



COMUNE DI GAVORRANO

PROVINCIA DI GROSSETO



REGIONE TOSCANA

REGIONE TOSCANA



REALIZZAZIONE DI UN IMPIANTO SOLARE FOTOVOLTAICO E DELLE OPERE DI CONNESSIONE ALLA RETE DELLA POTENZA DI PICCO PARI A 14.963,52 kW COLLEGATO AD UN PIANO AGRONOMO PER L'UTILIZZO A SCOPI AGRICOLI DELL'AREA

Denominazione Impianto:

IMPIANTO GAVORRANO 1

Ubicazione:

Comune di Gavorrano (GR)
Località Strada Comunale Poggio al Fabbro

**ELABORATO
020900**

COMPONENTI PRINCIPALI – DATA SHEET

Cod. Doc.: GAV20_020900_IMP_R



Project - Commissioning – Consulting
Municipiul Bucuresti Sector 1
Str. HRISOVULUI Nr. 2-4, Parter, Camera 1, Bl. 2, Ap. 88
RO41889165

Scala: --

PROGETTO

Data:
15/11/2021

PRELIMINARE



DEFINITIVO



AS BUILT



Richiedente:

GAVORRANO Srl
Piazza Walther Von Vogelweide, 8
39100 Bolzano
Provincia di Bolzano
P.IVA 03016530218
ITALY

Tecnici e Professionisti:

Ing. Luca Ferracuti Pompa:
Iscritto al n.A344 dell'Albo degli Ingegneri della Provincia di Fermo

Revisione	Data	Descrizione	Redatto	Approvato	Autorizzato
01	01/12/2020	Progetto Definitivo	F.P.L.	F.P.L.	F.P.L.
02	15/11/2021	Revisione	F.P.L.	F.P.L.	F.P.L.
03					
04					

Il Tecnico:
Dott. Ing. Luca Ferracuti Pompa
(Iscritto al n. A344, dell'Albo dell'Ordine degli Ingegneri della Provincia di Fermo)



Il Richiedente:
GAVORRANO S.r.l.
Piazza Walther Von Vogelweide n.8 – 39100 Bolzano (BZ)
P.IVA: 03016530218

ELABORATO.: GAV20_020900_IMP_R	COMUNE di GAVORRANO PROVINCIA di GROSSETO	Rev.: 02/21
COMET ENERGY POWER	<i>PROGETTO DEFINITIVO</i> REALIZZAZIONE DI UN IMPIANTO SOLARE FOTOVOLTAICO E DELLE OPERE CONNESSIONE ALLA RETE DI UN IMPIANTO FOTOVOLTAICO DELLA POTENZA DI PICCO PARI A 14.963,52 KWp COLLEGATO AD UN PIANO AGRONOMICICO PER L'UTILIZZO A SCOPI AGRICOLI DELL'AREA	Data: 15/11/21
	COMPONENTI PRINCIPALI – DATA SHEET	Pagina 2 di 2

1. OGGETTO

Il Presente documento è redatto quale allegato alla documentazione per l'autorizzazione relativa ad un impianto fotovoltaico, di potenza di picco pari a **14.963,52 kW**, da realizzare nel Comune di **Gavorrano (GR)**, in Località **Strada Comunale Poggio al Fabbro**, ai fini della costruzione di un impianto conforme alle vigenti prescrizioni di legge.

L'impianto sarà del tipo Grid Connected e l'energia elettrica prodotta sarà riversata completamente in rete, con allaccio in Media Tensione alla Rete di E-Distribuzione alla cabina primaria esistente denominata **MENGA**.

Il Produttore e Soggetto Responsabile, è la Società **GAVORRANO S.r.l.**, la quale dispone dell'autorizzazione all'utilizzo dell'area su cui sorgerà l'impianto in oggetto. La denominazione dell'impianto è "**GAVORRANO 1**".

