

Communication Protocol for Logger

Modbus V1.0.2.1

Upgrade history:

| Ver. | Edited by | Edited date | Changed content and reason | Checked by | Approved by |
|---------|----------------|-------------|--|-------------|-------------|
| 1.0.1.3 | Xu Shunan | 2013/9 | Initial | | |
| 1.0.1.4 | Xu Shunan | 2014/4 | Add digital input, output measuring point, reserved | | |
| 1.0.1.5 | Xu Shunan | 2014/9 | Add accumulative reactive output power measuring point | | |
| 1.0.1.6 | Xu Shunan | 2015/8 | Add AGC/AVC dispatch measuring point | Chen Xiaohu | Song Shi |
| 1.0.1.7 | Xu Shunan | 2016/8 | Add nominal active power, reactive power measuring point | | |
| 1.0.1.8 | Xu Shunan | 2016/11 | Add longitude and latitude data, add digital output state display, add ADC output value, delete work state | | |
| 1.0.1.9 | Xu Shunan | 2017/3 | Adjust the today's power yield unit to kWh | | |
| 1.0.2.0 | Yu Junjun | 2018/3/3 | Change product logo and product name | | |
| 1.0.2.1 | Zhang Changhao | 2019/4/18 | Extend the Logger1000 protocol | | |

1. Introduction

This communication protocol, adopting MODBUS RTU/TCP protocol, applies to the communication between Sungrow LoggerV3/Logger3000/Logger1000 and the upper computer (PC) monitoring software. This protocol can read the real-time operating data and sensor information of the LoggerV3/Logger3000/Logger1000. The default communication address of LoggerV3/Logger3000/Logger1000 is 247.

2. Communication Interface

- (1) RS485 (Default port: A2B2; Baud rate: 9600bps; Check bit: Null; data bit: 8; stop bit: 1)
- (2) Ethernet (Default IP: 192.168.1.100; Subnet mask: 255.255.0.0; Port (Logger3000): 502/503/504/505/506; Port (LoggerV3): 502/503. Each port supports only one TCP link.)

3. Definition of Address

3.1 Running information variable address definition (read-only register, supporting 0x04 function code)

| No. | Name | Address | Data type | Data range | Unit | Remark |
|-----|-----------------------------|-----------|-----------|---|------|--------|
| 1 | Device type code | 8000 | U16 | 0x0701 LoggerV3 0x0705 LoggerV3000 | | |
| 2 | Protocol No. | 8001-8002 | U32 | | | |
| 3 | Communication protocol ver. | 8003-8004 | U32 | Example: V1.0.1.9 Transmission order: little-endian for | | |

| | | | | | | |
|----|-----------------------------------|-----------|-----|--|----------|--|
| | | | | double-word data. Big-endian for byte data. The data transmitted are 0x01 0x09 0x01 0x00 | | |
| 4 | Total number of devices connected | 8005 | U16 | | pcs | |
| 5 | Total number of fault device | 8006 | U16 | | pcs | |
| 6 | Total active power | 8007-8008 | U32 | | W | |
| 7 | Daily power yields | 8009-8010 | U32 | | kWh | |
| 8 | Total reactive power | 8011-8012 | S32 | | var | |
| 9 | Total power yields | 8013-8014 | U32 | | kWh | |
| 10 | Reserved | 8015-8016 | U32 | | | |
| 11 | Reserved | 8017-8020 | U16 | | | |
| 12 | Digital input state | 8021-8022 | U32 | Each bit stands for the state of one digital output 0: common terminal and normal close terminal are closed 1: common terminal and normal open terminal are closed | | |
| 13 | Reserved | 8023-8024 | U32 | Original: work state | | |
| 14 | Reserved | 8025-8026 | U32 | | | |
| 15 | PT100-1 | 8027 | S16 | | 0.1°C | |
| 16 | PT100-1 | 8028 | S16 | | 0.1°C | |
| 17 | ADC1 voltage | 8029 | S16 | | 0.01V | |
| 18 | ADC1 current | 8030 | S16 | | 0.01mA | |
| 19 | ADC2 voltage | 8031 | S16 | | 0.01V | |
| 20 | ADC2 current | 8032 | S16 | | 0.01mA | |
| 21 | ADC3 voltage | 8033 | S16 | | 0.01mV | |
| 22 | ADC4 voltage | 8034 | S16 | | 0.01mV | |
| 23 | Reserved | 8035-8053 | | | | |
| 24 | Longitude | 8054-8055 | S32 | | 0.0001 ° | |
| 25 | Latitude | 8056-8057 | S32 | | 0.0001 ° | |
| 26 | Max. total nominal active power | 8058 | U16 | | kW | |
| 27 | Min. total nominal active power | 8059 | U16 | | kW | |
| 28 | Max. total nominal reactive power | 8060 | S16 | | kvar | |
| 29 | Min. total nominal reactive power | 8061 | U16 | | kvar | |

