

SUN2000-(12-20)KTL-M2



Siguranță activă

Folosește IA pentru protecția împotriva arcurilor electrice



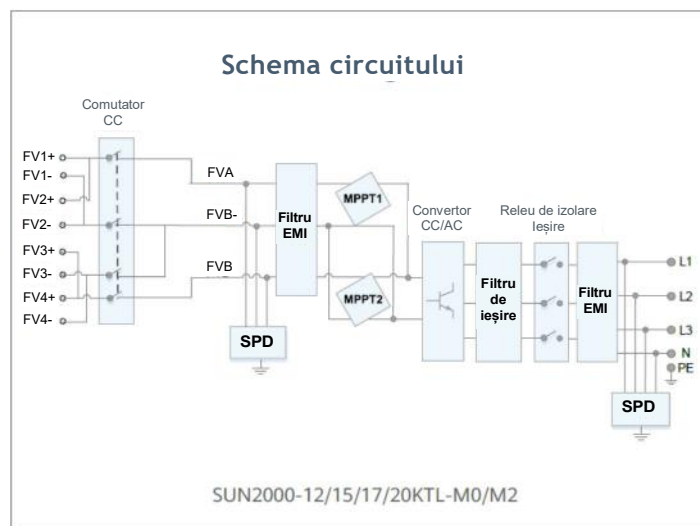
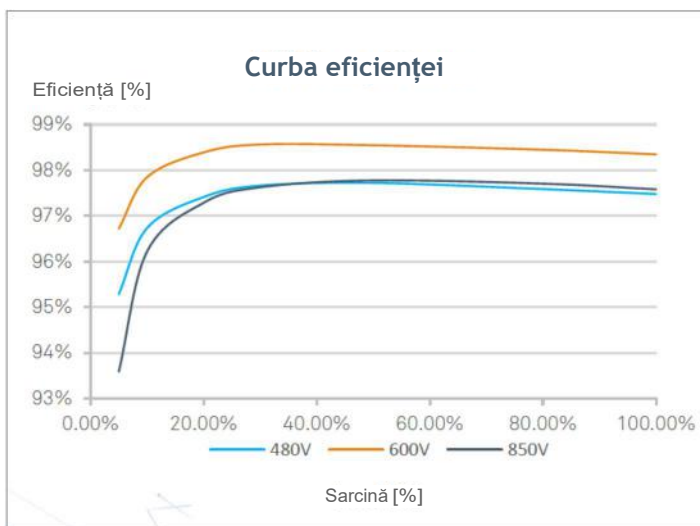
Randamente mai mari

Cu până la 30% mai multă energie cu optimizator ¹



Comunicație flexibilă

Comunicație WLAN, Fast Ethernet, 4G acceptată



¹ Se aplică numai invertorului SUN2000-12/15/17/20KTL-M2.

Specificații tehnice	SUN2000 -12KTL-M2	SUN2000 -15KTL-M2	SUN2000 -17KTL-M2	SUN2000 -20KTL-M2
Eficiență				
Eficiență maximă	98.50%	98.65%	98.65%	98.65%
Eficiență europeană ponderată	98.00%	98.30%	98.30%	98.30%
Intrare				
Putere recomandată maximă ¹	18,000 Wp	22,500 Wp	25,500 Wp	30,000 Wp
Tensiunea maximă de intrare ²	1,080 V			
Interval de tensiune de funcționare ³	160 V ~ 950 V			
Tensiunea de pornire	200 V			
Tensiunea nominală de intrare	600 V			
Curent maxim de intrare per MPPT	22 A			
Curent maxim de scurtcircuit	30 A			
Numărul de dispozitive de urmărire MPP	2			
Numărul maxim de intrări per dispozitiv de urmărire MPP	2			
Ieșire				
Conexiune la rețea	Trifazată			
Putere nominală de ieșire	12,000 W	15,000 W	17,000 W	20,000 W
Putere aparentă maximă	13,200 VA	16,500 VA	18,700 VA	22,000 VA
Tensiune nominală de ieșire	220 Vca / 380 Vca, 230 Vca / 400 Vca, 3W + N + PE			
Frecvența nominală a rețelei CA	50 Hz / 60 Hz			
Curent maxim de ieșire	20 A	25.2 A	28.5 A	33.5 A
Factor de putere reglabil	0.8 defazaj înainte ... 0.8 defazaj înapoi			
Distorsiunea armonică totală maximă	≤ 3 %			
Protecție și caracteristici				
Dispozitiv de deconectare pe partea de intrare	Da			
Protecție anti-insularizare	Da			
Protecție împotriva supracurenților CA	Da			
Protecție la scurtcircuit CA	Da			
Protecție la supratensiune CA	Da			
Protecție polaritate inversă CC	Da			
Protecție la supratensiune CC	TIP II			
Protecție la supratensiune CA	Da, compatibil cu clasa de protecție TIP II conform EN/IEC 61643-11			
Unitate monitorizare curent rezidual	Da			
Protecție împotriva arcului electric	Da			
Controlul receptorului de variație de curent	Da			
Recuperare PID integrată ⁴	Da			
Date generale				
Interval temperatură de funcționare	-25 ~ +60 °C (-13 °F ~ 140 °F)			
Umiditate relativă de funcționare	0 % RH ~ 100% RH			
Altitudine de funcționare	0 ~ 4,000 m (13,123 ft.) (pierdere peste 2000 m)			
Răcire	Convecție naturală			
Afișaj	Indicatoare LED; Aplicație WLAN + FusionSolar integrată			
Comunicație	RS485; WLAN/Ethernet prin Dongle inteligent-WLAN-FE (Opțional)			
Greutate (incl. suport de montare)	4G / 3G / 2G prin Dongle inteligent-4G (Opțional)			
Dimensiune (L x H x A) (incl. suport de montare)	25 kg			
Grad de protecție	525 x 470 x 262 mm (20.7 x 18.5 x 10.3 inch)			
Consum de energie pe timp de noapte	IP65			
	< 5.5 W ⁵			
Compatibilitatea optimizatorului				
Optimizator compatibil CC MBUS	SUN2000-450W-P			
Conformitate standard (mai multe disponibile la cerere)				
Siguranță	EN/IEC 62109-1, EN/IEC 62109-2			
Standarde de conectare la rețea	G98, G99, EN 50549, CEI 0-21, CEI 0-16, VDE-AR-N-4105, VDE-AR-N-4110, AS 4777.2, C10/11, ABNT, VFR 2019, RD 1699, RD 661, PO 12.3, TOR D4, IEC61727, IEC62116, DEWA			

¹ Puterea FV de intrare maximă a invertorului este de 40.000 Wp atunci când șirurile lungi sunt proiectate și conectate complet cu optimizatoarele de putere SUN2000-450W-P.

² Tensiunea maximă de intrare este limita superioară a tensiunii CC. Orice tensiune CC de intrare mai mare ar putea deteriora invertorul.

³ Orice tensiune de intrare CC care depășește intervalul de tensiune de funcționare poate duce la o funcționare necorespunzătoare a invertorului.

⁴ SUN2000-12 ~ 20KTL-M2 crește potențialul între FV și sol peste zero prin funcția integrată de recuperare PID pentru a reface deteriorarea modulului din PID. Tipurile de module acceptate includ: tip P (mono, poli)

⁵ <10 W când funcția de recuperare PID este activată.



Inteligent

8 șiruri de monitorizare inteligentă



Eficient

Eficiență maximă 98,7%



Sigur

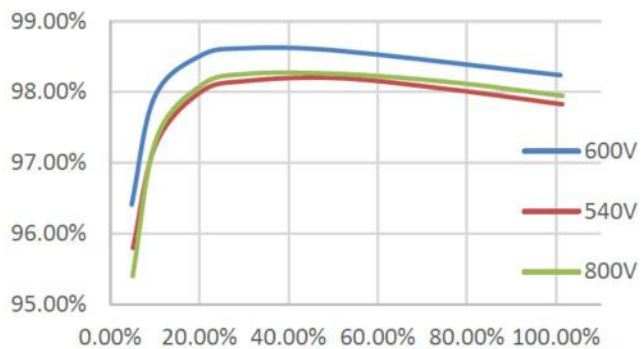
Design fără siguranțe



Fiabil

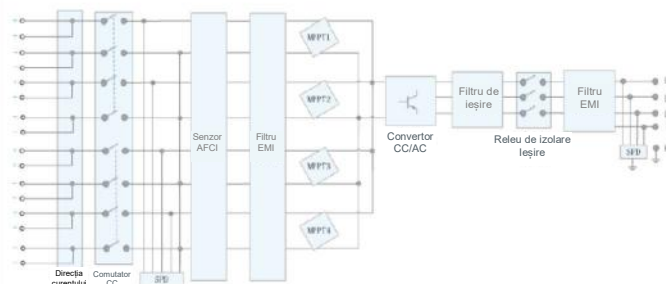
Descărcătoare de supratensiune de tip II pentru CC și CA

Curba eficienței



SUN2000-30/36/40KTL-M3

Schema circuitului



Specificații tehnice	SUN2000-30KTL-M3	SUN2000-36KTL-M3	SUN2000-40KTL-M3
Eficiență			
Eficiență maximă		98.7%	
Eficiență europeană		98.4%	
Intrare			
Putere recomandată maximă ¹		1,100 V	
Curent maxim per MPPT		26 A	
Curent maxim de scurtcircuit per MPPT		40 A	
Tensiune de pornire		200 V	
Interval de tensiune de funcționare MPPT ²		200 V ~ 1000 V	
Tensiune nominală de intrare		600 V	
Numărul de intrări		8	
Numărul de dispozitive de urmărire MPP		4	
Ieșire			
Putere activă nominală CA	30,000 W	36,000 W	40,000 W
Putere aparentă maximă CA	33,000 VA	40,000 VA	44,000 VA
Tensiune nominală de ieșire		230 Vca / 400 Vca, 3W/N+PE	
Frecvență nominală a rețelei CA		50 Hz / 60 Hz	
Curent nominal de ieșire	43.3 A	52.0 A	57.8 A
Curent maxim de ieșire	47.9 A	58.0 A	63.8 A
Interval reglabil pentru factorul de putere		0.8 LG 0.8 LD	
Distorsiunea armonică totală maximă		< 3%	
Protecție			
Dispozitiv de deconectare pe partea de intrare		Da	
Protecție anti-insularizare		Da	
Protecție împotriva supracurenților CA		Da	
Protecție polaritate inversă CC		Da	
Monitorizare defecțiune a șirului sistemului FV		Da	
Descărcător de supratensiune CC		Da	
Descărcător de supratensiune CA		Da	
Detectarea rezistenței la izolație CC		Da	
Unitate monitorizare curent rezidual		Da	
Protecție împotriva arcului electric		Da	
Controlul receptorului de variație de curent		Da	
Recuperare PID integrată ³		Da	
Comunicație			
Afișaj		Indicatoare LED, aplicație WLAN + FusionSolar integrată	
RS485		Da	
Smart Dongle		WLAN/Ethernet prin Smart Dongle-WLAN-FE (Opțional) 4G / 3G / 2G prin Smart Dongle-4G (Opțional)	
Monitorizare BUS (MBUS)		Da (este necesar un transformator de izolare)	
Date generale			
Dimensiuni (L x H x A)		640 x 530 x 270 mm (25.2 x 20.9 x 10.6 inch)	
Greutate (cu placa de montaj)		43 kg (94.8 lb)	
Nivel nosie		< 46 dB	
Interval de temperatură de funcționare		-25 ~ + 60 °C (-13 °F ~ 140 °F)	
Metoda de răcire		Convecție naturală	
Altitudine maxima de funcționare		0 - 4,000 m (13,123 ft.)	
Umiditate relativă		0% RH ~ 100% RH	
Conector CC		Staubli MC4	
Conector CA		Conector hidrofug + terminal OT / DT	
Grad de protecție		IP 66	
Topologie		Fără transformator	
Consum de energie pe tip de noapte		≤ 5.5W	
Compatibilitatea optimizatorului			
Optimizator compatibil CC MBUS		SUN2000-450W-P	
Conformitate standard (mai multe disponibile la cerere)			
Șuranta		EN 62109-1/-2, IEC 62109-1/-2, EN 50530, IEC 62116, IEC 60068, IEC 61683	
Standarde de conectare la rețea		IEC 61727, VDE-AR-N4105, VDE 0126-1-1, BDEW, G59/3, UTE C 15-712-1, CEI 0-16, CEI 0-21, RD 661, RD 1699, P.O. 12.3, RD 413, EN-50438-Turcia, EN-50438-Irlanda, C10/11, MEA, Decizia Nr.7, NRS 097-2-1, AS/NZS 4777.2, DEWA	

1. Tensiunea maximă de intrare este limita superioară a tensiunii CC. Orice tensiune CC de intrare mai mare ar putea deteriora invertorul.

2. Orice tensiune de intrare CC care depășește intervalul de tensiune de funcționare poate duce la o funcționare necorespunzătoare a invertorului.

