



Technical Description

SUNNY WEBBOX Modbus® Interface

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Important Safety Instructions

SAVE THESE INSTRUCTIONS

This manual contains important instructions for the following product:

- SUNNY WebBox

This manual must be followed during installation and maintenance.

The product is designed and tested in accordance with international safety requirements, but as with all electrical and electronic equipment, certain precautions must be observed when installing and/or operating the product. To reduce the risk of personal injury and to ensure the safe installation and operation of the product, you must carefully read and follow all instructions, cautions and warnings in this manual.

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1 Information on this Document

Validity

This document is valid for the SMA devices listed in section “7.1 Supported SMA Devices”, p. 70. It describes the variation of the communication protocol “Modbus^{®1} Application Protocol” implemented by SMA, as well as the associated parameters, measured values and data exchange formats.

This document does not include any information on the software communicating with the Modbus interface (see instructions of the software manufacturer).

Target Group

This document is intended for qualified employees. Only persons with the appropriate skills are allowed to perform the tasks described in this document (see section 2.2 “Target Group Qualifications”, p. 10).

Secondary Information

SMA documents

Additional information is available at www.SMA-Solar.com:

Title of Document	Type of Document
Sunny WebBox	User Manual
Measured Values and Parameters	Technical Description

Other documents

Title of Document	Source
Service Name and Transport Protocol Port Number Registry	http://www.iana.org/assignments/service-names-port-numbers/service-names-port-numbers.xml
Modbus Application Protocol Specification	http://www.modbus.org/specs.php

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Symbols

Symbol	Explanation
	Indicates information that is important for a specific topic or objective, but is not safety-relevant.
☐	Prerequisite that has to be met for a specific target.
☒	Desired result.

Typographies

Typography	Usage	Example
Bold	• File names • Elements that you have to select • Elements at a user interface • Elements that you have to enter • Parameters	• Select Settings. • Read the set port in field Port • Enter the value 502 in field Port
>	• Connects several elements that you have to select	• Select Settings > Port
[Button]	• Button that you have to select or click on	• Select [Next]
[Source]	• Data channel name	• Requesting the plant time (UTC) [SerTm]

Nomenclature

Complete designation	Designation in this document
Photovoltaic plant	PV plant
SMA America Production, LLC	SMA
SMA Solar Technology Canada Inc.	SMA
Sunny WebBox	WebBox

Abbreviations and Terms

Abbreviation/ Term	Designation	Explanation
CT	Current measuring unit	Hardware for string monitoring
Device-ID	-	Numerical value, which identifies a certain SMA device type, e.g. 155 = Sunny Central 250U.
DWORD	Double word	Data with a width of 32 bit, according to IEC 61131-3
GFDI	Ground-Fault Detection and Interruption	Detection of grounding faults and following disruption of the circuit
Hex	-	Hexadecimal number
IP	Internet Protocol	Network protocol for connections over the Internet
MPP	Maximum Power Point	The point on the current-voltage (I-V) curve of a solar module under illumination, where the product of current and voltage is maximum (P _{MAX} , measured in watts).
NaN	Not a number	No valid value is available
P _{MAX}	Active power, maximum value	A device can generated active power up to this limit
RO	Read Only	Value can only be read
RW	Read/Write	Value can be read and written
SCADA	Supervisory Control and Data Acquisition	Concept for monitoring and controlling technical processes; this handbook uses SCADA as an example for a Modbus master system.

SMA fieldbus	-	Interface for communication between SMA devices (e.g. RS485 or Ethernet). You can find information on supported communication interfaces in the data sheets of the SMA devices.
SMID	Supervised Multiple Input Device	Technical system in the SMA product "Optiprotect"
SMU	String Monitoring Unit	A String Monitoring Unit recognizes, in cooperation with a Sunny Central String-Monitor Controller, a reduced power or a breakdown of solar panels (Strings).
UTC	Coordinated Universal Time	-
VPN	Virtual Private Network	VPN is used to establish a connection from one private computer network to another. The point of connection is established on both sides by what is referred to as a 'VPN gateway'. In each case the VPN gateway may be a computer or a router. The connection itself is described as a VPN tunnel. A secured data stream runs via the tunnel from one network to the other, providing VPN nodes from one network with access to services and devices of the other network.
WORD	-	Data with a width of 16 bit, according to IEC 61131-3

2 Safety

2.1 Intended Use

The Modbus interface of WebBox is designed for industrial use and has the following tasks:

- Remote controlled request of measured values of a PV.
- Remote controlled change of parameters of a PV plant.

The Modbus interface can be used with the protocol Modbus TCP.

The enclosed documentation is an integral part of this product:

- Read and observe this documentation.
- Keep this document in a convenient place for future reference.

2.2 Target Group Qualifications

The activities described in this document must only be performed by qualified persons. Qualified persons must have the following skills:

- Knowledge of IP-based network protocols
- Training in the installation and configuration of IT systems
- Knowledge of and compliance with this document and all the safety precautions

2.3 Advices for Data Security



Data Security in Ethernet Networks

You can connect the WebBox to the Internet. Note that connecting to the Internet carries the risk that unauthorized users can gain access to and manipulate the data or devices in the plant.

- Take suitable protective measures, for example:
 - Set up a firewall
 - Close unnecessary network ports
 - Only enable remote access via VPN tunnel
 - Do not install a port forwarding for the used Modbus port

3 Product Description

3.1 Modbus Protocol

The Modbus Application Protocol is an industrial communication protocol that is currently mainly used in the solar sector for plant communication in PV power stations.

The Modbus protocol has been developed for reading data from or writing data to clearly defined data areas. The Modbus specification does not specify what data is within which data area. This information must be defined specifically for a device in a so-called Modbus profile. With knowledge of the specific Modbus profile, a Modbus master (e.g. a SCADA system) can access the data of a Modbus slave (e.g. Sunny WebBox).

The SMA Modbus profile is the special Modbus profile for SMA devices.

3.2 SMA Modbus Profile

The SMA Modbus profile contains definitions for selected SMA devices. For the definition there was a reduction of the available data and an assignment to the respective Modbus registers. The SMA Modbus profile contains for example overall and daily energy, current output, voltages and currents. The assignment between SMA device data and Modbus addresses is divided into sections in the SMA Modbus profile that can be addressed by Unit IDs (see section 3.5 "Reading and Writing Data in Modbus Protocol", page 15)

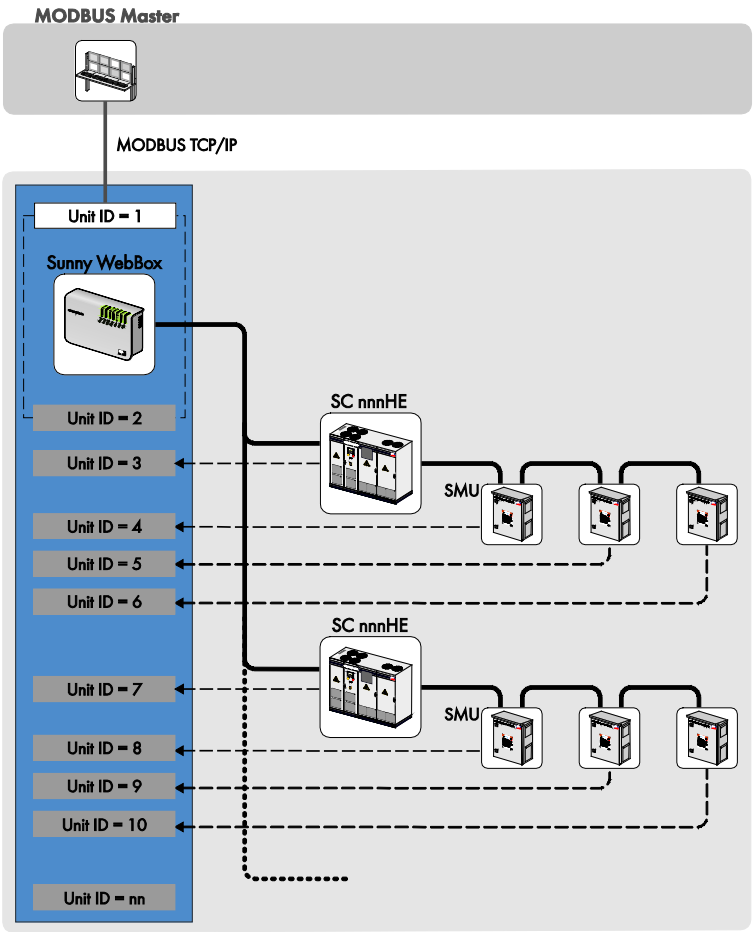
In order to enable access to data of an SMA device, a special gateway is required that is provided by Sunny WebBox.

3.3 Plant Topology

The SMA Modbus profile has been designed for a hierarchical plant structure. This structure contains the WebBox as communication device that is equipped with a Modbus TCP/IP interface. All other SMA devices that are connected to the WebBox via the SMA fieldbus are subordinate to it.

From the perspective of the Modbus protocol, the WebBox is a Modbus slave that provides a gateway to SMA devices. The SMA devices can only be addressed using this gateway per Unit ID.

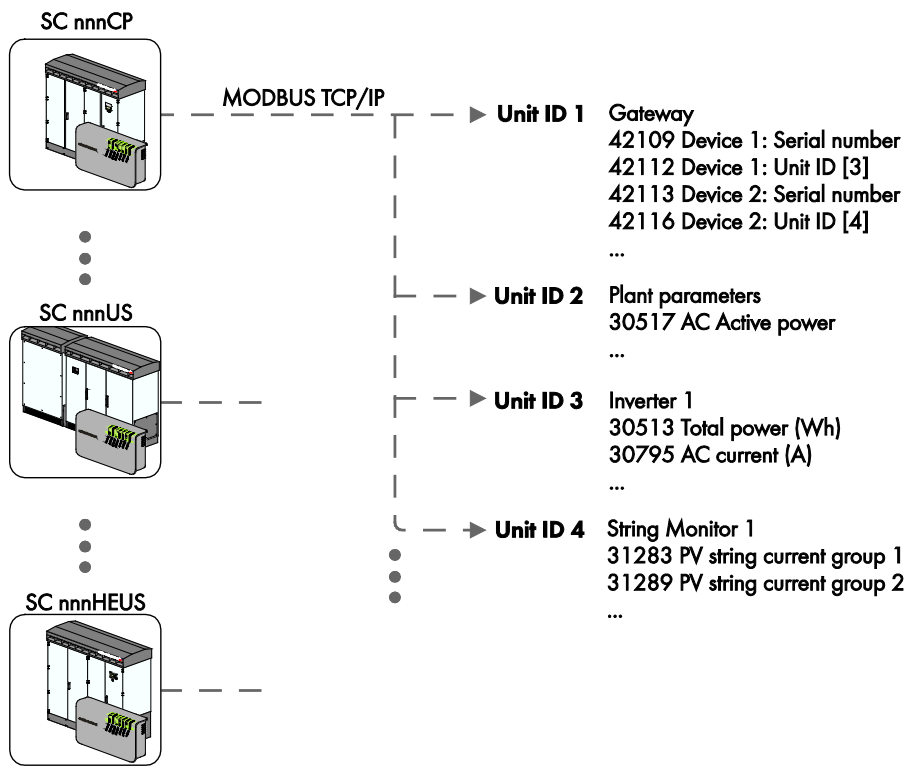
Example 1: Plant topology from the perspective of the SMA devices



Line	Explanation
—	IP network connection between SCADA system and WebBox (PV plant router)
—	SMA fieldbus
---	Logical assignment of SMA device to Unit ID

Example 2: Plant topology from the perspective of the Modbus

In the graphic below, an inverter and its String Monitoring Unit are assigned a Unit ID. With it, their data become available on the Modbus protocol. Unit ID 1 and Unit ID 2 represent the gateway to the Modbus interface as well as the plant parameters.



3.4 Addressing and Data Transmission in Modbus Protocol

3.4.1 Unit IDs

The Unit ID is a super-ordinate addressing method in Modbus protocol. The SMA Modbus profile has 247 Unit IDs available of which 245 can be assigned to individual devices. When a device is assigned to a Unit ID, its parameters and measured values can be accessed.

The following table shows a summary of the Unit IDs in SMA Modbus profile:

Unit ID	Explanation
1	This Unit ID is reserved for the gateway of WebBox.
2	This Unit ID is reserved for the plant parameters.
3 to 247	The Unit IDs 3 to 247 are used for addressing individual devices. You can change the assignment of these Unit IDs to individual devices (see section 4.4 "Changing Unit IDs via the Gateway", page 22).
255	Devices that are assigned to this Unit ID cannot be addressed. You have to assign these devices to Unit IDs of range 3 to 247 (see section 4.4 "Changing Unit IDs via the Gateway", page 22).

3.4.2 Assignment of Modbus Registers to Unit IDs

The assignment of parameters and measured values of SMA devices to Modbus register addresses is realized with assignment tables and accordingly explained in this document (see section 5 "SMA Modbus Profile – Assignment Tables", page 25).

The assignment table "Gateway (Unit ID = 1)" stores the assignments of SMA devices to individual Modbus registers. The assignment starts with address 42109 and each of it comprises an address range of 4 Modbus registers, whereby only the register with the Modbus address is writeable.

The assignment table "Plant Parameters (Unit ID = 2)" stores parameters and measured values of WebBox, as well as of the PV plant.

The assignment tables "SMA Devices (Unit ID = 3 to 247)" store the parameters and measured values in separate tables that are used for the individual SMA device families.

3.4.3 Modbus Register Address, Register Width and Data Block

A Modbus register is 16 bits wide. For broader data, connected registers are used and considered as data blocks. The number of connected Modbus registers is given in the assignment tables. The address of the first Modbus register of a data block is the start address of the data block. Moreover, large data blocks can be created.

3.4.4 Address Range for Modbus Registers

The address range 0 to 0xFFFF with 65536 addresses is available for addressing Modbus registers.

3.4.5 Data Transmission

According to the Modbus specification, only a certain amount of data can be transported in a simple protocol data unit (PDU) during a data transmission. The data also contains functional parameters, like e.g. functional code, start address or number of Modbus registers to be transmitted. The amount of data is depending on the used Modbus command and has to be considered for data transmission. The allowed number of Modbus registers per command is given in section 3.5.

Because of the data filing in Motorola format "Big-Endian" in case of a data transmission first the high byte and then the low byte of a Modbus register will be transmitted.

