Technical Information

SMA Modbus® Interface

SMA DATA MANAGER

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1 Information on this Document

1.1 Validity

This document is valid for:

- EDML-10 (SMA Data Manager L)
- EDMM-10 (SMA Data Manager M)
- EDMM-US-10 (SMA Data Manager M)
- EDMM-10.A (SMA Data Manager M Lite)

1.2 Target Group

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

- Detailed knowledge of the grid management services
- Knowledge of IP-based network protocols
- Knowledge of the Modbus specifications
- Training in the installation and configuration of IT systems
- Knowledge of and compliance with this document and all safety information

1.3 Content and Structure of this Document

This document does not contain any information on the Modbus registers provided by SMA products. Furthermore, no information on the firmware version to be installed on the respective SMA product is included. Information on firmware versions and device-specific Modbus registers of SMA products can be found on our product pages or Modbus page at www.SMA-Solar.com.

This document does not contain any information on software which can communicate with the Modbus interface (see the software manufacturer's manual).

This document contains a general description of the Modbus interface integrated in SMA products.

This document does not contain any information related to parameters for grid management services (system control objects). For more information on these parameters, contact the SMA Service.

Illustrations in this document are reduced to the essential information and may deviate from the real product.

1.4 Levels of warning messages

The following levels of warning messages may occur when handling the product.

⚠ DANGER
Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING
Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION
Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE
Indicates a situation which, if not avoided, can result in property damage.

1.5 Symbols in the Document

Icon	Explanation
	Information that is important for a specific topic or goal, but is not safety-relevant
☐	Indicates a requirement for meeting a specific goal
☑	Desired result
✖	A problem that might occur.
	Example

1.6 Typographical Elements in the Document

Typographical element	Use	Example
bold	• Messages • Terminals • Elements on a user interface • Elements to be selected • Elements to be entered	• Connect the insulated conductors to the terminals **X703:1** to **X703:6**. • Enter **10** in the field **Minutes**.
>	• Connects several elements to be selected	• Go to **Settings > Date**.
[**Button**] [**Key**]	• Button or key to be clicked on or pressed down	• Select [**Enter**].
#	• Placeholder for variable components (e.g., parameter names)	• Parameter **WCtlHz.Hz#**

2 Safety

2.1 Intended Use

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

- Remote control of grid management services
- Remote-controlled querying of measured values
- Remote-controlled changing of parameters
- Interface for direct marketing

The Modbus interface can only be used via the Modbus TCP protocol.

All components must remain within their permitted operating ranges and their installation requirements at all times.

Use SMA products only in accordance with the information provided in the enclosed documentation and with the locally applicable laws, regulations, standards and directives. Any other application may cause personal injury or property damage.

Alterations to the SMA products, e.g., changes or modifications, are only permitted with the express written permission of SMA Solar Technology AG. Unauthorized alterations will void guarantee and warranty claims and in most cases terminate the operating license. SMA Solar Technology AG shall not be held liable for any damage caused by such changes.

Any use of the product other than that described in the Intended Use section does not qualify as appropriate.

The enclosed documentation is an integral part of this product. Keep the documentation in a convenient, dry place for future reference and observe all instructions contained therein.

This document does not replace any regional, state, provincial, federal or national laws, regulations or standards that apply to the installation, electrical safety and use of the product. SMA Solar Technology AG assumes no responsibility for the compliance or non-compliance with such laws or codes in connection with the installation of the product.

2.2 IMPORTANT SAFETY INSTRUCTIONS

Keep the manual for future reference.

This section contains safety information that must be observed at all times when working.

The product has been designed and tested in accordance with international safety requirements. As with all electrical or electronical devices, there are residual risks despite careful construction. To prevent personal injury and property damage and to ensure long-term operation of the product, read this section carefully and observe all safety information at all times.

NOTICE

Damage of SMA products due to cyclical changing of parameters

The parameters of SMA products that can be changed with writable Modbus registers (RW) are intended for long-term storage of device settings. Cyclical changing of these parameters leads to destruction of the flash memory of the SMA products.

Parameters for grid management services to control and limit the nominal PV system power are an exception. Such parameters (system control objects) may be changed cyclically.

- Do not change device parameters cyclically.
- Use the parameters for grid management services for the automated remote control of the PV system.

