

Solar PV System Handover Pack



Customer Warranty for Installation Services

The Warranty sets out the terms upon which Treadlighter Limited offers warranty cover for the Products supplied by it to its customers, and for the installation services provided by Treadlighter Limited as Registered Installers. Terms defined in Treadlighter Limited's Terms and Conditions bear the same meaning when used in this warranty. Your attention is drawn to Treadlighter Limited's Terms and Conditions, which includes provisions relevant to the warranty set out below.

<p>1. Installation Services</p> <p>1.1 Treadlighter Limited warrants to you that the Installation Services will be performed by the appropriately qualified and trained Treadlighter Limited Registered Installers using reasonable care and skill, to such a high standard of quality as it is reasonable for you to expect.</p> <p>1.2 The Warranty Period for the Installation Services shall be two years from completion of the Installation Services.</p> <p>2. Remedial Action</p> <p>2.1 If you make a valid claim about our service in accordance with Treadlighter Ltd's Terms and Conditions, Treadlighter Ltd may arrange for the relevant Products to be reinstalled by any of Treadlighter Limited's Registered or approved Installers or refund to the Customer the charge for the relevant part of the Installation Service (or a proportionate part of such charge)</p> <p>3. Exceptions</p> <p>3.1 This Warranty will not apply:</p> <p>3.1.1 If the Product has been installed by a Treadlighter Limited Registered Installer and has been properly used and maintained throughout the Warranty Period.</p> <p>3.1.2 If you have informed Treadlighter Limited of the alleged defect within the Warranty Period and within a reasonable period of discovery.</p> <p>4. General Conditions</p> <p>4.1 You will promptly provide all information and support including access to site and services reasonably necessary to enable Treadlighter Limited to evaluate any alleged defect and to perform its obligations under this Warranty.</p> <p>4.2 You agree that all premises, plant, power, fuel support services and other inputs that you provide for the installation and use of the products are reasonable, fit for purpose and will be properly used and provided.</p>	<p>5. Expertise</p> <p>5.1 Any dispute as to whether a defect is covered by this Warranty shall be immediately be referred at the request of either party to the Renewable Energy Consumer Code's Complaints Service as detailed in 9.2 of the Renewable Energy Consumer Code.</p> <p>6. Third Party Rights</p> <p>6.1 When Treadlighter Limited has installed a system in a property that is sold within the Warranty period the warranty will pass to the new legal owner of the property. It may not be transferred to or exercised by any third party</p> <p>7. Law</p> <p>7.1 This Warranty is governed by English law and the English courts or by the law and the courts governing where your property is if this is outside England or Wales.</p> <p>8. Manufacturer's Product Warranty</p> <p>8.1 Most Products supplied by Treadlighter Limited come with the benefit of a manufacturer's product guarantee. Where a claim in respect of any of the Products is notified to Treadlighter Limited by you in accordance with the Treadlighter Limited's Terms and Conditions, Treadlighter Limited will liaise with the manufacturer and use all reasonable endeavours to secure a replacement of the Product or the part in question or a refund of the price of Product (or a proportionate part of the price). This warranty does not replace or limit your legal rights to bring a claim to Treadlighter Ltd as the retailer of the goods provided</p>
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Certificate of compliance

Applicant: SolarEdge Technologies Ltd.
1 HaMada Street
Herzeliya 4673335
Israel

Product: Grid-tied photovoltaic (PV) inverter

Model:

SE2200H	SE4000H	SE6000H
SE3000H	SE4600H	SE8000H
SE3500H	SE5000H* (4985W)	SE10000H
SE3680H	SE5000H	

Use in accordance with regulations:

Automatic disconnection device with single-phase mains surveillance in accordance with Engineering Recommendation G98/1 for photovoltaic systems with a single-phase parallel coupling via an inverter in the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter. This serves as a replacement for the disconnection device with isolating function that can access the distribution network provider at any time.

Applied rules and standards:

Engineering Recommendation G98/1-2:2018

Requirements for the connection of Fully Type Tested Micro-generators (up to and including 16 A per phase) in parallel with public Low Voltage Distribution Networks

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

Automatic disconnection device between a generator and the public low-voltage grid

The generators SE4000H, SE4600H, SE5000H* (4985W), SE5000H, SE6000H, SE8000H and SE10000H are rated >16A per phase. However all requirements of the Engineering Recommendation G98/1:2018 are fulfilled.

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.

