Regione Emilia Romagna
Comune di Alfonsine (RA)

IMPIANTO FOTOVOLTAICO E OPERE CONNESSE

Potenza Impianto 37,492 MWp

PROPONENTE

LIGHTSOURCE RENEWABLE ENERGY ITALY SPV 8 S.R.L.

VIA G. LEOPARDI, 7 - 20123 MILANO (MI) - P.IVA: 12593780963 – PEC: lightsourcespv_8@legalmail.it

PROGETTAZIONE

Ing. Antonello Ruttilio

Via R. Zandonai, 4 – 44124 – FERRARA IT - P.IVA: 00522150382 – PEC: incico@pec.it
Tel.: +39 0532 202613 – email: a.ruttilio@incico.com

Ing. Lorenzo Stocchino

Via R. Zandonai, 4 – 44124 – FERRARA IT - P.IVA: 00522150382 – PEC: incico@pec.it
Tel.: +39 0532 202613 – email: l.stocchino@incico.com

COORDINAMENTO PROGETTUALE

SOLAR IT S.R.L.

VIA I. ALPI 4 – 46100 - MANTOVA IT - P.IVA: 02627240209 – PEC: solarit@lamiapec.it
Tel.: +390425 072 257– email: info@solaritglobal.com

TITOLO ELABORATO

Schede Tecniche

LIVELLO DI PROGETTAZIONE	CODICE ELABORATO	FILE NAME	DATA
DEFINITIVO	PD-D02	LS15781-PG-D02_1	21/12/2022

REVISIONI

REV.	DATA	DESCRIZIONE	ESEGUITO	VERIFICATO	APPROVATO
0	21/12/2022	PERMITTING	MCA	MLA	ARI
1	15/11/2023	INTEGRAZIONE VOLONTARIA	MCA	LST	ARU

SCHEDE TECNICHE

INDICE

Contenuto del documento

La presente relazione è stata aggiornata per la trasformazione da Impianto agrivoltaico in Impianto fotovoltaico a terra tradizionale.

1. OGGETTO

La società proponente nell'ambito del proprio piano di sviluppo delle fonti energetiche rinnovabili prevede di realizzare un impianto di produzione da fonte rinnovabile - fotovoltaica - nel Comune di Alfonsine (RA) (nel seguito "Impianto FV"). Gli impianti saranno realizzati su due aree denominate S. Anna e Campeggia.

2. SCHEDE TECNICHE

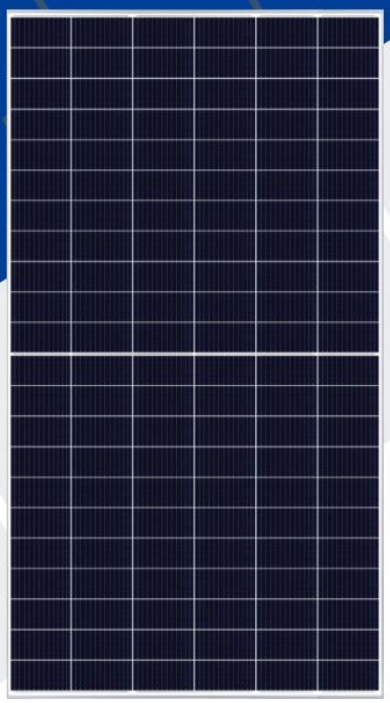
Nel seguito riportiamo le schede tecniche dei componenti principali dell'impianto di chi all'oggetto.

In virtù di una continua evoluzione dei materiali disponibili sul mercato e la sempre crescente rapidità con cui si aggiornano le tecnologie, in fase esecutiva il proponente potrà comunque prevedere materiali equivalenti di costruttori diversi.

