




**Impianto di produzione di energia elettrica da fonte  
solare fotovoltaica e relative opere connesse  
della potenza di 16,996 MWp, denominato  
“PIANE VOMANO”**

**Regione Abruzzo  
Comune di Morro D'Oro (TE), Località Piane Vomano**

**PROGETTO DEFINITIVO  
SCHEDE TECNICHE**




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## 1 Premessa


Le presenti **Schede Tecniche** sono redatte a corredo del Progetto Definitivo inerente alla realizzazione di un impianto “fotovoltaico” denominato "**Piane Vomano**". L’impianto è progettato per produrre energia elettrica in collegamento alla rete di distribuzione. La **potenza di picco** dell’impianto prevista è pari a **16,99656 MWp**, il collegamento alla rete verrà realizzato tramite un cavidotto MT 30 kV, connesso ad una nuova Stazione Elettrica RTN 132 kV.

L’impianto fotovoltaico verrà realizzato a terra, nel Comune di **Morro D’Oro** in provincia di Teramo, in un terreno avente superficie totale di circa **21,8 ettari**. Il cavidotto, di lunghezza totale di 7,12 km circa, correrà quasi interamente su strada pubblica, nel territorio dei Comuni di Morro D’Oro e Roseto degli Abruzzi (TE), collegando l’impianto ad una nuova Stazione Elettrica RTN 132 kV”, tramite nuova Sottostazione utente.

L’area dell’impianto in oggetto è situata nel Comune di Morro D’Oro in provincia di Teramo, censita in catasto terreni al Foglio 27 p.lle 17, 22, 145 e al Foglio 28 p.lle 6, 7, 17, 21, 23, e individuato alle coordinate 42°37'43.0"N - 13°55'51.0"E.

Lo scopo del presente elaborato è di fornire i dati tecnici dei principali componenti costituenti l’impianto fotovoltaico oggetto della documentazione progettuale di cui il presente documento è parte integrante.

I seguenti prodotti sono stati utilizzati al solo fine del dimensionamento del progetto a fine della presentazione dello stesso agli Enti competenti. Nelle successive fasi della progettazione questi potranno essere confermati o sostituiti da altri prodotti

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## 2 Moduli fotovoltaici

**Vertex N**  
BIFACIAL DUAL GLASS MODULE

PRODUCT: TSM-NEG21C.20  
PRODUCT RANGE: 660-690W

**690W**

MAXIMUM POWER OUTPUT

**0~+5W**

POSITIVE POWER TOLERANCE

**22.2%**

MAXIMUM EFFICIENCY



### High customer value

- Lower LCOE (levelized cost of energy), reduced BOS (balance of system) cost, shorter payback time
- Guaranteed first year and annual degradation
- High module power; high string power and low voltage design



### High power up to 690W

- Up to 22.2% module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping effect, lower series resistance and improved current collection



### High reliability

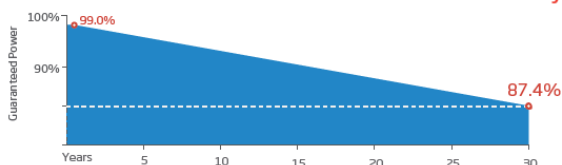
- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- Mechanical performance up to 5400 Pa positive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



### High energy yield

- Excellent product bifaciality and low irradiation performance, validated by 3rd party
- Extremely low 1% first year degradation and 0.4% annual power attenuation
- The unique design provides optimized energy production under inter-row shading conditions
- Lower temperature coefficient (-0.30%) and operating temperature
- Up to 30% additional power gain from back side depending on albedo

### Trina Solar's Vertex Bifacial Dual Glass Performance Warranty



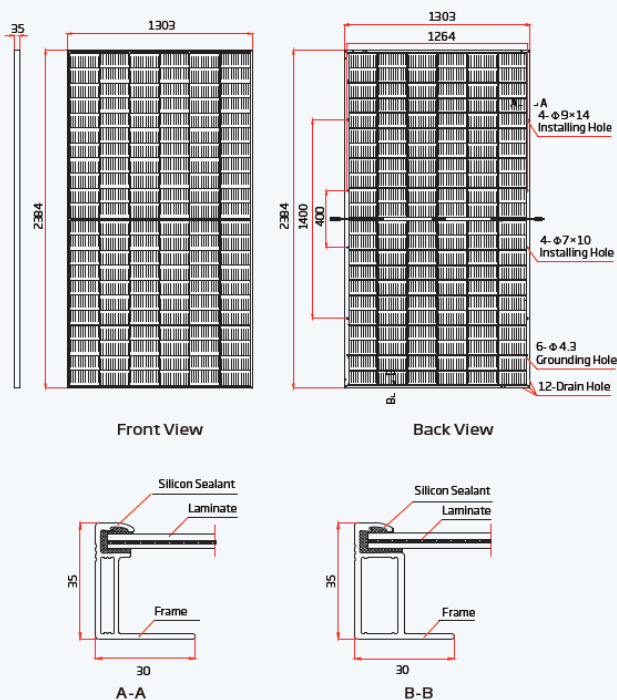
### Comprehensive Products and System Certificates



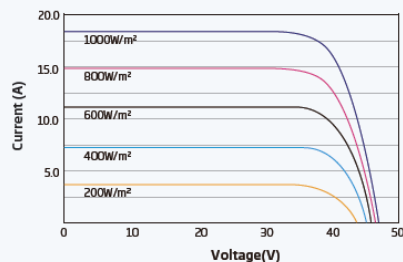
IEC61215/IEC61730/IEC61701/IEC62716  
ISO 9001: Quality Management System  
ISO 14001: Environmental Management System  
ISO 14064: Greenhouse Gases Emissions Verification  
ISO 45001: Occupational Health and Safety Management System

**Trina solar**

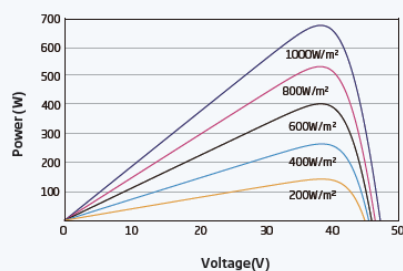
### DIMENSIONS OF PV MODULE(mm)



### I-V CURVES OF PV MODULE(675W)



### P-V CURVES OF PV MODULE(675 W)



### ELECTRICAL DATA (STC)

Peak Power Watts- $P_{max}$ (Wp)*	660	665	670	675	680	685	690
Power Tolerance- $P_{max}$ (W)				0 ~ +5			
Maximum Power Voltage- $V_{MP}$ (V)	38.8	39.0	39.2	39.4	39.6	39.8	40.1
Maximum Power Current- $I_{MP}$ (A)	17.02	17.06	17.09	17.12	17.16	17.19	17.23
Open Circuit Voltage- $V_{oc}$ (V)	46.6	46.8	47.0	47.2	47.4	47.7	47.9
Short Circuit Current- $I_{sc}$ (A)	18.03	18.07	18.10	18.14	18.18	18.21	18.25
Module Efficiency $\eta_m$ (%)	21.2	21.4	21.6	21.7	21.9	22.1	22.2

STC Irradiance: 1000W/m<sup>2</sup>, Cell Temperature 25°C, Air Mass A.M.L.1.5 \*Measuring tolerance: ±3%.

### Electrical characteristics with different power bin (reference to 10% Irradiance ratio)

Total Equivalent power - $P_{max}$ (Wp)	713	718	724	729	734	740	745
Maximum Power Voltage- $V_{MP}$ (V)	38.8	39.0	39.2	39.4	39.6	39.8	40.1
Maximum Power Current- $I_{MP}$ (A)	18.38	18.42	18.46	18.49	18.53	18.57	18.60
Open Circuit Voltage- $V_{oc}$ (V)	46.6	46.8	47.0	47.2	47.4	47.7	47.9
Short Circuit Current- $I_{sc}$ (A)	19.47	19.52	19.55	19.59	19.63	19.67	19.71
Irradiance ratio (rear/front)				10%			

Product Bifaciality: 80±5%.

### ELECTRICAL DATA (NOCT)

Maximum Power- $P_{max}$ (Wp)	502	506	510	514	517	521	526
Maximum Power Voltage- $V_{MP}$ (V)	36.4	36.6	36.8	37.0	37.2	37.3	37.7
Maximum Power Current- $I_{MP}$ (A)	13.79	13.84	13.86	13.89	13.91	13.94	13.96
Open Circuit Voltage- $V_{oc}$ (V)	44.2	44.4	44.5	44.7	44.9	45.2	45.4
Short Circuit Current- $I_{sc}$ (A)	14.53	14.56	14.59	14.62	14.65	14.67	14.71

NOCT: Irradiance at 800W/m<sup>2</sup>, Ambient Temperature 20°C, Wind Speed 1m/s.

