

INGECON**SUN STORAGE****3 Power M Series****UL 1741 SB
COMPLIANT****UP TO 4.54 MVA WITH FOUR MODULES OF 1.14 MVA**

AC-DC MODULAR CONVERTER FOR 1500 V BATTERY ENERGY STORAGE SYSTEMS

The INGECON® SUN STORAGE 3Power M Series is a three-phase bidirectional battery inverter that can be used in grid-connected and stand-alone systems. In addition, it will be matching any type of batteries at different range of hour of application. This one-of-a-kind battery inverter achieves a market-leading power density of 488 kW/m³, as it provides up to 1.14 MVA in just one power module.

Latest generation electronics

The INGECON® SUN STORAGE 3Power M Series battery 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 +57 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 / NEMA 3 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 / NEMA 3 protection

A secondary liquid cooling system is used to refrigerate the air inside the IP65 / NEMA 3 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.

Standard 5 years, extendible upon request

Ingeteam

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AC-DC modular converter for 1500 V battery storage systems

Real power related functionalities

Renewable resources integration:

- Ramp limits.
- Power smoothing / firming / curtailment.
- Time shifting.
- Micro grids.

Grid support / Ancillary services:

- Frequency regulation.
- Synthetic inertia.
- Black start.
- Frequency control / protection.
- Virtual "Synchronous Machine".

Investment deferral:

- Peak shaving.
- Load shifting / Load following.
- Real power response improvement of conventional power plants.

Power efficiency:

- Time shifting.
- Price arbitrage.
- Real power response improvement of conventional power plants.
- Peak shaving.

Safety and quality:

- "Un-interruptible" Power.
- Grid code compliance.
- Transmission congestion relief / Power quality-reliability.

Reactive power related functionalities

- Voltage control (Q/V).
- Voltage control / protection.
- Fixed power factor (QPF).
- Fixed reactive power output (Qref).
- Limitation of response of Reactive Power.

Protections

- Short-circuits and overloads at the output.
- Anti-islanding with automatic disconnection.
- Insulation failure DC.
- Monitoring of the DC currents.
- Up to 5 pairs of fuse-holders.
- Lightning induced DC and AC surge arresters, type II.
- Motorized DC switch.
- 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

- Heating kit, for operating at an ambient temperature between -20 °C and -40 °C.
- DC fuses in the positive pole or in both poles.
- DC surge arresters type I+II.
- AC surge arresters type I+II.
- AC measuring kit.

Main features

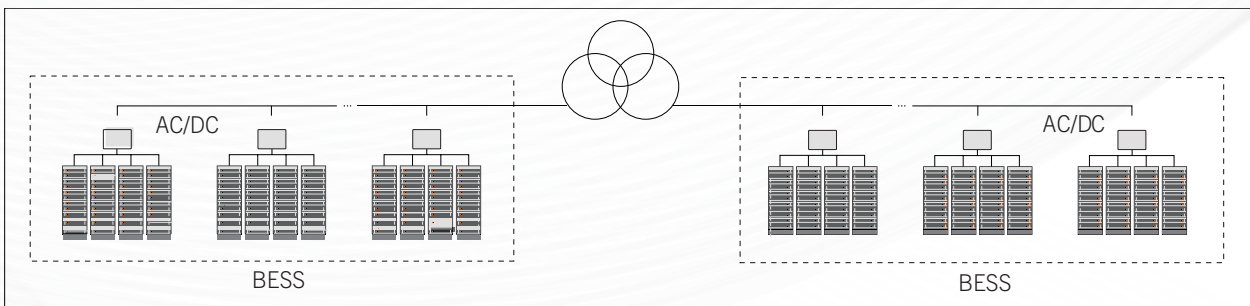
- Nominal power at 40 °C ambient.
- Same charge / discharge power.
- Modularity, adapts to customer demand.

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.