3.5 Reading and Writing Data in Modbus Protocol

The Modbus interface can be used with the protocol Modbus TCP. With this protocol, the Modbus registers can be read and written (RW).

The following Modbus commands are supported by the implemented Modbus interface:

Modbus Command	Hexadecimal Value	Amount of Data (Number of Registers) ²
Read Holding Registers	0x03	1 to 125
Read Input Registers	0x04	1 to 125
Write Single Register	0x06	1
Write Multiple Registers	0x10	1 to 123
Read Write Multiple Registers	0x17	Read: 1 to 125, Write: 1 to 121

² Number of Modbus registers (16 bit) transferable per command as data block

Reading or writing a single Modbus register

A Modbus exception will be generated if a Modbus register that is not contained in Modbus profile is accessed or if a Modbus command is erroneous. Just as, Modbus exceptions will be generated if a read only register is written or a write only register is read.

Reading or Writing Data Blocks

In order to avoid inconsistencies, data blocks of registers belonging together must be read or written in one step. For example, the 4 bytes of a 64 bit Modbus register have to be read with one operation into a 64 bit SMA data type.

Writing several Modbus registers as a data block

If several registers are written in a data block (Modbus commands 0x10 and 0x17) and an error occurs during writing, the next register in the data block will be processed. If data is mutually dependent or excludes each other a data block will only be processed if it is valid completely. Otherwise, the complete data block will be rejected. In the event of an error a Modbus exception will be generated.

Reading several Modbus registers as a data block

An answer will be returned if a data block is read and at least one register that is defined in the Modbus profile can be determined in the data blocks data range. If this block moreover contains Modbus registers that are not defined in Modbus profile, NaN will be generated in each case for their request values. A request is not valid and a Modbus exception will be generated if none of the Modbus registers in the data range of a data block is defined in Modbus profile.

Modbus exceptions

Modbus exceptions, see specification "Modbus Application Protocol Specification", under <http://www.modbus.org/specs.php>.

3.6 SMA Data Types

3.6.1 Data Types and NaN Values

The following table gives the data types used in the SMA Modbus profile and sets them against possible NaN values. The SMA data types are used in the assignment tables, in the **Type** column. They describe the data widths of the assigned values:

Type	Description	NaN value
U16	A word (16 bit/WORD) in the local processor format	0xFFFF
S16	Signed word (16 bit/WORD) in the local processor format	0x8000
U32	A double word (32 bit/DWORD) in the local processor format	0xFFFF FFFF
S32	A signed double word (32 bit/DWORD) in the local processor format	0x8000 0000
U64	A quad word (64 bit/2 x DWORD) in the local processor format	0xFFFF FFFF FFFF FFFF

3.6.2 16 Bit Integer Values

16 bit integers are stored in one Modbus register.

Modbus register	1	
Byte	0	1
Bits	8 ... 15	0 ... 7

3.6.3 32 Bit Integer Values

32 bit integers are stored in two Modbus registers.

Modbus register	1		2	
Byte	0	1	2	3
Bits	24 ... 31	16 ... 23	8 ... 15	0 ... 7

3.6.4 64 Bit Integer Values

64 bit integers are stored in four Modbus registers.

Modbus register	1		2	
Byte	0	1	2	3
Bits	56 ... 63	48 ... 55	40 ... 47	32 ... 39
Modbus register	3		4	
Byte	4	5	6	7
Bits	24 ... 31	16 ... 23	8 ... 15	0 ... 7

3.7 SMA Data Formats

The following SMA data formats describe how SMA data have to be interpreted. Data formats are e. g. important for data display or for further processing. In the assignment tables the SMA data formats are used in column **Format**.

Format	Explanation
Duration	Time period Time in seconds, in minutes or in hours, depending on the Modbus register.
DT	Date/Time Date/time, in accordance with country setting. Transmission as UTC (seconds since 01/01/1970).
FIX0	Factor 1 Decimal number, commercially rounded, no decimal places.
FIX1	Factor 0.1 Decimal number, commercially rounded, one decimal place.
FIX2	Factor 0.01 Decimal number, commercially rounded, two decimal places.
FIX3	Factor 0.001 Decimal number, commercially rounded, three decimal places.
FW	Firmware version (see "Firmware version excursus", below).

RAW	Text or number. A RAW number has no decimal places and no thousand or other separation indicators.
ENUM	Coded numerical values. You will find the breakdown of the code in each case directly under the description of the Modbus register in the assignment tables of the SMA Modbus profile (see also section 7.7 "Frequently used Numerical Codes (ENUM)", page 77).
TEMP	Temperature Temperature values are given in special Modbus registers in degrees Celsius, in degrees Fahrenheit or in Kelvin. The values are given commercially rounded with one decimal place.

Firmware version excursus, format "FW": Four values are extracted from the delivered DWORD. The values **Major** and **Minor** are contained BCD coded in bytes 1 and 2. Byte 3 contains the **Build** value (not BCD coded). The **Release type** in accordance with the following table is contained in the 4th byte:

Release Type	Coded Release Type	Explanation
0	N	No revision number
1	E	Experimental release
2	A	Alpha release
3	B	Beta release
4	R	Release
5	S	Special release
> 5	As number	No special interpretation

Example:

Firmware version of the product: 1.5.10.R
Values from DWORD: Major: 1, Minor: 5, Build: 10, Release type: 4
(Hex: 0x1 0x5 0xA 0x4)

4 Commissioning & Configuration

4.1 Commissioning Steps and Requirements

Requirements:

- ☐ The devices in the plant have to be connected to the WebBox and the plant has to be set into operation (Commissioning see user guide of the WebBox).
- ☐ Log in on the WebBox as installer (Logging In and Out of the Sunny WebBox see user manual of the WebBox)

Procedure:

1. Check the firmware version and if necessary carry out a firmware update (Firmware update for the Sunny WebBox see user manual of the WebBox). A firmware update to a newer version is recommended to enable the WebBox to support the SMA devices contained in the included SMA Modbus profile. You can find the required firmware version in section 7.1 "Supported SMA Devices", page 70.
2. Activate the Modbus server and if necessary, configure the communication port (see section 4.2 "Activating Modbus and Configuring the Port", page 21).



Distribution of Unit IDs through the activation of the Modbus server

With activating the Modbus server of WebBox Unit IDs will be assigned to the already connected SMA devices. The already assigned Unit IDs remain valid when the Modbus server is deactivated and reactivated again.

3. Execute plant detection if new devices have been added or if devices have been changed (see section 4.3 "Plant Detection - Automatic Distribution of the Unit IDs", page 21).
4. Change the Unit IDs for the case that new or exchanged devices of the plant cannot be reached with the Modbus protocol. You can either change the Unit IDs with the Modbus protocol through the gateway or with the user interface:
 - With the gateway, see section 4.4 "Changing Unit IDs via the Gateway", page 22
 - With the user interface, see section 4.5 "Changing Unit IDs with the user interface", page 24

4.2 Activating Modbus and Configuring the Port

If Sunny WebBox is already equipped with the necessary firmware or you already have installed an appropriate firmware, next the Modbus interface has to be activated. By default, the Modbus interface of Sunny WebBox is deactivated. If necessary, you can additionally change the communication port for the Modbus protocol with the described steps. However, we recommend letting the default communication port at 502.



Changing the Port

You also have to change the Modbus port of a connected Modbus master-system if you change the "Modbus-Port" of Sunny WebBox. Otherwise, Sunny WebBox can no more be accessed through the Modbus protocol.

Procedure:

1. Login to the user interface of Sunny WebBox as installer.
2. Select **Settings > Network**.
3. On page **Network Settings**:
In field **Use Modbus** select the option **Yes**.
4. If necessary, specify another port in field **Modbus-Port**.
5. Select [**Save**].

4.3 Plant Detection - Automatic Distribution of the Unit IDs

For a new PV plant or if other SMA devices are added or replaced, they must be added to the WebBox. During that process Unit IDs are allocated to the SMA devices (see section 3.4.1 "Unit IDs", page 14):



Unit ID after plant detection

When first detecting a plant and when adding further or modified SMA devices, they must be designated with the Modbus Unit ID = 255 (NaN) . These devices can then no longer be addressed and their measured values and parameters cannot be accessed via the Modbus gateway. You must change such assignments manually (see 4.4 "Changing Unit IDs via the Gateway", page 22).



Repeating the plant detection

If the plant is detected once again without any changes being made, existing Unit IDs that have been assigned will remain valid.

Procedure (plant detection):

1. Log into the user interface of the Sunny WebBox as an installer.
2. Select **Plant > Detect**.
 - ☒ The page **Plant detection** opens.
3. In the **Total number of devices to be detected** field, enter the number of devices connected to the Sunny WebBox.
4. Select **[Start detection]**.
 - ☒ The Sunny WebBox starts detecting all devices and displays its progress. Once all devices have been detected, the Sunny WebBox displays "#### Device detection finished ####".
5. Select **[OK]**.
 - ☒ The **Plant > Devices** page is displayed. The devices have been detected.

4.4 Changing Unit IDs via the Gateway

4.4.1 Reading out the Gateway

You can read out the individual Unit IDs of the SMA devices from the gateway.

Accessing the gateway

You access the gateway via the IP address of the WebBox under the Unit ID = 1.

The assignment of the plant devices to the Unit IDs 3 to 247 is saved in the Modbus registers from address 42109 on. Each assignment has an address range of 4 Modbus registers. You can find the Modbus registers of the gateway in section 5.2 "Gateway", page 26.

Exemplary assignment table:

An additional device was assigned the Unit ID = 255 by the automatic plant detection (in the following table labelled C in Column "Device#"). The assignments of the gateway were displayed with a SCADA system, as follows:

Modbus address	Content	Description	Device #
...	...	...	
42109	158	Device-ID	A
42110	2145600972	Serial number	A
42112	3	Unit ID	A
42113	160	Device-ID	B

42114	2145600320	Serial number	B
42116	4	Unit ID	B
42117	215	Device-ID	C
42118	2145600934	Serial number	C
42120	255	Unit ID	C
...	...	...	...

4.4.2 Changing Unit IDs in the Gateway

You change a Unit ID by writing it to the corresponding Modbus address. To do this all three Modbus registers belonging to a device-Unit ID-assignment must be transferred in one block of data, whereby only the register with the Unit ID is writeable. For the following example this means that all of the three Modbus addresses 42117, 42118 and 42120 have to be contained in the data block.



Do not assign duplicate Unit IDs

You must not assign duplicate Unit IDs. If there is a duplicate assignment of a Unit ID, the device data that is entered in the assignment table of the gateway under the lowest Modbus address is always read out in the event of a Modbus request of this Unit ID.

Example “Changing the Unit ID in the Gateway”

The following table shows an example assignment of device to Unit ID. An SMA device with device-ID = 160 and serial number 2145600320 has been detected subsequently as the third device in the plant. The Unit ID of this device was manually set to 5:

Modbus address	Description	After detection	Modified
42113	Device-ID	160	160
42114	Serial number	2145600320	2145600320
42116	Unit ID	255 (NaN)	5

4.5 Changing Unit IDs with the user interface

Overview:

- Show the assignment table in the user interface
- Change Unit ID in the assignment table in the user interface



Checking the Unit IDs automatically

You cannot allocate the same Unit ID twice in a user interface. Only Unit IDs from the valid range can be assigned. If you have accidentally entered a Unit ID twice or if a Unit ID is not from the valid range, a warning message will be displayed when saving. You may then correct and save the entries.

Procedure:

1. Select **Data > Devices > Modbus**.
 - ☒ On the page displayed, you can see the section **Device** with the columns **Device ID** and **Unit ID**.
2. Enter the required Unit ID in the column **Unit ID** next to the respective device or profile.
3. Select **[Save]**.
 - ✗ Warning: data could not be saved. Please check your entry! Next to incorrect entries one of the following information will be displayed:
 - "Unit ID is already assigned": Enter another Unit ID
 - "Unit ID is not within the range (3...247)" Use a Unit ID from the range 3 to 247.

5 SMA Modbus Profile – Assignment Tables

5.1 Information on the Assignment Tables

The following sections are sorted by Unit ID. Each section contains a table of the Modbus addresses which can be accessed under the corresponding Unit ID. The tables present the following information:

Information	Explanation
ADR (DEC)	Decimal Modbus address (see also section 3.4 and following)
Description/Numerical code(s)	Brief description of the Modbus register and the possible numerical codes. The name of the SMA data channel is additionally specified in square brackets if available.
CNT	Number of utilized Modbus registers (see also section 3.4 and following)
Type	Data type, e.g. U32 = 32 bit without algebraic sign (see also section 3.4)
Format	Data format of the stored value, e.g. DT = date, FIX n = output with n decimal places, TEMP = output as temperature (see also section 3.7)
Access	Access type for Modbus TCP (see section 3.5 "Reading and Writing Data in Modbus Protocol", page 15): RO: read-only access RW: read-write access A Modbus exception will be generated if an access type is not supported.

5.2 Gateway (Unit ID = 1)

In the following table you can find the parameters and measured values provided by the gateway, which you can access under the Unit ID = 1. Furthermore you will find the assignment of the SMA devices to the Unit IDs. You can access the gateway under the IP address of the WebBox:

 Unit ID = 255

For Unit ID = 255, observe section 3.4.1 "Unit IDs", page 14.