### MECHANICAL DATA

Solar Cells	Monocrystalline
No. of cells	132 cells
Module Dimensions	2384×1303×35 mm (93.86×51.30×1.38 inches)
Weight	38.7 kg (85.3 lb)
Front Glass	2.0 mm (0.08 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	EVA/POE
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	35mm(1.38 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm <sup>2</sup> (0.006 inches <sup>2</sup> ), Portrait: 280/280 mm(11.02/11.02 inches) Length can be customized
Connector	MC4 EV02 / TS4*

\*Please refer to regional datasheet for specified connector.

### TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of $P_{max}$	-0.30%/°C
Temperature Coefficient of $V_{oc}$	-0.25%/°C
Temperature Coefficient of $I_{sc}$	0.04%/°C

### MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC)
Max Series Fuse Rating	35A

### WARRANTY


12 year Product Workmanship Warranty
30 year Power Warranty
1% first year degradation
0.4% Annual Power Attenuation

(Please refer to product warranty for details)

### PACKAGING CONFIGURATION

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



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### 3 Trackers



#### Easy to Install. Easy to Own.

The modular design and superior engineering of Valmont® Solar Convert-1P Trackers make them simple to install, easy to maintain and built for long-term performance.



**Simple, Robust Table Structure Design** | Short rows provide best-in-class terrain following and layout density while enabling a stiff structure that minimizes failures and decreases long-term costs.



**Innovative, Hybrid Controller Architecture** | The wireless controller utilizes existing DC infrastructure to enable backup capabilities instead of failure-prone batteries or the need for auxiliary modules.



**Global Supply Chain, Highest Quality** | With 85 manufacturing facilities on six continents, Valmont has the footprint and capability to ship the highest-quality product while offering unmatched price stability and availability.



**International, Bankable Product Portfolio** | The Convert-1P Single-Axis Solar Trackers have been deployed in 11 countries on four continents, generating nearly 3GW for leading customers, financiers and partners.



**THE IDEAL SOLUTION FOR:**  
Distributed Generation Projects  
Utility-Scale Projects

POWERED BY **CONVERT TECHNOLOGY** 

## CONVERT-1P | SINGLE-AXIS SOLAR TRACKER



### STRUCTURAL/MECHANIC FEATURES

Tracking Technology	Horizontal, balanced single-axis tracker with independently driven rows and backtracking
Maximum Tracking Error	$\pm 2^\circ$
Rotation Angle	$\pm 55^\circ$ (Up to $60^\circ$ )
Module Compatibility	Adaptable to all available PV modules types on market: Monofacial and Bifacial (thin film, framed and frameless)
Ground Cover Ratio	Fully configurable; typical range from 25% to 50%
Land Slope	Up to 7% N-S (extended options available); Unlimited E-W
Configurations	1 module in portrait

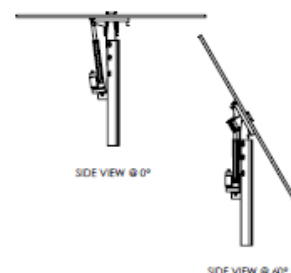
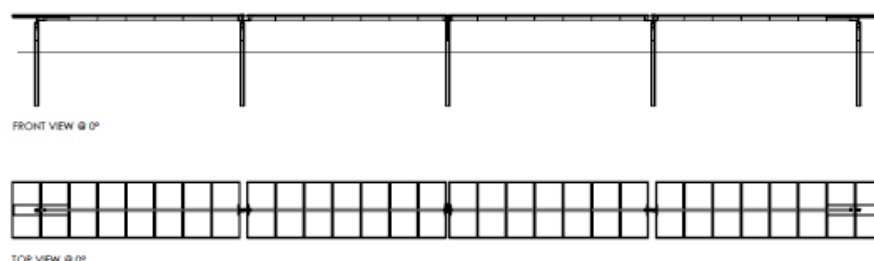
### ELECTRONIC SPECIFICATIONS

Motor	Linear actuator with induction AC motor (lubrication free) with integrated encoder
System	Electronic control boards for multiple system architectures (two solutions 10 or 100 actuators in closed loop with encoder)
Power Supply	<ul style="list-style-type: none"> <li>AC power supply from auxiliary service</li> <li>Self-powered from PV string (patented backup solution without batteries)</li> <li>Smart power integration with string inverters</li> </ul>
Operating Temperature Range	$-20^\circ/50^\circ\text{C}$ ( $-4^\circ\text{F}/122^\circ\text{F}$ ) extended range available
Solar Tracking Method	Astronomical clock with GPS input; self-configuring; no irradiation or tilt sensor required
Monitoring & Data Stream	Wireless or wired (RS485, Ethernet, Fiber)
Communication	Real-time local or remote communication data provided via Modbus

### INSTALLATION

Foundation	Compatible with all foundation types (driven pile, ground screw, concrete)
Installation Method	Requires no specialized personnel or equipment; no in-field welding
Module Installation Method	Rivets, bolts or clamps
Grounding Method	Self-ground structure; no separate materials or labor
Warranty	10 years on structural components; 5 years on motors and electronic components (extended warranty available)

### EXAMPLE OF: TYPICAL TRACKER TABLE WITH 56 MODULES



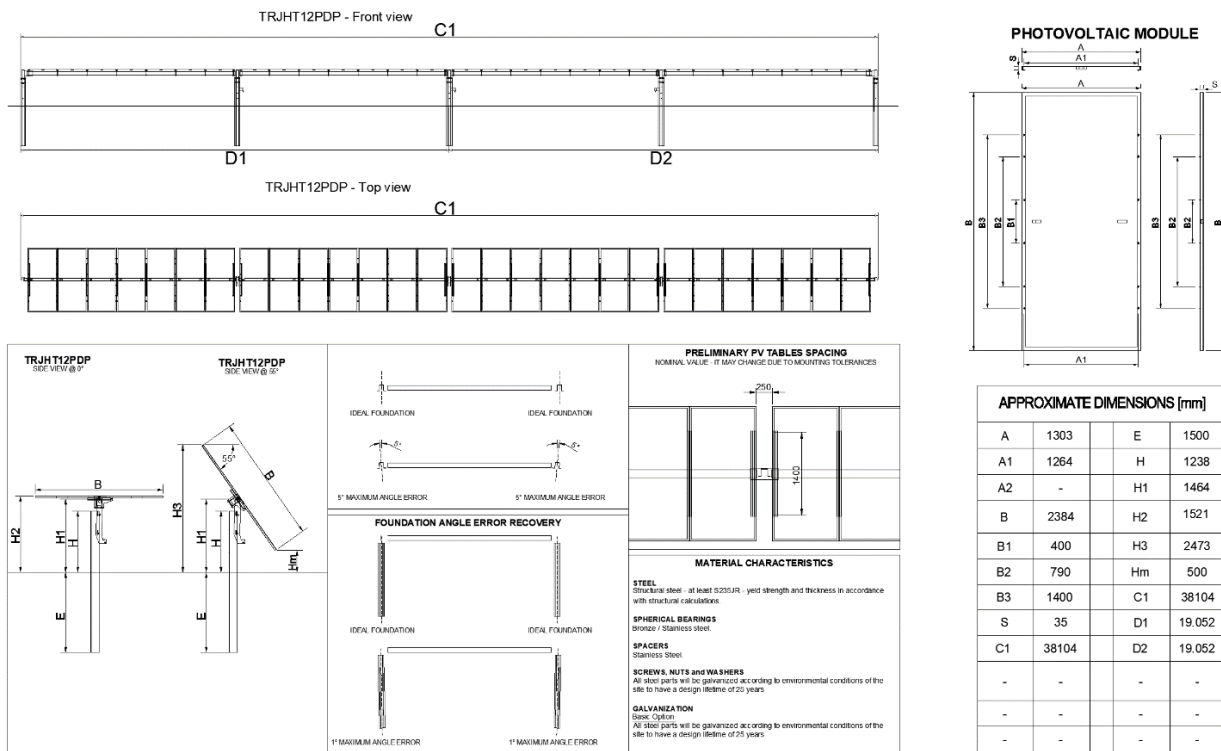
#### QUALIFICATIONS & CERTIFICATES:

UL 2703  
UL 3707  
ISO 9001

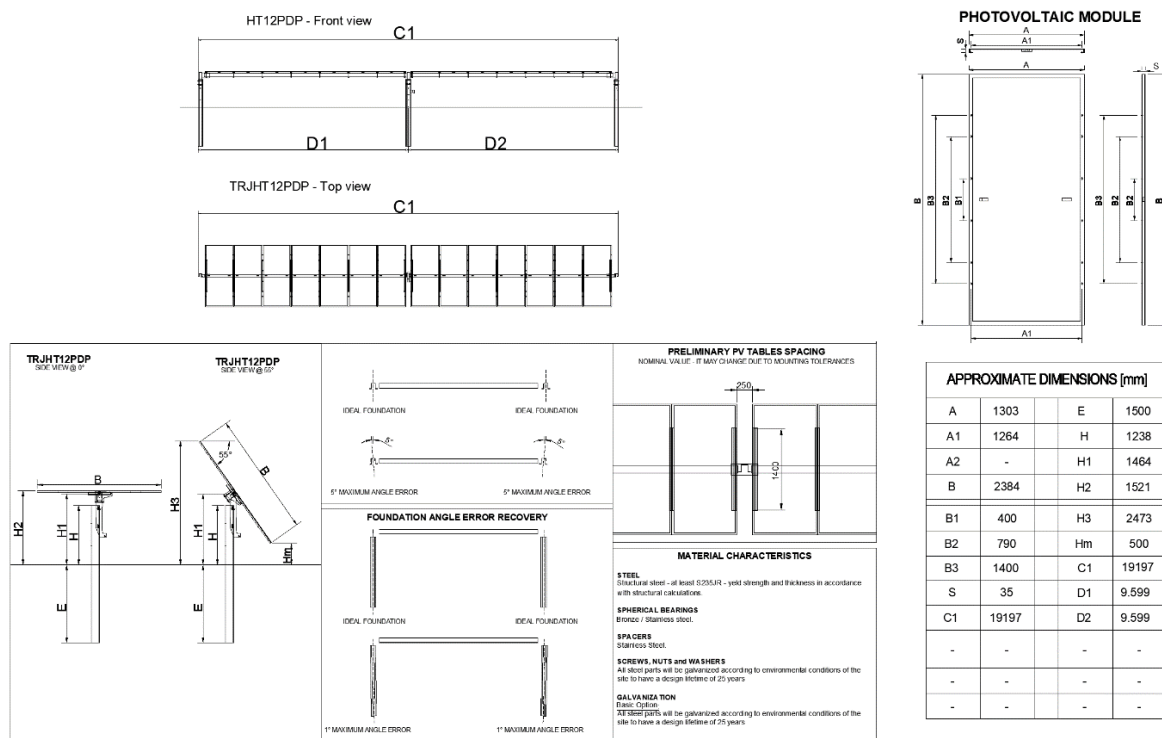
ISO 14001  
ISO 45001  
ISO 50001




### 3.1 Tracker da 28 moduli



### 3.2 Tracker da 14 moduli





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## 4 String boxes

### SMA STRING-COMBINER



#### Robust

- Stable housing made of glass-fiber-reinforced polyester
- Indoor and outdoor installation possible thanks to IP54 degree of protection

- Can be operated at ambient temperatures of  $-25^{\circ}\text{C}$  to  $60^{\circ}\text{C}$  and at altitudes of up to 4000 m above MSL

#### Easy to Use

- Easy to install thanks to its compact structure and low weight
- Integrated DC load-break switch for ultra-high safety

#### Versatile

- For PV array voltages of 1000 V and 1500 V
- Collection and safeguarding of 16, 24 or 32 strings for flexibility during the system design phase

### SMA STRING-COMBINER

For safe collection of all strings in the PV field

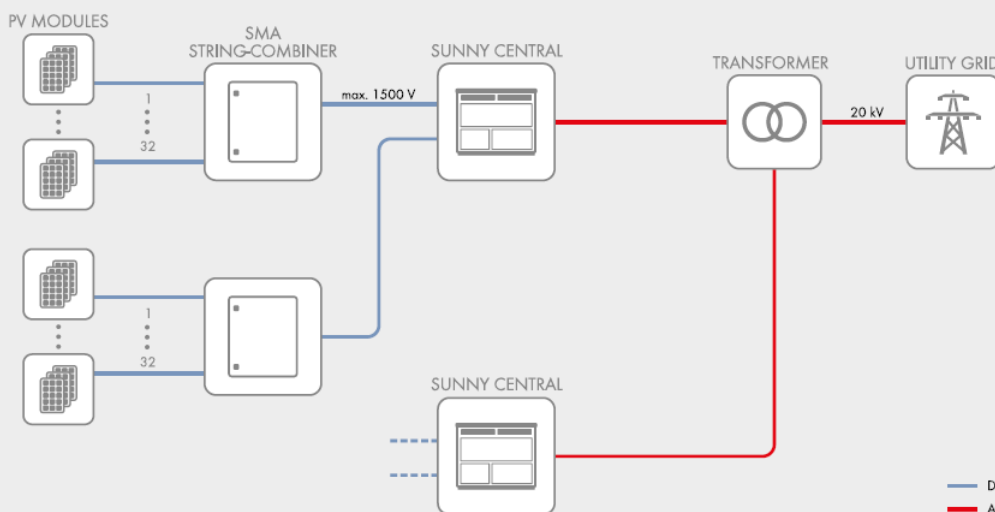
The boxes can be installed quickly, safely and easily both indoors and outdoors thanks to their compact dimensions, while their robust enclosure guarantees durability and reliable safety in the PV field. The SMA String-Combiners with 24 and 32 string inlets are fitted with two cable outlets per pole as standard and cover – just like the Combiner with 16 string inlets – a sealing range of 17 to 38.5 millimeters. Cables with cross-sections of 70 to 400 mm<sup>2</sup> can be inserted.


## SMA STRING-COMBINER for 1500 V<sub>DC</sub> systems



Technical Data	DC-CMB-U15-16	DC-CMB-U15-24	DC-CMB-U15-32
<b>Input (DC)</b>			
Rated voltage	1500 V	1500 V	1500 V
Altitude derating (rated voltage)	2001 m to 3000 m above MSL = reduction by 1.0% per 100 m 3001 m to 4000 m above MSL = reduction by 1.2% per 100 m		
Number of string inputs / fuse holders per pole	16	24	32
Rated current	17.2 A	13.75 A	10.31 A
Fuse type*	10.3 x 85 - 1500 VDC - gPV		
String connection	Connection to the fuse holder		
Sealing range of cable gland	5 mm to 8 mm		
<b>Output (DC)</b>			
Rated current	275 A	330 A	330 A
Temperature derating (rated current)	>50°C operating temperature = reduction by 1% per K		
DC switch (load-break switch)	400 A / 1500 V	400 A / 1500 V	400 A / 1500 V
Surge arrester	Type 2, I <sub>n</sub> = 15 kA; I <sub>max</sub> = 40 kA		
DC output	Busbar (ring terminal lug M12)		
Number of DC outputs	1	1 / 2	1 / 2
Conductor cross-section	Busbar 70 mm <sup>2</sup> to 400 mm <sup>2</sup>		
Sealing range of cable glands	17 mm to 38.5 mm	17 mm to 38.5 mm	17 mm to 38.5 mm
<b>Enclosure / Ambient Parameters</b>			
IP degree of protection according to IEC 60529	IP 54 / self-ventilated	IP 54 / self-ventilated	IP 54 / self-ventilated
Enclosure material	Glass-fiber reinforced plastic / UV-resistant		
Dimensions (W / H / D), wall mounting bracket and string cable harness included	550 / 650 / 260 mm (21.65 / 25.59 / 10.24 inch)		590 / 790 / 285 mm (23.23 / 31.10 / 11.22 inch)
Max. weight	25 kg (55 lb)	28 kg (62 lb)	40 kg (88 lb)
Protection class (according to IEC 61140)	II	II	II
Mounting type	Wall mounting		
Ambient temperature in operation / during storage	-25°C to +60°C / -40°C to +70°C		
Relative humidity	0% to 95%, non-condensing		
Max. altitude above MSL	4000 m	4000 m	4000 m
<b>Standards</b>			
Compliance	CE, IEC 61439-1, IEC 61439-2		
* accessory required			


### SYSTEM EXAMPLE



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## 5 Cabine di conversione e trasformazione

Come evidenziato sullo schema elettrico e descritto nelle altre relazioni a corredo del presente progetto, le cabine di conversione e trasformazione saranno di due differenti taglie: 2930kVA e 4000kVA. Alle due differenti cabine saranno abbinati due diversi inverter. Di seguito si riportano le schede tecniche delle due cabine con i relativi inverter accoppiati.

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## 5.1 Cabine di conversione e trasformazione da 2930 kVA

### 5.1.1 Cabina da 2930 kVA



/ MVPS 2660-S2-10 / MVPS 2800-S2-10 / MVPS 2930-S2-10 / MVPS 3060-S2-10

## MV Power Station

2660-S2 / 2800-S2 / 2930-S2 / 3060-S2

Turnkey solution for PV and battery-storage power plants



#### Robust

- Station and all individual components type-tested
- Galvanized base frame for extreme ambient conditions

#### Easy to use

- Turn-key solution
- Fully pre-assembled for easy setup and commissioning

#### Cost-effective

- Lower specific costs thanks to high power classes
- Minimal coordination required during planning and installation
- Low transport costs thanks to 20-foot platform

#### Flexible

- One design for the whole world
- Numerous options

With the power of the robust central inverters Sunny Central UP or Sunny Central Storage UP and the perfectly matched medium-voltage components, the MV Power Station offers high power density and is a turnkey solution available worldwide.

Ideal for use in the new generation of PV and battery-storage power plants with 1500 V<sub>DC</sub>, the integrated system solution is easy to transport and quick to assemble and commission. The MVPS and all components are type-tested. The MV Power Station combines rigorous plant safety with maximum energy yield and minimized deployment and operating risk.



