

**THREE-PHASE  
TRANSFORMERLESS  
BATTERY INVERTER**

**Battery inverter up to 1.64 MVA**

The INGECON® SUN STORAGE PowerMax is a three-phase bidirectional battery inverter that can be used in grid-connected and stand-alone systems. This inverter offers a high-power density in a single power block, providing different configurable operating modes. Besides, it features the same technology as Ingeteam's PV inverters, facilitating the supply of spare parts.

**Easy maintenance**

String inverter philosophy has been applied in the design of this central inverter, facilitating the inverter usage. Moreover, the input and output lines are integrated into the same cabinet, in order to make maintenance work easier.

**Battery management**

The INGECON® SUN STORAGE PowerMax features a highly advanced battery control technology, ensuring the maximum life of the storage system. The battery temperature could be controlled at all times ensuring an enhanced lifespan of the accumulator. This inverter is 100% compatible with Ingeteam's PV inverters.

**Software included**

Included at no extra cost the software INGECON® SUN Manager for monitoring and recording the inverter data over the Internet. Ethernet communications are supplied as standard.

The INGECON® SUN STORAGE PowerMax three-phase inverter complies with the most demanding international standards.

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

PROTECTIONS

- Lightning induced DC and AC surge arresters, type II.
- Output short-circuits and overloads.
- Insulation failures.
- Motorized DC load break disconnect.
- Motorized AC circuit breaker.
- Additional protection for the power stack, as it is air cooled by a closed loop.

INTEGRATED ACCESSORIES

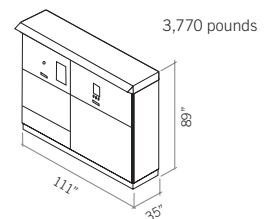
- Ethernet communication.
- DC pre-charge system.
- AC pre-charge system.

OPTIONAL ACCESSORIES

- DC fuses.
- Heating kit, for operating at an ambient temperature of -30 °C (-22 °F).
- Sand trap kit.



**Size and weight** (inches and lbs)



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**Stand-alone operating mode:**

The INGECON SUN® STORAGE PowerMax, together with Ingeteam's Plant Controller, generates the stand-alone AC grid (to which the PV inverters -both string and central models- and the loads are connected). The ISS PowerMax is able to control the energy flows between this