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30001	Version number of the SMA Modbus profile	2	U32	RAW	RO
30003	Device ID of the WebBox	2	U32	RAW	RO
30007	Modbus data change: Counter value will increase if data in the profile has changed.	2	U32	RAW	RO
30057	Serial number of the WebBox	2	U32	RAW	RO
Assignment Unit ID – SMA devices (see also section 5 "SMA Modbus Profile – Assignment Tables", page 25):					
42109	Device 1: Device-ID	1	U16	RAW	RO
42110	Device 1: Serial number	2	U32	RAW	RO
42112	Device 1: Unit ID, e.g. 3	1	U16	RAW	RW
42113	Device 2: Device-ID	1	U16	RAW	RO
42114	Device 2: Serial number	2	U32	RAW	RO
42116	Device 2: Unit ID, e.g. 4	1	U16	RAW	RW
...	...	...	...	...	...
43085	Device 245: Device-ID	1	U16	RAW	RO
43086	Device 245: Serial number	2	U32	RAW	RO
43088	Device 245: Unit ID, e.g. 247	1	U16	RAW	RW

5.3 Plant Parameters (Unit ID = 2)

In the following table you can find the plant parameters which you can access under Unit ID = 2. The plant parameters represent measured values and parameters of the WebBox, as well as of the devices of the PV plant that are connected via Modbus protocol. Parameters like for example time settings are passed through to the devices of the PV plant by WebBox. Depending on the device types the parameters are furtheron processed accordingly. Measured values like for example energy counters are requested from the devices and provided as accumulated values:

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30001	Version number of the SMA Modbus profile	2	U32	RAW	RO
30003	Device ID of the WebBox	2	U32	RAW	RO
30007	Modbus data change: Counter value will increase if data in the profile has changed.	2	U32	RAW	RO
30057	Serial number of the WebBox [Serial Number]	2	U32	RAW	RO
30193	Reading the plant time (UTC) [SerTm]	2	U32	DT	RO
	Reading the time zone (UTC).				
30195	For possible values, see section 7.6 "Numerical Codes for Time Zones", page 75.	2	U32	ENUM	RO
30513	Total yield (Wh) [E-Total]	4	U64	FIX0	RO
30517	Day yield (Wh) [E-heute]	4	U64	FIX0	RO
30529	Total yield (Wh) [E-Total]	2	U32	FIX0	RO
30531	Total yield (kWh) [E-Total]	2	U32	FIX0	RO
30533	Total yield (MWh) [E-Total]	2	U32	FIX0	RO
30535	Day yield (Wh) [E-heute]	2	U32	FIX0	RO
30537	Day yield (kWh) [E-heute]	2	U32	FIX0	RO
30539	Day yield (MWh) [E-heute]	2	U32	FIX0	RO
30775	AC active power across all phases (W) [Pac]	2	S32	FIX0	RO
40001	Setting of the plant time (UTC) [SerTm]	2	U32	DT	RW
	Selected time zone for the display [TmZn]. For possible values, see section 7.6 "Numerical Codes for Time Zones", page 75.				
40003		2	U32	ENUM	RW

5.4 SMA Devices (Unit ID = 3 to 247)

5.4.1 Common Addresses of all SMA Devices

In the following table, you will find the measured values and parameters, which you can access under the Unit IDs = 3-247. The table does not apply to the Unit IDs 1 and 2:

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30057	Serial number [Serial Number]	2	U32	RAW	RO
30193	Reading the plant time (UTC) [SerTm]	2	U32	DT	RO
30197	Event ID of the current event (number of digits is limited by the device) [ErrNo]; see also section 6 "Troubleshooting", page 69.	2	U32	FIX0	RO
30231	Maximum possible continuous active power, fixed configuration. Can be greater than the nominal power (W) [Plimit]	2	U32	FIX0	RO
30233	Permanent active power limitation (W) [Pmax]	2	U32	FIX0	RO
30513	Total yield (Wh) [E-total]	4	U64	FIX0	RO
30517	Day yield (Wh) [E-heute]	4	U64	FIX0	RO
30521	Operating time (s) [h-On]	4	U64	Duration	RO
30525	Feed-in time (s) [h-total]	4	U64	Duration	RO
30529	Total yield (Wh) [E-Total]	2	U32	FIX0	RO
30531	Total yield (kWh) [E-Total]	2	U32	FIX0	RO
30533	Total yield (MWh) [E-Total]	2	U32	FIX0	RO
30541	Operating time (s) [h-on]	2	U32	Duration	RO
30543	Feed-in time (s) [h-Total]	2	U32	Duration	RO
30769	DC current input (A) [I _{pv}]	2	S32	FIX3	RO
30771	DC voltage input (V) [V _{pv}]	2	S32	FIX2	RO
30773	DC power input (W) [P _{pv}]	2	S32	FIX0	RO
30775	AC active power across all phases (W) [P _{ac}]	2	S32	FIX0	RO
30789	Grid voltage phase AB (V) [VacL12]	2	U32	FIX2	RO
30791	Grid voltage phase BC (V) [VacL23]	2	U32	FIX2	RO

30793	Grid voltage phase CA (V) [VacL31]	2	U32	FIX2	RO
30795	Grid current (A) [Iac]	2	U32	FIX3	RO
30803	Power frequency (Hz) [Fac]	2	U32	FIX2	RO
30805	Reactive power (var) [Qac]	2	S32	FIX2	RO
30813	Apparent power ³ (VA) [Sac]	2	S32	FIX0	RO
30837	Active power target value (W) [P-WSpf]	2	U32	FIX0	RO
34109	Heat sink temperature 1 (°C) [TmpHs]	2	S32	TEMP	RO
34113	Interior temperature 1 (°C) [TmpCab1]	2	S32	TEMP	RO
34125	External temperature 1 (air supply) (°C) [TmpEx11]	2	S32	TEMP	RO
40001	Setting of the plant time (UTC) [SerTm]	2	U32	DT	RW

³ Due to internal calculation of the apparent power [Sac] for SC nnnCP it cannot be guaranteed that this value is available synchronous to the measured values reactive power [Qac] and active power [Pac].

5.4.2 Device Family SB n000US

In the following table, you will find the measured values and parameters supported by the SB n000US device family, which you can access under the Unit IDs = 3-247 (see section 3.4.1 "Unit IDs", page 14):



Address compatibility

The assignments in section 5.4.1 "Common Addresses of all SMA Devices", page 28, do **not** apply to this device type.

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30051	Device class [MainModel]: 260 = Solar inverter	2	U32	ENUM	RO
30057	Serial number [SMA-SN]	2	U32	RAW	RO
	Message [Error]: 71 = Interference of device 84 = Over current grid (HW) 87 = Grid frequency disturbance 89 = Grid disconnection point 90 = Deviation grid voltage measurement 125 = Overvoltage input A (SW) 132 = System data defective 133 = System data access not possible 134 = System data restored				
30213	141 = Derating occurred 145 = Relay defect 148 = Internal communication 156 = Execution (Operation) 168 = Code memory defective 189 = Execution (State machine) 208 = Execution (Watchdog) 520 = Over temperature transformer area 540 = Ground fuse missing 542 = Internal measurement comparison fault 543 = Internal measurement comparison fault 546 = Measurement recording fault	2	U32	ENUM	RO

	547 = Grid fault reported 1004 = Grid type detection failed 1007 = Over current Ground fuse 1255 = Grid voltage fault 1598 = Transformer incorrectly connected				
30231	Maximum permanent active power, set unchangeable. Can be higher than the rated power (W) [Plimit]	2	U32	FIX0	RO
30233	Permanent active power limitation (W) [Pmax]	2	U32	FIX0	RO
30235	Status of the backup mode [Backup State]: 1440 = Grid mode 1441 = Separate grid mode	2	U32	ENUM	RO
30237	Grid type [Grid Type]: 1433 = 277 Volt 1434 = 208 Volt 1435 = 240 Volt 1436 = 208 Volt without neutral conductor 1437 = 240 Volt without neutral conductor	2	U32	ENUM	RO
30239	Operating mode of the PowerBalancer [Balancer]: 303 = Off 1442 = PhaseGuard 1443 = PowerGuard 1444 = FaultGuard	2	U32	ENUM	RO
30241	Operation mode [Mode]: 295 = MPP 381 = Stop 443 = Constant voltage 557 = Temperature derating is active 565 = Power specification via characteristic curve 1392 = Fault 1466 = Waiting 1467 = Starting 1468 = Searching for MPP 1470 = Disturbance 2100 = Power limitation to avoid unbalanced load (Power Balancing)	2	U32	ENUM	RO

30513	Total yield (Wh) [E-Total]	4	U64	FIX0	RO
30521	Operating time (s) [h-On]	4	U64	Duration	RO
30525	Feed-in time (s) [h-Total]	4	U64	Duration	RO
30529	Total yield (Wh) [E-Total]	2	U32	FIX0	RO
30531	Total yield (kWh) [E-Total]	2	U32	FIX0	RO
30533	Total yield (MWh) [E-Total]	2	U32	FIX0	RO
30561	Number of events for installer [Event-Cnt]	2	U32	FIX0	RO
30769	DC current input (A) [I _{pv}]	2	S32	FIX3	RO
30771	DC voltage input (V) [V _{pv}]	2	S32	FIX2	RO
30775	AC active power across all phases (W) [P _{ac}]	2	S32	FIX0	RO
30783	Grid voltage L1 against N (V) [V _{acL1}]	2	U32	FIX2	RO
30785	Grid voltage L2 against N (V) [V _{acL2}]	2	U32	FIX2	RO
30797	Grid current L1 (A) [I _{ac}]	2	U32	FIX3	RO
30803	Power frequency (Hz) [F _{ac}]	2	U32	FIX2	RO
Type of inverter control [Operating mode]:					
295 = MPP					
40007	381 = Stop	2	U32	ENUM	RW
443 = Constant voltage					
565 = Power specification via characteristic curve					

5.4.3 Device Family SB nn000TL-US-12

In the following table, you will find the measured values and parameters supported by the SB nn000TL-US-12 device family, which you can access under the Unit IDs = 3-247 (see section 3.4.1 "Unit IDs", page 14):

 Address compatibility

The assignments in section 5.4.1 "Common Addresses of all SMA Devices", page 28, do **not** apply to this device type.

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30051	Device class [MainModel]: 260 = Solar inverter	2	U32	ENUM	RO
30057	Serial number [SMA-SN]	2	U32	RAW	RO
	Message [Error]: 71 = Interference of device 84 = Over current grid (HW) 85 = Over current grid (HW) (SW) 87 = Grid frequency disturbance 90 = Deviation grid voltage measurement 99 = High discharge current 110 = DI converter fault 112 = Residual current 119 = DC grid feed-in				
30213	123 = Overvoltage intermediate circuit (SW) 125 = Overvoltage input A (SW) 132 = System data defective 133 = System data access not possible 134 = System data restored 139 = Execution (Test HW) 141 = Derating occurred 145 = Relay defect 148 = Internal communication 149 = Insulation failure 150 = Sensor system insulation resistance 156 = Execution (Operation)	2	U32	ENUM	RO

	163 = L/N swapped				
	166 = Memory defective				
	168 = Code memory defective				
	189 = Execution (State machine)				
	207 = Bridge short-circuit				
	208 = Execution (Watchdog)				
	542 = Internal measurement comparison fault				
	543 = Internal measurement comparison fault				
	546 = Measurement recording fault				
	547 = Grid fault reported				
	1003 = Intermediate circuit voltages not permitted				
	1004 = Grid type detection failed				
	1255 = Grid voltage fault.				
	1655 = Electric arc detected				
	1657 = AFCI self-test failed				
30231	Maximum permanent active power, set unchangeable. Can be higher than the rated power (W) [Plimit]	2	U32	FIX0	RO
30233	Permanent active power limitation (W) [Pmax]	2	U32	FIX0	RO
30235	Status of the backup mode [Backup State]: 1440 = Grid mode 1441 = Separate grid mode	2	U32	ENUM	RO
30237	Grid type [Grid Type]: 1435 = 240 Volt 1436 = 208 Volt without neutral conductor 1437 = 240 Volt without neutral conductor 1530 = 208V WYE	2	U32	ENUM	RO
30239	Operating mode of the PowerBalancer [Balancer]: 303 = Off 1442 = PhaseGuard 1443 = PowerGuard 1444 = FaultGuard	2	U32	ENUM	RO
30241	Operation mode [Mode]: 295 = MPP 381 = Stop 443 = Constant voltage 557 = Temperature derating is active 1392 = Fault 1466 = Waiting	2	U32	ENUM	RO

	1467 = Starting				
	1468 = Searching for MPP				
	1470 = Disturbance				
	2100 = Power limitation to avoid unbalanced load (Power Balancing)				
	2101 = Insulation measurement				
30513	Total yield (Wh) [E-Total]	4	U64	FIX0	RO
30521	Operating time (s) [h-On]	4	U64	Duration	RO
30525	Feed-in time (s) [h-Total]	4	U64	Duration	RO
30529	Total yield (Wh) [E-Total]	2	U32	FIX0	RO
30531	Total yield (kWh) [E-Total]	2	U32	FIX0	RO
30533	Total yield (MWh) [E-Total]	2	U32	FIX0	RO
30561	Number of events for installer [Event-Cnt]	2	U32	FIX0	RO
30769	DC current input (A) [I _{pv}]	2	S32	FIX3	RO
30771	DC voltage input (V) [V _{pv}]	2	S32	FIX2	RO
30775	AC active power across all phases (W) [P _{ac}]	2	S32	FIX0	RO
30783	Grid voltage L1 against N (V) [V _{acL1}]	2	U32	FIX2	RO
30785	Grid voltage L2 against N (V) [V _{acL2}]	2	U32	FIX2	RO
30797	Grid current L1 (A) [I _{ac}]	2	U32	FIX3	RO
30803	Power frequency (Hz) [F _{ac}]	2	U32	FIX2	RO
	Type of inverter control [Operating mode]:				
40007	295 = MPP	2	U32	ENUM	RW
	381 = Stop				
	443 = Constant voltage				

5.4.4 Device Family SC nnnCP and SC nnnHE-20

In the following table, you will find the measured values and parameters supported by the SC nnnCP and SC nnnHE-20 device family, which you can access under the Unit IDs = 3-247 (see section 3.4.1 "Unit IDs", page 14). The assignments in section 5.4.1 "Common Addresses of all SMA Devices", page 28 also apply to this table:

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30195	Reading the time zone (UTC) [TmZn]: For possible values, see section 7.6 "Numerical Codes for Time Zones", page 75.	2	U32	ENUM	RO
30199	Time until grid connection attempt (s) [TmsRmg]	2	U32	Duration	RO
30211	Recommended action [Prio]: 336 = Contact manufacturer 337 = Contact installer 338 = Invalid	2	U32	ENUM	RO
30217	Grid contactor [GriSwStt]: 51 = Contactor closed 311 = Contactor open	2	U32	ENUM	RO
30225	Insulation resistance (ohms) [Riso]	2	U32	FIX0	RO
30227	Status of the key switch [DInKeySwStrStp]: 381 = Stop 569 = Activated	2	U32	ENUM	RO
30241	Operating state [Mode]: 309 = Operation 381 = Stop 455 = Warning 1392 = Error 1393 = Wait for PV voltage 1394 = Wait for AC grid 1480 = "Wait for electricity supplier" operating state (for regulation 0%) 1560 = Remote control disconnection active 2383 = Manual restart	2	U32	ENUM	RO