Allegati:

- COMPONENTI PRINCIPALI – DATA SHEET

Porto San Giorgio li 15.11.2021

In Fede
Il Tecnico
(Dott. Ing. Luca Ferracuti Pompa)

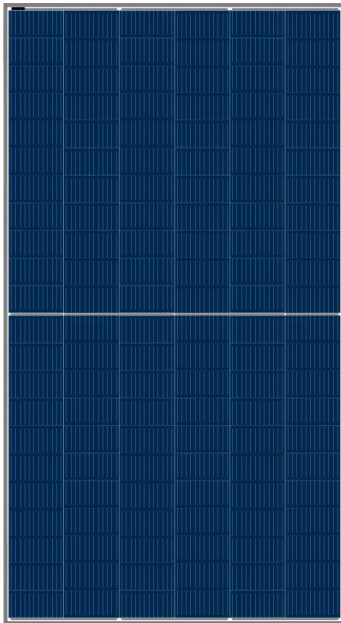


Ultra X Plus

132 HALF-CELL MONOFACIAL MODULE

640-660W

STPXXXS - D66/Wmh



Features



High module conversion efficiency

Module efficiency up to 21.2 % achieved through advanced cell technology and manufacturing process



Suntech current sorting process

Up to 2 % power loss caused by current mismatch could be diminished by current sorting technique to maximize system power output



Excellent weak light performance

More power output in weak light condition, such as cloudy, morning and sunset



Lower operating temperature

Lower operating temperature and temperature coefficient increases the power output



Extended wind and snow load tests

Module certified to withstand extreme wind (2400 Pascal) and snow loads (5400 Pascal) *



Withstanding harsh environment

Reliable quality leads to a better sustainability even in harsh environment like desert, farm and coastline

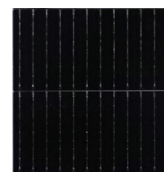
Certifications and standards:
IEC 61215, IEC 61730, conformity to CE



Trust Suntech to Deliver Reliable Performance Over Time

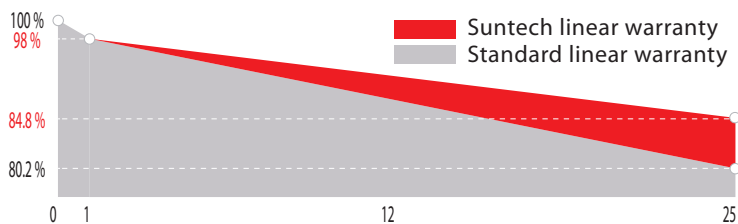
- World-class manufacturer of crystalline silicon photovoltaic modules
- Rigorous quality control meeting the highest international standards: ISO 9001, ISO 14001 and ISO17025
- Regular independently checked production process from international accredited institute/company
- Tested for harsh environments (IEC 61701, IEC 62716, DIN EN 60068-2-68) ***
- Long-term reliability tests
- 2 x 100% EL inspection ensuring defect-free modules

HD technology + Half-Cell



Half-cell with MBB design decreases internal resistance while boosts power output; narrowed inter-cell gap through flexible welding technology contributes to the module's compact dimension.

Industry-leading Warranty based on nominal power



-2.0%
First year power degradation

-0.55%
Annual degradation

12
Product warranty

25
linear warranty

IP68 Rated Junction Box



The Suntech IP68 rated junction box ensures an outstanding waterproof level, supports installations in all orientations and reduces stress on the cables.

* Please refer to Suntech Standard Module Installation Manual for details.
** WEEE only for EU market. *** Please refer to Suntech Product Near-coast Installation Guide for details.
**** Please refer to Suntech Limited Warranty for details.