3. PANNELLI FV

ULTRA-LOW CARBON

HETEROJUNCTION TECHNOLOGY
HJT BIFACIAL MODULE



RSM132-8-680BHDG-700BHDG

132 CELL
HJT Bifacial Module

680-700Wp
Power Output Range

1500VDC
Maximum System Voltage

22.5%
Maximum Efficiency

KEY SALIENT FEATURES

- Global, Tier 1 bankable brand, with independently certified state-of-the-art automated manufacturing
- N-type solar cell without LID caused by B-O
- No PID
- Better Temperature Coefficient
- Bifacial technology enables additional energy harvesting from rear side
- Positive power tolerance of 0~+3%
- Dual stage 100% EL Inspection warranting defect-free product
- Module Imp binning radically reduces string mismatch losses
- Excellent wind load 2400Pa & snow load 5400Pa under certain installation method
- Comprehensive product and system certification
  - IEC61215:2016; IEC61730-1/-2:2016;
  - ISO 9001:2015 Quality Management System
  - ISO 14001:2015 Environmental Management System
  - ISO 45001:2018 Occupational Health and Safety Management System

ISO9001
ISO14001
OHSAS18001
IEC TS 62941

★ As there are different certification requirements in different markets, please contact your local Risen Energy sales representative for the specific certificates applicable to the products in the region in which the products are to be used.

RISEN ENERGY CO., LTD.

Risen Energy is a leading, global tier 1 manufacturer of high-performance solar photovoltaic products and provider of total business solutions for residential, commercial and utility-scale power generation. The company, founded in 1986, and publicly listed in 2010, compels value generation for its chosen global customers. Techno-commercial innovation, underpinned by consummate quality and support, encircle Risen Energy's total Solar PV business solutions which are among the most powerful and cost-effective in the industry. With local market presence and strong financial bankability status, we are committed, and able, to building strategic, mutually beneficial collaborations with our partners, as together we capitalise on the rising value of green energy.

Tashan Industry Zone, Meilin, Ninghai 315609,Ningbo | PRC
Tel: +86-574-59953239 Fax: +86-574-59953599
E-mail: marketing@risenenergy.com Website: www.risenenergy.com

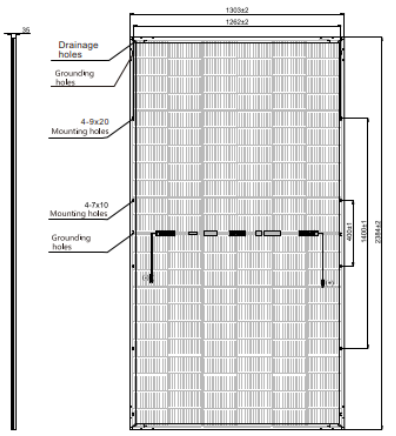
LINEAR PERFORMANCE WARRANTY

12 year Product Warranty / 30 year Linear Power Warranty

★ Please check the valid version of Limited Product Warranty which is officially released by Risen Energy Co., Ltd

risen | Preliminary For Global Market

Dimensions of PV Module



ELECTRICAL DATA (STC)

Model Number	RSM132-8-680BHDG	RSM132-8-685BHDG	RSM132-8-690BHDG	RSM132-8-695BHDG	RSM132-8-700BHDG
Rated Power in Watts-Pmax(Wp)	**680**	**685**	**690**	**695**	**700**
Open Circuit Voltage-Voc(V)	49.47	49.58	49.69	49.80	49.91
Short Circuit Current-Isc(A)	17.26	17.33	17.40	17.46	17.52
Maximum Power Voltage-Vmpp(V)	41.48	41.57	41.67	41.76	41.85
Maximum Power Current-Impp(A)	16.41	16.49	16.58	16.66	16.74
Module Efficiency (%) ★	21.9	22.1	22.2	22.4	22.5

STC: Irradiance 1000 W/m², Cell Temperature 25°C, Air Mass AM1.5 according to EN 60904-3.
Bifacial factor:(%) 85±5 ★ Module Efficiency (%): Round-off to the nearest number

Electrical characteristics with 10% rear side power gain

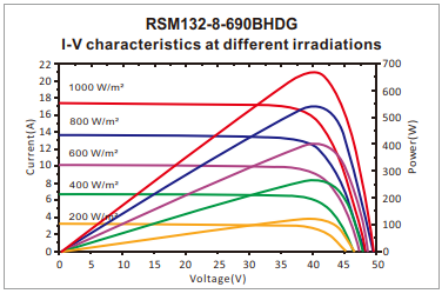
Total Equivalent power -Pmax (Wp)	748	754	759	765	770
Open Circuit Voltage-Voc(V)	49.47	49.58	49.69	49.80	49.91
Short Circuit Current-Isc(A)	18.99	19.06	19.14	19.21	19.27
Maximum Power Voltage-Vmpp(V)	41.48	41.57	41.67	41.76	41.85
Maximum Power Current-Impp(A)	18.05	18.14	18.24	18.33	18.41