NOTICE

Manipulation of system data in networks

You can connect the supported SMA products to the Internet. When connected to the Internet, there is a risk that unauthorized users can access and manipulate the data of your system.

- Set up a firewall.
- Close unnecessary network ports.
- If absolutely necessary, only enable remote access via a virtual private network (VPN).
- Do not use the port forwarding feature. This also applies to the used Modbus ports.
- Disconnect system components from other network components (network segmentation).

Access to data points after activating the Modbus interface

The read-only access to data points is possible after activating the Modbus interface. The write-only access to all designated data points is possible. All parameter changes are shown on the user interface of the SMA product.

- Ensure that the Modbus interface is still active after resetting the SMA product to default settings.

3 Product Overview

3.1 Modbus Protocol

The Modbus Application Protocol is an industrial communication protocol that is currently used in the solar sector mainly for PV system communication. The Modbus protocol has been developed for reading data from or writing data to clearly defined data areas. The Modbus specification does not prescribe what data is within which data area. The data areas must be defined device-specifically in Modbus profiles. With knowledge of the device-specific Modbus profile, a Modbus client (e.g. a SCADA system) can access the data of a Modbus server (e.g. SMA product with Modbus interface).

The SMA Modbus profile and SunSpec Modbus profile are used for SMA products.

3.2 SMA Modbus Profile

The SMA Modbus profile contains definitions for SMA products. All available data on SMA products was assigned to the corresponding Modbus registers for the definition. Not all SMA products support all Modbus registers of the SMA Modbus profile.

For supported Modbus register (see Section 4, page 14).

3.3 System Topology

An SMA product with Modbus interface is connected with the SCADA system of the electric utility company or the grid operator via Ethernet. The Modbus interface also enables communication via the Modbus protocol. From the perspective of the Modbus protocol, an SMA product with Modbus interface constitutes a Modbus server that supports the SMA Modbus profile.

3.4 Addressing and Data Transmission

3.4.1 Unit IDs

The Unit ID is a superordinate addressing type in the Modbus protocol.

The following tables shows the Unit IDs supported by this SMA product.

Unit ID	Explanation
1	This Unit ID is reserved for information on the SMA product.
2	This unit ID is reserved for the system parameters and measured values.

3.4.2 Register Address, Register Width and Data Block

A Modbus register is 16 bits wide. For wider data items, connected Modbus registers are used and considered as data blocks. The address of the first Modbus register in a data block is the start address of the data block.

3.4.3 Data Transmission

In accordance with the Modbus specification, only a specific volume of data can be transported in a single data transmission in a simple protocol data unit (PDU). The data also contains function-dependent parameters such as the function code, start address or number of Modbus registers to be transmitted. The amount of data depends on the Modbus command used and has to be taken into account during data transmission (see Section 3.4.4, page 9).

With data storage in the Motorola format "Big Endian", data transmission begins with the high byte and then the low byte of the Modbus register.

3.4.4 Reading and Writing of Data

The Modbus interface can be used via the protocol Modbus TCP. Using Modbus TCP enables read and write access to the Modbus register. SMA products with Modbus interface use the Modbus TCP as standard.

Access type	Explanation
RO (Read-Only)	Read only
RW (Read-Write)	Read and write

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

Modbus command	Hexadecimal value	Data volume (number of registers)*
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

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

Error messages on reading or writing individual Modbus registers

If a Modbus register is accessed, which is not contained in a Modbus profile, or if a Modbus command is incorrect, a Modbus exception is generated. Modbus exceptions are also generated when write access occurs on a read-only Modbus register or read access occurs on a write-only Modbus register.

Reading or writing of data blocks

To prevent inconsistencies, data blocks of associated Modbus registers or Modbus register ranges must be read or written consecutively. The 4 bytes of a 64-bit Modbus register must be read, for example, with an operation in a 64-bit SMA data type.

Reading multiple Modbus registers as a data block

If a data block is read and if at least one register defined in the Modbus profile can be determined in its data range, an answer is returned. If this data block also contains Modbus registers that are not defined in the Modbus profile, NaN is used for the query values in each case. If none of the Modbus registers are defined in the data range of a data block in the Modbus profile, the query is invalid and a Modbus exception is generated.

