

Progetto definitivo di un impianto fotovoltaico di potenza di
circa 84 MWp da realizzare al suolo
Figline e Incisa Valdarno (FI) denominato:
H2-Era Green Valley



Titolo: Specifica Materiali	Nome File: Specifica Materiali
	<u>Procedimento Autorizzativo Unico Regionale</u> (ex. Art.27Bis del DLgs 152/2006)
	Rev: <u>RE01</u>



SolarFieldsSette srl

SolarFieldsSette srl – P.iva 01998810566 – solarfields@pec.it

web: www.solarfields.it

Sede legale:

Via Gianbattista Casti 65 Acquapendente 01021 (Vt)

N° Rev		Data	Redatto:	Verificato:	Approvato:
00		22 Feb 24	Ing. M.Manenti 	H2-ERA GREEN VALLEY SRL C.F./PIVA 07002730484 Il Legale Rappresentante 	

Committente: H2-Era Green Valley s.r.l.

Hi-MO 7

LR7-72HGD 590~620M

- High-performance PV modules for utility power plants
- Advanced HPDC cell technology delivers superior module efficiency and power
- High bifaciality and excellent power temperature coefficient achieves high energy yield
- LONGi lifecycle quality ensures long-term performance

12

12-year Warranty for
Materials and Processing

30

30-year Warranty for Extra
Linear Power Output

Complete System and Product Certifications

IEC 61215, IEC 61730, UL 61730

ISO9001:2015: ISO Quality Management System

ISO14001: 2015: ISO Environment Management System

ISO45001: 2018: Occupational Health and Safety

IEC62941: Guideline for module design qualification and type approval

LONGi



23.0%
MAX MODULE
EFFICIENCY

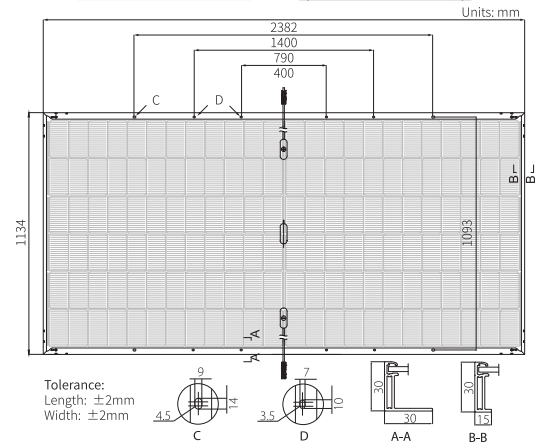
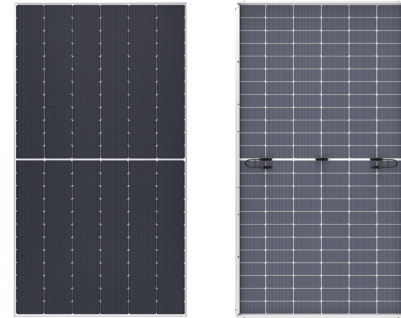
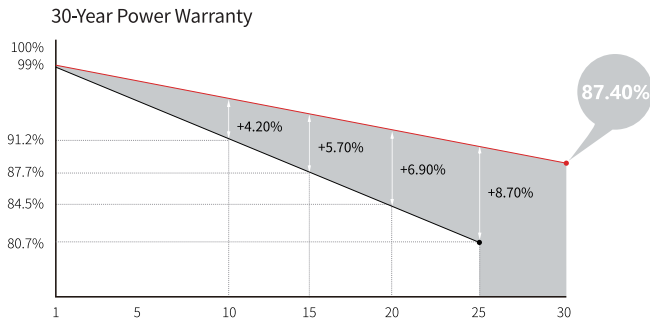
0~3%
POWER
TOLERANCE

<1%
FIRST YEAR
POWER DEGRADATION

0.4%
YEAR 2-30
POWER DEGRADATION

HALF-CELL
Lower operating temperature

Additional Value



Mechanical Parameters

Cell Orientation	144 (6×24)
Junction Box	IP68, three diodes
Output Cable	4mm ² , +400, -200mm/±1400mm length can be customized
Glass	Dual glass, 2.0+2.0mm semi-tempered glass
Frame	Anodized aluminum alloy frame
Weight	33.5kg
Dimension	2382×1134×30mm
Packaging	36pcs per pallet / 180pcs per 20' GP / 720pcs per 40' HC

Electrical Characteristics

STC : AM1.5 1000W/m² 25°C NOCT : AM1.5 800W/m² 20°C 1m/s

Test uncertainty for Pmax: ±3%

Module Type	LR7-72HGD-590M		LR7-72HGD-595M		LR7-72HGD-600M		LR7-72HGD-605M		LR7-72HGD-610M		LR7-72HGD-615M		LR7-72HGD-620M	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax/W)	590	449.1	595	452.9	600	456.7	605	460.6	610	464.4	615	468.2	620	468.2
Open Circuit Voltage (Voc/V)	50.98	48.45	51.09	48.55	51.20	48.66	51.31	48.76	51.42	48.87	51.53	49.0	51.64	48.97
Short Circuit Current (Isc/A)	14.46	11.62	14.54	11.68	14.62	11.74	14.70	11.80	14.77	11.87	14.85	11.93	14.93	11.93
Voltage at Maximum Power (Vmp/V)	43.17	41.03	43.28	41.13	43.39	41.24	43.50	41.35	43.61	41.45	43.72	41.55	43.83	41.55
Current at Maximum Power (Imp/A)	13.67	10.95	13.75	11.02	13.83	11.08	13.91	11.14	13.99	11.21	14.07	11.27	14.15	11.27
Module Efficiency(%)	21.9		22.0		22.2		22.4		22.6		22.8		23.0	

Electrical characteristics with different rear side power gain (reference to 605W front)

Pmax /W	Voc/V	Isc /A	Vmp/V	Imp /A	Pmax gain
635	51.31	15.43	43.50	14.60	5%
666	51.31	16.17	43.50	15.30	10%
696	51.41	16.90	43.60	15.99	15%
726	51.41	17.64	43.60	16.69	20%
756	51.41	18.37	43.60	17.39	25%

Operating Parameters



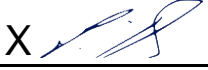
Operational Temperature	-40°C ~ +85°C
Power Output Tolerance	0 ~ 3%
Voc and Isc Tolerance	±3%
Maximum System Voltage	DC1500V (IEC/UL)
Maximum Series Fuse Rating	30A
Nominal Operating Cell Temperature	45±2°C
Protection Class	Class II
Bifaciality	80±5%
Fire Rating	UL type 29 IEC Class C

Mechanical Loading

Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Hailstone Test	25mm Hailstone at the speed of 23m/s

Temperature Ratings (STC)

Temperature Coefficient of Isc	+0.045%/°C
Temperature Coefficient of Voc	-0.230%/°C
Temperature Coefficient of Pmax	-0.280%/°C

Test Report No.: <i>Prüfbericht-Nr.:</i>	DE23OV4U 002	Order No.: <i>Auftrags-Nr.:</i>	300101634	Page 1 of 13 Seite 1 von 13
Client Reference No.: <i>Kunden-Referenz-Nr.:</i>	2042170	Order date: <i>Auftragsdatum:</i>	2023-10-24	
Client: <i>Auftraggeber:</i>	LONGi Green Energy Technology Co., Ltd			
Test item: <i>Prüfgegenstand:</i>	Photovoltaic (PV) modules			
Identification/ Type No.: <i>Bezeichnung / Typ-Nr.</i>	see page 7			
Order content: <i>Auftrags-Inhalt:</i>	Measurement of Optical Reflectance of Photovoltaic (PV) Modules			
Test specification: <i>Prüfgrundlage:</i>	see page 6			
Date of sample receipt: <i>Wareneingangsdatum:</i>	2023-09-21			
Test sample No.: <i>Prüfmuster-Nr.:</i>	see page 7			
Testing period: <i>Prüfzeitraum:</i>	2023-12-18			
Place of testing: <i>Ort der Prüfung:</i>	Am Grauen Stein, 51105 Cologne/Germany			
Testing laboratory: <i>Prüflaboratorium:</i>	TÜV Rheinland Solar GmbH			
Test result*: <i>Prüfergebnis*:</i>	No pass/fail criteria applicable			
tested by: <i>geprüft von:</i>	X 	authorized by: / <i>genehmigt von:</i>	X 	
Date: 2024-01-11 <i>Datum:</i>	Signiert von: Mehdi Azmani	Issue Date: 2024-01-11 <i>Ausstellungsdatum:</i>	Signiert von: Lukas Jakisch	
Position / Stellung:	Expert	Position / Stellung:	Laboratory manager	
Others / ./. <i>Sonstiges:</i>				
Condition of the test item at delivery: <i>Zustand des Prüfgegenstandes bei Anlieferung:</i>	Test item complete and undamaged			
* Legend: P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested				
* Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet				
<p>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</p> <p><i>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</i></p>				

