

## M-BUS pulse counter **MBSS-2/4/6/8**

### USER MANUAL

MBSS-2/4/6/8 is microcontroller pulse counters with m-bus interface. Their purpose is to connect in m-bus network devices, which do not have m-bus (usually water- and heat- meters with pulse output). MBSS-2/4/6/8 has embedded real time clock, but no display and keyboard are provided. They can track up to four different tariffs. Mounted on a standard M36 DIN-rail.



#### 1. Main technical parameters

- number of pulse inputs – 2/4/6/8
- allowable net voltage – 12-42 VDC
- nominal power consumption – 2mA (1.33 standard m-bus loads)
- display – none
- keyboard – none
- max input frequency – 5-100 Hz programmable, 10Hz default
- max cable length – 25 m twisted pair (depends on cable)
- max resistance of closed switch – 1 k $\Omega$
- min resistance of open switch – 1000 k $\Omega$
- storage temperature – -50 ÷ +90 °C
- humidity – 40 ÷ 90 %
- dimensions (H/W/D)
  - MBSS-6/8 – 75/70/105 mm
  - MBSS-2/4 – 75/45/105mm
- baud rate – 300/2400/4800bps  
Odd/Even/None parity  
1 stop bit
  
- own weight – 125 g
- embedded battery – LiMnO<sub>2</sub> 60mAh (~7 days)
- additional battery (optional) – Li 1450mAh (~200 days)
- m-bus default data parameters – 2400bps, 8-O-1

#### 2. Turning on MBSS

Devices of type MBSS are turned on automatically after m-bus voltage is up and running or when putting standard/additional battery (if the device is not locked). Date is set to 01.01.2000r., time - 00:00h, pulses storage and tariff information are zeroed. Device enters normal mode of operation and starts to count any pulses on all of its inputs. Setup can be made through m-bus network using some kind of m-bus software (if the device is not locked). Some of the settings are manufacturer specific. Primary network address of any MBSS can be set by two ways – special DIP-switches on board or through m-bus commands, keeping in mind that the first address change through the m-bus network locks DIP-switch change further on.

##### ***Setting primary network address of MBSS***

Primary network address is unique number from 1 to 250 for every device in m-bus network. This address is the parameter, telling central collecting point how to connect with this particular device. Because MBSS has several pulse inputs (max 8) every pulse input is threat like separate device in the network. This means that if the

user changes network address he in fact changes the address of the first pulse input, others are set automatically by the MBSS. Initial primary address is set by the DIP switches inside MBSS. They can be accessed after removing upper side of the box. Total number of DIP switches are 8, every switch represents binary bit, from left to right (1 byte – i.e. decimal 255 max). Turning some DIP switch ON sets this bit to logical '1'. User must have in mind that addresses greater than 250 have special purpose in m-bus protocol, so this must not be done when setting new address. This setting represents primary network address of the first pulse input, others are incremented automatically.

The process is illustrated with the figure on the right.

After locking a device (through m-bus network command) further setting of primary address is forbidden regardless of DIP switch positions. The device will work with the address, set before locking it.

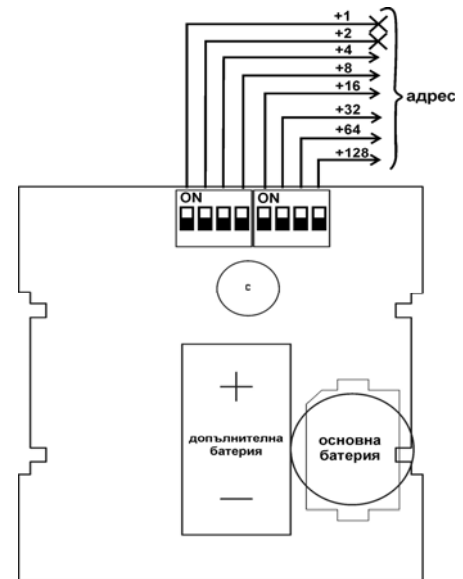


Fig. 1. Board view

### Turning OFF MBSS

Turning OFF MBSS device makes it work in mode of minimal consumption, without counting input pulses. This mode is useful when transporting device or when the device is mounted, but m-bus network is not turned on yet. Turning OFF is made with long thin object (like needle) through a small hole in the front panel of MBSS, like shown in the figure.

After locking the device turning OFF is no longer available.