30243	Error [Error]: 267 = Inverter 1395 = DC section 1396 = AC grid	2	U32	ENUM	RO
30247	Current event number for manufacturer [ErrNoSma]	2	U32	FIX0	RO
30249	GFDI relay status [DInGfdi]: 51 = closed 311 = open	2	U32	ENUM	RO
30251	Restart block status [ManResStt]: 1690 = Fast shut-down 2386 = Overvoltage 2387 = Undervoltage 2388 = Overfrequency 2389 = Underfrequency 2390 = Passive island detection 2490 = Phase Lost Detection	2	U32	ENUM	RO
30257	DC switch in cabinet [DcSwStt]: 51 = Closed 311 = Open	2	U32	ENUM	RO
30261	AC switch 1 in cabinet [AcSwStt]: 51 = Closed 311 = Open	2	U32	ENUM	RO
30265	AC switch-disconnector in cabinet [AcDiscon]: 51 = Closed 311 = Open	2	U32	ENUM	RO
30535	Day yield (Wh) [E-heute]	2	U32	FIX0	RO
30537	Day yield (kWh) [E-heute]	2	U32	FIX0	RO
30539	Day yield (MWh) [E-heute]	2	U32	FIX0	RO
30545	Operating time interior fan 1 (s) [CntFanCab1]	2	U32	Duration	RO
30547	Operating time interior fan 2 (s) [CntFanCab2]	2	U32	Duration	RO
30549	Operating time heat sink fan (s) [CntFanHs]	2	U32	Duration	RO
30557	Operating time cabinet heating 2 (s) [CntHtCab2]	2	U32	Duration	RO
30601	Operating time interior fan 3 (s) [CntFanCab3]	2	U32	Duration	RO
30799	Grid current L2 (A) [IacL2]	2	U32	FIX3	RO
30801	Grid current L3 (A) [IacL3]	2	U32	FIX3	RO
30821	Displacement power factor, across all phases [PF]	2	U32	FIX2	RO

30823	Excitation type of $\cos \varphi$ [PFExt]:	2	U32	ENUM	RO
	1041 = Capacitive 1042 = Inductive				
30825	Operating mode of reactive power regulation [Q-VArMod]:	2	U32	ENUM	RO
	303 = Off 1069 = Reactive power/Voltage characteristic curve Q(U) 1070 = Reactive power Q, direct default setting 1071 = Reactive power const. Q (kvar) 1072 = Reactive power Q, default setting via plant control 1074 = $\cos \varphi$, direct default setting 1075 = $\cos \varphi$, default setting via plant control 1076 = $\cos \varphi(P)$ – characteristic curve 1387 = Reactive power Q, default setting via analog input 1388 = $\cos \varphi$, default setting via analog input 1389 = Reactive power/Voltage characteristic curve Q(U) with hysteresis and deadband				
30827	Reactive power target value (var) [SpntPwrRt]	2	S32	FIX0	RO
30829	Reactive power target value (%) [Q-VArNom]	2	S32	FIX1	RO
30831	Target value $\cos \varphi$ [PF-PFSpt]	2	S32	FIX2	RO
30833	Target value excitation type of $\cos \varphi$ [PF-PFExtSpt]:	2	U32	ENUM	RO
	1041 = Capacitive 1042 = Inductive				
30835	Operating mode of active power limitation [P-WMod]:	2	U32	ENUM	RO
	303 = Off 1077 = Active power limitation P (W) 1078 = Active power limitation P in (%) of P _{MAX} 1079 = Active power limitation P through plant control 1390 = Active power limitation P via analog inputs 1391 = Active power limitation P via digital inputs				
30839	Active power target value (%) [P-WNom]	2	U32	FIX0	RO
30841	AC voltages (average of all string voltages) (V) [Vac]	2	U32	FIX2	RO

30919	Operating mode of static voltage-stability for "Q at Night" [QoDQ-VArMod]: 303 = Off 1069 = Reactive power/voltage characteristic curve Q(U) 1070 = Reactive power Q, direct specification 1071 = React. power const. Q in kvar 1072 = Q specified by plant control 1387 = Reactive power Q, specified via analogue input 1389 = Reactive power/volt. char. Q(U) parameterised	2	U32	ENUM	RO
	Reactive power setpoint for "Q at Night" (var) [QoDQ-VAr]	2	S32	FIX0	RO
	Reactive power setpoint for "Q at Night" (%) [QoDQ-VArNom]	2	S32	FIX1	RO
	Operating time interior fan 1 (s) [CntFanCab1]	4	U64	Duration	RO
	Operating time interior fan 2 (s) [CntFanCab2]	4	U64	Duration	RO
	Operating time heat sink fan (s) [CntFanHs]	4	U64	Duration	RO
	Interior temperature 3 (°C) [TmpCab3]	2	S32	TEMP	RO
34141	Operating time interior heater 2 (s) [CntHtCab2]	4	U64	Duration	RO
34145	Temperature of the sine-wave filter chokes (°C) [TmpCol]	2	S32	TEMP	RO
34613	Total irradiation on sensor surface (W/m ²) [ExtSollrr]	2	U32	FIX0	RO
34637	Analogue current input 1 (mA) [ExtSollrr]	2	S32	FIX2	RO
34639	Analogue current input 2 (mA) [ExLAnalnCur]	2	S32	FIX2	RO
34645	Analogue voltage input 1 (V) [ExLAnalnV1]	2	S32	FIX2	RO
40003	Selected time zone for the display [TmZn]. For possible values, see section "Numerical Codes for Time Zones", page 75.	2	U32	ENUM	RW
40009	Operating state [SpntRemEna]: 381 = Stop 569 = Switched on	2	U32	ENUM	RW
40020	External measurement of the insulation resistance: 303 = Off 308 = On	2	U32	ENUM	RW

5.4.5 Device Family SC nnnHE-US

In the following table, you will find the measured values and parameters supported by the SC nnnHE-US device family, which you can access under the Unit IDs = 3-247 (see section 3.4.1 "Unit IDs", page 14). The assignments in section 5.4.1 "Common Addresses of all SMA Devices", page 28 also apply to this table:

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30199	Time until grid connection attempt (s) [TmsRmg]	2	U32	Duration	RO
30211	Recommended action [Prio]: 336 = Contact manufacturer 337 = Contact installer 338 = Invalid	2	U32	ENUM	RO
30217	Grid contactor [GdCtcStt]: 51 = Contactor closed 311 = Contactor open	2	U32	ENUM	RO
30241	Operating state [Mode]: 309 = Operation 455 = Warning 1392 = Error 1470 = Fault	2	U32	ENUM	RO
30243	Error [Error]: 267 = Inverter 1395 = DC section 1396 = AC grid	2	U32	ENUM	RO
30247	Current event number for manufacturer [ErrNoSma]	2	U32	FIX0	RO
30257	DC switch in cabinet [DcSwStt]: 51 = Closed 311 = Open	2	U32	ENUM	RO
30261	AC switch 1 in cabinet [AcSwStt]: 51 = Closed 311 = Open	2	U32	ENUM	RO
30265	AC switch-disconnector in cabinet [DlnErrAcScir]: 51 = Closed 311 = Open	2	U32	ENUM	RO

30535	Day yield (Wh) [E-heute]	2	U32	FIX0	RO
30537	Day yield (kWh) [E-heute]	2	U32	FIX0	RO
30539	Day yield (MWh) [E-heute]	2	U32	FIX0	RO
30547	Operating time interior fan 2 (s) [CntFanCab2]	2	U32	Duration	RO
30549	Operating time heat sink fan (s) [CntFanHs]	2	U32	Duration	RO
30797	Grid current L1 (A) [IacL1]	2	U32	FIX3	RO
30799	Grid current L2 (A) [IacL2]	2	U32	FIX3	RO
30801	Grid current L3 (A) [IacL3]	2	U32	FIX3	RO
30821	Displacement power factor, across all phases [PF]	2	U32	FIX2	RO
Excitation type of cos ϕ [PFExt]:					
30823	1041 = Capacitive 1042 = Inductive	2	U32	ENUM	RO
Operating mode of reactive power regulation [Q-VArMod]: 303 = Off 1069 = Reactive power/Voltage characteristic curve Q(U) 1070 = Reactive power Q, direct default setting 1071 = Reactive power const. Q (kvar) 1072 = Reactive power Q, default setting via plant control					
30825	control 1074 = cos ϕ , direct default setting 1075 = cos ϕ , default setting via plant control 1076 = cos $\phi(P)$ – characteristic curve 1387 = Reactive power Q, default setting via analog input 1388 = cos ϕ , default setting via analog input 1389 = Reactive power/Voltage characteristic curve Q(U) with hysteresis and deadband	2	U32	ENUM	RO
30827	Reactive power target value (var) [SpntPwrRt]	2	S32	FIX0	RO
30829	Reactive power target value (%) [Q-VArNom]	2	S32	FIX1	RO
30831	Target value cos ϕ [PF-PFSpt]	2	S32	FIX2	RO
Target value excitation type of cos ϕ [PF-PFExtSpt]:					
30833	1041 = Capacitive 1042 = Inductive	2	U32	ENUM	RO

Operating mode of active power limitation [P-WMod]: 303 = Off					
30835	1077 = Active power limitation P (W) 1078 = Active power limitation P in (%) of P _{MAX} 1079 = Active power limitation P via plant control 1390 = Active power limitation P via analog input	2	U32	ENUM	RO
30839	Active power target value (%) [P-WNom]	2	U32	FIX0	RO
30841	AC voltages (average of all string voltages) (V) [Vac]	2	U32	FIX2	RO
34101	Operating time interior fan 2 (s) [CntFanCab2]	4	U64	Duration	RO
34105	Operating time heat sink fan (s) [CntFanHs]	4	U64	Duration	RO
34115	Interior temperature 2 (°C) [TmpCab2]	2	S32	TEMP	RO
34121	Transformer temperature 1 (°C) [TmpTrf]	2	S32	TEMP	RO

5.4.6 Device Family SC nnnHE, SC nnnHE-10 and SC nnnHE-11

In the following table, you will find the measured values and parameters supported by the SC nnnHE, SC nnnHE-10 and SC nnnHE-11 device family, which you can access under the Unit IDs = 3-247 (see section 3.4.1 "Unit IDs", page 14). The assignments in section 5.4.1 "Common Addresses of all SMA Devices", page 28 also apply to this table:

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30225	Insulation resistance (ohms) [R-Insul]	2	U32	FIX0	RO
	Operating state [Mode]:				
	295 = MPP				
	381 = Stop				
	1455 = Emergency stop				
	1466 = Waiting				
	1467 = Start				
	1468 = MPP search				
	1469 = Shut-down				
30241	1470 = Fault	2	U32	ENUM	RO
	1471 = Warning/Error mail OK				
	1472 = Warning/Error mail not OK				
	1473 = Plant information mail OK				
	1474 = Plant information mail not OK				
	1475 = Error mail OK				
	1476 = Error mail not OK				
	1477 = Warning mail OK				
	1478 = Warning mail not OK				
	1479 = Wait after grid interruption				
30535	Day yield (Wh) [E-heute]	2	U32	FIX0	RO
30537	Day yield (kWh) [E-heute]	2	U32	FIX0	RO
30539	Day yield (MWh) [E-heute]	2	U32	FIX0	RO
30821	Displacement power factor, across all phases [PF]	2	U32	FIX2	RO

Operating mode of reactive power regulation [Q-VarMod]: 303 = Off 1069 = Reactive power/Voltage characteristic curve Q(U) 1070 = Reactive power Q, direct default setting 1071 = Reactive power const. Q (kvar)					
30825	1072 = Reactive power Q, default setting via plant control 1074 = $\cos \varphi$, direct default setting 1075 = $\cos \varphi$, default setting via plant control 1076 = $\cos \varphi(P)$ – characteristic curve 1387 = Reactive power Q, default setting via analog input 1388 = $\cos \varphi$, default setting via analog input	2	U32	ENUM	RO
30827	Reactive power target value (var) [Q-VarSpt]	2	S32	FIX0	RO
30831	Target value $\cos \varphi$ [PF-PFSpt]	2	S32	FIX2	RO
Target value excitation type of $\cos \varphi$ [PF-PFExtSpt]:					
30833	1041 = Capacitive 1042 = Inductive	2	U32	ENUM	RO
Operating mode of active power limitation [P-WMod]: 303 = Off					
30835	1077 = Active power limitation P (W) 1078 = Active power limitation P in (%) of P _{MAX} 1079 = Active power limitation P via plant control 1390 = Active power limitation P via analog input	2	U32	ENUM	RO
31283	PV string current group 1 [Mittelwert Grp1]	2	S32	FIX3	RO
31289	PV string current group 2 [Mittelwert Grp2]	2	S32	FIX3	RO
31295	PV string current group 3 [Mittelwert Grp3]	2	S32	FIX3	RO
32049	SSM ID for the communication fault has occurred [Komm.Fehler SMU]	2	U32	FIX0	RO
32051	SMU warning code for string fault [SMU Warncode]	2	U32	FIX0	RO
Operating state [BF_Anlage Abf.]:					
40009	381 = Stop 569 = Switched on	2	U32	ENUM	RW

5.4.7 Device Family SC nnnU

In the following table, you will find the measured values and parameters supported by the SC nnnU device family, which you can access under the Unit IDs = 3-247 (see section 3.4.1 "Unit IDs", page 14). The assignments in section 5.4.1 "Common Addresses of all SMA Devices", page 28 also apply to this table:

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30199	Time until grid connection attempt (s) [TmsRmg]	2	U32	Duration	RO
30211	Recommended action [Prio]: 336 = Contact manufacturer 337 = Contact installer 338 = Invalid	2	U32	ENUM	RO
30217	Grid contactor [GdCtcStt]: 51 = Contactor closed 311 = Contactor open	2	U32	ENUM	RO
30241	Operating state [mode]: 309 = Operation 455 = Warning 1392 = Error 1470 = Fault	2	U32	ENUM	RO
30243	Error [Error]: 267 = Inverter 1395 = DC section 1396 = AC grid	2	U32	ENUM	RO
30247	Current event number for manufacturer [ErrNoSma]	2	U32	FIX0	RO
30257	DC switch in cabinet [DcSwStt]: 51 = Closed 311 = Open	2	U32	ENUM	RO
30261	AC switch 1 in cabinet [AcSwStt]: 51 = Closed 311 = Open	2	U32	ENUM	RO
30265	AC switch-disconnector in cabinet [DlnErrAcScir]: 51 = Closed 311 = Open	2	U32	ENUM	RO

30535	Day yield (Wh) [E-heute]	2	U32	FIX0	RO
30537	Day yield (kWh) [E-heute]	2	U32	FIX0	RO
30539	Day yield (MWh) [E-heute]	2	U32	FIX0	RO
30547	Operating time interior fan 2 (s) [CntFanCab2]	2	U32	Duration	RO
30549	Operating time heat sink fan (s) [CntFanHs]	2	U32	Duration	RO
30797	Grid current L1 (A) [IacL1]	2	U32	FIX3	RO
30799	Grid current L2 (A) [IacL2]	2	U32	FIX3	RO
30801	Grid current L3 (A) [IacL3]	2	U32	FIX3	RO
Operating mode of active power limitation [P-WMod]: 303 = Off					
30835	1077 = Active power limitation P (W) 1078 = Active power limitation P in (%) of P _{MAX} 1079 = Active power limitation P via plant control 1390 = Active power limitation P via analog input	2	U32	ENUM	RO
30839	Active power target value (%) [PWNom]	2	U32	FIX0	RO
30841	AC voltages (average of all string voltages) (V) [Vac]	2	U32	FIX2	RO
34101	Operating time interior fan 2 (s) [CntFanCab2]	4	U64	Duration	RO
34105	Operating time heat sink fan (s) [CntFanHs]	4	U64	Duration	RO
34115	Interior temperature 2 (°C) [TmpCab2]	2	S32	TEMP	RO
34121	Transformer temperature 1 (°C) [TmpTrf]	2	S32	TEMP	RO

5.4.8 Device Family SI and SBU

In the following table, you will find the measured values and parameters supported by the SI and SBU device families, which you can access under the Unit IDs = 3-247 (see section 3.4.1 "Unit IDs", page 14):



Address compatibility

The assignments in section 5.4.1 "Common Addresses of all SMA Devices", page 28, do **not** apply to this device type.

