

- **GET CONN** – returns current firmware version, LAN/WAN network parameters (MAC-address, IP-address, gateway address, network mask, connection retries and the time between two retries) and remote reading network parameters (baud rate, parity, message timeout).
- **GET MEDx** – returns allowed mediums for data operator x, x=1-4. The mediums can be programmed only remotely by control operator.

3. Electrical connections

All the connectors of MBET-3 are terminal blocks:

- C1 – Power supply (150 - 250 VAC)
- C2 – RS-485 (+, - and "0")
- C3 – RS-232 (Rx, Tx, GND)
- C4 – Ethernet 10/100, RJ-45 plug

4. Warranty

The warranty of the device is limited to 3 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's instructions are not met, warranty seals are removed or the device was opened by unauthorized by the manufacturer personnel.

Serial number:.....

Date of sale:.....

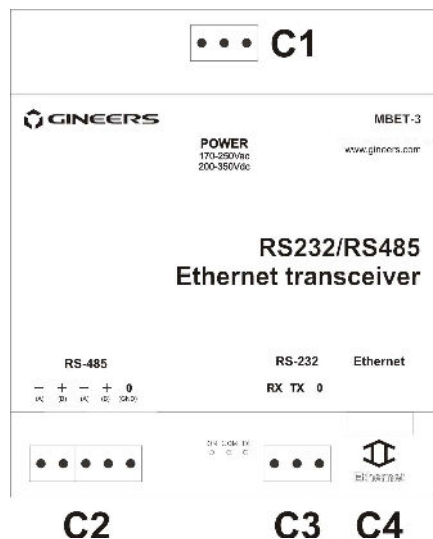
Signature:.....

5. The package contains

- MBET-3 - 1 pc.
- Instruction manual - 1 pc.
- LAN Data cable RJ45 straight 1-3 m – 1 pc.

6. Manufacturer

Gineers Ltd.
7 "Iskarsko shausse" blvd, TCE, building 2
1528 Sofia, Bulgaria
tel./fax (+359-2) 9758105
URL: <http://www.gineers.com>
e-mail: office@gineers.com



Ethernet/Internet modem **MBET-3**

M-BUS Series

Instruction manual

MBET-3 is an internet/ LAN data transceiver for use in remote reading systems, mostly **m-bus**. It has one RS-232C/RS-485 interface for connection to the network master converter (like MBRS-xx) and for initial programming. The other interface is 10/100 Mbit TCP/IP. Intended for 230Vac and DIN-rail mounting.

1. General technical data

- | | |
|--|---|
| - connection protocol | - TCP/IP |
| - connection speed | - 10/100 Mbit |
| - power supply | - 150-250 VAC |
| - max. power consumption @ 12Vdc | - <1W |
| - serial port baud rate | - 300/1.2k/2.4k/4.8k/9.6k/19.2k/38.4k/115.2 bps |
| - ambient temperature, operating | - -20÷+50 °C |
| - ambient temperature, storage | - -50÷+90 °C |
| - air humidity, operating & storage | - 40÷90 % |
| - dimensions (L/W/H) | - 100/55/30 mm |
| - protection class | - IP30 |
| - 3 LEDs (on, comm /local communication/, TX /remote communication/) | |
| - weight | - 320 g |

2. MBET-3 operation

MBET-3 begins operation immediately after power-up. After initialization (about 2s), MBET-3 enters "Command mode"/ checks for connection time, if device is set as remote client. The connection with servers can be initiated by MBET-3 (acts as a client) or from external network (MBET-3 acts as a server). The mode of MBET-3 is configured with service command through RS-232/RS-485 interface. All of the contacted servers/clients must have static real IP-addresses in order for MBET-3 to be able to connect to them (or proper routing must be done by system administrator). MBET-3 can contact up to six servers/clients – two "control" operators and four "data" operators. The two control servers/clients can program all network access settings and have no access to the transmitted data. Otherwise, the data operators can access only the data, but cannot program any network parameters. If it is needed for an operator to have access both to the network settings and the data, its IP-address must be set both as control and data operator. Accessible mediums for every data operator may be programmed, so, for example, the operator which monitors water consumption, cannot access the data, monitored by gas supplier and vice-versa.

If device is set as client, MBET-3 tries to connect to the remote servers after predetermined period of time (default 1h). Each of the servers can accept or reject the incoming connection. If the connection is accepted, MBET-3 starts with identification data packet to identify the remote reading network, connected to this particular MBET-3. After identifying the network the server can reprogram network parameters (for control operators) or access network data (data operators). After reprogramming the parameters or gathering the data, the server sends packet for closing the connection. After receiving this packet, MBET-3 closes the connection and tries to connect to the next server in the list until all the servers in the list are contacted. Then MBET-3 waits for predetermined period of time before attempting to connect again to the first server in the list.

If the connection is accepted by the server, but then there is no communication for predefined period of time (default 300s), MBET-3 drops the connection and goes to the next server in the list.

If the device is set as server, it just waits for remote connections on specific local port. By default port is set 59615 (a free port). When connection request arrives, MBET-3 checks its internal list of IP addresses for allowed operators and decides to accept or reject the connection. If there is no communication with the remote client for predefined period of time (default 300s), MBET-3 closes the connection. If one of IP addresses is set 0.0.0.0 - then MBET-3 accepts connections from anywhere and does not check the incoming request IP address.

