Logger Communication Protocol

AW0 1.0.2.5

For models:

Logger1000
Logger3000

I. General Description

This protocol applies to the communication between the Logger3000/Logger1000 and the host computer monitoring software. It adopts MODBUS RTU/TCP communication protocol. This protocol can read the run information of the Logger3000/Logger1000 and the sensor information configured for the Logger3000/Logger1000 in real time. The Logger3000/Logger1000 communication address is 247.

When the logger forwards data from a device (e.g. inverter), the device (inverter) address is its forwarding address.

II. Physical Interface

1. RS485

	Default setting
Addressing	247
Broadcast	Yes
Baud rate	9600 bit/s
Check	N/A
Data bit	8
Stop bit	1
Mode	RTU
Electrical interface	RS485-2W cable connection

2. Ethernet (for the Logger1000, default IP: 12.12.12.12, default open port: 502; for the Logger3000, default ETH1 IP: 12.12.12.12, default ETH2 IP: 13.13.13.13, default open port: 502)

III. Communication Description

1. Data type

U16 - 16-bit unsigned integer, big-endian.

S16 - 6-bit signed integer, big-endian.

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

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

U64 - unsigned 64-bit integer data, big-endian format.

S64 - signed 64-bit integer data, big-endian format.

For example,

U16 data 0x0102 is transmitted in the order 01, 02.

U32 data 0x01020304 is transmitted in the order 03, 04, 01, 02.

U64 data 0x0102030405060708 is transmitted in the order 01, 02, 03, 04, 05, 06, 07, 08.

The address register starts counting at 1, so the communication address = protocol address - 1.

2. Numerical description

Decimal numbers are transmitted as integers after expansion. For example, 10.333KW is transmitted as 10 333 in expanded form; 800.5V is transmitted as 8005. Negative numbers are transmitted as complements. For example, 0xFFFF denotes -1.

"Reserved" or unsupported registers cannot be queried or set. "F"s are returned when unsigned numbers are queried. For example, "0xFFFF" is returned for U16, "0xFFFFFFFF" for U32, and "0xFFFFFFFFFFFFFFFF" for U64. The largest positive numbers are returned for signed numbers, for example, “0x7FFF” is returned for S16, "0x7FFFFFFF" for S32, "0x7FFFFFFFFFFFFFFF" for S64, and 0x00 for UTF-8.

UTF-8 occupies 1 byte. An odd length is padded with 0x00.

3. Address type

The input register is a read-only register and supports 0x04 function code read.

The holding register is a read/write register and supports 0x03 function code query and 0x06/0x10 function code write.

4. Check type

CRC16, polynomial 0xA001, little-endian.

IV. Address Definition Table

4.1 Input register (address type: 3X)

Note: In the Remarks column, "Logger1000" indicates that it is supported by the Logger1000 only; "Logger3000" indicates that it is supported by the Logger3000 only; blank indicates that it is supported by both Logger1000 and Logger3000.

Name	Address	Data type	Factor	Unit	Remarks
Device type code	8000	U16	1		0x0705 Logger3000 0x0710 Logger1000
Protocol number	8001	U32	1		
Communication protocol version	8003	U32	1		
Total devices connected	8005	U16	1	Set	
Total faulty devices	8006	U16	1	Set	
Reserved	8015	U32	1		
Reserved	8017	U16	1		
Digital input state	8021	U32	1		Currently only the low 16 bits are used. Logger1000 only uses 8 bits, while Logger3000 uses 16 bits
Reserved	8023	U32	1		
Reserved	8025	U32	1		
PT100-1	8027	S16	0.1	□	Logger3000
PT100-2	8028	S16	0.1	□	Logger3000
ADC1 voltage	8029	S16	0.01	V	
ADC1 current	8030	S16	0.01	mA	
ADC2 voltage	8031	S16	0.01	V	
ADC2 current	8032	S16	0.01	mA	
ADC3 voltage	8033	S16			Shared by Logger3000 and Logger1000, where Logger3000 consumes 0.01mV, while Logger1000 consumes 0.01V
ADC4 voltage	8034	S16			Shared by Logger3000 and Logger1000, where Logger 3000 consumes 0.01mV while Logger 1000 consumes 0.01V
ADC3 current	8035	S16	0.01	mA	Logger1000
ADC4 current	8036	S16	0.01	mA	Logger1000
Reserved	8037	S16	1		
Longitude	8054	S32	0.0001	°	Logger3000
Latitude	8056	S32	0.0001	°	Logger3000
Max. total nominal active power	8058	U16	1	kW	
Min. total nominal active power	8059	U16	1	kW	
Max. total nominal reactive power	8060	U16	1	kvar	
Min. total nominal reactive	8061	S16	1	kvar	