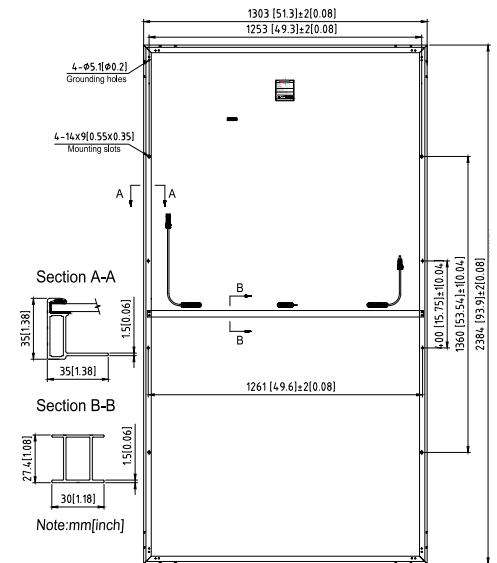
Electrical Characteristics

STC	STPXXXS-D66/Wmh				
Maximum Power at STC (Pmax)	660W	655W	650W	645W	640W
Optimum Operating Voltage (Vmp)	38.05V	37.85V	37.65V	37.45V	37.25V
Optimum Operating Current (Imp)	17.35A	17.31A	17.27A	17.23A	17.19A
Open Circuit Voltage (Voc)	46.05V	45.85V	45.65V	45.45V	45.25V
Short Circuit Current (Isc)	18.35A	18.31A	18.27A	18.23A	18.19A
Module Efficiency	21.2%	21.1%	20.9%	20.8%	20.6%
Operating Module Temperature	-40 °C to +85 °C				
Maximum System Voltage	1500 V DC (IEC)				
Maximum Series Fuse Rating	35 A				
Power Tolerance	0/+5 W				

STC: Irradiance 1000 W/m², module temperature 25 °C, AM=1.5;
Tolerance of Pmax is within +/- 3%;
For tracker installation, please turn to Suntech for mechanical load information.

NMOT	STPXXXS-D66/Wmh				
Maximum Power at NMOT (Pmax)	497.9W	494.1W	490.3W	486.7W	483.0W
Optimum Operating Voltage (Vmp)	35.6V	35.4V	35.2V	35.1V	34.9V
Optimum Operating Current (Imp)	13.99A	13.96A	13.92A	13.89A	13.85A
Open Circuit Voltage (Voc)	43.4V	43.2V	43.0V	42.8A	42.6V
Short Circuit Current (Isc)	14.76A	14.73A	14.70A	14.67V	14.64A

NMOT: Irradiance 800 W/m², ambient temperature 20 °C, AM=1.5, wind speed 1 m/s.



Temperature Characteristics

Nominal Module Operating Temperature (NMOT)	42 ± 2 °C
Temperature Coefficient of Pmax	-0.36%/°C
Temperature Coefficient of Voc	-0.304%/°C
Temperature Coefficient of Isc	0.050%/°C

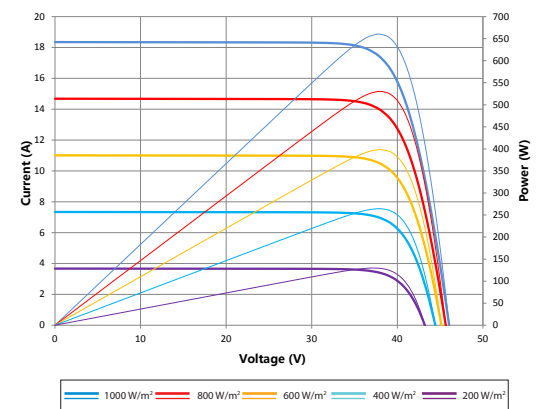
Mechanical Characteristics

Solar Cell	Monocrystalline silicon 210 mm
No. of Cells	132 (6 × 22)
Dimensions	2384 × 1303 × 35 mm (93.9 × 51.3 × 1.4 inches)
Weight	34.5 kgs (76.1 lbs.)
Front Glass	3.2 mm (0.126 inches)
Frame	Anodized aluminium alloy
Junction Box	IP68 rated (3 bypass diodes)
Output Cables	4.0 mm ² , Portrait: (-) 350 mm and (+) 160 mm in length Landscape: (-) 1400 mm and (+) 1400 mm in length or customized length
Connectors	MC4 EVO2, Cable 01S

Packing Configuration

Container	40' HC
Pieces per container	558

Current-Voltage & Power-Voltage Curve (660S)