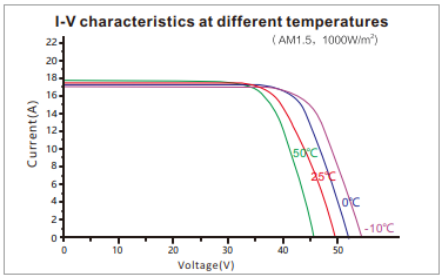
Rear side power gain: The additional gain from the rear side compared to the power of the front side at the standard test condition. It depends on mounting (structure, height, tilt angle etc.) and albedo of the ground.

ELECTRICAL DATA (NMOT)

Model Number	RSM132-8-680BHDG	RSM132-8-685BHDG	RSM132-8-690BHDG	RSM132-8-695BHDG	RSM132-8-700BHDG
Maximum Power-Pmax (Wp)	519.3	523.0	527.1	530.8	534.5
Open Circuit Voltage-Voc (V)	46.35	46.46	46.56	46.66	46.77
Short Circuit Current-Isc (A)	14.15	14.21	14.27	14.32	14.37
Maximum Power Voltage-Vmpp (V)	38.78	38.87	38.96	39.05	39.13
Maximum Power Current-Impp (A)	13.39	13.46	13.53	13.59	13.66

NMOT: Irradiance at 800 W/m², Ambient Temperature 20°C, Wind Speed 1 m/s.





MECHANICAL DATA

Solar cells	HJT cell
Cell configuration	132 cells (6×11+6×11)
Module dimensions	2384×1303×35mm
Weight	41kg
Superstrate	High Transmission, Low Iron, Tempered ARC Glass
Substrate	Tempered Glass
Frame	High strength alloy steel
J-Box	Potted, IP68, 1500VDC, TÜV&UL Certified
Cables	4.0mm² (12AWG), Positive(+)350mm, Negative(-)230mm (Connector Included)
Connector	Risen Twinsel PV-SY02, IP68

TEMPERATURE & MAXIMUM RATINGS

Nominal Module Operating Temperature (NMOT)	43°C±2°C
Temperature Coefficient of Voc	-0.22%/°C
Temperature Coefficient of Isc	0.047%/°C
Temperature Coefficient of Pmax	-0.24%/°C
Operational Temperature	-40°C~+85°C
Maximum System Voltage	1500VDC
Max Series Fuse Rating	35A
Limiting Reverse Current	35A

PACKAGING CONFIGURATION

	40ft(HQ)
Number of modules per container	558
Number of modules per pallet	31
Number of pallets per container	18
Box gross weight[kg]	1315

Our Partners:

REM132-8HDG-SMBB-EN-H1-3-2022-BVC

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

THE POWER OF RISING VALUE

4. COMBINER BOX

INGECON SUN StringBox

12 / 16 / 18 / 20 / 24 / 32

SIMPLE AND SAFE CONNECTION OF PHOTOVOLTAIC STRINGS, 1500 V

The new INGECON® SUN StringBox is a cost-effective PV string combiner box series designed for central inverter-based PV systems. The INGECON® SUN StringBox features efficient input and output DC wiring with fully rated DC disconnect switches for safe maintenance.

When used in combination with INGECON® SUN series central inverters, the INGECON® SUN StringBox outputs can be monitored by means of the optional DC input groups monitoring kit available for B and C series.

A complete range of equipment for all types of projects
Available in models ranging from 12 to 32 inputs and 1,500 V max. DC voltage, the INGECON® SUN StringBox provide the maximum flexibility and expandability in system design. The compact and rugged IP65 enclosure is designed for installation in outdoor environments, such as roof-mounted systems and large-scale solar farms.

Maximum protection
The INGECON® SUN StringBox is a passive combiner box equipped with touch-safe DC fuse holders, DC fuses, lightning induced DC surge arresters and load disconnector switch.