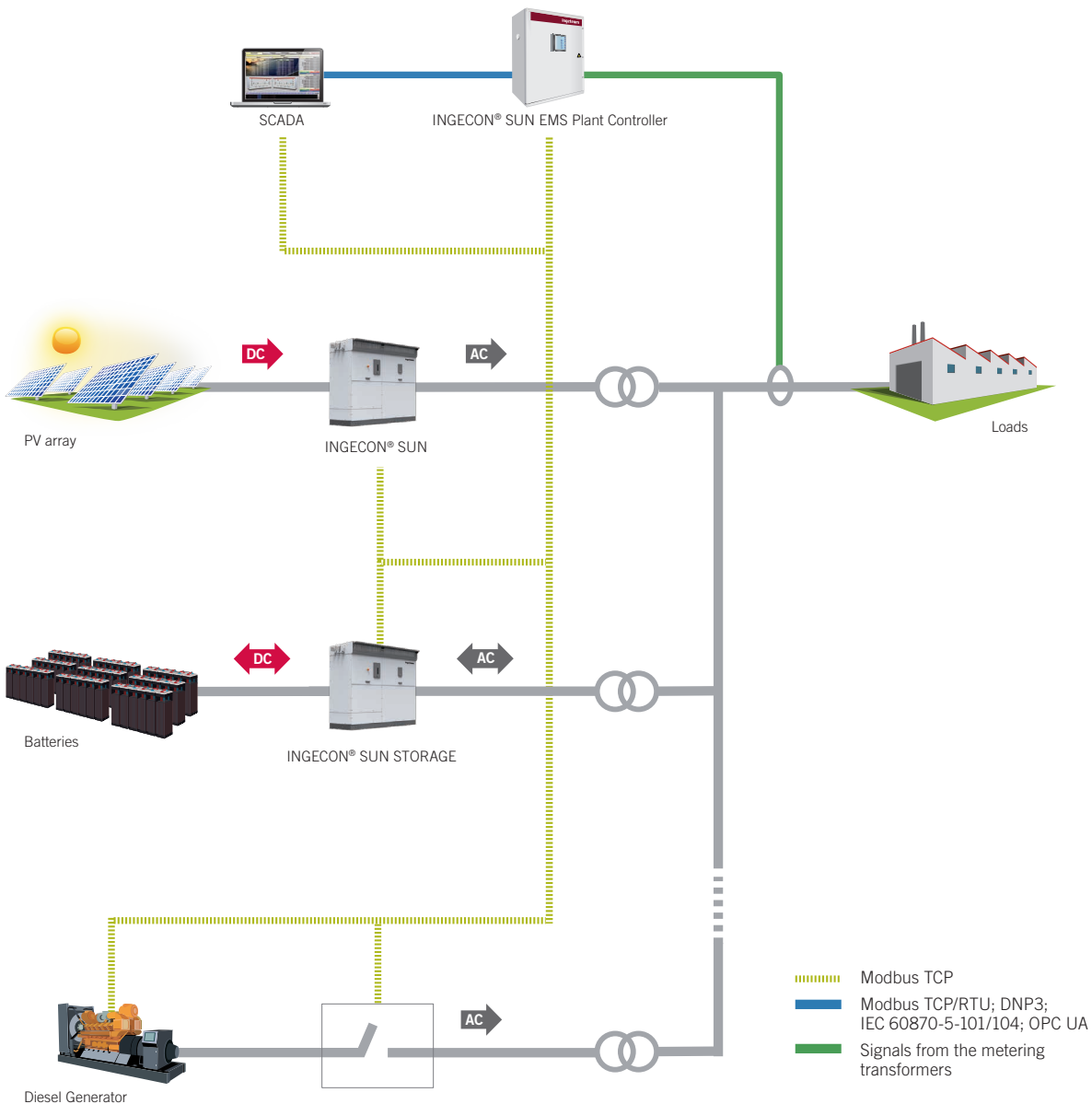
grid and the batteries, based on their status at any given time.

An advanced control system, based on a frequency droop and requiring no communications, manages the power generated by the INGECON SUN® PV inverters

based on the consumption data and the battery state of charge.

The back-up power source (a diesel generator) will only start when the battery state of charge is below a certain programmable threshold.

**Schema for stand-alone mode**



**Grid-connected operating modes:**

**- Self-consumption**

This operating mode is conceived for grid-connected systems with renewable energy sources, in order to minimise grid consumption. If the loads demand more energy than the one produced by the renewable sources then the batteries would cover this demand, increasing the self-consumption ratio.

Back-up functionality is also available. If a grid outage occurs, the battery inverter generates the AC network and the energy stored in the batteries is used to power the loads.