Dealer information

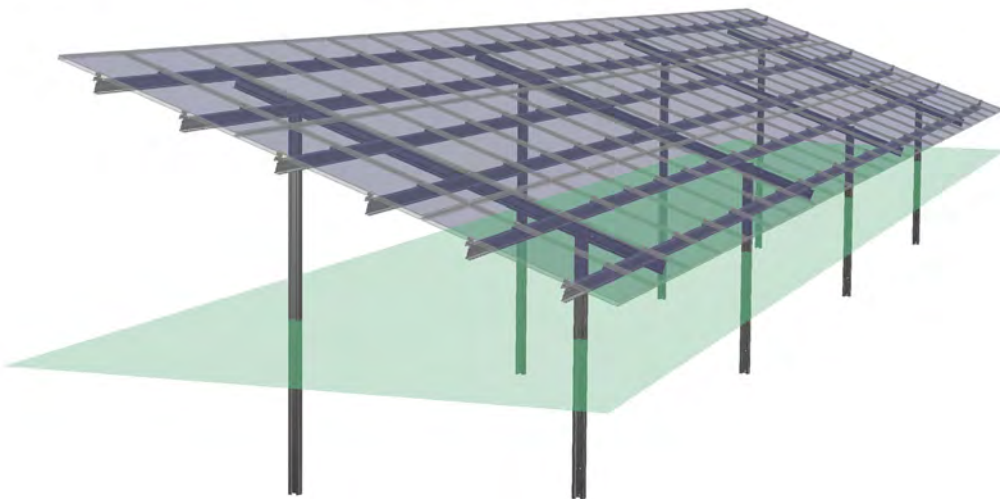


Information on how to install and operate this product is available in the installation instruction. All values indicated in this data sheet are subject to change without prior announcement. The specifications may vary slightly. All specifications are in accordance with standard EN 50380. Color differences of the modules relative to the figures as well as discolorations of/in the modules which do not impair their proper functioning are possible and do not constitute a deviation from the specification.

SCHLETTER
The Solar Mounting Group

FS DUO

PRODUCT SHEET



FS DUO

The double-post steel system

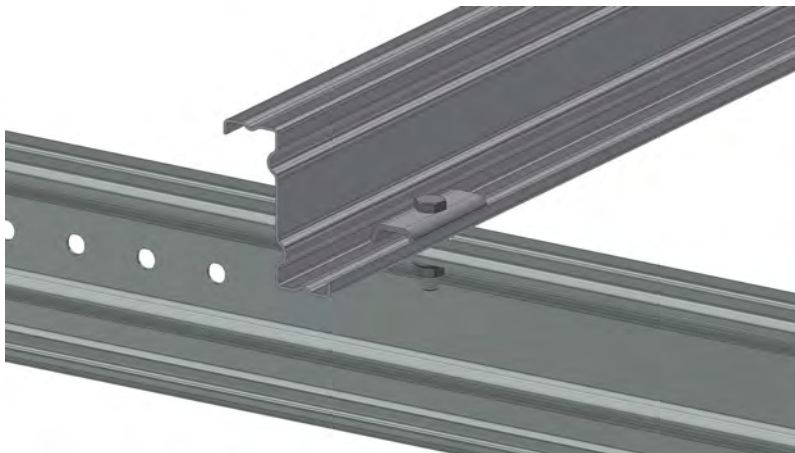
With the right substructure from Schletter, secure standing, high efficiency and a long service life of open-area installations are guaranteed. For many years, FS has proven itself in countless projects almost everywhere in the world. Double-post systems are the first choice for large multi-row module arrangements. FS Duo is the ideal solution if large module tables are to be installed on flat slopes on level terrain.

- No soil sealing
- Perfectly matched system components
- Extremely short installation times
- Maximum degree of prefabrication
- High efficiency
- 5 year warranty



We have successfully turned the screw on savings

The call for even greater economic efficiency is also becoming louder for open-area installations. Cost pressure is growing. In many cases, we have succeeded in noticeably reducing the total costs for large-scale PV systems by using steel ram foundations. This type of foundation makes the use of concrete foundations mostly superfluous. This reduces labour and material costs.



Stability is the top priority

Two ram foundations per support, combined with the load-optimised Z purlins, result in a stable and load-bearing PV substructure for module panels with large spans.