Initial parameters programming is essential and includes setting the LAN/WAN-network parameters (IP-address, gateway IP-address, network mask, IP-address of the control server, etc, including setting new MAC-address if MAC-conflict occurs) and remote reading network parameters (baud rate and parity of serial connection, remote reading network number). These parameters must be set first, and after successful connection all the parameters can be set remotely by the server.

Direct programming of the parameters can be done with simple terminal program (like GiCom) or by special software. When using terminal program, the parameters are set as follows: each line starts with the keyword "SET", then space, then parameter code, "=" sign, value of the parameter. Like this:

SET IPV4=192.168.1.20 sets local MBET-3 IP-address to 192.168.1.20

After parameter value there should not be any additional characters (like CR, LF, etc.), the string should be send to the MBET-3 directly. MBET-3 responds to every command with either success or error.

The direct programmable parameters are these:

#	Des.	Description	Default value	Value range	Note
1	IPV4	MBET-2's IP-address	255.255.255.255	0.0.0.0-255.255.255.255	A "must" parameter, can be programmed by control operator
2	GATE	Gateway's IP-address	255.255.255.255	0.0.0.0-255.255.255.255	A "must" parameter
3	MASK	Network Mask	255.255.255.255	0.0.0.0-255.255.255.255	A "must" parameter
4	NETN	Remote reading network number	255.255.255.255	0.0.0.0-255.255.255.255	A "must" parameter
5	MACA	Sets new MBET-2's MAC-address (xx - depends on MBET-2 serial number)	02.08.DC.xx.xx.xx	00:00:00:00:00:00-FF:FF:FF:FF:FF:FF	Should be set only if there is MAC-conflict in the network as each MBET-2 MAC is unique
6	IPMA	First control operator (manufacturer) IP-address	Manufacturer designated IP-address	0.0.0.0-255.255.255.255	Can be reprogrammed
7	IPCO	Second control operator IP-address	255.255.255.255	0.0.0.0-255.255.255.255	A "must" parameter
8	IPOx	Data operator x IP-address (x=1-4)	255.255.255.255	0.0.0.0-255.255.255.255	A "must" for at least one operator
9	COM2	Serial port parameters (baud rate, parity)	2,0 (2400bps, even)	0-6,0-2 (300bps-38.4kbps, even/odd/none)	
10	DATE	Current date (dd,mm,yy)	01/01/10	01/01/00-31/12/99	
11	TIME	Current time (hh,mm)	00,00	00,00-23,59	
12	PITO	Time between two consecutive connection attempts	01	01-48	Two digits must be set (01 instead of 1)
13	NETO	Remote reading network message timeout, in 0.1s	20 (2.0s)	03-25 (0.3-2.5s)	Two digits must be set (07 instead of 7)
14	INTO	Server inactivity timeout, in x10s	30 (300s)	01-60 (10-300s)	Two digits must be set (02 instead of 2)
15	RETN	Server connection retries	03	01-16	Two digits must be set (05 instead of 5)
16	RETI	Time between two consecutive retries, in 0.1s	0.5s	01-50 (0.1-5s)	Two digits must be set (03 instead of 3)
17	DUED	Set due-date (dd,hh,mm)	inactive	01,00,00-31,23,59	
18	SERV	Set Client or Server mode	1 (server)	0/1	0 = Client, 1 = Server

19	DHCP	Sets ON or OFF DHCP	0 (Off)	0/1	0 = DHCP Off, 1 = DHCP ON
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The command and parameters are upper or lower case, with no preceding or trailing characters like space, CR, LF, etc.

The steps of initial programming are the following:

- Power-up MBET-3 and connect it to the PC/laptop's serial port
- Set all basic network parameters (if DHCP is OFF)
 - IP-address **/IPV4**
 - Gateway address. **/GATE**
 - Network mask. **/MASK**
 - If there is MAC-conflict, set new MAC-address. **/MACA**
- Remote reading network number. This setting is essential as this is the only way the server can identify the network to read. **/NETN**
- COM port settings for remote reading network (baud rate and parity) – only if different from defaults. **/COM2**
- Network message timeout – if there is no response from the network after MBET-3 has issued command, MBET-3 responds to the server with timeout error. **/NETO**
- Set IP-addresses of control and data operators. At least one control operator IP-address must be set in order to gain remote control of the network. All operator IP-addresses can be set remotely by control operator. **/IPMA, IPCO, IPO1-IPO4. If you want access from anywhere - set 0.0.0.0 (default for Control Operator and Data OP1)**
- other parameters
 - Current date and time set. These are lost at power interruption. **/DATE, TIME**
 - Time between two connections, in hours (1-48, default 1h). **/PITO**
 - Due date set. At due-date MBET-3 connects only to the data operators. Set day, hour, minute. **/DUED**
 - Set max. number or connection retries and the time between two retries. **/RETN, RETI**
 - Server inactivity timeout. MBET-3 drops connection after expiration of this timeout without server activity. **/INTO**

The parameters can be reprogrammed remotely by control operator. Allowed mediums for all the four data operators can be programmed only remotely by control operator. All mediums are allowed for all data operators by default.

Current settings can be checked locally by issuing command "GET", space, parameter code. Parameter codes are: MAIN, SERV, CONN, MEDx (x=1-4).

- **GET MAIN** – returns current firmware version, current date & time, MBET-3's ID-number, network number, working time after power-up or power interruption in days
- **GET SERV** – returns current firmware version, all operators IP-addresses, predefined server connection time and the time remaining to the next connection attempt