3. SUN2000-30 ~ 40KTL-M3 crește potențialul între FV- și sol peste zero prin funcția de recuperare PID integrată pentru a reface deteriorarea modulului din PID. Tipurile de module acceptate includ: tip P (mono, poli), tip N (nPERT, HIT)



Inteligent

12 șiruri de monitorizare inteligentă



Eficient

Eficiență maximă 98.7%



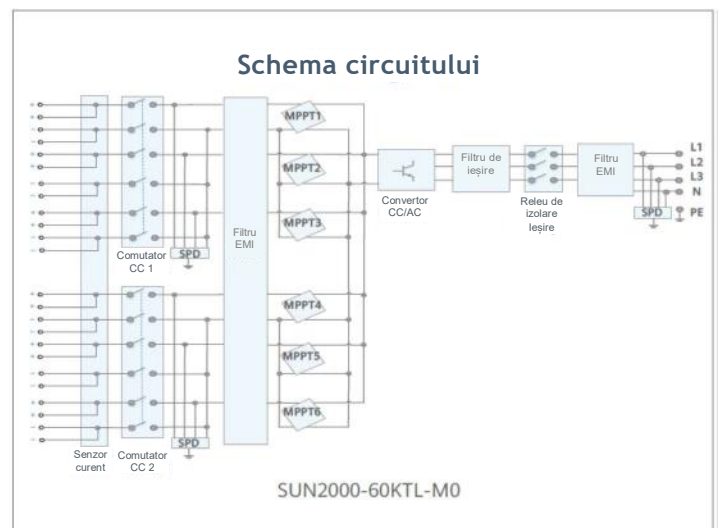
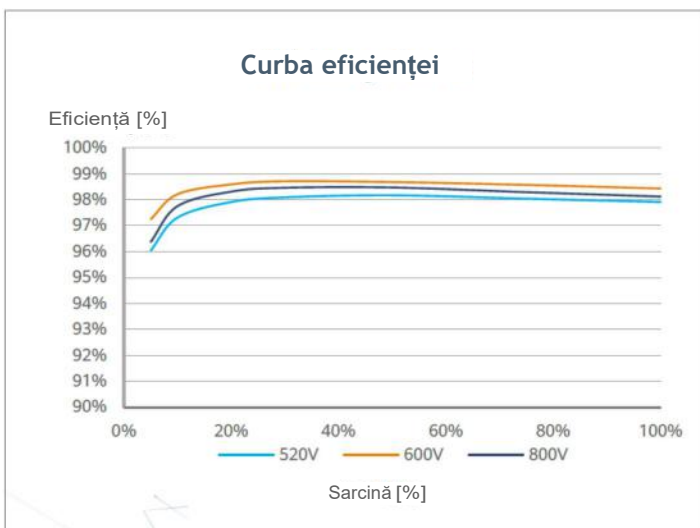
Sigur

Design fără siguranțe



Fiabil

Descărcătoare de supratensiune de tip II pentru CC și CA



Specificații tehnice	SUN2000-60KTL-M0
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Eficiență

Eficiență maximă	98.9% @480 V; 98.7% @380 V / 400 V
Eficiență europeană	98.7% @480 V; 98.5% @380 V / 400 V

Intrare

Tensiune maximă de intrare	1,100 V
Curent maxim per MPPT	22 A
Curentul maxim de scurtcircuit per MPPT	30 A
Tensiune de pornire	200 V
Interval de tensiune de funcționare MPPT	200 V ~ 1,000 V
Tensiune nominală de intrare	600 V @380 Vca / 400 Vca; 720 V @480 Vca
Numărul de dispozitive de urmărire MPP	6
Numărul maxim de intrări	12

Ieșire

Putere activă nominală CA	60,000 W
Putere aparentă maximă CA	66,000 VA
Putere activă maximă CA (cosφ=1)	66,000 W
Tensiune nominală de ieșire	220 V / 380 V, 230 V / 400 V, implicit 3W + N + PE; 3W + PE opțional în setări; 277 V / 480 V, 3W + PE
Frecvență nominală a rețelei CA	50 Hz / 60 Hz
Curent nominal de ieșire	91.2 A @380 V, 86.7 A @400 V, 72.2 A @480 V
Curent maxim de ieșire	100 A @380 V, 95.3 A @400 V, 79.4 A @480 V
Interval reglabil pentru factorul de putere	0.8 defazaj înainte...0.8 defazaj înapoi
Distorsiunea armonică totală maximă	<3%

Protecție

Dispozitiv de deconectare pe partea de intrare	Da
Protecție anti-insularizare	Da
Protecție împotriva supracurenților CA	Da
Protecție polaritate inversă CC	Da
Monitorizare defecțiune a șirului sistemului FV	Da
Descărcător de supratensiune CC	Tip II
Descărcător de supratensiune CA	Tip II
Detectarea rezistenței la izolație CC	Da
Unitate monitorizare curent rezidual	Da

Comunicație

Afișaj	Indicatoare LED; adaptor WLAN + aplicație FusionSolar
RS485	Da
USB	Da
Monitorizare BUS (MBUS)	Da (este necesar un transformator de izolare)

Date generale

Dimensiuni (L x H x A)	1,075 x 555 x 300 mm (42.3 x 21.9 x 11.8 inch)
Greutate (cu placa de montaj)	74 kg (163.1 lb.)
Interval de temperatură de funcționare	-25° C ~ 60° C (-13° F ~ 140° F)
Metoda de răcire	Convecție naturală
Altitudine maxima de funcționare	4,000 m (13,123 ft.)
Umiditate relativă	0 ~ 100%
Conector CC	Amphenol Helios H4
Conector CA	Terminal hidrofug PG + clemă terminal
Grad de protecție	IP65
Topologie	Fără transformator
Consum de energie pe timp de noapte	< 2 W

Conformitate standard (mai multe disponibile la cerere)

Certificat	EN 62109-1/-2, IEC 62109-1/-2, EN 50530, IEC 62116, IEC 60068, IEC 61683
Standarde de conectare la rețea	IEC 61727, VDE-AR-N4105, VDE 0126-1-1, BDEW, VDE 4120, UTE C 15-712-1, CEI 0-16, CEI 0-21, RD 661, RD 1699, P.O. 12.3, RD 413, EN-50438-Turcia, EN-50438-Irlanda, C10/11

*1 Tensiunea maximă de intrare este limita superioară a tensiunii CC. Orice tensiune CC de intrare mai mare ar putea deteriora invertorul.
 *2 Orice tensiune de intrare CC care depășește domeniul de tensiune de lucru poate duce la o funcționare necorespunzătoare a invertorului.

Versionea Nr.:03-(20200409)

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Sector 6, București

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10 dispozitive de urmărire MPP



Eficiență maximă 98.8% (@480V)



Gestionare la nivel de șir



Diagnosticarea curbei inteligente I-V acceptată



MBUS acceptat



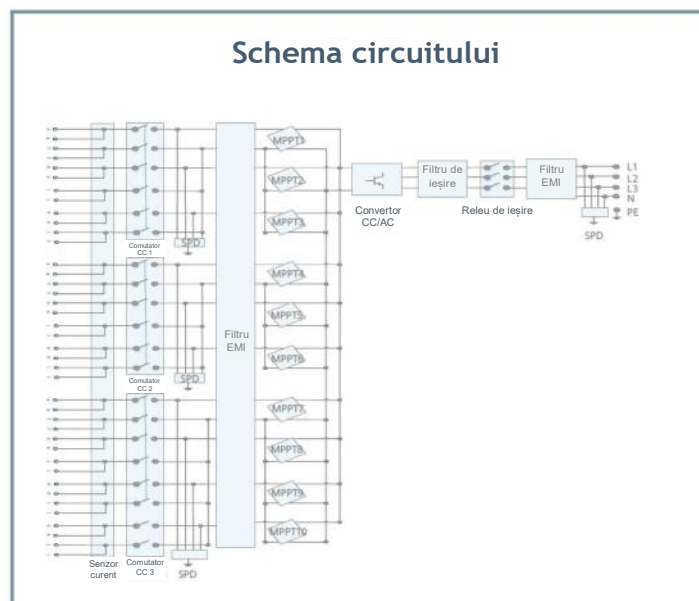
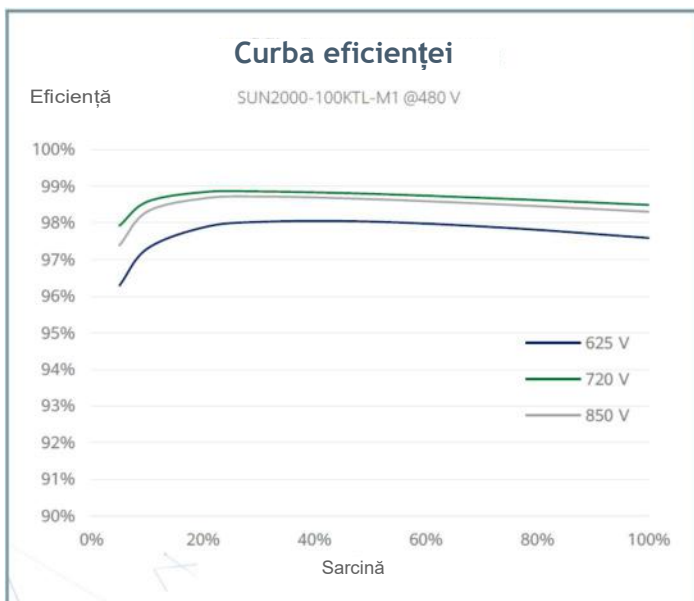
Design fără siguranțe



Recuperare AFCI și PID Opțional



Protecție IP66



Eficiență	
Eficiență maximă	98.8% @480 V, 98.6% @380 V / 400 V
Eficiență europeană	98.6% @480 V, 98.4% @380 V / 400 V
Intrare	
Tensiune maximă de intrare	1,100 V
Curent maxim per MPPT	26 A
Curentul maxim de scurtcircuit per MPPT	40 A
Tensiune de pornire	200 V
Interval de tensiune de funcționare MPPT	200 V ~ 1,000 V
Tensiune nominală de intrare	720 V @480 Vca, 600 V @400 Vca, 570 V @380 Vca
Numărul de intrări	20
Numărul de dispozitive de urmărire MPP	10
Ieșire	
Putere activă nominală CA	100,000 W
Putere aparentă maximă CA	110,000 VA
Putere activă maximă CA (cos φ=1)	110,000 W
Tensiune nominală de ieșire	480 V/ 400 V/ 380 V, 3W+(N)+PE
Frecvență nominală a rețelei CA	50 Hz / 60 Hz
Curent nominal de ieșire	120.3 A @480 V, 144.4 A @400 V, 152.0 A @380 V
Curent maxim de ieșire	133.7 A @480 V, 160.4 A @400 V, 168.8 A @380 V
Interval reglabil pentru factorul de putere	0.8 LG...0.8 LD
Distorsiunea armonică totală maximă	<3%
Protecție	
Dispozitiv de deconectare pe partea de intrare	Da
Protecție anti-insularizare	Da
Protecție împotriva supracurenților CA	Da
Protecție polaritate inversă CC	Da
Monitorizare defecțiune a șirului sistemului FV	Da
Descărcător de supratensiune CC	Da
Descărcător de supratensiune CA	Da
Detectarea rezistenței la izolație CC	Da
Unitate monitorizare curent rezidual	Da
Recuperare PID	Opțional
Protecție împotriva arcului electric	Opțional
Comunicație	
Afișaj	Indicatoare LED, adaptor WLAN + APP
USB	Da
MBUS	Da (este necesar un transformator de izolare)
RS485	Da
General	
Dimensiuni (L x H x A)	1,035 x 700 x 365 mm (40.7 x 27.6 x 14.4 inch)
Greutate (cu placa de montaj)	90 kg (198.4 lb.)
Interval de temperatură de funcționare	-25 °C ~ 60 °C (-13 °F ~ 140 °F)
Metoda de răcire	Răcire inteligentă cu aer
Altitudine maxima de funcționare fără pierdere	4,000 m (13,123 ft.)
Umiditate relativă	0 ~ 100%
Conector CC	Staubli MC4
Conector CA	Conector hidrofug + terminal OT / DT
Grad de protecție	IP66
Topologie	Fără transformator
Conformitate standard (mai multe disponibile la cerere)	
CertIFICATE	EN 62109-1/-2, IEC 62109-1/-2, EN 50530, IEC 62116, IEC 61727, IEC 60068, IEC 61683

1: Clasă de protecție de tip II compatibilă conform IEC / EN 61643-11

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This document is to declare the grid code compliance for SLOVENIA – according to EN50549-1: 2019 and SLOVENIAN grid code

This is to declare that the inverter model in following table are compliant to - EN50549-1: 2019 - Requirements for generating plants to be connected in parallel with distribution networks - Part 1: Connection to a LV distribution network - Generating plants up to and including Type B and - Slovenian Grid Code (defined by SONDSEE – March 2021)

Inverter Model	SUN2000-2KTL-L1, SUN2000-3KTL-L1, SUN2000-3.68KTL-L1, SUN2000-4KTL-L1, SUN2000-4.6KTL-L1, SUN2000-5KTL-L1, SUN2000-6KTL-L1; SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-L1, SUN2000-6KTL-M1, SUN2000-8KTL-M1, SUN2000-10KTL-M1; SUN2000-12KTL-M2, SUN2000-15KTL-M2, SUN2000-17KTL-M2, SUN2000-20KTL-M2; SUN2000-30KTL-M3, SUN2000-36KTL-M3, SUN2000-40KTL-M3; SUN2000-100KTL-M1
Type of Power Gener. plants	Type A and Type B (according to Commission Regulation (EU) 2016/631)

All inverters listed above can be used in Type A power generating plant (according to Commission Regulation EU 2016/631).

The inverter with the country setting Slovenia have grid protection parameters below (or can be set with the following grid protection parameters according to SIST EN50549-1):

Protection Parameter	Trip Setting	Time
Under-voltage level 1	0.85 Un	2000 ms
Under-voltage level 2	0.7 Un	200 ms
Over-voltage level 1	1.11 Un	2000 ms
Over-voltage level 2	1.15 Un	200 ms
Under-frequency level 1	47 Hz	200 ms
Under-frequency level 2	52 Hz	200 ms

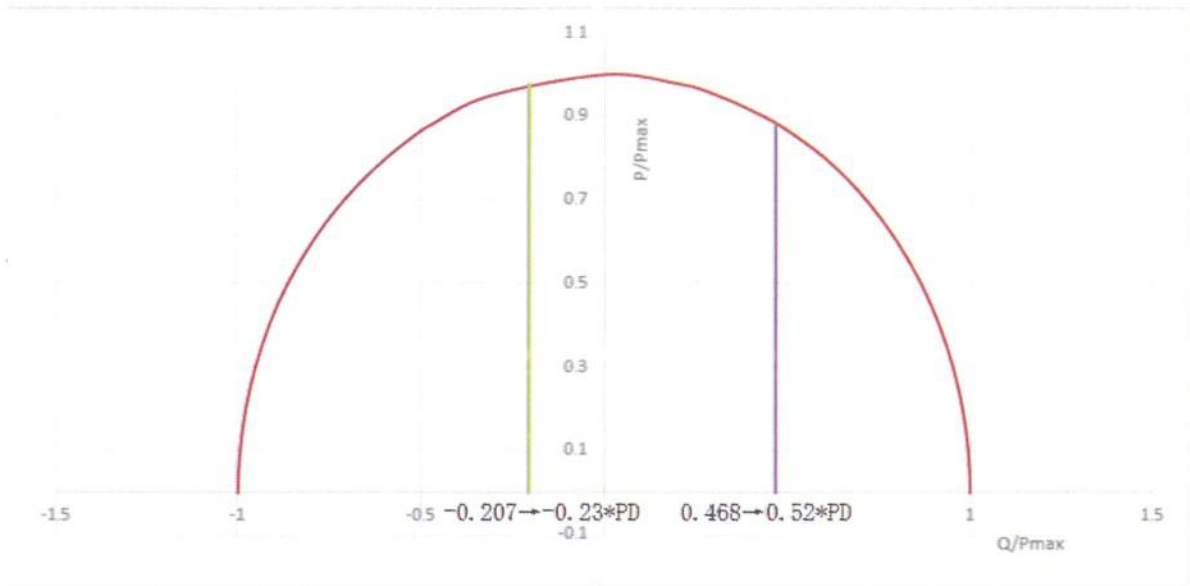
10-min overvoltage protection threshold	253.0 V >	Level-1 overfrequency protection threshold	52.00 Hz >
10-min overvoltage protection time	200 ms >	Level-1 overfrequency protection time	200 ms >
Level-1 overvoltage protection threshold	255.3 V >	Level-2 overfrequency protection threshold	52.00 Hz >
Level-1 overvoltage protection time	2000 ms >	Level-2 overfrequency protection time	200 ms >
Level-2 overvoltage protection threshold	264.5 V >	Level-1 underfrequency protection threshold	47.00 Hz >
Level-2 overvoltage protection time	200 ms >	Level-1 underfrequency protection time	200 ms >
Level-1 undervoltage protection threshold	195.5 V >	Level-2 underfrequency protection threshold	47.00 Hz >
Level-1 undervoltage protection time	2000 ms >	Level-2 underfrequency protection time	200 ms >
Level-2 undervoltage protection threshold	161.0 V >		
Level-2 undervoltage protection time	200 ms >		