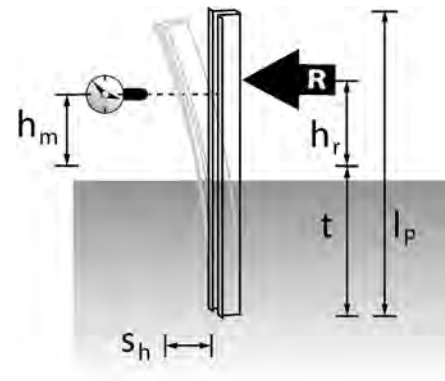
Secure standing is guaranteed

The detailed and individual project planning based on the currently applicable standards enables the long-term stability of the installation. Of course, this is not enough for us. In addition, a geological survey of the foundation soil is carried out on site. The load-bearing capacity of the soil is determined on the ram foundation by means of load tests.

- **Oblique tension tests**
- **Horizontal compression tests**
- **Preparation of soil profiles**
- **Chemical analysis in the laboratory**

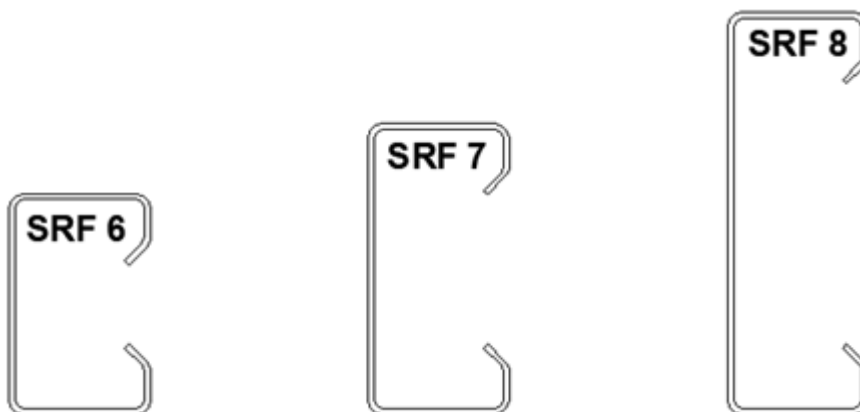
Oblique tension mechanical background:

The fundamental principle of oblique tension tests is based on the fact that the wind blows almost perpendicular to the module surface. This creates a contact pressure from the initiation of the bending torque in the form of a force couple. The frictional resistance between the post and the ground is usually significantly higher than the skin friction at inclinations greater than "15°", resulting in a higher tightening resistance.



Optimally equipped against wind and snow pressure

In order to ensure that the binding forces can also be transmitted to the upper connection point and thus give the installation its optimum stability against wind and snow pressure, strip-galvanised ram profiles in various size classes (SRF6/SRF7/SRF8) are used for the foundation. The ram designs specially developed by us ensure optimal embedding in the ground with maximum bending stiffness at the same time.



Clear advantage for the double-post system

The basic structural framework for every FS system is the support geometry. By using two ram foundations per support, higher superimposed loads can be dimensioned than with a single post. This, of course, also enables larger spacing between supports and module panel spans. The small number of components reduces installation times to a minimum.

Suitable for every module

Depending on the customer's wishes, the modules can be installed quickly and inexpensively from the floor or on the frame with suitable tools. The arrangement of the modules is project-specific. These are laid out vertically, horizontally or with the Schletter combi clamp, as required. The module clamps are fixed in pre-punched slotted holes (Fig. 1) or, on request, on aluminium module clamp adapters (Fig. 2).

For bi-facial modules, a raised adapter (Fig. 3) of 60 mm in height is used to prevent shading of the support profiles on the rear side.

