Comune

MONSUMMANO TERME

Provincia

PISTOIA

Salvetti Graneroli engineering

Firmato digitalmente da

STEFANO SALVETTI

CN = SALVETTI STEFANO
O = Ordine degli Ingegneri della Provincia di Sondrio
C = IT

IMPIANTO SOLARE AGRIVOLTAICO DI MONSUMMANO

Progetto

IMPIANTO AGRIVOLTAICO A TERRA PER LA PRODUZIONE DI ENERGIA ELETTRICA SITO NEL COMUNE DI MONSUMMANO TERME (PT)

Istanza di valutazione di impatto ambientale per la costruzione e l'esercizio di impianti di produzione di energia elettrica alimentati da fonti rinnovabili ai sensi degli artt. 23, 24-24 bis e 25 del D.Lgs.152/2006

PROGETTO DEFINITIVO

Firmato digitalmente da

Carlo Graneroli

CN = Graneroli Carlo
O = Ordine degli Ingegneri della Provincia di Sondrio
C = IT

Oggetto

A - RELAZIONI
Schede tecniche dei materiali

Progettista

Dott. Ing. STEFANO SALVETTI n. 459 sezione A a-Civile e ambientale b-Industriale c-Dell'informazione
ORDINE INGEGNERI DELLA PROVINCIA DI SONDRIO

Dott. Ing. CARLO GRANEROLI n. 517 sezione A a-Civile e ambientale b-Industriale c-Dell'informazione
ORDINE INGEGNERI DELLA PROVINCIA DI SONDRIO

Aggiornamenti

Rev.	Data	Descrizione
0	03/04/2023	Emissione

Committente

RNE6 S.R.L.
Viale San Michele del Carso, 22
20144 Milano (MI)

Data	Scala	Tavola
03/04/2023	-	A.08_00

SONDRIO L. Mallero Cadorna, 49
Tel: 0342.211625
Fax: 0342.519070
E-mail: info@salvettigraneroli.com
PEC: salvettigranerolienginеering@pec.it
C.F./P.IVA: 01013400146

SOMMARIO

1 MODULI FV

Hi-MO 6
Scientists

LR5-72HTH
580~600M

- Suitable for distributed projects
- Excellent outdoor power generation performance
- High module quality ensures long-term reliability

