Firmato digitalmente da

Pablo Miguel Otin Pintado

C = IT

SARDEGNA ORISTANO BAULADU

COMUNE DI PAULILATINO | COMUNE DI ZERFALIU | COMUNE DI VILLANOVA Truschedu | COMUNE DI FORDONGIANUS | COMUNE DI BUSACHI

Realizzazione di un impianto agrivoltaico integrato con allevamento non intensivo di ovini, produzione agricola, produzione di energia elettrica da fonte rinnovabile fotovoltaica e sistema di accumulo elettrochimico da ubicarsi in agro di Bauladu e Paulilatino (OR) e delle relative opere di connessione nei Comuni di Paulilatino, Zerfaliu, Villanova Truschedu, Fordongianus, Busachi (OR) per la connessione alla Stazione Elettrica SE "Busachi"

Impianto FV:Potenza nominale cc: 52,390 MWp - Potenza in immissione ca: 45,888 MVA
Sistema di accumulo: Potenza nominale ca: 10,00 MVA - Capacità nominale: 22,320 MWh

ELABORATO

COMPONENTI PRINCIPALI - DATA SHEET

IDENTIFICAZIONE ELABORATO

Livello progetto	Codice Pratica AU	Documento	Codice elaborato	n° foglio	n° tot. fogli	Nome file	Data	Scala
PD		**R**	2.1_02			R_2.1_02_DATASHEET.pdf	Giugno 2022	n.a.

REVISIONI

Rev. n°	Data	Descrizione	Redatto	Verificato	Approvato
00	27/06/2022	I Emissione	MILELLA	SPINELLI	AMBRON

PROGETTAZIONE:

MATE System S.r.l.

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tel. +39 080 5746758
mail: info@matesystemsrl.it pec: matesystem@pec.it

ORDINE DEGLI INGEGNERI PROVINCIA DI BARI
INGEGNERE FRANCESCO AMBRON
Sez. A - 8904
a) CIVILE AMBIENTALE b) INDUSTRIALE c) dell' INFORMAZIONE

PROPONENTE:
MARMARIA SOLARE 2 S.r.l.
Via TEVERE n° 41
00198 ROMA

Il legale rappresentante
Dott. PABLO MIGUEL OTIN PINTADO


Soltec
SF7
Single-Axis
Tracker
The next-generation-now horizontal single-axis solar tracker
LISTED
[PV SOLAR TRACKER]
E476688
SGS
ANATEL
07441-17-10783
TÜVRheinland
CERTIFIED
IEC 62817
INTI
FINAME
BNDES

TECHNICAL DATASHEET

SF7
Single-Axis Tracker

MAIN FEATURES

Tracking System	Horizontal Single-Axis with independent rows
Tracking Range	± 55° Optional: ± 60°
Drive System	Enclosed Slewing Drive, DC Motor
Power Supply	Dedicated Panel Optional: 120/240 Vac or 24 Vdc power-cable
Tracking Algorithm	Astronomical with TeamTrack® Backtracking
Communication	
Open Thread	Full Wireless Optional: RS-485 Full Wired RS-485 cable not included in Soltec scope
Wind Resistance	Per Local Codes
Land Use Features	
Independent Rows	YES
Slope North-South	3% Optional: up to 15%
Slope East-West	10% (4% under the tracker)
Ground Coverage Ratio	Configurable. Typical range: 30-50%
Foundation	Driven Pile | Ground Screw | Concrete
Temperature Range	
Standard	- 4°F to +131°F | -20°C to +55°C
Extended	-40°F to +131°F | -40°C to +55°C
Availability	>99%
Modules	Standard: 72 / 78 cells | Optional: 60 Cells; Crystalline, Thin Film (Solar Frontier, First Solar and others)

MODULE CONFIGURATIONS Approximate Dimentions

	Length	Height	Width
2x28	29.2 m (95' 10")	4.1 m (13' 4")	4.1 m (13' 4")
2x29	30.2 m (99' 1")		
2x30	31.4 m (103')		

	Length	Height	Width
2x42	43.6 m (143')	4.1 m (13' 4")	4.1 m (13' 4")
2x43.5	45.6 m (149' 7")		
2x45	46.7 m (153' 3")		

SERVICES

Pull Test Plan	Commissioning Plan
Factory Support Plan	Operation & Maintenance Plan
Onsite Advisory Plan	Tracker Monitoring System Plan
Construction Plan	Solmate Customer Care

MAINTENANCE ADVANTAGES

- Self-lubricating Bearings
- Face to Face Cleaning Mode
- 2x Wider Aisles

WARRANTY

Structure	10 years (extendable)
Motor	5 years (extendable)
Electronics	5 years (extendable)