Error message on writing multiple Modbus registers as a data block

If multiple registers are written in the data block (Modbus command 0x10 and 0x17) and an error occurs when writing, the process continues with the next register in the data block. If some data is dependent on other data, or if some data is mutually exclusive, the data is only processed if the entire data block is valid. Otherwise the entire data block is discarded. In the event of an error, a Modbus exception will be generated.

Modbus exceptions

For Modbus exceptions, see "Modbus Application Protocol Specification" at http://www.modbus.org/specs.php.

3.4.5 SMA Data Types and NaN Values

The following table shows the data types used in the SMA Modbus profile and compares these to possible NaN values. The SMA data types are listed in the assignment tables in the **Type** column. The SMA data types describe the data widths of the assigned values:

Type	Explanation	NaN value
S16	A signed word (16-bit).	0x8000
S32	A signed double word (32-bit).	0x8000 0000
STR32	32 byte data field, in UTF8 format.	ZERO
U16	A word (16-bit).	0xFFFF
U32	A double word (32-bit).	0xFFFF FFFF
U32	For status values, only the lower 24 bits of a double word (32-bit) are used.	0xFFFF FD
U64	A quadruple word (64-bit).	0xFFFF FFFF FFFF FFFF

3.4.6 SMA Data Formats

The following SMA data formats describe how SMA data is to be interpreted. The data formats are used, for example, for the display of data or for its further processing. The SMA data formats are listed in the **Format** column of the assignment tables.

Format	Explanation
Duration	Time in seconds, in minutes or in hours, depending on the Modbus register
ENUM or TAGLIST	Coded numerical values. The breakdown of the possible codes can be found directly under the designation of the Modbus register in the assignment tables.
FIX0	Decimal number, commercially rounded, without decimal place.
FIX1	Decimal number, commercially rounded, one decimal place.
FIX2	Decimal number, commercially rounded, two decimal places.
FIX3	Decimal number, commercially rounded, three decimal places.
FIX4	Decimal number, commercially rounded, four decimal places.
FUNCTION_SEC	The date saved in the Modbus register will be transmitted in the event of a change to a function and starts this. After execution of the function, no status value is set. A security question must be executed in the client software prior to execution of the function.
FW	Firmware version
HW	Hardware version (e.g. 24)
IP4	4-byte IP address (IPv4) of the form XXX.XXX.XXX.XXX.
RAW	Text or number. A RAW number has no decimal places and no thousand or other separation indicators.

Format	Explanation
Outline Purchase Agreement	Revision number of the form 2.3.4.5.
TEMP	Temperature values are stored in special Modbus registers in degrees Celsius (°C), in degrees Fahrenheit (°F), or in Kelvin K. The values are commercially rounded, with one decimal place.
TM	UTC time, in seconds
UTF8	Data in UTF8 format.
DT	Date/time (Transmission in seconds since 1970-01-01)

3.4.7 SMA Firmware Data Formats

Four values are extracted from the delivered double word (DWORD) within the corresponding Modbus register. The values "Major" and "Minor" are contained BCD-coded in bytes 1 and 2. Byte 3 contains the "Build" value (not BCD-coded). Byte 4 contains the "Release Type" value according to the following table:

Release type	Release-type coding	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:

Product firmware version:	1.05.10.R
Values from double word (DWORD):	Major: 1, Minor: 05, Build: 10, Release type: 4 (Hex: 0x1 0x5 0xA 0x4)

3.5 Modbus Ports

The following table shows the default setting of the supported network protocols:

Network protocol	Modbus port
TCP	502

Using free ports

Only use free ports when using another port than 502. The following range is generally available: 49152 to 65535.

You can find more information on occupied ports in the database "Service Name and Transport Protocol Port Number Registry" at http://www.iana.org/assignments/service-names-port-numbers/service-names-port-numbers.xml.

Changing the Modbus port

If you change one of the communication ports, you must also change the corresponding Modbus port of a connected Modbus/client system. Otherwise the SMA product can no longer be accessed via the Modbus protocol.

3.6 Data Processing and Time Behavior

In this Section, you can find typical data-processing and reaction times of the Speedwire Modbus interface and time details for saving parameters in SMA products.

NOTICE

Damage of SMA products due to cyclical changing of parameters

The parameters of SMA products that can be changed with writable Modbus registers (RW) are intended for long-term storage of device settings. Cyclical changing of these parameters leads to destruction of the flash memory of the SMA products.

