



**REGIONE LAZIO
PROVINCIA DI ROMA
COMUNE DI ARDEA**



ARDEA_26

PROGETTO DI UN LOTTO DI IMPIANTI AGRIVOLTAICI PN 14,03 MW/p



diviso in: LOTTO 1: PN 2889 kW; LOTTO 2: PN 5365 kW; LOTTO 3: 5778 kW

UBICAZIONE IMPIANTO:

Località La Fossa, snc
00040 Ardea (RM)
Foglio 46, particelle 144-146-2273

ITER AUTORIZZATIVO:

V.I.A. – Valutazione di impatto ambientale
D.Lgs n. 152/06 – art. 23

COMMESSA: 2021_FV26	DOCUMENTO: 2021_26_FV_R_06	TITOLO: DATASHEET COMPONENTI PRINCIPALI			
REV. 2					
REV. 1	REVISIONE	30/09/22	M. SESTILI	G. GROSSI	A. COSTANTINI
REV. 0	EMISSIONE	18/07/22	M. SESTILI	G. GROSSI	A. COSTANTINI
REV.	DESCRIZIONE	DATA	REDATTO	CONTROLLATO	APPROVATO
COMMITTENTE: ERMES S.P.A. Piazza Albania, 10 – 00153, Roma, Italia Tel: + 39 06 94838931 www.ermesgroup.it , info@ermesgroup.it , ermes@pec.ermesgroup.it C.F.:12730811002 P.IVA: 12730811002		PROGETTISTA:  			

 ERMES [®] INNOVAZIONE ENERGETICA	ARDEA _26	DOCUMENTO: 2021_26_FV_R_06	
	PROGETTO DI UN LOTTO DI IMPIANTI AGRIVOLTAICI PN 14,03 MW/p diviso in: LOTTO 1: PN 2889 kW; LOTTO 2: PN 5365 kW; LOTTO 3: 5778 kW	DATA: 30/09/22	
	Località La Fossa, snc - 00040 Ardea (RM)	REV.: 01	PAG.: 2/11

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ERMES S.p.A.

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Certificazioni:
 ISO 9001:2015 CERT. N. SC 20-4612
 UNI EN ISO 14001:2015 CERT.N.711294





BACKSHEET MONOCRYSTALLINE MODULE

PRODUCT: TSM-DE2L

POWER RANGE: 645-670W

670W

MAXIMUM POWER OUTPUT

0~+5W

POSITIVE POWER TOLERANCE

21.6%

MAXIMUM EFFICIENCY



High customer value

- Lower LCOE (Levelized Cost Of Energy), reduced BOS (Balance of System) cost, shorter payback time
- Lowest guaranteed first year and annual degradation
- Designed for compatibility with existing mainstream system components



High power up to 670W

- Up to 21.6% module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping effect, lower series resistance and improved current collection



High reliability

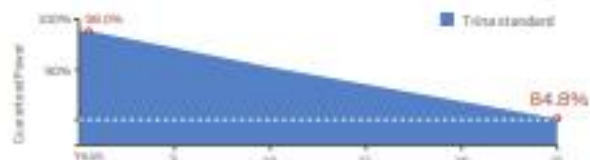
- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load



High energy yield

- Excellent IAM (Incident Angle Modifier) and low irradiation performance, validated by 3rd party certifications
- The unique design provides optimized energy production under inter-row shading conditions
- Lower temperature coefficient (-0.34%) and operating temperature