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B&V Bankability report
DNV GL Technology Review available
RWDI WIND TUNNEL TESTED

Soltec

soltec.com

INGECON SUN

3Power C Series
1,500 Vdc

TRANSFORMERLESS PV INVERTER WITH AN EXTRA THERMAL STABILITY AND A GREATER POWER DENSITY

Up to 3.8 MVA at 1,500 V

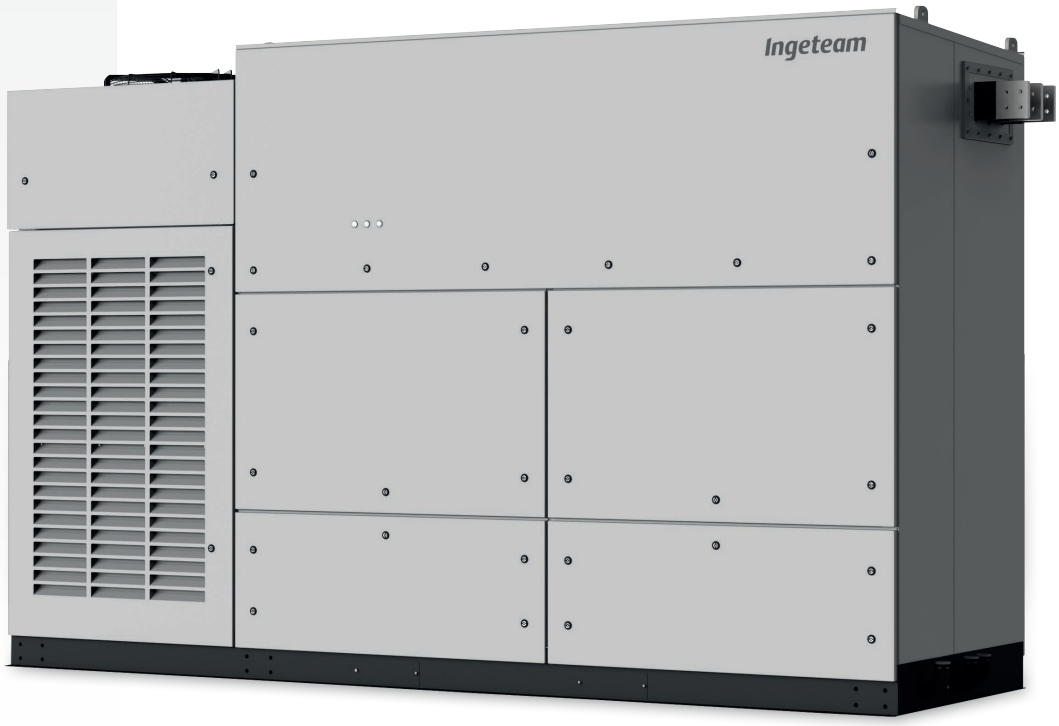
Greater power density
This solar PV inverter achieves a market-leading power density of 492 kVA/m³, as it provides up to 3,825 kVA kVA in just one power stack.

Latest generation electronics
The INGECON® SUN 3Power C Series PV inverter features an innovative control unit that performs a more efficient and sophisticated inverter control, as it uses a last-generation digital signal processor.

Liquid Cooling System (LCS)
Ingeteam has already supplied +52 GW of liquid-cooled wind power converters worldwide. It offers a greater thermal stability and a more optimized component usage. The LCS has been designed to refrigerate the IGBTs, the power phases and the IP65 compartment. It features less moving components, so it consumes a lower amount of power and it requires less maintenance works.

The LCS is a closed circuit supplied totally filled and purged, equipped with fast connectors with an anti-dripping system, so it offers zero risk of particle entrance. It has been designed to avoid siphons in order to easily purge it if necessary. The coolant used is a biodegradable glycol water mixture. There is no need of emptying the LCS in order to replace the phases, nor the sensors.

IP65 protection
A secondary liquid cooling system is used to refrigerate the air inside the IP65-protected compartment. A water-air heat exchanger is used for that. This compartment contains the power and control electronics, the DC fuses, the DC and AC protections, the busbars and the power phases.



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

Ingeteam

Monitoring and communication
Dual Ethernet to communicate with the SCADA and the PPC (power plant controller). Moreover, it features Wi-Fi communication as access point to connect with the inverter during commissioning and O&M works. Ingeteam's advanced PV plant monitoring system INGECON® SUN Monitor is also available at no extra cost. The Smartphone application of the INGECON® SUN Monitor -available on the App Store and on the Play Store- makes it easier and more comfortable to monitor the PV plant.

Standard 5 year warranty, extendable for up to 25 years.

