Regione Sicilia

Provincia di Trapani

Comune di Marsala

Signed by: CLEMENTI RICCARDO
Issuer: Namirial CA Firma Qualificata
Signing time: 04-11-2022 12:04 UTC +01

PARCO FOTOVOLTAICO DENOMINATO "RINAZZO" E RELATIVE OPERE DI CONNESSIONE ALLA RTN DI POTENZA PARI A 21 MW NEL COMUNE DI MARSALA (TP)

Società proponente:

ecOnergy
Powering renewables.

Via A. Manzoni, 30 - Milano (20121)
P.IVA: 11119020961
Pec: ecosicily3srl@legalmail.it

Scala

n.d.

Formato

A4

Titolo elaborato:

SCHEDE TECNICHE COMPONENTI

SHAPIRA
YOAV
15.12.2022
14:41:17
GMT+00:00

PROGETTISTI INCARICATI

Progettazione elettrica:
Ing, Clementi Riccardo

CODICE ELABORATO

PROGETTO	PROG.	TIPO	REV.
RNZFV	007	R	00

Rev.	Data	Descrizione	Redige	Verifica	Approva
00	05/22	*Prima emissione*	G.R.	R.C.	R.C.
01					
02					
03					
04					
05					
06					

GESTORE RETE ELETTRICA

Terna
Rete Elettrica Nazionale

Progettazione a cura di:

STE energy

STE Energy S.r.l. società a socio unico
Via Sorio, 120 - 35141 Padova (IT)
Tel. +39 049.2963900 Fax +39 049.2963901 www.ste-energy.com

www.jinkosolar.com

Building Your Trust in Solar

Tiger Neo N-type 72HL4-BDV

550-570 Watt

BIFACIAL MODULE WITH DUAL GLASS

N-Type

Positive power tolerance of 0~+3%

IEC61215(2016), IEC61730(2016)

ISO9001:2015: Quality Management System

ISO14001:2015: Environment Management System

ISO45001:2018
Occupational health and safety management systems

Key Features

SMBB Technology

Better light trapping and current collection to improve module power output and reliability.

Hot 2.0 Technology

The N-type module with Hot 2.0 technology has better reliability and lower LID/LETID.

PID Resistance

Excellent Anti-PID performance guarantee via optimized mass-production process and materials control.

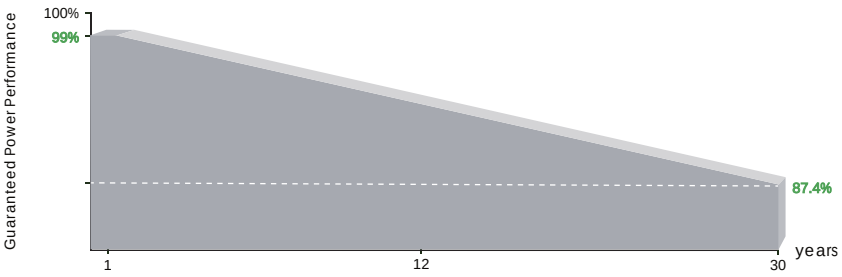
Enhanced Mechanical Load

Certified to withstand: wind load (2400 Pascal) and snow load (5400 Pascal).

Higher Power Output

Module power increases 5-25% generally, bringing significantly lower LCOE and higher IRR.