Trina Solar's Backsheet Performance Warranty



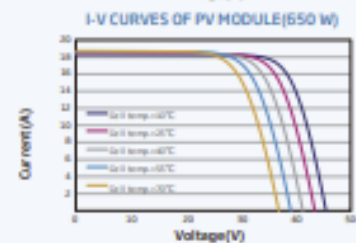
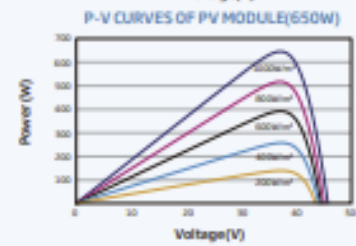
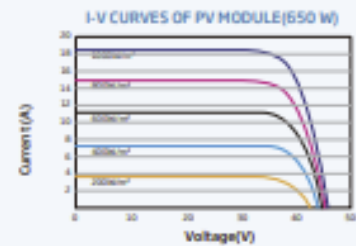
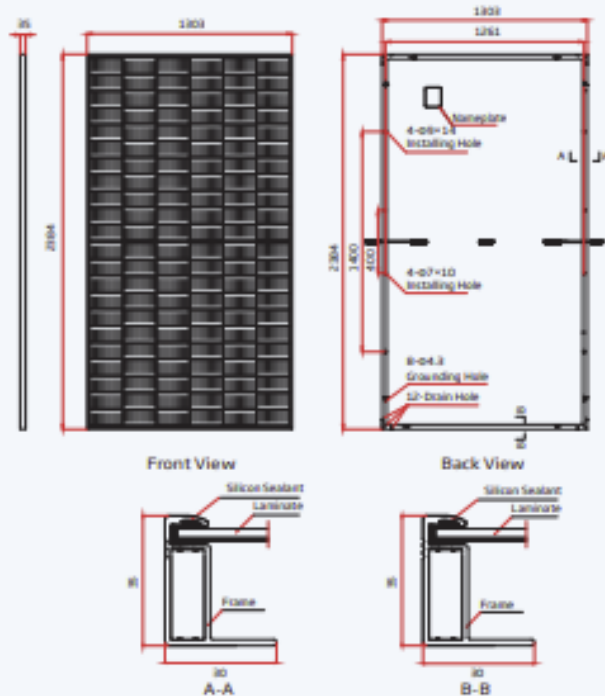
Comprehensive Products and System Certificates



IEC61215/IEC61730/IEC61701/IEC62716
 ISO 9001: Quality Management System
 ISO 14001: Environmental Management System
 ISO14064: Greenhouse Gas Emissions Verification
 ISO45001: Occupational Health and Safety Management System



DIMENSIONS OF PV MODULE(mm)



ELECTRICAL DATA (STC)

Peak Power Watts-Pmax (Wp)*	645	650	655	660	665	670
Power Tolerance-Pmax (W)	0 ~ +5					
Maximum Power Voltage-Vmp (V)	37.2	37.4	37.5	37.8	38.0	38.2
Maximum Power Current-Imp (A)	17.35	17.39	17.43	17.47	17.51	17.55
Open Circuit Voltage-Voc (V)	45.1	45.2	45.5	45.7	45.9	46.1
Short Circuit Current-Isc (A)	18.39	18.44	18.49	18.53	18.57	18.62
Module Efficiency η_m (%)	20.8	20.9	21.1	21.2	21.4	21.6

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass 1.5, *Measuring tolerance ±3%.

ELECTRICAL DATA (NOCT)

Maximum Power-Pmax (Wp)	488	492	496	500	504	508
Maximum Power Voltage-Vmp (V)	34.8	34.9	35.1	35.3	35.4	35.6
Maximum Power Current-Imp (A)	14.05	14.09	14.13	14.17	14.22	14.26
Open Circuit Voltage-Voc (V)	42.5	42.7	42.9	43.0	43.2	43.4
Short Circuit Current-Isc (A)	14.82	14.86	14.89	14.93	14.96	15.00

NOCT: Irradiance at 800W/m², Ambient Temperature 25°C, Wind Speed 2m/s.

MECHANICAL DATA

Solar Cells	Monocrystalline
No. of cells	132 cells
Module Dimensions	2304*1203*25 mm (91.86*51.30*1.38 inches)
Weight	23.6 kg (74.1 lb)
Class	3.2 mm (0.12 inches), High Transmission, 99 Coated Heat Strengthened Glass
Encapsulant material	EVA
Backsheet	White
Frame	25mm(1.38 inches) Anodized Aluminium Alloy
J-Box	IP68 rated
Cables	Photovoltaic Technology Cable 4.0mm ² (0.006 inches ²), Portrait: 290/290 mm(11.60/11.62 inches) Length can be customized
Connector	MCA EV02 / TSA*

*Please refer to regional list sheet for specified connectors.