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30051	Device class: 460 = Solar inverter	2	U32	ENUM	RO
30057	Serial number [Serial Number]	2	U32	RAW	RO
30061	Firmware [FwVer]	2	U32	FW	RO
30063	Firmware [FwVer2]	2	U32	FW	RO
30199	Time until grid connection attempt (s) [GdRmgTm]	2	U32	Duration	RO
30201	Condition [Mode]: 35 = Fault 303 = Off 307 = OK 455 = Warning	2	U32	ENUM	RO
30211	Recommended action [Prio]: 336 = Contact manufacturer 337 = Contact installer 338 = Invalid	2	U32	ENUM	RO
30213	Message [Msg]: 886 = none nnnnn = breakdown see respective device documentation	2	U32	ENUM	RO
30229	Local time (s) [Tm]	2	U32	DT	RO
30531	Total yield (kWh) [E-Total]	2	U32	FIX0	RO

30541	Operating time (s) [OnTmh]	2	U32	Duration	RO
30543	Feed-in time (s) [TotTmh]	2	U32	Duration	RO
30565	Number of generator starts [GnStrCnt]	2	U32	FIX0	RO
30567	Amp hours counter for battery charge (Ah) [AhCntIn]	2	U32	FIX0	RO
30569	Amp hours counter for battery discharge (Ah) [AhCntOut]	2	U32	FIX0	RO
30571	Meter reading consumption meter (Wh) [TotLodEgyCnt]	2	U32	FIX0	RO
30573	Generator operating time (s) [GnOpTmh]	2	U32	Duration	RO
30575	Released generator power (Wh) [GnEgyCnt]	2	U32	FIX0	RO
30577	Grid energy consumption today (Wh) [GdCsmPEgyTdy]	2	U32	FIX0	RO
30579	Grid energy feed-in today (Wh) [GdFeedEgyTdy]	2	U32	FIX0	RO
30581	Grid reference counter reading (Wh) [GdCsmPEgyMtr]	2	U32	FIX0	RO
30583	Grid feed-in counter reading (Wh) [GdFeedEgyMtr]	2	U32	FIX0	RO
30585	Power outage (s) [GdFailTms]	2	U32	Duration	RO
30587	PV generation counter reading (Wh) [PvEgyMtr]	2	U32	FIX0	RO
30589	Rise in self-consumption in total (Wh) [SlfCsmplncEgy]	2	U32	FIX0	RO
30591	Rise in self-consumption today (Wh) [SlfCsmplncTdy]	2	U32	FIX0	RO
30593	Energy consumed internally in total (Wh) [SlfCsmPEgy]	2	U32	FIX0	RO
30595	Absorbed energy (Wh) [EgyCntIn]	2	U32	FIX0	RO
30597	Released energy (Wh) [EgyCntOut]	2	U32	FIX0	RO
30599	Number of grid connections [GdCtcCnt]	2	U32	FIX0	RO
30775	Power (W) [TotInvPwrAt]	2	S32	FIX0	RO
30777	Power L1 (W) [InvPwrAt]	2	S32	FIX0	RO
30779	Power L2 (W) [InvPwrAtSlv1]	2	S32	FIX0	RO
30781	Power L3 (W) [InvPwrAtSlv2]	2	S32	FIX0	RO
30783	Grid voltage phase L1 (V) [InvVtg]	2	U32	FIX2	RO
30785	Grid voltage phase L2 (V) [InvVtgSlv1]	2	U32	FIX2	RO
30787	Grid voltage phase L3 (V) [InvVtgSlv2]	2	U32	FIX2	RO

30795	Grid current (A) [TotInvCur]	2	U32	FIX3	RO
30797	Grid current phase L1 (A) [InvCur]	2	U32	FIX3	RO
30799	Grid current phase L2 (A) [InvCurSlv1]	2	U32	FIX3	RO
30801	Grid current phase L3 (A) [InvCurSlv2]	2	U32	FIX3	RO
30803	Grid frequency (Hz) [InvFrq]	2	U32	FIX2	RO
30805	Reactive power (var) [TotInvPwrRt]	2	S32	FIX2	RO
30807	Reactive power L1 (var) [InvPwrRt]	2	S32	FIX0	RO
30809	Reactive power L2 (var) [InvPwrRtSlv1]	2	S32	FIX0	RO
30811	Reactive power L3 (var) [InvPwrRtSlv2]	2	S32	FIX0	RO
30843	Battery current (A) [TotBatCur]	2	S32	FIX3	RO
30845	Current battery charge status (%) [BatSoc]	2	U32	FIX0	RO
30847	Current battery capacity (%) [Soh]	2	U32	FIX0	RO
30849	Battery temperature (°C) [BatTmp]	2	S32	TEMP	RO
30851	Battery voltage (V) [BatVtg]	2	U32	FIX2	RO
30853	Active battery charging mode [BatChrgOp]:				
	1767 = Quick charge				
	1768 = Full charge				
	1769 = Compensation charge				
	1770 = Maintenance charge				
30853	2184 = Save energy while on mains				
	2	U32	ENUM	RO	
30855	Current battery charging set voltage (V) [BatChrgVtg]	2	U32	FIX2	RO
30857	Number of battery charge throughputs [BatCpyThrpCnt]	2	S32	FIX0	RO
30859	Battery maintenance charge status [BatMntStt]:				
	803 = Inactive				
	1771 = Charge with solar power				
	1772 = Charge with solar and mains power				
30861	Consumer power (W) [TotLodPwrAt]	2	S32	FIX0	RO
30863	Current generator power (W) [TotGnPwrAt]	2	U32	FIX0	RO
30865	Power grid reference (W) [GdCsmPwrAt]	2	S32	FIX0	RO
30867	Power grid feed-in (W) [GdFeedPwrAt]	2	S32	FIX0	RO
30869	PV power generated (W) [TotPvPwr]	2	S32	FIX0	RO
30871	Current self-consumption (W) [SlfCsmPwrAt]	2	U32	FIX0	RO

30873	Current rise in self-consumption (W) [SlfCsmplncPwr]	2	S32	FIX0	RO
Multifunction relay status [Rly1Stt]:					
30875	51 = Closed 311 = Open	2	U32	ENUM	RO
Power supply status [LodGdConStt]:					
303 = Off					
30877	1461 = Mains connected 1462 = Backup not available 1463 = Backup	2	U32	ENUM	RO
Reason for generator request [GnDmdSrc]:					
46 = Battery					
1773 = No request					
1774 = Load					
30879	1775 = Time control 1776 = Manual one hour 1777 = Manual start 1778 = External source	2	U32	ENUM	RO
PV mains connection [PvGdConStt]:					
1779 = Separated					
30881	1780 = Public electricity mains 1781 = Island mains	2	U32	ENUM	RO
Status public electricity mains [GdStt]:					
303 = Off					
1392 = Fault					
1394 = Waiting for valid AC grid					
1461 = Mains connected					
30883	1466 = Wait 1787 = Initialization 2183 = Mains operation without consumption 2184 = Save energy while on mains 2185 = Stop save energy while on mains 2186 = Start save energy while on mains	2	U32	ENUM	RO
30885	Power external mains connection (W) [TotExtPwrAt]	2	U32	FIX0	RO
30887	Power external mains connection phase A (W) [ExtPwrAt]	2	U32	FIX0	RO
30889	Power external mains connection phase B (W) [ExtPwrAtSlv1]	2	U32	FIX0	RO

30891	Power external mains connection phase C (W) [ExtPwrAtSlv2]	2	U32	FIX0	RO
30893	Reactive power external mains connection (var) [TotExtPwrRt]	2	U32	FIX0	RO
30895	Reactive power external mains connection phase A (var) [ExtPwrRt]	2	U32	FIX0	RO
30897	Reactive power external mains connection phase B (var) [ExtPwrRtSlv1]	2	U32	FIX0	RO
30899	Reactive power external mains connection phase C (var) [ExtPwrRtSlv2]	2	U32	FIX0	RO
30901	Grid frequency external mains connection (Hz) [ExtFrq]	2	U32	FIX2	RO
30903	Voltage external mains connection phase A (V) [ExtVtg]	2	U32	FIX2	RO
30905	Voltage external mains connection phase B (V) [ExtVtgSlv1]	2	U32	FIX2	RO
30907	Voltage external mains connection phase C (V) [ExtVtgSlv2]	2	U32	FIX2	RO
30909	Current external mains connection phase A (A) [ExtCur]	2	S32	FIX3	RO
30911	Current external mains connection phase B (A) [ExtCurSlv1]	2	S32	FIX3	RO
30913	Current external mains connection phase C (A) [ExtCurSlv2]	2	S32	FIX3	RO
30917	Generator status [GnStt]: 303 = Off 1392 = Fault 1787 = Initialization 1788 = Ready 1789 = Warming 1790 = Synchronization 1791 = Activated 1792 = Resynchronization 1793 = Generator separation 1794 = Slow down 1795 = Bolted 1796 = Blocked after error	2	U32	ENUM	RO

Operating condition [ManStr]:					
40009	381 = Stop 569 = Activated	2	U32	ENUM	RW
Acknowledge fault [ErrAckn]:					
40011	26 = Acknowledge fault	2	U32	ENUM	RW
40031	Rated battery capacity (Ah) [BatCpyNom]	2	U32	FIX0	RO
40033	Max. battery temperature (°C) [BatTmpMax]	2	U32	TEMP	RW
Battery type [BatTyp]:					
1782 = Sealed lead battery (VRLA)					
1783 = Flooded lead acid batt. (FLA)					
1784 = Nickel/Cadmium (NiCd)					
1785 = Lithium-Ion (Li-Ion)					
40037	Rated battery voltage (V) [BatVtgNom]	2	U32	FIX0	RO
40039	Battery quick charge time (min) [AptTmBoost]	2	U32	Duration	RW
40041	Battery compensation charge time (h) [AptTmEqu]	2	U32	Duration	RW
40043	Battery full charge time (h) [AptTmFul]	2	U32	Duration	RW
40045	Max. battery charging current (A) [BatChrgCurMax]	2	U32	FIX3	RW
40047	Rated generator current (A) [GnCurNom]	2	U32	FIX3	RW
Automatic generator start [GnAutoEna]:					
1129 = Yes					
1130 = No					
40051	Generator shutdown battery charge limit (%) [GnSocTm1Stp]	2	U32	FIX0	RW
40053	Generator startup battery charge limit (%) [GnSocTm1Str]	2	U32	FIX0	RW
Manual generator control [GnManStr]:					
381 = Stop					
1438 = Automatic					
1467 = Start					
1776 = Manual one hour					
Generator request via power on [GnPwrEna]:					
1129 = Yes					
1130 = No					
40059	Generator shutdown load limit (W) [GnPwrStp]	2	U32	FIX0	RW

40061	Generator startup load limit (W) [GnPwrStr]	2	U32	FIX0	RW
40071	Grid creating generator [ExtSrc]: 1799 = No 1801 = Mains 1802 = Mains and generator 1803 = Invalid configuration for the PV generation counter	2	U32	ENUM	RW
40073	Lower discharging limit for rise in self-consumption (%) [SlfCsmplSOCMin]	2	U32	FIX0	RW
40075	Rise in self-consumption switched on [SlfCsmplIncEna]: 1129 = Ja 1130 = Nein	2	U32	ENUM	RW
40077	Initiate device restart [InvRs]: 1146 = Execute	2	U32	ENUM	RW
40079	Charging stop voltage battery (V) [BatDiChgVtgMin]	2	U32	FIX2	RW
40081	Maximum charging current battery (A) [BatChrgCurMax]	2	U32	FIX3	RW
40083	Maximum discharging current battery (A) [BatDiChgCurMax]	2	U32	FIX3	RW
40085	Target voltage per cell for quick charge (V) [ChrgVtgBoost]	2	U32	FIX2	RW
40087	Target voltage per cell for full charge (V) [ChrgVtgFul]	2	U32	FIX2	RW
40089	Target voltage per cell for compensation charge (V) [ChrgVtgEqu]	2	U32	FIX2	RW
40091	Target voltage per cell for maintenance charge (V) [ChrgVtgFlo]	2	U32	FIX2	RW
40093	Voltage monitoring minimum threshold (V) [GdVtgMin]	2	U32	FIX2	RW
40095	Voltage monitoring maximum threshold (V) [GdVtgMax]	2	U32	FIX2	RW
40097	Voltage monitoring hysteresis minimum threshold (V) [GdVtgMinDel]	2	U32	FIX2	RW
40099	Voltage monitoring hysteresis maximum threshold (V) [GdVtgMaxDel]	2	U32	FIX2	RW