LINEAR PERFORMANCE WARRANTY

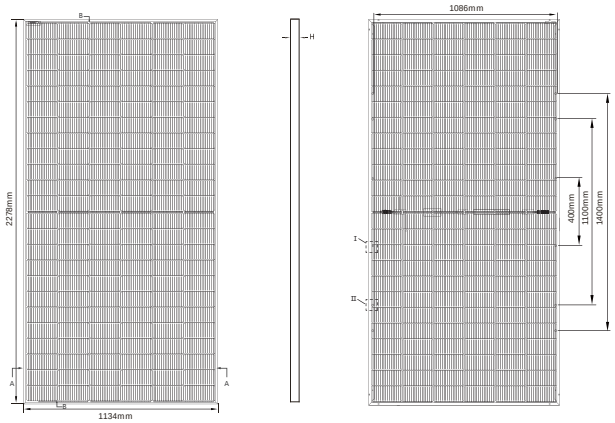


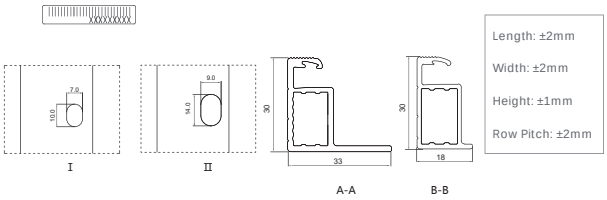
12 Year Product Warranty

30 Year Linear Power Warranty

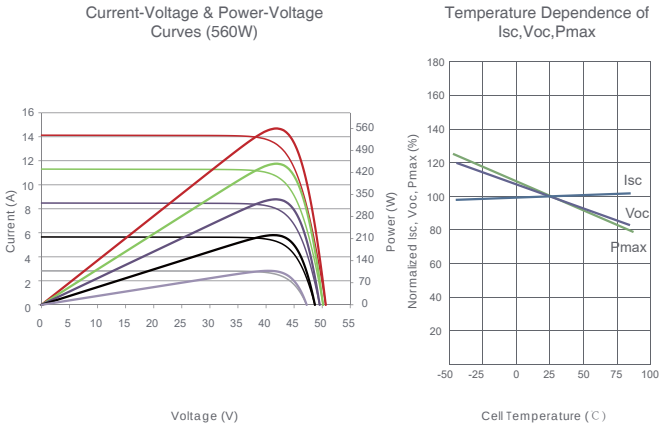
0.40% Annual Degradation Over 30 years

Engineering Drawings





Electrical Performance & Temperature Dependence



Mechanical Characteristics

Cell Type	N type Mono-crystalline
No. of cells	144 (6×24)
Dimensions	2278×1134×30mm (89.69×44.65×1.18 inch)
Weight	32 kg (70.55 lbs)
Front Glass	2.0mm, Anti-Reflection Coating
Back Glass	2.0mm, Heat Strengthened Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP68 Rated
Output Cables	TUV 1×4.0mm² (+): 400mm , (-): 200mm or Customized Length

Packaging Configuration

(Two pallets = One stack)

36pcs/pallets, 72pcs/stack, 720pcs/ 40'HQ Container

SPECIFICATIONS

Module Type	JKM550N-72HL4-BDV		JKM555N-72HL4-BDV		JKM560N-72HL4-BDV		JKM565N-72HL4-BDV		JKM570N-72HL4-BDV	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	550Wp	414Wp	555Wp	417Wp	560Wp	421Wp	565Wp	425Wp	570Wp	429Wp
Maximum Power Voltage (Vmp)	41.58V	39.13V	41.77V	39.26V	41.95V	39.39V	42.14V	39.52V	42.29V	39.65V
Maximum Power Current (Imp)	13.23A	10.57A	13.29A	10.63A	13.35A	10.69A	13.41A	10.75A	13.48A	10.81A
Open-circuit Voltage (Voc)	50.27V	47.75V	50.47V	47.94V	50.67V	48.13V	50.87V	48.32V	51.07V	48.51V
Short-circuit Current (Isc)	14.01A	11.31A	14.07A	11.36A	14.13A	11.41A	14.19A	11.46A	14.25A	11.50A
Module Efficiency STC (%)	21.29%		21.48%		21.68%		21.87%		22.07%	
Operating Temperature(℃)	-40℃~+85℃									
Maximum system voltage	1500VDC (IEC)									
Maximum series fuse rating	30A									
Power tolerance	0~+3%									
Temperature coefficients of Pmax	-0.30%/℃									
Temperature coefficients of Voc	-0.25%/℃									
Temperature coefficients of Isc	0.046%/℃									
Nominal operating cell temperature (NOCT)	45±2℃									
Refer. Bifacial Factor	80±5%									