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	47°C (±2°C)
Temperature Coefficient of Pmax	-0.24%/°C
Temperature Coefficient of Voc	-0.25%/°C
Temperature Coefficient of Isc	0.04%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (BC)
	1500V DC (LA)
Max Series Fuse Rating	20A

WARRANTY

12 year Product Workmanship Warranty
25 year Power Warranty
2% first year degradation
0.55% Annual Power Attenuation

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

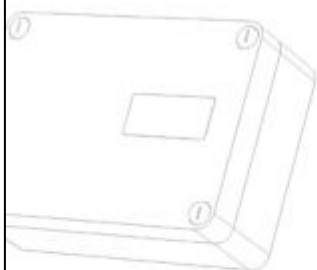
Modules per box: 31 pieces
Modules per 40' container: 558 pieces



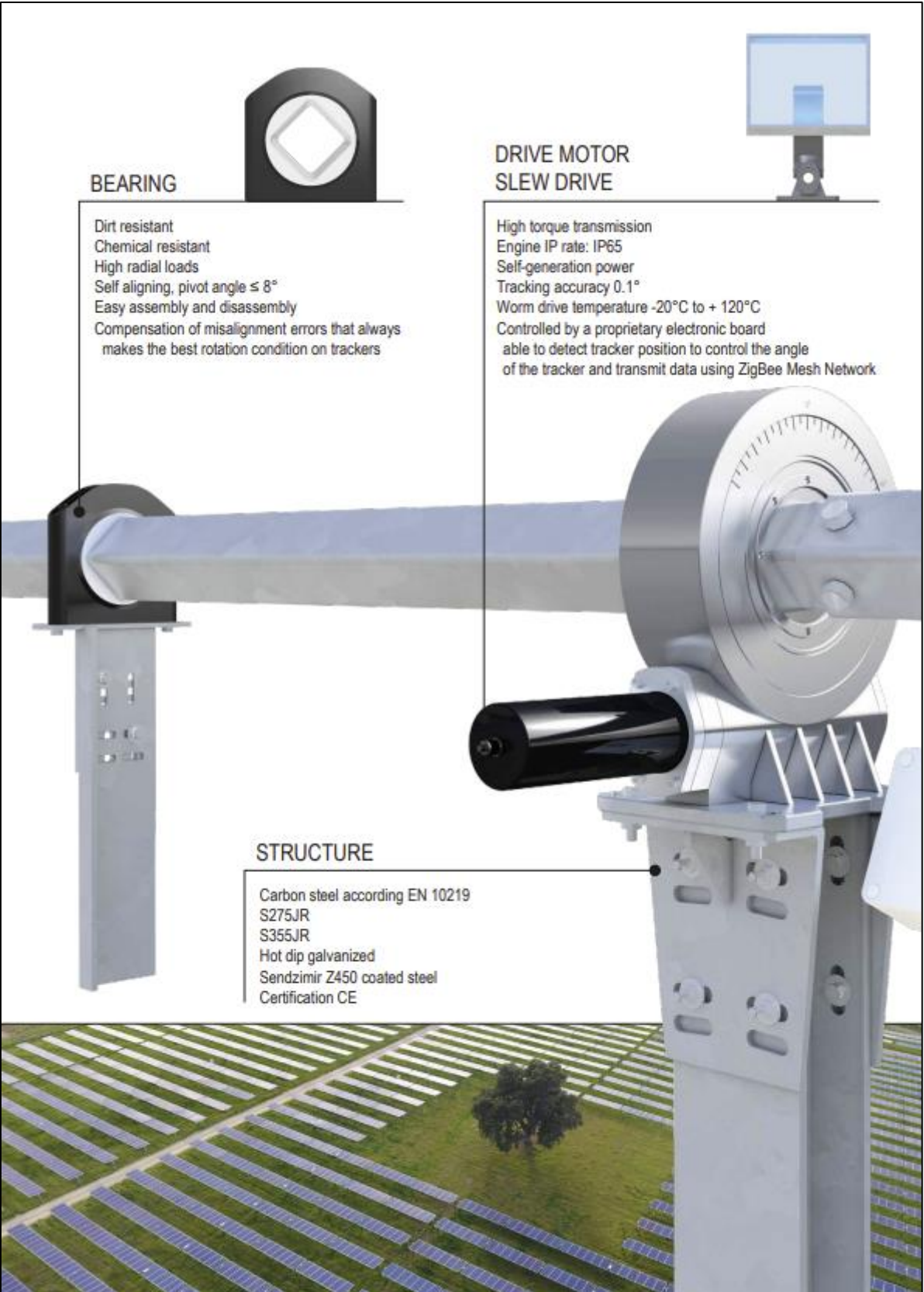
30TH ANNIVERSARY

Impianti srl

We build an endless energy



SUNHUNTER 18AB
TECHINICAL DATA SHEET



BEARING

- Dirt resistant
- Chemical resistant
- High radial loads
- Self aligning, pivot angle $\leq 8^\circ$
- Easy assembly and disassembly
- Compensation of misalignment errors that always makes the best rotation condition on trackers

DRIVE MOTOR SLEW DRIVE

- High torque transmission
- Engine IP rate: IP65
- Self-generation power
- Tracking accuracy 0.1°
- Worm drive temperature -20°C to $+120^\circ\text{C}$
- Controlled by a proprietary electronic board able to detect tracker position to control the angle of the tracker and transmit data using ZigBee Mesh Network

STRUCTURE

- Carbon steel according EN 10219