Technical data	MVPS 2930-S2	MVPS 3060-S2
<b>Input (DC)</b>		
Available inverters	1 x SC 2930 UP / 1 x SCS 2530 UP-XT	1 x SC 3060 UP / 1 x SCS 2630 UP-XT
Max. input voltage	1500 V	1500 V
Number of DC inputs	Depending on selected inverter	
Integrated zone monitoring	○	
<b>Output (AC) on the medium-voltage side</b>		
Nominal power at SC UP (from -25°C to +35°C / 40°C; optional 50°C) <sup>1)</sup>	2933 kVA / 2640 kVA	3067 kVA / 2760 kVA
Charging power at SCS UP-XT (from -25°C to +25°C / 40°C; optional 50°C) <sup>1)</sup>	2633 kVA / 2201 kVA	2752 kVA / 2302 kVA
Discharging power at SCS UP-XT (from -25°C to +25°C / 40°C; optional 50°C) <sup>1)</sup>	2933 kVA / 2493 kVA	3067 kVA / 2607 kVA
Typical nominal AC voltages with a tolerance of +/-10%	10 kV to 35 kV	10 kV to 35 kV
AC power frequency	50 Hz / 60 Hz	50 Hz / 60 Hz
Transformer vector group Dy11 / YNd11 / YNy0	● / ○ / ○	● / ○ / ○
Transformer cooling method	KNAN <sup>2)</sup>	KNAN <sup>2)</sup>
Transformer standby power losses, industry standard / Eco design 1 / Eco design 2	● / ○ / ○	● / ○ / ○
Transformer short-circuit losses, industry standard / Eco design 1 / Eco design 2	● / ○ / ○	● / ○ / ○
Max. total harmonic distortion	< 3 %	
Reactive power feed-in (up to max. 60% of nominal power)	○	
Power factor at rated power / adjustable displacement power factor	1 / 0.8 overexcited to 0.8 underexcited	
<b>Inverter efficiency</b>		
Max. efficiency <sup>3)</sup> / Europ. efficiency <sup>3)</sup> / CEC efficiency <sup>4)</sup>	98.7% / 98.6% / 98.5%	98.7% / 98.6% / 98.5%
<b>Protective devices</b>		
Input-side disconnection point	DC load-break switch	
Output-side disconnection point	Medium-voltage vacuum circuit breaker	
DC overvoltage protection	Surge arrester, type I	
Galvanic isolation	●	
Arc fault resistance medium-voltage control room (according to IEC 62271-202)	IAC A 20 kA 1 s	
<b>General data</b>		
Dimensions (W / H / D)	6058 mm / 2896 mm / 2438 mm	
Weight	< 18 t	
Self-consumption (max. / partial load / average) <sup>1)</sup>	< 8.1 kW / < 1.8 kW / < 2.0 kW	
Self-consumption (stand-by) <sup>1)</sup>	< 370 W	
Ambient temperature -25°C to +45°C / -25°C to +55°C / -35°C to +55°C / -40°C to +45°C	● / ○ / ○ / ○	
Degree of protection according to IEC 60529	Control rooms IP23D, inverter electronics IP54	
Environment: standard/extreme	● / ○	
Maximum permissible value for relative humidity	95% (for 2 months/year)	
Max. operating altitude above MSL 1000 m / 2000 m	● / ○	
Inverter fresh air consumption	6500 m³/h	
<b>Equipment</b>		
DC connection	Lug	
AC connection	Outer-cone angle plug	
Tap changer for MV voltage transformer: without/with	● / ○	
Shield winding for MV transformer: without/with	● / ○	
Monitoring package	○	
Station enclosure color	RAL 7004	
Transformer for external loads: without / 10 / 20 / 30 / 40 / 50 / 60 kVA	● / ○ / ○ / ○ / ○ / ○ / ○	
MV switchgear: without / 1 panel / 3 panels	● / ○ / ○	
2 cable panels with load-break switch, 1 transformer panel with circuit breaker, arc fault resistance IAC A FL 20 kA 1 s to IEC 62271-200	● / ○ / ○	
MV switchgear short-circuit current capability (20 kA 1 s / 20 kA 3 s / 25 kA 1 s)	● / ○ / ○	
Accessory for MV switchgear: without / auxiliary contacts / motor for transformer panel / cascade control / monitoring	● / ○ / ○ / ○ / ○	
Integrated oil spill containment: without/with	● / ○	
Industry standards (other industry standards: see inverter datasheet)	IEC 60076, IEC 62271-200, IEC 62271-202, EN50588-1, CSC certificate	
<b>Model type number</b>	MVPS-2930-S2-10	MVPS-3060-S2-10

● Standard features ○ Optional features – Not available


1) Data based on inverter. Further details can be found in the inverter datasheet.

2) KNAN = ester with natural air cooling


3) Efficiency measured at inverter without internal power supply

4) Efficiency measured at inverter with internal power supply



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### 5.1.2 Inverter da 2930 kVA



/ SC 2660 UP / SC 2800 UP / SC 2930 UP / SC 3060 UP

**SMA**

## Sunny Central UP

The new Sunny Central: more power per cubic meter

#### Efficient

- Up to 4 inverters can be transported in one standard shipping container
- Overdimensioning up to 200% is possible
- Full power at ambient temperatures of up to 35°C

#### Robust

- Intelligent air cooling system OptiCool for efficient cooling
- Suitable for outdoor use in all climatic ambient conditions worldwide

#### Flexible

- One device for all applications
- PV application with DC-coupled battery-storage system and charging from the AC utility as an option

#### Easy to Use

- Improved DC connection area
- Connection area for customer equipment
- Integrated voltage support for internal and external loads

With an output of up to 3067 kVA and system voltages of 1500 V DC, the SMA central inverter allows for more efficient system design and a reduction in specific costs for PV and battery power plants.

A separate voltage supply and additional space are available for the installation of customer equipment. True 1500 V technology and the intelligent cooling system OptiCool ensure smooth operation even in extreme ambient temperature as well as a long service life of 25 years.



Technical Data	Sunny Central 2930 UP	Sunny Central 3060 UP
<b>DC side</b>		
MPP voltage range $V_{DC}$ (at 35 °C / at 50 °C)	962 V to 1325 V / 1100 V	1003 V to 1325 V / 1100 V
Min. DC voltage $V_{DC, min}$ / Start voltage $V_{DC, start}$	934 V / 1112 V	976 V / 1153 V
Max. DC voltage $V_{DC, max}$	1500 V	1500 V
Max. DC current $I_{DC, max}$ / with DC coupling	3200 A / 4800 A	3200 A / 4800 A
Max. short-circuit current $I_{DC, SC}$	8400 A	8400 A
Number of DC inputs	Busbar with 26 connections per terminal, 24 double pole fused (32 single pole fused)	
Number of DC inputs with optional DC battery coupling	18 double pole fused (36 single pole fused) for PV and 6 double pole fused for batteries	
Max. number of DC cables per DC input (for each polarity)	2 x 800 kcmil, 2 x 400 mm <sup>2</sup>	
Integrated zone monitoring	○	
Available PV fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	
Available battery fuse size (per input)	750 A	
<b>AC side</b>		
Nominal AC power at $\cos \varphi = 1$ (at 35 °C / at 50 °C)	2933 kVA / 2640 kVA	3067 kVA / 2760 kVA
Nominal AC active power at $\cos \varphi = 0.8$ (at 35 °C / at 50 °C)	2346 kW / 2112 kW	2454 kW / 2208 kW
Nominal AC current $I_{AC, nom}$ (at 35 °C / at 50 °C)	2566 A / 2309 A	2566 A / 2309 A
Max. total harmonic distortion	< 3% at nominal power	
Nominal AC voltage / nominal AC voltage range <sup>1) 8)</sup>	660 V / 528 V to 759 V	690 V / 552 V to 759 V
AC power frequency / range	50 Hz / 47 Hz to 53 Hz 60 Hz / 57 Hz to 63 Hz	
Min. short-circuit ratio at the AC terminals <sup>9)</sup>	> 2	
Power factor at rated power / displacement power factor adjustable <sup>10) 11)</sup>	● 1 / 0.8 overexcited to 0.8 underexcited	
<b>Efficiency</b>		
Max. efficiency <sup>2)</sup> / European efficiency <sup>3)</sup> / CEC efficiency <sup>3)</sup>	98.9% / 98.7% / 98.5%	98.9% / 98.7% / 98.5%
<b>Protective Devices</b>		
Input-side disconnection point	DC load break switch	
Output-side disconnection point	AC circuit breaker	
DC overvoltage protection	Surge arrester, type I & II	
AC overvoltage protection (optional)	Surge arrester, class I & II	
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III	
Ground-fault monitoring / remote ground-fault monitoring	○ / ○	
Insulation monitoring	○	
Degree of protection: electronics / air duct / connection area (as per IEC 60529)	IP54 / IP34 / IP34	
<b>General Data</b>		
Dimensions (W / H / D)	2815 / 2318 / 1588 mm (110.8 / 91.3 / 62.5 inch)	
Weight	< 3400 kg / < 7500 lb	
Self-consumption (max. <sup>4)</sup> / partial load <sup>5)</sup> / average <sup>6)</sup>	< 8100 W / < 1800 W / < 2000 W	
Self-consumption (standby)	< 370 W	
Internal auxiliary power supply	○ Integrated 8.4 kVA transformer	
Operating temperature range <sup>7)</sup>	-25 °C to 60 °C / -13 °F to 140 °F	
Noise emission <sup>7)</sup>	63.0 dB(A)	
Temperature range (standby)	-40 °C to 60 °C / -40 °F to 140 °F	
Temperature range (storage)	-40 °C to 70 °C / -40 °F to 158 °F	
Max. permissible value for relative humidity (condensing / non-condensing)	95% to 100% (2 month/year) / 0% to 95%	
Maximum operating altitude above MSL <sup>8)</sup> 1000 m / 2000 m <sup>11)</sup> / 3000 m <sup>11)</sup>	● / ○ / -	
Fresh air consumption	6500 m <sup>3</sup> /h	
<b>Features</b>		
DC connection	Terminal lug on each input (without fuse)	
AC connection	With busbar system (three busbars, one per line conductor)	
Communication	Ethernet, Modbus Master, Modbus Slave	
Enclosure / roof color	RAL 9016 / RAL 7004	
Supply for external loads	○ (2.5 kVA)	
Standards and directives complied with	CE, IEC / EN 62109-1, IEC / EN 62109-2, AR-N 4110, IEEE1547, UL 840 Cat. IV, Arrêté du 23/04/08	
EMC standards	IEC 55011, FCC Part 15 Class A	
Quality standards and directives complied with	VDI/VDE 2862 page 2, DIN EN ISO 9001	
● Standard features ○ Optional – not available		
Type designation	SC 2930 UP	SC 3060 UP