15 15-year Warranty for Materials and Processing

25 25-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

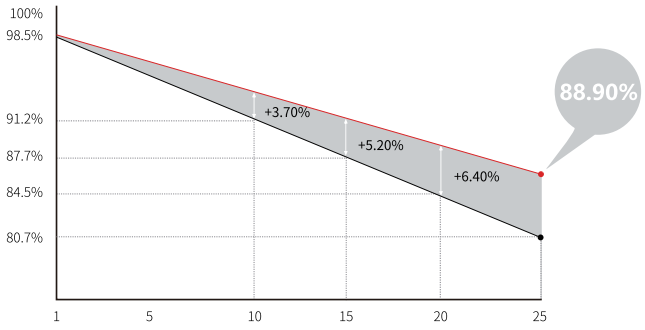
Hi-MO 6

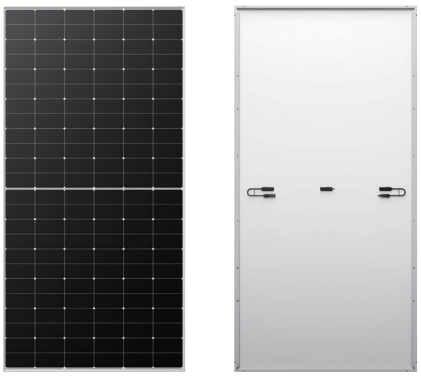
LR5-72HTH 580~600M

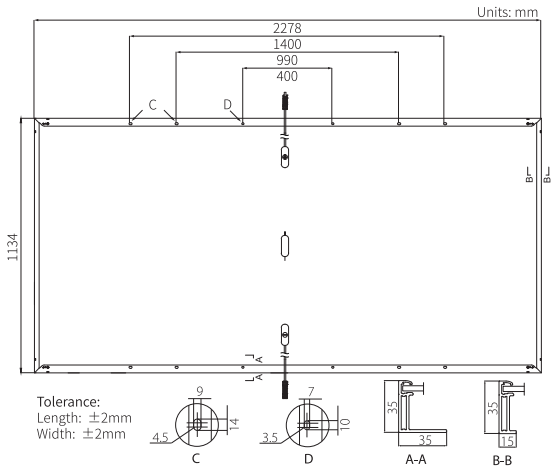
23.2%	0~3%	<1.5%	0.40%
MAX MODULE EFFICIENCY	POWER TOLERANCE	FIRST YEAR POWER DEGRADATION	YEAR 2-25 POWER DEGRADATION

Additional Value

25-Year Power Warranty







Mechanical Parameters

Cell Orientation	144 (6×24)
Junction Box	IP68, three diodes
Output Cable	4mm², +400, -200mm/±1400mm length can be customized
Glass	Single glass, 3.2mm coated tempered glass
Frame	Anodized aluminum alloy frame
Weight	27.5kg
Dimension	2278×1134×35mm
Packaging	31pcs per pallet / 155pcs per 20' GP / 620pcs 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	LR5-72HTH-580M		LR5-72HTH-585M		LR5-72HTH-590M		LR5-72HTH-595M		LR5-72HTH-600M	
Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax/W)	580	433	585	437	590	441	595	445	600	448
Open Circuit Voltage (Voc/V)	52.21	49.02	52.36	49.16	52.51	49.30	52.66	49.44	52.81	49.58
Short Circuit Current (Isc/A)	14.20	11.47	14.27	11.52	14.33	11.57	14.40	11.63	14.46	11.68
Voltage at Maximum Power (Vmp/V)	44.06	40.20	44.21	40.34	44.36	40.48	44.51	40.62	44.66	40.75
Current at Maximum Power (Imp/A)	13.17	10.78	13.24	10.84	13.31	10.90	13.37	10.97	13.44	11.00
Module Efficiency(%)	22.5		22.6		22.8		23.0		23.2	

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	25A
Nominal Operating Cell Temperature	45±2°C
Protection Class	Class II
Fire Rating	UL type 1 or 2 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)