- S275JR
- S355JR
- Hot dip galvanized
- Sendzimir Z450 coated steel
- Certification CE

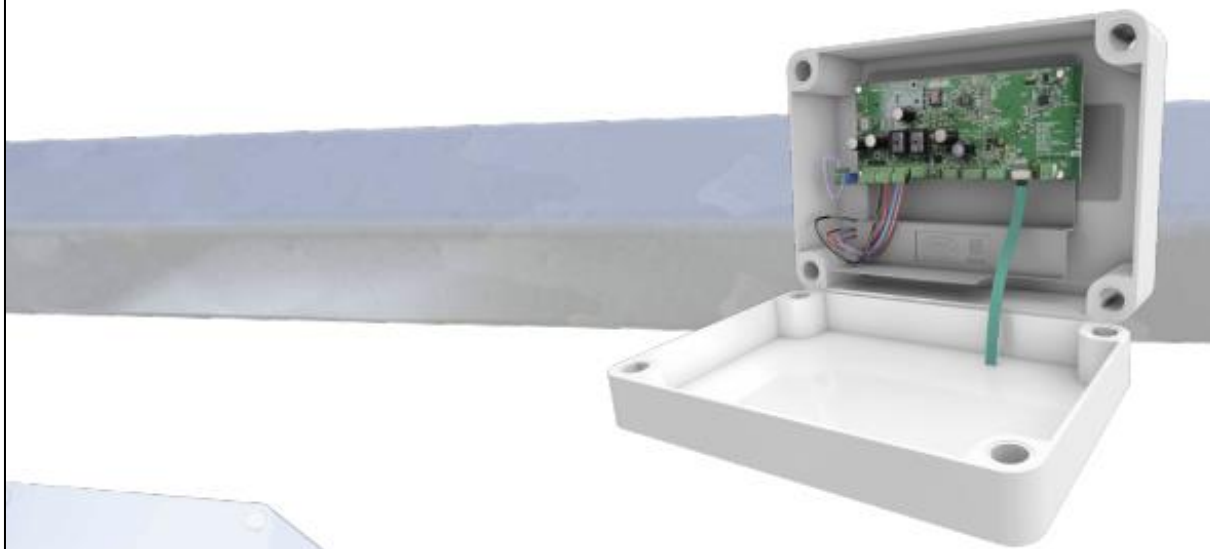
Sunhunter *An advanced, technically valid and economically competitive product.*

Comal "Sunhunter 18AB" Horizontal Single Axis System is easily adaptable, due to its flexibility characteristics, to the configuration of the various Photovoltaic Fields, in order to reach the objective of maximizing the power that can generate each individual field.

The use of different length trackers, mounting allowed on topographical slopes up to 8 degrees and the ability to independently set the angles of each tracker, even at the end of the back-tracking, allows to reach the aforementioned objective.

The Trackers System is characterized by two components: the Structural Component and the Electronic Component.

The structure can be adapted to the different electronic configurations required given the many configurations available, both landscape and portrait, both monofacial and bifacial. Each tracker is equipped with a controller containing the logic operation of the specific tracker. The controller can operate autonomously or with each other through a Mesh Radio Network thanks to the concentrator, which allows data exchange (status signals and remote commands) with a control room.