Grid connection parameters:

Lower frequency	49.9 Hz
Upper frequency	50.1 Hz
Lower voltage	0.9 Un
Upper voltage	1.1 Un
Grid monitoring time	60 s
Gradient	10% Pmax/min

Grid connection time after power grid recovery	60 s >	Grid reconnection voltage upper limit	253.0 V >
Maximum voltage of grid-tied startup	253.0 V >	Grid reconnection voltage lower limit	207.0 V >
Minimum voltage of grid-tied startup	207.0 V >	Grid reconnection frequency upper limit	50.10 Hz >
Maximum frequency of grid-tied startup	50.10 Hz >	Grid reconnection frequency lower limit	49.90 Hz >
Minimum frequency of grid-tied startup	49.90 Hz >	delay time for connecting automatically to the network	60 s >
Soft start time	600 s >		
Frequency change rate protection	<input type="checkbox"/>		
AFCI	<input checked="" type="checkbox"/>		
Soft start time after grid failure	600 s >		

The reactive power capability graph is according to SONDOSEE requirements and clarifications i.e. within the limit of the following graph for inductive and capacitive behavior, i.e. between $-0.23 \cdot PD$ and $0.52 \cdot PD$ where $PD = P_{max} \cdot \cos\phi_n$ and $\cos\phi_n = 0.9$



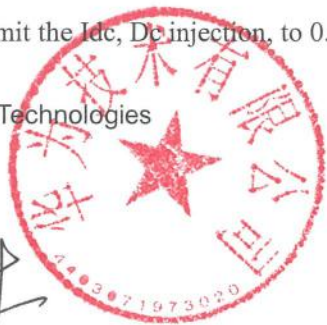
Inverters are able to limit the Idc, Dc injection, to 0.5% of nominal current.

On behalf of Huawei Technologies

Yours Faithfully,

Signed: _____

Date: _____





Certificate of Conformity

Certificate No.: 1988AP0424N048010
Equipment: SOLAR INVERTER
Brand Name:  HUAWEI
Test Model No.: SUN2000-8KTL-M0, SUN2000-10KTL-M0, SUN2000-12KTL-M0, SUN2000-15KTL-M0, SUN2000-17KTL-M0, SUN2000-20KTL-M0, SUN2000-8KTL-M2, SUN2000-10KTL-M2, SUN2000-12KTL-M2, SUN2000-15KTL-M2, SUN2000-17KTL-M2, SUN2000-20KTL-M2
Applicant: Huawei Technologies Co., Ltd.
Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
Bantian, Longgang District, Shenzhen, 518129, P.R.C
Report No.: PVNL190424N048

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with EN 50549-1:2019 for photovoltaic systems with a three-phase parallel coupling via an inverter in the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter.

Applied rules and standards

EN 50549-1:2019

Requirements for generating plants to be connected in parallel with distribution networks - Part 1-1: Connection to a LV distribution network - Generating plants up to and including Type B

DIN V VDE V 0126-1-1:2006-02 (Functional safety)

Automatic disconnection device between a generator and the public low-voltage grid
At the time of issue of this certificate the safety concept of an aforementioned representative product corresponds to the valid safety specifications for the specified use in accordance with regulations.



Name: James Huang
Technical Manager/ New Energy Team
Date: 2020-04-24

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Information given in this document is related to the tested specimen of the described electrical sample.



Certificate of Conformity

Certificate No.: 1988AP0424N048010
Equipment: SOLAR INVERTER
Brand Name:  HUAWEI
Test Model No.: SUN2000-8KTL-M0, SUN2000-10KTL-M0, SUN2000-12KTL-M0, SUN2000-15KTL-M0, SUN2000-17KTL-M0, SUN2000-20KTL-M0, SUN2000-8KTL-M2, SUN2000-10KTL-M2, SUN2000-12KTL-M2, SUN2000-15KTL-M2, SUN2000-17KTL-M2, SUN2000-20KTL-M2
Applicant: Huawei Technologies Co., Ltd.
Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
Bantian, Longgang District, Shenzhen, 518129, P.R.C
Report No.: PVNL190424N048

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with EN 50549-1:2019 for photovoltaic systems with a three-phase parallel coupling via an inverter in the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter.

Applied rules and standards

EN 50549-1:2019

Requirements for generating plants to be connected in parallel with distribution networks - Part 1-1: Connection to a LV distribution network - Generating plants up to and including Type B

DIN V VDE V 0126-1-1:2006-02 (Functional safety)

Automatic disconnection device between a generator and the public low-voltage grid
At the time of issue of this certificate the safety concept of an aforementioned representative product corresponds to the valid safety specifications for the specified use in accordance with regulations.



Name: James Huang
Technical Manager/ New Energy Team
Date: 2020-04-24

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Certificate of Conformity

Certificate No.: 1988AP0424N048010
Equipment: SOLAR INVERTER
Brand Name:  HUAWEI
Test Model No.: SUN2000-8KTL-M0, SUN2000-10KTL-M0, SUN2000-12KTL-M0, SUN2000-15KTL-M0, SUN2000-17KTL-M0, SUN2000-20KTL-M0, SUN2000-8KTL-M2, SUN2000-10KTL-M2, SUN2000-12KTL-M2, SUN2000-15KTL-M2, SUN2000-17KTL-M2, SUN2000-20KTL-M2
Applicant: Huawei Technologies Co., Ltd.
Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
Bantian, Longgang District, Shenzhen, 518129, P.R.C
Report No.: PVNL190424N048

Use in accordance with regulations:

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Product Service

Compliance Document

No. D 18 04 41829 03144

Holder of Certificate: Huawei Technologies Co., Ltd.

Administration Building
Headquarters of Huawei Technologies Co., Ltd.
Bantian, Longgang District
518129 Shenzhen
PEOPLE'S REPUBLIC OF CHINA

**Product: Converter
SOLAR INVERTER**

This Compliance document confirms the compliance with the listed standards on a voluntary basis. It refers only to the sample submitted for testing and certification and does not certify the quality or safety of the serial products. See also notes overleaf.

Test report no.: 704091805121-00



Date, 2018-04-26


(Zhengdong Ma)

Page 1 of 2



Product Service

Compliance Document
No. D 18 04 41829 03144

Model(s): SUN2000-50KTL-M0, SUN2000-60KTL-M0,
SUN2000-65KTL-M0

Parameters:

d.c. Max. Input Voltage:	1100 Vd.c.
d.c. MPP Range:	200-1000 Vd.c.
d.c. Max. Input Current:	22 A /22 A /22 A /22 A / 22 A /22 A
Isc PV:	30 A /30 A /30 A /30 A / 30 A /30 A
a.c. Output Nominal Voltage:	For model SUN2000-50KTL-M0: 3/N/PE~ 400V For model SUN2000-60KTL-M0: 3/N/PE~ 400V 3~ 480V (optional) For model SUN2000-65KTL-M0: 3~ 480V
a.c. Nominal Operating Frequency:	50 Hz
a.c. Output Max. Current:	For model SUN2000-50KTL-M0: 79,4 A (@rated voltage 400V) For model SUN2000-60KTL-M0: 95,3 A (@rated voltage 400V) 79,4 A (@rated voltage 480V) For model SUN2000-65KTL-M0: 87,6 A
a.c. Output Rated Power:	50 kW (SUN2000-50KTL-M0) 60 kW (SUN2000-60KTL-M0) 65 kW (SUN2000-65KTL-M0)
a.c. Output Max. Power:	55 kVA (SUN2000-50KTL-M0) 66 kVA (SUN2000-60KTL-M0) 72 kVA (SUN2000-65KTL-M0)
Power factor(adj.):	0,8(lagging)... 0,8(leading)
Operating Temperature Range:	-25°C... + 60°C
Protective Class:	I
Ingress Protection:	IP65

Tested according to: CLC/TS 50549-1:2015



Product Service

Compliance Document

No. D 18 04 41829 03144

Holder of Certificate: Huawei Technologies Co., Ltd.

Administration Building
Headquarters of Huawei Technologies Co., Ltd.
Bantian, Longgang District
518129 Shenzhen
PEOPLE'S REPUBLIC OF CHINA

**Product: Converter
SOLAR INVERTER**

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Test report no.: 704091805121-00



Date, 2018-04-26


(Zhengdong Ma)

Page 1 of 2



Product Service

Compliance Document
No. D 18 04 41829 03144

Model(s): SUN2000-50KTL-M0, SUN2000-60KTL-M0,
SUN2000-65KTL-M0

Parameters:

d.c. Max. Input Voltage:	1100 Vd.c.
d.c. MPP Range:	200-1000 Vd.c.
d.c. Max. Input Current:	22 A /22 A /22 A /22 A / 22 A /22 A
Isc PV:	30 A /30 A /30 A /30 A / 30 A /30 A
a.c. Output Nominal Voltage:	For model SUN2000-50KTL-M0: 3/N/PE~ 400V For model SUN2000-60KTL-M0: 3/N/PE~ 400V 3~ 480V (optional) For model SUN2000-65KTL-M0: 3~ 480V
a.c. Nominal Operating Frequency:	50 Hz
a.c. Output Max. Current:	For model SUN2000-50KTL-M0: 79,4 A (@rated voltage 400V) For model SUN2000-60KTL-M0: 95,3 A (@rated voltage 400V) 79,4 A (@rated voltage 480V) For model SUN2000-65KTL-M0: 87,6 A
a.c. Output Rated Power:	50 kW (SUN2000-50KTL-M0) 60 kW (SUN2000-60KTL-M0) 65 kW (SUN2000-65KTL-M0)
a.c. Output Max. Power:	55 kVA (SUN2000-50KTL-M0) 66 kVA (SUN2000-60KTL-M0) 72 kVA (SUN2000-65KTL-M0)
Power factor(adj.):	0,8(lagging)... 0,8(leading)
Operating Temperature Range:	-25°C... + 60°C
Protective Class:	I
Ingress Protection:	IP65

Tested according to: CLC/TS 50549-1:2015



Product Service

Compliance Document

No. D 18 04 41829 03145

Holder of Certificate: Huawei Technologies Co., Ltd.

Administration Building
Headquarters of Huawei Technologies Co., Ltd.
Bantian, Longgang District
518129 Shenzhen
PEOPLE'S REPUBLIC OF CHINA

**Product: Converter
SOLAR INVERTER**

This Compliance document confirms the compliance with the listed standards on a voluntary basis. It refers only to the sample submitted for testing and certification and does not certify the quality or safety of the serial products. See also notes overleaf.

Test report no.: 704091805122-00



Date, 2018-04-26


(Zhengdong Ma)

Page 1 of 2



Product Service

Compliance Document
No. D 18 04 41829 03145

Model(s): SUN2000-50KTL-M0, SUN2000-60KTL-M0,
 SUN2000-65KTL-M0

Parameters:	d.c. Max. Input Voltage:	1100 Vd.c.
	d.c. MPP Range:	200-1000 Vd.c.
	d.c. Max. Input Current:	22 A /22 A /22 A /22 A / 22 A /22 A
	Isc PV:	30 A /30 A /30 A /30 A / 30 A /30 A
	a.c. Output Nominal Voltage:	For model SUN2000-50KTL-M0: 3/N/PE~ 400V For model SUN2000-60KTL-M0: 3/N/PE~ 400V 3~ 480V (optional) For model SUN2000-65KTL-M0: 3~ 480V
	a.c. Nominal Operating Frequency:	50 Hz
	a.c. Output Max. Current:	For model SUN2000-50KTL-M0: 79,4 A (@rated voltage 400V) For model SUN2000-60KTL-M0: 95,3 A (@rated voltage 400V) 79,4 A (@rated voltage 480V) For model SUN2000-65KTL-M0: 87,6 A
	a.c. Output Rated Power:	50 kW (SUN2000-50KTL-M0) 60 kW (SUN2000-60KTL-M0) 65 kW (SUN2000-65KTL-M0)
	a.c. Output Max. Power:	55 kVA (SUN2000-50KTL-M0) 66 kVA (SUN2000-60KTL-M0) 72 kVA (SUN2000-65KTL-M0)
	Power factor(adj.):	0,8(lagging)... 0,8(leading)
	Operating Temperature Range:	-25°C... + 60°C
	Protective Class:	I
	Ingress Protection:	IP65

Tested according to: CLC/TS 50549-2:2015



**BUREAU
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Certificate of compliance

Applicant: Huawei Technologies Co., Ltd.
Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
Bantian, Longgang District, Shenzhen, 518129
P.R. China

Product: SOLAR INVERTER

Model: SUN2000-100KTL-H1, SUN2000-105KTL-H1

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with EN50549-2:2019 for photovoltaic systems with a three-phase parallel coupling via an inverter in the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter.

Firmware version: V200R001

Connection rule: EN 50549-2:2019:

Requirements for generating plants to be connected in parallel with distribution networks - Part 2:
Connection to a MV distribution network - Generating plants up to and including Type B

Standards / directives for testing:

FGW TG3, Rev. 25: 2018-09-01

Report number: 18TH0387-EN50549-2_0

Certificate number: U20-0110

Certification scheme: NSOP-0032-DEU-ZE-V01

Date of issue: 2020-03-02

Certification body

Holger Schaffer



Deutsche
Akkreditierungsstelle
D-ZE-12024-01-00

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

Type Approval and declaration of compliance with the requirements of EN 50549-2

Manufacturer / applicant:	Huawei Technologies Co., Ltd. Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129 P.R. China	
Product description:	Grid-tied photovoltaic inverter	
Unit / Type:	SUN2000-100KTL-H1	SUN2000-105KTL-H1
Full-load MPP DC voltage range [V]:	880 - 1300	
Input DC voltage range [V]:	600 - 1500	
Input DC current [A]:	max. 22A x 6	max. 25A x 6
Nominal output AC voltage [V]:	800 (3~ + PE, 50/60 Hz)	
Output AC current [A]:	max. 80,2	max. 84,6
Nominal active output power [kW]:	100	105
Max. apparent output power [kVA]:	105	116
Firmware version:	V200R001	

Description of the structure of the power generation unit:
 The input and output are protected by Varistors to Earth. 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 a two relays. This assures that the opening of the output circuit will also operate in case of one error.