BIFACIAL OUTPUT-REARSIDE POWER GAIN

5%	Maximum Power (Pmax)	578Wp	583Wp	588Wp	593Wp	599Wp
	Module Efficiency STC (%)	22.36%	22.56%	22.77%	22.97%	23.17%
15%	Maximum Power (Pmax)	633Wp	638Wp	644Wp	650Wp	656Wp
	Module Efficiency STC (%)	24.48%	24.71%	24.93%	25.15%	25.37%
25%	Maximum Power (Pmax)	688Wp	694Wp	700Wp	706Wp	713Wp
	Module Efficiency STC (%)	26.61%	26.86%	27.10%	27.34%	27.58%

*STC: Irradiance 1000W/m² Cell Temperature 25°C AM=1.5

NOCT: Irradiance 800W/m² Ambient Temperature 20°C AM=1.5 Wind Speed 1m/s

EKOS GROUP

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3.15-7.5 MVA 36 kV

POWER STATION FOR STRING INVERTERS

MV Turnkey Station for 1500 VDC String Inverters

EKO-CS-3150-7500-kVA: ○ **Cost-Effective**, factory tested, customized robust plug & play solutions for different power ranges up to 7500 kVA and 36 kV. ○ **High environmental protection** withstanding challenging climates. ○ **Smart operation** monitoring for predictive maintenance. ○ **Cost-optimized Balance of System** w/o the need of additional recombiners.

Plug & Play

Solar Inverter Solutions

POWER STATION for STRING INVERTERS

Robust and Efficient Solar Energy Solutions

EKO-CS-3150-7500-kVA

BRAND INDEPENDENT FLEXIBLE DESIGN

- Compact plug & play solution up to 7.5 MVA and 36 kV
- Easy-to-deploy containerized design
- Less E/C duration at site
- Fully type-tested components
- Compliance with universal standards including IEC 60076, IEC 62271 and IEC 61439

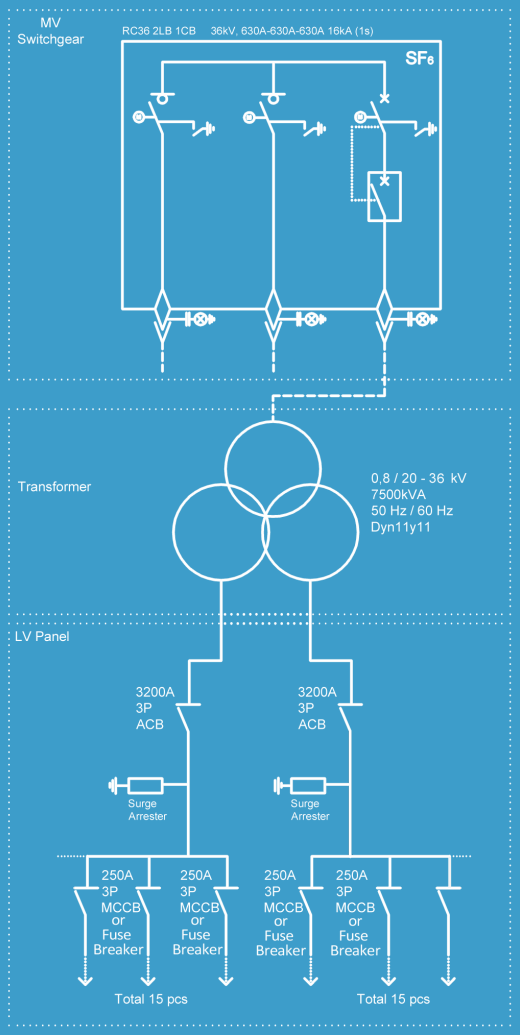
OPERATIONAL SAFETY

- MV and LV isolated and enclosed switchgears with remote control feature
- Front accessible switchgear with AFL IAC protection

OPERATION & MAINTENANCE

- High availability due to online monitoring and control
- Visual & physical remote control systems
- Smart predictive maintenance for maximizing operational uptime

CIRCUIT DIAGRAM



TRANSFORMER	
Transformer type	Oil immersed
Rated power	3.15 MVA / 7.5 MVA
Vector group	Dyn11 / Dyn11y11
LV / MV voltage	0.8 kV - 10 kV / 36 kV ‖ 2 x 0.8 kV - 10 kV / 36 kV
Maximum input current at nominal voltage	2706 A x 2
Frequency	50 Hz / 60 Hz
Tapping on HV	0, ±2×2.5%
Efficiency	≥99%
Cooling type	ONAN (Oil Natural Air Natural)
Impedance	8% (±10%)
Oil type	Mineral oil (PCB free)
Insulation class	A