| | | | | | | |
|----|--------------------------------------|-----------|-----|----------------------|---------|-------------------|
| 30 | Inverter actual total active power | 8062-8063 | U32 | | W | |
| 31 | Inverter actual total reactive power | 8064-8065 | S32 | | var | |
| 32 | Inverter preset total active power | 8066 | U16 | | kW | |
| 33 | Inverter preset total reactive power | 8067 | S16 | | kvar | |
| 34 | Start/Stop state of Logger | 8068 | U16 | 0: Stop 1: Start | | |
| 35 | Lock state of Logger | 8069 | U16 | 0: Lock 1: Unlock | | |
| 36 | Total active power expansion | 8070-8073 | U64 | | W | For Logger1000 |
| 37 | Daily power yield expansion | 8074-8075 | U32 | | 0.1kWh | For Logger1000 |
| 38 | Total reactive power expansion | 8076-8079 | S64 | | var | For Logger1000 |
| 39 | Total power yield expansion | 8080-8083 | U64 | | 0.1kWh | For Logger1000 |
| 40 | Min. adjustable active power | 8084-8085 | U32 | | 0.1kW | For Logger1000 |
| 41 | Max. adjustable active power | 8086-8087 | U32 | | 0.1kW | For Logger1000 |
| 42 | Min. adjustable reactive power | 8088-8089 | S32 | | 0.1kvar | For Logger1000 |
| 43 | Max. adjustable reactive power | 8090-8091 | S32 | | 0.1kvar | For Logger1000 |
| 44 | Rated active power | 8092-8093 | U32 | | 0.1kW | For Logger1000 |
| 45 | Rated reactive power | 8094-8095 | U32 | | 0.1kvar | For Logger1000 |
| 46 | Number of grid-connected devices | 8096 | U16 | | PCS | For Logger1000 |
| 47 | Number of off-grid devices | 8097 | U16 | | PCS | For Logger1000 |

3.2 Information variable setting address definition (write-only register, supporting 0x06 function code)

| No. | Name | Address | Data type | Data range | Unit | Remark |
|-----|--|---------|-----------|------------|------|--------|
| 1 | Set the active power for subarray inverter | 8000 | U16 | | kW | |
| 2 | Set the reactive power for subarray inverter | 8001 | S16 | | kvar | |

| | | | | | | |
|---|--|-----------|-----|---------------------|-------------|-------------------|
| 3 | Set the start/stop for subarray inverter | 8002 | U16 | 0: Stop 1: Start | | |
| 4 | Set the active power value for subarray inverter | 8003-8004 | U32 | | 0.1 kW | For Logger1000 |
| 5 | Set the active power ratio for subarray inverter | 8005-8006 | U32 | | 0.001 | For Logger1000 |
| 6 | Set the reactive power value for subarray inverter | 8007-8008 | S32 | | 0.1 kvar | For Logger1000 |
| 7 | Set the reactive power ratio for subarray inverter | 8009-8010 | S32 | | 0.001 | For Logger1000 |
| 8 | Set the power factor for subarray inverter | 8011-8012 | S32 | | 0.001 | For Logger1000 |

Note:

U16: 16-bit unsigned integer, big-endian

U32: 32-bit unsigned integer; little-endian for double-word data; big-endian for byte data

S16: 16-bit signed integer, big-endian

S32: 32-bit signed integer; little-endian for double-word data; big-endian for byte data

U64---

S64---

Address starts from 1, and communication address = protocol address – 1

Longitude and latitude data

Example 1:

The background communicates with the Logger via the network. The address of Logger is 247. When the background has bound to the 502 port of the Logger, the background needs to check the digital input state of the Logger.

Background sends: 00 00 00 00 00 06 F7 04 1F 55 00 01

Logger replies: 00 00 00 00 00 05 F7 04 02 0F FE

"00 00 00 00 00 06" and "00 00 00 00 00 05" are messages headers of the Modbus TCP; F7 is the address of the Logger; 04 is the function code; 0x1F55 = 8021, i.e. check the data of register 8022. According to this protocol, register 8022 is the "digital input state (DIN)".

The data of 8022 register in the replied message is 0x0FFE. Since the Logger V3 has 12-input digital inputs, the data of the latter 12 bits are valid. After converting 0x0FFE to binary data, the last bit of 0x0FFE is 0 while the other bits are 1. According to this protocol, the state of DIN1 of the Logger is closed and other ports are open.

Example 2: AGC/AVC dispatch

1. It is advisable to use the port 503 of Modbus TCP for the AGC&AVC dispatch while the port 502 for data checking.

2. The recommended dispatch period ≥ 1 min

3. Read the dispatch related parameters:

Sent to

Send instruction: 00 00 00 00 00 06 F7 04 1F 7D 00 08

Relay data: 00 00 00 00 00 13 F7 04 10 45 03 00 20 09 30 00 00 08 44 00 03 00 01 00 01

Sequence of data:

Total active power: 2114.819 kW; total reactive power: 2.352 kvar; total preset active power: 2116 kW;
total preset reactive power: 3 kvar; Logger in start state; Logger in unlock state.

4. Set the total active power to 2116kW

Send instruction: 00 00 00 00 00 06 F7 06 1F 3F 08 44

Replay data: 00 00 00 00 00 06 F7 06 1F 3F 08 44

5. Set the total reactive power to 3kvar

Send instruction: 00 00 00 00 00 06 F7 06 1F 40 00 03

Replay data: 00 00 00 00 00 06 F7 06 1F 40 00 03