

# Modbus TCP/IP slave variables v2

BM-GW as a Modbus TCP/IP slave (server).

## UPS

**ui = UPS index (1-32)**

| var         | Unit ID | address | type | scale | description                                                                             |
|-------------|---------|---------|------|-------|-----------------------------------------------------------------------------------------|
| ups_status  | ui      | 0       | int  | -     | UPS status (0 = disabled, 1 = OK (all strings OK), 2 = ERR (at least one string error)) |
| ups_voltage |         | 1,2     | long | 0.01  | UPS voltage (average of strings voltages) [0.01 V]                                      |
| ups_current |         | 3,4     | long | 0.01  | UPS current (sum of string currents) [0.01 A]; + = charge, - = discharge                |
| ups_soc     |         | 5       | int  | 1     | UPS state of charge (average of strings SOC) [%]                                        |

# Strings

**si = string index (1-32)**

| var                        | unit ID     | address | type | scale | description                                                                                                                                |
|----------------------------|-------------|---------|------|-------|--------------------------------------------------------------------------------------------------------------------------------------------|
| string_ups_id              | 100<br>+ si | 0       | int  | -     | UPS id where the string is connected (1..32; 0=not connected/disabled)                                                                     |
| string_status              |             | 1       | int  | -     | String status (0 = disabled, 1 = OK, 2 = Error)                                                                                            |
| string_voltage             |             | 2,3     | long | 0.01  | String voltage [0.01 V]                                                                                                                    |
| string_current             |             | 4,5     | long | 0.01  | String current [0.01 A]; + = charge, - = discharge                                                                                         |
| string_soc                 |             | 6       | int  | 1     | String state of charge [%]                                                                                                                 |
| string_balance             |             | 7       | int  | 0.01  | String balancing state [0.01 %]                                                                                                            |
| string_state               |             | 8       | int  | -     | 0=floating charge, 1=equalizing charge, 2=discharge, 3=idle, 5=abnormal                                                                    |
| string_alarm               |             | 9       | int  | -     | bit coded; b0=current hi (charging), b1=current lo (discharging), b2=voltage hi, b3=voltage lo, b4=SOC lo, b5=SOH lo, b6=hall disconnected |
| string_cell_count          |             | 10      | int  | 1     | Number of string cells                                                                                                                     |
| string_ambient_temperature |             | 11      | int  | 0.1   | String ambient temperature [0.1 °C]                                                                                                        |
| string_ambient_humidity    |             | 12      | int  | 0.1   | String ambient relative humidity [0.1% RH]                                                                                                 |
| string_relay_status        |             | 13      | int  |       | String relay status (0=open, 1=closed)                                                                                                     |
| string_aux_input_status    |             | 14      | int  |       | String auxiliary input status (0=off, 1=on)                                                                                                |

## Cells

**si = string index (1..32); ci = cell index (1..120)**

| var                 | unit ID  | address                   | type | scale | description                                                                                                                    |
|---------------------|----------|---------------------------|------|-------|--------------------------------------------------------------------------------------------------------------------------------|
| cell_status         | 100 + si | $100 * \mathbf{ci} + 0$   | int  | -     | Cell status (0=disabled, 1=OK, 2=error)                                                                                        |
| cell_voltage        |          | $100 * \mathbf{ci} + 1$   | int  | 0.001 | Cell voltage [0.001 V]                                                                                                         |
| cell_resistance     |          | $100 * \mathbf{ci} + 2,3$ | long | 0.001 | Cell resistance [0.001 mΩ]                                                                                                     |
| cell_temperature    |          | $100 * \mathbf{ci} + 4$   | int  | 0.1   | Cell temperature [0.1 °C]                                                                                                      |
| cell_soc            |          | $100 * \mathbf{ci} + 5$   | int  | 1     | Cell state of charge [%]                                                                                                       |
| cell_soh            |          | $100 * \mathbf{ci} + 6$   | int  | 1     | Cell state of health [%]                                                                                                       |
| cell_alarm          |          | $100 * \mathbf{ci} + 7$   | int  | -     | Cell alarm (bit coded):<br>b0=voltage hi,<br>b1=voltage lo,<br>b2=resistance hi,<br>b3=SOC lo, b4=SOH lo,<br>b5=temperature hi |
| cell_remaining_time |          | $100 * \mathbf{ci} + 8$   | int  | 0.1   | Cell remaining time [0.1 h]                                                                                                    |

## Legend

| type        |                                         |
|-------------|-----------------------------------------|
| <b>bit</b>  | 1 bit (0..1)                            |
| <b>int</b>  | 16 bit signed (-32768..32767)           |
| <b>long</b> | 32 bit signed (-2147483648..2147483647) |
| scale       |                                         |
| <b>0.01</b> | 12345 $\Rightarrow$ 123.45              |
| origin      |                                         |
| <b>IC</b>   | Internal calculation                    |
| <b>SS</b>   | String Sensor                           |
| <b>MC</b>   | Master Controller                       |