Advanced grid support

- Low Voltage Ride Through
- Fast Frequency Regulation
- Reactive Power at Night
- Voltage Droop Control
- Active Power Reserve Without Batteries
- Grid Following & Grid Forming
- Black Start Capability
- Automatic Voltage Regulation

PROTECTIONS

- DC Reverse polarity.
- Short-circuits and overloads at the output.
- Anti-islanding with automatic disconnection.
- Insulation failure DC.
- Up to 24 pairs of fuse-holders.
- Lightning induced DC and AC surge arresters, type II.
- Motorized DC switch to automatically disconnect the inverter from the PV array.
- Motorized AC circuit breaker.
- Hardware protection via firmware.
- Additional protection for the power stack, liquid cooled, IP65 rated and air cooled by a closed loop.

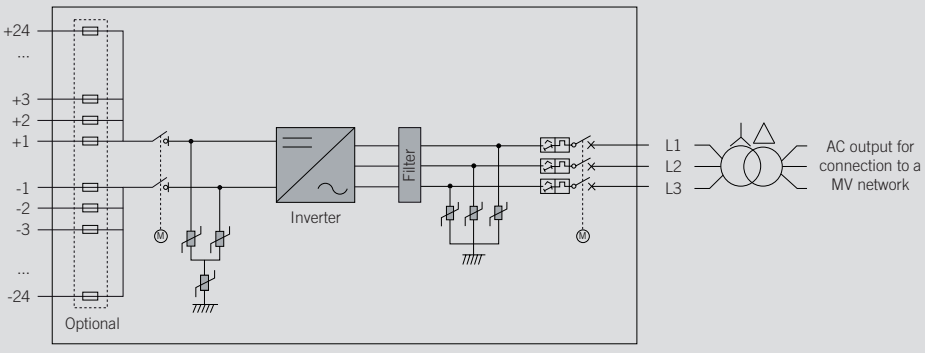
OPTIONAL ACCESSORIES

- Auxiliary services feeder.
- Grounding kit.
- Heating kit, for operating at an ambient temperature of down to -30 ºC.
- DC surge arresters type I+II.
- AC surge arresters type I+II.
- DC fuses.
- Monitoring of the currents at the DC input.
- PID prevention kit (PID: Potential Induced Degradation).

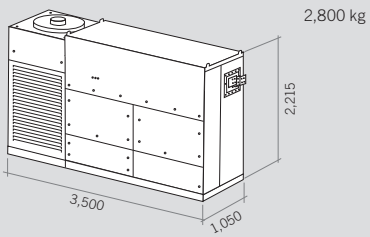
LIQUID COOLING SYSTEM

- LCS to refrigerate the IGBTs.
- More optimized component usage: greater thermal stability.
- Less moving components: lower power consumption and less maintenance works.
- No risk of particle entrance.
- Anti-corrosion protection with stainless steel components.
- LCS is used in many industries. Thus, it is very reliable, as its components are subject to many validation tests.
- Fast connectors with anti-dripping system
- Biodegradable glycol water mixture.
- No need of emptying the LCS in order to replace the phases, nor the sensors.

INGECON® SUN 3825TL



Size and weight (mm and kg)