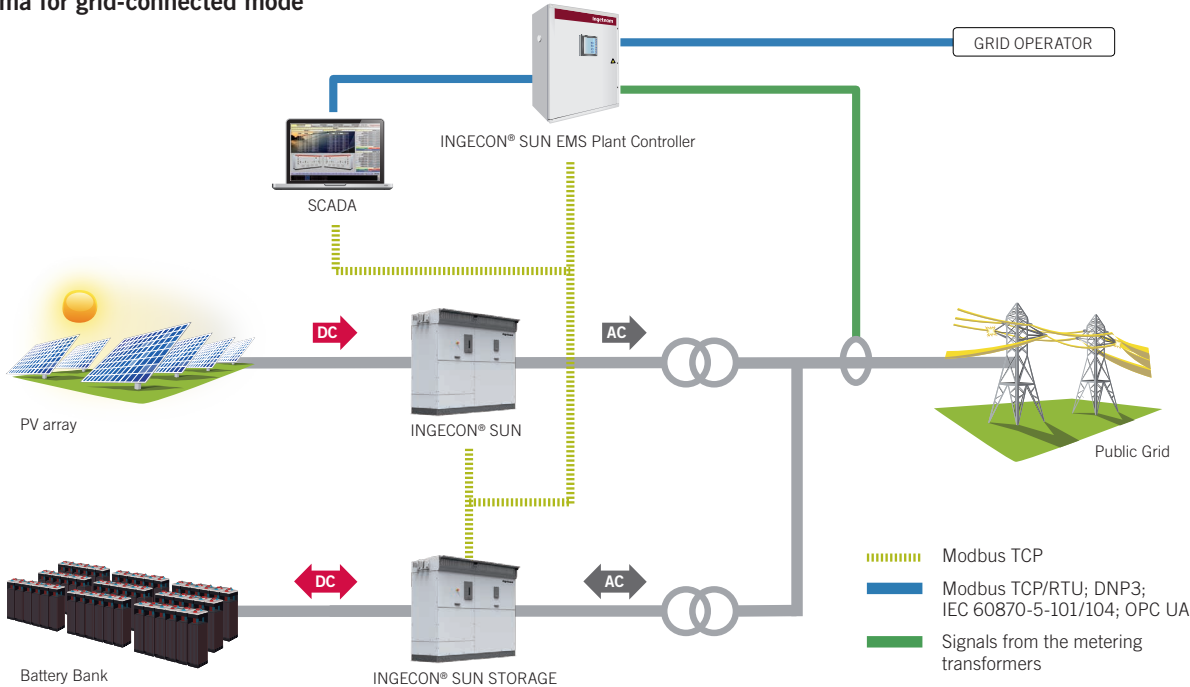
**- Grid Support**

This operating mode is mainly based on active and reactive power control functions that can be implemented thanks to Ingeteam's power plant controller:

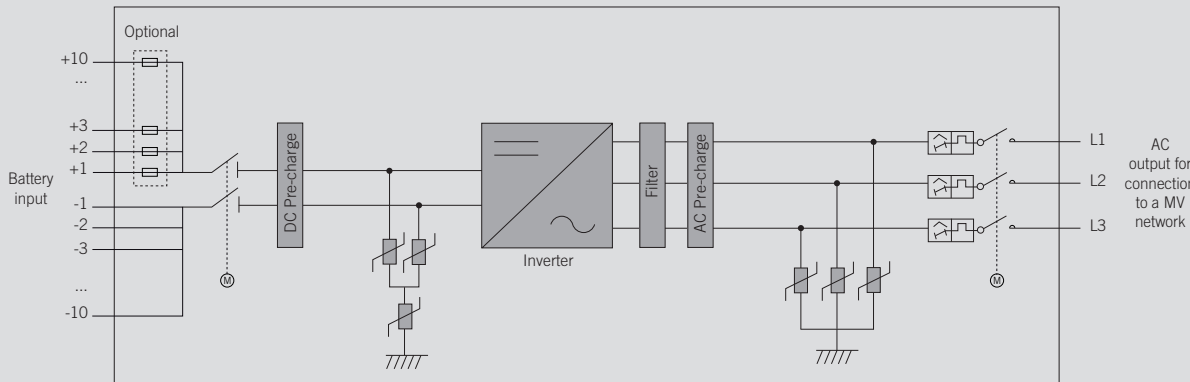
- Active Power Curtailment.
- Ramp Rate Control.
- Fast Frequency Regulation.
- Solar Power Reserve.
- Energy Time Shifting.
- P Open Loop.
- Hybrid Self-Consumption.

- Uninterrupted Power Supply.
- Stand-Alone Generation.
- Q Open Loop.
- Dynamic Reactive Compensation.
- Peak-Shaving.
- On Demand Q.
- Power Factor Control.
- Automatic Voltage Regulation.
- Voltage Droop Control.
- Power Oscillations Damping.
- Black Start capability.