CONTROLLER

Self-powered: power kit with 30W photovoltaic panel battery 24V 6 Ah for each slew drive ready to hold a second battery

WPAN (wireless personal area networks): based on ZigBee standard IEEE 802.15.4

X-CHECK - INTEGRATED STRING CONTROL

Optionally, the X-Check system is provided for the integrated control of the string performance. The system is based on Comal Impianti proprietary technology and allows a real-time monitoring of the output power from the strings installed on the tracker.

TESTING

The Sunhunter tracker is subjected to a series of very stringent quality and durability test, aimed to guaranteeing maximum product quality and high system reliability.

- Wind tunnel test at University of Perugia
- CFD analysis
- Motor salt spray test
- Climatic chamber test
- Destructive testing of steel materials

CORE COMPONENTS OF SUNHUNTER SINGLE AXIS TRACKER

CONTROLLER

Self-powered: power kit with 30W photovoltaic panel battery 24V 6 Ah for each slew drive ready to hold a second battery
WPAN (wireless personal area networks): based on ZigBee standard IEEE 802.15.4

DRIVE MOTOR SLEW DRIVE

High torque transmission
Engine IP rate: IP65
Self-generation power
Tracking accuracy 0.1°
Worm drive temperature -20°C to + 120°C
Controlled by a proprietary electronic board able to detect tracker position to control the angle of the tracker and transmit data using ZigBee Mesh Network

STRUCTURE

Carbon steel according EN 10219
S275JR
S355JR
Hot dip galvanized
Sendzimir Z450 coated steel
Certification CE

BEARING

Dirt resistant
Chemical resistant
High radial loads
Self aligning, pivot angle $\leq 8^\circ$
Easy assembly and disassembly
Compensation of misalignment errors that always makes the best rotation condition on trackers

GENERAL CHARACTERISTICS

System type
Drive type
Tracking range of Motion
Power supply to motor / controller
Materials
Slope of terrain permitted
Max wind speed
Safety mode (automatic stow position)
Controller

Horizontal Single - Axis tracking
Slew drive (134W DC - 5.500 N*m)
 $\pm 55^\circ$
Self generation with panel 30W and battery 24V 6Ah
S275 JOH, S355 JOH hot dip galvanized; Sendzimir Z450
 $\leq 8^\circ$ N/S
14 m/s in stow position; wind tunnel tested up to 43 m/s
Wind mode / Vibration Mode
Electronic solar controller, Modbus protocol

CUSTOMER SERVICES



Structure calculation processing according to the client's request



Customization: available for both monofacial or bifacial solar modules

<i>1Xportrait configuration:</i>	<i>2Xportrait configuration:</i>
25 modules, 50 modules, 75 modules;	26 modules, 52 modules;
26 modules, 52modules, 78 modules;	28 modules, 56 modules;
27 modules, 54 modules; 81 modules.	30 modules, 60 modules.