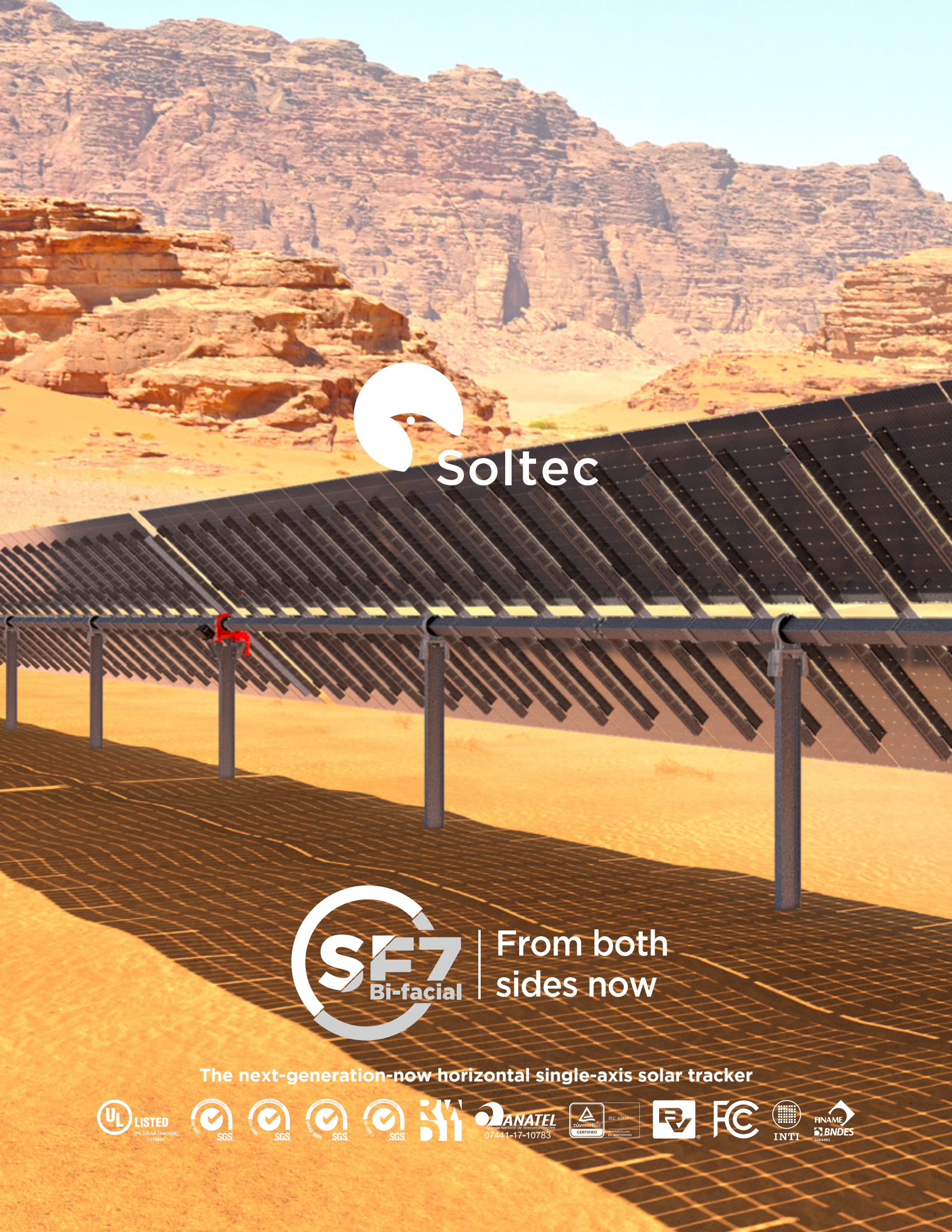
Temperature Coefficient of Isc	+0.050%/°C
Temperature Coefficient of Voc	-0.230%/°C
Temperature Coefficient of Pmax	-0.290%/°C

LONGi

No.8369 Shangyuan Road, Xi'an Economic And Technological Development Zone, Xi'an, Shaanxi, China.

Web: www.longi.com

2 STRUTTURE DI SOSTEGNO MODULI FV

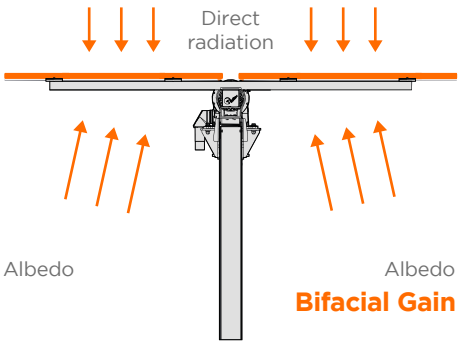

Soltec
SF7
Bi-facial
From both
sides now
The next-generation-now horizontal single-axis solar tracker
LISTED
[PV SOLAR TRACKER]
E476688
SGS
ANATEL
07441-17-10783
TÜVRheinland
CERTIFIED
IEC 62817
FC
INTI
FINAME
BNDES
3264461

Bifacial Yield Boost

SF7 Bi-facial

Single-Axis Tracker

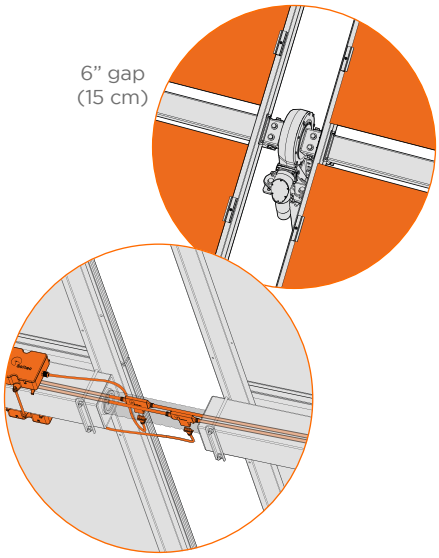
The SF7 standard configuration enables cost-effective installation, operation, and innovation such as the bifacial tracking solution.



