TEST REPORT

IEC 61683

Photovoltaic systems – Power conditioners – Procedure for measuring efficiency

Report reference number ..... :	**PV190627N026-2**
Date of issue ..... ……..:	2019-07-23
Total number of pages ..... ……..:	23
Testing laboratory name ..... :	**Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch**
Address ..... :	No. 34, Chenwulu Section, Guantai Rd., Houjie Town, Dongguan City, Guangdong 523942, China
Applicant's name ..... :	**EVOLVE ENERGY GROUP CO., LIMITED**
Address ..... :	RM 702, 7/F FU FAI COMM CTR 27 HILLIER ST SHEUNG WAN, HK
Test specification	
Standard..... :	IEC 61683:1999; EN 61683:2000; DIN EN 61683:2000
Certificate..... :	**Certificate of compliance**
Test report form number. ..... :	IEC61683
Master TRF ..... :	Bureau Veritas Consumer Products Services Germany GmbH
Test item description..... :	**PV Grid inverter**
Trademark..... :	EVVO
Model / Type ..... :	**EVVO 50000TL3P, EVVO 60000TL3P, EVVO 70000TL3P-HV**

Ratings ..... :	**EVVO 50000TL3P**	**EVVO 60000TL3P**	**EVVO 70000TL3P-HV**
Full load MPP DC voltage range [V] :	600-800		700-800
Input DC voltage range [V]..... :	250-950, Max. 1000		
Input DC current [A] ..... :	Max. 40/30/30	Max. 40/40/40	
Output AC voltage [V] ..... :	3~/N/PE, 230/400Vac, 50Hz		3~/PE, 480Vac, 50Hz
Output AC current [A]..... :	Max. 80	Max. 90	
Nominal output power [W]..... :	50000	60000	70000
Max. output power [VA]..... :	50000	60000	75000

Testing Location ..... :	**Shenzhen Academy of Metrology & Quality Inspection**
Address ..... :	No. 4 Tongfa Rd.,Nanshan, Shenzhen, China
Tested by (name and signature) ..... :	Dora Zhang 
Approved by (name and signature) ..... :	James Huang 
Manufacturer's name ..... :	**EVOLVE ENERGY GROUP CO., LIMITED**
Factory address ..... :	1F - 6F, Building E, No. 1 JinQi Road, Bihu Industrial Park, Wulian Village, Fenggang Town, Dongguan City

Document History			
Date	**Internal reference**	**Modification / Change / Status**	**Revision**
2019-07-23	Dora Zhang	This is a copy test report	--
Supplementary information:			

Test items particulars

Equipment mobility ..... :	Permanent connection
Operating condition ..... :	Continuous
Class of equipment ..... :	Class I
Mass of equipment [kg] ..... :	EVVO 50000TL3P, EVVO 60000TL3P: 68kg; EVVO 70000TL3P-HV: 70kg

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 ..... :	2018-12-20
Date(s) of performance of test ..... :	2018-12-20 to 2019-02-21

General remarks:

The test result presented in this report relate only to the object(s) tested.
This report must not be reproduced in part or in full, without the written approval of the issuing testing laboratory.

”(see Annex #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.

The test results refer to the original test report PV181220N074-2 issued by Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch, dated on Mar. 01, 2019.

Throughout this report a comma is used as the decimal separator.

This Test Report consists of the following documents:

1. Test Results
2. Annex No. 1 – Datasheet of the unit
3. Annex No. 2 – Pictures of the unit
4. Annex No. 3 – Test equipment list

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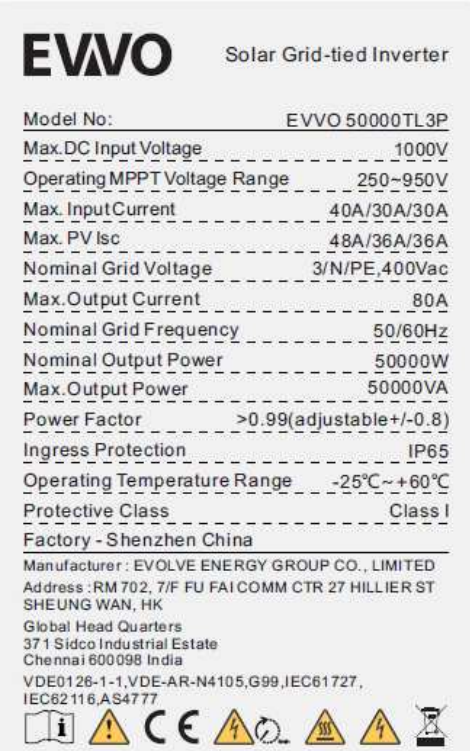
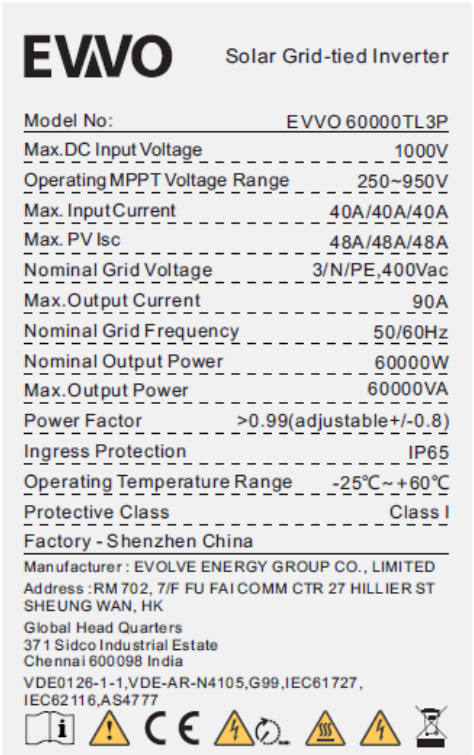