	INGECON® SUN **3825TL**						
	C600	**C615**	**C630**	**C645**	**C660**	**C675**	**C690**
Input (DC)							
Recommended PV array power range[1]	3,144 - 4,188 kWp	3,222 - 4,293 kWp	3,301 - 4,398 kWp	3,379 - 4,502 kWp	3,458 - 4,607 kWp	3,537 - 4,712 kWp	3,615 - 4,816 kWp
Voltage Range MPP[2]	853 - 1,300 V	874 - 1,300 V	895 - 1,300 V	916 - 1,300 V	937 - 1,300 V	958 - 1,300 V	979 - 1,300 V
Maximum voltage[3]	1,500 V						
Maximum current	3,965 A						
Nº inputs with fuse-holders	Up to 24						
Fuse dimensions	63 A / 1,500 V to 500 A / 1,500 V fuses (optional)						
Type of connection	Connection to copper bars						
Power blocks	1						
MPPT	1						
Input protections							
Overvoltage protections	Type II surge arresters (type I+II optional)						
DC switch	Motorized DC load break disconnect						
Other protections	Up to 24 pairs of DC fuses (optional) / Reverse polarity / Insulation failure monitoring / Anti-islanding protection / Emergency pushbutton						
Output (AC)							
Power @35 °C / @50 °C	3,326 kVA / 2,858 kVA	3,409 kVA / 2,929 kVA	3,492 kVA / 3,001 kVA	3,575 kVA / 3,072 kVA	3,658 kVA / 3,144 kVA	3,741 kVA / 3,215 kVA	3,824 kVA / 3,287 kVA
Current @35 °C / @50 °C	3,200 A / 2,750 A						
Rated voltage[4]	600 V IT System	615 V IT System	630 V IT System	645 V IT System	660 V IT System	675 V IT System	690 V IT System
Frequency	50 / 60 Hz						
Power Factor[5]	1						
Power Factor adjustable	Yes, 0 - 1 (leading / lagging)						
THD (Total Harmonic Distortion)[6]	<3%						
Output protections							
Overvoltage protections	Type II surge arresters (type I+II optional)						
AC breaker	Motorized AC circuit breaker						
Anti-islanding protection	Yes, with automatic disconnection						
Other protections	AC short-circuits and overloads						
Features							
Operating efficiency	98.9%						
CEC	98.5%						
Max. consumption aux. services	9,000 W						
Stand-by or night consumption[7]	< 180 W						
Average power consumption per day	2,500 W						
General Information							
Ambient temperature	-20 °C to +60 °C						
Relative humidity (non-condensing)	0-100% (Outdoor)						
Protection class	IP65[8]						
Corrosion protection	External corrosion protection						
Maximum altitude	4,500 m (for installations beyond 1,000 m, please contact Ingeteam's solar sales department)						
Cooling system	Liquid cooling system and forced air cooling system with temperature control (400V 3 phase + neutral power supply, 50/60 Hz)						
Air flow range	0 - 18,000 m³/h						
Average air flow	12,000 m³/h						
Acoustic emission (100% / 50% load)	57 dB(A) at 10m / 49.7 dB(A) at 10m						
Marking	CE						
EMC and security standards	IEC 62920, IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-4, IEC 61000-3-11, IEC 61000-3-12, IEC 62109-1, IEC 62109-2, EN 50178, FCC Part 15, AS3100						
Grid connection standards	IEC 62116, EN 50530, IEC 61683, EU 631/2016 (EN 50549-2, P.O.12.2, CEI 0-16, VDE AR N 4120 ...), G99, South African Grid code, Mexican Grid Code, Chilean Grid Code, Ecuadorian Grid Code, Peruvian Grid code, Thailand PEA requirements, IEC61727, UNE 206007-1, ABNT NBR 16149, ABNT NBR 16150, IEEE 1547, IEEE1547.1, DEWA (Dubai) Grid code, Abu Dhabi Grid Code, Jordan Grid Code, Egyptian Grid Code, Saudi Arabia Grid Code, RETIE Colombia, Australian Grid Code						

Notes: [1] Depending on the type of installation and geographical location. Data for STC conditions [2] Vmpp.min is for rated conditions (Vac=1 p.u. and Power Factor=1) and floating systems [3] Consider the voltage increase of the 'Voc' at low temperatures [4] Other AC voltages and powers available upon request [5] For P_{out}>25% of the rated power [6] For P_{out}>25% of the rated power and voltage in accordance with IEC 61000-3-4 [7] Consumption from PV field when there is PV power available [8] Except for the LC filter and the air-water heat exchanger, that are IP54.

CE

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INGECON SUN

PowerStation FSK C Series
1,500 Vdc

MEDIUM VOLTAGE POWER STATION CUSTOMIZED UP TO 7.65 MVA, WITH ALL THE COMPONENTS SUPPLIED ON TOP OF THE SAME SKID PLATFORM

From 2500 up to 7650 kVA

This medium-voltage solution integrates all the necessary elements to develop a large-scale solar PV plant.

Maximize your investment with a minimal effort
Ingeteam's FSK power station is a compact, customizable and flexible solution that can be configured to suit each customer's requirements. It is supplied together with up to two photovoltaic inverters. All the equipment is suitable for outdoor installation, so there is no need of any kind of housing.