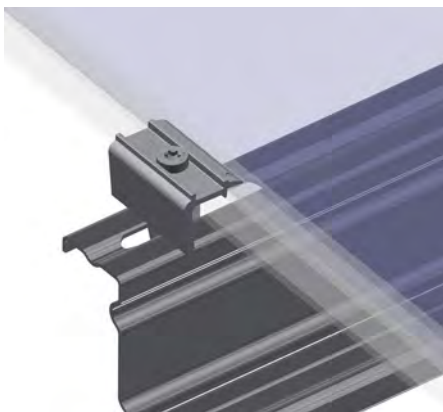


Fig. 1

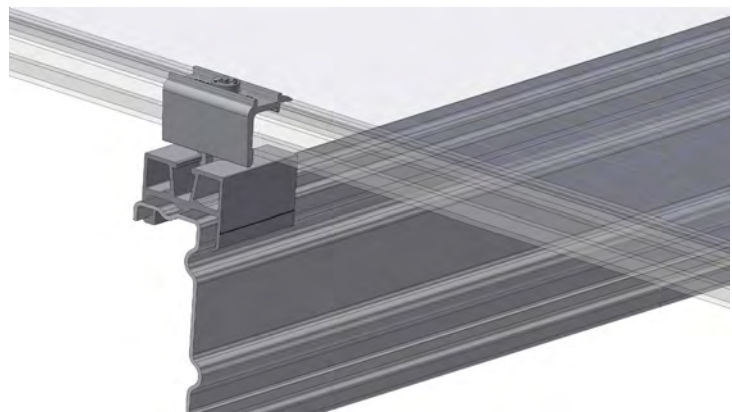


Fig. 2



Fig. 3

TECHNICAL DATA

Material	<ul style="list-style-type: none">• Ram foundation: Steel, continuously hot-dip refined• Girder/purlins: Steel, coated with zinc magnesium alloy, alternatively continuously hot-dip refined• Fixing elements, screws: Zinc-flake coated steel, aluminium• Module clamps: Aluminium
Design	<ul style="list-style-type: none">• Adjustment option for fine adjustment to the ram result• Reduced overall construction costs on the basis of static optimisation• Components for quick and easy installation
Module clamps	<ul style="list-style-type: none">• Framed and unframed modules• Combined module clamping possible• Rapid16 and Rapid16L
Accessories	Cable ties
Logistics	<ul style="list-style-type: none">• Maximum degree of prefabrication• Optimal transfer to the construction site
Delivery and service	<ul style="list-style-type: none">• Individual frame structural analysis based on regional data• Delivery of all installation materials
Structural analysis	<ul style="list-style-type: none">• Individual site structural analysis based on an external soil survey• Individual system structural analysis based on the regional critical loads Load assumptions according to DIN EN 1990 (Eurocode 0), DIN EN 1991 (Eurocode 1), DIN EN 1993 (Eurocode 3), DIN EN 1999 (Eurocode 9) and additional or corresponding country-specific standards• Profile geometries with highly efficient material utilisation• Verification of all construction components on the basis of FEM calculations• Optional: Vibration simulations for wind forces
Ground maintenance	Sheep grazing

Module clamps and accessories can be found in our latest component overview.