Report number: 18TH0371-G98/1_0
Certificate number: U19-0157
Date of issue: 2019-03-08

Certification body

Holger Schaffer

Certification body of Bureau Veritas Consumer Products Services Germany GmbH
Accredited according to DIN EN ISO/IEC 17065

Appendix C Type Test Verification Report

Extract from test report according to the Engineering Recommendation G98

Nr. 18TH0371-G98/1_0

Type Approval and declaration of compliance with the requirements of Engineering Recommendation G98				
PGM Technology	Photovoltaic inverter			
Manufacturer:	SolarEdge Technologies Ltd.			
Address	1 HaMada Street Herzeliya 4673335 Israel			
Tel	+972-9-957-6620	Fax	+972-9-957-6591	
Email	info@solaredge.com	Website	www.solaredge.com	
Rated values	SE2200H	SE3000H	SE3500H	SE3680H
Maximum rated capacity	2200W	3000W	3500W	3680W
Rated voltage	220/230 60Hz/50Hz			
Rated values	SE4000H	SE4600H	SE5000H*	SE5000H
Maximum rated capacity	4000W	4600W	4985W	5000W
Rated voltage	220/230 60Hz/50Hz			
Rated values	SE6000H	SE8000H	SE10000H	
Maximum rated capacity	6000W	8000W	10000W	
Rated voltage	220/230 60Hz/50Hz			
Firmware version	Main DSP software version is 1.130 Aux DSP software version is 2.19			
Measurement period:	2018-04-18, 2019-01-10 to 2019-02-05			
Description of the structure of the power generation unit:				
The power generation unit is equipped with a PV and line-side EMC filter. The power generation unit has no galvanic isolation between DC input and AC output. Output switch-off is performed with single-fault tolerance based on two series-connected relays in line and neutral. This enables a safe disconnection of the power generation unit from the network in case of error.				
Differences between Generating Units:				
The inverters of the SExxxH series consist of the low power models: SE2200H, SE3000H, SE3500H and SE3680H. All the models use the same hardware and software. The different powers are realized by software derating. The models are equipped with two DC input.				
The inverters of the SExxxH series consist of the high power models: SE4000H, SE5000H, SE6000H, SE8000H and SE10000H. All the models use the same hardware and software. The different powers are realized by software derating. The models are equipped with two DC input.				
The low and high power models have different ac filter.				
The above stated Generating Units are tested according the requirements in the Engineering Recommendation G98/1. Any modification that affects the stated tests must be named by the manufacturer/supplier of the product to ensure that the product meets all requirements of the Engineering Recommendation G98/1.				

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Nr. 18TH0371-G98/1_0

Operating Range.	
Connection:	Always connected
Limit:	Always connected
Test 1	Voltage = 85% of nominal (195,5 V) Frequency = 47.5 Hz Power Factor = 1 Period of test 90 minutes
Connection:	Always connected
Limit:	Always connected
Test 2	Voltage = 110% of nominal (253 V) Frequency = 51.5 Hz Power Factor = 1 Period of test 90 minutes
Connection:	Always connected
Limit:	Always connected
Test 3	Voltage = 110% of nominal (253 V) Frequency = 52.0 Hz Power Factor = 1 Period of test 15 minutes
Connection:	Always connected
Limit:	Always connected

Protection. Voltage tests.						
Phase 1						
Function	Setting		Trip test		No trip test	
	Voltage [V]	Time delay [s]	Voltage [V]	Time delay [s]	Voltage / time	Confirm no trip
U/V	184	2,5	184,6	2,757	188V / 3,5s	No trip
					180V / 2,48s	No trip
O/V stage 1	262,2	1,0	262,5	1,257	258,2V 2,0s	No trip
O/V stage 2	273,7	0,5	273,5	0,757	269,7V 0,98s	No trip
					277,7V 0,48s	No trip
Note. For Voltage tests the Voltage required to trip is the setting $\pm 3,45V$. The time delay can be measured at a larger deviation than the minimum required to operate the protection. The No trip tests need to be carried out at the setting $\pm 4V$ and for the relevant times as shown in the table above to ensure that the protection will not trip in error.						

Appendix C Type Test Verification Report

Extract from test report according to the Engineering Recommendation G98

Nr. 18TH0371-G98/1_0

Protection. Frequency tests.						
Function	Setting		Trip test		No trip test	
	Frequency [Hz]	Time delay [s]	Frequency [Hz]	Time delay [s]	Frequency / time	Confirm no trip
U/F stage 1	47,5	20	47,50	20,272	47,7Hz / 25s	No trip
U/F stage 2	47	0,5	47,00	0,808	47,2Hz / 19,98s	No trip
					46,8Hz / 0,48s	No trip
O/F stage 2	52	0,5	52,01	0,783	51,8Hz / 89,98s	No trip
					52,2Hz / 0,48s	No trip
Note. For Frequency Trip tests the Frequency required to trip is the setting $\pm 0,1$ Hz. In order to measure the time delay a larger deviation than the minimum required to operate the projection can be used. The "No-trip tests" need to be carried out at the setting $\pm 0,2$ Hz and for the relevant times as shown in the table above to ensure that the protection will not trip in error.						