EVVO Solar Grid-tied Inverter

Model No:	EVVO 50000TL3P
Max.DC Input Voltage	1000V
Operating MPPT Voltage Range	250~950V
Max. Input Current	40A/30A/30A
Max. PV Isc	48A/36A/36A
Nominal Grid Voltage	3/N/PE,400Vac
Max.Output Current	80A
Nominal Grid Frequency	50/60Hz
Nominal Output Power	50000W
Max.Output Power	50000VA
Power Factor	>0.99(adjustable+/-0.8)
Ingress Protection	IP65
Operating Temperature Range	-25℃~+60℃
Protective Class	Class I

Factory - Shenzhen China

Manufacturer : EVOLVE ENERGY GROUP CO., LIMITED
Address :RM 702, 7/F FU FAI COMM CTR 27 HILLIER ST SHEUNG WAN, HK
Global Head Quarters
371 Sidco Industrial Estate
Chennai 600098 India
VDE0126-1-1,VDE-AR-N4105,G99,IEC61727, IEC62116,AS4777



EVVO Solar Grid-tied Inverter

Model No:	EVVO 60000TL3P
Max.DC Input Voltage	1000V
Operating MPPT Voltage Range	250~950V
Max. Input Current	40A/40A/40A
Max. PV Isc	48A/48A/48A
Nominal Grid Voltage	3/N/PE,400Vac
Max.Output Current	90A
Nominal Grid Frequency	50/60Hz
Nominal Output Power	60000W
Max.Output Power	60000VA
Power Factor	>0.99(adjustable+/-0.8)
Ingress Protection	IP65
Operating Temperature Range	-25℃~+60℃
Protective Class	Class I

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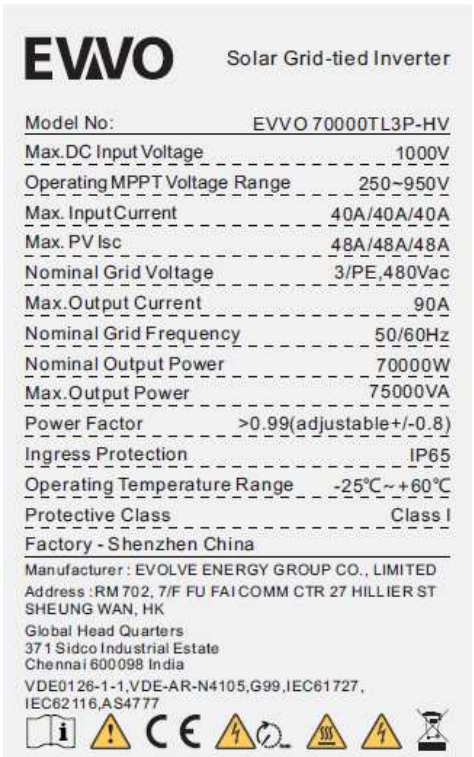

EVVO Solar Grid-tied Inverter

Model No:	EVVO 70000TL3P-HV
Max.DC Input Voltage	1000V
Operating MPPT Voltage Range	250~950V
Max. Input Current	40A/40A/40A
Max. PV Isc	48A/48A/48A
Nominal Grid Voltage	3/PE,480Vac
Max.Output Current	90A
Nominal Grid Frequency	50/60Hz
Nominal Output Power	70000W
Max.Output Power	75000VA
Power Factor	>0.99(adjustable+/-0.8)
Ingress Protection	IP65
Operating Temperature Range	-25℃~+60℃
Protective Class	Class I

Factory - Shenzhen China

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General product information:

The Solar Grid-tied inverter converts DC voltage into AC voltage.

The unit is providing EMC filtering at the output toward mains. The unit does not provide galvanic separation from input to output (transformerless). The output is switched off redundant by the high power switching bridge and two relays for each phases in series. This assures that the opening of the output circuit will also operate in case of one error. Block diagram as following:

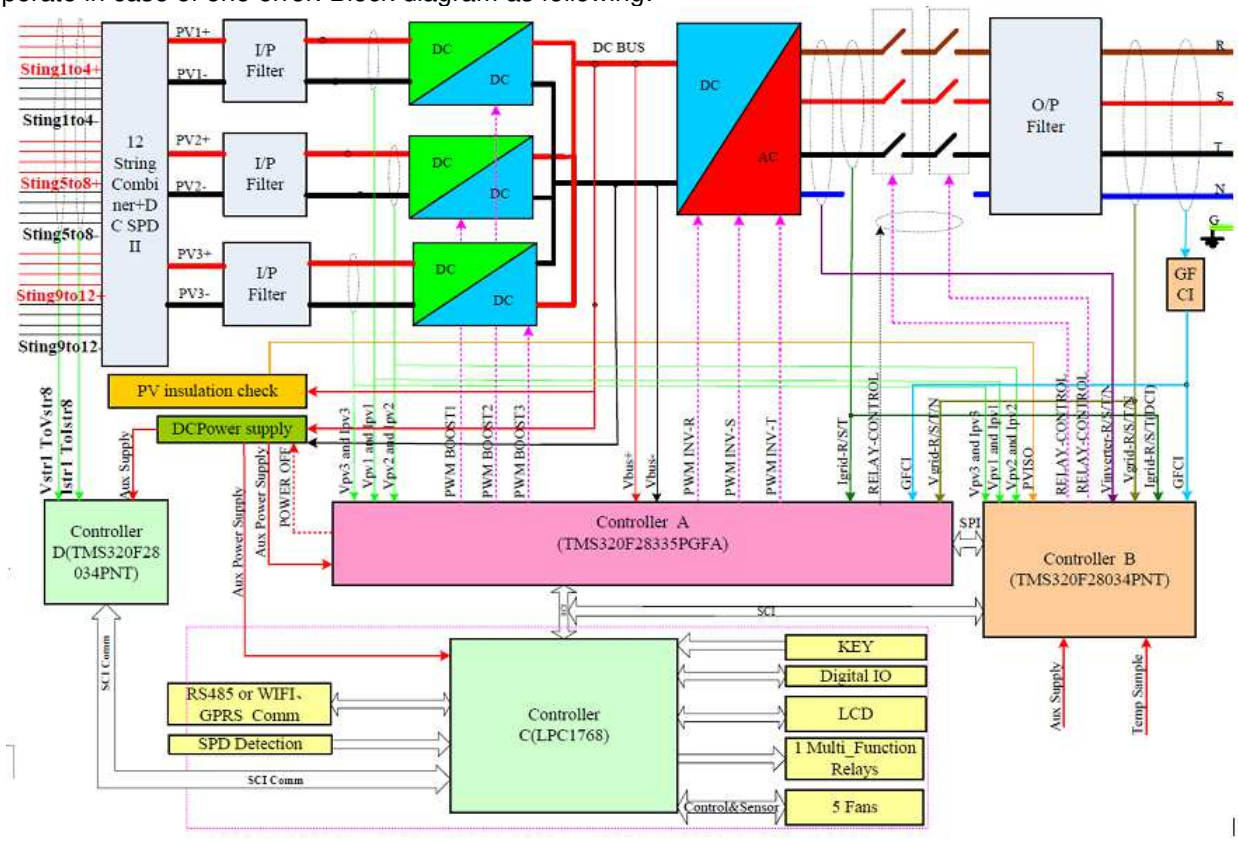


Figure 1 Block diagram

The internal control is redundant built. It consists of master DSP (UC20) and slave DSP (UC73).

The master DSP (UC20) can control the relays, measures voltage, and frequency, AC current with injected DC, array insulation resistance and residual current and the RCMU circuit before each start up.

The slave DSP (UC73) is using for sample the grid voltage, frequency, DC voltage, current and residual current, also can open the relays independently and communicate with master DSP (UC20) each other.

The grid voltage is measured before the relays. The voltage between polarity is calculated. The voltage signals are sent to both DSP. In addition this signal is used for the frequency measurement.

The unit provides two relays in series in each phase. The relays are tested before each start up. Each DSP switch off each relays.

The current is measured by a current sensor. The AC current signal and the injected DC current signal are sent to the main DSP (UC20). The main DSP (UC20) tests and calibrates before each start up all current sensors.

The RCMU is located at the AC output. The RCMU is tested before each start up by the main DSP (UC20). While unit working, if a high level residual current occurs, the RCMU will give signal to DSP assuring that unit grid-off from AC mains.

The model EVVO 70000TL3P-HV is identical to EVVO 50000TL3P and EVVO 60000TL3P except the numbers of the input PV terminals, Sic diodes, Sis MOS, BOOST inductors and INV inductors, the output ac voltage and output power derated by software.

The product was tested on:

Hardware version: V1.00

Software version: V2.00

IEC 61683:1999			
Clause/§	**Requirement**	**Remark**	**Verdict**
1	**Scope** (measuring the efficiency of power conditioners used in stand-alone and utility-interactive photovoltaic systems)		
2	**Normative references**		
	IEC 60146-1-1:1991,		
3	**Definitions**		
	3.1 rated output efficiency 3.2 partial output efficiency 3.3 energy efficiency 3.4 efficiency tolerance 3.5 PV array simulator 3.6 no-load loss 3.7 standby loss 3.8 maximum power point tracking (MPPT)		
4	**Efficiency measurement conditions**	Considered.	**P**
	Efficiency shall be measured under the matrix of conditions as described in the following clauses and table 1. Specific conditions may be excluded by mutual agreement when those conditions are outside the manufacturer's allowable operating range. The resulting data shall be presented in tabular form and may also be presented graphically.	See below.	**P**
4.1	DC power source for testing		**P**
	For power conditioners operating with fixed input voltage, the d.c. power source shall be a storage battery or constant voltage power source to maintain the input voltage.		**N/A**
	For power conditioners that employ maximum power point tracking (MPPT) and shunt-type power conditioners, either a photovoltaic array or a photovoltaic array simulator shall be utilized.	Photovoltaic array simulator used.	**P**
4.2	Temperature		**P**
	All measurements are to be made at an ambient temperature of 25 °C ± 2 °C.	25°C	**P**
4.3	Output voltage and frequency		**P**