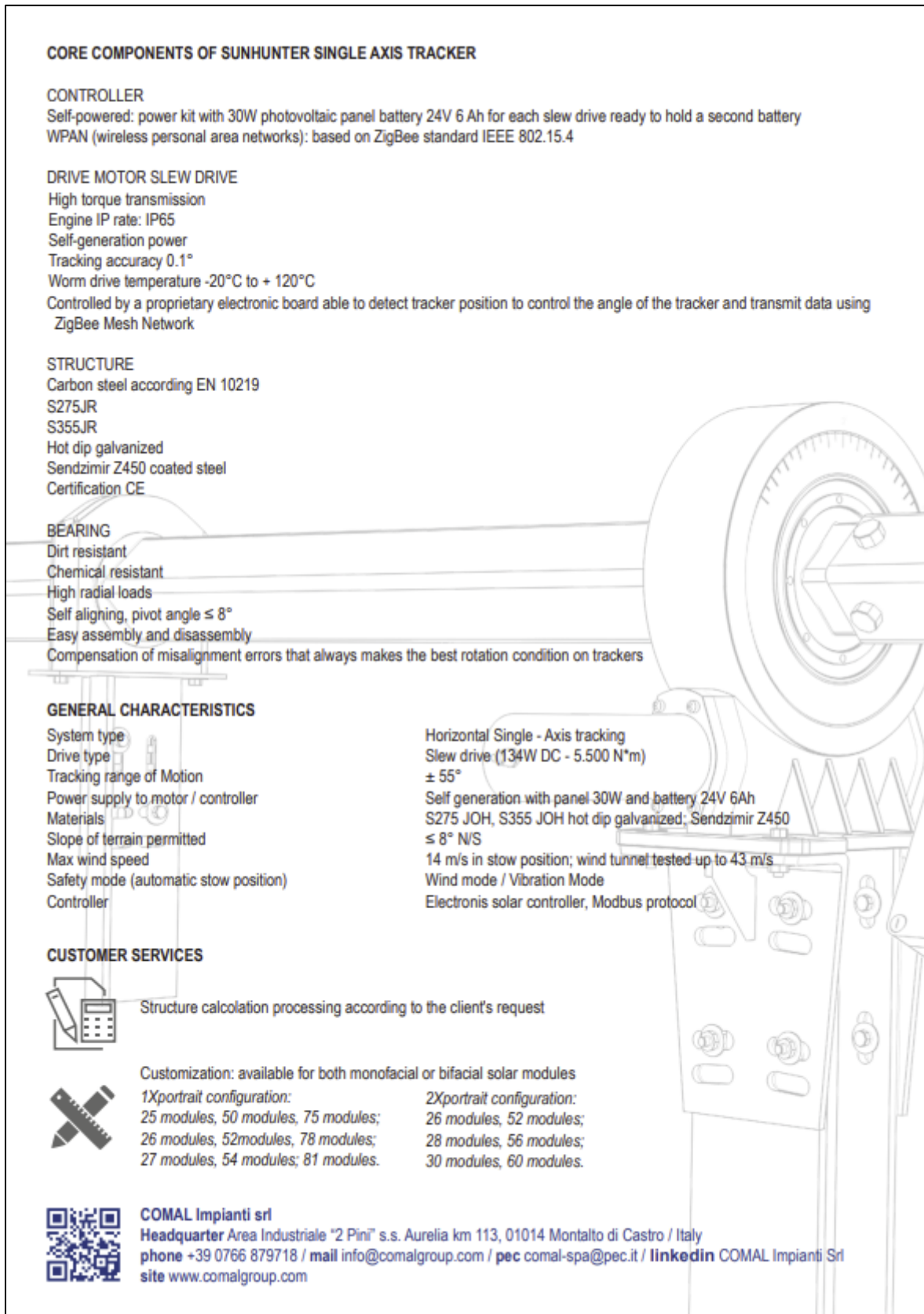


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site www.comalgroup.com

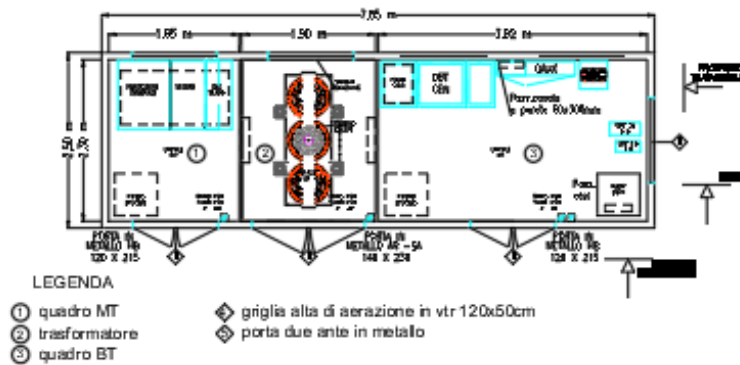


Type designation	SG350HX
Input (DC)	
Max. PV input voltage	1500 V
Min. PV input voltage / Startup input voltage	500 V / 550 V
Nominal PV input voltage	1080 V
MPP voltage range	500 V – 1500 V
MPP voltage range for nominal power	860 V – 1300 V
No. of independent MPP inputs	12 (Optional: 14 / 16)
Max. number of input connector per MPPT	2
Max. PV input current	12 * 40 A (Optional: 14 * 30 A / 16 * 30 A)
Max. DC short-circuit current per MPPT	60 A
Output (AC)	
AC output power	352 kVA @ 30 °C / 320 kVA @40 °C / 295 kVA @50 °C
Max. AC output current	254 A
Nominal AC voltage	3 / PE, 800 V
AC voltage range	640 – 920 V
Nominal grid frequency / Grid frequency range	50 Hz / 45 – 55 Hz, 60 Hz / 55 – 65 Hz
THD	< 3 % (at nominal power)
DC current injection	< 0.5 % I _n
Power factor at nominal power / Adjustable power factor	> 0.99 / 0.8 leading – 0.8 lagging
Feed-in phases / Connection phases	3 / 3
Efficiency	
Max. efficiency / European efficiency / CEC	99.01 % / 98.8 % / 98.5 %
Protection	
DC reverse connection protection	Yes
AC short circuit protection	Yes
Leakage current protection	Yes
Grid monitoring	Yes
Ground fault monitoring	Yes
DC switch/ AC switch	Yes / No