V05

Prüfbericht-Nr.: DE23OV4U 002
Test report no.:

Seite 2 von 13
Page 2 of 13

Remarks
Anmerkungen

A	<p>Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.</p> <p><i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i></p>
B	<p>Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben.</p> <p><i>As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged.</i></p>
C	<p>Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.</p> <p><i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report. Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i></p>
D	<p>Die Entscheidungsregel für Konformitätserklärungen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC GC8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird.</p> <p><i>The decision rule for statements of conformity in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance to ILAC GC8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report.</i></p>

Prüfbericht-Nr.: **DE23OV4U 002**
Test report no.:

Seite 3 von 13
Page 3 of 13

Table of contents
Inhaltsverzeichnis

1	General information	4
1.1	Executive summary	4
1.2	Setting of tasks	5
1.3	Summary of test results	5
1.4	Test specifications	6
2	Product description	7
2.1	Test sample obtaining.....	7
2.2	List of test samples	7
3	Module examinations	8
3.1	Measurement of spectral optical reflectance	8
Appendix A:	Calculation of ISO 9050 external light reflectance $\rho_{v,o}$ (ISO 9050, Section 3.4.1)	12
Appendix B:	Abbreviations possible in the report	13

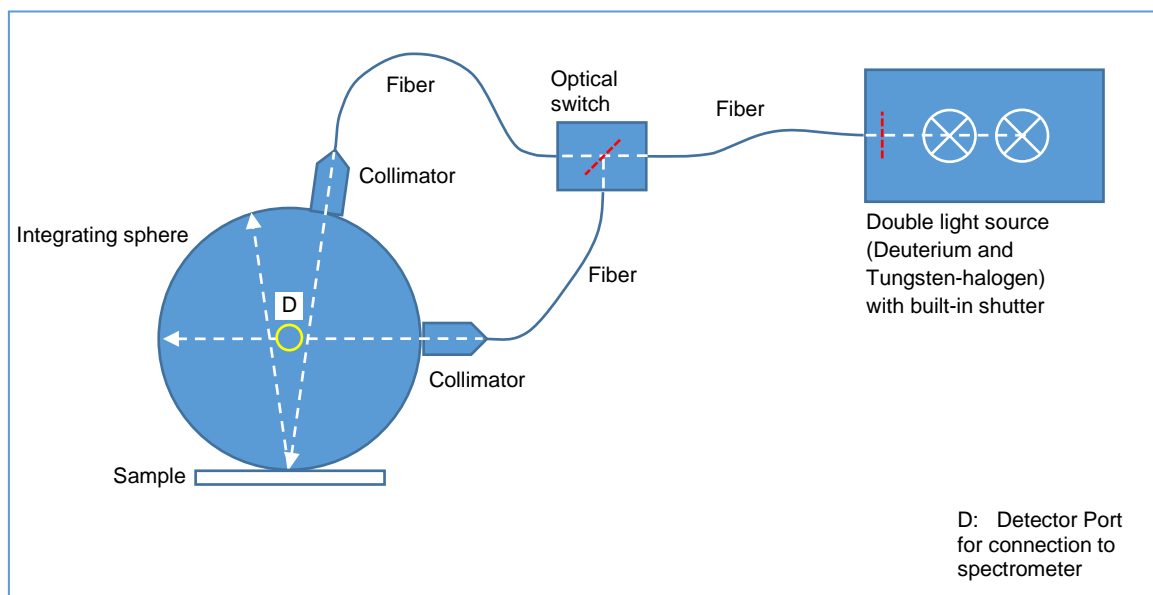
General information
Allgemeine Informationen

1 General information

1.1 Executive summary

Measurement of spectral optical reflectance

The procedure used here is analogous to the determination of spectral transmittance described in Section 7 and 8 of ISO 13468-2. The test set-up is shown in the figure below. The sample is irradiated by a beam whose axis has an angle of 8° with respect to the vertical on the sample surface. Spectral reflectance is measured in the wavelength range 300 nm to 1600 nm. Measurement is performed using an integrating sphere with 150 mm inner diameter, suitable to collect the entire (hemispherically) reflected light. The measuring spot size is 10 mm in diameter.



Based on the resulting spectral optical reflectance curves, the ISO 9050 external light reflectance is calculated, which involves weighting by:

- a) D65 solar spectral irradiance in accordance with ISO/CIE 10526
- b) Spectral luminous efficiency for photopic vision (standard observer for photometry) in accordance with ISO/CIE 10527

For the detailed calculation specification, see Appendix A.

Prüfbericht-Nr.: **DE23OV4U 002**
Test report no.:

Seite 5 von 13
Page 5 of 13

General information
Allgemeine Informationen

1.2 Setting of tasks

According to the inquiry of the customer following measurements on the below listed crystalline PV module(s) shall be performed:

- Spectral hemispherical optical reflectance of one PV module shall be measured analogous to ISO 13468-2:1999, but extended to the wavelength range 300 nm to 1600 nm.
- "External light reflectance" shall be calculated according to ISO 9050:2003.

1.3 Summary of test results

- When measuring on a solar cell, the external light reflectance of the PV module surface is on average 2.3%. External light reflectance varies between 2.15% and 2.58%, depending on the investigated solar cell.
- When measuring between the solar cells, external light reflectance of the PV module surface is approx. 33.7%, based on one measurement location.

Prüfbericht-Nr.: **DE23OV4U 002**
Test report no.:

Seite 6 von 13
Page 6 of 13

General information
Allgemeine Informationen

1.4 Test specifications

QMA 2.581.102 (TÜV Rheinland Solar GmbH)	Optische Transmissions- und Reflexionsmessung Optical transmission and reflection measurement
ISO 13468-2:1999	Plastics – Determination of the total luminous transmittance of transparent materials – Part 2: Double-beam instrument
ISO 9050:2003	Glass in building – Determination of light transmittance, solar direct transmittance, total solar energy transmittance, ultraviolet transmittance and related glazing factors

Prüfbericht-Nr.: **DE23OV4U 002**
Test report no.:

Seite 7 von 13
Page 7 of 13

Product Description
Produktbeschreibung

2 Product description

2.1 Test sample obtaining

- Sending by customer Sampling by TÜV Rheinland Group
 others:

2.2 List of test samples

Sample No.	Sample S/N	Manufacturer	Module type	Module technology
HV2023003510	LRPI04094230500303577	LONGi Green Energy Technology Co., Ltd	LR5-72HGD-570M	N-TOPCon

Supplementary information: Measurement location(s): 4 locations as specified in Section 3.

Prüfbericht-Nr.: **DE23OV4U 002**
 Test report no.:

Seite 8 von 13
 Page 8 of 13

Module examination
Modulprüfungen

3 Module examinations

3.1 Measurement of spectral optical reflectance

External light reflectance was computed from spectral optical reflectance in accordance with ISO 9050, Section 3.4.1 (see Appendix A).

