

## GRNbms MK3 Modbus Protocol Version 1.0

### Function Code: 0x01 Read Coils

| Offset (dec) | Description                   | Type | Scale | Range  | Unit |
|--------------|-------------------------------|------|-------|--------|------|
| 0            | Any Warning                   | Bit  | 1     | 0 .. 1 | BOOL |
| 1            | Overcharge current warning    | Bit  | 1     | 0 .. 1 | BOOL |
| 2            | Overdischarge current warning | Bit  | 1     | 0 .. 1 | BOOL |
| 3            | Cell delta warning            | Bit  | 1     | 0 .. 1 | BOOL |
| 4            | Cell overvoltage warning      | Bit  | 1     | 0 .. 1 | BOOL |
| 5            | Cell undervoltage warning     | Bit  | 1     | 0 .. 1 | BOOL |
| 6            | Overtemperature warning       | Bit  | 1     | 0 .. 1 | BOOL |
| 7            | Undertemperature warning      | Bit  | 1     | 0 .. 1 | BOOL |
| 8            | Currentsensor warning         | Bit  | 1     | 0 .. 1 | BOOL |
| 9            | CMU warning                   | Bit  | 1     | 0 .. 1 | BOOL |
| 20           | Any error                     | Bit  | 1     | 0 .. 1 | BOOL |
| 21           | Overcharge current error      | Bit  | 1     | 0 .. 1 | BOOL |
| 22           | Overdischarge current error   | Bit  | 1     | 0 .. 1 | BOOL |
| 23           | Cell delta error              | Bit  | 1     | 0 .. 1 | BOOL |
| 24           | Cell overvoltage error        | Bit  | 1     | 0 .. 1 | BOOL |
| 25           | Cell undervoltage error       | Bit  | 1     | 0 .. 1 | BOOL |
| 26           | Overtemperature error         | Bit  | 1     | 0 .. 1 | BOOL |
| 27           | Undertemperature error        | Bit  | 1     | 0 .. 1 | BOOL |
| 28           | Currentsensor error           | Bit  | 1     | 0 .. 1 | BOOL |
| 29           | CMU error                     | Bit  | 1     | 0 .. 1 | BOOL |
| 40           | Precharge relay state         | Bit  | 1     | 0 .. 1 | BOOL |
| 41           | Main positive relay state     | Bit  | 1     | 0 .. 1 | BOOL |
| 42           | Main negative relay state     | Bit  | 1     | 0 .. 1 | BOOL |
| 50           | 12V AUX Outputs state         | Bit  | 1     | 0 .. 1 | BOOL |
| 51           | 12V CMU Output state          | Bit  | 1     | 0 .. 1 | BOOL |
| 52           | 12V SHUNT Output state        | Bit  | 1     | 0 .. 1 | BOOL |
| 53           | 5V AUX Output state           | Bit  | 1     | 0 .. 1 | BOOL |

### Function Code: 0x03 Read Holding Registers

| Offset (dec) | Description                                                                                    | Type   | Scale | Range             | Unit |
|--------------|------------------------------------------------------------------------------------------------|--------|-------|-------------------|------|
| 0            | SOC                                                                                            | uint16 | 100   | 0,00 .. 100,00    | %    |
| 1            | Pack Voltage ( Calculated )                                                                    | uint16 | 10    | 0,0 .. 6553,5     | V    |
| 2            | Module Count                                                                                   | uint16 | 1     | 0 .. 65535        | pcs  |
| 3            | Total Cell Count                                                                               | uint16 | 1     | 0 .. 65535        | pcs  |
| 4            | Current                                                                                        | int16  | 10    | -3276,8 .. 3276,7 | A    |
| 5            | Load                                                                                           | int16  | 100   | -100,00 .. 100,00 | %    |
| 6            | Total Pack Capacity                                                                            | uint16 | 10    | 0,0 .. 6553,5     | kW   |
| 7            | Supply Voltage                                                                                 | uint16 | 100   | 0,00 .. 24,00     | V    |
| 8            | Isolation status<br>0 = Not Tested, 1 = Hardware error,<br>2 = Testing, 3 = Passed, 4 = Failed | uint16 | 1     | 0 .. 4            | ENUM |
| 10           | Lowest cell voltage                                                                            | uint16 | 1000  | 0,000 .. 65,535   | V    |
| 11           | Lowest cell module ID                                                                          | uint16 | 1     | 0 .. 65535        | ID   |
| 12           | Lowest cell ID                                                                                 | uint16 | 1     | 0 .. 65535        | ID   |