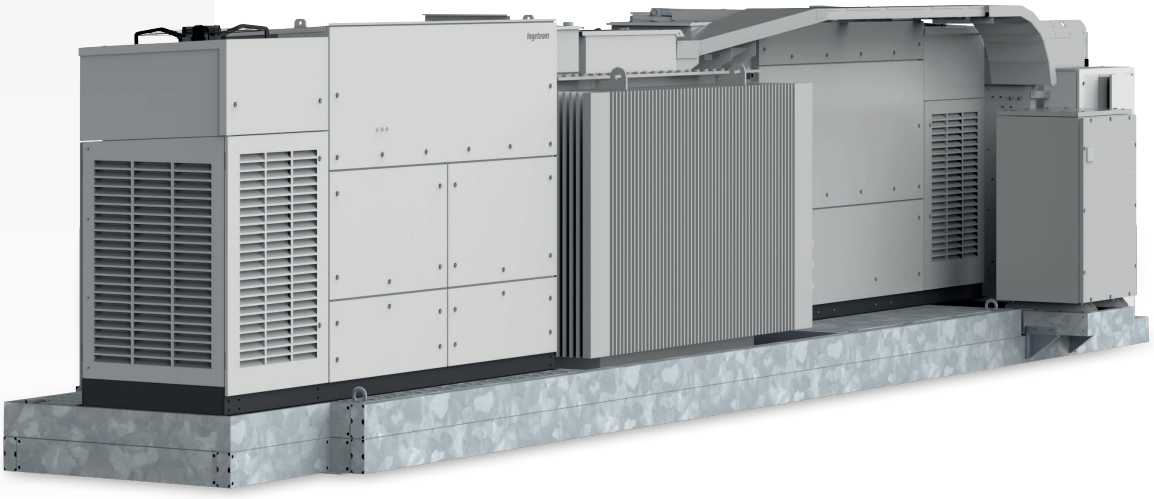
Higher adaptability and power density
This power station is now more versatile, as it presents the MV transformer integrated into a steel platform together with the LV and MV components, including the PV inverters. Moreover, it features one of the market's greatest power densities.

Plug & Play technology
This MV solution integrates power conversion equipment (up to 7.65 MVA), liquid-filled hermetically sealed transformer up to 38 kV and provision for low voltage equipment. The MV Skid is delivered pre-assembled for a fast on-site connection with up to two PV inverters from Ingeteam's INGECON® SUN 3Power C Series inverter family.

Complete accessibility
Thanks to the lack of housing, the inverters, the switchgear and the transformer can have immediate access. Furthermore, the design of the 3Power C Series central inverters has been conceived to facilitate maintenance and repair works.

Maximum protection
Ingeteam's 3Power C Series central inverters feature an IP65 protection class for their power stacks thanks to a combined water and air cooling system that optimises the operating temperature of the power electronics.

Apart from that, they feature the main electrical protections and they deploy grid support functionalities, such as low voltage ride-through capability, reactive power deliverance and active power injection control.



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solar.energy@ingeteam.com

Ingeteam

CONSTRUCTION

- Steel base frame.
- Suitable for slab or piers mounting.
- Compact design, minimising freight costs.
- Minimum installation at project site.

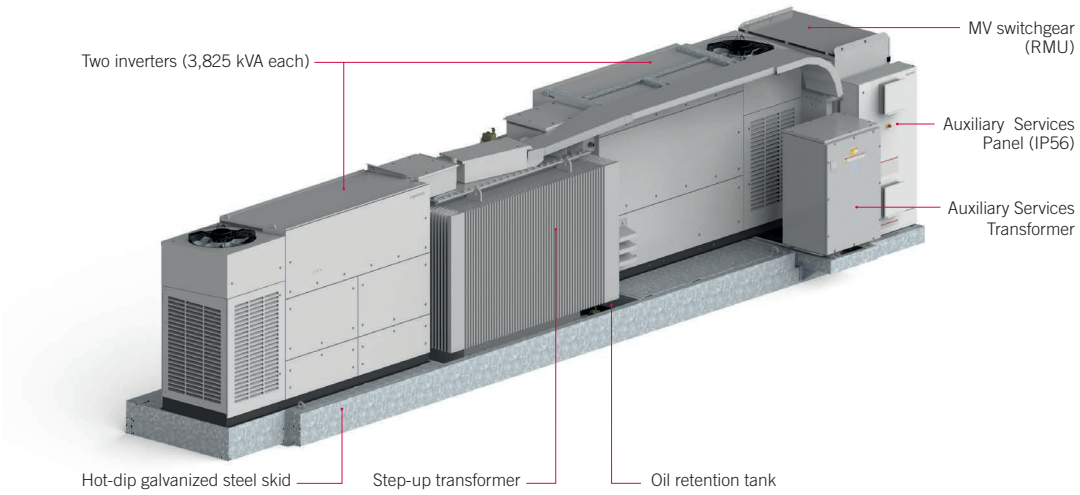
OPTIONAL ACCESSORIES

- Auxiliary services transformer (up to 60 kVA, Dyn11).
- MV Surge arresters.
- Auxiliary services panel (IP56)
- Power plant commissioning.
- High-speed Ethernet / fibre optic communication infrastructure for Plug & Play connection to the Power Plant Controller and/or SCADA systems.
- INGECON® SUN StringBox with 16 / 24 / 32 input channels. Intelligent or passive string combiner box.
- Energy meter for auxiliary services and/or energy production.
- Insulation monitoring relay for continuous monitoring of IT systems insulation.
- Reactive power regulation when there is no PV power available.
- Ground connection of the PV array.

