

# 1. Modbus TCP/IP slave variables v2

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

## 1.1. 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) [%]                                        |

## 1.2. Strings

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

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

## 1.3. Cells

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

| var                 | unit ID     | address           | type | scale | origin |                                             | description                                                                                                                             |
|---------------------|-------------|-------------------|------|-------|--------|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| cell_status         | 100<br>+ si | 100 * ci<br>+ 0   | int  | -     | SS     | modbus.ushort.HR(1300+ci-1)                 | Cell status<br>(0=disabled,<br>1=OK, 2=error)                                                                                           |
| cell_voltage        |             | 100 * ci<br>+ 1   | int  | 0.001 | SS     | modbus.ushort.HR(1600+ci-1)                 | Cell voltage<br>[0.001 V]                                                                                                               |
| cell_resistance     |             | 100 * ci<br>+ 2,3 | long | 0.001 | SS     | modbus.uint.HR(1901+(ci-1)*2,1900+(ci-1)*2) | Cell resistance<br>[0.001 mΩ]                                                                                                           |
| cell_temperature    |             | 100 * ci<br>+ 4   | int  | 0.1   | SS     | modbus.short.HR(2500+ci-1)                  | Cell<br>temperature<br>[0.1 °C]                                                                                                         |
| cell_soc            |             | 100 * ci<br>+ 5   | int  | 1     | SS     | modbus.ushort.HR(2800+ci-1)                 | Cell state of<br>charge [%]                                                                                                             |
| cell_soh            |             | 100 * ci<br>+ 6   | int  | 1     | SS     | modbus.ushort.HR(3100+ci-1)                 | Cell state of<br>health [%]                                                                                                             |
| cell_alarm          |             | 100 * ci<br>+ 7   | int  | -     | SS     | modbus.ushort.HR(3400+ci-1)                 | Cell alarm (bit<br>coded):<br>b0=voltage hi,<br>b1=voltage lo,<br>b2=resistance<br>hi, b3=SOC lo,<br>b4=SOH lo,<br>b5=temperature<br>hi |
| cell_remaining_time |             | 100 * ci<br>+ 8   | int  | 0.1   | SS     | modbus.ushort.HR(3700+ci-1)                 | Cell remaining<br>time [0.1 h]                                                                                                          |

## 1.4. 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 ⇒ 123.45                          |
| origin      |                                         |
| <b>IC</b>   | Internal calculation                    |
| <b>SS</b>   | String Sensor                           |
| <b>MC</b>   | Master Controller                       |