IEC 61683:1999			
Clause/§	**Requirement**	**Remark**	**Verdict**
	The output voltage and frequency shall be maintained at the manufacturer's stated nominal values.	EVVO 50000TL3P, EVVO 60000TL3P: 230Vac, 50Hz; EVVO 70000TL3P-HV: 480Vac, 50Hz;	**P**
4.4	Input voltage		**P**
	manufacturer's minimum rated input voltage	250Vdc	**P**
	the inverter's nominal voltage or the average of its rated input range	EVVO 50000TL3P, EVVO 60000TL3P: 700Vdc; EVVO 70000TL3P-HV: 750Vdc	**P**
	90 % of the inverter's maximum input voltage	900Vdc	**P**
4.5	Ripple and distortion		**P**
	Record input voltage and current ripple for each measurement	The ripple of the input voltage had no influence on the measurements. (see appended table)	**P**
4.6	Resistive loads/utility grid		**P**
	Grid-connected inverters: measure the efficiency for power levels of 10 %, 25 %, 50 %, 75 %, 100 % and 120 %	The efficiency measurement was performed at 10 %, 25 %, 50 %, 75 %, 100 % because the unit does not provide overload function.	**P**
	Stand-alone inverters: measure the efficiency for power levels of 5 %, 10 %, 25 %, 50 %, 75 %, 100 % and 120 %	Grid-connected inverters.	**N/A**
4.7	Reactive loads		**N/A**
	Stand-alone inverters: efficiency with a load which provides a power factor equal to the manufacturer's specified minimum level (or 0,25, whichever is greater) and at power levels of 25 %, 50 % and 100 % of rated VA	Grid-connected inverters.	**N/A**
	Stand-alone inverters: efficiency with power factors of 0,5 and 0,75 (do not go below the manufacturer's specified minimum PF) and power levels of 25 %, 50 %, and 100 % of rated VA		**N/A**
4.8	Resistive plus non-linear loads		**N/A**
	Stand-alone inverters: efficiency with a fixed non-linear load (total harmonic distortion (THD) = (80 ± 5) %) equal to (25 ± 5) % of the inverter's rated VA plus sufficient resistive load in parallel to achieve a total load of 25 %, 50 % and 100 % of rated VA	Grid-connected inverters.	**N/A**
	Stand-alone inverters: efficiency with a fixed non-linear load equivalent to (50 ± 5) % of the inverter's rated VA plus sufficient resistive load in parallel to achieve a total load of 50 % and 100 % of rated VA		**N/A**

IEC 61683:1999			
Clause/§	**Requirement**	**Remark**	**Verdict**
4.9	Complex loads		**N/A**
	Stand-alone inverters: efficiency with a fixed non-linear load (THD = (80 ± 5) %) equal to (50 ± 5) % of the inverter's rated VA plus a sufficient reactive load (PF = 0,5) in parallel to achieve a total load of 50 % and 100 % of rated VA.	Grid-connected inverters.	**N/A**

5.	**Efficiency calculations**	See below.	**P**
5.1	Rated output efficiency		**P**
	Rated output efficiency shall be calculated from measured data as follows: $\eta_R = (P_o / P_i) \times 100$	Considered.	**P**
5.2	Partitial output efficiency		**N/A**
	Partial output efficiency shall be calculated from measured data as follows: $\eta_{par} = (P_{op} / P_{ip}) \times 100$	No derating during testing.	**N/A**
5.3	Energy efficiency		**P**
	Energy efficiency shall be calculated from measured data as follows: $\eta_E = (W_o / W_i) \times 100$	Considered.	**P**
5.4	Efficiency tolerances		**P**
	When an efficiency value has been guaranteed, the tolerance of this value shall be within: $-0,2(1-\eta)\eta$ (%)	Considered.	**P**

6.	**Efficiency test circuits**	See below.	**P**
6.1	Test circuits	Considered.	**P**
	See figures 1a and 1b	Figure 1b used.	**P**
6.2	Measurement procedure	Considered.	**P**
	a) Efficiency is calculated with equation (1) or (2) using measured P_i, P_o or P_{ip}, P_{op}. DC input power P_i, P_{ip} can be measured by wattmeter W_1, or determined by multiplying the d.c. voltmeter V_1 and d.c. ammeter A_1 readings. Output power P_o, P_{op} is measured with wattmeter W_2.	Considered.	**P**
	b) DC input voltage, which is measured by d.c. voltmeter V_1, shall be varied in the defined range where the output current, which is measured with a.c. ammeter A_2, is varied from low output to the rated output.	Considered.	**P**