PROTECTION	
AC input protection	Circuit breaker
Transformer protection	Oil-temperature, Oil-level, Oil-Pressure
Relay protection	50 / 51, 50N / 51N
LV overvoltage protection	AC Type II (optional: AC Type I + II)

MV SWITCHGEAR	
Insulation type	SF_6
Rated voltage	24 – 36 kV
Rated current	630 A
Internal arcing fault	IAC AFL 16 - 20kA / 1s
Qty. of feeders	3 feeders

LV PANEL	
ACB specification	3200 A / 800 Vac / 3P, 2 pcs
MCCB or Fuse Breaker specification	250 A / 800 Vac / 3P, 30 pcs

GENERAL SPECIFICATIONS	
Dimensions (W x H x D)	6100 mm x 2950 mm x 2500 mm
Approximate weight	25 T
Operating ambient temperature range	-20 to 60 °C (optional: -30 to 60 °C)
Auxiliary power supply	5 - 10 kVA / 400 V
Degree of protection	IP54
Allowable relative humidity range (non-condensing)	0 – 95 %
Operating altitude	<1000 m (standard) / > 1000 m (optional)
Communication	RS485, Ethernet, Optical fiber
Compliance	IEC 60076, IEC 62271-200, IEC 62271-202, IEC 61439-1, EN50588-1

PRODUCTION & TESTS

EKOS GROUP

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Manufacturing and Services

EKOS GROUP designs and manufactures medium voltage solutions with its own engineering expertise, tailored for the customers. EKOSinerji Solar Solutions' versatility is suitable for various renewable energy projects. Ranging from skid-mounted, containerized to kiosk type, EKOSinerji's solar inverter medium voltage (MV) plug & play solutions provide both low OPEX and CAPEX to satisfy the low balance of system (BOS) cost.

Type Test Reports

EKOSinerji's products comply with the requirements of IEC 62271-200 and IEC 62271-202 standards determined by the International Electrotechnical Commission (IEC) for the 1-52 kV medium voltage switchgears/substations and the other sub-standards (IEC 62271-100 and IEC 62271-102 and IEC 62271-105 and the others) for the other equipment.

Testing Capabilities

- Power frequency withstand (50-60 Hz, max. 600 kV)
- Measurement of resistance of the main circuit
- Circuit breaker open-close velocity and timing
- Lighting impulse test (max. 1200 kV)
- Pressure withstand test
- Temperature-rise test
- Partial discharge test
- Functional tests
- SF_6 gas leakage and quality tests
- Dielectric tests

EKOSinerji provides specialized expertise in engineering and local support aiming for a sustainable world. The wide range of products and services the company provides thrive to improve the quality of the society and environment both locally and globally. EKOS' longstanding systematic approach in finding solutions to suit the customers' needs ensures superior service. Whether it be turnkey design, startup, commissioning or field service, EKOSinerji is your solution partner.

Learn more at **www.ekosinerji.com**

24/7 Service, Global Network

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SG350HX

Inverter di stringa multi-MPPT per sistemi a 1500 Vdc

NEW

RESA ELEVATA

- Fino a 16 MPPT con efficienza massima 99%
- 20 A per stringa, compatibilità con moduli da 500Wp+
- Scambio dati con sistema tracker, miglioramento della resa

BASSI COSTI

- Funzione Q at night, risparmio sull'investimento
- Power line communication (PLC)
- Diagnosi con Smart IV Curve*, O&M attivo

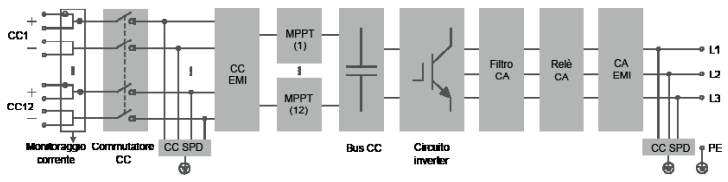
SUPPORTO ALLA RETE

- SCR≥1.16 funzionamento stabile in reti estremamente deboli
- Tempo di risposta della potenza reattiva <30ms
- Conforme al codice di rete globale