1) At grid voltage lower than nominal AC voltage, the nominal AC power decreases in the same proportion

2) Efficiency measured without internal power supply

3) Efficiency measured with internal power supply

4) Self-consumption at rated operation

5) Self-consumption at < 75% P<sub>n</sub> at 25 °C

6) Self-consumption averaged out from 5% to 100% P<sub>n</sub> at 25 °C


7) Sound pressure level at a distance of 10 m

8) Values apply only to inverters. Permissible values for SMA MV solutions from SMA can be found in the corresponding data sheets.

9) A short-circuit ratio of < 2 requires a special approval from SMA

10) Depending on the DC voltage

11) Earlier temperature-dependent de-rating and reduction of DC open-circuit voltage

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## 5.2 Cabine di conversione e trasformazione da 4000 kVA

### 5.2.1 Cabina da 4000 kVA



/ MVPS 4000-S2-10 / MVPS 4200-S2-10 / MVPS 4400-S2-10 / MVPS 4600-S2-10

# MV Power Station

4000-S2 / 4200-S2 / 4400-S2 / 4600-S2

Turnkey solution for PV and battery-storage power plants



#### Robust

- Station and all individual components type-tested
- Galvanized base frame for extreme ambient conditions

#### Easy to use

- Turn-key solution
- Fully pre-assembled for easy setup and commissioning

#### Cost effective

- Lower specific costs thanks to high power classes
- Minimal coordination required during planning and installation
- Low transport costs thanks to 20-foot platform

#### Flexible

- One design for the whole world
- Numerous options

With the power of the robust central inverters Sunny Central UP or Sunny Central Storage UP and the perfectly matched medium-voltage components, the MV Power Station offers high power density and is a turnkey solution available worldwide.

Ideal for use in the new generation of PV and battery-storage power plants with 1500 V<sub>DC</sub>, the integrated system solution is easy to transport and quick to assemble and commission. The MVPS and all components are type-tested. The MV Power Station combines rigorous plant safety with maximum energy yield and minimized deployment and operating risk.

## MV POWER STATION 4000-S2 / 4200-S2 / 4400-S2 / 4600-S2



Technical data	MVPS 4000-S2	MVPS 4200-S2
<b>Input (DC)</b>		
Available inverters	1 x SC 4000 UP or 1 x SCS 3450 UP or 1 x SCS 3450 UP:XT	1 x SC 4200 UP or 1 x SCS 3600 UP or 1 x SCS 3600 UP:XT
Max. input voltage	1500 V	1500 V
Number of DC inputs	Depending on selected inverter	
Integrated zone monitoring	○	
<b>Output (AC) on the medium-voltage side</b>		
Nominal power at SC UP (from -25°C to +35°C / 40°C; optional 50°C) <sup>1)</sup>	4000 kVA / 3600 kVA	4200 kVA / 3780 kVA
Nominal power at SCS UP (from -25°C to +25°C / 40°C; optional 50°C) <sup>1)</sup>	3450 kVA / 2930 kVA	3620 kVA / 3075 kVA
Charging power at SCS UP:XT (from -25°C to +25°C / 40°C; optional 50°C) <sup>1)</sup>	3589 kVA / 3001 kVA	3769 kVA / 3152 kVA
Discharging power at SCS UP:XT (from -25°C to +25°C / 40°C; optional 50°C) <sup>1)</sup>	4000 kVA / 3400 kVA	4200 kVA / 3570 kVA
Typical nominal AC voltages with a tolerance of +/-10%	10 kV to 35 kV	10 kV to 35 kV
AC power frequency	50 Hz / 60 Hz	50 Hz / 60 Hz
Transformer vector group Dy11 / YNd11 / YNy0	● / ○ / ○	● / ○ / ○
Transformer cooling method	KNAN <sup>2)</sup>	KNAN <sup>2)</sup>
Transformer standby power losses, industry standard / Eco design 1 / Eco design 2	● / ○ / ○	● / ○ / ○
Transformer short-circuit losses, industry standard / Eco design 1 / Eco design 2	● / ○ / ○	● / ○ / ○
Max. total harmonic distortion	< 3 %	
Reactive power feed-in (up to max. 60% of nominal power)	○	
Power factor at rated power / adjustable displacement power factor	1 / 0.8 overexcited to 0.8 underexcited	
<b>Inverter efficiency</b>		
Max. efficiency <sup>3)</sup> / Europ. efficiency <sup>3)</sup> / CEC efficiency <sup>4)</sup>	98.8 % / 98.6 % / 98.5 %	98.8 % / 98.7 % / 98.5 %
<b>Protective devices</b>		
Input-side disconnection point	DC load-break switch	
Output-side disconnection point	Medium-voltage vacuum circuit breaker	
DC overvoltage protection	Surge arrester, type I	
Galvanic isolation	●	
Arc fault resistance medium-voltage control room (according to IEC 62271-202)	IAC A 20 kA 1 s	
<b>General data</b>		
Dimensions (W / H / D)	6058 mm / 2896 mm / 2438 mm	
Weight	< 18 t	
Self-consumption (max. / partial load / average) <sup>1)</sup>	< 8.1 kW / < 1.8 kW / < 2.0 kW	
Self-consumption (stand-by) <sup>1)</sup>	< 370 W	
Ambient temperature -25°C to +45°C / -25°C to +55°C / -35°C to +55°C / -40°C to +45°C	● / ○ / ○ / ○	
Degree of protection according to IEC 60529	Control rooms IP23D, inverter electronics IP54	
Environment: standard/extreme	● / ○	
Maximum permissible value for relative humidity	95% (for 2 months/year)	
Max. operating altitude above MSL 1000 m / 2000 m	● / ○	
Inverter fresh air consumption	6500 m³/h	
<b>Equipment</b>		
DC connection	Lug	
AC connection	Outer-cone angle plug	
Tap changer for MV voltage transformer: without/with	● / ○	
Shield winding for MV transformer: without/with	● / ○	
Monitoring package	○	
Station enclosure color	RAL 7004	
Transformer for external loads: without / 10 / 20 / 30 / 40 / 50 / 60 kVA	● / ○ / ○ / ○ / ○ / ○ / ○	
MV switchgear: without / 1 panel / 3 panels	● / ○ / ○	
2 cable panels with load-break switch, 1 transformer panel with circuit breaker, arc fault resistance IAC A FL 20 kA 1 s to IEC 62271-200	● / ○ / ○	
MV switchgear short-circuit current capability (20 kA 1 s / 20 kA 3 s / 25 kA 1 s)	● / ○ / ○	
Accessory for MV switchgear: without / auxiliary contacts / motor for transformer panel / cascade control / monitoring	● / ○ / ○ / ○ / ○	
Integrated oil spill containment: without/with	● / ○	
Industry standards (other industry standards: see inverter datasheet)	IEC 60076, IEC 62271-200, IEC 62271-202, EN50588-1, CSC certificate	
<b>Type designation</b>	MVPS-4000-S2-10	MVPS-4200-S2-10

● Standard features ○ Optional features – Not available


1) Data based on inverter. Further details can be found in the inverter datasheet.