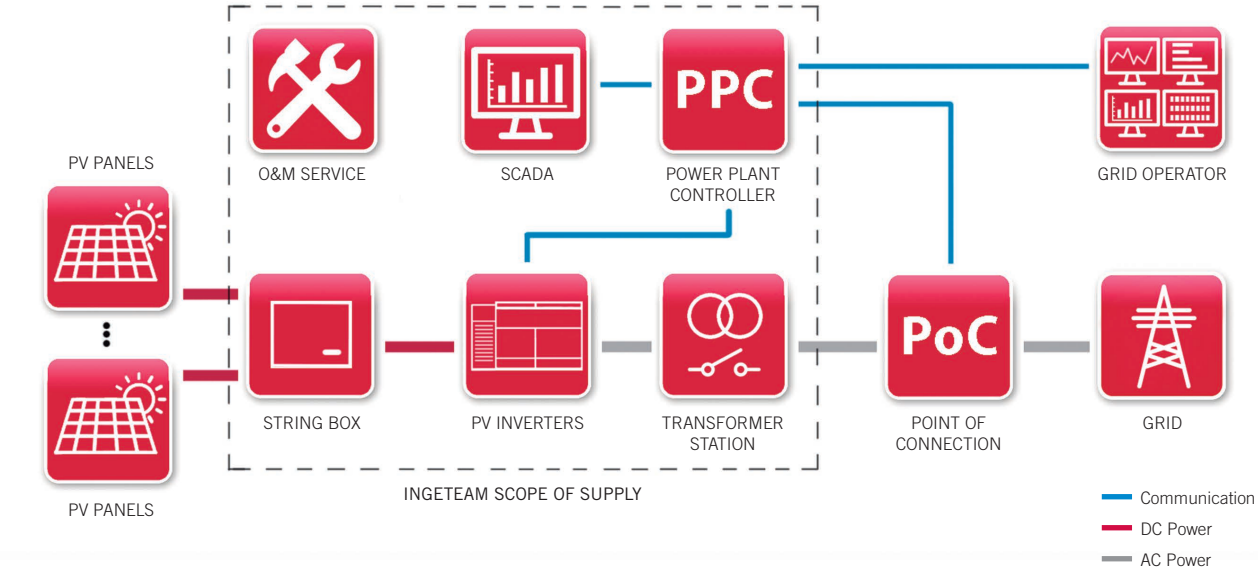
STANDARD EQUIPMENT

- Up to two inverters with an output power of 7.65 MVA.
- Liquid-filled hermetically-sealed transformer up to 36 kV.
- 1L1A MV switchgear (2L1A optional).
- Oil-retention tank.
- Metal frame for installation of LV equipment.