40101	Frequency monitoring minimum threshold (Hz) [GdFrqMin]	2	U32	FIX2	RW
40103	Frequency monitoring maximum threshold (Hz) [GdFrqMax]	2	U32	FIX2	RW
40105	Frequency monitoring hysteresis minimum threshold (Hz) [GdFrqMinDel]	2	32	FIX2	RW
40107	Frequency monitoring hysteresis maximum threshold (Hz) [GdFrqMaxDel]	2	32	FIX2	RW
40109	Country standard set [Country]: 42 = AS4777.3 438 = VDE0126-1-1 1013 = Other standard	2	U32	ENUM	RO
40111	Voltage monitoring generator minimum threshold (V) [GnVtgMin]	2	U32	FIX2	RW
40113	Voltage monitoring generator maximum threshold (V) [GnVtgMax]	2	U32	FIX2	RW
40115	Voltage monitoring generator hysteresis minimum threshold (V) [GnVtgMinDel]	2	U32	FIX2	RW
40117	Voltage monitoring generator hysteresis maximum threshold (V) [GnVtgMaxDel]	2	U32	FIX2	RW
40119	Frequency monitoring generator minimum threshold (Hz) [GnFrqMin]	2	U32	FIX2	RW
40121	Frequency monitoring generator maximum threshold (Hz) [GnFrqMax]	2	U32	FIX2	RW
40123	Frequency monitoring generator hysteresis minimum threshold (Hz) [GnFrqMinDel]	2	U32	FIX2	RW
40125	Frequency monitoring generator hysteresis maximum threshold (Hz) [GnFrqMaxDel]	2	U32	FIX2	RW
40127	Voltage monitoring generator maximum reverse power (W) [GnRvPwr]	2	U32	FIX2	RW
40129	Voltage monitoring generator maximum reverse power trigger time (s) [GnRvTm]	2	U32	Duration	RW
40131	Grid connection point rated current (A) [GdCurNom]	2	U32	FIX2	RW
40133	Grid nominal voltage (V) [GdVtgNom]	2	U32	FIX0	RW

40135	Nominal frequency (Hz) [GdFrqNom]	2	U32	FIX2	RW
40137	Acknowledge generator faults [GnAck]: 26 = Acknowledge fault	2	U32	ENUM	RW
40141	Max. start attempts after error [AutoStr]	2	U32	FIX0	RW
40143	Active current for operating mode "plant control" (A) [FedInCurAtCom]	2	S32	FIX2	RW
40145	Reactive current for the operating mode "plant control" (A) [FedInCurRtCom]	2	S32	FIX2	RW
40147	Generator active current limitation for the operating mode "plant control" (A) [GnCurNomCom]	2	U32	FIX2	RW
40149	Active power setpoint for the operating mode "plant control" (W) [FedInPwrAtComW]	2	S32	FIX0	RW
40151	Plant control (Effective and reactive power control via communication) [FedInSpntCom]: 802 = active 803 = inactive	2	U32	ENUM	RW
40153	Reactive power setpoint for the operating mode "plant control" (var) [FedInPwrRtComW]	2	S32	FIX0	RW

5.4.9 Device Family STP nn000TL-10

In the following table, you will find the measured values and parameters supported by the STP nn000TL-10 device family, which you can access under the Unit IDs = 3-247 (see section 3.4.1 "Unit IDs", page 14).



Address compatibility

The assignments in section 5.4.1 "Common Addresses of all SMA Devices", page 28, do **not** apply to this device family.

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30051	Device class [MainModel]: 260 = Solar inverter	2	U32	ENUM	RO
30053	Device-ID [Model]: 9067 = Sunny Tripower 10000TL-10 9068 = Sunny Tripower 12000TL-10 9069 = Sunny Tripower 15000TL-10 9070 = Sunny Tripower 17000TL-10 9101 = Sunny Tripower 8000TL-10	2	U32	ENUM	RO
30057	Serial number [SerNumSet]	2	U32	RAW	RO
30197	Event ID of the current event (number of digits is limited by device) [Op.EvtNo]; see also section 6 "Troubleshooting" page 69.	2	U32	FIX0	RO
30199	Time until grid connection attempt (s) [Op.TmsRmg]	2	U32	Duration	RO
30201	Condition [Op.Health]: 35 = Fault 307 = OK 455 = Warning	2	U32	ENUM	RO
30211	Recommended action [Op.Prio]: 336 = Contact manufacturer 337 = Contact installer 338 = Invalid 887 = None	2	U32	ENUM	RO

Grid contactor [Op.GriSwStt]:					
30217	51 = Contactor closed 311 = Contactor open	2	U32	ENUM	RO
Temperature derating [Inv.TmplimStt]:					
30219	557 = Regulation due to temperature 884 = Not active	2	U32	ENUM	RO
30225	Insulation resistance (ohms) [Riso]	2	U32	FIX0	RO
30231	Maximum permanent active power, set unchangeable. Can be higher than the rated power (W) [Plimit]	2	U32	FIX0	RO
30233	Permanent active power limitation (W) [Pmax]	2	U32	FIX0	RO
30513	Total yield (Wh) [E-Total]	4	U64	FIX0	RO
30521	Operating time (s) [Mt.TotTmh]	4	U64	Duration	RO
30525	Feed-in time (s) [Mt.TotOpTmh]	4	U64	Duration	RO
30529	Total yield (Wh) [E-Total]	2	U32	FIX0	RO
30531	Total yield (kWh) [E-Total]	2	U32	FIX0	RO
30533	Total yield (MWh) [E-Total]	2	U32	FIX0	RO
30541	Operating time (s) [Mt.TotTmh]	2	U32	Duration	RO
30543	Feed-in time (s) [Mt.TotOpTmh]	2	U32	Duration	RO
30559	Number of events for user [Op.EvtCntUsr]	2	U32	FIX0	RO
30561	Number of events for installer [Op.EvtCntIstl]	2	U32	FIX0	RO
30563	Number of events for service [Op.EvtCntSvc]	2	U32	FIX0	RO
30769	DC current input (A) [A.Ms.Amp]	2	S32	FIX3	RO
30771	DC voltage input (V) [A.Ms.Vol]	2	S32	FIX2	RO
30773	DC power input (W) [A.Ms.Watt]	2	S32	FIX0	RO
30775	AC active power across all phases (W) [Pac]	2	S32	FIX0	RO
30777	Power L1 (W) [GridMs.W.phsA]	2	S32	FIX0	RO
30779	Power L2 (W) [GridMs.W.phsB]	2	S32	FIX0	RO
30781	Power L3 (W) [GridMs.W.phsC]	2	S32	FIX0	RO
30783	Grid voltage phase L1 to N (V) [GridMs.PhV.phsA]	2	U32	FIX2	RO
30785	Grid voltage phase L2 to N (V) [GridMs.PhV.phsB]	2	U32	FIX2	RO
30787	Grid voltage phase L3 to N (V) [GridMs.PhV.phsC]	2	U32	FIX2	RO

30797	Grid current phase L1 (A) [GridMs.A.phsA]	2	U32	FIX3	RO
30799	Grid current phase L2 (A) [GridMs.A.phsB]	2	U32	FIX3	RO
30801	Grid current phase L3 (A) [GridMs.A.phsC]	2	U32	FIX3	RO
30803	Power frequency (Hz) [GridMs.Hz]	2	U32	FIX2	RO
30805	Reactive power (var) [GridMs.TotVAr]	2	S32	FIX2	RO
30807	Reactive power L1 (var) [GridMs.VAr.phsA]	2	S32	FIX0	RO
30809	Reactive power L2 (var) [GridMs.VAr.phsB]	2	S32	FIX0	RO
30811	Reactive power L3 (var) [GridMs.VAr.phsC]	2	S32	FIX0	RO
30813	Total apparent power (VA) [GridMs.TotVA]	2	S32	FIX0	RO
30815	Apparent power L1 (VA) [GridMs.VA.phsA]	2	S32	FIX0	RO
30817	Apparent power L2 (VA) [GridMs.VA.phsB]	2	S32	FIX0	RO
30819	Apparent power L3 (VA) [GridMs.VA.phsC]	2	S32	FIX0	RO
Operating mode of reactive power regulation [Q-VArMod]:					
303 = Off					
1069 = Reactive power/Voltage characteristic curve Q(U)					
30825	1070 = Reactive power Q, direct default setting	2	U32	ENUM	RO
	1072 = Reactive power Q, default setting via plant control				
	1074 = $\cos \varphi$, direct default setting				
	1075 = $\cos \varphi$, default setting via plant control				
	1076 = $\cos \varphi(P)$ – characteristic curve				
30829	Reactive power target value (%) [Q-VArNom]	2	S32	FIX1	RO
30831	Target value $\cos \varphi$ [PF-PF]	2	S32	FIX2	RO
Target value excitation type of $\cos \varphi$ [PF-PFExt]:					
30833	1041 = Capacitive	2	U32	ENUM	RO
	1042 = Inductive				
Operating mode of active power limitation [P-WMod]:					
303 = Off					
30835	1077 = Active power limitation P (W)	2	U32	ENUM	RO
	1078 = Active power limitation P in (%) of P _{MAX}				
	1079 = Active power limitation P via plant control				

30837	Active power target value (W) [P-W]	2	U32	FIX0	RO
30839	Active power target value (%) [P-WNom]	2	U32	FIX0	RO
31793	String current, string 1 (A) [A1.Ms.Amp]	2	S32	FIX3	RO
31795	String current, string 2 (A) [A2.Ms.Amp]	2	S32	FIX3	RO
31797	String current, string 3 (A) [A3.Ms.Amp]	2	S32	FIX3	RO
31799	String current, string 4 (A) [A4.Ms.Amp]	2	S32	FIX3	RO
31801	String current, string 5 (A) [A5.Ms.Amp]	2	S32	FIX3	RO
31803	String current, string 6 (A) [B1.Ms.Amp]	2	S32	FIX3	RO
35377	Number of events for user [Op.EvtCntUshr]	4	U64	FIX0	RO
35381	Number of events for installer [Op.EvtCntIstl]	4	U64	FIX0	RO
35385	Number of events for service [Op.EvtCntSvc]	4	U64	FIX0	RO
40009	Operating state [Op.OpModSet]: 295 = MPP 381 = Stop 443 = Constant voltage	2	U32	ENUM	RW
40204	Reactive power setpoint Q in (%) of P _{MAX} [Q-VArNom]	2	S32	FIX1	RW
40206	Cos φ setpoint, direct specification [PF-PF]	2	S32	FIX2	RW
40208	Cos φ excitation type, direct specification [PF-PFExt]: 1041 = Capacitive 1042 = Inductive	2	U32	ENUM	RW
40212	Active power limitation P (W) [P-W]	2	U32	FIX0	RW
40214	Active power limitation P (%) [P-WNom]	2	U32	FIX0	RW

5.4.10 Optiprotect

In the following table, you will find the measured values and parameters supported by the Optiprotect, which you can access under the Unit IDs = 3-247 (see section 3.4.1 "Unit IDs", page 14).



Address compatibility

The assignments in section 5.4.1 "Common Addresses of all SMA Devices", page 28, do **not** apply to this device type.

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30051	Device class [MainModel]: 8001 = Sensor system general	2	U32	ENUM	RO
30057	Serial number SMID-CONT [Serial Number]	2	U32	RAW	RO
30061	Firmware SMID-CONT [Firmware]	2	U32	FW	RO
30063	Boot loader SMID-CONT [Firmware-2]	2	U32	FW	RO
30065	Firmware SMID-CT1 [Firmware-3]	2	U32	FW	RO
30067	Boot loader SMID-CT1 [Firmware-4]	2	U32	FW	RO
30069	Firmware SMID-CT2 [Firmware-5]	2	U32	FW	RO
30071	Boot loader SMID-CT2 [Firmware-6]	2	U32	FW	RO
30073	Firmware SMID-CT3 [Firmware-7]	2	U32	FW	RO
30075	Boot loader SMID-CT3 [Firmware-8]	2	U32	FW	RO
30077	Firmware SMID-CT4 [Firmware-9]	2	U32	FW	RO
30079	Boot loader SMID-CT4 [Firmware-10]	2	U32	FW	RO
30097	Serial number SMID-CT1 [Serial Number-1]	2	U32	RAW	RO
30099	Serial number SMID-CT2 [Serial Number-2]	2	U32	RAW	RO
30101	Serial number SMID-CT3 [Serial Number-3]	2	U32	RAW	RO
30103	Serial number SMID-CT4 [Serial Number-4]	2	U32	RAW	RO
30193	Reading the plant time (UTC) [SerTm]	2	U32	DT	RO

Reading the time zone (UTC) [TmZn]:					
30195	For possible values, see section 7.6 "Numerical Codes for Time Zones", page 75.	2	U32	ENUM	RO
Event ID of the current event (number of digits is limited by the device) [ErrNo]; see also section 6 "Troubleshooting", page 69".					
30197		2	U32	FIX0	RO
30199	Time until grid connection attempt (s) [TmsRmg]	2	U32	Duration	RO
Recommended action [Prio]: 336 = Contact manufacturer 337 = Contact installer 338 = Invalid					
30211		2	U32	ENUM	RO
30225	Insulation resistance (ohms) [Riso]	2	U32	FIX0	RO
Operating state [Mode]: 309 = Operation 455 = Warning 1392 = Error					
30241		2	U32	ENUM	RO
Error [Error]: 267 = Inverter 1395 = DC section 1396 = AC grid					
30243		2	U32	ENUM	RO
SMID DC switch 1 to 16 [DcSwStt1.1] to [DcSwStt4.4]: 51 = closed 311 = opened 1694 = has triggered					
30267		2	U32	ENUM	RO
30297					
Error message SMID DC switch 1 to 16 [DcSwErr1.1] to [DcSwErr4.4] 1508 = 90% of the DC-switching cycles reached 1509 = 100% of the DC switching times reached 1695 = DC switch waits for connection 1696 = DC switch blocked by spindle 1697 = DC switch manually blocked 1698 = DC switch triggered 3 times 1699 = DC switch defective					
30331		2	U32	ENUM	RO
30361					
30771	DC voltage (V) [Vpv]	2	S32	FIX2	RO

31791	Number of DC current measurement units [CTNoOf]	2	U32	FIX0	RO
31793					
to 31855	String current 1 to 32 (A) [Ipv1.1.B] to [Ipv4.4.B]	2	S32	FIX3	RO
	Status of the monitored strings 1 to 32 [DclnStt1.1.B] to [DclnStt4.4.B]: 307 = OK 467 = DC overvoltage 477 = Reverse current				
32057	1492 = String temporarily deselected due to earth fault	2	U32	ENUM	RO
32119	1493 = String permanently deselected due to earth fault 1649 = String x has low power 1650 = Partial string x has low power 1692 = String deactivated due to power reduction 1693 = No string connected				
40001	Setting of the plant time (UTC in s) [SerTm]	2	U32	DT	RW
	Setting of the time zone [TmZn].				
40003	For possible values, see section 7.6 "Numerical Codes for Time Zones", page 75.	2	U32	ENUM	RW
40011	Acknowledgement: 26 = Acknowledge fault	2	U32	ENUM	RW

5.4.1.1 Sunny String-Monitor

In the following table, you will find the measured values and parameters supported by the Sunny String-Monitor, which you can access under the Unit IDs = 3-247 (see section 3.4.1 "Unit IDs", page 14).