2) KNAN = ester with natural air cooling


3) Efficiency measured at inverter without internal power supply

4) Efficiency measured at inverter with internal power supply



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### 5.2.2 Inverter da 4000 kVA



/ SC 4000 UP / SC 4200 UP / SC 4400 UP / SC 4600 UP

**SMA**

## Sunny Central UP

The new Sunny Central: more power per cubic meter

#### Efficient

- Up to 4 inverters can be transported in one standard shipping container
- Overdimensioning up to 200% is possible
- Full power at ambient temperatures of up to 35°C

#### Robust

- Intelligent air cooling system OptiCool for efficient cooling
- Suitable for outdoor use in all climatic ambient conditions worldwide

#### Flexible

- One device for all applications
- PV application with DC-coupled battery-storage system and charging from the AC utility as an option

#### Easy to Use

- Improved DC connection area
- Connection area for customer equipment
- Integrated voltage support for internal and external loads

With an output of up to 4600 kVA and system voltages of 1500 V DC, the SMA central inverter allows for more efficient system design and a reduction in specific costs for PV and battery power plants.


A separate voltage supply and additional space are available for the installation of customer equipment. True 1500 V technology and the intelligent cooling system OptiCool ensure smooth operation even in extreme ambient temperature as well as a long service life of 25 years.



## SUNNY CENTRAL UP



Technical Data	SC 4000 UP	SC 4200 UP
<b>DC side</b>		
MPP voltage range $V_{DC}$ (at 25 °C / at 50 °C)	880 to 1325 V / 1050 V	921 to 1325 V / 1050 V
Min. DC voltage $V_{DC, min}$ / Start voltage $V_{DC, start}$	849 V / 1030 V	891 V / 1071 V
Max. DC voltage $V_{DC, max}$	1500 V	1500 V
Max. DC current $I_{DC, max}$	4750 A	4750 A
Max. short-circuit current $I_{DC, SC}$	8400 A	8400 A
Number of DC inputs	Busbar with 26 connections per terminal, 24 double pole fused (32 single pole fused)	
Number of DC inputs with optional DC coupled storage	18 double pole fused (36 single pole fused) for PV and 6 double pole fused for batteries	
Max. number of DC cables per DC input (for each polarity)	2 x 800 kcmil, 2 x 400 mm <sup>2</sup>	
Integrated zone monitoring	○	
Available PV fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	
Available battery fuse size (per input)	750 A	
<b>AC side</b>		
Nominal AC power at $\cos \varphi = 1$ (at 35 °C / at 50 °C)	4000 kVA <sup>(1)</sup> / 3600 kVA	4200 kVA <sup>(1)</sup> / 3780 kVA
Nominal AC active power at $\cos \varphi = 0.8$ (at 35 °C / at 50 °C)	3200 kW <sup>(2)</sup> / 2880 kW	3360 kW <sup>(2)</sup> / 3024 kW
Nominal AC current $I_{AC, max}$ (at 35 °C / at 50 °C)	3850 A / 3465 A	3850 A / 3465 A
Max. total harmonic distortion	< 3% at nominal power	
Nominal AC voltage / AC voltage range <sup>(1) (4)</sup>	600 V / 480 V to 720 V	630 V / 504 V to 756 V
AC power frequency / range	50 Hz / 47 Hz to 53 Hz 60 Hz / 57 Hz to 63 Hz	
Min. short-circuit ratio at the AC terminals <sup>(5)</sup>	> 2	
Power factor at rated power / displacement power factor adjustable <sup>(6) (10)</sup>	1 / 0.8 overexcited to 0.8 underexcited	
<b>Efficiency</b>		
Max. efficiency <sup>(1)</sup> / European efficiency <sup>(2)</sup> / CEC efficiency <sup>(3)</sup>	98.8% / 98.6% / 98.5%	98.8% / 98.7% / 98.5%
<b>Protective Devices</b>		
Input-side disconnection point	DC load break switch	
Output-side disconnection point	AC circuit breaker	
DC overvoltage protection	Surge arrester, type I & II	
AC overvoltage protection (optional)	Surge arrester, class I & II	
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III	
Ground-fault monitoring / remote ground-fault monitoring	○ / ○	
Insulation monitoring	○	
Degree of protection: electronics / air duct / connection area (as per IEC 60529)	IP54 / IP34 / IP34	
<b>General Data</b>		
Dimensions (W / H / D)	2815 / 2318 / 1588 mm (110.8 / 91.3 / 62.5 inch)	
Weight	< 3700 kg / < 8158 lb	
Self-consumption (max. <sup>(4)</sup> / partial load <sup>(5)</sup> / average <sup>(6)</sup> )	< 8100 W / < 1800 W / < 2000 W	
Self-consumption (standby)	< 370 W	
Internal auxiliary power supply	○ Integrated 8.4 kVA transformer	
Operating temperature range (optional) <sup>(4)</sup>	(-40 °C) -25 °C to 60 °C / (-40 °F) -13 °F to 140 °F	
Noise emission <sup>(7)</sup>	65.0 dB(A)	
Temperature range (standby)	-40 °C to 60 °C / -40 °F to 140 °F	
Temperature range (storage)	-40 °C to 70 °C / -40 °F to 158 °F	
Max. permissible value for relative humidity (condensing / non-condensing)	95% to 100% (2 month/year) / 0% to 95%	
Maximum operating altitude above MSL <sup>(8)</sup> 1000 m / 2000 m <sup>(11)</sup> / 3000 m <sup>(11)</sup>	● / ○ / ○      ● / ○ / -	
Fresh air consumption	6500 m <sup>3</sup> /h	
<b>Features</b>		
DC connection	Terminal lug on each input (without fuse)	
AC connection	With busbar system (three busbars, one per line conductor)	
Communication	Ethernet, Modbus Master, Modbus Slave	
Enclosure / roof color	RAL 9016 / RAL 7004	
Supply for external loads	○ (2.5 kVA)	
Standards and directives complied with	AR-N 4110, AR-N 4120 <sup>(12)</sup> , Arrêté du 23/04/08, CE, IEC / EN 62109-1, IEC / EN 62109-2, IEEE1547, UL 840 Cat. IV	
EMC standards	IEC 55011, IEC 61000-6-2, FCC Part 15 Class A	
Quality standards and directives complied with	VDI/VDE 2862 page 2, DIN EN ISO 9001	
● Standard features    ○ Optional    - not available		
Type designation	SC 4000 UP	SC 4200 UP

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## 6 Cavi elettrici

### 6.1 Cavi CC per collegamento stringa-string box (H1Z2Z2-K)



Bassa tensione - Energia e cablaggio

HalogenFree

## NPE SUN H1Z2Z2-K

cavo per impianti fotovoltaici

Costruzione, requisiti elettrici, fisici e meccanici:	EN 50618
Non propagazione della fiamma:	EN 60332-1-2
Gas corrosivi o alogenidrici:	EN 50625-1
Densità del fumo:	EN 61034-2
Resistenza raggi UV:	EN 50289-4-17 (A)
Resistenza ozono:	EN 50396
Resistenza alla sollecitazione termica:	EN 60216-1
	EN 60216-2
Direttiva Bassa Tensione:	2014/35/UE
Direttiva RoHS:	2011/65/UE

#### REAZIONE AL FUOCO

CONFORME CPR REGOLAMENTO 305/2011/UE	
Norma:	EN 50675:2014+A1:2016
Classe:	E <sub>ca</sub>
Classificazione:	EN 13501-6
Propagazione della fiamma:	EN 60332-1-2
Organismo Notificatore:	0051 - IMQ
CE	2020



www.latrieneta.cavi.com



revisione n° 004 data 28/09/22

**Descrizione**

- Conduttore: rame stagnato, formazione flessibile, classe 5
- Isolamento: compound reticolato (LS0H)
- Guaina: compound reticolato (LS0H)
- Colore: nero, rosso

LS0H = Low Smoke Zero Halogen

**Caratteristiche funzionali**

- Tensione nominale Uo/U: 1000/1000 V c.a.  
1500/1500 V c.c.
- Tensione massima Um (anche verso terra): 1800 V c.c.
- Temperatura massima di esercizio sul conduttore: 90°C
- Temperatura massima sul conduttore alla temperatura ambiente max di 90°C: 120°C (max 20.000 ore)
- Temperatura minima di esercizio: -40°C (in assenza di sollecitazioni meccaniche)
- Temperatura massima di corto circuito: 250°C per un periodo di 5 sec.

**Caratteristiche particolari**

Funzionamento per almeno 25 anni in normali condizioni d'uso. Funzionamento a lungo termine (Indice di temperatura TI): 120°C riferito a 20.000 ore (EN 60216-1)

**Condizioni di posa**

- Temperatura minima di installazione: -25°C
- Raggio minimo di curvatura consigliato: 4 volte il diametro del cavo
- Massimo sforzo di trazione consigliato: 50 N/mm<sup>2</sup> di sezione del rame

**Impiego e tipo di posa**

Uso previsto in installazioni fotovoltaici secondo la HD 60364-7-712.

Sono progettati per uso permanente all'esterno o all'interno, per installazioni libere mobili, libere a sospensione e fisse. Installazione anche in condotti e su canaline, all'interno o sotto intonaco oltre che nelle apparecchiature. Adatto per l'applicazione su apparecchiature con isolamento di protezione (classe di protezione II).

