

# 1 MODBUS Register

## 1 Read Only Register(0X03)

| Register Address | Description                    | Byte number | Sign | Resolution | EXAMPLE                           | scope    |
|------------------|--------------------------------|-------------|------|------------|-----------------------------------|----------|
| 1                | PV module power (W)            | 2           | yes  | 1W         | 100 (Register value)<br>mean 100W | 0-8000 W |
| 2                | Discharge power of Battery (W) | 2           | yes  | 1W         | 100 mean<br>100W                  | 0-8000 W |
| 3                | Charge power of Battery (W)    | 2           | yes  | 1W         | 100 mean<br>100W                  | 0-8000 W |
| 4                | power Obtain from GRID (W)     | 2           | yes  | 1W         | 100 mean<br>100W                  | 0-43600W |
| 5                | power feed to GRID (W)         | 2           | yes  | 1W         | 100 mean<br>100W                  | 0-8000 W |
| 6                | power of LOAD (W)              | 2           | yes  | 1W         | 100 mean<br>100W                  | 0-43600W |
| 7                | Voltage of PV (V)              | 2           | yes  | 1V         | 392 mean<br>392V                  | 0-450V   |
| 8                | Current of PV (A)              | 2           | yes  | 0.1A       | 1000 mean<br>1.0A                 | 0-30A    |
| 9                | RMS Voltage of INVERT          | 2           | yes  | 1V         | 100 mean<br>100V                  | 0-276V   |

|                     |   |   |     |          |                       |                   |
|---------------------|---|---|-----|----------|-----------------------|-------------------|
|                     | ER A<br>phase (V)                                   |   |     |          |                       |                   |
| 10                  | RMS<br>Voltage<br>of<br>INVERT<br>ER B<br>phase (V) | 2 | yes | 1V       | 100 mean<br>100V      | 0-276V            |
| 11                  | RMS<br>Voltage<br>of<br>INVERT<br>ER C<br>phase (V) | 2 | yes | 1V       | 100 mean<br>100V      | 0-276V            |
| 12                  | RMS<br>Current<br>of<br>INVERT<br>ER A<br>phase (A) | 2 | yes | 0.1A     | 101 mean<br>10.1A     | 0-20A             |
| 13                  | RMS<br>Current<br>of<br>INVERT<br>ER B<br>phase (A) | 2 | yes | 0.1A     | 101 mean<br>10.1A     | 0-20A             |
| 14                  | RMS<br>Current<br>of<br>INVERT<br>ER C<br>phase (A) | 2 | yes | 0.1A     | 101 mean<br>10.1A     | 0-20A             |
| 15                  | Battery<br>Voltage<br>(V)                           | 2 | yes | 1V       | 192 mean<br>192V      | 0-300V            |
| 16                  | Battery<br>Current<br>(A)                           | 2 | yes | 0.1A     | 1234 mean<br>1.2A     | -60A-60A          |
| 17 (high<br>16 bit) | Energy<br>PV<br>generated<br>per day<br>(kW·h)      | 4 | NO  | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 18 (low<br>16 bit)  |   |   |     |          |                       |                   |
| 19                  | Energy  | 4 | NO  | 0.1 kW·h | 1234 mean             | 0-4294967         |

|    |  |   |    |          |           |           |
|----|--|---|----|----------|-----------|-----------|
|    | Battery  |   |    |          | 1.2 kW·h  | kW·h      |
| 20 | discharge<br>d per day<br>(kW·h)                 |   |    |          |           |           |
| 21 | Energy   | 4 | NO | 0.1 kW·h | 1234 mean | 0-4294967 |
| 22 | Battery<br>charged<br>per day<br>(kW·h)          |   |    |          | 1.2 kW·h  | kW·h      |
| 23 | Energy   | 4 | NO | 0.1 kW·h | 1234 mean | 0-4294967 |
| 24 | obtained<br>from<br>GRID per<br>day<br>(kW·h)    |   |    |          | 1.2 kW·h  | kW·h      |
| 25 | Energy   | 4 | NO | 0.1 kW·h | 1234 mean | 0-4294967 |
| 26 | feed to<br>GRID per<br>day<br>(kW·h)             |   |    |          | 1.2 kW·h  | kW·h      |
| 27 | Load   | 4 | NO | 0.1 kW·h | 1234 mean | 0-4294967 |
| 28 | used<br>energy<br>per day<br>(kW·h)              |   |    |          | 1.2 kW·h  | kW·h      |
| 29 | Energy   | 4 | NO | 0.1 kW·h | 1234 mean | 0-4294967 |
| 30 | saving<br>per day<br>(kW·h)                      |   |    |          | 1.2 kW·h  | kW·h      |
| 31 | Energy   | 4 | NO | 0.1 kW·h | 1234 mean | 0-4294967 |
| 32 | PV<br>generated<br>per month<br>(kW·h)           |   |    |          | 1.2 kW·h  | kW·h      |
| 33 | Energy   | 4 | NO | 0.1 kW·h | 1234 mean | 0-4294967 |
| 34 | Battery<br>discharge<br>d per<br>month<br>(kW·h) |   |    |          | 1.2 kW·h  | kW·h      |
| 35 | Energy   | 4 | NO | 0.1 kW·h | 1234 mean | 0-4294967 |
| 36 | Battery<br>charged<br>per month                  |   |    |          | 1.2 kW·h  | kW·h      |