IEC 61683:1999			
Clause/§	**Requirement**	**Remark**	**Verdict**
	c) An average indicating instrument shall be used for the d.c. voltmeter and d.c. ammeter. A true r.m.s. type of indicating instrument shall be used for the a.c. voltmeter and a.c. ammeter. The d.c. wattmeter W_1 shall be a d.c. measuring type. The wattmeter W_2 shall be an a.c. or d.c. measuring type according to the output.	Considered.	**P**
	d) Power factor (PF in per cent) can be measured by a power factor meter PF, or calculated from the readings of V_2, A_2, W_2 and as follows: $PF = (W_2/(V_2 \times A_2)) \times 100$	Considered.	**P**
	e) Each meter may be an analogue type or a digital type. The measurement accuracy shall be better than ± 0,5 % of the full-scale value for each power measured. Digital power instruments for W1 and W2 are also recommended.	Digital measurement devices were used for testing. The accuracy of the measurement devices fulfills the requirements.	**P**
	f) An MPPT dynamically adjusts the input voltage so as to maximize the output power. In principle, the monitoring equipment shall sample all of the electrical parameters, such as input voltage and current, output power and current, within the update period of the MPPT. If the MPPT and input source (PV array or PV array simulator) interact in such a way that the input voltage varies by less than 5 %, then averaging of readings is acceptable. The averaging period shall be 30 s or longer.	The dynamic MPPT was deactivated, the 60s average was used anyway.	**P**

7.	**Loss measurement**	See below.	**P**
7.1	No-load loss		**P**
	Stand-alone inverters: reading of d.c. input voltage, output voltage and frequency is given with meters V_1, V_2 and F respectively in figure 1a, and shall be adjusted to the rated values.	Grid-connected inverters.	**N/A**
	Utility-interactive inverters: reading of d.c. input voltmeter V_1, a.c. output voltmeter V_2 and frequency meter F in figure 1b shall be adjusted to meet the specified voltages and frequency.	See appended table.	**P**
7.2	Standby loss		**P**
	Stand-alone inverters: Consumption of utility power when the power conditioner is not operating but is under standby condition.	No such inverters.	**N/A**
	Utility-interactive inverters: consumption from the d.c. source when the power conditioner is not operating but is under standby condition.	See appended table.	**P**

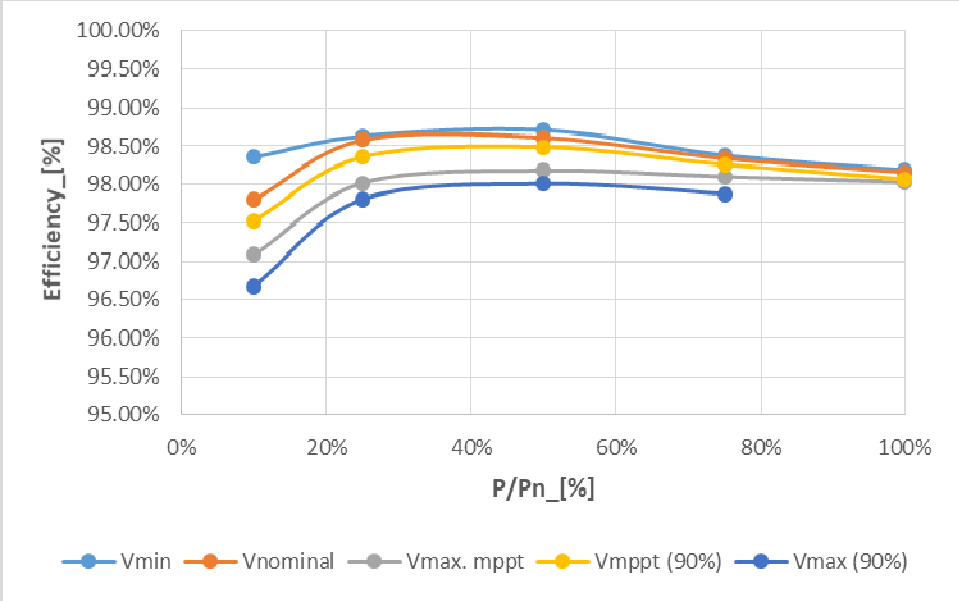
Annex A	**Power conditioner description (informative)**	See below.	**P**
	A power conditioner is defined in IEC 61277	Figure A.2	**P**

IEC 61683:1999			
Clause/§	**Requirement**	**Remark**	**Verdict**
Annex B	**Power efficiency and conversion factor (informative)**	See below.	**P**
	There are two types of efficiencies shown in IEC 60146-2; one is a power efficiency, the other is a conversion factor. Power efficiency is defined as the ratio of active output power and active input power. Conversion factor is the ratio between output and input fundamental power levels.	Power efficiency used.	**P**
Annex C	**Weighted-average energy efficiency (informative)**	See below.	**P**
	The energy of a power conditioner depends on both the irradiance profile and the load profile. The energy efficiency of a power conditioner shall be calculated by the ratio of the output to the input energy actually measured over a certain period	Considered.	**P**
C.1	η_{WT} of power conditioner for utility-interactive PV systems	EVVO 50000TL3PL: 700Vdc, T1=T2=T3=T4: 98,09%; EVVO 60000TL3P: 700Vdc, T1=T2=T3=T4: 98,18%; EVVO 70000TL3P-HV: 750Vdc, T1=T2=T3=T4: 98,26%;	**P**
	Utility-interactive PV systems, which have no storage and for which reverse-power flow is accepted, are described. In this case, d.c. power generated by the PV array is supplied direct into the power conditioner (PC). Almost all of the input power to the PC is converted to a.c. power. A part of it is dissipated as the PC loss.	Considered.	**P**
C.2	η_{WT} of power conditioner for stand-alone PV systems	Grid-connected inverters.	**N/A**
	In stand-alone PV systems with a storage subsystem, power generated from the PV array is stored and stabilized by the batteries. DC power is converted into regulated d.c. power or constant-voltage and constant-frequency a.c. power by a power conditioner (PC) and supplied to the load. In this case, some fraction of the generated power is dissipated as a loss in the batteries and power conditioner.		**N/A**
Annex D	**Derivation of efficiency tolerance in table 2 (informative)**	Considered.	**P**

