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M-BUS converter **MBU-250** **M-BUS Series**

Instruction Manual

MBU-250 is microcontroller-based bidirectional **M-bus** supply converter. It has several input interfaces and one **main Output** interface which can supply maximum of 250 standard m-bus slaves (1.5mA load). Communication interfaces are RS-232, RS-485, USB and m-bus input. MBU-250 is used in building and industrial tax meters and/or sensors remote reading networks. It has output short circuit protection and is mounted on standard M36 DIN rail.

1. General technical data

- max. number of m-bus slave devices	– 250
- max. output current	– 385 ± 5 mA
- output current protection level	– 410 ± 5 mA
- nominal output voltage (mark)	– 35.5 VDC ± 1 V
- zero output voltage '0' (space)	– 22-25 VDC
- power supply voltage	– 165-235 VAC (210-270 VDC)
- max. power consumption	< 21 W (@ 250 m-bus slaves connected)
- input interfaces	- RS-232, RS-485, USB, m-bus input
- ambient temperature, operating	- -20÷+50 °C
- ambient temperature, storage	- -50÷+90 °C
- air humidity	- 40÷90 %
- dimensions (H/W/D)	– 105/130/71 mm
- IP protection class	– IP20
- max. transmissible signal baud rate (m-bus)	– 9600 bps
- max. distance between master and slave in the network	– 600 m
- display	– 6 LEDs (on, protection, communication, overload, collision, out)
- weight	– 285 g

2. MBU-250 operation

MBU-250 begins operation immediately after power-up. The sequence is the following:

Initialization mode *(0.2-0.3 s)*

- In the first 0.2-0.3s the MBU-250 initializes. During initialization the output is shut down and therefore output voltage is 0 V. LEDs 'on' (turned on) and 'prot" (protection) are turned on.
- Then the output is enabled and the network current consumption is measured. The 'prot' LED goes out, LEDs 'out' (output enabled) and 'com' (communication) are turned on. On short circuit the output is shut down, LED 'prot' is turned on and LEDs 'out' and 'com' are turned off. Then MBU-250 waits for 1.5 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. It is possible LED 'coll' to be lit for few minutes after start

Normal operation

MBU-250 measures constantly the current consumption of the network. If the consumption exceeds 385mA, the 'ovr' (overload) LED is turned on, in some cases led 'coll'. If the consumption further increases and exceeds 410mA the output is disabled until current consumption level is restored to normal levels. MBU-250 can be connected to a computer (or other device such as modem, transceiver, etc.) through its input serial interfaces - RS-232C, RS-485 or USB. To use the USB port one needs FTDI drivers. Then it is possible to access/read slave devices in the network. The device, connected to the serial port of MBU-250 can access every slave device in the network, can issue commands and collect data. MBU-250 is transparent and data is transmitted without any delay. When transmitting or receiving data from the network, the 'com' LED blinks. Full-duplex communication is possible, but usually that is not the case in m-bus networks, because its kind of "master-slave" structure. When collision is detected (simultaneous transmission of more than one slave device in the network), the 'coll' (collision) LED is turned on. However, the data is sent through the serial port, because reading device should know if there is collision (for instance if its performing *Secondary search*). There are cases, when many devices can respond simultaneously. Then m-bus load can become very high and go over permitted level. In this case MBU-250 will shut down m-bus output for 1.5 seconds. This should be taken in mind from software point of view.

MBU-250 can also serve as an m-bus repeater in larger networks. All have to be done is to physically connect the device as a slave in the existing network - i.e. use input "m-bus input". Then everything received on m-bus input will go on m-bus output and vice versa.

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3. Mounting and electrical connections

MBU-250 should be mounted on standard M36 din-rail. All connections should be made with isolated multi-wire cables with cross section 0.5mm^2÷2.5mm^2. Mounting should be done in industrial enclosure with high IP class. All the connections are shown in the figure and the tables below:

C1 'Power' – 3P terminal block

No	Description
1, 3	Power input **L**, **N**
2	Power Grounding input **PE**

C2 'M-bus out' – 2P terminal block

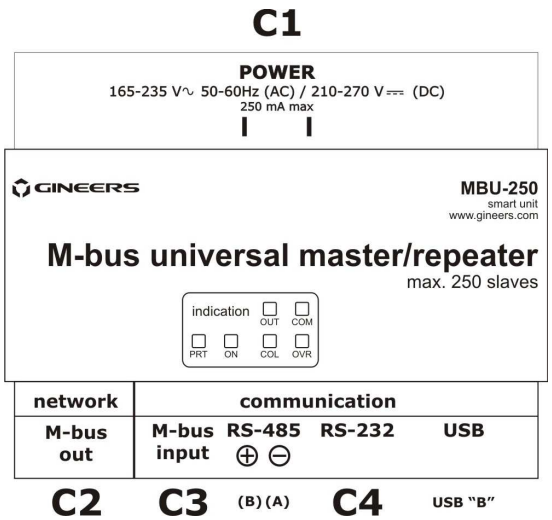
No	Description
1	M-bus output, +
2	M-bus output, -

C3 'M-bus in' – 2P terminal block

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

C4 'RS-232C' – RJ-11

No	Description
2	RXD
3	TXD
4	GND



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

- MBU-250 - 1 pc.
- Instruction manual - 1 pc.
- Data cable (DB9F to RJ-11) 1 m – 1 pc.