|    |  |   |    |          |                       |                   |
|----|--|---|----|----------|-----------------------|-------------------|
|    | (kW·h)                                     |   |    |          |                       |                   |
| 37 | Energy obtained from GRID per month (kW·h) | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 38 |  |   |    |          |                       |                   |
| 39 | Energy feed to GRID per month (kW·h)       | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 40 |  |   |    |          |                       |                   |
| 41 | Load used energy per month (kW·h)          | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 42 |  |   |    |          |                       |                   |
| 43 | Energy saving per month (kW·h)             | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 44 |  |   |    |          |                       |                   |
| 45 | Energy PV generated per year (kW·h)        | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 46 |  |   |    |          |                       |                   |
| 47 | Energy Battery discharged per year (kW·h)  | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 48 |  |   |    |          |                       |                   |
| 49 | Energy Battery charged per year (kW·h)     | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 50 |  |   |    |          |                       |                   |
| 51 | Energy obtained from GRID per year (kW·h)  | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 52 |  |   |    |          |                       |                   |
| 53 | Energy feed to                             | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |

|    |  |   |    |          |                       |                   |
|----|--|---|----|----------|-----------------------|-------------------|
| 54 | GRID per year (kW·h)                     |   |    |          |                       |                   |
| 55 | Load used energy per year (kW·h)         | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 56 |  |   |    |          |                       |                   |
| 57 | Energy saving per year (kW·h)            | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 58 |  |   |    |          |                       |                   |
| 59 | Energy PV generated totally (kW·h)       | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 60 |  |   |    |          |                       |                   |
| 61 | Energy Battery discharged totally (kW·h) | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 62 |  |   |    |          |                       |                   |
| 63 | Energy Battery charged totally (kW·h)    | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 64 |  |   |    |          |                       |                   |
| 65 | Energy obtained from GRID totally (kW·h) | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 66 |  |   |    |          |                       |                   |
| 67 | Energy feed to GRID totally (kW·h)       | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 68 |  |   |    |          |                       |                   |
| 69 | Load used energy totally (kW·h)          | 4 | NO | 0.1 kW·h | 1234 mean<br>1.2 kW·h | 0-4294967<br>kW·h |
| 70 |  |   |    |          |                       |                   |
| 71 | Energy                                   | 4 | NO | 0.1 kW·h | 1234 mean             | 0-4294967         |

|     |   |   |    |           |                       |                   |
|-----|---|---|----|-----------|-----------------------|-------------------|
|     | saving                                      |   |    |           | 1.2 kW·h              | kW·h              |
| 72  | totally<br>(kW·h)                           |   |    |           |                       |                   |
| 73  | Self<br>consumpt<br>ion rate                | 2 | NO | 0.01%     | 9999<br>mean99.99%    | 0-100%            |
| 74  | GRID<br>frequency                           | 2 | NO | 0.01HZ    | 4999mean49.<br>99HZ   | 45-55Hz           |
| 75* | FAULT<br>WORD 1                             | 2 | NO | 1         | 1234mean123<br>4      |                   |
| 76* | FAULT<br>WORD 2                             | 2 | NO | 1         | 1234mean123<br>4      |                   |
| 77* | FAULT<br>WORD 3                             | 2 | NO | 1         | 1234mean123<br>4      |                   |
| 78* | FAULT<br>WORD 4                             | 2 | NO | 1         | 1234mean123<br>4      |                   |
| 79* | FAULT<br>WORD 5                             | 2 | NO | 1         | 1234mean123<br>4      |                   |
| 80* | FAULT<br>WORD 6                             | 2 | NO | 1         | 1234mean123<br>4      |                   |
| 81  | Insulation<br>Resistanc<br>e of PV          | 2 | NO | 1k Ω      | 450mean450<br>k Ω     | 0-9M Ω            |
| 82  | Insulation<br>Resistanc<br>e of<br>GRID     | 2 | NO | 1k Ω      | 1 mean1 k Ω           | 0-9M Ω            |
| 83  | Energy<br>INVERT<br>ER per<br>day<br>(kW·h) | 2 | NO | 0.01 kW·h | 1234mean<br>1.23 kW·h | 0-4294967<br>kW·h |
| 84  | Capacity<br>of battery<br>A                 | 2 | NO | 1%        | 90mean90%             | 0-100%            |
| 85  | Capacity<br>of battery<br>B                 | 2 | NO | 1%        | 90mean90%             | 0-100%            |
| 86  | Capacity<br>of battery<br>C                 | 2 | NO | 1%        | 90mean90%             | 0-100%            |
| 87  | Capacity<br>of battery<br>D                 | 2 | NO | 1%        | 90mean90%             | 0-100%            |