Test date [yyyy-mm-dd]	2023-12-18	
Sample No.	HV2023003510	
No. of measurement locations	4, as specified in the picture below	
Measurement location	ISO 9050 external light reflectance	Average
Cell R7C1	2.15%	2.3%
Cell R13C2	2.58%	
Cell R23C3	2.23%	
Backsheet	33,73%	—

Summary of results:

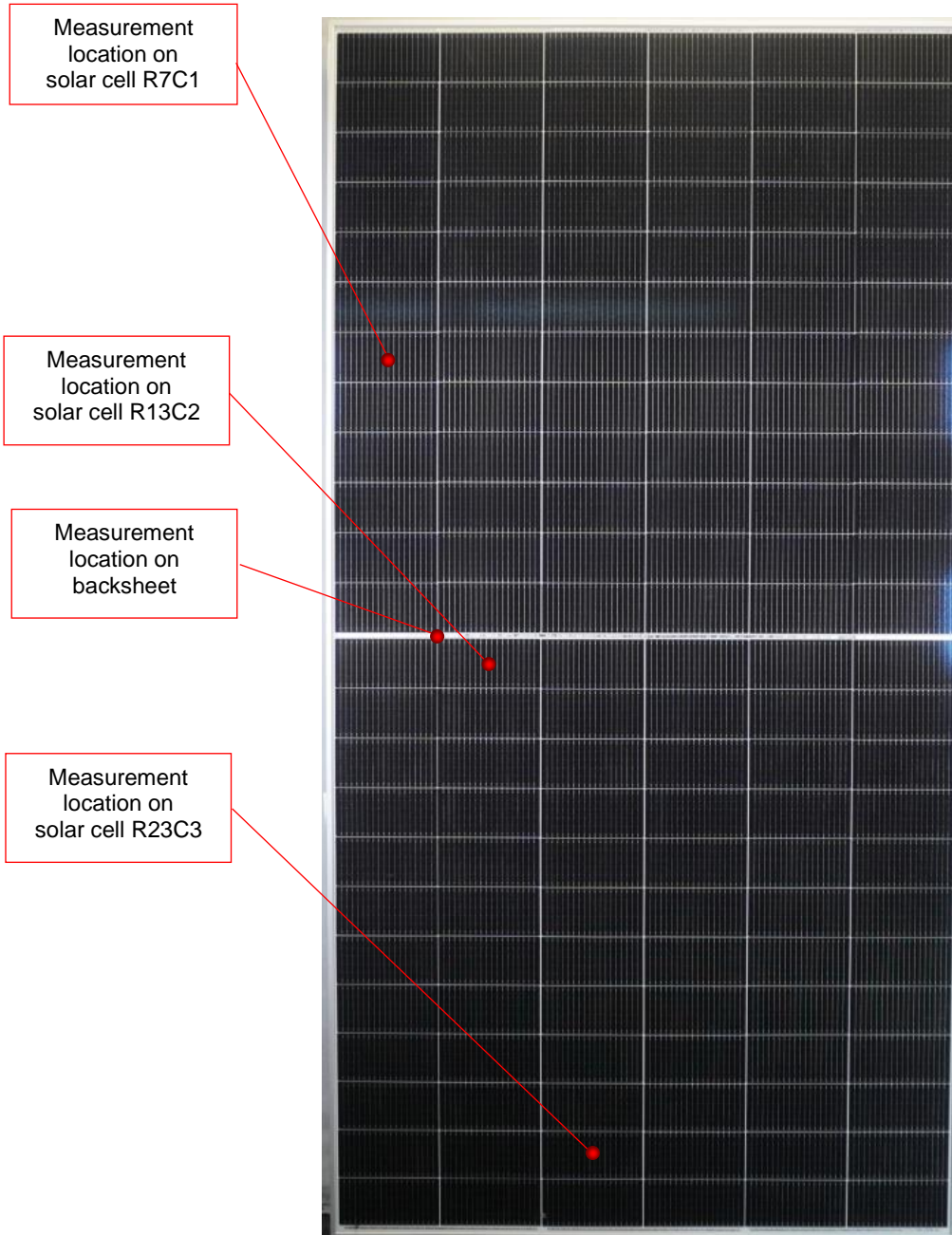
- When measuring on a solar cell, the external light reflectance of the PV module surface is on average 2.3%. External light reflectance varies between 2.15% and 2.58%, depending on the investigated solar cell.
- When measuring between the solar cells, external light reflectance of the PV module surface is approx. 33.7%, based on one measurement location.

Supplementary information: the measurement of Backsheet (between solar cells) has been performed on the crossing of the large lines spacing between columns 1 and 2 and rows 12 and 13 avoiding the metallic bus bar (see picture on page 9).

Prüfbericht-Nr.: DE23OV4U 002
Test report no.:

Seite 9 von 13
Page 9 of 13

Module examination
Modulprüfungen



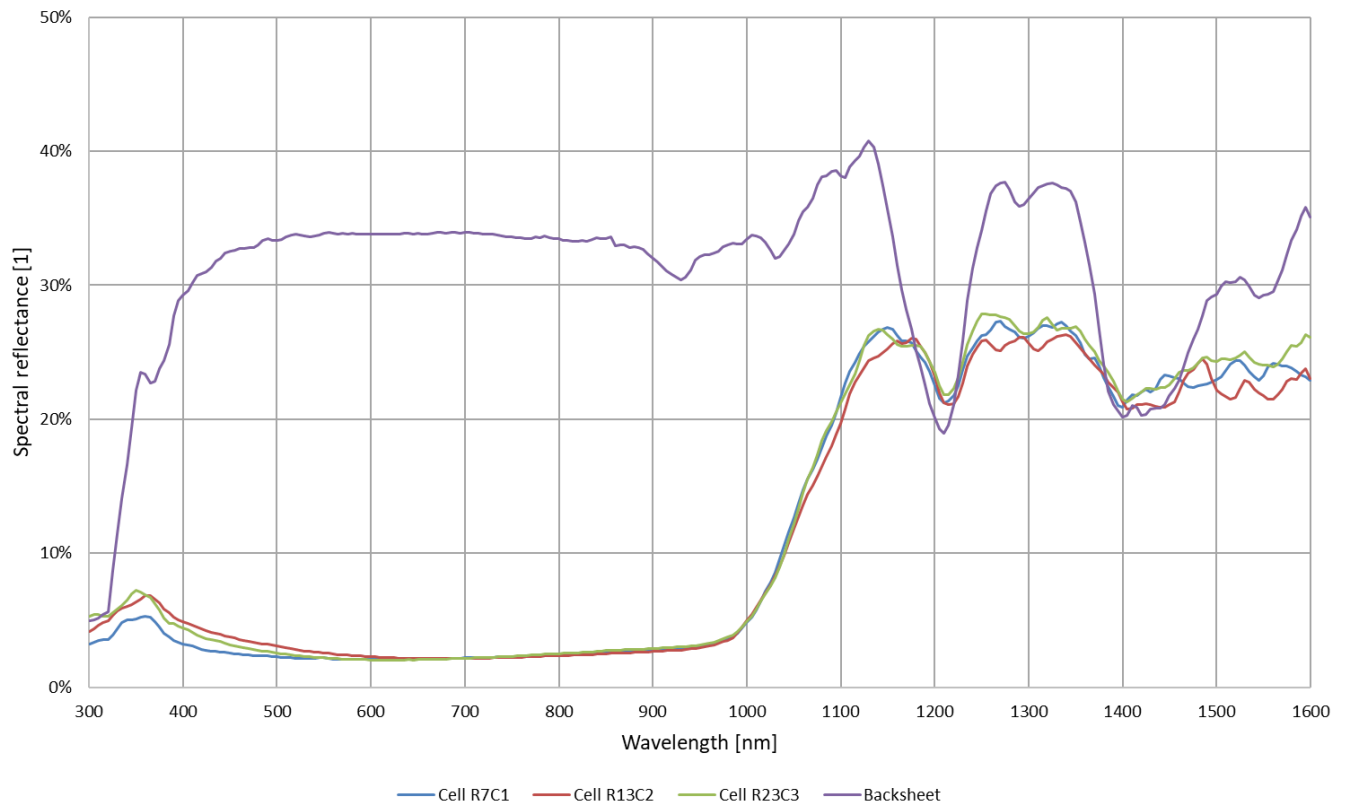
Measurement locations on test sample HV2023003510
Row (R) and column (C) of the tested solar cells are indicated