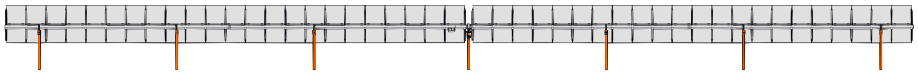
Bifacial Gain

No Shading

Two-up portrait module mounting: no backside shading from torque tube.

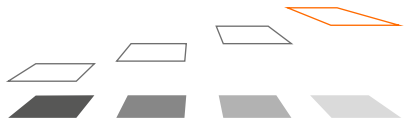


Eliminates hanging wires and manages cable through the torque tube, reducing the total wire up to **83%** and installation labor up to **75%**.



Only 7 piles per every 90 modules and no dampers, minimizing the number of objects shading the rear side of the modules. 46% fewer piles per MW.

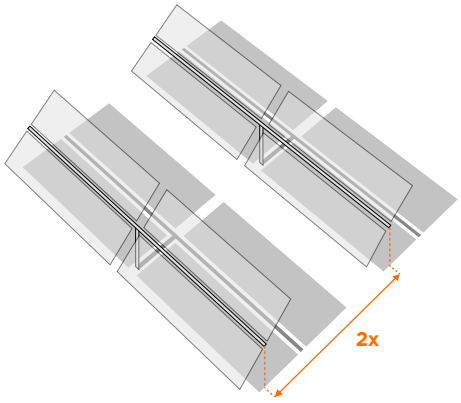
Taller Tracker



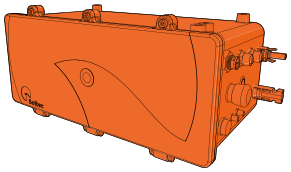
Bifacial performance is increased by height of installation, reducing shadow intensity projection.

2x Wider Aisles

Maximize reflected solar energy (albedo) while improve O&M accessibility for modules washing and vegetation control.



Highest Power Density



SF7 is **Self-Powered PV Series** and does not require an extra module. More PV active area per tracker for better land-use.

UNITED STATES
5800 Las Positas Road
Livermore, CA 94551
usa@soltec.com
+1 510 440 9200

SPAIN
(Murcia)
info@soltec.com
+34 968 603 153
(Madrid)
emea@soltec.com
+34 91 449 72 03