Parameter Table

	Firma / Company:	Huawei Technologies Co., Ltd.	Projekt-Nr. / Project-no.:	18TH0387
	Ansprechpartner / Customer Contact:	Qingbin CHEN Website: http://www.huawei.com Email: support@huawei.com	BV-Kontakt / BV Contact:	Weizhao Zheng Tel: +49 40 74041 - 2267 weizhao.zheng@de.bureauveritas.com

Parameter list of SUN2000-105KTL-H1 & SUN2000-100KTL-H1

1. General information regarding the Parameter list

Manufacturer:	Huawei Technologies Co., Ltd.
Created by:	Qingbin Chen
Created on:	2020-02-26
Revised on:	V1.0

2. Information regarding the power generating unit

Type designation	Rated power [kW]	Rated active current [A] (at $\cos\phi = 1$)
SUN2000-105KTL-H1	105	75.8A
SUN2000-100KTL-H1	100	72.2A

3. Parameter set during the measurement

If no noted otherwise the following standard parameters were used during the measurement.
All adaptations to the standard parameters used during the measurement were documented in the TG3 test report.

4. Main Components of the regulating system

Main components of the control system with firmware and software	
Main component(s) of the control system	Control system integrated in the PGU
Firmware version	V200R001
Software version	V200R001

5. Relevant parameters for the electrical behaviour

No.	Name	Description	Unit	Setting range		Default value (acc. to parameter set)
				Min.	Max.	
General parameter settings (rated values or reference values)						
1	Pn	Rated active power	kW	parameter not adjustable		105 kW @ SUN2000-105KTL-H1 100 kW @SUN2000-100KTL-H1
2	Smax	Max apparent power	kVA	parameter not adjustable		116 kVA @ SUN2000-105KTL-H1 105 kVA @ SUN2000-100KTL-H1

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No.	Name	Description	Unit	Setting range		Default value (acc. to parameter set)
				Min.	Max.	
3	Un	Rated voltage	V	parameter not adjustable		800V
4	In	Rated current	A	parameter not adjustable		75.8A@ SUN2000-105KTL-H1 72.2A@ SUN2000-100KTL-H1
5	Fn	Rated frequency	Hz	parameter not adjustable		50
Active power peaks						
6	Pmax	Maximum active power limit	kW	parameter not adjustable		116 kW @ SUN2000-105KTL-H1 105 kW @ SUN2000-100KTL-H1
7	Maximum active power	Plimit	kW	0.100	Pmax	Pmax
8	Active power baseline	Pmaxref	kW	0.100	Pmax	Pmax
Operating power limited by grid operator						
9	Shutdown at 0% power limit	Shutdown at 0% power limit function enable	---	Disable / Enable		Disable
10	Active power change gradient	Active power change gradient	%Pmaxref/s	0.100	1000.000	125.000
11	Fixed active power derated	Fixed active power derated	kW	0.0	Plimit	Plimit
12	Active power percentage derating	Active power percentage derating	%Pmaxref	0.0	100.0	100.0
13	Reactive power change gradient	Reactive power change gradient	%(0.6Smax)/s	0.100	1000.000	125.00
14	Reactive power adjustment time	Reactive power adjustment time ¹⁾	s	1	120	10
Active power feed-in as a function of grid frequency						
15	Overfrequency derating	Overfrequency derating function enable	---	Disable / Enable		Disable
16	Trigger frequency of over frequency derating	Start frequency P(f) (Start of frequency regulation - power reduction)	Hz	40.00	60.00	50.20
17	Quit frequency of over frequency derating	Quit frequency P(f) (End of frequency regulation - power reduction)	Hz	40.00	60.00	50.20
18	Cutoff frequency of over frequency derating	End frequency P(f) (End of frequency regulation - power reduction)	Hz	40.00	60.00	51.50
19	Cutoff power of	End power P(f) (End of	%PM	0	100	48

	Firma / Company:	Huawei Technologies Co., Ltd.	Projekt-Nr. / Project-no.:	18TH0387
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No.	Name	Description	Unit	Setting range		Default value (acc. to parameter set)
				Min.	Max.	
	over frequency derating	power of frequency regulation - power reduction)				
20	Power recovery gradient of overfrequency derating	Power recovery gradient when quit overfrequency derating	%Prated/min	1	6000	10

Note:

The required gradient (or droop) of the frequency dependent active power derating can be defined using the Parameters *Trigger frequency of over frequency derating*, *Cutoff frequency of over frequency derating* and *Cutoff power of over frequency derating*.

Active power gradient following disconnection from the grid

21	Soft start time after grid failure	The soft start time the active power from 0 to power rated after fault	s	1	1800	600
----	------------------------------------	--	---	---	------	-----

Reconnection time following disconnection from the grid

22	Grid connection duration after power grid recovery	Time until reconnection	s	0	7200	60
----	--	-------------------------	---	---	------	----

Reactive power provision

a) Power factor fix control

23	Power factor	Cos phi specifications	---	(-1.000,-0.800] U [0.800,1.000]		1.000
----	---------------------	------------------------	-----	------------------------------------	--	-------

b) Reactive power fix control

24	Reactive power	Q specifications	kvar	-0.6·Smax	0.6·Smax	0.0
----	----------------	------------------	------	-----------	----------	-----

c) Q-U characteristic curve ²⁾

Note:

²⁾ The Q-U characteristic curve is free programmable with up to 10 supporting points.

25	Trigger power ratio	Q(U) function trigger power ratio of Pmax	%Pmax	10	100	20
26	Characteristic curve points	Number of Q-U characteristic curve	---	2	10	4
27	U/Un(A)	Q(U) characteristic node 1 U	%Un	80.0	136.0	90.0
28	Q/S(A)	Q(U) characteristic node 1 Q	/Smax	-0.600	0.600	0.436
29	U/Un(B)	Q(U) characteristic node 2 U	%Un	80.0	136.0	92.0
30	Q/S(B)	Q(U) characteristic node 2 Q	/Smax	-0.600	0.600	0.000
31	U/Un(C)	Q(U) characteristic node 3 U	%Un	80.0	136.0	108.0
32	Q/S(C)	Q(U) characteristic node 3 Q	/Smax	-0.600	0.600	0.000
33	U/Un(D)	Q(U) characteristic node 4 U	%Un	80.0	136.0	110.0
34	Q/S(D)	Q(U) characteristic node 4 Q	/Smax	-0.600	0.600	-0.436

d) Q-P characteristic curve ³⁾

Note:

³⁾ The Q-P characteristic curve is free programmable with up to 10 supporting points.

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No.	Name	Description	Unit	Setting range		Default value (acc. to parameter set)
				Min.	Max.	
35	Characteristic curve points	Number of Q-P characteristic curve	-	2	10	5
36	P/Pmax(A)	Q(P) characteristic node 1 P	%Pmax	0.0	100.0	10.0
37	Q/Qmax(A)	Q(P) characteristic node 1 Q	/Smax	-0.600	0.600	0.000
38	P/Pmax(B)	Q(P) characteristic node 2 P	%Pmax	0.0	100.0	50.0
39	Q/Qmax(B)	Q(P) characteristic node 2 Q	/Smax	-0.600	0.600	0.000
40	P/Pmax(C)	Q(P) characteristic node 3 P	%Pmax	0.0	100.0	60.0
41	Q/Qmax(C)	Q(P) characteristic node 3Q	/Smax	-0.600	0.600	-0.050
42	P/Pmax(D)	Q(P) characteristic node 4 P	%Pmax	0.0	100.0	90.0
43	Q/Qmax(D)	Q(P) characteristic node 4 Q	/Smax	-0.600	0.600	-0.330
44	P/Pmax(E)	Q(P) characteristic node 5 P	%Pmax	0.0	100.0	100.0
45	Q/Qmax(E)	Q(P) characteristic node 5 Q	/Smax	-0.600	0.600	-0.330
PGU disconnection from the grid						
46	10 minute OV protection	10 minute voltage average value protection point	p.u	1.00Un	1.25Un	1.10Un
47	10 minute OV protection time	10 minute voltage average value protection time	ms	50	7200000	200
48	Level-1 OV protection	Level 1 over voltage protection point	p.u	1.00Un	1.25Un	1.15Un
49	Level-1 OV protection time	Level 1 over voltage protection time	ms	50	7200000	61000
50	Level-2 OV protection	Level 2 over voltage protection point	p.u	1.00Un	1.36Un	1.25Un
51	Level-2 OV protection time	Level 2 over voltage protection time	ms	50	7200000	200
52	Level-1 UV protection	Level 1 under voltage protection point	p.u	0.15Un	1.00Un	0.80Un
53	Level-1 UV protection time	Level 1 under voltage protection time	ms	50	7200000	5000
54	Level-2 UV protection	Level 2 under voltage protection point	p.u	0.15Un	1.00Un	0.50Un
55	Level-2 UV protection time	Level 2 under voltage protection time	ms	50	7200000	2000
56	Level-1 OF protection	Level 1 over frequency protection point	Hz	50.00	60.00	51.50
57	Level-1 OF protection time	Level 1 over frequency protection time	ms	50	7200000	500
58	Level-2 OF protection	Level 2 over frequency protection point	Hz	50.00	60.00	52.00
59	Level-2 OF protection time	Level 2 over frequency protection time	ms	50	7200000	200
60	Level-1 UF protection	Level 1 under frequency protection point	Hz	40.00	50.00	47.50

	Firma / Company:	Huawei Technologies Co., Ltd.	Projekt-Nr. / Project-no.:	18TH0387
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No.	Name	Description	Unit	Setting range		Default value (acc. to parameter set)
				Min.	Max.	
61	Level-1 UF protection time	Level 1 under frequency protection time	ms	50	7200000	500
62	Level-2 UF protection	Level 2 under frequency protection point	Hz	40.00	50.00	47.00
63	Level-2 UF protection time	Level 2 under frequency protection time	ms	50	7200000	200
Connection conditions						
64	Auto start upon grid recovery	Enable Auto start upon grid after grid fault	---	Disable/Enable		Enable
65	Grid reconnection voltage upper limit	Limit value connection U>	p.u	Un	1.36Un	1.10Un
66	Grid reconnection voltage lower limit	Limit value connection U<	p.u	0.45Un	1.00Un	0.90Un
67	Grid reconnection frequency upper limit	Limit value connection f>	Hz	50.00	60.00	50.20
68	Grid reconnection frequency lower limit	Limit value connection f<	Hz	40.00	50.00	49.50
Response during grid faults						
69	LVRT	LVRT enable	---	Enable/Disable		Enable
78	LVRT triggering threshold	LVRT triggering threshold	V	0.50Un	1.00Un	0.90Un
79	LVRT reactive power compensation factor	k factor	---	0.0	10.0	2.0
80	HVRT	HVRT enable	---	Enable/Disable		Enable
81	HVRT triggering threshold	LVRT triggering threshold	V	1.00Un	1.36Un	1.10Un
82	HVRT reactive power compensation factor	k factor	---	0.0	6.0	2.0
83	VRT exit hysteresis threshold	VRT exit hysteresis threshold	V	0.02Un	0.1Un	0.02Un
84	Grid voltage protection shield during HVRT/LVRT	Grid voltage protection shield during HVRT/LVRT	---	Enable/Disable		Enable
85	Zero current due to power	Zero current due to power grid fault	---	Enable/Disable		Disable



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No.	Name	Description	Unit	Setting range		Default value (acc. to parameter set)
				Min.	Max.	
	grid fault					
Self-protection						
98	Line voltage peak value protection point	Line voltage peak value protection point, exceeds which a non-delayed self-protection tripping occurs	p.u.	parameter not adjustable		1.35·U _n

	Firma / Company:	Huawei Technologies Co., Ltd.	Projekt-Nr. / Project-no.:	18TH0387
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6. Description for reading out parameters

Reading out the parameters

- The parameters can be read out using the following software.

Name:	SmartLogger WebUI and SUN2000 APP
Version:	SmartLogger:V200R002 SUN2000 APP:3.2.00.002

- The parameters can be read out using the display in the control system.

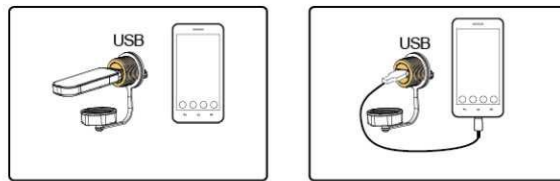
7. Interfaces

7.1. Active power specification

Interfaces for the active power reduction by defined setpoint

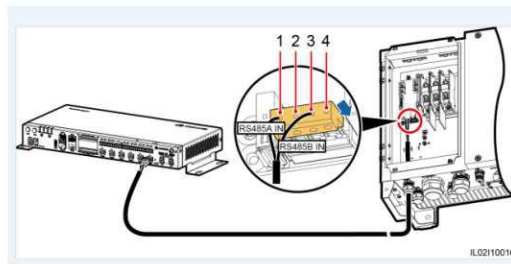
Following interfaces for control of the active power provision are provided on the PGU level:

- connect a mobile phone that runs the SUN2000 app to the inverter using a Bluetooth module, a WLAN module, or a USB data cable for active power setting using parameter *Fixed active power derated* or *Active power percentage derating*;



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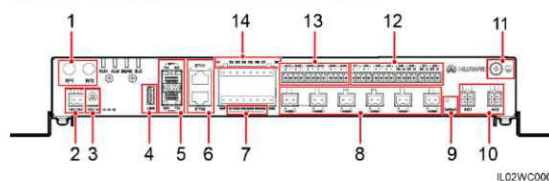
- connect the inverter to Smartlogger via MBUS or RS485 for active power setting using the WebUI using the parameter *Fixed active power derated* or *Active power percentage derating*.



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- connect the inverter to Smartlogger via MBUS or RS485, the digital interfaces DI1, DI2, DI3, DI4 of the Smartlogger can be connected to the dry contacts for active power setting.