|     |                                  |   |    |        |                                       |                   |
|-----|----------------------------------|---|----|--------|---------------------------------------|-------------------|
| 88  | Capacity of battery E            | 2 | NO | 1%     | 90mean90%                             | 0-100%            |
| 89  | Power of INVERTER                | 2 | NO | W      | 1234 mean<br>1234W                    | 0-8000 W          |
| 90  | Serial Number                    | 8 | NO | 1      | 12345679<br>mean<br>123456789         |                   |
| 91  | Serial Number                    |   |    |        |                                       |                   |
| 92  | Serial Number                    |   |    |        |                                       |                   |
| 93  | Serial Number                    |   |    |        |                                       |                   |
| 94  | Daily Self-consumption           | 2 | NO | 0.1    | 991 mean<br>99.1%                     | 0-100%            |
| 95  | Monthly Self-consumption         | 2 | NO | 0.1    | 991 mean<br>99.1%                     | 0-100%            |
| 96  | Yearly Self-consumption          | 2 | NO | 0.1    | 991 mean<br>99.1%                     | 0-100%            |
| 97  | State of INVERTER                | 2 | NO | 1      | 0 OFF<br>1 ON<br>3 STARTING<br>4 FAIL |                   |
| 98  | Total Self-consumption           | 2 | NO | 0.1    | 991 mean<br>99.1%                     | 0-100%            |
| 99  | Energy INVERTER per MONTH (kW·h) | 4 | NO | 1 kW·h | 1234 mean<br>1234 kW·h                | 0-4294967<br>kW·h |
| 100 | Energy INVERTER per YEAR (kW·h)  |   |    |        |                                       |                   |
| 101 | Energy INVERTER per YEAR (kW·h)  | 4 | NO | 1 kW·h | 1234 mean<br>1234 kW·h                | 0-4294967<br>kW·h |
| 102 | Energy INVERTER per YEAR (kW·h)  |   |    |        |                                       |                   |
| 103 | Energy INVERTER                  | 4 | NO | 1 kW·h | 1234 mean<br>1234 kW·h                | 0-4294967<br>kW·h |

|     |                    |  |  |  |  |  |
|-----|--------------------|--|--|--|--|--|
| 104 | ER Total<br>(kW·h) |  |  |  |  |  |
|-----|--------------------|--|--|--|--|--|

\*reference 5

### Write Register(0X10)

| Register | Description                      | Byte number | Resolution | Example                         |
|----------|----------------------------------|-------------|------------|---------------------------------|
| 1        | P Limit                          | 2           | 0.01%      | 10000 means 100%                |
| 2        | Reactive Power<br>control on/off | 2           | 1          | 0 means OFF, 1<br>means ON      |
| 3        | Cos(phi)                         | 2           | 0.01       | 70 means cos(phi) =<br>0,70     |
| 4        | OverExcited<br>cos(phi)          | 2           | 1          | 1=means<br>cos(phi)=overexcited |

2

Baud rate: 9600 BPS

Stop Bit: 1

Parity:NO

**Connection Details** [X]

Connect Using:  
 Direct Connection to COM1

Phone Number:

Service Port:

Configuration

Baud Rate:

Word:

Parity:

Stop:

Hardware Flow Control

Wait for DSR from slave  
 Delay  ms after RTS before transmitting first

Wait for CTS from slave  
 Delay  ms after last character before

Protocol Selections

OK Cancel

**Modbus Protocol Selections** [X]

Transmission Mode

|  |   |
|--|---|
| STANDARD   | DANIEL/ENRON/OMNI                                     |
| <input type="radio"/> ASCII <input checked="" type="radio"/> RTU | <input type="radio"/> ASCII <input type="radio"/> RTU |

Slave Response Timeout  
 (msecs)

Delay Between Polls  
 (msecs)

Force modbus command 15 and 16 for single-point writ  
 (To be used in cases where the slave does not support the single-point write functions 05 and 06.)

