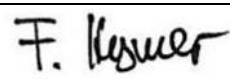


TEST REPORT		
AS 4777.2:2005 and AS 4777.3:2005 with additional deviations for Israel		
Grid connection of energy systems via inverters – Grid protection requirements		
Report reference No.:	10TH0052_AS4777+_ISR_3	
Tested by (printed name and signature)	Urs Seifert	
Approved by (printed name and signature)	Frank Hesmer	
Date of issue	2012-02-20	
Testing Laboratory Name	Bureau Veritas Consumer Product Services GmbH	 Deutsche Akkreditierungsstelle D-PL-12024-03-01
Address	Businesspark A96 86842 Türkheim	
Testing location	same as above	
Applicant's Name	SMA Solar Technology AG	
Address	Sonnenallee 1, 34266 Niestetal	
Test specification		
Standard	AS 4777.2:2005 and AS 4777.3:2005 with additional deviations for Israel	
Non-standard test method	None	
Test Report Form No.	AS4777_B	
Master TRF	Bureau Veritas Consumer Product Services GmbH, 2010-08	
Copyright © Bureau Veritas Consumer Product Services GmbH		
Test item description	Solar Inverter	
Trademark		
Model / Type	STP 8000TL-10, STP 10000TL-10, STP 12000TL-10, STP 15000TL-10, STP 15000TLHE-10, STP 15000TLEE-10, STP 17000TL-10, STP 20000TLHE-10, STP 20000TLEE-10	
Hardware Version.....	S/N: 2110003479, S/N: 2110003496,	
Software Version	Firmware Pack 2.10	

Ratings.....	8000TL	10000TL	12000TL	15000TL	15000TLHE/ 15000TLEE	17000TL	20000TLHE/ 20000TLEE
Input Voltage (MPP):	320-800V	320-800V	380-800V	360-800V	580-800V	400-800V	580-800V
Max. Input current (Input A/B):	22,0A/11A	22,0A/11A	22,0A/11A	33A/11A	36A	33A/11A	36A
Output Voltage:	160-280V, 50Hz				400V, 50Hz	160- 280V, 50Hz	400V, 50Hz
Nom. Output current:	11,6A	14,5A	17,4A	21,7A	24A	24,6A	29A
Output power:	8kW	10kW	12kW	15kW	15kW	17kW	20kW

Copy of marking plate:

SMA Solar Technology AG
www.SMA.de

SUNNY TRIPOWER
Photovoltaic string inverter * Made in Germany

Model
STP 8000TL-10

Serial No.
1234567890

V _{DC max}	1000 V
V _{DC MPP}	320 - 800 V
I _{DC max}	22 A / 11 A
V _{AC nom}	3/N/PE, 230/400 V
f _{AC nom}	50/60 Hz
S _{AC nom}	8000 VA
I _{AC nom}	11.6 A
cos φ	1, adj

outdoor

CE, VDE, RoHS, RAL

1234567890

1234567890

1234567890

1234567890

1234567890

1234567890

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1234567890

STP 8000TL-10 / 12/2010

1234567890

SMA Solar Technology AG
www.SMA.de

SUNNY TRIPOWER
Photovoltaic string inverter * Made in Germany

Model
STP 10000TL-10

Serial No.
9876543210

V _{DC max}	1000 V
V _{DC MPP}	320 - 800 V
I _{DC max}	22 A / 11 A
V _{AC nom}	3/N/PE, 230/400 V
f _{AC nom}	50/60 Hz
S _{AC nom}	10000 VA
I _{AC nom}	14.5 A
cos φ	1, adj

outdoor/IP54

CE, VDE, RoHS, RAL

9876543210

9876543210

9876543210

9876543210

9876543210

9876543210

9876543210

9876543210

9876543210

STP 10000TL-10 / 11/2010

9876543210

SMA Solar Technology AG
www.sma.de



SUNNY TRIPOWER
Photovoltaic string inverter • Made in Germany

Model:
STP 12000TL-10
Serial No.:
9876543210

	V _{DC} max	1000 V
	V _{DC} MPP	380 - 800 V
	I _{DC} max	22 A / 11 A
	V _{AC} nom	3/N/PE 230/400 V
	f _{AC} nom	50/60 Hz
	S _{AC} nom	12000 VA
	I _{AC} nom	17.4 A
	cos φ	1, adj
















9876543210













STP 12000TL-10 / 11/2010
9876543210

SMA Solar Technology AG
www.sma.de



SUNNY TRIPOWER
Photovoltaic string inverter • Made in Germany

Model:
STP 15000TL-10
Serial No.:
9876543210

	V _{DC} max	1000 V
	V _{DC} MPP	360 - 800 V
	I _{DC} max	33 A / 11 A
	V _{AC} nom	3/N/PE 230/400 V
	f _{AC} nom	50/60 Hz
	S _{AC} nom	15000 VA
	I _{AC} nom	21.7 A
	cos φ	1, adj
