Parameters for grid management services to control and limit the nominal PV system power are an exception. Such parameters (system control objects) may be changed cyclically.

- Do not change device parameters cyclically.
- Use the parameters for grid management services for the automated remote control of the PV system.

Signal runtime via the SMA product with Modbus interface

The signal runtime of the SMA product with Modbus is usually 150 ms. The signal runtime is the time required by the SMA product to process incoming Modbus commands.

Data transfer interval via the Modbus protocol

For system stability reasons, the time period between data transfers via the Modbus protocol should be at least 1 second. No more than five parameters and measured values should be simultaneously transmitted.

Physical reaction time via the Modbus protocol

The physical reaction time of SMA products is normally approx. 1 second. The physical reaction time is the time between the changing of setpoints in a SMA product until their physical implementation. Such a change would be, for example, changing cos φ.

Reaction time of the Modbus interface

The reaction time of the Modbus interface is up to 1 second. The reaction time of the Modbus interface is the time between the arrival of the parameter specifications in the SMA product until the corresponding measured values are provided to the Modbus interface. Due to this reaction time, parameter specifications can be displayed via a Modbus/client system (e.g., a SCADA system) only at a corresponding or larger interval.

3.7 Frequently Used Number Codes

The following table contains number codes which, as function coding in data format ENUM, are frequently used in the SMA Modbus profile.

The event numbers of the SMA products are not decrypted with the number codes in this document.

The event numbers of the SMA products are device-specific and cannot be decrypted with the number codes in this document. To decrypt the event numbers of low or medium-power inverters, you require additional information such as operating parameters and measured values (see Technical Description "Measured Values and Parameters" at www.SMA-Solar.com).

To decrypt the event numbers of central inverters, contact the Service department (see Section 5, page 19).

Code	Explanation	Code	Explanation
51	Closed	1390	Active power limitation P via analog input
276	Instantaneous value	1391	Active power limitation P via digital inputs
295	MPP	1392	Errors
303	Off	1393	Wait for PV voltage
308	On	1394	Wait for valid AC grid
309	Operation	1395	DC area
311	Open	1396	AC grid
336	Contact the manufacturer	1438	Automatic
337	Contact the installer	1455	Emergency stop
338	Invalid	1466	Waiting
381	Stop	1467	Starting
455	Warning	1468	MPP search
461	SMA (manufacturer specification)	1469	Shutdown
1041	leading	1470	Event message
1042	lagging	1471	Warning/error e-mail OK
1069	Reactive power / voltage characteristic curve Q(V)	1472	Warning/error e-mail not OK
1070	Reactive power Q, direct setpoint	1473	System info e-mail OK
1071	Reactive power const. Q (kVAr)	1474	System info e-mail not OK
1072	Q specified by PV system control	1475	Error e-mail OK
1073	Reactive power Q(P)	1476	Error e-mail not OK
1074	cos φ, direct setpoint	1477	Warning e-mail OK
1075	cos φ, setpoint via system control	1478	Warning e-mail not OK
1076	cos φ(P) characteristic curve	1479	Wait after grid interruption
1077	Active power limitation P (W)	1480	Wait for electric utility company
1078	Active power limitation P (%) of PMAX	4405	Maximum active power WMax
1079	Active power limitation P via system control	4406	Maximum reactive power VArMax
1387	Reactive power Q, setpoint via analog input	4520	Mean value of the phase voltages
1388	cos φ, setpoint via analog input	4521	Maximum phase voltage
1389	Reactive power / voltage characteristic curve Q(U) with hysteresis and deadband	-	-

4 Assignment Tables

4.1 Information on Assignment Tables

The following subsections are sorted by unit ID. Each contains a table of the Modbus registers which can be accessed using this unit ID. The tables present the following information:

Information	Explanation
ADR	Decimal Modbus register
Description/number codes	Short description of the Modbus register and the number codes used
CNT	Number of assigned Modbus registers
Type	Data type
Format	Data format of the saved value
Access	Access type

4.2 Unit ID = 1 (Communication Product)

The following table lists the parameters provided by the communication product and measured values that can be accessed at Unit ID = 1:

ADR	Description/number codes	CNT	Type	Format	Access
30001	Version number of the SMA profile	2	U32	RAW	RO
30003	SUSyID (Device ID)	2	U32	RAW	RO
30005	Serial number	2	U32	RAW	RO
30007	Modbus data change: counter value will increase if data in the Profile has changed (overflow).	2	U32	RAW	RO
30051	Device class: • 8128 = Communication products	2	U32	ENUM	RO
30193	UTC system time (s)	2	U32	DT	RO

4.3 Unit ID = 2 (System)

Not all data points available at EDMM-10.A

Not all data points mentioned in this section are available with the EDMM-10.A. If a data point is not available, a NaN value is sent.

In the following table, you can find the PV system parameters that you can access using unit ID = 2. The system parameters represent measured values and parameters of the communication product and also system devices that are connected via the Modbus protocol. Parameters such as time settings are transferred by the communication product to the devices of the system and there, depending on the device type, processed further. Measured values such as energy meter values are queried by the devices and made available as accumulated values:

ADR	Description/number codes	CNT	Type	Format	Access
30193	UTC system time (s)	2	U32	DT	RO
30201	Current state of health; 5-minute value; device status	2	U32	ENUM	RO

ADR	Description/number codes	CNT	Type	Format	Access
30233	Accumulated connected power of the PV inverter (W)	2	U32	FIX0	RO
30513	Total energy fed in on all line conductors (Wh)	4	U64	FIX0	RO
30517	Energy fed in on the current day on all line conductors, in Wh	4	U64	FIX0	RO
30775	Current PV feed-in active power on all line conductors (W)	2	S32	FIX0	RO
30805	Reactive power on all line conductors (VAr)	2	S32	FIX0	RO
30845	Current battery state of charge (SOC in relation to present capacity of the battery), in %	2	U32	FIX0	RO
31235	Power limitation via digital input (%)	2	U32	FIX2	RO
31237	Setpoint of active power limitation P via analog input, in %	2	U32	FIX2	RO
31239	PV power limitation via communication (%)	2	U32	FIX2	RO
31241	PV power limitation via communication for direct marketing (%)	2	U32	FIX2	RO
31243	Maximum active power setpoint, in %	2	U32	FIX2	RO
31245	Internal PV power limitation (%)	2	U32	FIX2	RO
31249	Active power of system at PCC (W)	2	S32	FIX0	RO
31251	Reactive power of system at PCC (VAr)	2	S32	FIX0	RO
31393	Current battery charge, in W If no battery inverter is installed in the system, a NaN value is sent.	2	U32	FIX0	RO
31395	Current battery discharge, in W If no battery inverter is installed in the system, a NaN value is sent.	2	U32	FIX0	RO
31397	Battery charge, in Wh	4	U64	FIX0	RO
31401	Battery discharge, in Wh	4	U64	FIX0	RO
31503	Feed-in of power into grid: Line conductor L1 at PCC, in W	2	S32	FIX0	RO
31505	Feed-in of power into grid: Line conductor L2 at PCC, in W	2	S32	FIX0	RO
31507	Feed-in of power into grid: Line conductor L3 at PCC, in W	2	S32	FIX0	RO
31509	Feed-in of reactive power into grid: Line conductor L1 at PCC, in VAr	2	S32	FIX0	RO