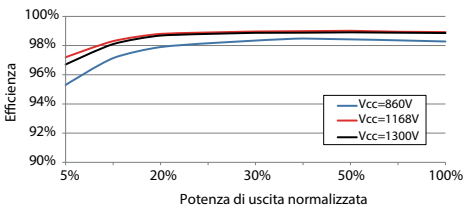
SICUREZZA

- 2 stringhe per MPPT, protezione del collegamento da inversione di polarità CC
- Interruttore CC integrato, spegnimento automatico in caso di guasti
- Monitoraggio dell'isolamento CA e CC in tempo reale 24 ore su 24

TOPOLOGIA



CURVA DI EFFICIENZA



ITALIA

SUNGROW
Clean power for all

Designazione	SG350HX
Ingresso (CC)	
Tensione fotovoltaica in ingresso max.	1500 V
Tensione fotovoltaica in ingresso min. / Tensione di avvio	500 V / 550 V
Tensione nominale in ingresso	1080 V
Intervallo tensione MPP	500 V – 1500 V
Intervallo di tensione MPP per potenza nominale	860 V – 1300 V
N. di MPPT	12 (Opzionale: 14/16)
Numero max. stringhe fotovoltaiche per MPPT	2
Corrente max. in ingresso	12 * 40 A (Opzionale: 14 * 30 A / 16 * 30 A)
Corrente di cortocircuito max.	60 A
Uscita (CA)	
Potenza CA massima in uscita alla rete	352 kVA @ 30 °C / 320 kVA @ 40 °C / 295 kVA @ 50 °C
Potenza CA nominale in uscita	320 kW
Corrente CA max. in uscita	254 A
Tensione CA nominale	3 / PE, 800 V
Intervallo tensione CA	640 – 920 V
Frequenza di rete nominale / Intervallo f requenza di rete	50 Hz / 45 – 55 Hz, 60 Hz / 55 – 65 Hz
Distorsione armonica totale (THD)	< 3 % (alla potenza nominale)
Iniezione di corrente CC	< 0.5 % In
Fattore di potenza alla potenza nominale / regolabile	> 0.99 / 0.8 in anticipo – 0.8 in ritardo
Fasi di immissione / fasi di connessione	3 / 3
Efficienza	
Efficienza max. / Efficienza europea / Efficienza CEC	99.01 % / 98.8 % / 98.5 %
Protezione	
Protezione da collegamento inverso CC	Si
Protezione corto circuito CA	Si
Protezione da dispersione di corrente	Si
Monitoraggio della rete	Si
Monitoraggio dispersione verso terra	Si
Sezionatore CC / Sezionatore CA	Si / No
Monitoraggio corrente stringa fotovoltaica	Si
Funzione erogazione reattiva notturna (Q at night)	Si
Protezione anti-PID e PID-recovery	Opzionale
Protezione sovratensione	CC Tipo II / CA Tipo II
Dati Generali	
Dimensioni (L x A x P)	1136*870*361 mm
Peso	≤ 116 kg
Metodo di isolamento	Senza trasformatore
Grado di protezione	IP66 (NEMA 4X)
Consumo energetico notturno	< 6 W
Intervallo di temperature ambiente di funzionamento	-30 to 60 °C
Intervallo umidità relativa consentita (senza condensa)	0 – 100 %
Metodo di raffreddamento	Raffreddamento ad aria forzata intelligente
Altitudine massima di funzionamento	4000 m (> 3000 m derating)
Display	LED, Bluetooth+APP
Comunicazione	RS485 / PLC
Tipo di collegamento CC	MC4-Evo2 (Max. 6 mm², opzionale 10 mm²)
Tipo di collegamento CA	Supporto terminali OT / DT (Max. 400 mm²)
Conformità	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, CEI 0-16
Supporto rete	Funzione erogazione potenza reattiva notturna (Q at night), LVRT, HVRT, controllo potenza attiva e reattiva, velocità rampa di potenza, Q-U e P-f

*: Compatibile solo con logger Sungrow e iSolarCloud

ITALIA