Protection. Loss of Mains.						
SE3680H						
Inverters tested according to BS EN 62116.						
Balancing load on islanded network	33% of -5% Q Test 22	66% of -5% Q Test 12	100% of -5% P Test 5	33% of +5% Q Test 31	66% of +5% Q Test 21	100% of +5% P Test 10
Trip time. Ph1 fuse removed [s]	217	35	162	43	96	240
SE6000H						
Inverters tested according to BS EN 62116.						
Balancing load on islanded network	33% of -5% Q Test 22	66% of -5% Q Test 12	100% of -5% P Test 5	33% of +5% Q Test 31	66% of +5% Q Test 21	100% of +5% P Test 10
Trip time. Ph1 fuse removed [s]	572	648	345	605	587	569
Note. Trip time limit is 0,5s. For technologies which have a substantial shut down time this can be added to the 0,5s in establishing that the trip occurred in less than 0,5s maximum. Shut down time could therefore be up to 1,0s for these technologies.						

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Nr. 18TH0371-G98/1_0

Protection. Re-connection timer.

Test should prove that the reconnection sequence starts in no less than 20 seconds for restoration of voltage and frequency to within the stage 1 settings of table 10.5.7.1.

Over Voltage				
Time delay setting		Measured delay		
20s		24,0s		
Under Voltage				
Time delay setting		Measured delay		
20s		22,0s		
Over Frequency				
Time delay setting		Measured delay		
20s		24,0s		
Under Frequency				
Time delay setting		Measured delay		
20s		24,0s		
	Checks on no reconnection when voltage or frequency is brought to just outside stage 1 limits of table 1.			
	At 266,2V	At 196,1V	At 47,4Hz	At 52,1Hz
Confirmation that the Generating Unit does not re-connect.	No reconnection	No reconnection	No reconnection	No reconnection

Protection. Frequency change, Stability test.

	Start Frequency [Hz]	Change	Test Duration	Confirm no trip
Positive Vector Shift	49,5	+50 degrees		No trip
Negative Vector Shift	50,5	-50 degrees		No trip
Positive Frequency drift	49,0 to 51,0	+0,95Hz/sec	2,1s	No trip
Negative Frequency drift	51,0 to 49,0	-0,95Hz/sec	2,1s	No trip

Appendix C Type Test Verification Report

Extract from test report according to the Engineering Recommendation G98

Nr. 18TH0371-G98/1_0

Limited Frequency Sensitive Mode – Over Frequency							
SE3680H							
1-min mean value [Hz]:	a) 50,00	b) 50,45	c) 50,70	d) 51,15	e) 50,70	f) 50,45	g) 50,00
1. Measurement a) to g): Active power output > 80% Pn							
Frequency [Hz]:	50,00	50,45	50,70	51,15	50,70	50,45	50,00
PM [kW]:	N/A	3,58	3,49	3,33	3,49	3,58	N/A
PE60 [kW]:	3,60	3,58	3,49	3,33	3,49	3,58	3,60
ΔPE60/PM [%]:	N/A	0,00	0,00	0,00	0,00	0,00	N/A
Limit ΔP/P _{1min} :	+ 10 % of PM						
2. Measurement a) to g): Active power output 40% and 60% after freezing > 80% Pn							
Frequency [Hz]:	50,00	50,45	50,70	51,15	50,70	50,45	50,00
PM [kW]:	N/A	1,93	1,88	1,79	1,88	1,93	N/A
PE60 [kW]:	1,94	1,92	1,88	1,79	1,88	1,92	2,10
ΔPE60/PM [%]:	N/A	0,00	0,00	0,00	0,00	0,00	N/A
Limit ΔP/P _{1min} :	+ 10 % of PM						

Limited Frequency Sensitive Mode – Over Frequency							
SE10000H							
1-min mean value [Hz]:	a) 50,00	b) 50,45	c) 50,70	d) 51,15	e) 50,70	f) 50,45	g) 50,00
1. Measurement a) to g): Active power output > 80% Pn							
Frequency [Hz]:	50,00	50,45	50,70	51,15	50,70	50,45	50,00
PM [kW]:	N/A	9,87	9,62	9,17	9,62	9,87	N/A
PE60 [kW]:	9,92	9,87	9,62	9,17	9,62	9,87	9,91
ΔPE60/PM [%]:	N/A	0,00	0,00	0,00	0,00	0,00	N/A
Limit ΔP/P _{1min} :	+ 10 % of PM						
2. Measurement a) to g): Active power output 40% and 60% after freezing > 80% Pn							
Frequency [Hz]:	50,00	50,45	50,70	51,15	50,70	50,45	50,00
PM [kW]:	N/A	4,92	4,79	4,57	4,79	4,92	N/A
PE60 [kW]:	4,94	4,92	4,79	4,57	4,80	4,92	5,37
ΔPE60/PM [%]:	N/A	0,00	0,00	0,00	0,00	0,00	N/A
Limit ΔP/P _{1min} :	+ 10 % of PM						

Appendix C Type Test Verification Report

Extract from test report according to the Engineering Recommendation G98

Nr. 18TH0371-G98/1_0

Output Power with falling Frequency			
SE3680H			
5-min mean value (each)	a) $50 \pm 0,01$ Hz	b) - 0,4 to - 0,5 Hz	c) - 2,4 to - 2,5 Hz
Frequency [Hz]:	50,00	49,55	47,55
Active power [W]:	9930	9927	9920
$\Delta P/PM$ [%] per 1 Hz:			0
Output Power with falling Frequency			
SE10000H			
5-min mean value (each)	a) $50 \pm 0,01$ Hz	b) - 0,4 to - 0,5 Hz	c) - 2,4 to - 2,5 Hz
Frequency [Hz]:	50,00	49,55	47,55
Active power [W]:	3597	3596	3598
$\Delta P/PM$ [%] per 1 Hz:			0

Appendix C Type Test Verification Report

Extract from test report according to the Engineering Recommendation G98

Nr. 18TH0371-G98/1_0

Power Quality. Harmonics.