COMPONENTS



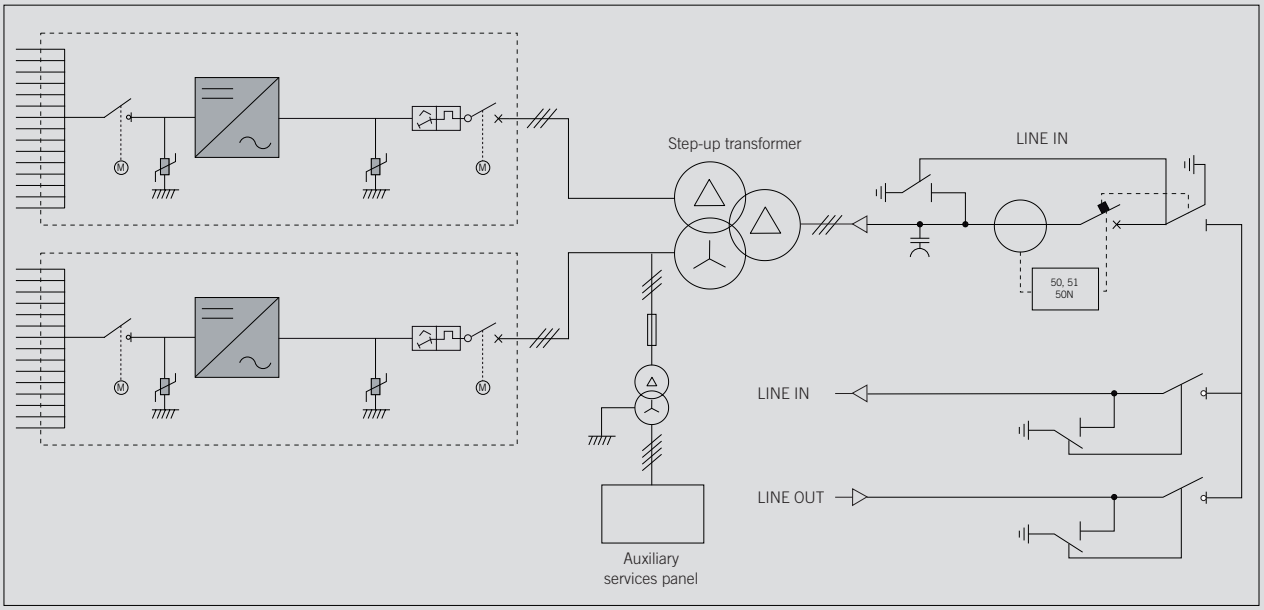
PLANT CONFIGURATION



	3825 FSK C Series	7650 FSK C Series
General information		
Number of inverters	1	2
Max. power. @35 °C / 95 °F[1]	3,824 kVA	7,648 kVA
Operating temperature range	from -5 °C to +50 °C	
Relative humidity (non condensing)	0 - 100%	
Maximum altitude	3,000 masl (power derating starting at 1,000 masl)	
LV/MV Transformer		
Medium voltage	From 20 kV up to 36 kV, 50-60 Hz	
Cooling system	ONAN (KNAN optional)	
Minimum PEI (Peak Efficiency Index)[2]	99.50%	
Protection degree	IP54	
MV Switchgear (RMU)		
Medium voltage	24 kV / 36 kV / 40.5 kV	
Rated current	630 A	
Cooling system	Natural air ventilation	
Protection degree	IP54 (IP55 optionally)	
Equipment		
Auxiliary services panel	Standard version (optional monitoring system)	
Step-up transformer	Oil-immersed hermetically sealed transformer	
MV Switchgear	1L1A cells (2L1A optional)	
Mechanical information		
Structure type	Hot dip galvanized steel skid	
Dimensions Full Skid (W x D x H)	11,390 x 2,100 x 2,460 mm	11,390 x 2,100 x 2,460 mm
Full Skid	16 T	25 T
Standards	IEC 62271-212, IEC 62271-200, IEC 60076, IEC 61439-1	

Notes: [1] Maximum power calculated with the inverter model INGECON® SUN 3825TL C690. For other inverter models, please contact Ingeteam's Solar sales department [2] For European installations, ECO design according to the EU 548/2014 and EU 2019/1783 standards.

Configuration with two C Series solar inverters



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NEW

Preliminary Technical Information Sheet

CanadianSolar

HiKu7 Mono

640 W ~ 665 W

CS7N-640|645|650|655|660|665MS

MORE POWER

665 W — Module power up to 665 W
Module efficiency up to 21.4 %

Up to 3.5 % lower LCOE
Up to 5.7 % lower system cost

Comprehensive LID / LeTID mitigation technology, up to 50% lower degradation

Compatible with mainstream trackers, cost effective product for utility power plant

Better shading tolerance

MORE RELIABLE

40 °C lower hot spot temperature, greatly reduce module failure rate

Minimizes micro-crack impacts

Heavy snow load up to 5400 Pa, wind load up to 2400 Pa*

12 Years — **Enhanced Product Warranty on Materials and Workmanship***

25 Years — **Linear Power Performance Warranty***

1st year power degradation no more than 2%
Subsequent annual power degradation no more than 0.55%

*According to the applicable Canadian Solar Limited Warranty Statement.

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001:2015 / Quality management system
ISO 14001:2015 / Standards for environmental management system
OHSAS 18001:2007 / International standards for occupational health & safety

PRODUCT CERTIFICATES*

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

CANADIAN SOLAR INC. is committed to providing high quality solar products, solar system solutions and services to customers around the world. Canadian Solar was recognized as the No. 1 module supplier for quality and performance/price ratio in the IHS Module Customer Insight Survey, and is a leading PV project developer and manufacturer of solar modules, with over 46 GW deployed around the world since 2001.

* For detailed information, please refer to the Installation Manual.