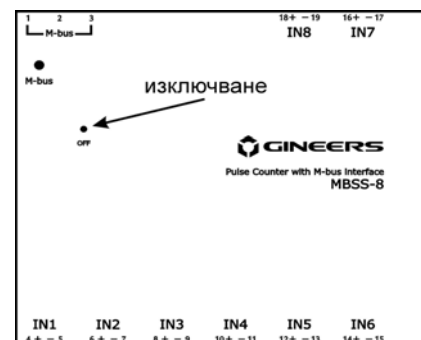


Fig.2. Front panel view

### 3. Mounting and wiring

MBSS can be mounted either on standard M36 DIN-rail or on a wall. All connections should be made with isolated wires 0.25mm<sup>2</sup>-2.5mm<sup>2</sup>. Wiring is shown on Figure 2 and is as follows:

No. TB	Description
1, 3	m-bus
2	Not used
4+, 5-	Non-potential pulse input 1 (NC, if not used)
6+, 7-	Non-potential pulse input 2 (NC, if not used)
8+, 9-	Non-potential pulse input 3 (NC, if not used)
10+, 11-	Non-potential pulse input 4 (NC, if not used)
12+, 13-	Non-potential pulse input 5 (NC, if not used)
14+, 15-	Non-potential pulse input 6 (NC, if not used)
16+, 17-	Non-potential pulse input 7 (NC, if not used)
18+, 19-	Non-potential pulse input 8 (NC, if not used)

### 4. Putting MBSS in exploitation

- step 1: MBSS must be unpacked and opened. If the battery (batteries) is (are) not mounted, first thing to do is to place battery in its working position (shown on Fig.1.). After that MBSS must be turned OFF like described in previous paragraph
- step 2: set desired primary network address – either with DIP-switches or with “MBConfig” software (available for free download on our website)

- step 3: mount MBSS mechanically
- step 4: connect pulse cables to pulse inputs of MBSS
- step 5: connect m-bus cable
- step 6: after all m-bus network is ready and m-bus master is turned on, parameters of every MBSS must be programmed separately. This includes:
  - communication parameters changes (if needed)
  - ID number change – secondary addressing (if needed)
  - Setting exact time and date
  - Setting type of pulse device for every pulse input (water, heat, energy, gas, etc.)
  - Setting pulse unit, constant and pulse length, if needed
  - Setting tariffs (up to four different time tariffs)
  - Locking the device after all programming and setting is done

Now the system is ready for normal work.

Battery life is at least five years from date of turning on the device. Normally it will last longer. Anyway, we recommend replacing battery (batteries) every 5 years.

**IMPORTANT:** After locking the device user can not change any more primary network address with DIP-switches. Also, he can't turn OFF the device or change important parameters of MBSS. All this is made for security reasons, to make sure no one can manipulate the device.

## 5. Pulse inputs and pulse counting

MBSS can have from 2 to 8 independent pulse inputs for counting external pulses. Every input must be taken in mind as independent device with own parameters and network address. For every pulse input user can program type and value of measured quantity, cost and time interval for up to four different tariffs. Pulses are accumulated in five memory areas – one for total pulses for each input and four for total pulses for each tariff on every pulse input. Accumulated pulses can only be read – no one can write or change pulse count, neither total pulses nor tariff pulses.

Maximal frequency of input pulses is programmable from 5Hz to 100Hz. If pulses are with greater frequency it is likely counting to be incorrect (usually less counted pulses than real one).

Pulses usually come from non-potential contact or optron switch, in most cases reed relay. Minimal resistance of open circuit must be around or greater than 1M $\Omega$ , maximal resistance of closed switch must be less than 1k $\Omega$ , to guarantee correct pulse counting. Distance between contact and MBSS must not exceed 25m (if optron pulse output – about 2m), it is good to use twisted pair for connection cable. If pulse output is optron switch the user must keep in mind the polarity of the signal.

When reaching pulse count of 99999999 every of the counters (including tariff counting) "overloads" and starts to count from 0.

## 6. 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:.....

Sale date:.....

Sign:.....

*(if no date of sale, date sale becomes production date, coded in device serial number. If no serial number – no warranty)*

**7. The package contains**

- MBSS - 1 pcs.
- User manual - 1 pcs.

**8. Manufacturer**

Gineers Ltd.  
18 Kliment Ohridski blvd, office 613  
1756 Sofia, Bulgaria  
phone/fax: +359 2 975 81 05  
URL: <http://www.gineers.com>  
mailto: [office@gineers.com](mailto:office@gineers.com)