)	– 24 VDC ± 1 V
- zero output voltage '0' (space)	– 10-12 VDC
- power supply voltage	– via USB
- max. power consumption	< 0.4 W
- ambient temperature, operating	- -20÷+50 °C
- ambient temperature, storage	- -50÷+90 °C
- air humidity	- 40÷90 %
- dimensions (H/W/D)	– 85/35/21 mm (with plugs)
- IP protection class	– IP20
- max. transmissible signal baud rate	– 9600 bps
- max. distance between master and slave in the network	– 100 m (cable 2x0.75mm^2)
- display	– 3 LEDs (ON, COMmunication, OUTput)
- weight	– 65 g

2. MBnano-10 operation

MBnano-10 begins operation immediately after power-up through USB port. Device is equipped with USB type B plug. Each **MBnano-10** is delivered with USB A-to-B cable in order device to be connected to PC or laptop/notebook. In order device to work correctly, user should install appropriate FTDI drivers, since **MBnano-10** uses FTDI based *USB-to-RS-232* chip.

The sequence after power ON is the following:

Initialization mode *(0.2-0.3 s)*

- In the first 0.2-0.3s the MBnano-10 initializes. During initialization the output is shut down and therefore output voltage is 0 V. Only led *"ON"* is lid
- Then the output is enabled and the network current consumption is measured. LED *"OUT"* (output enabled/TX) is turned on. On short circuit or overload at all the output is shut down, LED *"OUT"* is turned off. Then **MBnano-10** waits for some seconds before attempting to power the network again. If the attempt is unsuccessful (i.e. the short circuit is still present) the whole sequence is repeated again.

Normal operation

MBnano-10 measures the current consumption of the network. After the consumption exceeds 50mA m-bus output is stopped, LED *"OUT"* is respectively turned off. **MBnano-10** must be connected to a computer/laptop/notebook through its USB interface. Thus it is possible to access the slave devices in the network. As mentioned above, USB drivers should be installed - appropriate FTDI drivers. User can get them from FTDI website or contact us. When drivers are installed user will get virtual RS-232 port through which communication with **MBnano-10** is drive by. The device, connected to the USB port of **MBnano-10** can access every slave device in m-bus network, can issue commands and collect data. The data is transmitted without any delay. When transmitting data to the network, the *"COM"* LED blinks. Communication is half-duplex.

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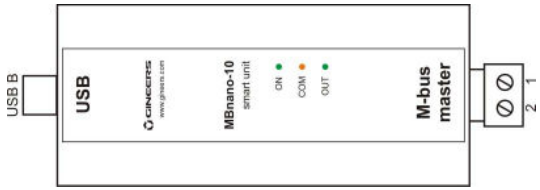
3. Mounting and electrical connections

MBnano-10 is designed to be used mainly by developers, testers and technicians as a setting/testing tool. It is not suitable for wall or industrial enclosure mounting. All connections should be made with isolated multi-wire cables with cross section 0.5mm^2÷2.5mm^2. All the connections are shown in the figure and the tables below:

'M-bus' terminal block

No	Description
1	M-bus output, +
2	M-bus output, -



'USB' – USB, type B

4. Warranty

The warranty of the device is limited to 2 years from the date of sale. If the device shows any defect or malfunctions during that period, the manufacturer is obligated to repair the device in its own service for manufacturer's expense, or, if the repair is impossible, to replace the device with new one. The transportation costs to the manufacturer's service are due to the client. The warranty voids if this manual' instructions are not met, warranty seals are removed or the device was opened by unauthorized by the manufacturer personnel.

Serial number:..... Date of sale:.....

Signature:.....

5. The package contains

- MBnano-10 - 1 pc.
- Instruction manual - 1 pc.
- USB data cable 1m (A to B) – 1 pc.

6. Manufacturer

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