4. Efficiency measurement conditions test results — P

EVVO 50000TL3P

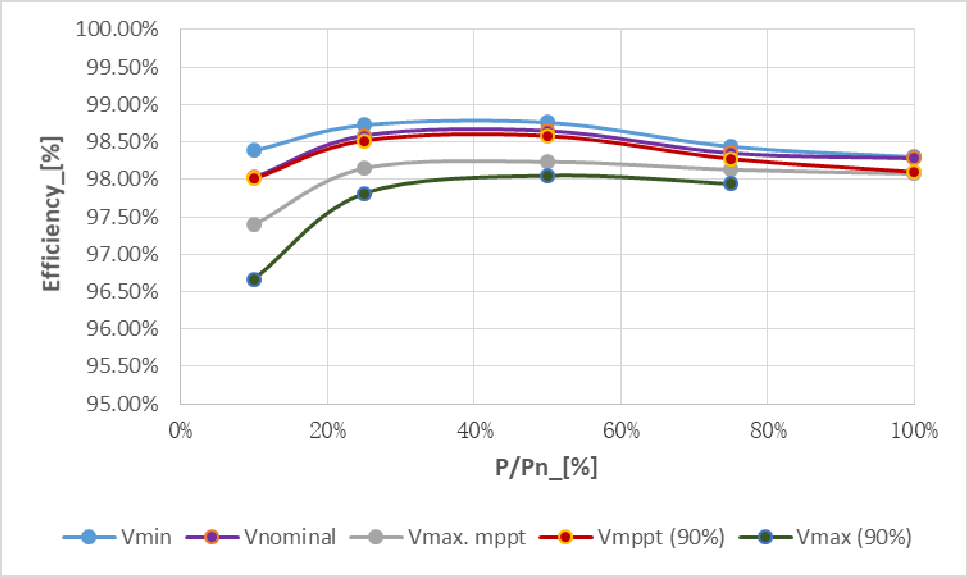
Input voltage (Vdc)		Power Level				
		10%	25%	50%	75%	100%
		5000W	12500W	25000W	37500W	50000W
V_{min}	600	98,36%	98,63%	98,71%	98,38%	98,19%
$V_{nominal}$	700	97,80%	98,58%	98,61%	98,34%	98,16%
$V_{max.\ mppt}$	800	97,08%	98,02%	98,18%	98,10%	98,03%
$V_{mppt\ (90\%)}$	720	97,53%	98,36%	98,49%	98,26%	98,07%
$V_{max\ (90\%)}$	900	96,67%	97,81%	98,01%	97,88%	--



Internal power consumption via PV No-load: 33W

Internal power consumption include internal auxiliary power at maximum output power: 1152W

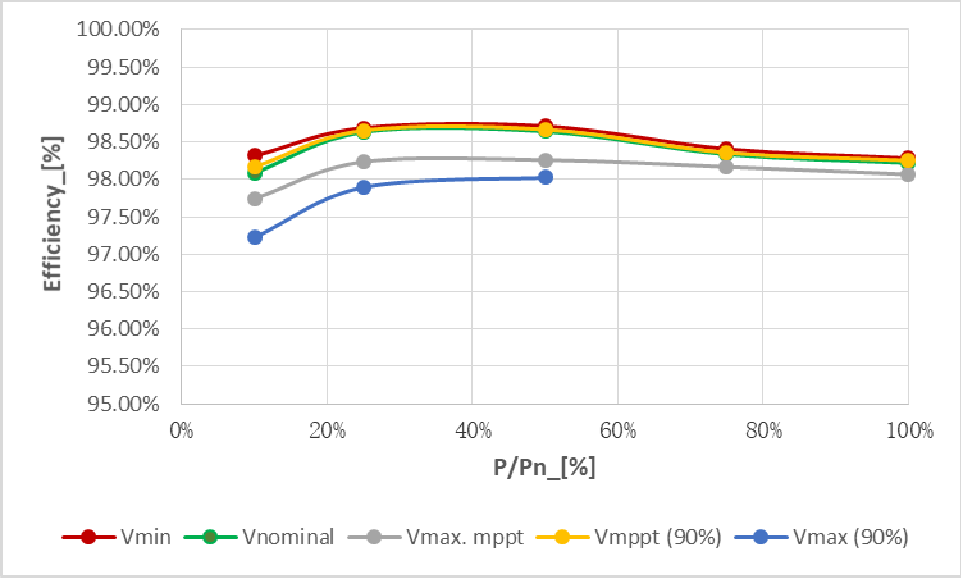
EVVO 60000TL3P						
Input voltage (Vdc)		Power Level				
		10%	25%	50%	75%	100%
		6000W	15000W	30000W	45000W	60000W
V_{min}	600	98,38%	98,72%	98,76%	98,44%	98,30%
$V_{nominal}$	700	98,03%	98,59%	98,65%	98,35%	98,28%
$V_{max.\ mppt}$	800	97,40%	98,15%	98,24%	98,13%	98,08%
$V_{mppt\ (90\%)}$	720	98,01%	98,52%	98,58%	98,28%	98,10%
$V_{max\ (90\%)}$	900	96,67%	97,81%	98,05%	97,94%	--