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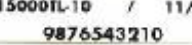




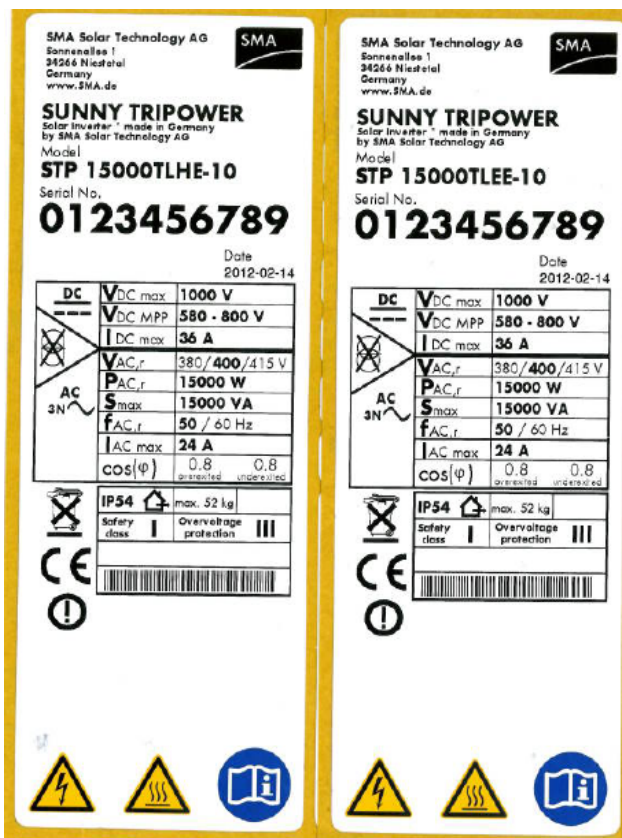








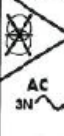
STP 15000TL-10 / 11/2010
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SMA Solar Technology AG
Sonnenallee 1
34266 Niestetal
Germany
www.SMA.de

SUNNY TRIPOWER
Solar Inverter * made in Germany
by SMA Solar Technology AG
Model
STP 20000TLHE-10
Serial No.
0123456789

Date
2012-02-14

	DC	V _{DC max}	1000 V
		V _{DC MPP}	580 - 800 V
		I _{DC max}	36 A
		V _{AC,r}	380/400/415 V
		P _{AC,r}	20000 W
		S _{max}	20000 VA
		f _{AC,r}	50 / 60 Hz
		I _{AC max}	29 A
		cos(φ)	0.8 overvoltage 0.8 undervoltage
		IP54	max. 52 kg
	Safety class	I	
	Overvoltage protection	III	

CE

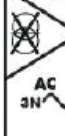
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SMA Solar Technology AG
Sonnenallee 1
34266 Niestetal
Germany
www.SMA.de

SUNNY TRIPOWER
Solar Inverter * made in Germany
by SMA Solar Technology AG
Model
STP 20000TLEE-10
Serial No.
0123456789

Date
2012-02-14

	DC	V _{DC max}	1000 V
		V _{DC MPP}	580 - 800 V
		I _{DC max}	36 A
		V _{AC,r}	380/400/415 V
		P _{AC,r}	20000 W
		S _{max}	20000 VA
		f _{AC,r}	50 / 60 Hz
		I _{AC max}	29 A
		cos(φ)	0.8 overvoltage 0.8 undervoltage
		IP54	max. 52 kg
	Safety class	I	
	Overvoltage protection	III	

CE

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History Sheet:

Name	Date	Comment	Revision
Lennart Luckert	2010-09-23	Initial report was written	Rev. 0
Michael Schugg	2010-11-19	Copy of marking plate were updated and the Ratings were changed	Rev. 1
Urs Seifert	2011-09-20	Model type STP8000TL-10 added	Rev. 2
Viktor Hergett	2012-02-20	- Added the following new models: STP 15000TLHE-10, STP 15000TLEE-10, STP 20000TLHE-10, STP 20000TLEE-10 - Added the marking plates for the new models.	Rev. 3

Address of the manufacturer sites:

SMA Solar Technology AG
Sonnenallee 1
34266 Niestetal
Germany

Particulars:	
Equipment mobility	Permanent connection
Operating condition	Continuous
Class of equipment	Class I
Protection against ingress of water	IP65 according to EN 60529
Test case verdicts:	
Test case does not apply to the test object	N/A
Test item does meet the requirement	P(ass)
Test item does not meet the requirement	F(ail)
Testing:	
Date of receipt of test item	2010-07-19
Date(s) of performance of test	2010-07-28, 2010-07-29, 2010-08-02 - 2010-08-6, 2010-08-13
General remarks: The test result presented in this report relate only to the object(s) tested. This report shall not be reproduced, except in full, without the written approval of the applicant. "(see Annex #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report. Throughout this report a comma is used as the decimal separator. The unit was reviewed to AS 4777.2:2005 Grid connection of energy systems via inverters, Part 2: Inverter requirements AS 4777.3:2005 Grid connection of energy systems via inverters, Part 3: Grid protection requirements and the unit fulfils the requirements of the European EMC directive requirements. The EMC requirements of AS 4777.2 (flicker) refer to the same standards as the EMC directive; therefore the EMC report documents show the compliance. The grid trip tests were conducted as per clause B4, Appendix B of AS 4777.3. For Israel over- and under-voltage (see 5. and B2) as well as over and under-frequency (see 5. and B3) trip values deviate from the values given in AS4777. Additionally a second trip level has been applied in the voltage tests. This Test Report consists of the following documents: 1. Test Results 2. Annex No. 1 – EMC Test Report 3. Annex No. 2 – Pictures of the unit 4. Annex No. 3 – Test equipment list	

General product information:

The Solar converter converts DC voltage into AC voltage.

The input is protected by varistors to earth. The unit provides EMC filtering at the output toward mains. The unit does not provide galvanic separation from input to output. Each phase output is switched off redundantly by the bridge and two independent relays. This and additional internal fault detection of the relay circuit assure that the opening of the overall output circuit will also operate in case of one error.

The input of the inverter is EMC filtered, the input DC voltage is PWM modulated by the inverter bridge. This PWM blocks are filtered by the following inductors and capacitors and finally result in the 50Hz sine wave.

The automatic disconnection facility is an integral part of the inverter, permanently monitoring the grid frequency and voltage. In addition, the unit provides active anti-islanding detection via frequency shifting.

The inverter models 8000TL, 10000TL, 12000TL, 15000TL, 17000TL, 15000TLHE-10, 15000TLEE-10, are software derated versions of 20000TLHE-10 and 20000TLEE-10. Their hardware is identical.

The tests had been performed on serial models S/N 2110003479 and S/N 2110003496, both with software version: Firmware Pack 2.10.

Information for production testing:

The transformerless inverter must be routinely tested for DC-injection.

AS4777.2 – 2005			
Clause	Requirement – Test	Result - Remark	Verdict
4	INVERTER REQUIREMENTS		
4.1	General	An applicable test report according to AS3100 must be provided by the manufacturer	P
4.2	Compatibility with electrical installation	The inverter has voltage and frequency ratings compatible with AS 60038 (230V _{AC} , 50Hz)	P
4.3	Power flow direction	In either direction	P
4.4 (A)	Power factor	See test report 4.4	P
4.5 (B)	Harmonic currents	See test report 4.5	P
4.6	Voltage fluctuations and flicker	Covered by EMC report (Annex 1)	P
4.7	Impulse protection	See test report 4.7	P
4.8 (C)	Transient voltage limits	See test report 4.8	P
4.9	Direct current injection	See test report 4.9	P
4.10	Data logging and communication devices	Data logging provided only via radio communication; optional communication modules can be installed. These modules are fed by the SELV circuit of the unit. An applicable test report according to IEC60950 or an equivalent report must be provided.	P

AS4777.3 – 2005			
Clause	Requirement – Test	Result - Remark	Verdict
4	GENERAL AND SAFETY REQUIREMENTS		
4.1	General	The automatic disconnection device is integral part of the inverter.	P
4.2	Electrical Safety	An applicable test report according to AS/NZS 3100 must be provided by the manufacturer.	P
4.3	Connection to Low-Voltage distribution network	The inverter has voltage and frequency in accordance with AS 60038 (230V _{AC} , 50Hz)	P
4.4	Voltage flicker	See enclosed EMC report (Annex 1)	P
4.5	Impulse protection	See test report 4.7	P
4.6	Data logging and communication devices	Data logging provided only via radio communication; optional communication modules can be installed. These modules are fed by the SELV circuit of the unit. An applicable test report according to IEC60950 or an equivalent report must be provided.	P
5.	GRID PROTECTION REQUIREMENTS		
5.1	General	The device includes an automatic disconnecting facility for renewable power generator installations (under/ over voltage/ under/ over frequency and anti islanding), see test Report	P
5.2	Disconnect device	The unit does not provide galvanic separation and therefore is switched off redundant by the high power bridge of the inverter and the relays in line and neutral.	P
5.3	Voltage and frequency limits (passive anti islanding protection)	See test report 5.3 Includes deviating limits for Israel	P
5.4 (A)	Sustained operation		N/A
5.5	Active anti-islanding protection	See test report 5.5	P
5.6	Reconnection procedure	The unit provides monitoring of the voltage, frequency and synchronisation. If one of these conditions is not met, then the unit will not connect.	P
5.7	Security of protection settings	Settings only available with password for the service personal via software tool.	P
5.8	Compliance with grid protection requirements	Appendix B4 noticed	P