Prüfbericht-Nr.: **DE23OV4U 002**
Test report no.:

Seite 10 von 13
Page 10 of 13

Module examination
Modulprüfungen

HV2023003510



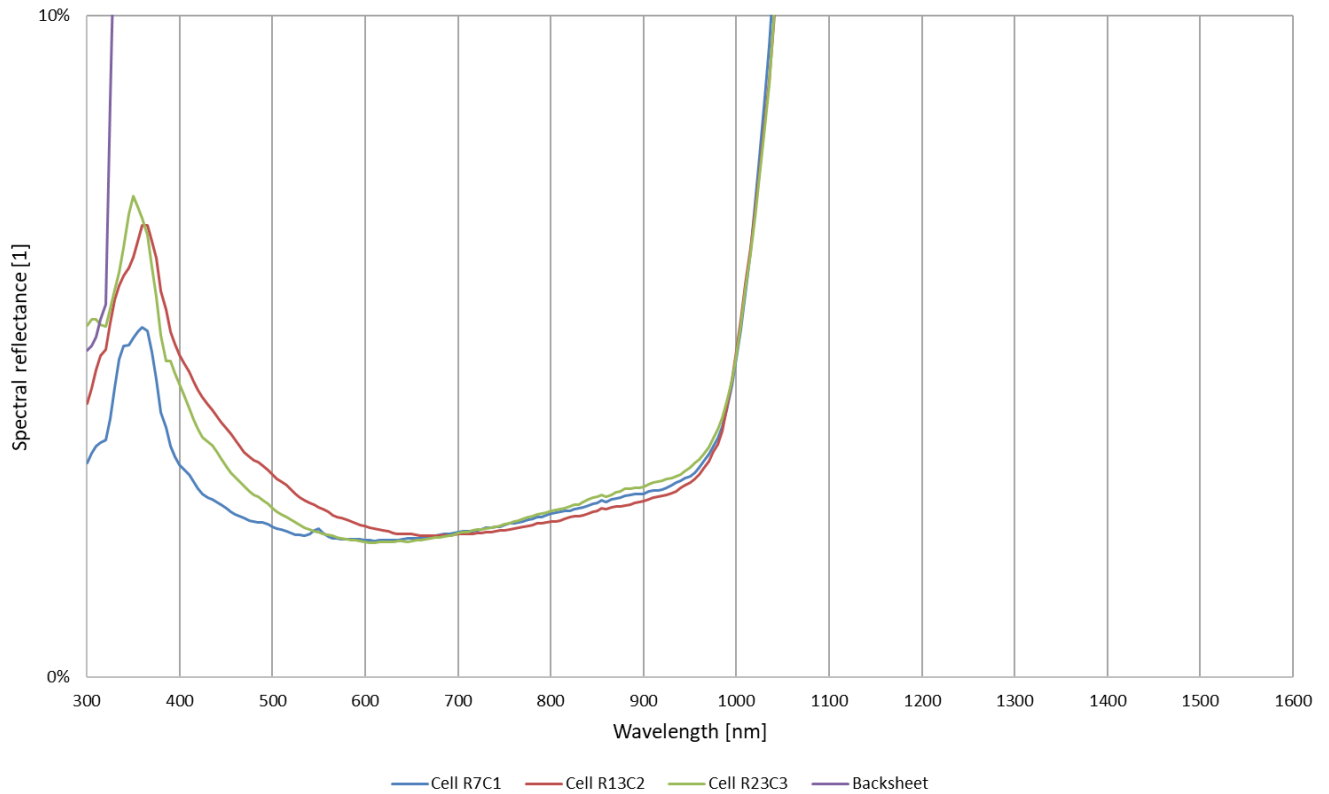
Measured spectral hemispherical reflectance curves

Prüfbericht-Nr.: **DE23OV4U 002**
Test report no.:

Seite 11 von 13
Page 11 of 13

Module examination
Modulprüfungen

HV2023003510



Measured spectral hemispherical reflectance curves (detail)

Prüfbericht-Nr.: **DE23OV4U 002**
 Test report no.:

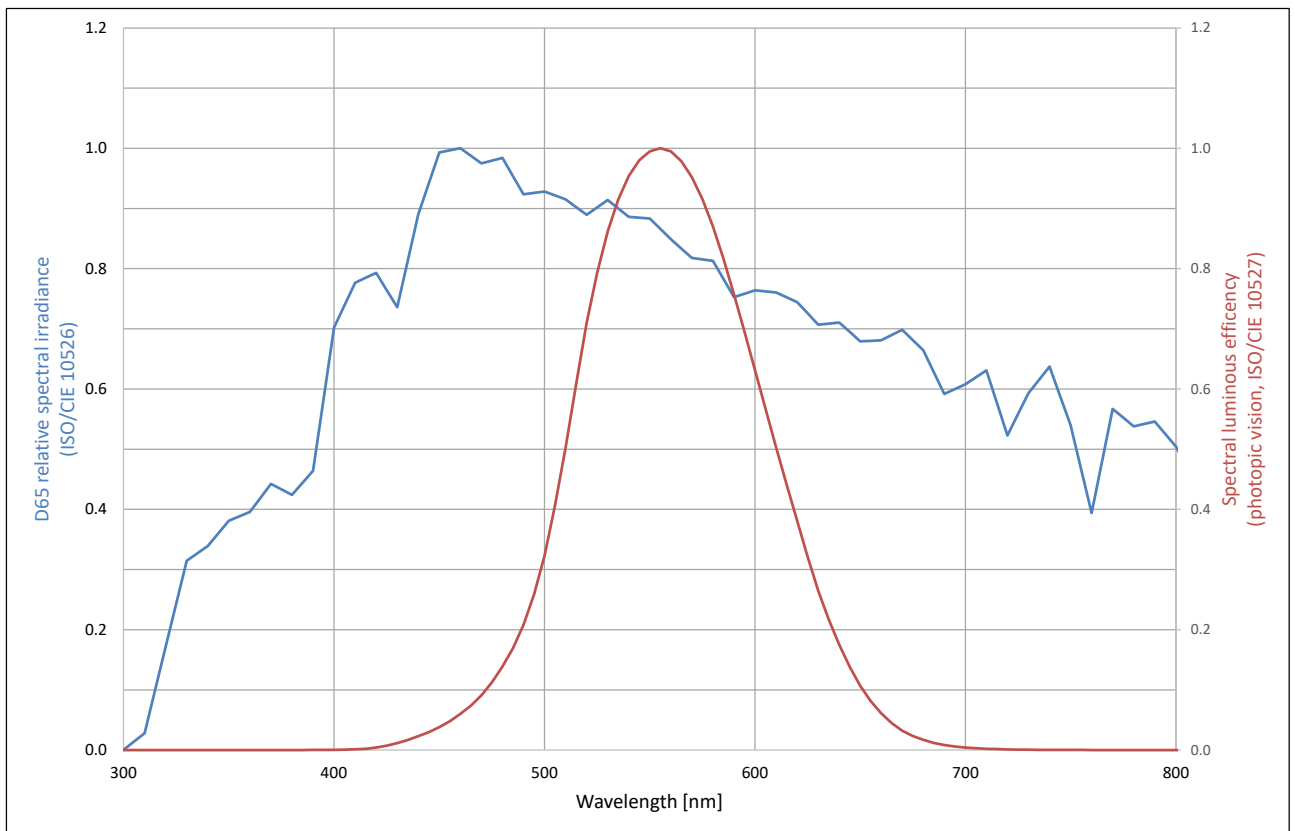
Seite 12 von 13
 Page 12 of 13

Additional documentation
Zusatzdokumentation

Appendix A: Calculation of ISO 9050 external light reflectance $\rho_{v,o}$ (ISO 9050, Section 3.4.1)

$$\rho_{v,o} = \frac{\sum_{\lambda = 380 \text{ nm}}^{780 \text{ nm}} \rho_o(\lambda) D_\lambda V(\lambda) \Delta\lambda}{\sum_{\lambda = 380 \text{ nm}}^{780 \text{ nm}} D_\lambda V(\lambda) \Delta\lambda}$$