**Schema for grid-connected mode**



**SUN STORAGE PowerMax U B Series**



|   | 950TL U<br>B366  | 1170TL U<br>B450        | 1245TL U<br>B480      | 1325TL U<br>B510        | 1380TL U<br>B530        | 1500TL U<br>B578        | 1560TL U<br>B600      | 1640TL U<br>B630      |
|---|--|-------------------------|-----------------------|-------------------------|-------------------------|-------------------------|-----------------------|-----------------------|
| <b>Input (DC)</b>   |  |                         |                       |                         |                         |                         |                       |                       |
| Battery voltage range for stand-alone mode                          | 536 - 1,300 V  | 660 - 1,300 V           | 704 - 1,300 V         | 742 - 1,300 V           | 770 - 1,300 V           | 840 - 1,300 V           | 870 - 1,300 V         | 998 - 1,300 V         |
| Battery voltage range for grid-connected modes range <sup>(1)</sup> | 588 - 1,300 V  | 715 - 1,300 V           | 762.6 - 1,300 V       | 812.3 - 1,300 V         | 843.6 - 1,300 V         | 916 - 1,300 V           | 950 - 1,300 V         | 998 - 1,300 V         |
| Maximum voltage <sup>(2)</sup>                                      | 1,500 V  |                         |                       |                         |                         |                         |                       |                       |
| Maximum current   | 1,850 A  |                         |                       |                         |                         |                         |                       |                       |
| Type of battery <sup>(3)</sup>                                      | Li-ion, lead, Ni-Cd and flow batteries   |                         |                       |                         |                         |                         |                       |                       |
| N° inputs with fuse holders   | 6 up to 10   |                         |                       |                         |                         |                         |                       |                       |
| Fuse dimensions   | 630 A / 1,500 V / aR / 100 kA (L/R 5mS) (optional)   |                         |                       |                         |                         |                         |                       |                       |
| Type of connection  | Single copper bar (up to 30 cables) or multiple copper bars with fuse holders  |                         |                       |                         |                         |                         |                       |                       |
| <b>Input protections</b>  |  |                         |                       |                         |                         |                         |                       |                       |
| Overvoltage protections   | Type II surge arresters  |                         |                       |                         |                         |                         |                       |                       |
| DC switch   | Motorized DC load break disconnect   |                         |                       |                         |                         |                         |                       |                       |
| Other protections   | Up to 10 pairs of DC fuses (optional) / Insulation failure monitoring / Anti-islanding protection / Emergency pushbutton |                         |                       |                         |                         |                         |                       |                       |
| <b>Output (AC)</b>  |  |                         |                       |                         |                         |                         |                       |                       |
| Power NEMA 3 @86 °F / @122 °F                                       | 950.9 kVA / 855.8 kVA  | 1,169 kVA / 1,052.2 kVA | 1,247 kVA / 1,122 kVA | 1,325 kVA / 1,192.5 kVA | 1,377 kVA / 1,239.2 kVA | 1,502 kVA / 1,351.5 kVA | 1,559 kVA / 1,403 kVA | 1,637 kVA / 1,473 kVA |
| Current NEMA 3 @86 °F / @122 °F                                     | 1,500 A / 1,350 A  |                         |                       |                         |                         |                         |                       |                       |
| Power NEMA 4 @80.5 °F / @122 °F <sup>(4)</sup>                      | 950.9 kVA / 841.9 kVA  | 1,169 kVA / 1,035 kVA   | 1,247 kVA / 1,104 kVA | 1,325 kVA / 1,173 kVA   | 1,377 kVA / 1,219 kVA   | 1,502 kVA / 1,330 kVA   | 1,559 kVA / 1,380 kVA | 1,637 kVA / 1,449 kVA |
| Current NEMA 4 @80.5 °F / @122 °F <sup>(4)</sup>                    | 1,500 A / 1,328 A  |                         |                       |                         |                         |                         |                       |                       |
| Rated voltage   | 366 V IT System  | 450 V IT System         | 480 V IT System       | 510 V IT System         | 530 V IT System         | 578 V IT System         | 600 V IT System       | 630 V IT System       |
| Frequency   | 50 / 60 Hz   |                         |                       |                         |                         |                         |                       |                       |
| Power Factor <sup>(5)</sup>   | 1  |                         |                       |                         |                         |                         |                       |                       |
| Power Factor adjustable   | Yes, 0-1 (leading / lagging)   |                         |                       |                         |                         |                         |                       |                       |
| THD (Total Harmonic Distortion) <sup>(6)</sup>                      | <3%  |                         |                       |                         |                         |                         |                       |                       |
| Type of connection  | Connection to cables or copper bars  |                         |                       |                         |                         |                         |                       |                       |