PV String current monitoring	Yes
Q at night function	Yes
Anti-PID and PID recovery function	Optional
Overvoltage protection	DC Type II / AC Type II
General Data	
Dimensions (W*H*D)	1136*870*361 mm (44.7" * 34.3" * 14.2")
Weight	≤110 kg (≤242.5 lbs)
Isolation method	Transformerless
Ingress protection rating	IP66 (NEMA 4X)
Night power consumption	< 6 W
Operating ambient temperature range	-30 to 60 °C (-22 to 140 °F)
Allowable relative humidity range (non-condensing)	0 – 100 %
Cooling method	Smart forced air cooling
Max. operating altitude	4000 m (> 3000 m derating) / 13123 ft (> 9843 ft derating)
Display	LED, Bluetooth+APP
Communication	RS485 / PLC
DC connection type	MC4-Evo2 (Max. 6 mm ² , optional 10mm ² / Max. 10AWG, optional 8AWG)
AC connection type	Support OT/DT terminal (Max. 400 mm ² / 789 Kcmil)
Compliance	IEC 62109, IEC 61727, IEC 62116, IEC 60068, IEC 61683, VDE-AR-N 4110:2018, VDE-AR-N 4120:2018, EN 50549-1/2, UNE 206007-1:2013, P.O.12.3, UTE C15-712-1:2013, UL1741, UL1741SA, IEEE1547, IEEE1547.1, CSA C22.2 107.1-01-2001, California Rule 21, UL1699B
Grid support	Q at night function, LVRT, HVRT, active & reactive power control and power ramp rate control, Q-U control, P-f control

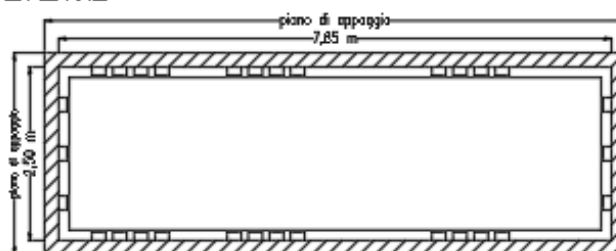
*: Only compatible with Sungrow logger and iSolarCloud