**Marcatura**


[Ditta] NPE SUN H1Z2Z2-K [formazione] mm2 IEMMEQU ◀HAR▶ [anno] (CE logo) [ordine] [metrica]  
[Ditta] NPE SUN H1Z2Z2-K [formazione] mm2 [anno] (CE logo) [ordine] [metrica]

## NPE SUN H1Z2Z2-K

Formazione	Ø indicativo conduttore	Ø esterno max	Resistenza elettrica max a 20°C	Peso indicativo cavo	Portata di corrente a temperatura ambiente 60°C e temperatura del conduttore 120°C		
					1 cavo in aria libera	1 cavo su una superficie	2 cavi in contatto su una superficie
n° x mm²	mm	mm	Ω/km	kg/km	A	A	A
1 x 1,5	1,5	5,4	13,7	32	30	29	24
1 x 2,5	1,9	5,9	8,21	43	41	39	33
1 x 4	2,4	6,6	5,09	60	55	52	44
1 x 6	3,0	7,4	3,39	82	70	67	57
1 x 10	3,9	8,8	1,95	125	98	93	79
1 x 16	5,0	10,1	1,24	185	132	125	107
1 x 25	6,1	12,5	0,795	280	176	167	142
1 x 35	7,3	14,0	0,565	370	218	207	176
1 x 50	8,7	16,3	0,393	520	276	262	221
1 x 70	10,5	18,7	0,277	715	347	330	278
1 x 95	11,9	20,8	0,210	925	416	395	333
1 x 120	13,8	22,8	0,164	1165	488	464	390
1 x 150	15,3	25,5	0,132	1480	566	538	453
1 x 185	16,9	28,5	0,108	1825	644	612	515
1 x 240	19,4	32,1	0,0817	2345	775	736	620

Coefficienti di correzione per temperature ambiente diverse da 60°C	
Temperatura ambiente (°C)	Coefficiente di correzione
Fino a 60	1,0
70	0,92
80	0,84
90	0,75

Per installazioni a gruppi i coefficienti di correzione della portata sono riportati nel documento HD 60364-5-52:2011, Tabella B.52.17

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## 6.2 Cavi CC per collegamento string box-inverter (NA2XH)



Click here for more information:  
[elandcables.com](http://elandcables.com) | [NA2XH XLPE 0.6/1kV cable](#)

### NA2XH Aluminium Conductor IEC 60502-1 XLPE 0.6/1kV Cable



Eland Product Group: A5N

#### APPLICATION

XLPE insulated and halogen-free thermoplastic compound sheathed power and auxiliary fixed wiring cables for the supply of electrical energy. Installations where fire and emissions of smoke and toxic fumes create a potential threat. Not suitable for use in water.

#### CHARACTERISTICS

**Voltage Rating**  $U_0/U$  (Um)  
AC: 0.6/1 (1.2)kV  
DC: 0.75/1.5 (1.8)kV

**Temperature Rating**  
Fixed: -40°C to +90°C

**Minimum Bending Radius**  
Single core: 15 x overall diameter  
Multi-core: 12 x overall diameter

#### CONSTRUCTION

**Conductor**  
RE: Class 1 solid aluminium-circular or circular compacted  
RM: Class 2 stranded  
SE: Class 1 solid sector - shaped or stranded  
SM: Class 2 sector - shaped

**Insulation**  
XLPE (Cross-Linked Polyethylene)

**Sheath**  
LSZH (Low Smoke Zero Halogen)

**Core Identification**  
3 core: ● Green/Yellow ● Blue ● Brown  
4 core: ● Green/Yellow ● Brown ● Black ● Grey  
5 core: ● Green/Yellow ● Blue ● Brown ● Grey  
7 and more: ● Black with ○ White numbers

**Sheath Colour**  
● Black

#### CABLE STANDARDS

IEC 60502-1, VDE 0276 Part 604,  
Low Smoke Zero Halogen according to IEC/EN 61034-1/2, IEC/EN 60754-1/2  
Flame Retardant according to IEC/EN 60332-1-2, IEC/EN 60332-3-24

#### THE CABLE LAB®

AN ISO/IEC 17025 AND IECCE CBTL ACCREDITED FACILITY

Our world-class testing facility assures the quality and compliance of this cable through a continuous and rigorous testing regime.



#### SUSTAINABILITY COMMITMENT

We are on a journey to Net Zero.

We've committed to near-term emissions reductions and a net-zero target with the Science Based Targets initiative and we're a signatory to the United Nations Global Compact Sustainable Development Goals.

Learn more about embodied carbon and our carbon emissions reduction actions, our comprehensive recycling services, and wider ESG activities for sustainable operations at: [www.elandcables.com/company/about-us/esg-sustainability](http://www.elandcables.com/company/about-us/esg-sustainability)



#### REGULATORY COMPLIANCE

This cable is compliant with European Regulation EN 50575, the Construction Products Regulation.



This cable meets the requirements of the Low Voltage Directive 2014/30/EU and the RoHS Directive 2011/65/EU. RoHS compliance has been tested and confirmed by The Cable Lab® as meeting the requirements of the BSI RoHS Trusted Kitemark™.



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[elandcables.com](http://elandcables.com) | [NA2XH XLPE 0.6/1kV cable](#)

## DIMENSIONS

ELAND PART NO.	NO. OF CONDUCTOR	NOMINAL CROSS SECTIONAL AREA mm <sup>2</sup>	CONDUCTOR TYPE	NOMINAL OVERALL DIAMETER mm	NOMINAL WEIGHT kg/km
A5NA2XH1025RM	1	25	RM	9.9	132
A5NA2XH1035RM	1	35	RM	11	166
A5NA2XH1050RM	1	50	RM	12.5	211
A5NA2XH1070RM	1	70	RM	14.1	283
A5NA2XH1095RM	1	95	RM	16.1	376
A5NA2XH1120RM	1	120	RM	17.5	456
A5NA2XH1150RM	1	150	RM	19.6	560
A5NA2XH1185RM	1	185	RM	21.8	697
A5NA2XH1240RM	1	240	RM	24	878
A5NA2XH1300RM	1	300	RM	26.7	1073
A5NA2XH1400RM	1	400	RM	29.7	1347
A5NA2XH1500RM	1	500	RM	33.1	1705
A5NA2XH1630RM	1	630	RM	42.8	2705
A5NA2XH1800RM	1	800	RM	47.9	3420
A5NA2XH3016RM	3	16	RM	16.3	364
A5NA2XH3025RM	3	25	RM	19.6	530
A5NA2XH3035RM	3	35	RM	22.1	684
A5NA2XH3035SE	3	35	SE	19	486
A5NA2XH3050SM	3	50	SM	22.4	655
A5NA2XH3050SE	3	50	SE	21.2	622
A5NA2XH3070SM	3	70	SM	26.1	903
A5NA2XH3070SE	3	70	SE	25.2	859
A5NA2XH3095SM	3	95	SM	29.1	1174
A5NA2XH3095SE	3	95	SE	27.8	1115
A5NA2XH3120SM	3	120	SM	32.2	1446
A5NA2XH3120SE	3	120	SE	30.8	1379
A5NA2XH3150SM	3	150	SM	36.2	1780
A5NA2XH3150SE	3	150	SE	33.9	1685
A5NA2XH3185SM	3	185	SM	40.1	2197
A5NA2XH3185SE	3	185	SE	37.6	2089
A5NA2XH3240SM	3	240	SM	44.9	2782
A5NA2XH3240SE	3	240	SE	41.8	2634
A5NA2XH3070/35	3	70 + 35	SM+SM	28.3	1044
A5NA2XH3120/70	3	120 + 70	SM+SM	35.1	1704
A5NA2XH3150/70	3	150 + 70	SM+SM	39.7	2065
A5NA2XH3185/95	3	185 + 95	SM+SM	43.7	2563
A5NA2XH3240/120	3	240 + 120	SM+SM	49.1	3237
A5NA2XH4025RM	4	25	RM	21.7	636
A5NA2XH4035SM	4	35	SM	22.4	649
A5NA2XH4035SE	4	35	SE	21.6	623
A5NA2XH4050SM	4	50	SM	25.4	845
A5NA2XH4050SE	4	50	SE	24.6	810
A5NA2XH4070SM	4	70	SM	29.7	1178
A5NA2XH4070SE	4	70	SE	28.8	1126
A5NA2XH4095SM	4	95	SM	33.3	1538