SE2200H

Phase 1

SSEG rating per phase (rpp)

At 45-55% of rated output
1,21kW

100% of rated output
2,20kW

Harmonic	Measured Value (MV) in [A]	Measured Value (%) in [A]	Measured Value (MV) in [A]	Measured Value (%) in [A]	Limit in BS EN61000-3-2 in Amps	Higher limit for odd harmonics 21 and above
2nd	0,011	0,064	0,021	0,119	1,080	
3rd	0,108	0,626	0,015	0,088	2,300	
4th	0,014	0,079	0,019	0,109	0,430	
5th	0,168	0,968	0,152	0,880	1,140	
6th	0,009	0,051	0,016	0,092	0,300	
7th	0,056	0,322	0,039	0,227	0,770	
8th	0,003	0,019	0,007	0,042	0,230	
9th	0,074	0,430	0,039	0,224	0,400	
10th	0,005	0,029	0,007	0,039	0,184	
11th	0,041	0,235	0,034	0,194	0,330	
12th	0,005	0,028	0,004	0,021	0,153	
13th	0,042	0,242	0,049	0,280	0,210	
14th	0,005	0,032	0,010	0,056	0,131	
15th	0,028	0,159	0,041	0,236	0,150	
16th	0,004	0,021	0,005	0,027	0,115	
17th	0,024	0,140	0,035	0,202	0,132	
18th	0,006	0,032	0,009	0,052	0,102	
19th	0,033	0,189	0,031	0,181	0,118	
20th	0,003	0,019	0,005	0,031	0,092	
21th	0,015	0,088	0,021	0,124	0,107	0,160
22th	0,006	0,037	0,010	0,056	0,084	
23th	0,008	0,047	0,024	0,137	0,098	0,147
24th	0,004	0,022	0,005	0,028	0,077	
25th	0,009	0,051	0,021	0,121	0,090	0,135
26th	0,007	0,043	0,007	0,042	0,071	
27th	0,012	0,068	0,021	0,119	0,083	0,124
28th	0,004	0,023	0,005	0,029	0,066	
29th	0,012	0,070	0,021	0,121	0,078	0,117
30th	0,007	0,038	0,005	0,027	0,061	
31th	0,011	0,065	0,016	0,094	0,073	0,109
32th	0,004	0,022	0,007	0,039	0,058	
33th	0,017	0,099	0,017	0,100	0,068	0,102
34th	0,006	0,035	0,005	0,030	0,054	
35th	0,016	0,094	0,012	0,070	0,064	0,096
36th	0,005	0,027	0,011	0,063	0,051	
37th	0,018	0,106	0,015	0,084	0,061	0,091
38th	0,007	0,040	0,006	0,032	0,048	
39th	0,009	0,053	0,015	0,089	0,058	0,087
40th	0,006	0,033	0,013	0,074	0,046	

Note the higher limits for odd harmonics 21 and above are only allowable under certain conditions, if these higher limits are utilised please state the exemption used as detailed in part 6.2.3.4 of BS EN 61000-3-2 in the box below. The test had been performed on the model SE3680H, SE2200H and SE10000H the test results are valid for the SE3000H, SE3500H, SE3680H, SE4000H, SE4600H, SE5000H* (4985W), SE5000H, SE6000H and SE8000H since it is identical in hardware and just the output power derated by software.

Appendix C Type Test Verification Report

Extract from test report according to the Engineering Recommendation G98

Nr. 18TH0371-G98/1_0

Power Quality. Harmonics.

SE3680

Phase 2

SSEG rating per phase (rpp)

