Type Certificate

Applicant: **SMA Solar Technology AG**

Address: Sonnenallee 1, 34266 Niestetal, Germany

Type of power generating unit:	**Grid-tied photovoltaic inverter/Bi-directional battery inverter**	**SHP 75-10**	**STPS 60-10**	**STP 60-10**
Technical data	Rated / Max. apparent power:	75 kVA		60 kVA
	Nominal AC voltage:	400 (3 Phasen + PE)		
	Nominal frequency:	50 Hz		
	Max. charging power (at DC voltage > 800 V)	N/A	60 kW	N/A
Technical data determined by measurements	Max. active power $P_{Emax/}$ Max. active power peak P_{600}*	76,30 kW	76,30 kW	61,04 kW
Firmware version:	02.04			
Validated type model:	Model file:	SMASC_SHPPeak1_V1_2_PF21_enc.pfd		
	Identification number (MD5):	46D52A98179E58FF0C15E0D1F306F482		

Grid connection regulation: **VDE-AR-N 4110:2018-11** – Technical requirements for the connection and operation of customer installations to the medium voltage network (TCR medium voltage) [1]
VDE-AR-N 4120:2018-11 – Technical requirements for the connection and operation of customer installations to the high voltage network (TCR high voltage) [2]

Pertinent standards / Guidelines: Technical guidelines:
FGW TR 3 Rev. 25 [3], FGW TR 4 Rev. 09 [4], FGW TR 8 Rev. 09 [5]

The power generating units, stated in the certificate, were tested and certified according to the technical guidelines referenced to the grid connection regulation. The electrical characteristics fulfil the requirements of the grid connection regulation:

- Quasi-steady-state operation
- Dynamic network stability (reactive current characteristic according to TCR medium voltage)
- Active power output and network security management
- Active power adjustment as a function of the grid frequency
- Protection technology and protection settings on generating unit level
- Power quality

The manufacturer has provided proof of certification of the quality management system of his production facility in accordance with ISO 9001

Restrictions, deviations or notes on usage: see *Supplement of Certificate* on p.2.

* For details, see *Supplement of Certificate* on p.2

The certificate includes the following information:

- technical data of the power generating unit, the auxiliary equipment used and the software version used;
- schematic structure of the power generating units;
- summarized information on the properties of the power generating unit.

The certificate is comprised of 80 pages (including Annex of 78 pages).

BV project number : **14TH0075**
Certificate no. : **22-0005_0**
Issued : **2022-01-21**
Certification scheme : **NSOP-0032-DEU-ZE-V01**
Valid until : **2027-01-20**

Certification body

Thomas Lammel

DAkkS Deutsche Akkreditierungsstelle D-ZE-12024-01-00

Supplement of Certificate (22-0005_0)

Note:

* The P_{Emax} is *the highest 10-min mean of the active power of a power generating unit* defined according to VDE-AR-N 4110:2018 [1]. The P_{600} is *the maximum active power peak of the overall system (averaging period 10 min)* defined according to FGW TR 3 Rev. 25 [3].

The stated values on the front page of this certificate were determined according to test 4.1.1, FGW TR 3 Rev. 25 [3].

The active power results of the *SHP 75-10* can be applied to the *STPS 60-10* directly and to the *STP 60-10* scaled by $P_{n,STP\ 60\text{-}10}$ / $P_{n,SHP\ 75\text{-}10}$ = 0,8).

Restrictions, deviations or notes on usage:

- The parameter for the active power gradient for increasing and reducing the active power must be set to a value of larger than 0,33% P_n/s in order to be faster than this value (0,37% P_n/s was used for testing).
- The Q(U) control function is implemented on the PGU but was not tested. In case this function is needed, it must be provided by higher level control.
- The Q(P) control function is implemented on the PGU but was not tested. In case this function is needed, it must be provided by higher level control.
- The reactive power with voltage limitation function is implemented but was not tested. In case this function is needed, it must be provided by higher level control.
- The cosφ setpoint control is implemented on the PGU but was not tested. In case this function is needed, it must be provided by higher level control.
- Test terminals for on-site testing are not provided. For necessary on-site testing, a separate test terminal must be installed additionally.

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Certification body of Bureau Veritas Consumer Products Services Germany GmbH accredited according to DIN EN ISO/IEC 17065
A partial representation of the certificate requires the written approval of Bureau Veritas Consumer Products Services Germany GmbH