Figure 2-4 SmartLogger2000-10/10-B/11-B bottom



IL021WC0006

	Firma / Company:	Huawei Technologies Co., Ltd.	Projekt-Nr. / Project-no.:	18TH0387
	Ansprechpartner / Customer Contact:	Qingbin CHEN Website: http://www.huawei.com Email: support@huawei.com	BV-Kontakt / BV Contact:	Weizhao Zheng Tel: +49 40 74041 - 2267 weizhao.zheng@de.bureauveritas.com

14	DI1-DIS	Digital parameter input	Connects to a dry contact input. GND1 and GND2 are grounding ports for DI signals.
----	---------	-------------------------	--

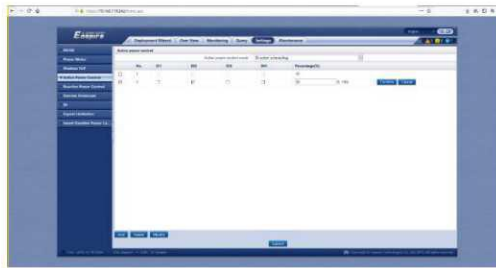
8.1.2 DI Active Scheduling

NOTICE

- When setting this function, ensure that the DI port for customized control is not occupied. Otherwise, the setting will fail.
- Before setting this function, ensure that the SmartLogger is properly connected to the Ripple Control Receiver.

Parameter	Description
Active Power Control Mode	Set this parameter to DI active scheduling .
DI	<ul style="list-style-type: none"> Supports 16 levels of percentages. "L" indicates a low level. When DI+ and DI- are connected, the four DI ports of the SmartLogger are low-level ports. If not connected, the ports are high-level ports. The percentage levels of DI1-DI4 should differ from each other. Otherwise, an abnormal command will be generated. If the actual input DI signal is inconsistent with that configured on the WebUI, the SmartLogger controls the inverter to work at full power and the Abnormal Reactive Schedule alarm is raised.

NOTE
The DI parameters include DI1, DI2, DI3, DI4, and Percentage(%).



7.2. Reactive power specification

Interfaces for the provision of reactive power

Following interfaces for control of the reactive power provision are provided on the PGU level:

- connect a mobile phone that runs the SUN2000 app to the inverter using a Bluetooth module, a WLAN module, or a USB data cable for:
 - Power factor fix control
 - Reactive power fix control
 - Q-P characteristic curve
 - Q-U characteristic curve

setting;

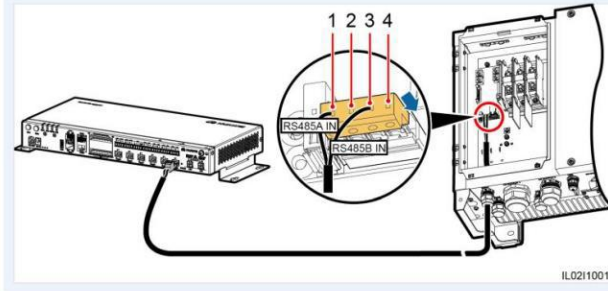


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- connect the inverter to Smartlogger via MBUS or RS485, the following reactive power control functions:
 - Power factor fix control
 - Reactive power fix control
 - Q-P characteristic curve
 - Q-U characteristic curve

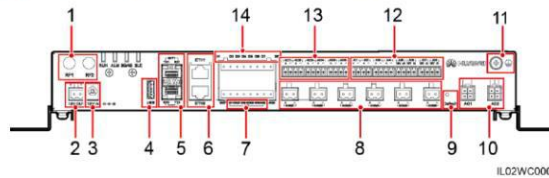
can be set using the WebUI.

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	Ansprechpartner / Customer Contact:	Qingbin CHEN Website: http://www.huawei.com Email: support@huawei.com	BV-Kontakt / BV Contact:	Weizhao Zheng Tel: +49 40 74041 - 2267 weizhao.zheng@de.bureauveritas.com



- connect the inverter to Smartlogger via MBUS or RS485, the digital interfaces DI5, DI6, DI7, DI8 of the Smartlogger can be connected to the dry contacts for power factor (cosφ) setting.

Figure 2-4 SmartLogger2000-10/10-B/11-B bottom



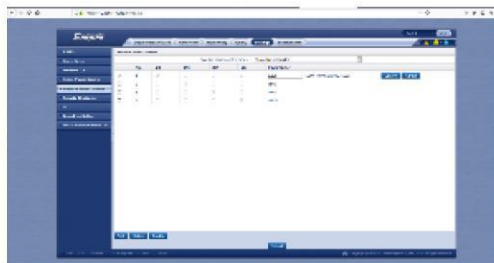
14	DI1-DI8	Дигитални контакти на входи	Электронные входы для DI элементов: можно подключить до 8 контактов
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8.2.2 DI Reactive Scheduling

NOTE

- When setting this function, ensure that the DI port for automated control is not occupied. Otherwise, the setting will fail.
- Before setting this function, ensure that the SmartLogger is properly connected to the Rapph Control Busbar.

Parameter	Description
Reactive power control mode	Set this parameter to DI reactive scheduling.
DI SCOPE	<ul style="list-style-type: none"> System levels are supported for power factors. "L" indicates a low level. When connecting to DI12, the four DI ports of the SmartLogger are low-level ports. If not connected, the ports are high-level ports. The percentage levels of DI5-DI8 should differ from each other. Otherwise, an abnormal command is generated. If the actual input DI signal is inconsistent with that assigned on the WebUI, the SmartLogger controls the inverter to work at full power and the Abnormal Reactive Schedule alarm is raised.





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Certificate of compliance

Applicant: Huawei Technologies Co., Ltd.
Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
Bantian, Longgang District, Shenzhen, 518129
P.R. China

Product: SOLAR INVERTER

Model: SUN2000-100KTL-M1

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with EN50549-2:2019 for photovoltaic systems with a three-phase parallel coupling via an inverter in the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter.

Firmware version: V500R001

Connection rule: EN 50549-2:2019:

Requirements for generating plants to be connected in parallel with distribution networks - Part 2:
Connection to a MV distribution network - Generating plants up to and including Type B

Standards / directives for testing:

FGW TG3, Rev. 25: 2018-09-01

Report number: 19TH0506-EN50549-2_1

Certificate number: U20-0009

Certification scheme: NSOP-0032-DEU-ZE-V01

Date of issue: 2020-01-10

Certification body



Holger Schaffer



Deutsche
Akkreditierungsstelle
D-ZE-12024-01-00

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

Type Approval and declaration of compliance with the requirements of EN 50549-2

Manufacturer / applicant:	Huawei Technologies Co., Ltd. Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129 P.R. China	
Product description:	Grid-tied photovoltaic inverter	
Unit / Type:	SUN2000-100KTL-M1	
MPP DC voltage range [V]:	200 - 1000	
Input DC voltage range [V]:	200 - 1100	
Input DC current [A]:	max. 26(A) x 10	
Nominal output AC voltage [V]:	400 (3~ + (N) + PE, 50/60 Hz)	480 (3~ + PE, 50/60 Hz)
Output AC current [A]:	max. 160,4	max. 133,7
Nominal active output power [kW]:	100	
Max. apparent output power [kVA]:	110	
Firmware version:	V500R001	

Description of the structure of the power generation unit:

The input and output are protected by Varistors to Earth. 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 a two relays. This assures that the opening of the output circuit will also operate in case of one error.

Parameter Table

	Firma / Company:	Huawei Technologies Co., Ltd.	Projekt-Nr. / Project-no.:	
	Ansprechpartner / Customer Contact:	Qingbin CHEN Website: http://www.huawei.com Email: support@huawei.com	BV-Kontakt / BV Contact:	Weizhao Zheng Tel: +49 40 74041 - 2267 weizhao.zheng@de.bureauveritas.com

Parameter list of SUN2000-100KTL-M1

1. General information regarding the Parameter list

Manufacturer:	Huawei Technologies Co., Ltd.
Created by:	Qingbin Chen
Created on:	2019-12-26
Revised on:	V1.0

2. Information regarding the power generating unit

Type designation	Rated power [kW]	Rated active current [A] (at $\cos\phi = 1$)
SUN2000-100KTL-M1	100	144.4@400V 120.3@480V

3. Parameter set during the measurement

If no noted otherwise the following standard parameters were used during the measurement.
All adaptations to the standard parameters used during the measurement were documented in the TG3 test report.

4. Main Components of the regulating system

Main components of the control system with firmware and software	
Main component(s) of the control system	Control system integrated in the PGU
Firmware version	V500R001
Software version	V500R001

5. Relevant parameters for the electrical behaviour

No.	Name	Description	Unit	Setting range		Default value (acc. to parameter set)
				Min.	Max.	
General parameter settings (rated values or reference values)						
1	Pn	Rated active power	kW	parameter not adjustable		100
2	Smax	Max apparent power	kVA	parameter not adjustable		110
3	Un	Rated voltage	V	parameter not adjustable		400V/480V
4	In	Rated current	A	parameter not adjustable		144.4@400V 120.3@480V
5	Fn	Rated frequency	Hz	parameter not adjustable		50
Active power peaks						
6	Pmax	Maximum active power limit	kW	parameter not adjustable		110.000

	Firma / Company:	Huawei Technologies Co., Ltd.	Projekt-Nr. / Project-no.:	
	Ansprechpartner / Customer Contact:	Qingbin CHEN Website: http://www.huawei.com Email: support@huawei.com	BV-Kontakt / BV Contact:	Weizhao Zheng Tel: +49 40 74041 - 2267 weizhao.zheng@de.bureauveritas.com

No.	Name	Description	Unit	Setting range		Default value (acc. to parameter set)
				Min.	Max.	
7	Maximum active power	Plimit	kW	0.100	Pmax	Pmax
8	Active power baseline	Pmaxref	kW	0.100	Pmax	Pmax
Operating power limited by grid operator						
9	Shutdown at 0% power limit	Shutdown at 0% power limit function enable	---	Disable / Enable		Disable
10	Active power change gradient	Active power change gradient	%Pmaxref/s	0.100	1000.000	125.000
11	Fixed active power derated	Fixed active power derated	kW	0.0	Plimit	Plimit
12	Active power percentage derating	Active power percentage derating	%Pmaxref	0.0	100.0	100.0
13	Reactive power change gradient	Reactive power change gradient	%(0.6Smax)/s	0.100	1000.000	125.00
14	Reactive power adjustment time	Reactive power adjustment time ¹⁾	s	1	120	10
Active power feed-in as a function of grid frequency						
15	Overfrequency derating	Overfrequency derating function enable	---	Disable / Enable		Disable
16	Trigger frequency of over frequency derating	Start frequency P(f) (Start of frequency regulation - power reduction)	Hz	40.00	60.00	50.20
17	Quit frequency of over frequency derating	Quit frequency P(f) (End of frequency regulation - power reduction)	Hz	40.00	60.00	50.20
18	Cutoff frequency of over frequency derating	End frequency P(f) (End of frequency regulation - power reduction)	Hz	40.00	60.00	51.50
19	Cutoff power of over frequency derating	End power P(f) (End of power of frequency regulation - power reduction)	%PM	0	100	48
20	Power recovery gradient of overfrequency derating	Power recovery gradient when quit overfrequency derating	%Prated/min	1	6000	10
<p>Note:</p> <p>The required gradient (or droop) of the frequency dependent active power derating can be defined using the Parameters <i>Trigger frequency of over frequency derating</i>, <i>Cutoff frequency of over frequency derating</i> and <i>Cutoff power of over frequency derating</i>.</p>						
Active power gradient following disconnection from the grid						
21	Soft start time after grid failure	The soft start time the active power from 0 to power rated after fault	s	1	1800	600

	Firma / Company:	Huawei Technologies Co., Ltd.	Projekt-Nr. / Project-no.:	
	Ansprechpartner / Customer Contact:	Qingbin CHEN Website: http://www.huawei.com Email: support@huawei.com	BV-Kontakt / BV Contact:	Weizhao Zheng Tel: +49 40 74041 - 2267 weizhao.zheng@de.bureauveritas.com

No.	Name	Description	Unit	Setting range		Default value (acc. to parameter set)
				Min.	Max.	
Reconnection time following disconnection from the grid						
22	Grid connection duration after power grid recovery	Time until reconnection	s	0	7200	60
Reactive power provision						
a) Power factor fix control						
23	Power factor	Cos phi specifications	---	(-1.000,-0.800] U [0.800,1.000]		1.000
b) Reactive power fix control						
24	Reactive power	Q specifications	kvar	-0.6·Smax	0.6·Smax	0.0
c) Q-U characteristic curve ²⁾						
Note:						
²⁾ The Q-U characteristic curve is free programmable with up to 10 supporting points.						
25	Trigger power ratio	Q(U) function trigger power ratio of Pmax	%Pmax	10	100	20
26	Characteristic curve points	Number of Q-U characteristic curve	---	2	10	4
27	U/Un(A)	Q(U) characteristic node 1 U	%Un	80.0	136.0	90.0
28	Q/S(A)	Q(U) characteristic node 1 Q	/Smax	-0.600	0.600	0.436
29	U/Un(B)	Q(U) characteristic node 2 U	%Un	80.0	136.0	92.0
30	Q/S(B)	Q(U) characteristic node 2 U	/Smax	-0.600	0.600	0.000
31	U/Un(C)	Q(U) characteristic node 3 U	%Un	80.0	136.0	108.0
32	Q/S(C)	Q(U) characteristic node 3 Q	/Smax	-0.600	0.600	0.000
33	U/Un(D)	Q(U) characteristic node 4 U	%Un	80.0	136.0	110.0
34	Q/S(D)	Q(U) characteristic node 4 Q	/Smax	-0.600	0.600	-0.436
d) Q-P characteristic curve ³⁾						
Note:						
³⁾ The Q-P characteristic curve is free programmable with up to 10 supporting points.						
35	Characteristic curve points	Number of Q-P characteristic curve	-	2	10	5
36	P/Pmax(A)	Q(P) characteristic node 1 P	%Pmax	0.0	100.0	10.0
37	Q/Qmax(A)	Q(P) characteristic node 1 Q	/Smax	-0.600	0.600	0.000
38	P/Pmax(B)	Q(P) characteristic node 2 P	%Pmax	0.0	100.0	50.0
39	Q/Qmax(B)	Q(P) characteristic node 2 Q	/Smax	-0.600	0.600	0.000
40	P/Pmax(C)	Q(P) characteristic node 3 P	%Pmax	0.0	100.0	60.0
41	Q/Qmax(C)	Q(P) characteristic node 3Q	/Smax	-0.600	0.600	-0.050
42	P/Pmax(D)	Q(P) characteristic node 4 P	%Pmax	0.0	100.0	90.0
43	Q/Qmax(D)	Q(P) characteristic node 4 Q	/Smax	-0.600	0.600	-0.330
44	P/Pmax(E)	Q(P) characteristic node 5 P	%Pmax	0.0	100.0	100.0