Internal power consumption via PV No-load: 34W

Internal power consumption include internal auxiliary power at maximum output power: 1511W

EVVO 70000TL3P-HV						
Input voltage (Vdc)		Power Level				
		10%	25%	50%	75%	100%
		7000W	17500W	35000W	52500W	70000W
V_{min}	700	98,31%	98,69%	98,71%	98,41%	98,28%
$V_{nominal}$	750	98,09%	98,63%	98,64%	98,33%	98,22%
$V_{max.\ mppt}$	800	97,74%	98,23%	98,26%	98,17%	98,07%
$V_{mppt\ (90\%)}$	720	98,17%	98,65%	98,67%	98,36%	98,25%
$V_{max\ (90\%)}$	900	97,22%	97,89%	98,02%	--	--



Internal power consumption via PV No-load: 33W

Internal power consumption include internal auxiliary power at maximum output power: 1985W

4.5 Input ripple and distortion						P
EVVO 50000TL3P						
Ripple voltage (Vp-p)		Power Level				
		10%	25%	50%	75%	100%
		5000W	12500W	25000W	37500W	50000W
V_{min}	600	19,26 V	9,63 V	7,70 V	8,67 V	5,92 V
$V_{nominal}$	700	16,09 V	11,,29 V	11,16 V	9,07 V	6,66 V
$V_{max.\ mppt}$	800	14,84 V	18,53 V	9,22 V	9,59 V	8,13 V
$V_{mppt\ (90\%)}$	720	19,92 V	16,15 V	10,62 V	8,40 V	7,68 V
$V_{max\ (90\%)}$	900	15,48 V	8,18 V	6,22 V	0,02 V	--
Ripple current (Ap-p)		Power Level				
		10%	25%	50%	75%	100%
		5000W	12500W	25000W	37500W	50000W
V_{min}	600	0,29 A	0,34 A	0,55 A	0,93 A	0,85 A
$V_{nominal}$	700	0,16 A	0,29 A	0,59 A	0,75 A	0,71 A
$V_{max.\ mppt}$	800	0,11 A	0,36 A	0,38 A	0,57 A	0,66 A
$V_{mppt\ (90\%)}$	720	0,21 A	0,42 A	0,53 A	0,62 A	0,78 A
$V_{max\ (90\%)}$	900	0,11 A	0,13 A	0,18 A	0,04 A	--

EVVO 60000TL3P						
Ripple voltage (Vp-p)		Power Level				
		10%	25%	50%	75%	100%
		6000W	15000W	30000W	45000W	60000W
V_{min}	600	13,77 V	11,25 V	7,78 V	7,52 V	8,56 V
$V_{nominal}$	700	20,31 V	12,84 V	9,41 V	9,67 V	10,19 V
$V_{max.\ mppt}$	800	22,27 V	14,43 V	10,36 V	9,11 V	8,92 V
$V_{mppt\ (90\%)}$	720	16,20 V	9,54 V	9,82 V	7,40 V	9,51 V
$V_{max\ (90\%)}$	900	15,45 V	9,87 V	8,48 V	0,02 V	--
Ripple current (Ap-p)		Power Level				
		10%	25%	50%	75%	100%
		6000W	15000W	30000W	45000W	60000W
V_{min}	600	0,25 A	0,47 A	0,66 A	0,96 A	1,50 A
$V_{nominal}$	700	0,25 A	0,41 A	0,59 A	0,93 A	1,26 A
$V_{max.\ mppt}$	800	0,20A	0,35 A	0,50 A	0,68 A	0,87 A
$V_{mppt\ (90\%)}$	720	0,19 A	0,28 A	0,61 A	0,66 A	1,16 A
$V_{max\ (90\%)}$	900	0,10 A	0,18 A	0,32 A	0,04 A	--

EVVO 70000TL3P-HV						
Ripple voltage (Vp-p)		Power Level				
		10%	25%	50%	75%	100%
		7000W	17500W	35000W	52500W	70000W
V_{min}	700	21,99V	10,38V	8,18V	7,69V	10,55V
$V_{nominal}$	750	22,19V	12,60V	8,56V	9,73V	8,85V
$V_{max\ (90\%)}$	800	24,49V	12,11V	8,89VV	7,83V	10,13V
$V_{mppt\ (90\%)}$	720	15,32V	11,53V	9,73V	7,19V	9,06V
$V_{max.\ mppt}$	900	13,82V	9,14V	5,76V	--	--
Ripple current (Ap-p)		Power Level				
		10%	25%	50%	75%	100%
		5000W	12500W	25000W	37500W	50000W
V_{min}	700	0,34A	0,40A	0,61A	0,85A	1,57A
$V_{nominal}$	750	0,25A	0,39A	0,56A	0,94A	1,16A
$V_{max\ (90\%)}$	800	0,27A	0,34A	0,51A	0,65A	1,11A
$V_{mppt\ (90\%)}$	720	0,21A	0,40A	0,69A	0,76A	1,30A
$V_{max.\ mppt}$	900	0,14A	0,25A	0,25A	--	--