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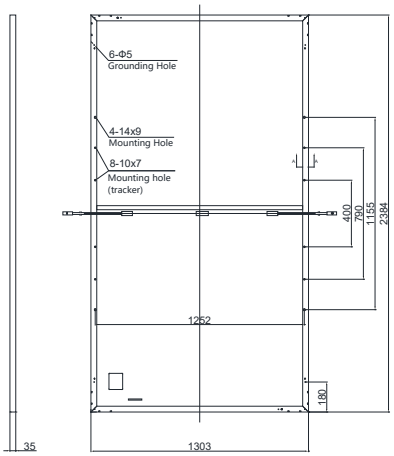
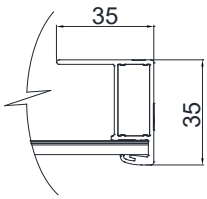
ENGINEERING DRAWING (mm)

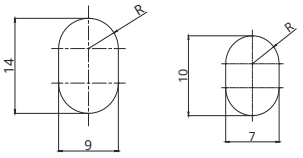
Rear View



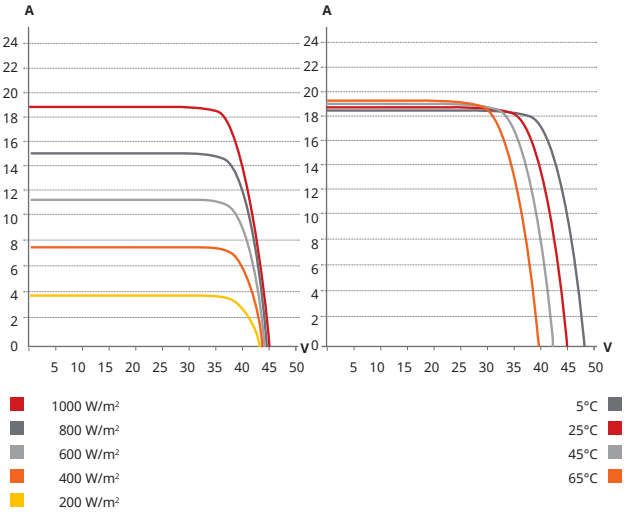
Frame Cross Section A-A



Mounting Hole



CS7N-650MS / I-V CURVES



ELECTRICAL DATA | STC*

CS7N	640MS	645MS	650MS	655MS	660MS	665MS
Nominal Max. Power (Pmax)	640 W	645 W	650 W	655 W	660 W	665 W
Opt. Operating Voltage (Vmp)	37.5 V	37.7 V	37.9 V	38.1 V	38.3 V	38.5 V
Opt. Operating Current (Imp)	17.07 A	17.11 A	17.16 A	17.20 A	17.24 A	17.28 A
Open Circuit Voltage (Voc)	44.6 V	44.8 V	45.0 V	45.2 V	45.4 V	45.6 V
Short Circuit Current (Isc)	18.31 A	18.35 A	18.39 A	18.43 A	18.47 A	18.51 A
Module Efficiency	20.6%	20.8%	20.9%	21.1%	21.2%	21.4%
Operating Temperature	-40°C ~ +85°C					
Max. System Voltage	1500V (IEC) or 1000V (IEC)					
Module Fire Performance	CLASS C (IEC 61730)					
Max. Series Fuse Rating	30 A					
Application Classification	Class A					
Power Tolerance	0 ~ + 10 W					

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.

ELECTRICAL DATA | NMOT*

CS7N	640MS	645MS	650MS	655MS	660MS	665MS
Nominal Max. Power (Pmax)	478 W	482 W	486 W	489 W	493 W	497 W
Opt. Operating Voltage (Vmp)	35.0 V	35.2 V	35.4 V	35.6 V	35.8 V	36.0 V
Opt. Operating Current (Imp)	13.66 A	13.70 A	13.73 A	13.75 A	13.78 A	13.81 A
Open Circuit Voltage (Voc)	42.0 V	42.2 V	42.4 V	42.6 V	42.8 V	43.0 V
Short Circuit Current (Isc)	14.77 A	14.80 A	14.84 A	14.87 A	14.90 A	14.93 A

* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m², spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

MECHANICAL DATA

Specification	Data
Cell Type	Mono-crystalline
Cell Arrangement	132 [2 x (11 x 6)]
Dimensions	2384 × 1303 × 35 mm (93.9 × 51.3 × 1.38 in)
Weight	35.7 kg (78.7 lbs)
Front Cover	3.2 mm tempered glass
Frame	Anodized aluminium alloy, crossbar enhanced
J-Box	IP68, 3 bypass diodes
Cable	4 mm² (IEC)
Cable Length (Including Connector)	460 mm (18.1 in) (+) / 340 mm (13.4 in) (-) or customized length*
Connector	T4 series or H4 UTX or MC4-EVO2
Per Pallet	30 pieces
Per Container (40' HQ)	480 pieces

* For detailed information, please contact your local Canadian Solar sales and technical representatives.

TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.34 % / °C
Temperature Coefficient (Voc)	-0.26 % / °C
Temperature Coefficient (Isc)	0.05 % / °C
Nominal Module Operating Temperature	42 ± 3°C

PARTNER SECTION

* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. Canadian Solar Inc. reserves the right to make necessary adjustment to the information described herein at any time without further notice.
Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

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