| <b>Output protections</b>   |  |                         |                       |                         |                         |                         |                       |                       |
| Overvoltage protections   | Type II surge arresters  |                         |                       |                         |                         |                         |                       |                       |
| AC breaker  | Motorized AC circuit breaker   |                         |                       |                         |                         |                         |                       |                       |
| Anti-islanding protection   | Yes, with automatic disconnection  |                         |                       |                         |                         |                         |                       |                       |
| Other protections   | AC short circuits and overloads  |                         |                       |                         |                         |                         |                       |                       |
| <b>Features</b>   |  |                         |                       |                         |                         |                         |                       |                       |
| Maximum efficiency  | 98.9%  |                         |                       |                         |                         |                         |                       |                       |
| CEC Efficiency  | 98.5%  |                         |                       |                         |                         |                         |                       |                       |
| Max. consumption aux. services                                      | 4,250 W  |                         |                       |                         |                         |                         |                       |                       |
| Stand-by or night consumption <sup>(7)</sup>                        | <90 W  |                         |                       |                         |                         |                         |                       |                       |
| Average power consumption per day                                   | 2,000 W  |                         |                       |                         |                         |                         |                       |                       |
| <b>General Information</b>  |  |                         |                       |                         |                         |                         |                       |                       |
| Ambient temperature   | -4 °F to +140 °F (-20 °C to +60 °C)  |                         |                       |                         |                         |                         |                       |                       |
| Relative humidity (non-condensing)                                  | 0 - 100%   |                         |                       |                         |                         |                         |                       |                       |
| Protection class  | NEMA 3R (NEMA 4 with the sand trap kit)  |                         |                       |                         |                         |                         |                       |                       |
| Maximum altitude  | 14,770 ft (for installations beyond 3,300 ft, please contact Ingeteam's solar sales department)                          |                         |                       |                         |                         |                         |                       |                       |
| Cooling system  | Forced air with temperature control (230 V phase + neutral power supply)   |                         |                       |                         |                         |                         |                       |                       |
| Air flow range  | 0 - 84 ft <sup>3</sup> /s (0 - 7,800 m <sup>3</sup> /h)  |                         |                       |                         |                         |                         |                       |                       |
| Average air flow  | 45 ft <sup>3</sup> /s (4,200 m <sup>3</sup> /h)  |                         |                       |                         |                         |                         |                       |                       |
| Acoustic emission (100% / 50% load)                                 | <66 dB(A) at 33 ft / <54.5 dB(A) at 33 ft  |                         |                       |                         |                         |                         |                       |                       |
| Marking   | CE, ETL  |                         |                       |                         |                         |                         |                       |                       |
| EMC & Security standards  | UL9540, UL1741, FCC Part 15, IEEE C37.90.1, IEEE C37.90.2, CSA22.2 No107   |                         |                       |                         |                         |                         |                       |                       |
| Grid connection standards   | IEC 62116, UL1741SA, IEEE 1547, IEEE 1547.1, NEC CODE, Rule 21, Rule 14H, CSA22.2 No107                                  |                         |                       |                         |                         |                         |                       |                       |

**Notes:** <sup>(1)</sup> Minimum voltage DC (V<sub>DC, min</sub>) for V<sub>grid,max</sub> = 1.1 p.u. and Power Factor=1 If V<sub>grid,max</sub> is higher than this value, the minimum voltage should be corrected as V<sub>DC, min</sub> \* V<sub>grid,max</sub> / 1.1  
<sup>(2)</sup> Beyond 1,300 V, the maximum current decreases gradually <sup>(3)</sup> Please contact Ingeteam's solar sales department to access the full list of compatible batteries and BMS <sup>(4)</sup> With the sand trap kit  
<sup>(5)</sup> For P<sub>AC</sub>>25% of the rated power <sup>(6)</sup> For P<sub>AC</sub>>25% of the rated power and voltage in accordance with IEC 61000-3-4 <sup>(7)</sup> Consumption from battery.