At 45-55% of rated output
1,84kW

100% of rated output
3,68kW

Harmonic	Measured Value (MV) in [A]	Measured Value (%) in [A]	Measured Value (MV) in [A]	Measured Value (%) in [A]	Limit in BS EN61000-3-2 in Amps	Higher limit for odd harmonics 21 and above
2nd	0,021	0,119	0,047	0,271	1,080	
3rd	0,028	0,160	0,067	0,384	2,300	
4th	0,018	0,106	0,036	0,206	0,430	
5th	0,157	0,904	0,119	0,687	1,140	
6th	0,014	0,079	0,017	0,100	0,300	
7th	0,044	0,255	0,035	0,205	0,770	
8th	0,007	0,040	0,007	0,040	0,230	
9th	0,045	0,260	0,030	0,174	0,400	
10th	0,006	0,033	0,008	0,047	0,184	
11th	0,035	0,202	0,022	0,127	0,330	
12th	0,004	0,024	0,011	0,062	0,153	
13th	0,048	0,275	0,032	0,186	0,210	
14th	0,008	0,045	0,005	0,031	0,131	
15th	0,042	0,245	0,049	0,284	0,150	
16th	0,004	0,024	0,011	0,065	0,115	
17th	0,033	0,191	0,032	0,186	0,132	
18th	0,007	0,038	0,007	0,042	0,102	
19th	0,031	0,179	0,032	0,188	0,118	
20th	0,004	0,023	0,012	0,067	0,092	
21th	0,022	0,125	0,028	0,161	0,107	0,160
22th	0,006	0,037	0,008	0,044	0,084	
23th	0,020	0,115	0,027	0,155	0,098	0,147
24th	0,005	0,027	0,012	0,068	0,077	
25th	0,019	0,112	0,033	0,190	0,090	0,135
26th	0,005	0,028	0,008	0,048	0,071	
27th	0,017	0,098	0,030	0,172	0,083	0,124
28th	0,007	0,042	0,015	0,086	0,066	
29th	0,023	0,134	0,031	0,178	0,078	0,117
30th	0,005	0,027	0,010	0,055	0,061	
31th	0,014	0,082	0,023	0,130	0,073	0,109
32th	0,009	0,049	0,014	0,079	0,058	
33th	0,018	0,101	0,026	0,149	0,068	0,102
34th	0,006	0,033	0,008	0,047	0,054	
35th	0,012	0,069	0,023	0,134	0,064	0,096
36th	0,012	0,067	0,014	0,080	0,051	
37th	0,013	0,078	0,023	0,131	0,061	0,091
38th	0,005	0,032	0,006	0,033	0,048	
39th	0,015	0,089	0,017	0,098	0,058	0,087
40th	0,011	0,066	0,009	0,053	0,046	

Note the higher limits for odd harmonics 21 and above are only allowable under certain conditions, if these higher limits are utilised please state the exemption used as detailed in part 6.2.3.4 of BS EN 61000-3-2 in the box below. The test had been performed on the model SE3680H, SE2200H and SE10000H the test results are valid for the SE3000H, SE3500H, SE3680H, SE4000H, SE4600H, SE5000H* (4985W), SE5000H, SE6000H and SE8000H since it is identical in hardware and just the output power derated by software.

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Nr. 18TH0371-G98/1_0

Power Quality. Harmonics.						
SE10000H						
Phase 1						
SSEG rating per phase (rpp)					Harmonic %	
	At 45-55% of rated output 5,50kW		100% of rated output 10,0kW			
Harmonic	Measured Value (MV) in [A]	Measured Value (%) in [A]	Measured Value (MV) in [A]	Measured Value (%) in [A]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	0,048	0,278	0,082	0,473	8%	8%
3rd	0,139	0,805	0,276	1,593	21,6%	N/A
4th	0,013	0,073	0,032	0,187	4%	4%
5th	0,111	0,643	0,110	0,633	10,7%	10,7%
6th	0,010	0,057	0,024	0,137	2,67%	2,67%
7th	0,023	0,135	0,024	0,139	7,2%	7,2%
8th	0,008	0,047	0,024	0,138	2%	2%
9th	0,047	0,271	0,077	0,445	3,8%	N/A
10th	0,005	0,029	0,019	0,107	1,6%	1,6%
11th	0,028	0,164	0,038	0,218	3,1%	3,1%
12th	0,007	0,040	0,018	0,101	1,33%	1,33%
13th	0,010	0,060	0,027	0,154	2%	2%
14th	0,005	0,029	0,013	0,078	N/A	N/A
15th	0,037	0,211	0,035	0,201	N/A	N/A
16th	0,010	0,060	0,020	0,115	N/A	N/A
17th	0,021	0,122	0,010	0,058	N/A	N/A
18th	0,008	0,046	0,014	0,083	N/A	N/A
19th	0,029	0,168	0,029	0,169	N/A	N/A
20th	0,013	0,076	0,016	0,091	N/A	N/A
21th	0,012	0,068	0,014	0,078	N/A	N/A
22th	0,011	0,062	0,009	0,053	N/A	N/A
23th	0,036	0,207	0,028	0,164	N/A	N/A
24th	0,016	0,093	0,011	0,062	N/A	N/A
25th	0,026	0,147	0,027	0,155	N/A	N/A
26th	0,008	0,045	0,012	0,069	N/A	N/A
27th	0,032	0,183	0,018	0,105	N/A	N/A
28th	0,012	0,067	0,010	0,059	N/A	N/A
29th	0,026	0,150	0,038	0,217	N/A	N/A
30th	0,006	0,034	0,019	0,111	N/A	N/A
31th	0,026	0,150	0,017	0,097	N/A	N/A
32th	0,006	0,033	0,017	0,098	N/A	N/A
33th	0,027	0,154	0,041	0,237	N/A	N/A
34th	0,009	0,054	0,022	0,128	N/A	N/A
35th	0,026	0,149	0,022	0,125	N/A	N/A
36th	0,006	0,034	0,012	0,068	N/A	N/A
37th	0,036	0,210	0,044	0,251	N/A	N/A
38th	0,015	0,089	0,018	0,101	N/A	N/A
39th	0,021	0,124	0,024	0,139	N/A	N/A
40th	0,010	0,057	0,009	0,050	N/A	N/A