	Firma / Company:	Huawei Technologies Co., Ltd.	Projekt-Nr. / Project-no.:	
	Ansprechpartner / Customer Contact:	Qingbin CHEN Website: http://www.huawei.com Email: support@huawei.com	BV-Kontakt / BV Contact:	Weizhao Zheng Tel: +49 40 74041 - 2267 weizhao.zheng@de.bureauveritas.com

No.	Name	Description	Unit	Setting range		Default value (acc. to parameter set)
				Min.	Max.	
45	Q/Qmax(E)	Q(P) characteristic node 5 Q	/Smax	-0.600	0.600	-0.330
PGU disconnection from the grid						
46	10 minute OV protection	10 minute voltage average value protection point	p.u	1.00Un	1.25Un	1.10Un
47	10 minute OV protection time	10 minute voltage average value protection time	ms	50	7200000	200
48	Level-1 OV protection	Level 1 over voltage protection point	p.u	1.00Un	1.25Un	1.15Un
49	Level-1 OV protection time	Level 1 over voltage protection time	ms	50	7200000	61000
50	Level-2 OV protection	Level 2 over voltage protection point	p.u	1.00Un	1.36Un	1.25Un
51	Level-2 OV protection time	Level 2 over voltage protection time	ms	50	7200000	200
52	Level-1 UV protection	Level 1 under voltage protection point	p.u	0.15Un@400V 0.3Un@480V	1.00Un	0.80Un
53	Level-1 UV protection time	Level 1 under voltage protection time	ms	50	7200000	5000
54	Level-2 UV protection	Level 2 under voltage protection point	p.u	0.15Un@400V 0.3Un@480V	1.00Un	0.50Un
55	Level-2 UV protection time	Level 2 under voltage protection time	ms	50	7200000	2000
56	Level-1 OF protection	Level 1 over frequency protection point	Hz	50.00	60.00	51.50
57	Level-1 OF protection time	Level 1 over frequency protection time	ms	50	7200000	500
58	Level-2 OF protection	Level 2 over frequency protection point	Hz	50.00	60.00	52.00
59	Level-2 OF protection time	Level 2 over frequency protection time	ms	50	7200000	200
60	Level-1 UF protection	Level 1 under frequency protection point	Hz	40.00	50.00	47.50
61	Level-1 UF protection time	Level 1 under frequency protection time	ms	50	7200000	500
62	Level-2 UF protection	Level 2 under frequency protection point	Hz	40.00	50.00	47.00
63	Level-2 UF protection time	Level 2 under frequency protection time	ms	50	7200000	200
Connection conditions						
64	Auto start upon grid recovery	Enable Auto start upon grid after grid fault	---	Disable/Enable		Enable

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	Ansprechpartner / Customer Contact:	Qingbin CHEN Website: http://www.huawei.com Email: support@huawei.com	BV-Kontakt / BV Contact:	Weizhao Zheng Tel: +49 40 74041 - 2267 weizhao.zheng@de.bureauveritas.com

No.	Name	Description	Unit	Setting range		Default value (acc. to parameter set)
				Min.	Max.	
65	Grid reconnection voltage upper limit	Limit value connection U>	p.u	Un	1.36Un	1.10Un
66	Grid reconnection voltage lower limit	Limit value connection U<	p.u	0.45Un	1.00Un	0.90Un
67	Grid reconnection frequency upper limit	Limit value connection f>	Hz	50.00	60.00	50.20
68	Grid reconnection frequency lower limit	Limit value connection f<	Hz	40.00	50.00	49.50
Response during grid faults						
69	LVRT	LVRT enable	---	Enable/Disable		Enable
78	LVRT triggering threshold	LVRT triggering threshold	V	0.50Un	1.00Un	0.90Un
79	LVRT reactive power compensation factor	k factor	---	0.0	10.0	2.0
80	HVRT	HVRT enable	---	Enable/Disable		Enable
81	HVRT triggering threshold	LVRT triggering threshold	V	1.00Un	1.36Un	1.10Un
82	HVRT reactive power compensation factor	k factor	---	0.0	6.0	2.0
83	VRT exit hysteresis threshold	VRT exit hysteresis threshold	V	0.02Un	0.1Un	0.02Un
84	Grid voltage protection shield during HVRT/LVRT	Grid voltage protection shield during HVRT/LVRT	---	Enable/Disable		Enable
85	Zero current due to power grid fault	Zero current due to power grid fault	---	Enable/Disable		Disable
Self-protection						
98	Line voltage peak value protection point	Line voltage peak value protection point, exceeds which a non-delayed self-protection tripping occurs	p.u.	parameter not adjustable		1.32·Un

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	Ansprechpartner / Customer Contact:	Qingbin CHEN Website: http://www.huawei.com Email: support@huawei.com	BV-Kontakt / BV Contact:	Weizhao Zheng Tel: +49 40 74041 - 2267 weizhao.zheng@de.bureauveritas.com

6. Description for reading out parameters

Reading out the parameters

- The parameters can be read out using the following software.

Name:	SmartLogger WebUI and SUN2000 APP
Version:	SmartLogger:V200R002 SUN2000 APP:3.2.00.002

- The parameters can be read out using the display in the control system.

7. Interfaces

7.1. Active power specification

Interfaces for the active power reduction by defined setpoint

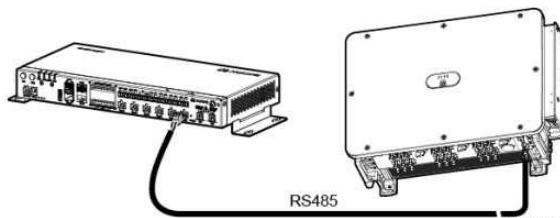
Following interfaces for control of the active power provision are provided on the PGU level:

- connect a mobile phone that runs the SUN2000 app to the inverter using a Bluetooth module, a WLAN module, or a USB data cable for active power setting using parameter *Fixed active power derated* or *Active power percentage derating*;



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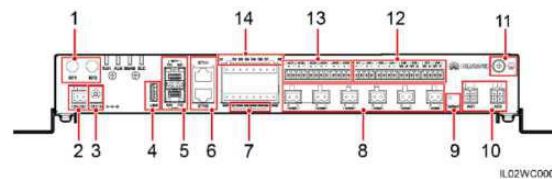
- connect the inverter to Smartlogger via MBUS or RS485 for active power setting using the WebUI using the parameter *Fixed active power derated* or *Active power percentage derating*.



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- connect the inverter to Smartlogger via MBUS or RS485, the digital interfaces DI1, DI2, DI3, DI4 of the Smartlogger can be connected to the dry contacts for active power setting.

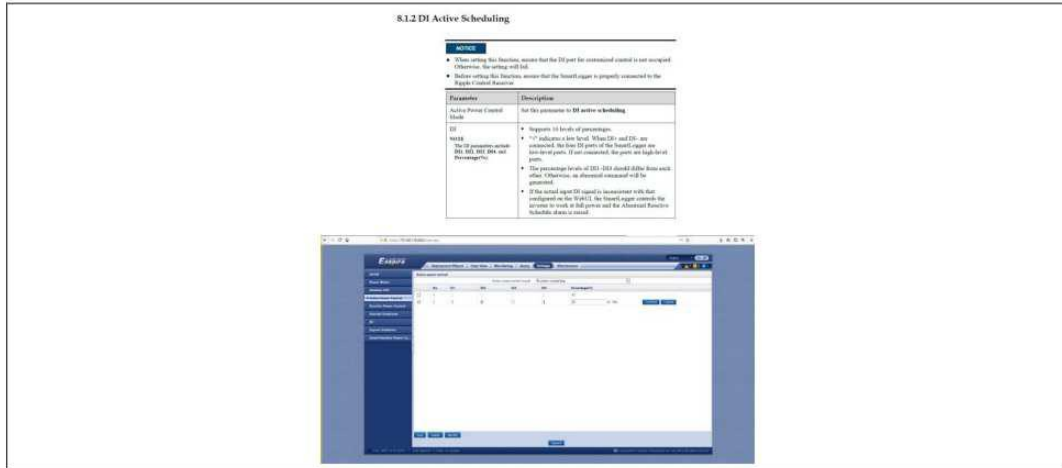
Figure 2-4 SmartLogger2000-10/10-B/11-B bottom



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14	DI1-DI8	Digital parameter input	Connects to a dry contact input. GND1 and GND2 are grounding ports for DI signals.
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	Firma / Company:	Huawei Technologies Co., Ltd.	Projekt-Nr. / Project-no.:	
	Ansprechpartner / Customer Contact:	Qingbin CHEN Website: http://www.huawei.com Email: support@huawei.com	BV-Kontakt / BV Contact:	Weizhao Zheng Tel: +49 40 74041 - 2267 weizhao.zheng@de.bureauveritas.com



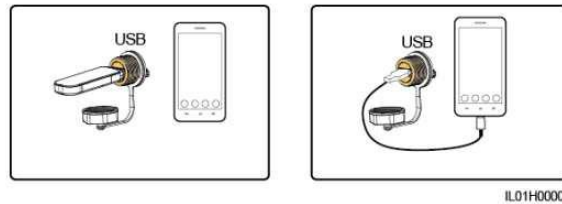
7.2. Reactive power specification

Interfaces for the provision of reactive power

Following interfaces for control of the reactive power provision are provided on the PGU level:

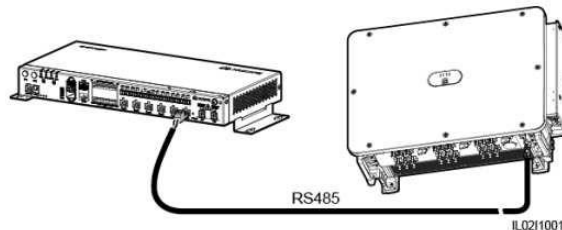
- connect a mobile phone that runs the SUN2000 app to the inverter using a Bluetooth module, a WLAN module, or a USB data cable for:
 - Power factor fix control
 - Reactive power fix control
 - Q-P characteristic curve
 - Q-U characteristic curve

setting;



- connect the inverter to Smartlogger via MBUS or RS485, the following reactive power control functions:
 - Power factor fix control
 - Reactive power fix control
 - Q-P characteristic curve
 - Q-U characteristic curve

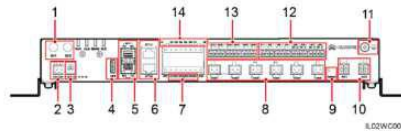
can be set using the WebUI.



	Firma / Company:	Huawei Technologies Co., Ltd.	Projekt-Nr. / Project-no.:	
	Ansprechpartner / Customer Contact:	Qingbin CHEN Website: http://www.huawei.com Email: support@huawei.com	BV-Kontakt / BV Contact:	Weizhao Zheng Tel: +49 40 74041 - 2267 weizhao.zheng@de.bureauveritas.com

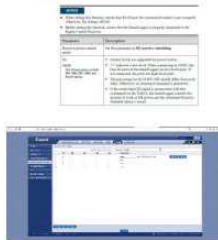
- connect the inverter to Smartlogger via MBUS or RS485, the digital interfaces DI5, DI6, DI7, DI8 of the Smartlogger can be connected to the dry contacts for power factor (cosφ) setting.

Figure 2-4 SmartLogger2000-10/10-B/11-B bottom



11	DI-DIR	Дирекция измерения	Назначение клеммы для DI-дирекции измерения cosφ при cosφD max (соединение с сухими контактами)
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ALLDR Benutzer-Schulung





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Certificate of compliance

Applicant: Huawei Technologies Co., Ltd.
Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
Bantian, Longgang District, Shenzhen, 518129
P.R. China

Product: SOLAR INVERTER

Model: SUN2000-100KTL-M1

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with EN50549-2:2019 for photovoltaic systems with a three-phase parallel coupling via an inverter in the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter.

Firmware version: V500R001

Connection rule: EN 50549-2:2019:

Requirements for generating plants to be connected in parallel with distribution networks - Part 2:
Connection to a MV distribution network - Generating plants up to and including Type B

Standards / directives for testing:

FGW TG3, Rev. 25: 2018-09-01

Report number: 19TH0506-EN50549-2_1

Certificate number: U20-0009

Certification scheme: NSOP-0032-DEU-ZE-V01

Date of issue: 2020-01-10

Certification body



Holger Schaffer



Deutsche
Akkreditierungsstelle
D-ZE-12024-01-00

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

Type Approval and declaration of compliance with the requirements of EN 50549-2

Manufacturer / applicant:	Huawei Technologies Co., Ltd. Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129 P.R. China	
Product description:	Grid-tied photovoltaic inverter	
Unit / Type:	SUN2000-100KTL-M1	
MPP DC voltage range [V]:	200 - 1000	
Input DC voltage range [V]:	200 - 1100	
Input DC current [A]:	max. 26(A) x 10	
Nominal output AC voltage [V]:	400 (3~ + (N) + PE, 50/60 Hz)	480 (3~ + PE, 50/60 Hz)
Output AC current [A]:	max. 160,4	max. 133,7
Nominal active output power [kW]:	100	
Max. apparent output power [kVA]:	110	
Firmware version:	V500R001	

Description of the structure of the power generation unit:

The input and output are protected by Varistors to Earth. 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 a two relays. This assures that the opening of the output circuit will also operate in case of one error.

Parameter Table

	Firma / Company:	Huawei Technologies Co., Ltd.	Projekt-Nr. / Project-no.:	
	Ansprechpartner / Customer Contact:	Qingbin CHEN Website: http://www.huawei.com Email: support@huawei.com	BV-Kontakt / BV Contact:	Weizhao Zheng Tel: +49 40 74041 - 2267 weizhao.zheng@de.bureauveritas.com

Parameter list of SUN2000-100KTL-M1

1. General information regarding the Parameter list

Manufacturer:	Huawei Technologies Co., Ltd.
Created by:	Qingbin Chen
Created on:	2019-12-26
Revised on:	V1.0

2. Information regarding the power generating unit

Type designation	Rated power [kW]	Rated active current [A] (at $\cos\phi = 1$)
SUN2000-100KTL-M1	100	144.4@400V 120.3@480V

3. Parameter set during the measurement

If no noted otherwise the following standard parameters were used during the measurement.
All adaptations to the standard parameters used during the measurement were documented in the TG3 test report.