- $\rho_o(\lambda)$ is the spectral external reflectance of the glazing
- D_λ is the relative spectral distribution of illuminant D65 (see ISO/CIE 10526)
- $V(\lambda)$ is the spectral luminous efficiency for photopic vision defining the standard observer for photometry (see ISO/CIE 10527)
- $\Delta\lambda$ is the wavelength interval



D65 relative spectral irradiance and Spectral luminous efficiency

Prüfbericht-Nr.: **DE230V4U 002**
Test report no.:

Seite 13 von 13
Page 13 of 13

Additional documentation
Zusatzdokumentation

Appendix B: Abbreviations possible in the report

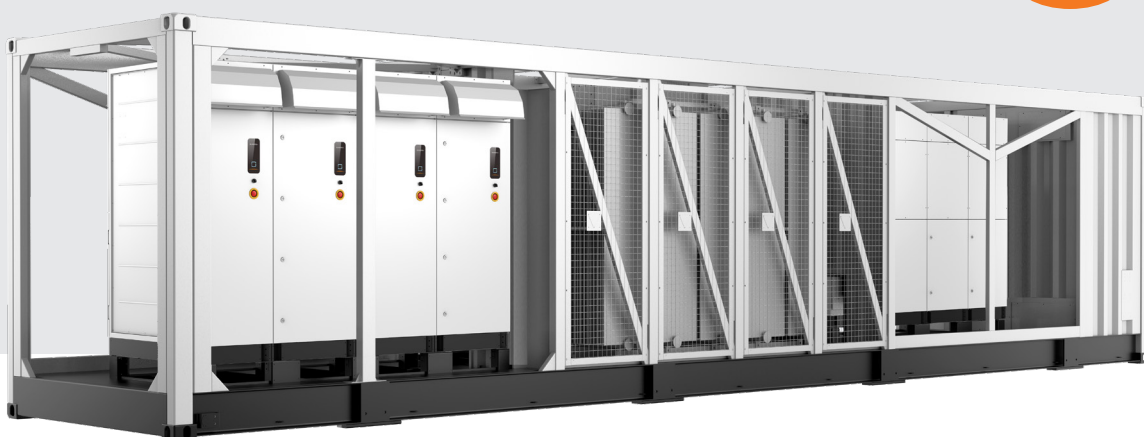
P_{max}	– Maximum power	R_{iso}	– Insulation resistance
I_{mpp}	– Maximum power point current	A	– Module surface
V_{mpp}	– Maximum power point voltage	SC	– Stabilization cycle
I_{sc}	– Short circuit current	n-Stab	– Non-Stability
V_{oc}	– Open circuit voltage	STC	– Standard Test Conditions
FF	– Fill factor	MQT	– Module Quality Test
a	– Irradiance correction factor	MST	– Module Safety Test
R_s	– Series resistance	PID	– Potential Induced Degradation
α	– Temperature coefficient of I_{sc}	DHT	– Damp heat test
β	– Temperature coefficient of V_{oc}	HFT	– Humidity freeze test
γ	– Temperature coefficient of P_{max}	TCT	– Thermal cycling test
κ	– Temperature coefficient of R_s	Hrs	– Hours
		Deg.	– Degradation

--- End of Test Report ---

SG6600/8800UD-MV

Soluzione "chiavi in mano" per sistemi a 1500 Vcc con trasformatore MT integrato

NOVITÀ



ALTO RENDIMENTO

- Tecnologia avanzata a tre livelli, efficienza massima dell'inverter 99%
- Raffreddamento efficace, funzionamento a piena potenza a 45 °C



SMART O&M

- Funzioni di "zone monitoring" e monitoraggio dei parametri MV integrate, per analisi on-line e risoluzione dei guasti
- Design modulare, manutenzione semplificata



RISPARMIO SULL'INVESTIMENTO

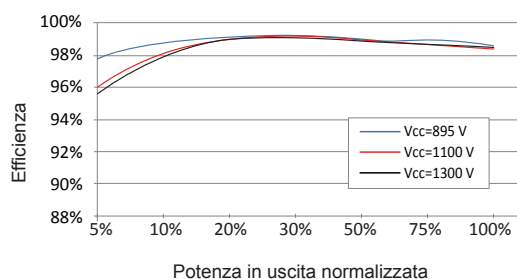
- Bassi costi di trasporto e installazione grazie al design del container da 40 piedi
- Impianto 1500 V CC, costi di sistema ridotti
- Trasformatore MT/BT, cella di media tensione e quadro di distribuzione ausiliaria integrati
- Funzione Q @ night opzionale



SUPPORTO ALLA RETE

- Conformità alle norme: IEC 61727, IEC 62116, IEC 62271-202, IEC 62271-200, IEC 60076
- Low/High voltage ride through (L/HVRT)
- Controllo della potenza attiva e reattiva e controllo della rampa di potenza

CURVA DI EFFICIENZA



Modello	SG6600UD-MV	SG8800UD-MV
Ingresso (CC)		
Tensione massima FV in ingresso	1500 V	
Tensione minima FV in ingresso / Tensione di avviamento	895 V / 905 V	
Intervallo di tensione MPP	895 – 1500 V	
N. di ingressi MPP indipendenti	6	8
N. di ingressi CC	30 (in opzione: 36/42 ingressi con polo negativo a terra)	40 (in opzione: 48/56 ingressi con polo negativo a terra)
Corrente massima FV in ingresso	6 * 1435 A	8 * 1435 A
Massima corrente di cortocircuito CC	6 * 3528 A	8 * 3528 A
Configurazione del generatore FV	Polo negativo a terra / Floating	
Uscita (CA)		
Potenza di uscita CA	6600 kVA a 45 °C 6798 kVA a 40 °C 7590 kVA a 22,5 °C	8800 kVA a 45 °C 9064 kVA a 40 °C 10120 kVA a 22,5 °C
Corrente di uscita massima inverter	6 x 1160 A	8 x 1160 A
Corrente massima in uscita CA	438,3 A	292,2 A
Intervallo di tensione CA	10 kV – 35 kV	20 kV – 35 kV
Frequenza nominale di rete / Intervallo di frequenza di rete	50 Hz / 45 – 55 Hz, 60 Hz / 55 – 65 Hz	
Distorsione armonica totale (THD)	< 3% (alla potenza nominale)	
Fattore di potenza alla potenza nominale / Fattore di potenza regolabile	>0,99 / 0,8 in entrata – 0,8 in uscita	
Fasi alimentazione / Connessione CA	3 / 3-PE	
Efficienza		
Efficienza massima dell'inverter / Efficienza europea dell'inverter	99,0% / 98,8%	
Trasformatore		
Potenza nominale del trasformatore	6600 kVA	8800 kVA
Potenza massima del trasformatore	7590 kVA	10120 kVA
Tensione LV / MT	0,63 kV / 0,63 kV / (10 – 35) kV	0,63 kV / 0,63 kV / (20 – 35) kV
Impedenza di corto circuito	8% (0 – ±10%) a 6600 kVA	9,5% (0 – ±10%) a 8800 kVA
Gruppo vettoriale	Dy11y11	
Tipo di raffreddamento del trasformatore	ONAN	
Tipo di olio	Olio minerale (privo di PCB) o olio biodegradabile su richiesta	
Protezioni e funzionalità		
Protezione ingressi CC	Sezionatore di carico + fusibile	
Protezione uscita inverter	Interruttore automatico	
Protezione uscita MT CA	Interruttore automatico	
Protezione da sovracorrente	CC Tipo II / CA Tipo II	
Monitoraggio rete / Monitoraggio delle dispersioni a terra	SI / SI	
Monitoraggio isolamento	SI	
Protezione da surriscaldamento	SI	
Funzione Q @ night	In opzione	
Dati generali		
Dimensioni (LarghezzaxAltezzaxProfondità)	12192x2896x2438 mm	
Peso	27,5 T	31,5 T
Grado di protezione	Inverter: IP65 / Altri: IP54	
Alimentazione ausiliaria	5 kVA (in opzione: max. 40 kVA)	
Intervallo di temperatura ambiente di esercizio	Da -35 a 60 °C (>45 °C depotenziamento)	
Intervallo di umidità relativa consentito	0 – 100%	
Metodo di raffreddamento	Raffreddamento ad aria forzata a temperatura controllata	
Altitudine massima di esercizio	1000 m (standard) / > 1000 m (in opzione)	
Display	Indicatori LED, WLAN+WebHMI	
Comunicazione	Standard: RS485, Ethernet; in opzione: fibra ottica	
Conformità	CE, IEC 62109, IEC 61727, IEC 62116, IEC 62271-202, IEC 62271-200, IEC 60076	
Supporto rete	Funzione reattiva notturna (Q @ night; in opzione), L/HVRT, controllo potenza attiva e reattiva e controllo della rampa di potenza	