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 8067 8811

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

Soltec

www.soltec.com

3 POWER STATION

SIEMENS

Ingenuity for life

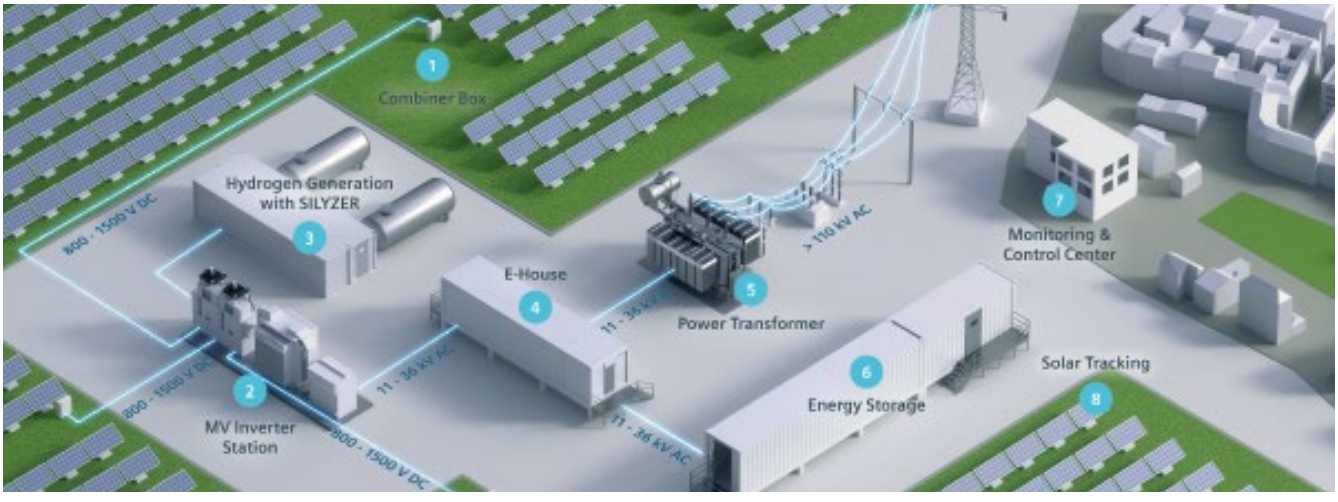
SINACON PV

Photovoltaic Central Inverter

Technical data 01/2020

The SINACON PV inverter is used in medium and large utility-scale photovoltaic power plants to achieve high efficiency. It is equipped with 3-level IGBT modules for input voltages of up to DC 1,500 V to maximize energy efficiency. The integrated DC and AC distribution makes the SINACON PV inverter cost efficient. Standardized interfaces for easy plug and play reduce engineering hours.

- Designed for harsh environments
- IP65 without humidity limits
- Liquid cooling (-40 °C ... +60 °C possible)
- Late power derating over 40 °C
- Extreme high quality standards



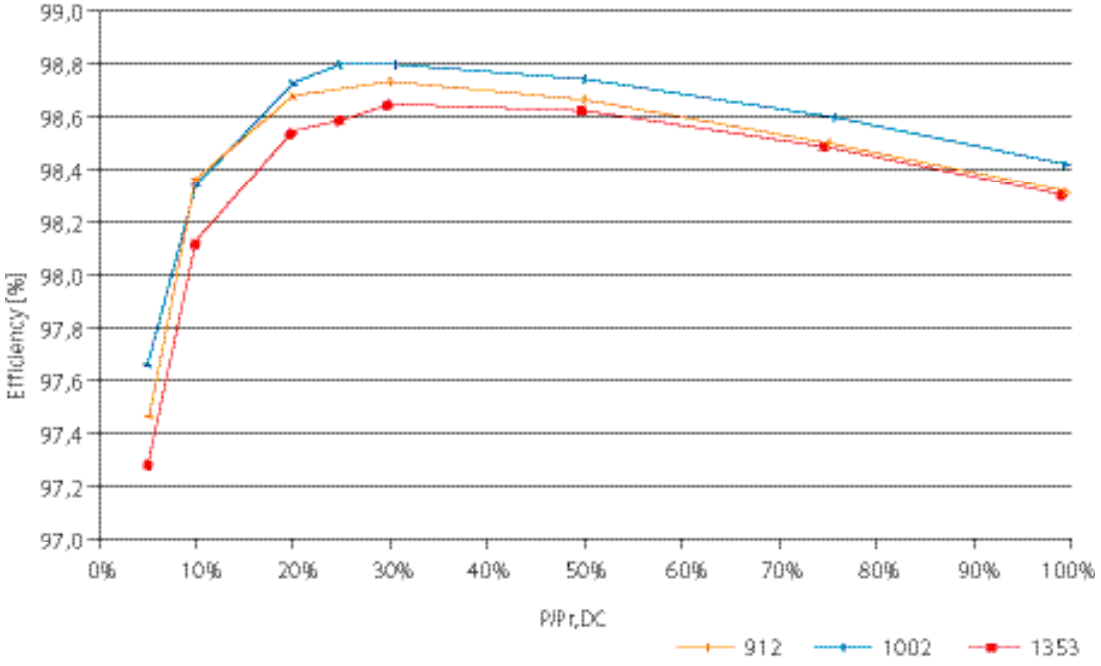
The SINACON PV inverter is part of the MV-Inverter Station with the transformer and RMU (Ring Main Unit) in the eBoP solution (electrical Balance of Plant).