4. Main Components of the regulating system

Main components of the control system with firmware and software	
Main component(s) of the control system	Control system integrated in the PGU
Firmware version	V500R001
Software version	V500R001

5. Relevant parameters for the electrical behaviour

No.	Name	Description	Unit	Setting range		Default value (acc. to parameter set)
				Min.	Max.	
General parameter settings (rated values or reference values)						
1	Pn	Rated active power	kW	parameter not adjustable		100
2	Smax	Max apparent power	kVA	parameter not adjustable		110
3	Un	Rated voltage	V	parameter not adjustable		400V/480V
4	In	Rated current	A	parameter not adjustable		144.4@400V 120.3@480V
5	Fn	Rated frequency	Hz	parameter not adjustable		50
Active power peaks						
6	Pmax	Maximum active power limit	kW	parameter not adjustable		110.000

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No.	Name	Description	Unit	Setting range		Default value (acc. to parameter set)
				Min.	Max.	
7	Maximum active power	Plimit	kW	0.100	Pmax	Pmax
8	Active power baseline	Pmaxref	kW	0.100	Pmax	Pmax
Operating power limited by grid operator						
9	Shutdown at 0% power limit	Shutdown at 0% power limit function enable	---	Disable / Enable		Disable
10	Active power change gradient	Active power change gradient	%Pmaxref/s	0.100	1000.000	125.000
11	Fixed active power derated	Fixed active power derated	kW	0.0	Plimit	Plimit
12	Active power percentage derating	Active power percentage derating	%Pmaxref	0.0	100.0	100.0
13	Reactive power change gradient	Reactive power change gradient	%(0.6Smax)/s	0.100	1000.000	125.00
14	Reactive power adjustment time	Reactive power adjustment time ¹⁾	s	1	120	10
Active power feed-in as a function of grid frequency						
15	Overfrequency derating	Overfrequency derating function enable	---	Disable / Enable		Disable
16	Trigger frequency of over frequency derating	Start frequency P(f) (Start of frequency regulation - power reduction)	Hz	40.00	60.00	50.20
17	Quit frequency of over frequency derating	Quit frequency P(f) (End of frequency regulation - power reduction)	Hz	40.00	60.00	50.20
18	Cutoff frequency of over frequency derating	End frequency P(f) (End of frequency regulation - power reduction)	Hz	40.00	60.00	51.50
19	Cutoff power of over frequency derating	End power P(f) (End of power of frequency regulation - power reduction)	%PM	0	100	48
20	Power recovery gradient of overfrequency derating	Power recovery gradient when quit overfrequency derating	%Prated/min	1	6000	10
<p>Note:</p> <p>The required gradient (or droop) of the frequency dependent active power derating can be defined using the Parameters <i>Trigger frequency of over frequency derating</i>, <i>Cutoff frequency of over frequency derating</i> and <i>Cutoff power of over frequency derating</i>.</p>						
Active power gradient following disconnection from the grid						
21	Soft start time after grid failure	The soft start time the active power from 0 to power rated after fault	s	1	1800	600

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No.	Name	Description	Unit	Setting range		Default value (acc. to parameter set)
				Min.	Max.	
Reconnection time following disconnection from the grid						
22	Grid connection duration after power grid recovery	Time until reconnection	s	0	7200	60
Reactive power provision						
a) Power factor fix control						
23	Power factor	Cos phi specifications	---	(-1.000,-0.800] U [0.800,1.000]		1.000
b) Reactive power fix control						
24	Reactive power	Q specifications	kvar	-0.6·Smax	0.6·Smax	0.0
c) Q-U characteristic curve ²⁾						
Note:						
²⁾ The Q-U characteristic curve is free programmable with up to 10 supporting points.						
25	Trigger power ratio	Q(U) function trigger power ratio of Pmax	%Pmax	10	100	20
26	Characteristic curve points	Number of Q-U characteristic curve	---	2	10	4
27	U/Un(A)	Q(U) characteristic node 1 U	%Un	80.0	136.0	90.0
28	Q/S(A)	Q(U) characteristic node 1 Q	/Smax	-0.600	0.600	0.436
29	U/Un(B)	Q(U) characteristic node 2 U	%Un	80.0	136.0	92.0
30	Q/S(B)	Q(U) characteristic node 2 U	/Smax	-0.600	0.600	0.000
31	U/Un(C)	Q(U) characteristic node 3 U	%Un	80.0	136.0	108.0
32	Q/S(C)	Q(U) characteristic node 3 Q	/Smax	-0.600	0.600	0.000
33	U/Un(D)	Q(U) characteristic node 4 U	%Un	80.0	136.0	110.0
34	Q/S(D)	Q(U) characteristic node 4 Q	/Smax	-0.600	0.600	-0.436
d) Q-P characteristic curve ³⁾						
Note:						
³⁾ The Q-P characteristic curve is free programmable with up to 10 supporting points.						
35	Characteristic curve points	Number of Q-P characteristic curve	-	2	10	5
36	P/Pmax(A)	Q(P) characteristic node 1 P	%Pmax	0.0	100.0	10.0
37	Q/Qmax(A)	Q(P) characteristic node 1 Q	/Smax	-0.600	0.600	0.000
38	P/Pmax(B)	Q(P) characteristic node 2 P	%Pmax	0.0	100.0	50.0
39	Q/Qmax(B)	Q(P) characteristic node 2 Q	/Smax	-0.600	0.600	0.000
40	P/Pmax(C)	Q(P) characteristic node 3 P	%Pmax	0.0	100.0	60.0
41	Q/Qmax(C)	Q(P) characteristic node 3Q	/Smax	-0.600	0.600	-0.050
42	P/Pmax(D)	Q(P) characteristic node 4 P	%Pmax	0.0	100.0	90.0
43	Q/Qmax(D)	Q(P) characteristic node 4 Q	/Smax	-0.600	0.600	-0.330
44	P/Pmax(E)	Q(P) characteristic node 5 P	%Pmax	0.0	100.0	100.0

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No.	Name	Description	Unit	Setting range		Default value (acc. to parameter set)
				Min.	Max.	
45	Q/Qmax(E)	Q(P) characteristic node 5 Q	/Smax	-0.600	0.600	-0.330
PGU disconnection from the grid						
46	10 minute OV protection	10 minute voltage average value protection point	p.u	1.00Un	1.25Un	1.10Un
47	10 minute OV protection time	10 minute voltage average value protection time	ms	50	7200000	200
48	Level-1 OV protection	Level 1 over voltage protection point	p.u	1.00Un	1.25Un	1.15Un
49	Level-1 OV protection time	Level 1 over voltage protection time	ms	50	7200000	61000
50	Level-2 OV protection	Level 2 over voltage protection point	p.u	1.00Un	1.36Un	1.25Un
51	Level-2 OV protection time	Level 2 over voltage protection time	ms	50	7200000	200
52	Level-1 UV protection	Level 1 under voltage protection point	p.u	0.15Un@400V 0.3Un@480V	1.00Un	0.80Un
53	Level-1 UV protection time	Level 1 under voltage protection time	ms	50	7200000	5000
54	Level-2 UV protection	Level 2 under voltage protection point	p.u	0.15Un@400V 0.3Un@480V	1.00Un	0.50Un
55	Level-2 UV protection time	Level 2 under voltage protection time	ms	50	7200000	2000
56	Level-1 OF protection	Level 1 over frequency protection point	Hz	50.00	60.00	51.50
57	Level-1 OF protection time	Level 1 over frequency protection time	ms	50	7200000	500
58	Level-2 OF protection	Level 2 over frequency protection point	Hz	50.00	60.00	52.00
59	Level-2 OF protection time	Level 2 over frequency protection time	ms	50	7200000	200
60	Level-1 UF protection	Level 1 under frequency protection point	Hz	40.00	50.00	47.50
61	Level-1 UF protection time	Level 1 under frequency protection time	ms	50	7200000	500
62	Level-2 UF protection	Level 2 under frequency protection point	Hz	40.00	50.00	47.00
63	Level-2 UF protection time	Level 2 under frequency protection time	ms	50	7200000	200
Connection conditions						
64	Auto start upon grid recovery	Enable Auto start upon grid after grid fault	---	Disable/Enable		Enable

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No.	Name	Description	Unit	Setting range		Default value (acc. to parameter set)
				Min.	Max.	
65	Grid reconnection voltage upper limit	Limit value connection U>	p.u	Un	1.36Un	1.10Un
66	Grid reconnection voltage lower limit	Limit value connection U<	p.u	0.45Un	1.00Un	0.90Un
67	Grid reconnection frequency upper limit	Limit value connection f>	Hz	50.00	60.00	50.20
68	Grid reconnection frequency lower limit	Limit value connection f<	Hz	40.00	50.00	49.50
Response during grid faults						
69	LVRT	LVRT enable	---	Enable/Disable		Enable
78	LVRT triggering threshold	LVRT triggering threshold	V	0.50Un	1.00Un	0.90Un
79	LVRT reactive power compensation factor	k factor	---	0.0	10.0	2.0
80	HVRT	HVRT enable	---	Enable/Disable		Enable
81	HVRT triggering threshold	LVRT triggering threshold	V	1.00Un	1.36Un	1.10Un
82	HVRT reactive power compensation factor	k factor	---	0.0	6.0	2.0
83	VRT exit hysteresis threshold	VRT exit hysteresis threshold	V	0.02Un	0.1Un	0.02Un
84	Grid voltage protection shield during HVRT/LVRT	Grid voltage protection shield during HVRT/LVRT	---	Enable/Disable		Enable
85	Zero current due to power grid fault	Zero current due to power grid fault	---	Enable/Disable		Disable
Self-protection						
98	Line voltage peak value protection point	Line voltage peak value protection point, exceeds which a non-delayed self-protection tripping occurs	p.u.	parameter not adjustable		1.32·Un

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6. Description for reading out parameters

Reading out the parameters

- The parameters can be read out using the following software.

Name:	SmartLogger WebUI and SUN2000 APP
Version:	SmartLogger:V200R002 SUN2000 APP:3.2.00.002

- The parameters can be read out using the display in the control system.

7. Interfaces

7.1. Active power specification

Interfaces for the active power reduction by defined setpoint

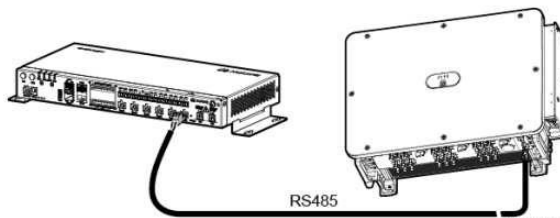
Following interfaces for control of the active power provision are provided on the PGU level:

- connect a mobile phone that runs the SUN2000 app to the inverter using a Bluetooth module, a WLAN module, or a USB data cable for active power setting using parameter *Fixed active power derated* or *Active power percentage derating*;



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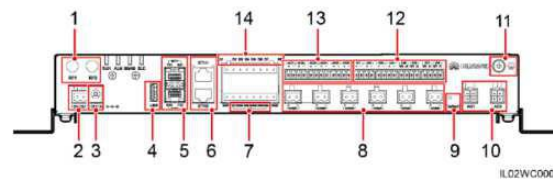
- connect the inverter to Smartlogger via MBUS or RS485 for active power setting using the WebUI using the parameter *Fixed active power derated* or *Active power percentage derating*.



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- connect the inverter to Smartlogger via MBUS or RS485, the digital interfaces DI1, DI2, DI3, DI4 of the Smartlogger can be connected to the dry contacts for active power setting.

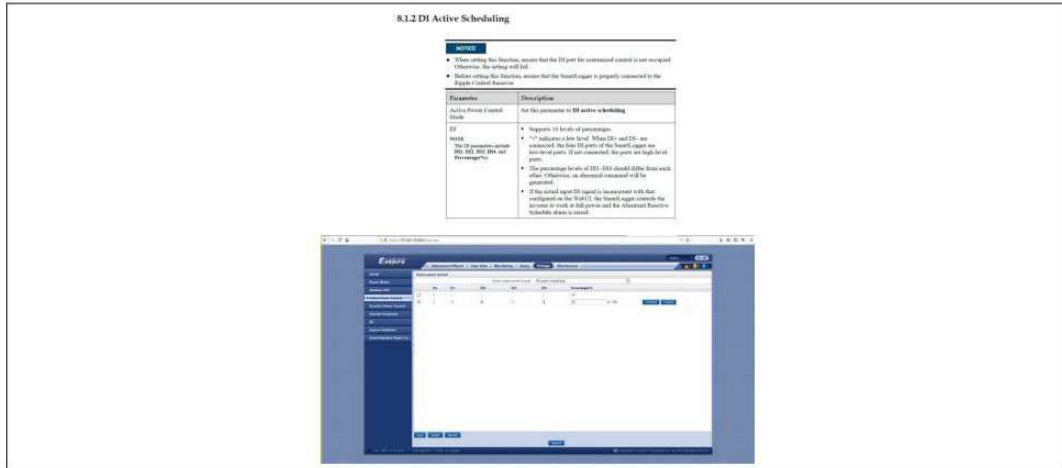
Figure 2-4 SmartLogger2000-10/10-B/11-B bottom



IL02WC0006

14	DI1-DI8	Digital parameter input	Connects to a dry contact input. GND1 and GND2 are grounding ports for DI signals.
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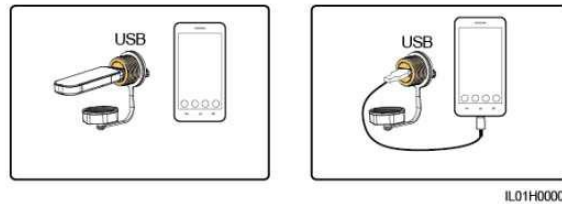
7.2. Reactive power specification

Interfaces for the provision of reactive power

Following interfaces for control of the reactive power provision are provided on the PGU level:

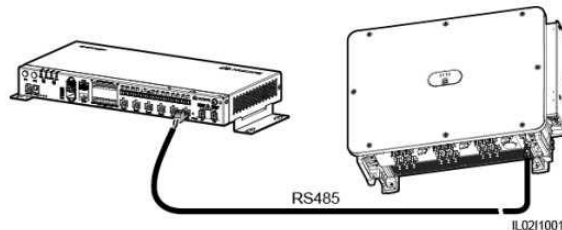
- connect a mobile phone that runs the SUN2000 app to the inverter using a Bluetooth module, a WLAN module, or a USB data cable for:
 - Power factor fix control
 - Reactive power fix control
 - Q-P characteristic curve
 - Q-U characteristic curve

setting;



- connect the inverter to Smartlogger via MBUS or RS485, the following reactive power control functions:
 - Power factor fix control
 - Reactive power fix control
 - Q-P characteristic curve
 - Q-U characteristic curve

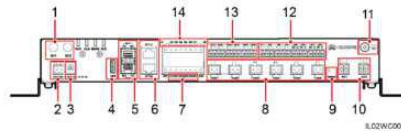
can be set using the WebUI.