SF7 | Single-Axis Tracker

The next-generation-now horizontal single-axis solar tracker



TECHNICAL DATASHEET



Single-Axis Tracker

MAIN FEATURES

Tracking System	Horizontal Single-Axis with independent rows
Tracking Range	± 55° Optional: ± 60°
Drive System	Enclosed Slewing Drive, DC Motor
Power Supply	Dedicated Panel Optional: 120/240 Vac or 24 Vdc power-cable
Tracking Algorithm	Astronomical with TeamTrack® Backtracking
Communication	Open Thread Full Wireless Optional: RS-485 Full Wired RS-485 cable not included in Soltec scope
Wind Resistance	Per Local Codes
Land Use Features	
Independent Rows	YES
Slope North-South	3% Optional: up to 15%
Slope East-West	10% (4% under the tracker)
Ground Coverage Ratio	Configurable. Typical range: 30-50%
Foundation	Driven Pile Ground Screw Concrete
Temperature Range	
Standard	- 4°F to +131°F -20°C to +55°C
Extended	-40°F to +131°F -40°C to +55°C
Availability	>99%
Modules	Standard: 72 / 78 cells Optional: 60 Cells; Crystalline, Thin Film (Solar Frontier, First Solar and others)

SPAIN / Headquarters
Pol. Ind. La Serreta
Gabriel Campillo, s/n, 30500
Molina de Segura, Murcia, Spain
info@soltec.com
+34 968 603 153

MADRID
Núñez de Balboa 33, 1ªA
28001 Madrid
emea@soltec.com
+34 91 449 72 03

UNITED STATES
usa@soltec.com
+1 510 440 9200

BRAZIL
brasil@soltec.com
+55 071 3026 4900

MEXICO
mexico@soltec.com
+52 1 55 5557 3144

CHILE
chile@soltec.com
+56 2 25738559

PERU
peru@soltec.com
+51 1422 7279

INDIA
india@soltec.com
+91 124 4568202

AUSTRALIA
australia@soltec.com
+61 2 9275 8806

CHINA
china@soltec.com
+86 21 66285799

ARGENTINA
argentina@soltec.com
+54 9 114 889 1476

EGYPT
egypt@soltec.com

B&V Bankability report
DNV GL Technology
Review available
RWDI WIND TUNNEL TESTED

MODULE CONFIGURATIONS Approximate Dimentions

	Length	Height	Width		Length	Height	Width
2x28	29.2 m (95' 10")	4.1 m (13' 4")	4.1 m (13' 4")	2x42	43.6 m (143')	4.1 m (13' 4")	4.1 m (13' 4")
2x29	30.2 m (99' 1")			2x43.5	45.6 m (149' 7")		
2x30	31.4 m (103')			2x45	46.7 m (153' 3")		

SERVICES

Pull Test Plan	Commissioning Plan
Factory Support Plan	Operation & Maintenance Plan
Onsite Advisory Plan	Tracker Monitoring System Plan
Construction Plan	Solmate Customer Care

MAINTENANCE ADVANTAGES

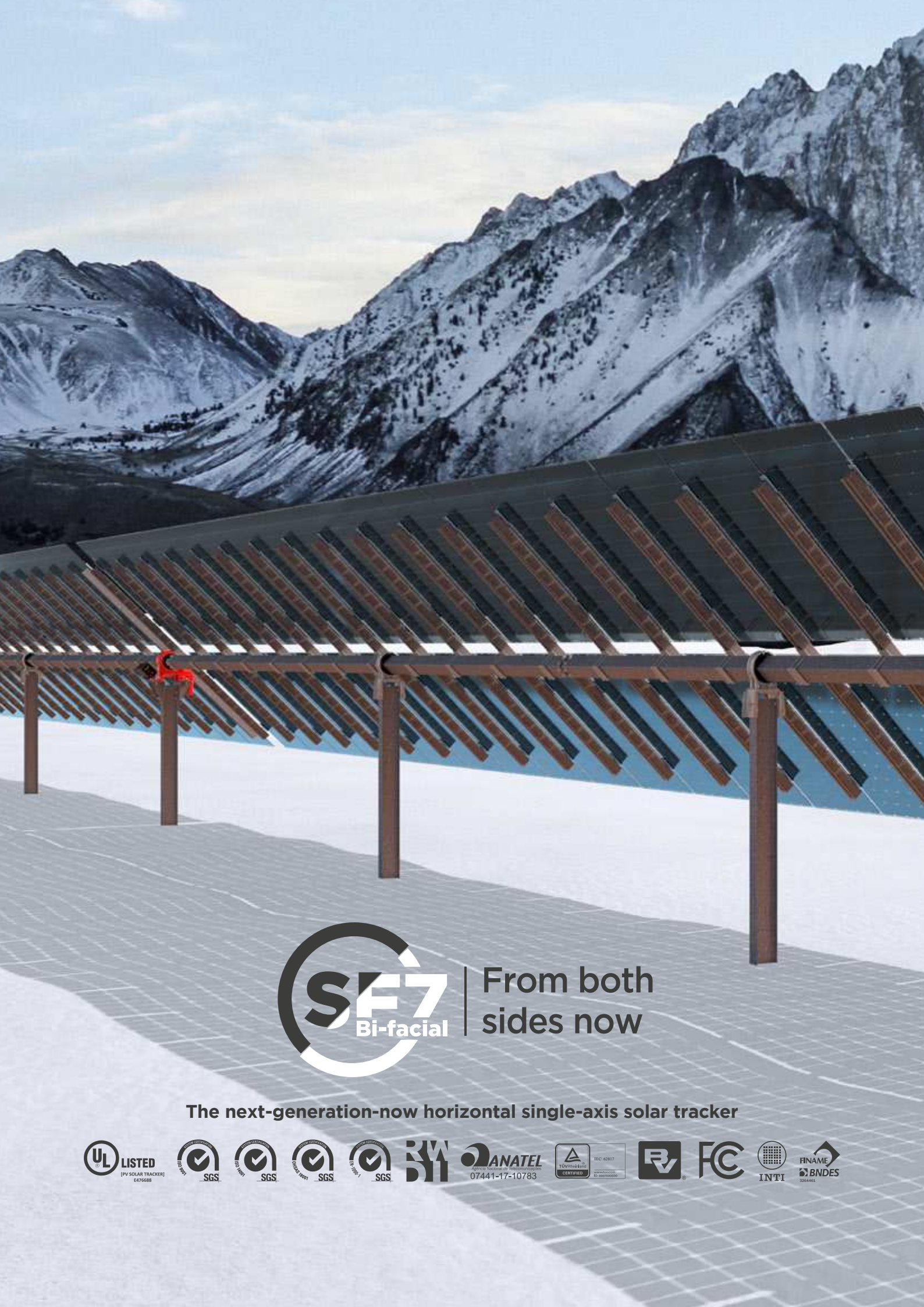
Self-lubricating Bearings
Face to Face Cleaning Mode
2x Wider Aisles

