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M-Bus to Modbus converter **MMCR-64** **M-BUS Series**

Instruction Manual

MMCR-64 is microcontroller-based bidirectional **M-bus Master** to **Modbus RS-485 RTU and/or Modbus TCP** converter. It can supply power to maximum of 64 m-bus slave devices. MMCR-64 is used as a bridge in building and industrial networks where it is needed to read m-bus devices (tax meters and/or sensors) in Modbus based SCADA systems. It has output short circuit protection on m-bus side. It is mounted on standard M36 DIN rail.

1. General technical data

- max. number of m-bus slave devices – 64
- max. output current – 110 ± 5 mA
- output current protection level – 130 ± 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 < 9 W (@ 64 m-bus slaves connected)
- ambient temperature, operating - -20÷+50 °C
- ambient temperature, storage - -50÷+90 °C
- air humidity - 40÷90 %
- dimensions (H/W/D) – 105/107/74 mm
- IP protection class – IP20
- max. transmissible signal (m-bus) baud rate – 4800 bps
- RS-485 RTU Modbus interface baud rate – 300, 1.2k, 2.4k, 4.8k, 9.6k, 19.2k, 38.4k bps
- TCP Modbus DHCP – yes, can be turned on or off
- m-bus cable length, max. – 600 m
- distance between MMCR and farthest m-bus slave - 300 m
- display - 6 LEDs (on, protection, over, collision, out, RX)
- weight – 520 g

2. MMCR-64 operation

MMCR-64 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 MMCR-64 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, LED 'out' (output enabled) is turned on. On short circuit the output is shut down, LED 'prot' is turned on. Then MMCR-64 waits for some seconds before attempting to power the m-bus 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 a minute after start.

Normal operation

In normal mode MMCR-64 waits pre-defined period of time and then reads all connected m-bus devices. Each activated device has a 24-register map, which is updated on every read. In order to function properly, the m-bus slave devices that MMCR-64 should read must be activated first. This can be achieved in several ways – automatic or manually.

Prior to activation of any device in the memory of MMCR, all the devices in the m-bus network should be programmed. They should be set with proper primary address, medium and value fields. Then MMCR can detect automatically all devices in the network (via their primary address) and activate them in its memory. Anyway, it could take a bit of time, so there is an option to activate the m-bus devices one by one. The user can deactivate any of the activated devices. A maximum of 64 devices can be activated on one MMCR-64, so if the m-bus network is larger (consists of more than 64 devices), several MMCR-64 would be needed. After activation of the devices the user can issue the command to MMCR-64 to sort the device table, so the devices can be sorted by their respective primary address. When

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activating m-bus devices the m-bus automatic readout must be disabled to avoid false reads, and when all the devices are activated and sorted, the user can enable automatic readout of the m-bus network. This automatic readout timeout is run-time programmable (via the modbus registers), so the network can be scanned from 1s (continuous scan) to 43200s (12h – twice a day). There are also more programmable parameters for m-bus and modbus, for more information see "MMCR-64 MODBUS REGISTER MAP" or download service software from our site.

3. Mounting and electrical connections

MMCR-64 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

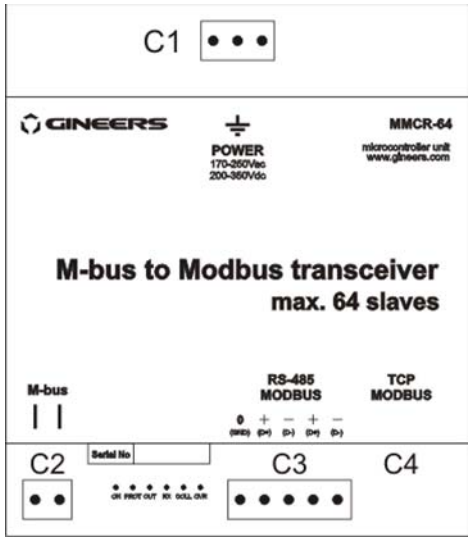
No	Description
1, 3	Power input **L**, **N**
2	Power Grounding input **PE**

C2 'M-bus' – 2P terminal block

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

C3 'RS-232C' – RJ-45

No	Description
2,4	RS-485 "+" (D+)
3,5	RS-485 "-" (D-)
1	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

- MMCR-64 - 1 pcs.
- Instruction manual - 1 pcs.

6. Manufacturer

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