|    |                                |        |      |                   |    |
|----|--------------------------------|--------|------|-------------------|----|
| 13 | Highest cell voltage           | uint16 | 1000 | 0,000 .. 65,535   | V  |
| 14 | Highest cell module ID         | uint16 | 1    | 0 .. 65535        | ID |
| 15 | Highest cell ID                | uint16 | 1    | 0 .. 65535        | ID |
| 16 | Delta                          | uint16 | 1000 | 0,000 .. 65,535   | V  |
| 17 | Target Delta                   | uint16 | 1000 | 0,000 .. 65,535   | V  |
| 20 | Lowest Temperature             | int16  | 10   | -3276,8 .. 3276,7 | °C |
| 21 | Highest Temperature            | int16  | 10   | -3276,8 .. 3276,7 | °C |
| 22 | AVG Temperature                | int16  | 10   | -3276,8 .. 3276,7 | °C |
| 30 | Chargecurrent Limit            | uint16 | 10   | 0,0 .. 6553,5     | A  |
| 31 | Chargecurrent Limit warning    | uint16 | 10   | 0,0 .. 6553,5     | A  |
| 32 | Chargecurrent Limit error      | uint16 | 10   | 0,0 .. 6553,5     | A  |
| 33 | Dischargcurrent Limit          | uint16 | 10   | 0,0 .. 6553,5     | A  |
| 34 | Dischargcurrent Limit warning  | uint16 | 10   | 0,0 .. 6553,5     | A  |
| 35 | Dischargcurrent Limit error    | uint16 | 10   | 0,0 .. 6553,5     | A  |
| 40 | Delta Limit warning            | uint16 | 1000 | 0,000 .. 65,535   | V  |
| 41 | Delta Limit error              | uint16 | 1000 | 0,000 .. 65,535   | V  |
| 42 | Cell Overvoltage Limit warning | uint16 | 1000 | 0,000 .. 65,535   | V  |
| 43 | Cell Overvoltage Limit error   | uint16 | 1000 | 0,000 .. 65,535   | V  |
| 44 | Cell Unervoltage Limit warning | uint16 | 1000 | 0,000 .. 65,535   | V  |
| 45 | Cell Unervoltage Limit error   | uint16 | 1000 | 0,000 .. 65,535   | V  |
| 46 | Overtemperature warning        | int16  | 10   | -3276,8 .. 3276,7 | °C |
| 47 | Overtemperature error          | int16  | 10   | -3276,8 .. 3276,7 | °C |
| 48 | Undertemperature warning       | int16  | 10   | -3276,8 .. 3276,7 | °C |
| 49 | Undertemperature error         | int16  | 10   | -3276,8 .. 3276,7 | °C |

#### Function Code: 0x04 Read Input Registers

| Offset (dec) | Description        | Type   | Scale | Range           | Unit |
|--------------|--------------------|--------|-------|-----------------|------|
| 0:15         | Cell 0 Error       | Bit    | 1     | 0 .. 1          | BOOL |
| 0:14         | Cell 0 Ballancing  | Bit    | 1     | 0 .. 1          | BOOL |
| 0:13-0       | Cell 0 Voltage     | uint14 | 1000  | 0,000 .. 37,777 | V    |
| ....         |                    |        |       |                 |      |
| 23:15        | Cell 23 Error      | Bit    | 1     | 0 .. 1          | BOOL |
| 23:14        | Cell 23 Ballancing | Bit    | 1     | 0 .. 1          | BOOL |
| 23:13-0      | Cell 23 Voltage    | uint14 | 1000  | 0,000 .. 37,777 | V    |
| etc....      |                    |        |       |                 |      |

#### Function Code: 0x05 Write Single Coil

| Offset (dec) | Description               | Type | Scale | Range  | Unit |
|--------------|---------------------------|------|-------|--------|------|
| 0            | Turn Battery on           | Bit  | 1     | 0 .. 1 | BOOL |
| 1            | Shutdown Battery ( Safe ) | Bit  | 1     | 0 .. 1 | BOOL |
| 2            | Emergency OFF             | Bit  | 1     | 0 .. 1 | BOOL |