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ELAND  
CABLES

ELAND PART NO.	NO. OF CONDUCTOR	NOMINAL CROSS SECTIONAL AREA mm <sup>2</sup>	CONDUCTOR TYPE	NOMINAL OVERALL DIAMETER mm	NOMINAL WEIGH kg/km
A5NA2XH4095SE	4	95	SE	32.1	1467
A5NA2XH4120SM	4	120	SM	37.2	1903
A5NA2XH4120SE	4	120	SE	35.5	1817
A5NA2XH4150SM	4	150	SM	41.3	2328
A5NA2XH4150SE	4	150	SE	39.4	2223
A5NA2XH4185SM	4	185	SM	45.7	2874
A5NA2XH4185SE	4	185	SE	43.4	2750
A5NA2XH4240SM	4	240	SM	51.2	3646
A5NA2XH4240SE	4	240	SE	48	3465
A5NA2XH5025RM	5	25	RM	23.9	763
A5NA2XH5035RM	5	35	RM	27	986
A5NA2XH5050RM	5	50	RM	31.3	1309
A5NA2XH5070RM	5	70	RM	35.8	1771
A5NA2XH5095SM	5	95	SM	36.5	1891
A5NA2XH5120SM	5	120	SM	39.2	2306
A5NA2XH5150SM	5	150	SM	45.4	2865
A5NA2XH5185SM	5	185	SM	50.1	3534
A5NA2XH5240SM	5	240	SM	55.2	4482

## ELECTRICAL CHARACTERISTICS

### Current Carrying Capacity

INSTALLATIONS			
NO. OF LOADED CORES	1	3	3
NOMINAL CROSS SECTIONAL AREA mm <sup>2</sup>	LAYING IN AIR AT 30°C A		
25	136	102	106
35	166	126	130
50	205	149	161
70	260	191	204
95	321	234	252
120	376	273	295
150	431	311	339
185	501	360	395
240	600	427	472
300	696	507	547
400	821	600	643
500	971	695	754
630	1151	-	882
800	1355	-	1019


<sup>1)</sup> Rated Current for direct current systems with a far-distanced return conductor.

\* The above is taken from DIN VDE 0276-603, DIN VDE 0276-627, HD 603 51, HD 627 51. The conversion factors for deviating ambient temperature defined in DIN VDE 0298 P4

## DE-RATING FACTORS

AMBIENT TEMPERATURE	10	10	20	25	30	35	40	45	50
RATING FACTOR	1.15	1.15	1.08	1.04	1.00	0.96	0.91	0.87	0.82

The information contained within this datasheet is for guidance only and is subject to change without notice or liability. All the information is provided in good faith and is believed to be correct at the time of publication. When selecting cable accessories, please note that actual cable dimensions may vary due to manufacturing tolerances.

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### 6.3 Cavi MT per i collegamenti trasformatore-cabina utente-SSU (ARG7H1RX)



Media tensione - Energia



Pb Free

## ARG7H1RX-12/20 kV ARG7H1RX-18/30 kV

Costruzione, requisiti elettrici, fisici e meccanici:	CEI 20-13 IEC 60502-2
Misura delle scariche parziali:	CEI 20-16 IEC 60885-3
Non propagazione della fiamma:	EN 60332-1-2
Gas corrosivi o alogenidrici:	EN 50267-2-1



www.latrivenetacavi.com



revisione n° 002 data 14/02/18

#### Descrizione

- Cavi tripolari precordati, isolati in gomma HEPR di qualità G7, sotto guaina di PVC.
- Conduttore: alluminio, formazione rigida compatta, classe 2
- Strato semiconduttore interno: estruso
- Isolamento: gomma HEPR, qualità G7 senza piombo
- Strato semiconduttore: estruso, pelabile a freddo
- Schermo: fili di rame rosso con nastro di rame in controspirale
- Guaina: mescola a base di PVC, qualità Rz
- Colore: rosso

#### Caratteristiche funzionali

- Tensione nominale di esercizio U<sub>o</sub>/U:
  - ARG7H1RX -12/20 kV: 12/20 kV
  - ARG7H1RX -18/30 kV: 18/30 kV
- Tensione U max:
  - ARG7H1RX -12/20 kV: 24 kV
  - ARG7H1RX -18/30 kV: 36 kV
- Temperatura massima di esercizio: 90°C
- Temperatura minima di esercizio: -15°C (in assenza di sollecitazioni meccaniche)
- Temperatura massima di corto circuito: 250°C

#### Marcatura

Pb free [Ditta] ARG7H1RX [tens. nominale] [form.] [anno] [ordine] [metrica] FASE 1/2/3

#### Condizioni di posa

- Temperatura minima di posa: 0°C
- Raggio minimo di curvatura consigliato: 10 volte il diametro del cavo
- Massimo sforzo di trazione consigliato: 50 N/mm<sup>2</sup> di sezione del conduttore

#### Impiego e tipo di posa

Adatto per il trasporto di energia tra le cabine di trasformazione e le grandi utenze. Per posa in aria libera, in tubo o canale.

Ammissa la posa interrata in conformità all'art. 4.3.11 della norma CEI 11-17.

## ARG7H1RX - 12/20 kV

U<sub>0</sub>/U: 12/20 kV

U max: 24 kV

### Caratteristiche tecniche

Formazione	Ø indicativo conduttore	Spessore medio isolante	Spessore medio guaina	Ø indicativo anima	Ø ciroscritto indicativo	Peso indicativo cavo	Portata di corrente A	
							in aria	interrato <sup>1)</sup>
n° x mm <sup>2</sup>	mm	mm	mm	mm	mm	kg/km	A	A
3 x 1 x 35	7,0	5,5	1,8	26,9	57,8	2250	144	142
3 x 1 x 50	8,1	5,5	1,8	28,1	60,4	2465	174	168
3 x 1 x 70	9,7	5,5	1,8	29,8	64,1	2875	218	207
3 x 1 x 95	11,4	5,5	1,9	31,9	68,5	3255	266	247
3 x 1 x 120	12,9	5,5	2,0	34,2	73,5	3780	309	281
3 x 1 x 150	14,3	5,5	2,0	35,8	77,0	4025	352	318
3 x 1 x 185	16,0	5,5	2,1	37,8	81,3	4685	406	361
3 x 1 x 240	18,3	5,5	2,2	41,0	88,2	5540	483	418
3 x 1 x 300	21,0	5,5	2,3	44,0	94,5	6365	556	472

(\*) I valori di portata si riferiscono alle seguenti condizioni:

- Resistività termica del terreno: 1 K-mW
- Temperatura ambiente 20°C
- profondità di posa: 0,8 m

### Caratteristiche elettriche

Formazione	Resistenza elettrica a 20°C	Resistenza apparente a 90°C e 50Hz	Reattanza di fase	Capacità a 50Hz
n° x mm <sup>2</sup>	Ω/Km	Ω/Km	Ω/Km	μF/km
3 x 1 x 35	0,868	1,113	0,14	0,17
3 x 1 x 50	0,641	0,822	0,13	0,18
3 x 1 x 70	0,443	0,568	0,13	0,21
3 x 1 x 95	0,320	0,411	0,12	0,23
3 x 1 x 120	0,253	0,325	0,12	0,25
3 x 1 x 150	0,206	0,265	0,11	0,27
3 x 1 x 185	0,164	0,211	0,11	0,29
3 x 1 x 240	0,125	0,161	0,11	0,32
3 x 1 x 300	0,100	0,130	0,10	0,35



## ARG7H1RX - 18/30 kV

U<sub>o</sub>/U: 18/30 kV

U max: 36 kV

### Caratteristiche tecniche


Formazione	Ø indicativo conduttore	Spessore medio isolante	Spessore medio guaina	Ø indicativo anima	Ø ciroscritto indicativo	Peso indicativo cavo	Portata di corrente A	
							in aria	interrato <sup>1</sup>
n° x mm <sup>2</sup>	mm	mm	mm	mm	mm	kg/km	A	A
3 x 1 x 35	7,0	8,0	1,9	33,5	72,0	3150	144	142
3 x 1 x 50	8,1	8,0	2,0	34,1	73,3	3480	174	168
3 x 1 x 70	9,7	8,0	2,0	36,2	77,8	3880	218	207
3 x 1 x 95	11,4	8,0	2,1	38,2	82,1	4355	266	247
3 x 1 x 120	12,9	8,0	2,2	40,0	86,0	5020	309	281
3 x 1 x 150	14,3	8,0	2,2	41,0	88,2	5385	352	318
3 x 1 x 185	16,0	8,0	2,3	43,1	92,7	6040	406	361
3 x 1 x 240	18,3	8,0	2,4	45,0	96,8	6910	483	418

(\*) I valori di portata si riferiscono alle seguenti condizioni:

- Resistività termica del terreno: 1 K-mW
- Temperatura ambiente 20°C
- profondità di posa: 0,8 m

### Caratteristiche elettriche

Formazione	Resistenza elettrica a 20°C	Resistenza apparente a 90°C e 50Hz	Reattanza di fase	Capacità a 50Hz
n° x mm <sup>2</sup>	Ω/Km	Ω/Km	Ω/Km	μF/km
3 x 1 x 35	0,868	1,113	0,14	0,17
3 x 1 x 50	0,641	0,822	0,13	0,18
3 x 1 x 70	0,443	0,568	0,13	0,21
3 x 1 x 95	0,320	0,411	0,12	0,23
3 x 1 x 120	0,253	0,325	0,12	0,25
3 x 1 x 150	0,206	0,265	0,11	0,27
3 x 1 x 185	0,164	0,211	0,11	0,29
3 x 1 x 240	0,125	0,161	0,11	0,32

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