ADR	Description/number codes	CNT	Type	Format	Access
31511	Feed-in of reactive power into grid: Line conductor L2 at PCC, in VAr	2	S32	FIX0	RO
31513	Feed-in of reactive power into grid: Line conductor L3 at PCC, in VAr	2	S32	FIX0	RO
31515	System voltage: Line conductor L1 - L2 at PCC, in V If no power analyzer is connected, a NaN value is sent.	2	U32	FIX2	RO
31517	System voltage: Line conductor L2 - L3 at PCC, in V If no power analyzer is connected, a NaN value is sent.	2	U32	FIX2	RO
31519	System voltage: Line conductor L3 - L1 at PCC, in V If no power analyzer is connected, a NaN value is sent.	2	U32	FIX2	RO
31521	Mean value of grid voltage L-N at PCC, in V If no power analyzer is connected, a NaN value is sent.	2	U32	FIX2	RO
31523	Mean value of grid voltage L-L at PCC, in V If no power analyzer is connected, a NaN value is sent.	2	U32	FIX2	RO
31525	Displacement power factor at PCC If no power analyzer is connected, a NaN value is sent.	2	S32	FIX2	RO
31527	Grid frequency at PCC, in Hz If no power analyzer is connected, a NaN value is sent.	2	U32	FIX2	RO
31529	System voltage: Line conductor L1 at PCC, in V	2	U32	FIX2	RO
31531	System voltage: Line conductor L2 at PCC, in V	2	U32	FIX2	RO
31533	System voltage: Line conductor L3 at PCC, in V	2	U32	FIX2	RO
31535	System current: Line conductor L1 at PCC	2	S32	FIX3	RO
31537	System current: Line conductor L2 at PCC	2	S32	FIX3	RO
31539	System current: Line conductor L3 at PCC	2	S32	FIX3	RO
31545	Power value of the generating system when all generating units are in operation, in W	2	U32	FIX0	RO
31547	Available active power of all inverters, in W	2	U32	FIX0	RO
32185	Internal PV reactive power limitation (%) If no internal PV reactive power limitation is set, a NaN value is sent.	2	S32	FIX2	RO

ADR		Description/number codes	CNT	Type	Format	Access
32187		Available underexcited reactive power, in VAr	2	S32	FIX0	RO
32189		Available overexcited reactive power, in VAr	2	S32	FIX0	RO
32191	*	Theoretically available power output, in W	2	U32	FIX2	RO
32193	**	Availability of generating system, in %	2	U32	FIX0	RO
32195		External active power limitation, in % If the function is disabled, a NaN value is sent.	2	U32	FIX2	RO
32197		Available underexcited reactive power, in %	2	S32	FIX2	RO
32199		Available overexcited reactive power, in %	2	S32	FIX2	RO
34609	*	Ambient temperature (°C)	2	S32	TEMP	RO
34615	*	Global wind speed (m/s)	2	U32	FIX2	RO
34621	*	PV module temperature (°C)	2	S32	TEMP	RO
34623	*	Total irradiation on the external irradiation sensor/ pyranometer (W/m²)	2	U32	FIX0	RO
34625	*	Ambient temperature (°F)	2	S32	TEMP	RO
34627	*	Ambient temperature (K)	2	S32	TEMP	RO
34629	*	PV module temperature (°F)	2	S32	TEMP	RO
34631	*	PV module temperature (K)	2	S32	TEMP	RO
34633	*	Global wind speed (km/h)	2	U32	FIX1	RO
34635	*	Global wind speed (mph)	2	U32	FIX1	RO

ADR	Description/number codes	CNT	Type	Format	Access
34653	Digital input group 1, coded as status: • 311 = Open • 2055 = DI1 • 2056 = DI1 DI2 • 2057 = DI1 DI2 DI3 • 2058 = DI1 DI2 DI3 DI4 • 2059 = DI1 DI2 DI4 • 2060 = DI1 DI3 • 2061 = DI1 DI3 DI4 • 2062 = DI1 DI4 • 2063 = DI2 • 2064 = DI2 DI3 • 2065 = DI2 DI3 DI4 • 2066 = DI2 DI4 • 2067 = DI3 • 2068 = DI3 DI4 • 2069 = DI4	2	U32	ENUM	RO
40018	Quick shut-down of the inverters • 311 = Standby • 1467 = start • 1749 = full stop (AC and DC sides)	2	U32	ENUM	RO/WO
40493	Direct marketer: Active power setpoint P, in % of the maximum active power (PMAX) of the PV plant. Value range: • -100% to -1% = load • 0% = no active power • < 0% to 100% = generator	1	S16	FIX2	RO/WO
41167	Manually set active power limit for the entire system (%)	2	U32	FIX2	RO/WO

* Sensors for module temperature, ambient temperature and irradiation must be included in the system, configured in the SMA Data Manager and activated in the Modbus interface.

** Compliant with parameter Pbinst/Pinst according to VDE AR-N 4110 (Table C2). PBinst: Sum of the rated active power of all generating units in operation. Pinst: Sum of the rated active powers of all generating units within a generating system. Determined only for inverters with the status "In operation" (OPERATION_OPSTT).

5 Contact

You can find your country's contact information at:

https://go.sma.de/service

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www.SMA-Solar.com