PROTECTIONS

- Up to 32 pairs of DC fuses.
- Available fuses: 10A, 12A, 15A, 16A, 20A, 25A, 30A, 32A (15A standard).
- Lightning induced DC surge arresters, type 2.
- Manual DC isolating switch.

OPTIONAL ACCESSORIES

- Lightning induced DC surge arresters, type 1+2.
- Pole mounting kit.
- PV connectors.

MAIN FEATURES

- Built to minimize system costs by providing the maximum flexibility.
- Available in 12, 16, 18, 20, 24, 32 inputs configurations.
- Rated for 1,500 Vdc maximum voltage
- Simplifies input and output wiring.
- Capability to connect up to 2 DC output cables per polarity (only for 12 and 16 inputs).
- IP65 protection rating.
- Maximum protection to corrosion and pollution thanks to the isolating polyester enclosure reinforced with fiberglass.

www.ingeteam.com
solar.energy@ingeteam.com

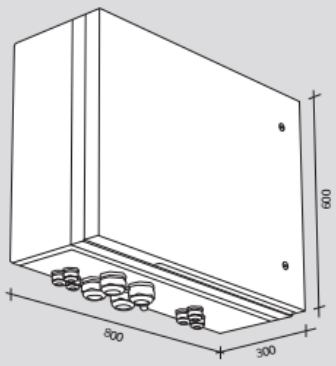
Ingeteam

INGECON SUN StringBox

	1,500 V			
	StringBox 12	StringBox 12B	StringBox 16	StringBox 16B
Input				
Maximum number of input strings	12 / 24[1]	12 / 24[1]	16 / 32[1]	16 / 32[1]
Maximum current per input (A)	12 / 24	12 / 24	12 / 24	12 / 24
Number of protection fuses	12	24	16	32
Type of fuses	gPV fuses, 10 x 85 mm, 30 kA			
Available fuses	10 A, 12 A, 15 A, 16 A, 20 A, 25 A, 30 A, 32 A (15 A / 30 A standard)			
Maximum DC voltage	1,500 Vdc			
Cable inlet	M40 cable glands (n.4 cables entry diameter: 6 to 10 mm for each cable gland)			
Inlet connections	Direct connection to fuse holders or distribution bar, wiring gauge 1.5 to 16 mm²			
Output				
Rated total current (A)[2]	144 / 288	144 / 288	192 / 384	192 / 384
Cable outlet	Up to 2 pairs of M50 cable glands (cable diameter: 27 to 35 mm)			
Outlet connections	Direct connection on copper plates, wiring gauge up to 2 x 240 mm² per pole			
DC switch disconnect rating (A)	315 / 400	315 / 400	315 / 400	315 / 400
SPD				
Type	Type 1 (optional: Type 1+2)			
Grounding connection	M20 cable gland (cable diameter: 7 to 13 mm, wiring gauge 2.5 to 35 mm²)			
General Information				
Enclosure type	Outdoor use, insulating cabinet (polyester reinforced with fiberglass)			
Protection rating	IP65			
Impact strength	IK10			
Operating temperature range	-20 °C to +55 °C			
Relative humidity (non-condensing)	0 to 95%			
Maximum altitude[3]	2,000 m a.s.l.			
DC switch handle	Internal, lockable in open position			
Consumption (W)	0 W			
Size (mm)	800 x 600 x 300 (W x H x D)			
Weight (kg)	35	36	36	38
Marking	CE			
Electrical installations	IEC 60364-7-712			
LV Switchgear standards	IEC 61439-1, IEC 61439-2, AS/NZS 61439-2, AS/NZS 5033			
Electric shock protection	Class II equipment			

Notes: [1] With external over-molding in line fuses and branch connectors [2] Over 50 °C ambient temperature, the current will be reduced at the rate of 3.5% every °C up to 55°C [3] Please contact Ingeteam for altitudes higher than 2,000 m.

Size (mm)



12
35 kg.

12B / 16
36 kg.

16B
38 kg.

