

Communication Protocol of RS485

Modification record

Version	Details	Time	Author
V1.00	Basic version	03/12/2024	Mao
V1.01	1. Add the value of input PV current and input PV power of optimizers. 2. Add the function of remote shut-down control	17/07/2024	Mao

A. Overview

This protocol complies to SUNGO GT/GTC and other gateway products with RS 485 terminals. It follows Modbus-RTU.

B. RS485 protocol describe

It's a standard Modbus-RTU protocol, supports 0x03 for data reading and 0x06/0x10 for data writing.

C. RS485 terminal

Transport: Modbus RTU

Baud rate: 9600 – 19200, default 9600

Check bit: NONE, EVEN, ODD, default NONE

Data bit: 8bit

Stop bit: 1-2bit, default 1bit

Maximum slave response time: 150 Byte

Minimum Host Polling Interval: 100 Byte

Parity bit: CRC-CCITT 16, Low bytes first, high bytes last

Modbus Slave Add : default 1

D. Register Address Map

Register address: High 8 bit is addressing, like

0x00XX – system info

0x01XX – info of No.1 optimizer, **0x02XX** - info of No.2 optimizer, **0x03XX** - info of No.3 optimizer, and so on. Up to 200 optimizers.

0xFFXX - info of GT

Item	Address	R/W	Description
Total number of optimizers	0x0000	R	Total number of optimizers found by this GT
Number of online optimizers	0x0001	R	Number of optimizers which are online at this time
Accumulated power generation	0x0002	R	High 16 bits
	0x0003	R	Low 16 bits, unit: 1 Wh
Today power generation	0x0004	R	High 16 bits
	0x0005	R	Low 16 bits, unit: 1 Wh
Current status	0x0006	R/W	0-Stop; 1-GO
Current power	0x0007	R	High 16 bits
	0x0008	R	Low 16 bits, unit: 0.1W. Total currently output power of all optimizers in this GT.
Product Type of #1 optimizer	0x0100	R	Value=0 when the communication with GT is down.
Software version of #1 optimizer	0x0101	R	Value=0 when the communication with GT is down.
Hardware version of #1 optimizer	0x0102	R	Value=0 when the communication with GT is down.
SN of #1 optimizer	0x0103	R	Part A of SN
	0x0104	R	Part B of SN
	0x0105	R	Part C of SN For example: Part A: 0x2401

			Part B: 0x0300 Part C: 0x0001 SN of #1 optimizer = 240103000001
Input voltage of #1 optimizer	0x0106	R	Unit: 0.1V
Input current of #1 optimizer	0x0107	R	Unit: 0.1A
Input power of #1 optimizer	0x0108	R	Unit: 0.1W
Output voltage of #1 optimizer	0x0109	R	Unit: 0.1V
Output current of #1 optimizer	0x010A	R	Unit: 0.1A
Output power of #1 optimizer	0x010B	R	Unit: 0.1W
Temperature of #1 optimizer	0x010C	R	Unit: 0.1°C
Total running time of #1 optimizer	0x010D	R	High 16 bits
	0x010E	R	Low 16 bits, Unit: S
Total work time of #1 optimizer	0x010F	R	High 16 bits
	0x0110	R	Low 16 bits, Unit: S
Accumulated power generation of #1 optimizer	0x0111	R	High 16 bits
	0x0112	R	Low 16 bits, Unit: Wh
Status of #1 optimizer	0x0113	R	0-STOP; 1-GO; 255-offline
Fault code of #1 optimizer	0x0114	R	Each bit indicates one fault status. Value =0 means no fault. Bit 0=1: input over voltage Bit 1=1: input voltage low Bit 2=1: over temperature Bit 3=1: output voltage abnormal Bit 4=1: output current backflow
Request command received from GT of #1 optimizer	0x0115	R	High 16 bits
	0x0116	R	Low 16 bits, counted from power-on, reset when status changes.
Max offline time of #1 optimizer	0x0117	R	High 16 bits
	0x0118	R	Low 16 bits, unit: 1S, counted from power-on, reset when status changes.
Number of offline of #1 optimizer	0x0119	R	Count when offline time over 10S. Counted from power-on, reset when status changes.
Timestamp	0x011A	R	High 16 bits
	0x011B	R	Low 16 bits, Unix Timestamp

Product Type of GT	0xFF00	R	
Software version of GT	0xFF01	R	Range: 1-65534
Hardware version of GT	0xFF02	R	Range: 1-65534
SN of GT	0xFF03	R	Part A of SN
	0xFF04	R	Part B of SN
	0xFF05	R	Part C of SN For example: Part A: 0x2401 Part B: 0x0300 Part C: 0x0001 SN of GT = 240103000001
Time of GT	0xFF06	R/W	High 16 bits
	0xFF07	R/W	Low 16 bits, Unix Timestamp. Write Low16 bits first.
Address of GT	0xFF08	R/W	Range: 1-254, default = 1, ignore other number. It would not be affected after write-in. After writing number into this register, "GT config hold" register will be set to 1, and this register will be affected when "GT config hold" register is set to 0.
Baud rate of GT	0xFF09	R/W	0 = 115200, 1 = 57600, 2 = 38400, 3 = 19200, 4 = 9600, default=4, ignore other number. It would not be affected after write-in. After writing number into this register, "GT config hold" register will be set to 1, and this register will be affected when "GT config hold" register is set to 0.
Check bit of GT	0xFF0A	R/W	0 = none, 1 = odd, 2 = even, default=0, ignore other number. It would not be affected after write-in. After writing number into this register, "GT config hold" register will be set to 1, and this register will be affected when "GT config hold" register is set to 0.
STOP bit of GT	0xFF0B	R/W	0 = 1bit, 1 = 2bit, default=0, ignore other number. It would not be affected after write-in. After writing number into this register, "GT config hold" register will be set to 1, and this register will be affected when "GT config hold" register is set to 0.
GT config hold	0xFFFE	R/W	0 = config saved and affect 1 = config is modified, but not saved and

			affected.
Restart GT	0xFFFF	W	1 = restart immediately, ignore other number.

E. NOTICE

- Recommended reading method
 - a. Read total number of optimizers;
 - b. Read data of each optimizer one by one.

For example, total number of optimizers is 5. Read data followed by

0x01XX, 0x02XX, 0x013XX, 0x04XX and **0x05XX**.

- Factory reset

TX(ASCII): **FCT RESTORE DEFAULT**

RX(ASCII): **FCT RESTORE DEFAULT OK**