Address compatibility

The assignments in section 5.4.1 "Common Addresses of all SMA Devices", page 28, do **not** apply to this device type.

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30057	Serial number [Seriennummer]	2	U32	RAW	RO
30245	SMU ID [SSM Identifier]	2	U32	FIX0	RO
31793	String current of the string 1 of an SMU/SMID (A) [IString 1]	2	S32	FIX3	RO
31795	String current of the string 2 of an SMU/SMID (A) [IString 2]	2	S32	FIX3	RO
31797	String current of the string 3 of an SMU/SMID (A) [IString 3]	2	S32	FIX3	RO
31799	String current of the string 4 of an SMU/SMID (A) [IString 4]	2	S32	FIX3	RO
31801	String current of the string 5 of an SMU/SMID (A) [IString 5]	2	S32	FIX3	RO
31803	String current of the string 6 of an SMU/SMID (A) [IString 6]	2	S32	FIX3	RO
31805	String current of the string 7 of an SMU/SMID (A) [IString 7]	2	S32	FIX3	RO
31807	String current of the string 8 of an SMU/SMID (A) [IString 8]	2	S32	FIX3	RO
32053	Status of signal contact 1 [Signal contact 1]: 303 = Off 308 = On	2	U32	ENUM	RO
32055	Status of signal contact 2 [Signal contact 2]: 303 = Off 308 = On	2	U32	ENUM	RO

5.4.12 Sunny Central String-Monitor Controller

In the following table, you will find the measured values and parameters supported by the Sunny String-Monitor Controller, which you can access under the Unit IDs = 3-247 (see section 3.4.1 "Unit IDs", page 14).



Address compatibility

The assignments in section 5.4.1 "Common Addresses of all SMA Devices", page 28, do **not** apply to this device type.

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30057	Serial number [Serial Number]	2	U32	RAW	RO
30197	Event ID of the current event (number of digits is limited by the device); see also section 6 "Troubleshooting", page 69".	2	U32	FIX0	RO
30241	Operating state [mode]: 309 = Operation 455 = Warning 1392 = Error 1470 = Fault	2	U32	ENUM	RO
30243	Error [Error]: 2440 = String-current error (coming) 2441 = Communication error (coming) 2442 = SMU error (WD, EEPROM) (coming) 2443 = String-current error (going) 2444 = Communication error (going) 2445 = SMU error (WD, EEPROM) (going)	2	U32	ENUM	RO
30521	Operating time (s) [h-On]	4	U64	Duration	RO
30541	Operating time (s) [h-on]	2	U32	Duration	RO
31283	PV string current group 1 (A) [MeanCurGr1]	2	S32	FIX3	RO
31289	PV string current group 2 (A) [MeanCurGr2]	2	S32	FIX3	RO
31295	PV string current group 3 (A) [MeanCurGr3]	2	S32	FIX3	RO
31301	PV string current group 4 (A) [MeanCurGr4]	2	S32	FIX3	RO
31307	PV string current group 5 (A) [MeanCurGr5]	2	S32	FIX3	RO
31313	PV string current group 6 (A) [MeanCurGr6]	2	S32	FIX3	RO
32051	SMU warning code for string error [SSMUWrnCode]	2	U32	FIX3	RO

5.4.13 Sunny Central String-Monitor-US

In the following table, you will find the measured values and parameters supported by the Sunny Central String-Monitor-US, which you can access under the Unit IDs = 3-247 (see section 3.4.1 "Unit IDs", page 14).

 Address compatibility

The assignments in section 5.4.1 "Common Addresses of all SMA Devices", page 28, do **not** apply to this device type.

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30057	Serial number [Serial Number]	2	U32	RAW	RO
	Operating state [Mode]: 309 = Operation				
30241	455 = Warning 1392 = Fault 1470 = Disruption	2	U32	ENUM	RO
30245	SMU ID [SSMId]	2	U32	FIX0	RO
31793	String current of the string 1 of an SMU/SMID (A) [CurCh1]	2	S32	FIX3	RO
31795	String current of the string 2 of an SMU/SMID (A) [CurCh2]	2	S32	FIX3	RO
31797	String current of the string 3 of an SMU/SMID (A) [CurCh3]	2	S32	FIX3	RO
31799	String current of the string 4 of an SMU/SMID (A) [CurCh4]	2	S32	FIX3	RO
31801	String current of the string 5 of an SMU/SMID (A) [CurCh5]	2	S32	FIX3	RO
31803	String current of the string 6 of an SMU/SMID (A) [CurCh6]	2	S32	FIX3	RO
31805	String current of the string 7 of an SMU/SMID (A) [CurCh7]	2	S32	FIX3	RO
31807	String current of the string 8 of an SMU/SMID (A) [CurCh8]	2	S32	FIX3	RO

5.4.14 SMA Meteo Station

In the following table, you will find the measured values and parameters supported by the SMA Meteo Station, which you can access under the Unit IDs = 3-247 (see section 3.4.1 "Unit IDs", page 14).



Address compatibility

The assignments in section 5.4.1 "Common Addresses of all SMA Devices", page 28, do **not** apply to this device type.

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30051	Device class [MainModel]: 8001 = Sensor system general	2	U32	ENUM	RO
30241	Operating status [Stat]: 455 = Warning 1392 = Error 1787 = Initialization	2	U32	ENUM	RO
30243	Error [Stat]: 503 = Fault sensor ambient temperature 1006 = Unknown error 1118 = Calibration failed 1835 = Fault sensor module temperature 1836 = Fan life-time reached 1837 = Error in pyranometer 1838 = Pyranometer calibration necessary	2	U32	ENUM	RO
30521	Operating time (s) [SMA h-On]	4	U64	Duration	RO
34609	Environment temperature (°C) [TmpAmb C]	2	S32	TEMP	RO
34613	Total irradiation on sensor surface (W/m²) [IntSollrr]	2	U32	FIX0	RO
34615	Wind speed (m/s) [WindVel m/s]	2	U32	FIX1	RO
34617	Relative humidity (%) [envhmdt]	2	U32	FIX2	RO
34619	Air pressure (Pa) [envpress]	2	U32	FIX2	RO
34621	PV module temperature (°C) [TmpMdul C]	2	S32	TEMP	RO
34625	Environment temperature (°F) [TmpAmb F]	2	S32	TEMP	RO

34627	Environment temperature (K) [TmpAmb K]	2	S32	TEMP	RO
34629	PV module temperature (°F) [TmpMdul F]	2	S32	TEMP	RO
34631	PV module temperature (K) [TmpMdul K]	2	S32	TEMP	RO
34633	Wind speed (km/h) [WindVel km/h]	2	U32	FIX1	RO
34635	Wind speed (mph) [WindVel mph]	2	U32	FIX1	RO

5.4.15 Sunny Sensorbox

In the following table, you will find the measured values and parameters supported by the Sunny Sensorbox, which you can access under the Unit IDs = 3-247 (see section 3.4.1 "Unit IDs", page 14).

Address compatibility

The assignments in section 5.4.1 "Common Addresses of all SMA Devices", page 28, do **not** apply to this device type.

ADR (DEC)	Description/Numerical code	CNT (WORD)	Type	Format	Access
30051	Device class [MainModel]: 8001 = Sensor system general	2	U32	ENUM	RO
30521	Operating time (s) [SMA h-On]	4	U64	Duration	RO
34609	Environment temperature (°C) [TmpAmb C]	2	S32	TEMP	RO
34613	Total irradiation on sensor surface (W/m²) [IntSollrr]	2	U32	FIX0	RO
34615	Wind speed (m/s) [WindVel m/s]	2	U32	FIX1	RO
34621	PV module temperature (°C) [TmpMdul C]	2	S32	TEMP	RO
34623	Total irradiation on external sensor/pyranometer (W/m²) [ExlSollrr]	2	U32	FIX0	RO
34625	Environment temperature (°F) [TmpAmb F]	2	S32	TEMP	RO
34627	Environment temperature (K) [TmpAmb K]	2	S32	TEMP	RO
34629	PV module temperature (°F) [TmpMdul F]	2	S32	TEMP	RO
34631	PV module temperature (K) [TmpMdul K]	2	S32	TEMP	RO
34633	Wind speed (km/h) [WindVel km/h]	2	U32	FIX1	RO
34635	Wind speed (mph) [WindVel mph]	2	U32	FIX1	RO

6 Troubleshooting

You can find further information for error analysis of the SMA Modbus profile in section 3.5 "Reading and Writing Data in Modbus Protocol", page 15.

For troubleshooting SMA devices use the event numbers provided by the devices under the Modbus address 30197.



Event numbers of the SMA devices cannot be decoded with the numerical codes of this document

The event numbers of the SMA devices are device-specific and cannot be decoded with the numerical codes of this document.

You need further information for breakdown of the event numbers of inverters with small and medium power (Operating parameters/Measured values see Technical Description "Measured values and Parameters" under www.SMA-Solar.com).

For breakdown of the event numbers of central inverters contact our Service Line (see section 8 "Contact", page 79).

7 Technical Data

7.1 Supported SMA Devices



SMA Modbus profile version

Starting with Sunny WebBox firmware version 1.53, the SMA Modbus profile can be updated at the WebBox with a separate XML file. The separate XML file has a profile version. With profile version 1.30 the device-IDs assigned until now will change. Take a look at the profile version and device-ID at all of the following SMA devices listed hereafter.

This document applies only for the following SMA devices:

Communication device:

- Sunny WebBox with firmware version 1.52 or higher, device-ID = 47

Backup Systems:

- Sunny Backup:
 - SBU2200, device-ID = 67, model = 9155
 - SBU5000, device-ID = 69, model = 9157

Inverters:

- Device family SB n000US, (firmware version 01.21.00.R, or higher):
 - Sunny Boy 5000US, device-ID = 268, model = 9044
 - Sunny Boy 6000US, device-ID = 268, model = 9047
 - Sunny Boy 7000US, device-ID = 268, model = 9053
 - Sunny Boy 8000US, device-ID = 268, model = 9083
- Device family SB nn000TL-US-12, (firmware version 01.90.00.R, or higher):
 - Sunny Boy 6000TL-US-12, device-ID = 269, model = 9153
 - Sunny Boy 7000TL-US-12, device-ID = 269, model = 9152
 - Sunny Boy 8000TL-US-12, device-ID = 269, model = 9148
 - Sunny Boy 9000TL-US-12, device-ID = 269, model = 9149
 - Sunny Boy 10000TL-US-12, device-ID = 269, model = 9150
 - Sunny Boy 11000TL-US-12, device-ID = 269, model = 9151
- Device family SC nnnCP and SC nnnHE-20:
 - Sunny Central 500CP (firmware version 01.13.07.R or higher), device-ID = 160, model = 9088. From profile version 1.30 on, device-ID = 122
 - Sunny Central 500CP-JP (firmware version 01.18.25.R, or higher), device-ID = 253, model = 9206. From profile version 1.30 on, device-ID = 122

- Sunny Central 500CP-US (firmware version 01.16.16.R, or higher), device-ID = 262, model = 9215. From profile version 1.30 on, device-ID = 122
- Sunny Central 500CP-US 600V (firmware version 01.16.16.R, or higher), device-ID = 271, model = 9221. From profile version 1.30 on, device-ID = 122
- Sunny Central 500HE-20 (firmware version 01.15.41.R or higher), device-ID = 202, model = 9123. From profile version 1.30 on, device-ID = 122
- Sunny Central 630CP (firmware version 01.13.07.R or higher), device-ID = 159, model = 9089. From profile version 1.30 on, device-ID = 122
- Sunny Central 630CP-JP (firmware version 01.15.30.R, or higher), device-ID = 122, model = 9228
- Sunny Central 630CP-US (firmware version 01.16.16.R, or higher), device-ID = 261, model = 9214. From profile version 1.30 on, device-ID = 122
- Sunny Central 630HE-20 (firmware version 01.15.41.R or higher), device-ID = 201, model = 9122. From profile version 1.30 on, device-ID = 122
- Sunny Central 720CP (firmware version 01.13.07.R or higher), device-ID = 165, model = 9095. From profile version 1.30 on, device-ID = 122
- Sunny Central 720CP-US (firmware version 01.16.16.R, or higher), device-ID = 263, model = 9216. From profile version 1.30 on, device-ID = 122
- Sunny Central 720HE-20 (firmware version 01.15.41.R or higher), device-ID = 203, model = 9124. From profile version 1.30 on, device-ID = 122
- Sunny Central 750CP-US (firmware version 01.16.16.R, or higher), device-ID = 264, model = 9217. From profile version 1.30 on, device-ID = 122
- Sunny Central 760CP (firmware version 01.13.07.R or higher), device-ID = 164, model = 9094. From profile version 1.30 on, device-ID = 122
- Sunny Central 760HE-20 (firmware version 01.15.41.R or higher), device-ID = 204, model = 9125. From profile version 1.30 on, device-ID = 122
- Sunny Central 800CP (firmware version 01.13.07.R or higher), device-ID = 158, model = 9090. From profile version 1.30 on, device-ID = 122
- Sunny Central 800CP-JP (firmware version 01.15.30.R, or higher), device-ID = 122, model = 9227
- Sunny Central 800CP-US (firmware version 01.16.16.R, or higher), device-ID = 260, model = 9213. From profile version 1.30 on, device-ID = 122
- Sunny Central 800HE-20 (firmware version 01.15.41.R or higher), device-ID = 200, model = 9121. From profile version 1.30 on, device-ID = 122
- Sunny Central 850CP (firmware version 01.13.07.R, or higher), device-ID = 254, model = 9207. From profile version 1.30 on, device-ID = 122