Storage, transportation and operation				
Temperature			-40 °C ... +60 °C	
Relative humidity			0% ... 100%	
Maximum altitude of installation site without derating			< 1,500 m above MSL	
Cooling				
Cooling method	Forced cooling by means of fans and liquid cooling			
Applicable standards and conformity				
BDEW (Germany)	BDEW Guideline, FGW TG3, TG4 and TG8			
IEC 61683 (efficiency)	IEC 61683: 1999			
IEC 62116 (anti islanding)	IEC 62116: 2014 (at 50 Hz)			
EMC Emission	IEC 61000-6-4: 2007 + A1: 2011			
EMC Immunity	IEC 61000-6-2: 2005			
Electrical Safety	IEC 62109-1: 2010, IEC 62109-2: 2011, IP65 according to IEC 60529: 1989			
Degree of protection: IP65 (cabinet only)	IEC 60529			
General data				
Control strategy	MPPT			
Efficiency (PV 5000)	(97.6|98.5|98.9|98.9|99.0|98.9|98.8|98.7)%		For (5|10|20|25|30|50|75|100)% power at 1,006 V_{DC} without self-consumption for cooling	
EU and CEC efficiency	98.8%		Without internal consumption	
Infeed starts from	260 W ... 2,500 W		Depending on cooling	
Standby loss	80 W ... 150 W		–	
Max. self-consumption for cooling	5,000 W		Without cabinet heating	
Mechanical data				
Mounting position	Vertical		–	
Type of mounting	Floor mounting		–	
				
Number of Power Units	1	2	3	4
SINACON PV series	PV1000 ... PV1250	PV2000 ... PV2500	PV3000 ... PV3750	PV4000 ... PV5000
Dimensions (without pallet, with heat exchanger); (W x H x D)	2,120 x 3,760 x 1,170 mm		3,690 x 3,760 x 1,170 mm	
Weight[1)]	< 1,600 kg	< 2,200 kg	< 3,300 kg	< 3,900 kg
Color	RAL 7035			
Input data (DC)				
Independent inputs	1 ... 2		Depending on configuration	
Nominal voltage	min. MPP voltage		–	
DC voltage (max. MPP)	1,500 V		Depending on application	
DC voltage (min. MPP)	802 V / 882 V (AC 550 V) 838 V / 922 V (AC 575 V) 875 V / 962 V (AC 600 V) 919 V / 1,010 V (AC 630 V) 962 V / 1,058 V (AC 660 V) 1,006 V / 1,107 V (AC 690 V)		For 100 % / 110 % nominal grid voltage	
DC current (max.)	1 ... 4 x 1,200 A		–	
Short-circuit current (max.)	6,4 kA / 7 kA		250 A /315 A DC fuses	
Nominal power	1 ... 4 x 1,016 kW 1 ... 4 x 1,062 kW 1 ... 4 x 1,108 kW 1 ... 4 x 1,159 kW 1 ... 4 x 1,209 kW 1 ... 4 x 1,270 kW		–	
Capacitance to ground (max.)	2,000 µF		Per IT system	