The test had been performed on the model SE3680H, SE2200H and SE10000H the test results are valid for the SE3000H, SE3500H, SE3680H, SE4000H, SE4600H, SE5000H* (4985W), SE5000H, SE6000H and SE8000H since it is identical in hardware and just the output power derated by software.

Appendix C Type Test Verification Report

Extract from test report according to the Engineering Recommendation G98

Nr. 18TH0371-G98/1_0

Power Quality. Voltage fluctuation and Flicker.								
SE3680H								
	Starting			Stopping			Running	
	dmax	dc	d(t)	dmax	dc	d(t)	Pst	Plt 2 hours
Measured values at test impedance	0,60%	0,54%	0,00%	0,78%	0,78%	0,00%	0,06	0,06
Normalised to standard impedance	0,60%	0,54%	0,00%	0,78%	0,78%	0,00%	0,06	0,06
Limits set under BS EN 61000-3-11	4%	3,3%	3,3% 500ms	4%	3,3%	3,3% 500ms	1,0	0,65
SE6000H								
	Starting			Stopping			Running	
	dmax	dc	d(t)	dmax	dc	d(t)	Pst	Plt 2 hours
Measured values at test impedance	4,79%	5,05%	0,00%	4,91%	5,08%	0,00%	0,12	0,12
Normalised to standard impedance	3,11%	3,28%	0,00%	3,19%	3,30%	0,00%	0,08	0,08
Limits set under BS EN 61000-3-11	4%	3,3%	3,3% 500ms	4%	3,3%	3,3% 500ms	1,0	0,65
Test impedance	R	0,24* 0,4^	Ω	XI	0,15* 0,25	Ω		
Standard impedance	R	0,24* 0,4^	Ω	XI	0,15* 0,25^	Ω		

Power Quality. DC injection.			
SE2200H			
Test level power [%]	10	55	100
Recorded value [mA]	-7,87	-11,82	-8,14
Recorded value [%]	-0,08	-0,12	-0,08
Limit [%]	0,25	0,25	0,25
SE3680H			
Test level power [%]	10	55	100
Recorded value [mA]	22,76	16,18	4,60
Recorded value [%]	0,14	0,10	0,03
Limit [%]	0,25	0,25	0,25
SE10000H			
Test level power [%]	10	55	100
Recorded value [mA]	21,79	13,94	23,21
Recorded value [%]	0,05	0,03	0,05
Limit [%]	0,25	0,25	0,25

Appendix C Type Test Verification Report

Extract from test report according to the Engineering Recommendation G98

Nr. 18TH0371-G98/1_0

Fault level Contribution.					
SE6000H					
For a directly coupled SSEG			For a Inverter SSEG		
Parameter	Symbol	Value	Time after fault	Volts [V]	Amps [A]
Peak Short Circuit current	I_p	N/A	20ms	34,2	11,9
Initial Value of aperiodic current	A	N/A	100ms	23,3	15,9
Initial symmetrical short-circuit current*	I_k	N/A	250ms	10,8	16,0
Decaying (aperiodic) component of short circuit current*	i_{dc}	N/A	500ms	42,7	9,9
Reactance/Resistance Ratio of source*	X/R	N/A	Time to Trip [s]	0,59	
For rotating machines and linear piston machines the test should produce a 0s – 2s plot of the short circuit current as seen at the Generating Unit terminals.					
* Values for these parameters should be provided where the short circuit duration is sufficiently long to enable interpolation of the plot.					

Self Monitoring – Solid state switching.	N/A
It has been verified that in the event of the solid state switching device failing to disconnect the Generating Unit, the voltage on the output side of the switching device is reduced to a value below 50 volts within 0,5 seconds.	
Note. Unit do not provide solid state switching relays. In case the semiconductor bridge is switched off, then the voltage on the output drops to 0. In this case the relays on the output will also open.	

