

MODBUS Specification of Irradiance Sensors Si-RS485 Series

1. Supported Bus Protocol

Baudrate: 1200, 2400, 9600, 19200, 38400
Parity: No, even, odd
Stop bit: 1, 2 (only at no parity)
Factory Default: 9600 Baud, 8N1, adress: 1

For setting the bus protocol parameter the sensor offers the function code 0x46 of the MODBUS protocol.

2. MODBUS Specification

References:

- MODBUS over Serial Line Specification and Implementation Guide V1.02
- MODBUS Application Protocol Specification V1.1b

Transmission mode: MODBUS RTU

The Sensors will start MODBUS operation 4 seconds after power up.

Supported function codes:

- 0x04: Read Input Register
 - Register 0000: Irradiance measurement G in 0.1 W/m² (0..14000 for 0..1400.0 W/m²)
 - Register 0001: Cell temperature measurement T_{cell} in 0.1 °C, offset -25 °C (0..1000 for -25..+75°C)
 - Register 0002: External temperature measurement T_{ext} in 0.1 °C, offset -25 °C (0..1000 for -25..+75°C)
 - Register 0003: Wind speed measurement v in 0.1 m/s (0..800 for 0..80.0 m/s)
 - Register 0004: reserved

Please note: The Register 0002 and 0003 are optional for some sensor types. If your sensor does not support this register, it will return the value 0 for this register.

Si-RS485 Series - MODBUS Specification

Ingenieurbüro Mencke & Tegtmeyer GmbH - Meßgeräte für die Solartechnik Hameln, 10th of January 2011

Hohe Linden 8F, D-31789 Hameln, Tel. +49 - 51 51 - 40 36 99 - 0, Fax +49 - 51 51 - 40 36 99 - 19

- 0x08: Diagnostics
 - Sub function 0x00: Return Query Data
 - Sub function 0x01: Restart Communications Option
 - Sub function 0x04: Force Listen Only Mode
 - Sub function 0x0A: Clear Counters
 - Sub function 0x0B: Return Bus Message Count
 - Sub function 0x0C: Return Bus Communication Error Count
 - Sub function 0x0D: Return Slave Exception Error Count
 - Sub function 0x0E: Return Slave Message Count
 - Sub function 0x0F: Return Slave No Response Count
 - Sub function 0x10: Return Slave NAK Count
 - Sub function 0x11: Return Slave Busy Count
 - Sub function 0x12: Return Bus Character Overrun Count

- 0x46: Communication Parameter
 - Please note: These settings will take effect after restart the sensor by power on reset or restart communication command (function 0x08, Sub function 01).**
 - Sub function 04: Write Module Address

Request:

00	Address	1 Byte	1 to 247
01	Function Code	1 Byte	0x46
02	Sub Function Code	1 Byte	0x04
03	New Address	1 Byte	1 to 247

Response:

00	Address	1 Byte	1 to 247
01	Function Code	1 Byte	0x46
02	Sub Function Code	1 Byte	0x04
03	New Address	1 Byte	1 to 247

Si-RS485 Series - MODBUS Specification

Ingenieurbüro Mencke & Tegtmeyer GmbH - Meßgeräte für die Solartechnik Hameln, 10th of January 2011

Hohe Linden 8F, D-31789 Hameln, Tel. +49 - 51 51 - 40 36 99 - 0, Fax +49 - 51 51 - 40 36 99 - 19

- Sub function 05: Read Communication Parameter

Request:

00	Address	1 Byte	1 to 247
01	Function Code	1 Byte	0x46
02	Sub Function Code	1 Byte	0x05

Response:

00	Address	1 Byte	1 to 247
01	Function Code	1 Byte	0x46
02	Sub Function Code	1 Byte	0x05
03	Baud rate	1 Byte	0 to 4, see table below
04	Parity / Stop Bit	1 Byte	0 to 3, see table below

- Sub function 06: Write Communication Parameter

Request:

00	Address	1 Byte	1 to 247
01	Function Code	1 Byte	0x46
02	Sub Function Code	1 Byte	0x05
03	Baud rate	1 Byte	0 to 4, see table below
04	Parity / Stop Bit	1 Byte	0 to 3, see table below

Response:

00	Address	1 Byte	1 to 247
01	Function Code	1 Byte	0x46
02	Sub Function Code	1 Byte	0x05
03	Baud rate	1 Byte	0 to 3, see table below
04	Parity / Stop Bit	1 Byte	0 to 3, see table below

Si-RS485 Series - MODBUS Specification

Ingenieurbüro Mencke & Tegtmeier GmbH - Meßgeräte für die Solartechnik Hameln, 10th of January 2011

Hohe Linden 8F, D-31789 Hameln, Tel. +49 - 51 51 - 40 36 99 - 0, Fax +49 - 51 51 - 40 36 99 - 19

- Communication Parameter Setting Sub Function 05 and 06:

Baud rate	Value
1200	0
2400	1
9600	2
19200	3
38400	4

Parity / Stop Bit	Value
8N1 (10 Bit)	0
8N2 (11 Bit)	1
8E1 (11 Bit)	2
8O1 (11 Bit)	3

- Sub function 07: Hardware and Firmware Version

Request:

00	Address	1 Byte	1 to 247
01	Function Code	1 Byte	0x46
02	Sub Function Code	1 Byte	0x07

Response:

00	Address	1 Byte	1 to 247
01	Function Code	1 Byte	0x46
02	Sub Function Code	1 Byte	0x07
03	Hardware Version	2 Byte	0 to 65535
04	Firmware Version	2 Byte	0 to 65535

Exception Codes:

- 01: Illegal Function
- 02: Illegal Data Access
- 03: Illegal Data Value
- 04: Slave Device Failure