PARTICOLARE CABINA UTENTE 1 trasformatore 2,5x7,85x2,7 m

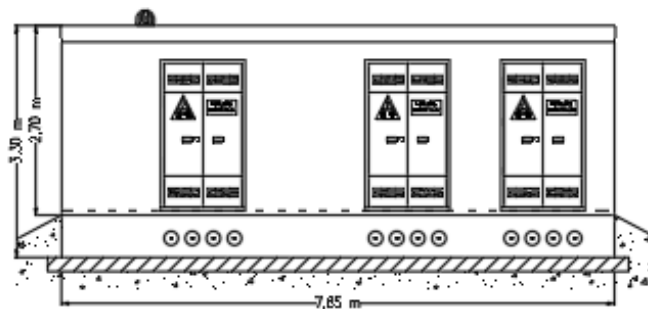
PIANTA



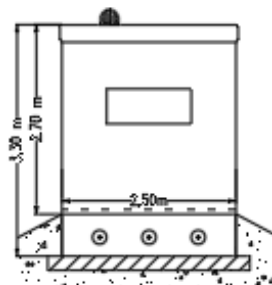
FONDAZIONE



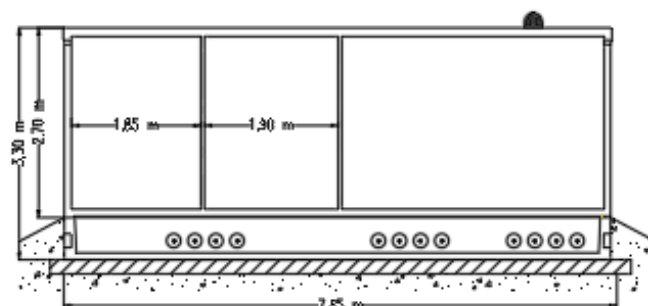
PROSPETTO LONGITUDINALE



PROSPETTO TRASVERSALE

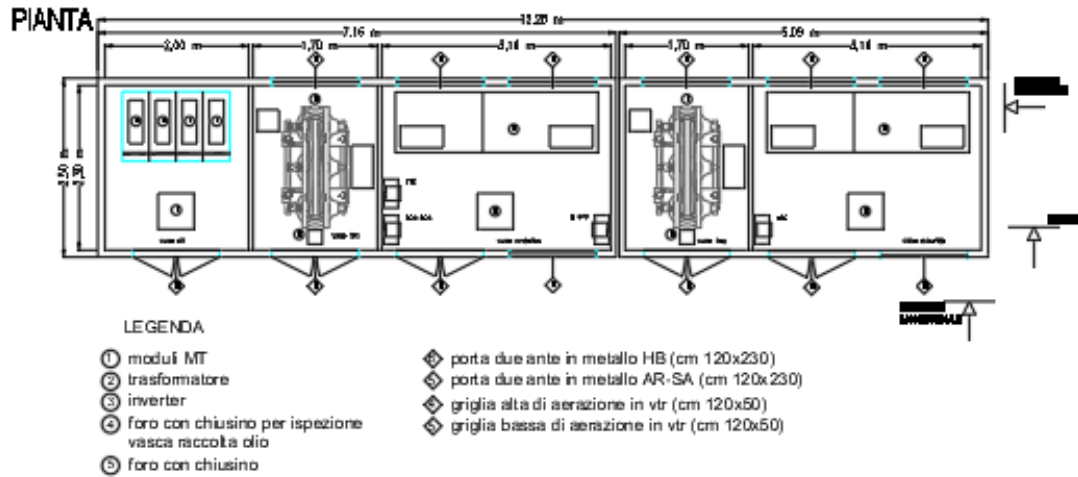


SEZIONE



PARTICOLARE CABINA UTENTE 2 trasformatori

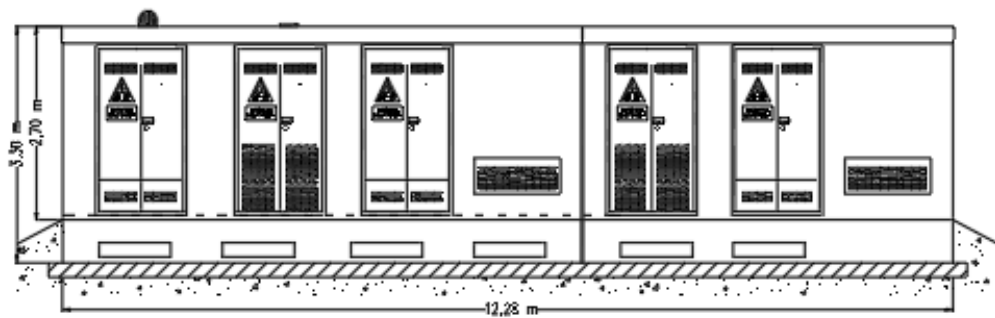
2,5x12,28x2,7 m



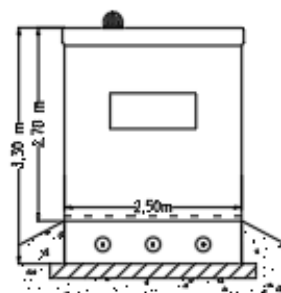
FONDAZIONE



PROSPETTO LONGITUDINALE



PROSPETTO TRASVERSALE



SEZIONE