WARRANTY

Structure 10 years (extendable)
Motor 5 years (extendable)
Electronics 5 years (extendable)



soltec.com



From both
sides now

The next-generation-now horizontal single-axis solar tracker



TECHNICAL DATASHEET



Single-Axis Tracker

MAIN FEATURES

Tracking System	Horizontal Single-Axis with independent rows	
Tracking Range	± 55° Optional: ± 60°	
Drive System	Enclosed Slewing Drive, DC Motor	
Power Supply	Dedicated Panel Optional: 120/240 Vac or 24 Vdc power-cable	
Tracking Algorithm	Astronomical with TeamTrack® Backtracking	
Communication	Open Thread	Full Wireless Optional: RS-485 Full Wired RS-485 cable not included in Soltec scope
Wind Resistance	Per Local Codes	
Land Use Features		
Independent Rows	YES	
Slope North-South	3% Optional: up to 15%	
Slope East-West	10% (4% under the tracker)	
Ground Coverage Ratio	Configurable. Typical range: 30-50%	
Foundation	Driven Pile Ground Screw Concrete	
Temperature Range		
Standard	- 4°F to +131°F -20°C to +55°C	
Extended	-40°F to +131°F -40°C to +55°C	
Availability	>99%	
Modules	Bifacial	

SPAIN / Headquarters
Pol. Ind. La Serreta
Gabriel Campillo, s/n, 30500
Molina de Segura, Murcia, Spain
info@soltec.com
+34 968 603 153

MADRID
Núñez de Balboa 33, 1ªA
28001 Madrid
emea@soltec.com
+34 91 449 72 03

UNITED STATES
usa@soltec.com
+1 510 440 9200

BRAZIL
brasil@soltec.com
+55 071 3026 4900

MEXICO
mexico@soltec.com
+52 1 55 5557 3144

CHILE
chile@soltec.com
+56 2 25738559

PERU
peru@soltec.com
+51 1422 7279

INDIA
india@soltec.com
+91 124 4568202

AUSTRALIA
australia@soltec.com
+61 2 9275 8806

CHINA
china@soltec.com
+86 21 66285799

ARGENTINA
argentina@soltec.com
+54 9 114 889 1476

EGYPT
egypt@soltec.com

B&V Bankability report
DNV GL Technology
Review available
RWDI WIND TUNNEL TESTED

2 year background industrial operation



MODULE CONFIGURATIONS Approximate Dimensions

	Length	Height	Width		Length	Height	Width
2x27	28.1 m (92' 3")	4.21 m (13' 10")	4.17 m (13' 8")	2x40.5	42.4 m (139' 3")	4.21 m (13' 10")	4.17 m (13' 8")
	2x28				29.6 m (97' 1")		

SERVICES

Pull Test Plan	Commissioning Plan
Factory Support Plan	Operation & Maintenance Plan
Onsite Advisory Plan	Tracker Monitoring System Plan
Construction Plan	Solmate Customer Care

MAINTENANCE ADVANTAGES

Self-lubricating Bearings
Face to Face Cleaning Mode
2x Wider Aisles

WARRANTY

Structure 10 years (extendable)
Motor 5 years (extendable)
Electronics 5 years (extendable)

www.soltec.com

Contents subject to change without prior notice © Soltec Energías Renovables S.L. • SF7.210706.V7



Single-Axis
Tracker

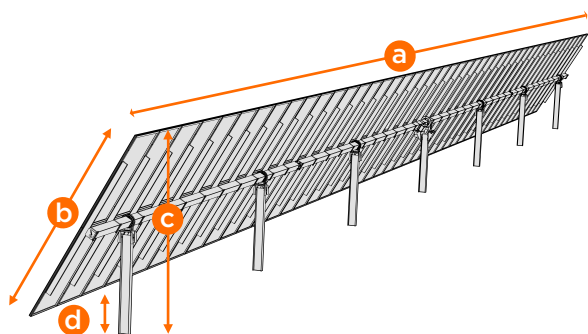
SF7

GENERAL TECHNICAL DESCRIPTION

- | | |
|---|--|
| 02 1. OVERVIEW | 06 6.1 Pre-existing field considerations |
| 03 2. MAIN FEATURES | 06 6.2 Requirements of drainage of surface waters |
| 04 3. MECHANICAL STRUCTURE | 06 6.3 Conditions of fill compaction |
| 05 4. TRACKERS POWER SUPPLY | 06 7. MAINTENANCE |
| 05 5. DRIVE SYSTEM | 06 8. CERTIFICATES OF QUALITY |
| 06 6. CONDITIONS FOR PROPER FOUNDATION | |

1. OVERVIEW

SF7 is an independent row solar tracker. It allows great installation flexibility in foundation, communication and size terms.



PV modules Configuration	Dimension*	Metric (meters)	Imperial (feet)
2x28	a	29.2	95.8
2x29	a	30.2	99.1
2x30	a	31.4	103
2x42	a	43.6	143
2x43.5	a	45.6	149.6
2x45	a	46.7	153.2
	b	4.1	13.3
	c**	4.1	13.4
	d***	0.5	1.6

*PV Modules of 2031 mm x 1008 mm (80 inch x 40 inch) **Max. height tracker at 60° nominal to ground level
***Max. clearance tracker at 60° nominal to ground level

Tracking Range	+120° (configurable)
Power Supply	Self-Powered / Grid-Powered
Drive Power	200 W max.
Tracker speed to go to STOW	< 20° / min
Tracking algorithm	Astronomical with TeamTrack Assymetric Backtracking
Monitoring and control	Tracker Monitoring System (TMS)
Communication	Full Wireless: 2.4GHz Radio communications between Trackers and between Gateway
Maximum wind resistance (in any position)	32 mph (60 km/h)
Maximum wind resistance (in stow position)	Configurable according to local regulations*
PV Module fasteners	Bolts, rivets, clamps
PV Modules supported	60-72-78 c-Si Crystalline, thin-film (First Solar, Solar Frontier...), Bifacial
Grounding	Soltec will guarantee tracker bonding according to Soltec UL and IEC certificates. For this purpose Soltec will provide only a bonding jumper for each motor pile.

*Maximum wind trigger is configurable by Soltec according to local conditions



2. MAIN FEATURES

Cost-effectiveness is the principal innovation criteria that SF7 standardization has followed. The feature-elements of cost-effectiveness are summarized here:

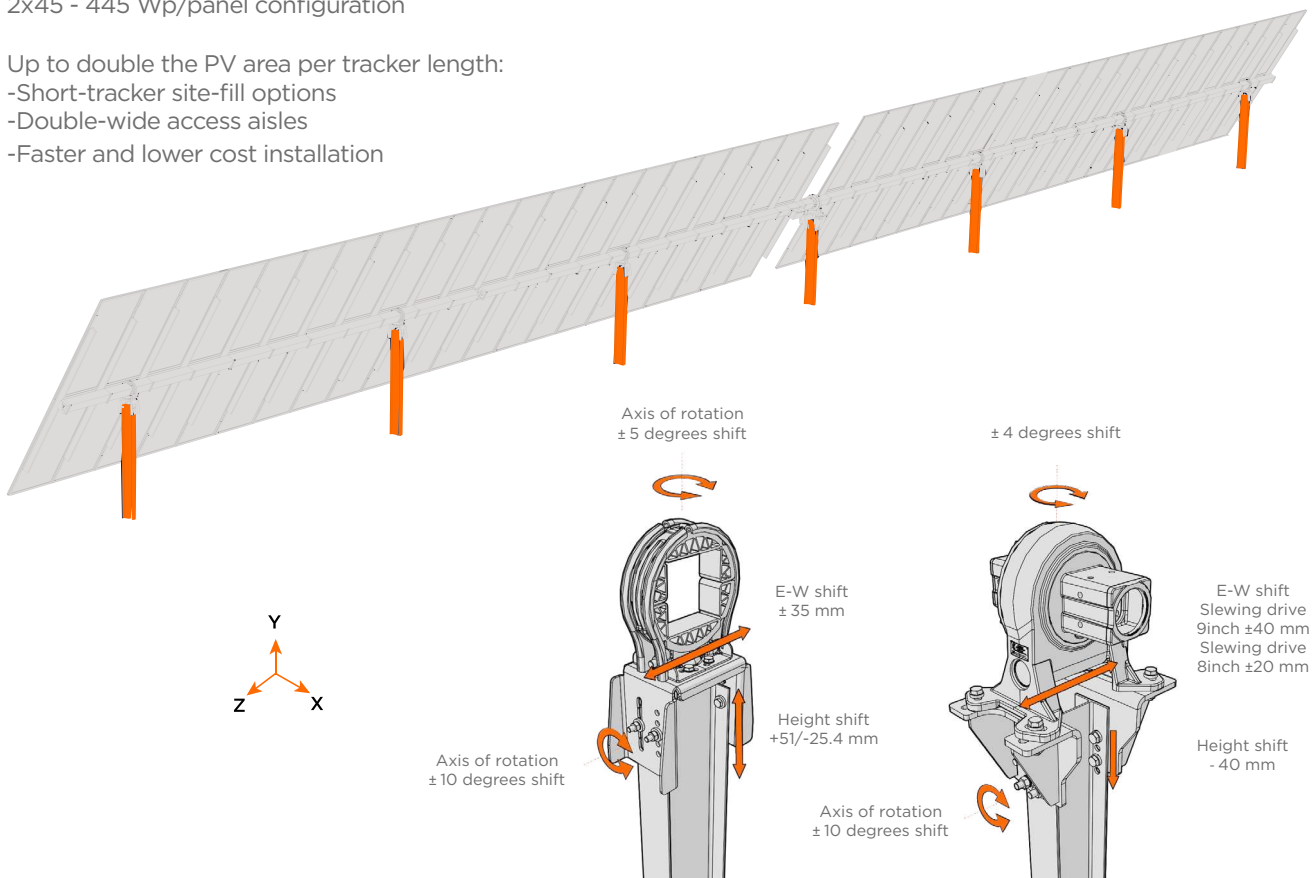
Yield enabler	Less array-gap on the tracker. Less site-gaps on the ground. Tracking range from -60 to +60°. TeamTrack Asymmetric Backtracking.
Land-use enabler	Independent-row, short-tracker design reaches into non-square site corners and over irregular land. Extends yield potential to where others cannot build without additional non-standard cost.
High installation tolerances	Steep-slope tolerance up to 17% grade on NS axis*. Contours tolerance to + 0.2m (0.66 ft). Short-steps tolerance <48m (157 f). Piles vertical plumb tolerance +2°. Market highest assembly tolerances in all three axes of pile mounting bracket installation.
Tolerance features savings	Reduce civil works, installation labor, timeline, and delays.

*The maximum slope considered in each project could vary.

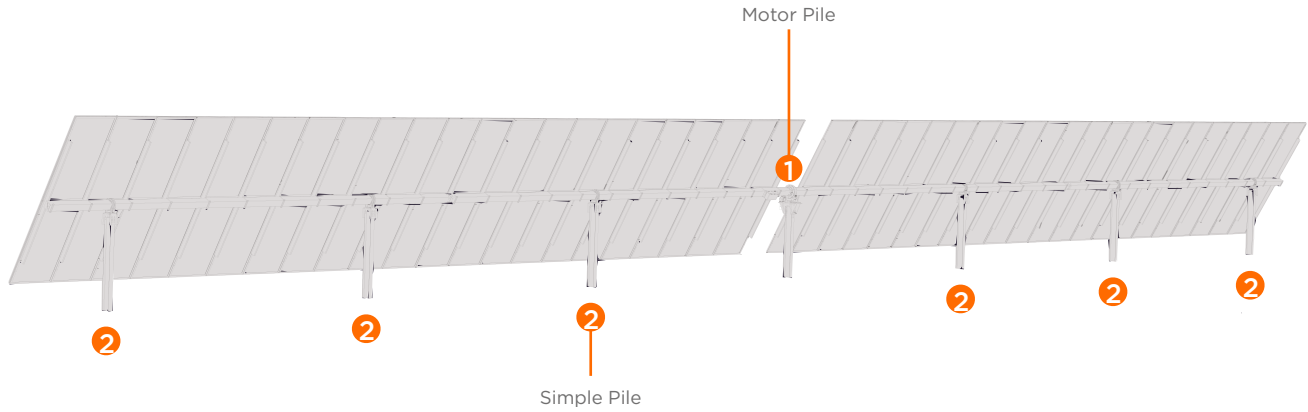
Lowest piles-per-MW

7 piles-per-tracker: 175 piles-per-MW
2x45 - 445 Wp/panel configuration

- Up to double the PV area per tracker length:
- Short-tracker site-fill options
 - Double-wide access aisles
 - Faster and lower cost installation



3. MECHANICAL STRUCTURE



	Profile	Coating	Standards	Standard pile dimensions**		
				meters	feet	
Foundation*	1 Motor pile: W8x13 or W8x15 or W8x18 or W8x21	Hot dip galvanized	ASTM A123/ ISO 1461	Total	3.3	10.8
	2 Simple pile: W8x10 or CF 200			Height	1.8	5.9
				Embedment	1.5	4.9

*Optional: Motor and simple pile foundation screw

**Dimensions may vary depending on project

	Material	Coating	Standards
Pile	A57250 ksi / A57260 ksi	Hot dip galvanized	ASTM A123/ ISO 1461
Mounting Brackets	A57250 ksi / A57260 ksi	Pregalvanized Hot dip galvanized Magnelis® / PosMAC	ASTM A123/ ISO 1461 EN 10346
Torque tube	A57250 ksi / A57260 ksi	Pregalvanized Hot dip galvanized Magnelis® / PosMAC	ASTM A123/ ISO 1461 EN 10346
Module support	A57250 ksi / A57260 ksi	Pregalvanized Hot dip galvanized Magnelis® / PosMAC	ASTM A123/ ISO 1461 EN 10346
Hardware	Steel 6.8, 8.8, 10.9, 12.9	Electrolytic treatment of Zinc-Nickel + sealant	ISO 10683/ ISO 19598

	Material	Coating
PV Module fasteners	Bolt connection M6x20, DIN933	Steel 8.8 Electrolytic treatment of Zinc-Nickel + sealant
	Rivet, Ø 6.4mm	Stainless steel Aluminum - Anodized
	Clamps	Stainless steel Aluminum - Anodized



4. TRACKERS POWER SUPPLY

Self-Powered Tracker

SF Trackers are by default **Self-Powered**. TCB is powered from a separate dedicated panel supplied by Soltec. It is installed on the tracker and TCB manages the power required for the movement of the tracker through a charge controller and an internal battery.

Tracker powering independent from electrical plant issues
Battery charge management. Controlled voltage and current, with temperature compensation.
LiFePO ₄ Battery, used to store energy.
Filtered input and output to avoid disturbances with other equipment.
Automatic battery disconnection to prevent deep discharge, with automatic reconnection.
Backup supply during 3 days prior to switching to STOW.

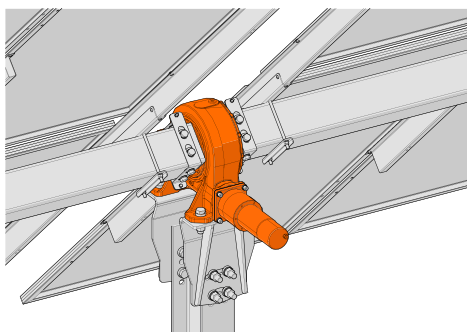
Grid-powered

TCB is powered from the AC electric grid of the PV plant.

Grid-powered electrical characteristics	
Power supply type	AC single phase
Range	100-240 V
Frequency	47-63 Hz
Maximum Input Current	2.1-3.4 A at 230V / 4.2-6.8 A at 115V

Contents subject to change without prior notice. TCB model may vary depending on the final configuration of the project.

5. DRIVE SYSTEM



Nominal voltage	24 VDC
Maximum power	200W
Enclosure Protection	IP55
Temperature range	Standard range: -20° to +55° C Extended: -40° to +55° C*

*Extended Temperature range entails limitations which can only be applied to Grid Powered