5. INVERTER FV

HEMK

690V

REFERENCES		FRAME 2 FS2195K	FRAME 3 FS3290K	FRAME 4 FS4390K
AC	AC Output Power (kVA/kW) @40°C[1]	2195	3290	4390
	AC Output Power (kVA/kW) @50°C[1]	2035	3055	4075
	Max. AC Output Current (A) @40°C	1837	2756	3674
	Operating Grid Voltage (VAC)	690V ±10%		
	Operating Grid Frequency (Hz)	50/60Hz		
	Current Harmonic Distortion (THDi)	< 3% per IEEE519		
	Power Factor (cosine phi)[2]	0.5 leading ... 0.5 lagging adjustable / Reactive power injection at night		
DC	DC Voltage Range [3]	976V - 1500V		
	Maximum DC Voltage	1500V		
	Number of Inputs	Up to 20	Up to 30	Up to 40
	Max. DC Continuous Current (A)[4]	2295	3443	4590
	Max. DC Short Circuit Current (A)[4]	3470	5205	6940
	Number of Freemaq DC/DC[4]	Up to 4		
EFFICIENCY	Efficiency (Max) (η) (preliminary)	98.81%	98.84%	98.90%
	Euroeta (η) (preliminary)	98.45%	98.48%	98.65%
CABINET	Dimensions [WxDxH] (ft)	9.8 x 6.5 x 7.2		
	Dimensions [WxDxH] (m)	3.0 x 2.0 x 2.2		
	Weight (lbs)	11465	11795	12125
	Weight (kg)	5200	5350	5500
	Type of Ventilation	Forced air cooling		
ENVIROMENT	Degree of Protection	NEMA 3R / IP55		
	Permissible Ambient Temperature [5]	-25°C to +60°C, >50°C / Active Power derating		
	Relative Humidity	4% to 100% non-condensing		
	Max. Altitude (above sea level)	2000m / >2000m power derating (Max. 4000m)		
CONTROL INTERFACE	Communication Protocol	Modbus TCP		
	Power Plant Controller	Optional		
	Keyed ON/OFF Switch	Standard		
PROTECTIONS	Ground Fault Protection	GFDI and isolation monitoring device		
	Humidity Control	Active heating		
	General AC Protection & Disconn.	Circuit breaker		
	General DC Protection & Disconn.	Fuses, DC switch-disconnectors		
	Overvoltage Protection	Type 2 protection for AC and DC (optionally, Type 1+2)		
CERTIFICATIONS & STANDARDS	Safety	UL 1741 / CSA 22.2 No.107.1-16 / IEC 62109-1 / IEC 62109-2		
	Installation	NEC 2020 / IEC		
	Utility Interconnect	IEEE 1547:2018 / UL 1741 SB / IEC 62116:2014		

NOTES

[1] Values at 1.00·Vac nom and cosφ=1.Consult Power Electronics for derating curves
[2] Consult P-Q charts available: Q(kVAr)=√(S(kVA)2-P(kW)2)
[3] Consult Power Electronics for derating curves
[4] Consult Power Electronics for Freemaq DC/DC connection configurations
[5] Optional available for temperatures down to -35ºC

6. TRACKER


DATASHEET
MONOLINE+
2P
ADAPTED TO XXL MODULES
IN-HOUSE MANUFACTURING
* providing local content if required
BIFACIAL OPTIMIZED
TERRAIN RESPONSE
PV CLEANER TESTED
Certified by module manufacturer
MADE WITH MAGNELIS®
* Optional

General specifications

Tracker	Independent-row. horizontal single-axis
Maximum length	70 m.
Maximum width	5 m.
Module configuration	2 modules in portrait
Rotational range	E-O: +/- 60º
Motor per MWp	Depending on the size, the type of the module and the number of modules per string. 3 motors per row. (Maximum 70 meters lenght)
Ground cover ratio	30-50%
Modules supported	All market available modules
Slope tolerance	N-S: up to 23.5% every 20 m.
	E-W: unlimited
Module attachment	By bolts and nuts, rivet or clamps for frameless modules
Allowable wind load	Tailored to site specific condition
Wind alarm	Controlled by ultrasonic anemometer
Prepared for XXL modules	

Communications & Control

Solar tracking method	Astronomical algorithm
Control System	Central control unit connected to plant SCADA
	Redundant wireless gateways to guarantee communication
	Self-powered DC Motor Drive Box with auxiliary panel
SCADA interface	Modbus TCP or OPC-UA
Communication	Wireless (LoRa)
Nigthttime stow	Configurable
Advanced Algorithms	Adaptative Backtracking 3D & Diffuse Light Optimization (optional)