Annex 1

Datasheet of the unit

9.1 Input parameter (DC)

Parameter	EVVO 50000TL3P	EVVO 60000TL3P	EVVO 70000TL3P-HV
Max. input voltage	1000V		
Start-up input voltage	350V (+/-1v)		
Number of independent MPPT	3		
Number of DC inputs	4/3/3	4/4/4	
Input range with Full power operation with 2 MPPT parallel	530V-800V	530V-800V	660V-800V
Max DC power for single MPPT	22000(530V-800V) 16000(530V-800V) 16000(530V-800V)	22000(530V-800V) 22000(530V-800V) 22000(530V-800V)	26000(660V-800V) 26000(660V-800V) 26000(660V-800V)
Operating input volt range	250V-960V		
Max. input MPPT current	40A/30A/30A	40A/40A/40A	
Input short circuit current for each MPPT	48A/36A/36A	48A/48A/48A	
Overvoltage category of input	II		

9.2 Output parameter (AC)

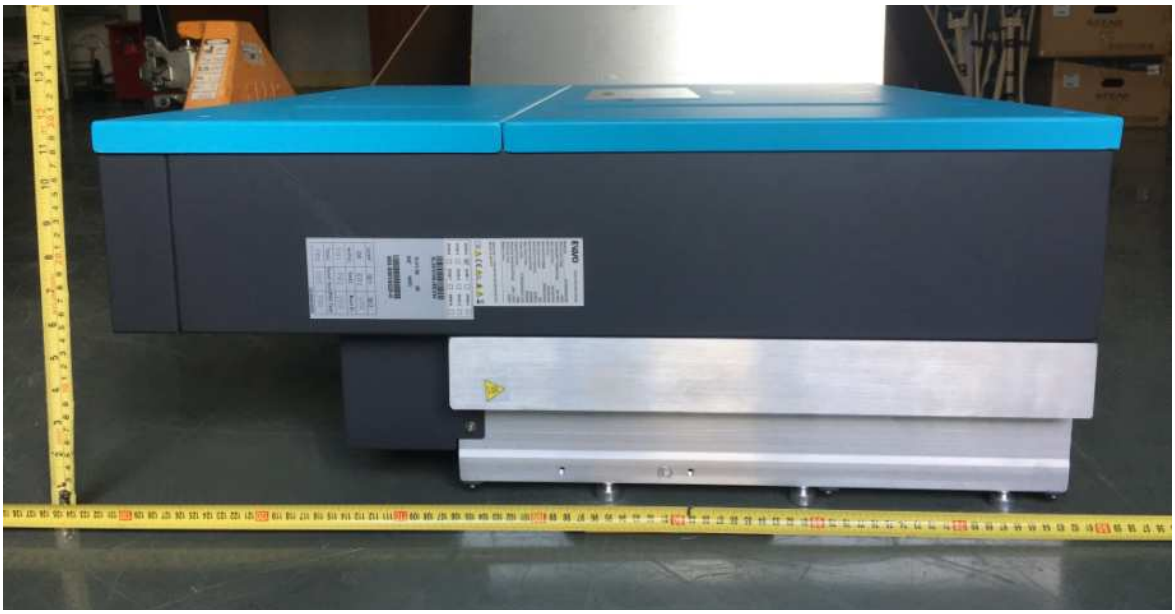
Parameter	EVVO 50000TL3P	EVVO 60000TL3P	EVVO 70000TL3P-HV
Rated power	50000W	60000W	70000W
Max. AC power	50000VA	60000VA	75000VA
Rated AC voltage	3/N/PE,230/400Vac		3/N/PE,277/480Vac或 3/PE,480Vac
Grid voltage range	310-480Vac(adjustable)		422-528Vac
Grid frequency range	44~55Hz/54~66Hz(adjustable, must meet local grid requirements)		
Active power adjustable range	0~100%		
Max. output current	80A	90A	
THDI	<3%		
Power factor	1 (adjustable +/-0.8)		
Overvoltage category of output	III(II-S2version)		

Annex 2

Pictures of the unit
The full pictures refer to PHOTO DOCUMENT
Project No.: 190627N026
Date: 20190723

Front view

Rear view


Side view


Terminal view


Annex 3
Test equipment list

Test location: Shenzhen Academy of Metrology & Quality Inspection
Performed dates of test: 2018-12-20 to 2019-02-20

Equipment	Internal No.	Manufacturer	Type	Serial No.	Last Calibration
Power Analyzer	SB11178	YOKOGAWA	WT3000	91P215776	2019/03/25
AC Source	SB14325	Chroma	61860	618603800236	Monitored by Power Analyzer
DC Simulation Power Supply	SB9540/02	Chroma	62000H	--	
RLC Load	SB9605	Qunling	ACLT-3830H	--	
PV inverter test system	SB9540	Chroma	--	CH0240021207	