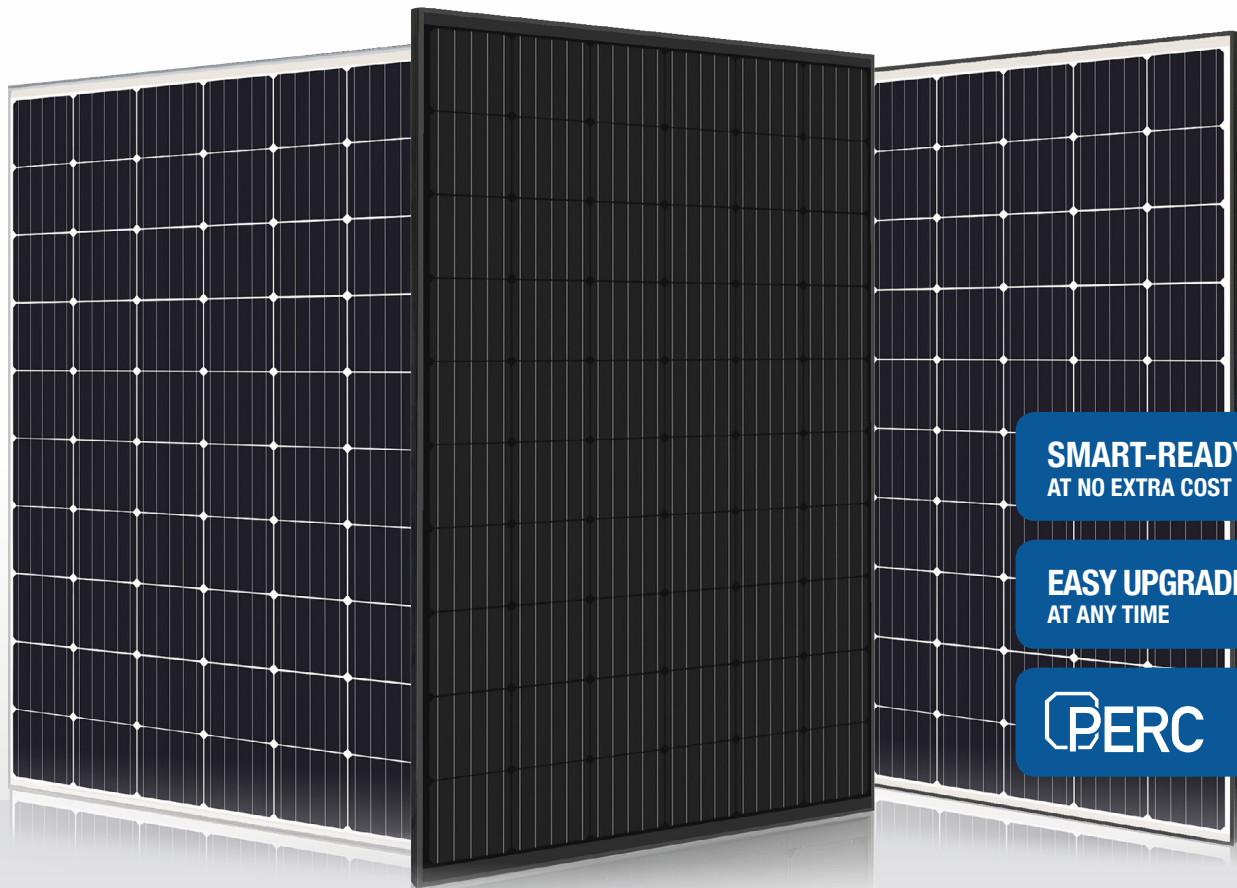
Additional comments
The single phase generators SE4000H, SE4600H, SE5000H* (4985W), SE5000H, SE6000H, SE8000H and SE10000H are rated above 16A per phase. However all requirements of the Engineering Recommendation G98/1:2018 are fulfilled. Installation acceptance of single-phase inverters above 16A per phase must be requested at the responsible grid operator.



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320W PLUS⁺ MONO 60 CELL SERIES

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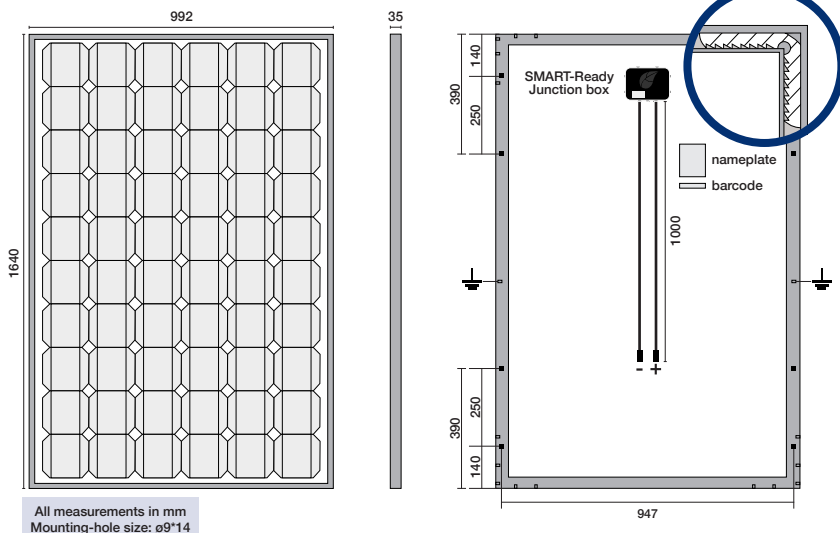
- ✓ Field replaceable diode cover
- ✓ Lower junction box temperature
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 - Advanced Safety
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- ✓ Over 30 Years Manufacturing Experience



MODULE FRAME



- ✓ Extremely reliable screw-less, interconnected frame for long-term flexibility and strength.
- ✓ 8 mounting holes for direct mounting option.
- ✓ Suitable for Insertion System on both long and short sides.
- ✓ 20 in-built drainage waterspouts.
- ✓ 2 earth (ground) points.
- ✓ Tempered ARC (anti-reflective) Front Glass.