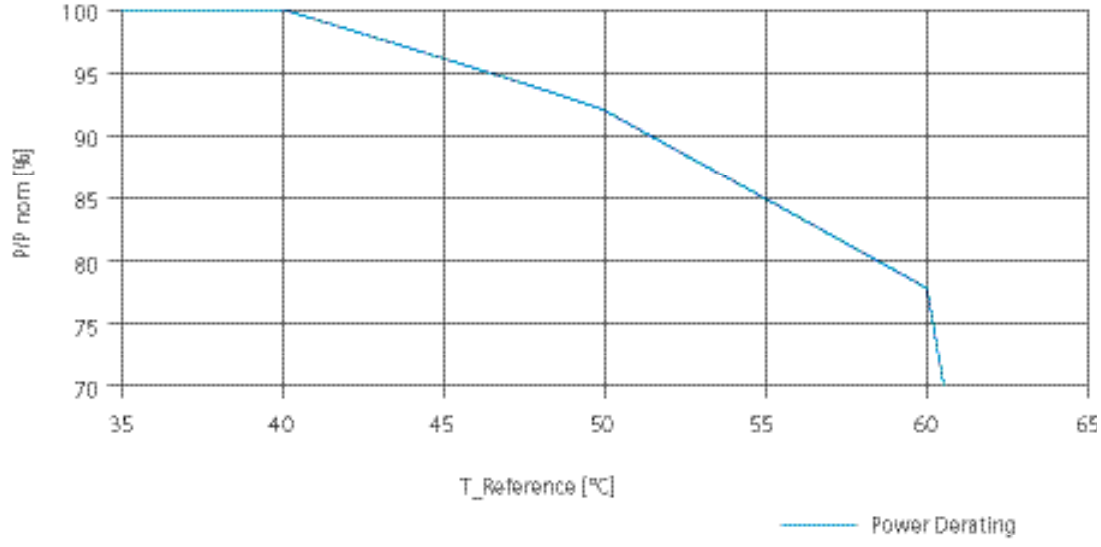
[1)] The weight refers to a complete system without extra options.

Output data (AC)		
Apparent power (max.) and nominal power	PV1000 ... PV4000 kVA (AC 550 V) PV1045 ... PV4180 kVA (AC 575 V) PV1090 ... PV4360 kVA (AC 600 V) PV1140 ... PV4560 kVA (AC 630 V) PV1200 ... PV4800 kVA (AC 660 V) PV1250 ... PV5000 kVA (AC 690 V)	With nominal grid voltage, cos φ = 1
Number of independent systems	1 ... 2	–
Grid voltage	550 ... 690 V (±10% at $U_{n\,(AC)}$)	–
Nominal frequency	50 Hz / 60 Hz (±10%)	–
Output current (max.)	1 ... 4 x 1,050 A	–
Short-circuit current (max.)	50 kA	–
Power factor cos φ	–	Adjustable to local requirements
Harmonic distortion	< 3%	–

Measured values[2)] without internal consumption for AC 600 V (PV4360)



Derating



[2)] Messured by Fraunhofer ISE

Order information – The order number consists of several digits depending on the configuration.

Description	1.	2.	3.	4.	5.	6.	7.	–	8.	9.	10.	11.	12.	–	13.	14.	15.	16.
SINACON PV inverter for medium voltage supply	6	S	P	1														
Number of power units																		
• 1 power unit					1													
• 2 power units					2													
• 3 power units					3													
• 4 power units					4													
Input connections (per power unit on plus and minus)																		
• 7 x M10 bolt and nut						0												
Initial current measurement at DC input																		
• Each + input measured							1											
Minimum operating ambient temperature																		
• Up to -10 °C									0									
• Up to -25 °C, with cabinet heating									1									
• Up to -40 °C, with cabinet heating and insulation									2									
Applied standards																		
• IEC with external AC connection										E								
• UL with external AC connection										U								
Network- / optical fiber switch connection																		
• Singlemode unmanaged											S							
• Multimode unmanaged											M							
• RJ45											R							
Seismic design																		
• Without seismic design												0						
• With seismic design												1						
Frequency																		
• 50 Hz													5					
• 60 Hz													6					
Inverter output AC voltage																		
• 550 V (PV1000 ... PV4000)															4			
• 575 V (PV1045 ... PV4180)															5			
• 600 V (PV1090 ... PV4360)															6			
• 630 V (PV1140 ... PV4560)															7			
• 660 V (PV1200 ... PV4800)															8			
• 690 V (PV1250 ... PV5000)															9			
Grounding / Insulation monitoring																		
• Insulation monitoring internal																I		
• Negative-pole grounding without isolation monitoring																N		
Inverter options																		
• None																	N	
• AC precharge																	A	
Additional internal transformer																		
• 63 A fuse																		2
• Transformer with 8 kVA, AC 400 V																		3
• none																		9
Example:	6	S	P	1	4	0	1	–	0	E	S	0	5	–	6	N	N	3