power					
Inverter preset total active power	8066	U16	1	kW	
Inverter preset total reactive power	8067	S16	1	kvar	
Logger On/Off state	8068	U16	1		0: Off 1: On
Logger unlatch state	8069	U16	1		0: latched 1: unlatched
Total active power	8070	U64	1	W	
Daily power yield	8074	U32	0.1	kWh	
Total reactive power	8076	S64	1	var	
Total power yield	8080	U64	0.1	kWh	
Min. adjustable active power	8084	U32	0.1	kW	
Max. adjustable active power	8086	U32	0.1	kW	
Min. adjustable reactive power	8088	S32	0.1	kvar	
Max. adjustable reactive power	8090	S32	0.1	kvar	
Nominal active power	8092	U32	0.1	kvar	
Nominal reactive power	8094	U32	0.1	kvar	
Grid-connected devices	8096	U16	1	Set	
Off-grid devices	8097	U16	1	Set	
Monthly yield of array	8098	U64	0.1	kWh	
Annual yield of array	8102	U64	0.1	kWh	
Apparent power of array	8106	U64	1	VA	

4.2 Holding register (address type: 4X)

Note: The holding register is set to support single function only. All commands from the broadcast address 0 are directly transparently transmitted to the inverter.

Name	Address	Data type	Upper limit	Lower limit	Factor	Unit	Remarks
Set On/Off for subarray inverter	8002	U16					0: Off 1: On
Set the active power value for subarray inverter	8003	U32			0.1	kW	
Set the active power ratio for subarray inverter	8005	U32			0.1	%	
Set the reactive power value for subarray inverter	8007	S32			0.1	kvar	
Set the reactive power ratio for subarray inverter	8009	S32			0.1	%	
Set the power factor for subarray inverter	8011	S32			0.001		
D01	8013	U16			1		Logger3000
D02	8014	U16			1		0: Common port and

D03	8015	U16			1		NC port are closed 1: Common port and NO port are closed
D04	8016	U16			1		

V. Examples

6.1. The background communicates with the logger over the network. The address of the logger is 247. When the background is bound to the port 502 of the logger, it needs to query the DI state of the logger.

Background sends: 09 79 00 00 00 06 F7 04 1F 54 00 02

Logger replies: 09 79 00 00 00 07 F7 04 04 00 01 00 00

In the data replied, "09 79 00 00 00 00 06" and "09 79 00 00 00 07" are headers of the Modbus TCP message; F7 is the address of the logger; 04 is the function code; 0x1F54 = 8020 is to query the data of Register 8021. According to this protocol, Register 8021 indicates the "digital input state (DIN)", and the data of Register 8021 in the logger reply message is 0x0000.

6.2. Set boot

Send command: 0A B3 00 00 00 06 F7 06 1F 41 00 01

Reply data: 0A B3 00 00 00 06 F7 06 1F 41 00 01

In the command sent, "0ab30000006" is the Modbus TCP message header, F7 is the logger address, 06 is the function code, 0x1F41 = 8001 is to write data to Register 8002; the value to write is 0x0001 indicates booting.

6.3 Set the active power ratio for subarray inverter

Send command: 00 00 00 00 00 0b F7 10 1F 42 00 02 04 00 00 00 00

Reply data: 00 00 00 00 00 06 F7 10 1F 42 00 02

In the command sent, "00 00 00 00 00 0b" is the Modbus TCP message header, F7 is the Logger address, 10 is the function code, 0x1F42 = 8002 is to write two consecutive register data to the starting address of Register 8003, and the value to write is 0x00000000.

6.4. Set the active power ratio for subarray inverter

Send command: 00 00 00 00 00 0b F7 10 1F 44 00 02 04 01 5E 00 00

Reply data: 00 00 00 00 00 06 F7 10 1F 44 00 02

In the command sent, "00 00 00 00 00 0b" is the Modbus TCP message header, F7 is the Logger address, 10 is the function code, 0x1F44 = 8004 is to write two consecutive register data to the starting address of Register 8005, and the value to write is 0x0000015E.