Long Side Clamping Zones:
0mm to 410mm from edge.

Short Side Clamping Zones:
0mm to 248mm from edge.

ELECTRICAL PERFORMANCE

Model Number	PLM-320M-60	PLM-320MB-60
Power Output	P _{max} W	320
Voltage at P _{max}	V _{mp} V	34.01
Current at P _{max}	I _{mp} A	9.41
Open-circuit voltage	V _{oc} V	41.55
Short-circuit current	I _{sc} A	9.77
Solar Module Efficiency	%	19.67
Power Tolerance	%	-0/+3

MECHANICAL CHARACTERISTICS

Front cover	3.2mm Tempered ARC glass
Backsheet colour	Black/White
Type of Cells	Mono PERC 156.75x156.75mm
Number of Cells	60
Frame	Black/Silver Anodised Aluminium
Junction box	TIG0 TS4 IP67
Cables	1000mm/4mm ²
Connectors	MC4 compatible IP67
Module dimensions	1640 x 992 x 35mm
Module weight	18kg

PERLIGHT PLUS SERIES - A NEW GENERATION OF SMART PV MODULES

High-performance PERC cell modules available in three elegant styles.

SilverPlus⁺: Classic white backsheet & silver frame

BW Plus⁺: Clean white backsheet with a sleek black frame.

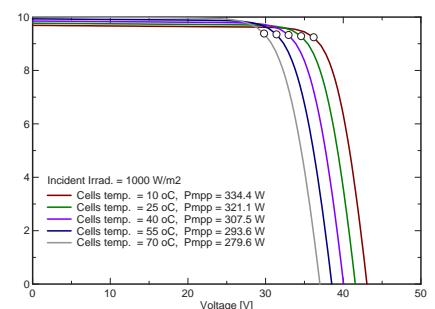
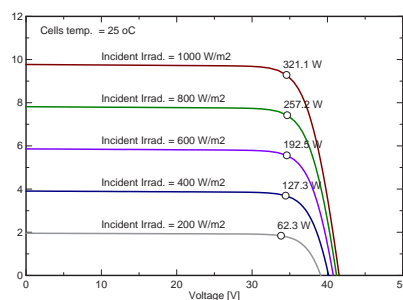
BlackPlus⁺: Black backsheet & black frame.

Expertly crafted, Perlight solar modules are built to deliver optimum performance in all applications and environments including low light levels.

Each Plus Series module is integrated with the advanced Tigo Smart-Ready junction box, which offers greater reliability than a conventional junction box due to lower operating temperature and an interchangeable diode cover. Furthermore, the diode cover can be upgraded at any time to offer module-level monitoring, optimisation for shaded arrays, enhanced safety features and much more. Visit www.westech-solar.co.uk for more details.

ELECTRICAL CURVES

320W (PLM-320M-60, PLM-320MB-60)



STC: 1000W/m² irradiance, 25°C cell temperature, AM 1.5g spectrum according to EN 60904-3.

OPERATING CONDITIONS

Max. system voltage	1000VDC
Limiting reverse current	15A
Operating temperature range	-40°C to 85°C
Max. static load front (e.g., snow)	5400Pa
Max. static load back (e.g., wind)	2400Pa
Max. hailstone impact	25mm@23m/s

THERMAL CHARACTERISTICS

NOCT	45±2 °C
Temp. coefficient P _{max}	-0.40 %/°C
Temp. coefficient V _{oc}	-0.30 %/°C
Temp. coefficient I _{sc}	0.06 %/°C
Temp. coefficient V _{mp}	-0.35 %/°C

- ✓ MCS Certified
- ✓ Positive output tolerance
- ✓ Fire safety certified
- ✓ PID-Free certified
- ✓ Ammonia corrosion resistance certified
- ✓ Salt mist corrosion resistance certified
- ✓ Worldwide accreditation



MANUFACTURING BASE

Perlight Solar Co.,Ltd
Mayu Administration District,
Wenling, Zhejiang,
317521, China
✉ jenny.uk@perlight.com

GLOBAL MARKETING CENTRE

Perlight Solar Co.,Ltd
E# 14th Floor, 58 Xinjinqiao Rd,
PuDong District, Shanghai,
200129, China
✉ enquiry@perlight.com

EU SALES & CUSTOMER CENTRE

Westech Solar (UK) Ltd
Unit 1 Bobby Fryer Close,
Garsington Rd, Oxford,
OX4 6ZN
✉ info@westech-solar.co.uk



+44 (0)1865 682 584 • westech-solar.co.uk