Installation & Services

On-site training and commissioning	
Warranty	Structure: 10 years
	Electromechanical components: 5 years
PV Cleaner	Optional
Certifications	UL 3703, IEC 62817 on going

7. QUADRI MT

SM6

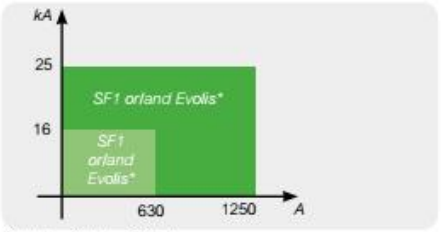
A truly professional **solution**!

Schneider Electric has developed protection, monitoring and control solutions specifically dedicated to Medium Voltage networks for over 40 years.

SM6 switchgear has been specifically designed on the basis of that extensive experience.

It also incorporates some very new solutions, giving the best in terms of continuity of service and operators' safety.

High-performance breaking devices



(*) Not available at 36 kV.

A comprehensive solution

SM6 switchgear is fully compatible with

- PowerMeter metering units.
- Easergy P3 relay and Easergy Sepam multi-function protection relays
  - Protection
  - Measurements and diagnosis.
- VIP protection self powered relay for protection.
  SM6 swithchboards can thus be easily integrated into any monitoring
  and control system.
  - Local & remote indication and operation.

Enclosures able to withstand internal arcing

Internal Arc Classification: A-FL and A-FLR.

- 3-sides internal arc protection IAC: A-FL, 12.5 kA 1 s, 16 kA 1 s and 20 kA 1s for SM6-24 and 16 kA 1 s for SM6-36.
- 4-sides internal arc protection IAC: A-FLR, 12.5 kA 1s, 16 kA 1 s and 20 kA 1 s for SM6-24.
- Choice of exhaust:
  - downwards exhaust
  - upwards exhaust for SM6-24.

Main characteristics

The hereunder values are for working temperatures from -5°C up to +40°C and for a setting up at an altitude below 1000 m.

Electrical characteristics

Rated voltage	Ur	kV		7.2	12	17.5	24	36
Insulation level								
Insulation	Ud	50/60 Hz, 1 min (kV rms)		20	28	38	50	70
Isolation	Ud	50/60 Hz, 1 min (kV rms)		23	32	45	60	80
Insulation	Up	1.2/50 µs (kV peak)		60	75	95	125	170
Isolation	Up	1.2/50 µs (kV peak)		70	85	110	145	195
Breaking capacity								
Transformer off load		A		16				
Cables off load		A		31.5				50
Rated current	Ir	A		400 - 630 -1250				630-1250
Short-time withstand current	Ik/tk (1)	kA/1 s	25	630 - 1250				1250
			20 (2)	630 - 1250				
			16	630 - 1250				
			12.5	400 - 630 - 1250				630-1250
Making capacity (50 Hz)	Ima	kA	62.5	630		NA		
			50	630				
			40	630				
			31.25	400 - 630				630
Maximum breaking capacity (Isc)								
Units IM, IMC, IMB, IMM		A		630 - 800 (3)				630
NSM-cables, NSM-busbars		A		630 - 800 (3)				NA
QM, QMC, QMB		kA		25		20		20
PM		kA		25				20
CVM		kA		6.3	NA			
CVM with fuses		kA		25	NA			
SF6 circuit breaker range				**7.2**	**12**	**17.5**	**24**	**36**
DM1-A, DM1-D, DM1-W		kA	25	630-1250				1250
			20	630-1250				
DM1-S, DM1-M		kA	25	630				NA
DM1-Z			25	1250				NA
DM2		kA	20	630				
			25	630				1250
Vacuum circuit breaker range				**7.2**	**12**	**17.5**	**24**	**36**
DMV-A, DMV-D		kA	25	630-1250			NA	
DMVL-A		kA	20	630				NA
DMVL-D		kA	25	630				NA

NA: Non Available
(1) 3 phases
(2) In 20 kA / 3 s for SM6-24 only, consult us
(3) In 800 A, consult us.