



TrueString™ Gateway MODBUS Map

*August 2016
Version 1.0*



Contents

Introduction	3
MODBUS TCP Settings	3
MODBUS RTU Settings	3
Supported MODBUS Function Codes	3
Supported MODBUS Exception Codes	4
Supported MODBUS Data Types	4
MODBUS Register Addressing	5
MODBUS Register Map	5
Gateway Register Map	5
Inverter Register Map	6
Inverter Mode Table.....	8
General Status Table	8
String Status Table.....	9

Introduction

The HiQ Solar Gateway provides a bridge between up to 200 HiQ inverters communicating using PLC (Power Line Communications) and an Ethernet network. Inverter data is polled by the Gateway and may be accessed over a network using its internal web server, its internal FTP server, or by MODBUS TCP. This document covers how to read data from the Gateway using MODBUS TCP. Familiarity with the MODBUS TCP protocol is assumed.

MODBUS TCP Settings

Default MODBUS Address	20
TCP Port	502
Maximum Simultaneous Connections	1

MODBUS RTU Settings

Not supported on current Gateway.

Supported MODBUS Function Codes

Code	Description
3	Read Holding Registers
4	Read Input Registers
6	Write Single Register
16	Write Multiple Registers
23	Read/Write Multiple Registers

Notes:

- Writes to non-writable registers will be ignored.
- The same registers are mapped into both Holding and Input register space.

Supported MODBUS Exception Codes

Code	Description
1	Illegal Function
2	Illegal Data Address
3	Illegal Data Value
4	Illegal Response Length

Supported MODBUS Data Types

SINT16	Signed 16-bit integer
SINT32	Signed 32-bit integer, split between two registers
ASCII	ASCII characters, two per register, padded with null (0) at the end.

Note:

- When accessing data types that span more than one register (ASCII strings, 32-bit values), partial reads of the data type are not allowed and will result in undefined values being returned for the entire transaction.

Per the MODBUS standard, all data types transmitted in big-endian format. For example:

Data Type	Example Value	Byte Offset / Transmission Order			
		0	1	2	3
SINT16	0x1234	0x12	0x34		
SINT32	0x12345678	0x12	0x34	0x56	0x78
ASCII	"ABC"	'A'	'B'	'C'	0x00

MODBUS Register Addressing

The Gateway uses extended addressing in order to fit all supported inverters into the address space. Note that, per the MODBUS standard, the supplied register addresses must be translated into data addresses in the request by removing the address space prefix (4) and subtracting 1. Effectively, subtract decimal 40001 from the supplied Register Address to get the required data address.

MODBUS Register Map

Base Register Address	Block Description
40100	Gateway
41000	Inverter 001
41200	Inverter 002
41400	Inverter 003
41600	Inverter 004
...	...
80800	Inverter 200

Gateway Register Map

Register	Number of Registers	Description	Units	Format	Multiplier	Comments
40100	1	MODBUS Map Version		SINT16	1	Version = 1
40101	8	Gateway Serial		ASCII		"GTYA001106" for example
40109	3	Firmware Version		ASCII		"01.02" for example
40112	1	Inverter Count		SINT16	1	Number of inverters on site
40113	1	Site Status		SINT16	1	See General Status Table
40114	2	Total Site Power	Watts	SINT32	0.1	
40116	2	Total Site Energy	KWh	SINT32	1	
40118	1	Gateway Status		SINT16	1	See General Status Table
40119	2	Gateway UTC Time	Seconds	SINT32	1	UNIX timestamp
40121	2	Gateway Active Faults		SINT32	1	
40123	1	Gateway Temperature	degC	SINT16	0.1	

Inverter Register Map

Notes:

- Registers in **bold** are supported by all inverters (Mini and TrueString). Non-bold registers are supported by TrueString only.
- Registers in *italics* are planned to be supported by future TrueString firmware releases.
- Unsupported registers will read zero.

Inverter Base +	Number of Registers	Description	Units	Format	Multiplier	Comments
0	2	Time Last Contacted	Seconds	SINT32	1	UNIX timestamp
2	1	Inverter Mode		SINT16	1	See Inverter Mode Table
3	1	Inverter Status		SINT16	1	See General Status Table
4	2	Net Output Power	Watts	SINT32	0.1	
6	2	Total Energy Produced	KWh	SINT32	1	
8	1	Voltage RMS L1-N	Volts	SINT16	0.1	
9	1	Voltage RMS L2-N	Volts	SINT16	0.1	
10	1	Voltage RMS L3-N	Volts	SINT16	0.1	
11	1	<i>Current RMS L1</i>	Amps	SINT16	0.01	
12	1	<i>Current RMS L2</i>	Amps	SINT16	0.01	
13	1	<i>Current RMS L3</i>	Amps	SINT16	0.01	
14	2	Power RMS L1	Watts	SINT32	0.1	
16	2	Power RMS L2	Watts	SINT32	0.1	
18	2	Power RMS L3	Watts	SINT32	0.1	
20	1	Line Frequency	Hz	SINT16	0.01	
21	1	String 1 Voltage	Volts	SINT16	0.1	
22	1	String 1 Current	Amps	SINT16	0.01	
23	2	String 1 Power	Watts	SINT32	0.1	
25	1	String 1 Status		SINT16	1	See String Status Table
26	1	String 2 Voltage	Volts	SINT16	0.1	
27	1	String 2 Current	Amps	SINT16	0.01	

28	2	String 2 Power	Watts	SINT32	0.1	
30	1	String 2 Status		SINT16	1	See String Status Table
...		...				
96	1	String 16 Voltage	Volts	SINT16	0.1	
97	1	String 16 Current	Amps	SINT16	0.01	
98	2	String 16 Power	Watts	SINT32	0.1	
100	1	String 16 Status		SINT16	1	See String Status Table
120	8	Inverter Serial Number		ASCII		"MIBB001234" for example
128	3	Firmware Version (AC)		ASCII		"01.03" for example
131	1	Max Number of Strings		SINT16	1	
132	1	PLC Signal		SINT16	1	
133	1	PLC Noise		SINT16	1	
134	2	Active Faults 0		SINT32	1	
136	2	Active Faults 1		SINT32	1	
138	1	AC Temperature	degC	SINT16	0.1	
139	1	DC Temperature	degC	SINT16	0.1	
150	1	<i>String 1 Mode</i>				
151	1	<i>String 1 Preset 0</i>				
152	1	<i>String 1 Preset 1</i>				
153	1	<i>String 2 Mode</i>				
154	1	<i>String 2 Preset 0</i>				
155	1	<i>String 2 Preset 1</i>				
...		...				
195	1	<i>String 16 Mode</i>				
196	1	<i>String 16 Preset 0</i>				
197	1	<i>String 16 Preset 1</i>				

Inverter Mode Table

Code	Description
0	Idle
1	Safety Check
2	Generating
3	Low Light
4	Sleeping
5	Locked Off
6+	Reserved

General Status Table

Code	Description
0	Healthy
1	Fault
2	Warning
3	Unknown
4	Reserved
5	Reserved
6	Missing
7+	Reserved

String Status Table

Code	Description
0	Not Available
1	Not Detected
2	Idle
3	Low Light
4	Safety Check
5	Generating
6	Reverse Voltage
7	RCD Fault
8	ARC Fault

----- End of document -----