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**	**Certification scheme:**	**NSOP-0032-DEU-ZE-V01**
Certificate number:	**U20-0110**	**Date of issue:**	**2020-03-02**

Certification body

Holger Schaffer

DAkkS 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

Extract from test report according to EN 50549-2	Nr. 18TH0387-EN50549-2_0

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.

Extract from test report according to EN 50549-2 **Nr. 18TH0387-EN50549-2_0**

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 cosφ = 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	Plimilt	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	Plimilt	Plimilt
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	Cuttoff 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

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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*, *Cuttoff 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 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.						

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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

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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		$1.35 \cdot U_n$

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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.

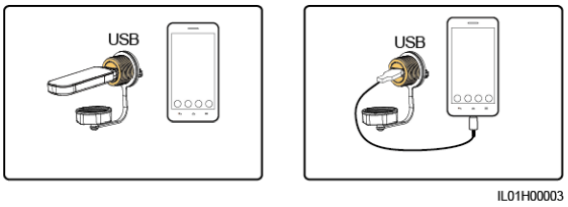
7. Interfaces

7.1. Active power specification

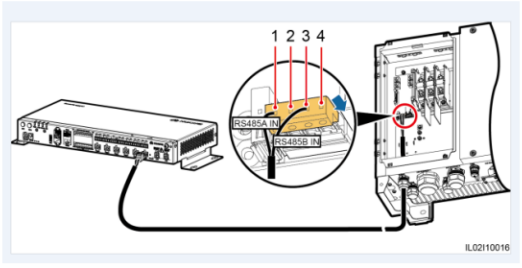
Interfaces for the active power reduction by defined setpoint

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*;

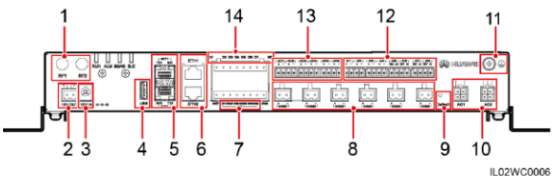


- connect the inverter to Smartlogger via MBUS or RS485 for active power setting using the WebUI using the parameter *Fixed active power derated* or *Active power percentage derating.*



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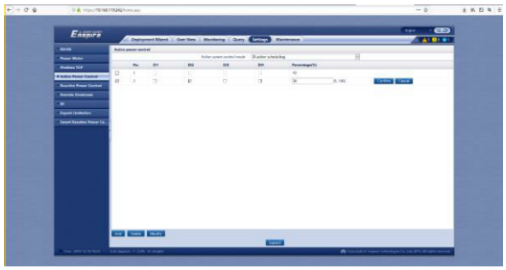
14	DI1–DI8	Digital parameter input	Connects to a dry contact input. GND1 and GND2 are grounding ports for DI signals.

8.1.2 DI Active Scheduling

NOTICE

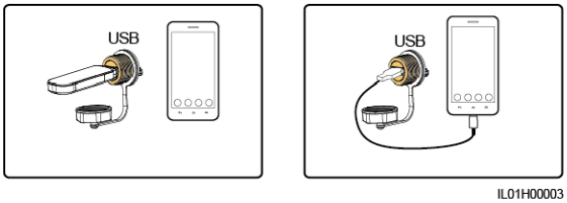
- When setting this function, ensure that the DI port for customized control is not occupied. Otherwise, the setting will fail.
- Before setting this function, ensure that the SmartLogger is properly connected to the Ripple Control Receiver.

Parameter	Description
Active Power Control Mode	Set this parameter to **DI active scheduling**.
DI **NOTE** The DI parameters include **DI1**, **DI2**, **DI3**, **DI4**, and **Percentage(%)**.	• Supports 16 levels of percentages. • "0" 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.



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;
 
 	
IL01H00003
• 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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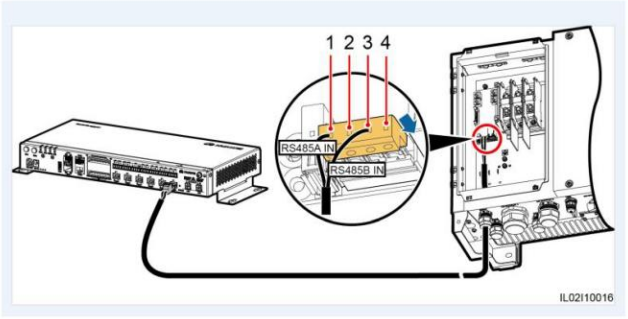
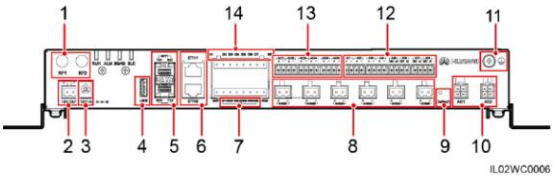


- connect the inverter to Smartlogger via MBUS or RS485, the digital interfaces DI5, DI6, DI7, DI8 of the Smartlogger can be connected to the dry contacts for power factor (cosφ) setting.

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



14	DI1–DI8	Digital barometer input	Connects to a dry contact input GND1 and GND2 as digital ground for DI signals

8.2.2 DI Reactive Scheduling