- Sunny Central 850CP-US (firmware version 01.15.30.R, or higher), device-ID = 256, model = 9209. From profile version 1.30 on, device-ID = 122
- Sunny Central 900CP (firmware version 01.13.07.R, or higher), device-ID = 255, model = 9208. From profile version 1.30 on, device-ID = 122
- Sunny Central 900CP-US (firmware version 01.15.30.R, or higher), device-ID = 257, model = 9210. From profile version 1.30 on, device-ID = 122
- Device family SC nnnHE, SC nnnHE-10 and SC nnnHE-11, (firmware version 2.10 or higher):
 - Sunny Central 250HE, device-ID = 230, model = 9175. From profile version 1.30 on, device-ID = 107
 - Sunny Central 400HE-11, device-ID = 228, model = 9170. From profile version 1.30 on, device-ID = 107
 - Sunny Central 500HE-10, device-ID = 227, model = 9169. From profile version 1.30 on, device-ID = 107
 - Sunny Central 500HE-11, device-ID = 227, model = 9169. From profile version 1.30 on, device-ID = 107
 - Sunny Central 630HE-11, device-ID = 166, model = 9168. From profile version 1.30 on, device-ID = 107
- Device family SC nnnHE-US:
 - Sunny Central 500HE-US (firmware version 1.060 or higher), device-ID = 157, model = 9093. From profile version 1.30 on, device-ID = 87
- Device family SC nnnU, (firmware version 1.060 or higher):
 - Sunny Central 250-US, device-ID = 155, model = 9091. From profile version 1.30 on, device-ID = 87
 - Sunny Central 500-US, device-ID = 156, model = 9092. From profile version 1.30 on, device-ID = 87
- Device family STP nn000TL-10, (firmware version 2.22.10.R or higher):
 - Sunny Tripower 8000TL-10, device-ID = 128, model = 9101
 - Sunny Tripower 10000TL-10, device-ID = 128, model = 9067
 - Sunny Tripower 12000TL-10, device-ID = 128, model = 9068
 - Sunny Tripower 15000TL-10, device-ID = 128, model = 9069
 - Sunny Tripower 17000TL-10, device-ID = 128, model = 9070

Island inverters:

- Sunny Island:
 - SI 2012, device-ID = 67, model = 9155
 - SI 2224, device-ID = 67, model = 9158
 - SI 5048, device-ID = 69, model = 9159
 - SI4548-US-10, device-ID = 69, model = 9159
 - SI6048-US-10, device-ID = 69, model = 9159
 - SI6.0H-10, device-ID = 137, model = 9159
 - SI8.0H-10, device-ID = 137, model = 9159

String monitoring devices:

- Optiprotect (firmware version 1.00 or higher), device-ID = 198, model = 9120. From profile version 1.30 on, device-ID = 161
- Sunny Central String-Monitor Controller (firmware version 1.05 or higher), device-ID = 187, model = 9108. From profile version 1.30 on, device-ID = 129
- Sunny Central String-Monitor-US (firmware version 1.04 or higher), device-ID = 190, model = 9110. From profile version 1.30 on, device-ID = 97
- Sunny String-Monitor (firmware version 1.04 or higher), device-ID = 171

Weather stations:

- SMA Meteo Station (firmware version 1.00 or higher), device-ID = 232, model = 9176
- Sunny Sensorbox (firmware version 1.00 or higher), device-ID = 81, model = 9061

7.2 Modbus Communication Port

The following table shows the factory setting of the supported network port:

Network protocol	Communication port, Factory setting
TCP	502



Use a free communication port

You should only use a free communication port. Generally, the following range of ports is available: 49152 to 65535.

You can find further information about used ports in the database "Service Name and Transport Protocol Port Number Registry" under <http://www.iana.org/assignments/service-names-port-numbers/service-names-port-numbers.xml>.



Changing the communication port

If you change the "Modbus-Port" of the WebBox, you must also change the Modbus port of a connected Modbus master system. Otherwise, the WebBox can no longer be accessed via Modbus protocol.

7.3 Modbus Reaction Time

This section contains typical reaction times for different inverter families. The reaction time is the interval within which changes in value are available in the SMA devices at the Modbus interface of the WebBox. Consequently, changes in value can only be displayed in a corresponding or larger interval in a Modbus master system (e.g. in a SCADA system).

Device Family	Reaction Time (s)
SC nnnCP and SC nnnHE-20	8 to 10
SC nnnU	8 to 10
SC nnnHE-US	8 to 10
SC nnnHE-11	8 to 10 (with 1-2 inverters per Sunny WebBox)
String Monitoring Unit (provides 300 5-minute mean values)	

7.4 Interval of Data Request and Number of Values



Limit of data processing capabilities

Due to reasons of system stability the period between data transfers via the Modbus protocol should be at least 10 seconds, whereby not more than 30 Modbus registers should be transmitted. This specification is the upper limit for SMA devices connected through the Modbus protocol, according to section "Number of SMA Devices".

7.5 Number of SMA Devices



Recommended number of SMA devices

For performance reasons, we recommend operating approx. 25 SMA devices on the WebBox and not to fully utilize the maximum possible number of 50 SMA devices that the WebBox can handle.

7.6 Numerical Codes of the Time Zones

The following table contains the most important time zones and their numerical codes that are used in the SMA Modbus profile. With a known location you can find out the numerical code and the time zone with it. The tables of section 5 "SMA Modbus Profile – Assignment Tables", page 25, refer to this time zone table.

City/Country	Code	Time zone			
Abu Dhabi, Muskat	9503	UTC+04:00	Bogotá, Lima, Quito	9563	UTC-05:00
Adelaide	9513	UTC+09:30	Brasilia	9527	UTC-03:00
Alaska	9501	UTC-09:00	Brisbane	9525	UTC+10:00
Amman	9542	UTC+02:00	Brussels, Copenhagen, Madrid, Paris	9560	UTC+01:00
Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna	9578	UTC+01:00	Buenos Aires	9562	UTC-03:00
Arizona	9574	UTC-07:00	Canberra, Melbourne, Sydney	9507	UTC+10:00
Astana, Dhaka	9515	UTC+06:00	Caracas	9564	UTC-04:30
Asuncion	9594	UTC-04:00	Casablanca	9585	UTC+00:00
Athens, Bucharest, Istanbul	9537	UTC+02:00	Cayenne	9593	UTC-03:00
Atlantic (Canada)	9505	UTC-04:00	Chennai, Kolkata, Mumbai, New Delhi	9539	UTC+05:30
Auckland, Wellington	9553	UTC+12:00	Chicago, Dallas, Kansas City, Winnipeg	9583	UTC-06:00
Azores	9509	UTC-01:00	Chihuahua, La Paz, Mazatlan	9587	UTC-07:00
Baghdad	9504	UTC+03:00	Darwin	9506	UTC+09:30
Baku	9508	UTC+04:00	Denver, Salt Lake City, Calgary	9547	UTC-07:00
Bangkok, Hanoi, Jakarta	9566	UTC+07:00	Dublin, Edinburgh, Lisbon, London	9534	UTC+00:00
Beirut	9546	UTC+02:00	Yerevan	9512	UTC+04:00
Belgrade, Bratislava, Budapest, Ljubljana, Prague	9517	UTC+01:00	Fidschi, Marshall Islands	9531	UTC+12:00

Georgetown, La Paz, San Juan	9591	UTC-04:00	Moskow, St. Petersburg, Volgograd	9561	UTC+03:00
Greenland	9535	UTC-03:00	Nairobi	9524	UTC+03:00
Guadalajara, Mexico City, Monterrey	9584	UTC-06:00	Newfoundland	9554	UTC-03:30
Guam, Port Moresby	9580	UTC+10:00	New York, Miami, Atlanta, Detroit, Toronto	9528	UTC-05:00
Harare, Pretoria	9567	UTC+02:00	Novosibirsk	9550	UTC+06:00
Hawaii	9538	UTC-10:00	Nuku'alofa	9572	UTC+13:00
Helsinki, Kiev, Riga, Sofia, Tallin, Vilna	9532	UTC+02:00	Osaka, Sapporo, Tokyo	9571	UTC+09:00
Hobart	9570	UTC+10:00	Pacific (USA, Canada)	9558	UTC-08:00
Indiana (East)	9573	UTC-05:00	Peking, Chongqing, Hongkong, Urumchi	9522	UTC+08:00
International Date Line (Western)	9523	UTC-12:00	Perth	9576	UTC+08:00
Irkutsk	9555	UTC+08:00	Petropavlovsk-Kamtschatski	9595	UTC+12:00
Islamabad, Karatschi	9579	UTC+05:00	Port Louis	9586	UTC+04:00
Yakutsk	9581	UTC+09:00	Santiago	9557	UTC-04:00
Jekaterinburg	9530	UTC+05:00	Sarajevo, Skopje, Warsaw, Zagreb	9518	UTC+01:00
Jerusalem	9541	UTC+02:00	Saskatchewan	9510	UTC-06:00
Kabul	9500	UTC+04:30	Seoul	9543	UTC+09:00
Cairo	9529	UTC+02:00	Sri Jayawardenepura	9568	UTC+05:30
Cape Verde Islands	9511	UTC-01:00	Taipeh	9569	UTC+08:00
Katmandu	9552	UTC+05:45	Taschkent	9589	UTC+05:00
Caucasian Standard Time	9582	UTC+04:00	Teheran	9540	UTC+03:30
Krasnoyarsk	9556	UTC+07:00	Tiflis	9533	UTC+04:00
Kuala Lumpur, Singapore	9544	UTC+08:00	Tijuana, Baja California (Mexico)	9559	UTC-08:00
Kuwait, Riyadh	9502	UTC+03:00	Ulan-Bator	9592	UTC+08:00
Magadan, Solomon Islands, New Caledonia	9519	UTC+11:00	West.Centr.Africa	9577	UTC+01:00
Manaus	9516	UTC-04:00	Windhoek	9551	UTC+02:00
Midway Islands, Samoa	9565	UTC-11:00	Vladisvostok	9575	UTC+10:00
Minsk	9526	UTC+02:00	Yangon (Rangoon)	9549	UTC+06:30
Central Atlantic	9545	UTC-02:00	Central America	9520	UTC-06:00
Monrovia, Reykjavik	9536	UTC+00:00			
Montevideo	9588	UTC-03:00			

7.7 Frequently used Numerical Codes (ENUM)

The following table provides numerical codes that are frequently used as a functional coding in data format ENUM. The enumeration(s) column contains the corresponding abbreviations. Due to the variety of devices, several abbreviations may be specified.



Event Numbers

The event numbers provided by the devices under the Modbus address 30197 are device-specific. For their breakdown, use the documentation of the respective device. You cannot decode the event numbers using the numerical codes of this document (see section 6 "Troubleshooting", page 69).

Code	Meaning	Enumeration(s)
51	Closed	Cls
276	Instantaneous value	LimFst
295	MPP	Mpp, MPP, Mpp-Betrieb, Mpp-Operation
303	Off	Off
308	On	On
309	Operation	Operation
311	Open	Opn
336	Contact manufacturer	PrioA
337	Contact installer	PrioC
338	Invalid	PrioIna
381	Stop	Stop
455	Warning	Wrn, Disturbance, Stoer, Stoerung, Störung, Warning
461	SMA (manufacturer specification)	
973	Not set, NaN	NaN, ---, ----, -----, -----, -----
1041	Capacitive	OVExt, Capacitive
1042	Inductive	UNExt, Inductive
1069	Reactive power/Voltage characteristic Q(U)	VArCilVol
1070	Reactive power Q, direct default setting	VArCnstNom
1071	Reactive power const. Q (kvar)	VArCnst
1072	Reactive power Q, default setting via plant control	VArCilCom
1073	Reactive power Q(P)	VArCilW
1074	cos ϕ , direct specification	PFCnst
1075	cos ϕ , default setting via plant control	PFCilCom
1076	cos $\phi(P)$ characteristic curve	PFCilW

1077	Active power limitation P (W)	WCnst
1078	Active power limitation P in (%) of P _{MAX}	WCnstNom
1079	Active power limitation P via plant control	WCtlCom
1387	Reactive power Q, default setting via analog input	VArCnstNomAnIn
1388	cos ϕ , default setting via analog input	PFCnstAnIn
1389	Reactive power/Voltage characteristic curve Q(U) with hysteresis and deadband	VArCtlVolHystDb
1390	Active power limitation P via analog input	WCnstNomAnIn
1391	Active power limitation P via digital inputs	WCnstNomDgIn
1392	Error	Flt
1393	Wait for PV voltage	WaitPV
1394	Wait for valid AC grid	WaitGri
1395	DC range	DcDm
1396	AC grid	Gri
1455	Emergency Stop	EvtEmgStop
1466	Waiting	Wait
1467	Starting	Str
1468	MPP search	MppSrch
1469	Shut-down	Shdwn
1470	Fault	Dst
1471	Warning/Error mail OK	EvtWrnErrTxOk
1472	Warning/Error mail not OK	EvtWrnErrTxNok
1473	Plant information mail OK	EvtPlntDatTxOk
1474	Plant information mail not OK	EvtPlntDatTxNok
1475	Error mail OK	EvtErrTxOk
1476	Error mail not OK	EvtErrTxNok
1477	Warning mail OK	EvtWrnTxOk
1478	Warning mail not OK	EvtWrnTxNok
1479	Wait after grid interruption	GriFltMon
1480	Wait for electricity supplier	WaitUtil

8 Contact

If you have technical problems concerning our products, contact the SMA Service Line. We require the following information in order to provide you with the necessary assistance:

- Used Modbus master software or hardware
- Software version of the WebBox
- Type of communication interface between the WebBox and the devices
- Type, serial numbers, and software version of the devices connected to the PV plant

United States/Estados Unidos	SMA America, LLC Rocklin, CA	+1 877-MY-SMATech (+1 877-697-6283) ⁴ +1 916 625-0870 ⁵
Canada/Canadá	SMA Canada, Inc. Toronto	+1 877-MY-SMATech (+1 877-697-6283) ⁶

⁴ toll free for USA, Canada and Puerto Rico/Exento de tasas en EE. UU., Canadá y Puerto Rico

⁵ international/Internacional

⁶ toll free for Canada/gratuit pour le Canada

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