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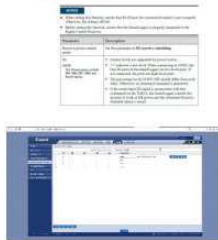
- connect the inverter to Smartlogger via MBUS or RS485, the digital interfaces DI5, DI6, DI7, DI8 of the Smartlogger can be connected to the dry contacts for power factor (cosφ) setting.

Figure 2-4 SmartLogger2000-10/10-B/11-B bottom



11	DI1-DE1	Дигитални интерфејси (суво)	Интерфејси билаз за ди електричне интерфејсе са ди електричним интерфејсима (суво контакте)
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SmartLogger2000-10/10-B/11-B





MANUFACTURER'S ELS PRODUCT DECLARATION FOR ESB NETWORKS FORM NC7-03-R1

ESB Networks DAC requires the information requested on this form to manage your electricity supply connection. As the Distribution System Operator, this information is also required to enable ESB Networks DAC to manage the electricity network. The data controller is ESB Networks DAC. Please refer to our privacy policy at <https://esbnetworks.ie/privacy>
All mandatory requirements in this form are as those required by ESB Networks Standard 'Conditions Governing the Connection and Operation of Export Limiting Schemes' (DOC-250221-GBT)

'Conditions Governing the Connection and Operation of Export Limiting Schemes' (DOC-250221-GBT) defines the technical design requirements for Export Limitation Schemes which limit the net site export to below an agreed maximum and are installed on the Customer's side of the Connection Point.

While DOC-250221-GBT does not describe a type test procedure, it does describe a number of system requirements. This document describes how the ELS product (outlined in Part 1 below) performs relative to key ESB Networks ELS requirements.

Please complete Parts 1 to 9 below

PART 1: PRODUCT DETAILS

Name of Product: SUN2000 Solar Inverter	Model No.: SUN2000-2~6KTL-L1 (Single Phase Inverter w. Battery Input) SUN2000-3~10KTL-M1 (Three Phase Inverter w. Battery Input) SUN2000-12~20KTL-M2 (Three Phase Inverter w.o. Battery Input) SUN2000-30~40KTL-M3 (Three Phase Inverter w.o. Battery Input)
Manufacturer: Huawei	Make: China

 Where Manufacturer's ESB Networks ELS Product Declaration Form is unavailable an Export Limiting Relay shall be installed as per ESB Networks Standard 'Conditions Governing the Connection and Operation of Export Limiting Schemes' (DOC-250221-GBT)

PART 2: DESCRIPTION OF OPERATION

ESB Networks ELS Requirement: *A description of the scheme, its settings, and a single line diagram shall be permanently displayed on site.*
When installed, the ELS product (as outlined in Part 1) operates as described below:

Please insert details of operation below or if attached as PDF to this form tick here:

PART 3: POWER QUALITY REQUIREMENTS

ESB Networks ELS Requirements:
Where the ELS product (as outlined in Part 1) relies on power electronics (e.g. Converters etc) to control the load it shall also provide information demonstrating compliance with the harmonics standards ([I.S. EN 61000-3-2](#) and/or [I.S. EN 61000-3-12](#)) or provide data on the harmonic currents produced in accordance with the format in the Distribution Code i.e. individual harmonic current and Total Harmonic Distortion.

It is necessary to confirm the ELS product(as outlined in Part 1) complies with harmonic standards cited in the Distribution Code and product standards cited in [I.S. EN 50549-1](#). Yes No

The Manufacturer (as outlined in Part 1) confirms that the ELS product (as outlined in Part 1) complies with the requirements of the harmonics standards listed above or that the harmonic data has been provided.

PART 4: SYSTEM SCHEMATIC

The ELS product (as outlined in Part 1) is formed of the following main elements:
Document the main elements and provide a system schematic or if attached as PDF to this form tick here:

1. Main elements:

1. SUN2000 Solar Inverter
2. DTSU666-H or DDSU666-H "Smart Power Sensor"
- 3a. SmartDongle (either WiFi-FE type or 4G type) OR;
- 3b. SmartLogger3000A or SmartLogger3000B

2. System Schematic

PART 5: COMPONENT INTERCONNECTION/FAILSAFE OPERATION

ESB Networks ELS Requirements: The ELS product (as outlined in Part 1) may be formed of discrete units or integrated into a single packaged scheme. Where discrete units are used, they should preferably be interconnected using metallic or fibre optic cables. Other means of connection such as Wi-Fi are not deemed 'Fail Safe' and require installation of Export Limiting Relay. Irrespective of the media used for interconnecting between the discrete units, if the communication path fails the generation output shall be reduced to the allowed MEC within 5 seconds time to prevent the Agreed Export Capacity from being exceeded.

Description of the fail-safe functionality (Interruption of sensor signals, disconnection of load, loss of power, internal fault detection etc.)

5.1 Describe Component Interconnection here:

Text or diagram or if attached as PDF to this form tick here:

5.2 System Fail Safe Test Results:

Please indicate appropriate answer

No.	Test	System Response	Time <5s	Pass
1	Remove Power Supply to PMU	Note: The PMU takes its power from the mains. A power supply failure would imply mains failure	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2	Remove Power Supply to CU	In case of a SmartLogger, the CU is considered a separate unit In case of SmartDongle, the CU is integrated in the inverter	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
3	Remove Power Supply to all Energy Source Units	A power supply failure to the energy source unit would imply the PV modules are not working	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
4	Remove power Supply to all DCUs	N/A. The solar inverter does not control the local loads	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>
5	Remove Power Supply to all Communication Hub Switches	N/A. There are no communication hubs or switches in the system	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>
6	Unplug PMU- CU Communications Cable	The system will reduce production to a predefined safe level	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
7	Unplug CU – ESIU Communications Cable (at ESIU end)	Remove communications between SmartLogger and Inverter. Affected inverter(s) will shut down.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
8	Unplug all ESIU –Communication Cables in turn	N/A. There is no communication with the energy source	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>
9	Unplug CU – DCU Comms. Cable for each DCU unit (at DCU end)	N/A. There is no communication with the local loads	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>
10	Unplug DCU – Load Comms cable	N/A. There is no communication with the local loads	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>

The purpose of the 'Fail Safe' Tests is to ensure that if any part of the ELS fail, the exported power does not exceed the MEC by more than 5% for more than 5 seconds.

It is a fixed requirement that at no time during the 'Fail Safe' sequence shall the exported power rise above the MEC by more than 5% for more than 5 seconds.

PART 6: ACCURACY AND RESPONSE TIME

ESB Networks ELS requirements:

The overall accuracy of the ELS product (as outlined in Part 1) with regard to measurement and control of MEC shall be determined by the manufacturer of the system and published within its operating manual. In carrying out the functional tests these tolerances shall be taken into account.

Functional testing – Injection testing

Export limit conditions can be simulated by temporarily connecting the PMU to a calibrated injection test set.

When using an injection test set, there is no feedback loop between the ELS product (as outlined in Part 1) and the injection test set. This has two significant implications for the test process:

1. As soon as the ELS begins to operate, because it sees no corresponding decrease in export levels, the control loop continues running until the Energy Source Units output is reduced to the programmed export capacity or below.
2. To ensure that the ELS is reacting by the correct amount and within an acceptable time period, a step change needs be applied by the test set to the PMU.

The following Step Change test sequence shall be performed:

Please indicate appropriate answer

No.	Test	Step Change Final Value	Outcome	Pass / Fail
1.	Step change A 95% to 105%	Export = 105% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
	Step change A 95% to 110%	Export = 105% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
	Step change A 95% to 120%	Export = 105% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
2.	Step change B 95% to 105%	Export = 110% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
	Step change B 95% to 110%	Export = 110% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
	Step change B 95% to 120%	Export = 110% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
3.	Step change C 95% to 105%	Export = 120% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
	Step change C 95% to 110%	Export = 120% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
	Step change C 95% to 120%	Export = 120% of programmed export limit value	At 95% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 100% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
			At 110% Voltage	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>

The procedure for performing the test is as follows:

- Initially apply 100% of nominal voltage and inject current (at unity power factor) to mimic an exported Active Power equivalent to 95% of the export limit setting. Check that the ELS product(as outlined in Part 1) does not operate.
- Step up the current to give an export Active Power equivalent to 105% of the export Active Power limit (for Test A), Check that change in export level is "seen" by the PMU.
- Check that the Active Power exported by the generation reduces to a value at least 5% below the export limit setting within the specified reaction time. The test shall be repeated at the maximum statutory voltage (i.e. at 110% of nominal voltage at LV) and also at the minimum voltage limit (i.e. 90% of nominal voltage for LV connections).
- All the above tests shall also be repeated for step increases from 95% to 110% of the export limit and from 95% to 120% of the export limit as detailed above.

When injection testing is complete, the correct orientation of any current monitoring connections (including CT orientations) which may have been removed for the test shall be checked and verified as correct.

PART 6A: CONFIRMATION OF OPERATION OF ELS TO LIMIT EXPORT AS REQUIRED

ESB Networks ELS requirements:

The ELS product(as outlined in Part 1) shall detect an excursion and reduce the export to the MEC or less, within 5 seconds.

Under normal operating conditions, the ELS product (as outlined in Part 1) response time is less than 5 seconds.

Under loss of communications, or loss of power to any part of the ELS product (as outlined in Part 1), response time is less than 5 seconds.

Operation of above is confirmed	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Operating Manual is available	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
The settings applied to ELS product(as outlined in Part 1) have taken account of the published (DOC-250221-GBT) tolerances to ensure the required export limits and voltage limits shall be maintained.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

PART 7: PASSWORD PROTECTION

ESB Networks ELS requirement:

Once installed and commissioned, the ELS product(as outlined in Part 1) settings shall not be capable of being readily altered by the Customer and shall only be changed with the written agreement of ESB Networks.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
All settings of the ELS product(as outlined in Part 1) are password protected and cannot be altered by the customer.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

PART 8: INSTALLATION REQUIREMENTS

ELS Installation Requirements for ELS Product(as outlined in Part 1):

Please insert installation requirements or if attached as PDF to this form tick here:

PART 9: MANUFACTURERS ELS PRODUCT DECLARATION FOR ESB NETWORKS

ESB Networks ELS requirement: Once installed and commissioned, the scheme settings shall not be capable of being readily altered by the Customer and shall only be changed with the written agreement of ESB Networks.

The ELS product (as outlined in Part 1) complies with the 'Conditions Governing the Connection and Operation of Export Limiting Schemes' (DOC-250221-GBT) when installed and commissioned in accordance with the product documentation.

Manufacturer's (as outlined in Part 1) Representative Details

Representative Name: Bouke van der Weerd

Title: Solution Sales Director

Email: boukev.weerd@huawei.com

Contact Telephone Number: +31 638310865

Signature: 

Date: 15-07-2022

PLEASE REMEMBER!
DON'T BUILD UNDER OR NEAR ELECTRICITY WIRES
STAY SAFE STAY CLEAR
OF ELECTRICITY WIRES
ESB NETWORKS DAC



ESB Networks DAC

Directors: Jerry O'Sullivan (Chairman), Nicholas Tarrant, Caroline Spillane, Ian Talbot.

Registered office: Three Gateway, East Wall Road, Dublin 3, D03 R583, Ireland.

Registered in Ireland No. 465172

Manufacturer's Declaration



Power Export Limitation for Small-Scale Solar Installations (<50kVA)

ESB Company Standard NC7-03-R1

Inverter Types:

SUN2000-2~6KLT-L1
SUN2000-3~10KTL-M1
SUN2000-12~20KTL-M2
SUN2000-30~40KTL-M3

Power Sensors:

DTSU666-H
DDSU666-H

Power Controllers:

SmartDongle WiFi-FE
SmartDongle 4G
SmartLogger3000A
SmartLogger3000B

Statement:

The above mentioned Solar Inverters (Power Park Modules, PPM), when installed with a power sensor and a power controller, are as a system compliant to the technical regulations set forth in the ESB Company Standard NC7-03-R1. This declaration applies to installations connected to the low voltage grid where the total Inverter Power Export capability must be reduced to meet the contracted Maximum Export Capability.

Digital Power (Netherlands) B.V.

Signed:

Date:

26-09-2022

A handwritten signature in black ink, appearing to read "Bouke van der Weerd".

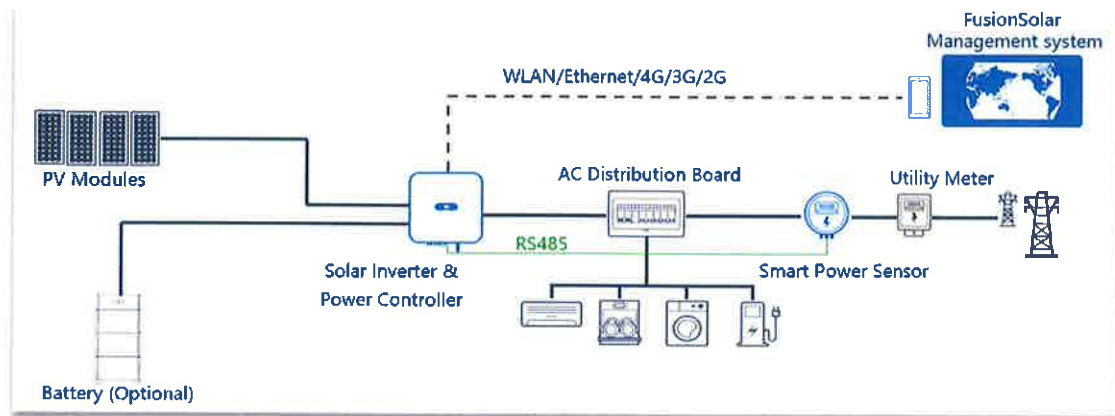
Bouke van der Weerd

Marketing & Solution Sales Director

WEU Multi-Country Digital Energy Business Dept.

Description of Operation

The Export Limiting System consists of a Solar Inverter that is linked to a power controller and a power sensor located at the utility grid connection (behind the meter). When a battery is connected to the same inverter, the Export Limitation function is not affected. The below diagram shows the ELS diagram for a typical installation with DC coupled energy storage (Battery).



Failsafe Operation

The Power Controller (either connected directly to the inverter as a Dongle or connected via a communications interface to a SmartLogger) polls the Power Sensor at regular intervals and updates the curtailment setpoint in the inverter to maintain the power balance in the system.

When the Power Controller does not receive data from the power sensor for a predefined period (Watchdog timer) it will command the inverters to a predefined "safe" curtailment power setpoint or to switch off within 5 seconds.

For installations where the ELS is controlled by a separate SmartLogger, the inverter expects regular updates from the SmartLogger (Watchdog timer). In case the watchdog timer fails to receive a timely update, the inverter will shut down within 5 seconds.