OK Cancel

MODBUS RTU

3

**READ\_REGISTER: CMD 0X03**

**SET\_REGISTER : C MD 0X10**

4 **PhonoCuube Device ID is 1 (Factory data) , Set by LCD**

5 **FAULT WORD discription**

|              | DATA BIT     | ERROR CODE          |
|--------------|--------------|---------------------|
| FAULT WORD1  | 1            | RF_DC_UNDER         |
|              | 2            | U_PV_OVER           |
|              | 3            | U_PV_LB             |
|              | 4            | I_CH_OVER           |
|              | 5            | I_PV_LB             |
|              | 6            | IR_PV_OVER          |
|              | 7            | IR_PV_LB            |
|              | 8            | TEM_CH_OVER         |
|              | 9            | PV_INPUT_RVSD       |
|              | 10           | OHP_OVERLOAD        |
|              | 11           | U_DCLINK1_OVER      |
|              | 12~16        | RESERVE1~RESERVE5   |
| FAULT WORD2  | 1            | RF_AC_UNDER         |
|              | 2            | U_BAT_OVER          |
|              | 3            | I_B_CH1_OVER        |
|              | 4            | I_B_CH2_OVER        |
|              | 5            | I_BAT_LB            |
|              | 6            | U_BAT_LB            |
|              | 7            | TEM_B_CH_OVER       |
|              | 8            | BAT_RVSD            |
|              | 9            | FLT_BAT_MONIT       |
|              | 10           | OHP_OVERLOAD        |
|              | 11~16        | RESERVE6~RESERVE11  |
|              | FAULT WORD 3 | 1                   |
| 2            |              | I_DC/DC1_LB         |
| 3            |              | RESERVE12           |
| 4            |              | I_DC/DC2_OVER       |
| 5            |              | RESERVE13           |
| 6            |              | U_DCLINK1_LB        |
| 7            |              | U_DCLINK1_OVER      |
| 8            |              | TEM_DC/DC_OVER      |
| 9            |              | I_BAT_LB            |
| 10~16        |              | RESERVE14~RESERVE20 |
| FAULT WORD 4 | 1            | F3=1                |
|              | 2            | U_DCLINK2_OVER      |

|              |    |                 |
|--------------|----|-----------------|
|              | 3  | U_DCLINK2_UNDER |
|              | 4  | IAC_INV_OVER    |
|              | 5  | IAC_INV_LB      |
|              | 6  | U_DCLINK2_LB    |
|              | 7  | TEM_INV_OVER    |
|              | 8  | IR_INV_OVER     |
|              | 9  | I_DC/DC_OVER    |
|              | 10 | IDC_INV_OVER    |
|              | 11 | UAC_INV_LB      |
|              | 12 | RF_AC_UNDER     |
|              | 13 | FLT_CONTACTOT   |
|              | 14 | PHASE_SEQ_RSVD  |
|              | 15 | I_BAT_LB        |
|              | 16 | RESERVE21       |
| FAULT WORD 5 | 1  | F3="1"          |
|              | 2  | U_DCLINK2_OVER  |
|              | 3  | U_DCLINK2_UNDER |
|              | 4  | IAC_INV_OVER    |
|              | 5  | IAC_INV_LB      |
|              | 6  | U_DCLINK2_LB    |
|              | 7  | TEM_INV_OVER    |
|              | 8  | IR_INV_OVER     |
|              | 9  | I_DC/DC_OVER    |
|              | 10 | IDC_INV_OVER    |
|              | 11 | UAC_INV_LB      |
|              | 12 | IR_INV_LB       |
|              | 13 | FLT_CONTACTOT   |
|              | 14 | PHASE_SEQ_RSVD  |
|              | 15 | UAC_INV_OVER    |
|              | 16 | UAC_INV_UNDER   |
| FAULT WORD 6 | 1  | U_GRID_OVER1    |
|              | 2  | U_GRID_OVER2    |
|              | 3  | U_GRID_UNDER    |
|              | 4  | U_PV_LB         |
|              | 5  | I_PV_LB         |
|              | 6  | FEQ_GRID_OVER   |
|              | 7  | FEQ_GRID_UNDER  |
|              | 8  | SHORT_GRID      |
|              | 9  | SHORT_GRID_SEC  |
|              | 10 | RF_DC_UNDER     |
|              | 11 | U_BAT_LB        |
|              | 12 | GND_LB          |
|              | 13 | FLT_COM_ARM     |

|  |    |             |
|--|----|-------------|
|  | 14 | FLT_ARM_IAC |
|  | 15 | FLT_IGBT    |