More information at: www.schletter-group.com

SCHLETTER SOLAR GMBH

Alustrasse 1
83527 Kirchdorf
GERMANY

www.schletter-group.com



SUN2000-185KTL-H1 Smart String Inverter



9
MPP Trackers



Max. Efficiency
>99.0%



String-level
Management



Smart I-V Curve
Diagnosis Supported



MBUS
Supported



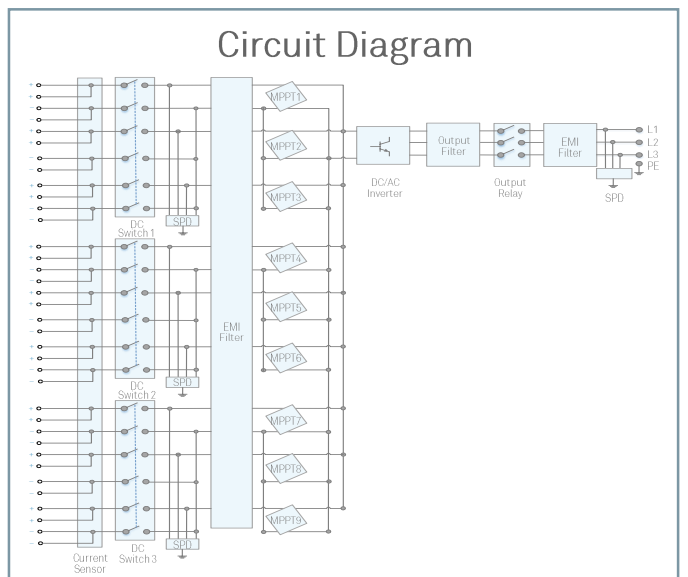
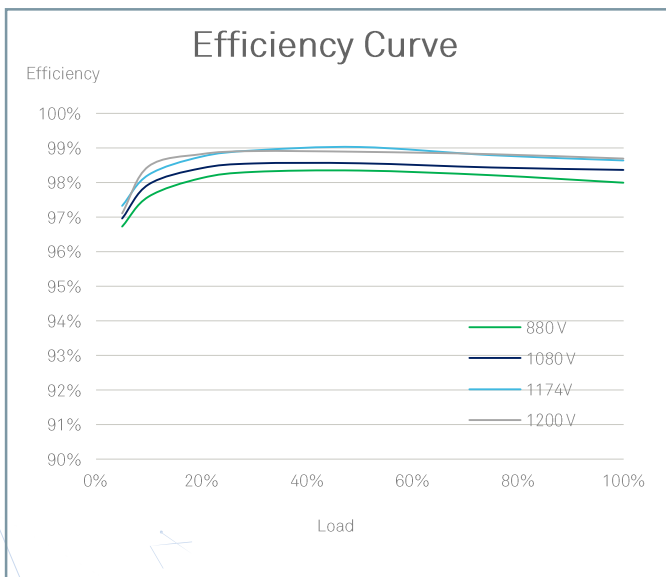
Fuse Free
Design



Surge Arresters for
DC & AC



IP66
Protection



Technical Specifications

Efficiency	
Max. Efficiency	99.03%
European Efficiency	98.69%
Input	
Max. Input Voltage	1,500 V
Max. Current per MPPT	26 A
Max. Short Circuit Current per MPPT	40 A
Start Voltage	550 V
MPPT Operating Voltage Range	500 V ~ 1,500 V
Nominal Input Voltage	1,080 V
Number of Inputs	18
Number of MPP Trackers	9
Output	
Nominal AC Active Power	175,000 W @40°C, 168,000 W @45°C, 150,000 W @50°C
Max. AC Apparent Power	185,000 VA
Max. AC Active Power (cosφ=1)	185,000 W
Nominal Output Voltage	800 V, 3W + PE
Rated AC Grid Frequency	50 Hz / 60 Hz
Nominal Output Current	126.3 A @40°C, 121.3 A @45°C, 108.3 A @50°C
Max. Output Current	134.9 A
Adjustable Power Factor Range	0.8 LG ... 0.8 LD
Max. Total Harmonic Distortion	< 3%
Protection	
Input-side Disconnection Device	Yes
Anti-islanding Protection	Yes
AC Overcurrent Protection	Yes
DC Reverse-polarity Protection	Yes
PV-array String Fault Monitoring	Yes
DC Surge Arrester	Type II
AC Surge Arrester	Type II
DC Insulation Resistance Detection	Yes
Residual Current Monitoring Unit	Yes
Communication	
Display	LED Indicators, Bluetooth/WLAN + APP
USB	Yes
MBUS	Yes
RS485	Yes
General	
Dimensions (W x H x D)	1,035 x 700 x 365 mm (40.7 x 27.6 x 14.4 inch)
Weight (with mounting plate)	84 kg (185.2lb.)
Operating Temperature Range	-25°C ~ 60°C (-13°F ~ 140°F)
Cooling Method	Smart Air Cooling
Max. Operating Altitude without Derating	4,000 m (13,123 ft.)
Relative Humidity	0 ~ 100%
DC Connector	Staubli MC4 EVO2
AC Connector	Waterproof Connector + OT/DT Terminal
Protection Degree	IP66
Topology	Transformerless
Standard Compliance (more available upon request)	
Certificate	EN 62109-1/-2, IEC 62109-1/-2, EN 50530, IEC 62116, IEC 60068, IEC 61683
Grid Code	IEC 61727, P.O. 12.3, RD 1699, RD 661, RD 413, RD 1565, RD 1663, UNE 206007-1, UNE 206006