Published by
Siemens AG

Smart Infrastructure
Distribution Systems
Mozartstrasse 31c
91052 Erlangen, Germany

Article No. SIDS-B10020-00-7600
HL 19125033 WS 01200.0

For the U.S. published by
Siemens Industry Inc.

100 Technology Drive
Alpharetta, GA 30005
United States

4 SISTEMA DI ACCCUMULO BESS

ST2752UX-US

Liquid Cooling Energy Storage System
2 - 8 hour application

Preliminary

LOW COSTS

- Highly integrated ESS for easy transportation and O&M
- All pre-assembled, no battery module handling on site
- 8 hour installation to commission, drop on a pad and make electrical connections

SAFE AND RELIABLE

- Integrated DC/DC converters actively limit fault current
- DC electric circuit safety management includes fast breaking and anti-arc protection
- Multi level battery protection layers formed by discreet standalone systems offer impeccable safety

EFFICIENT AND FLEXIBLE

- Intelligent liquid cooling ensures higher efficiency and longer battery cycle life
- Modular design supports parallel connection and easy system expansion
- IP54 outdoor cabinet and optional C5 anti-corrosion

SMART AND ROBUST

- Fast state monitoring and faults record enables pre-alarm and faults location
- Integrated battery performance monitoring and logging

SUNGROW
Clean power for all

Type designation	ST2752UX-US
Battery Data	
Cell type	LFP
Battery capacity (BOL)	2752 kWh
Battery voltage range	1160 ~ 1500 V
General Data	
Dimensions of battery unit (W * H * D)	9340*2600*1730mm
Weight of battery unit	26,400kg
Degree of protection	IP 54/Type 3R
Operating temperature range	-30 to 50 ℃ (> 45 ℃ derating)
Relative humidity	0 ~ 95 % (non-condensing)
Max. working altitude	3000m
Cooling concept of battery chamber	Liquid cooling
Fire safety	Fused sprinkler heads, NFPA 69 explosion prevention and ventillation IDLH gases
Communication interfaces	RS485, Ethernet
Communication protocols	Modbus RTU, Modbus TCP
Compliance	UL 9540,UL 9540A/NFPA 855
2 HOURS APPLICATION-ST2752UX*4-5000UD-MV-US	
BOL kWh(DC/AC LV Side)	11,008kWh DC/10,379kWh AC
ST2752UX Quantity	4
PCS Model	SC5000UD-MV-US
4 HOURS APPLICATION-ST2752UX*8-5000UD-MV-US	
BOL kWh(DC/AC LV Side)	22,016kWh/21,448kWh
ST2752UX Quantity	8
PCS Model	SC5000UD-MV-US
Grid Connection Data	
Max.THD of current	< 3 % (at nominal power)
DC component	< 0.5 % (at nominal power)
Power factor	> 0.99 (at nominal power)
Adjustable power factor	1.0 leading ~ 1.0 lagging
Nominal grid frequency	60 Hz
Grid frequency range	55 ~ 65 Hz
Transformer	
Transformer rated power	5,000 kVA
LV/MV voltage	0.9 kV / 34.5 kV
Transformer cooling type	ONAN (Oil Natural Air Natural)
Oil type	Mineral oil (PCB free) or degradable oil on request