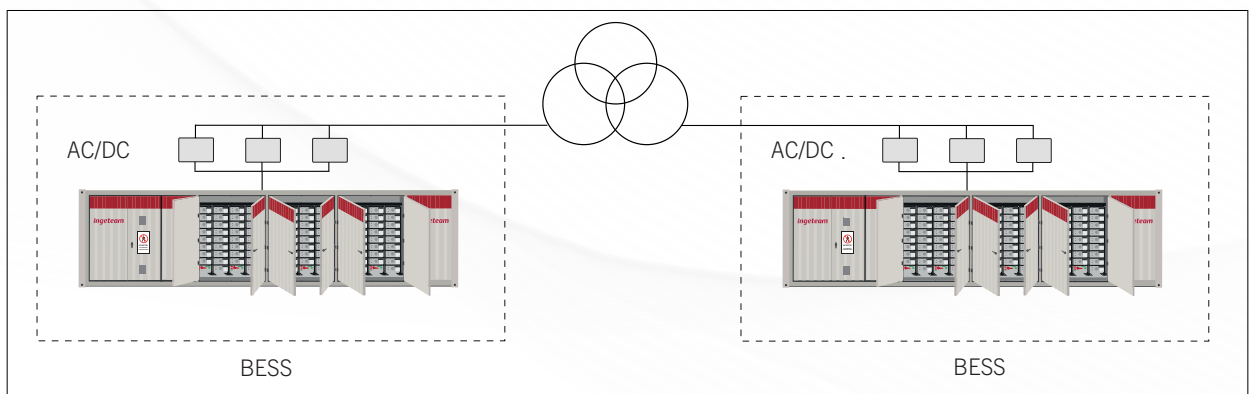
Solution for independent Racks:

Modular inverter working independently to its battery racks



Solution for battery containers with a single output:

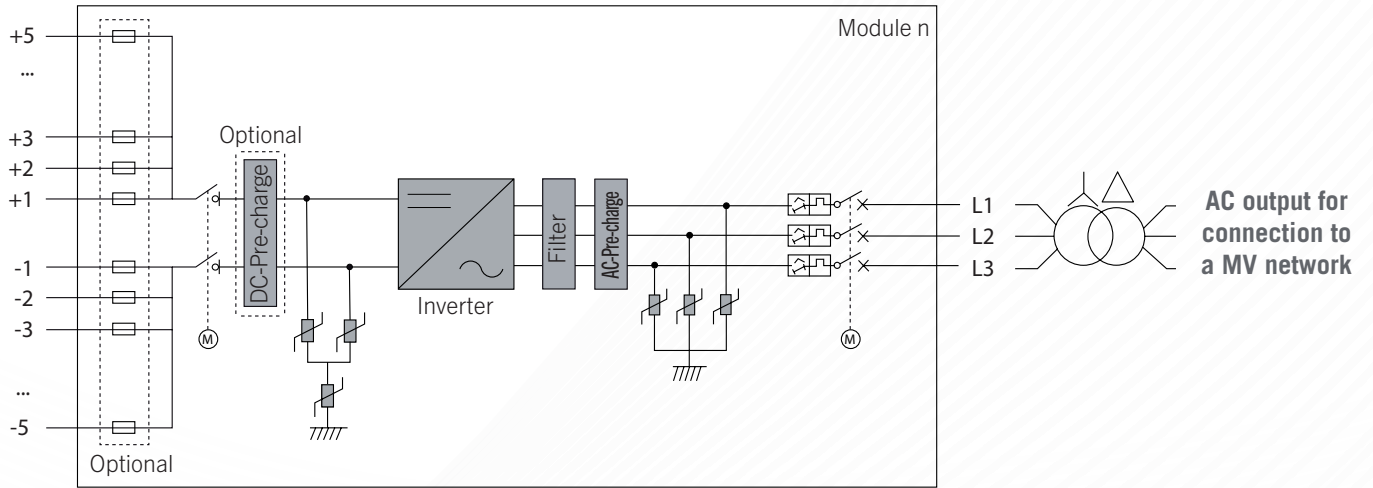
Modular inverter working in parallel



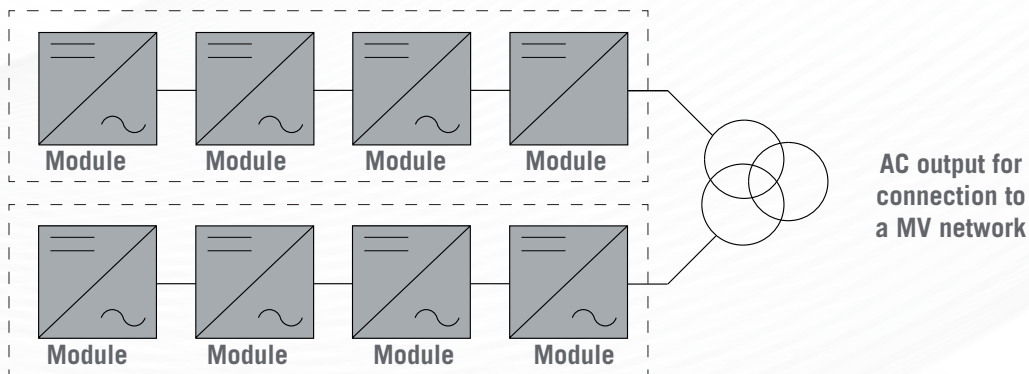
UP TO 4.54 MVA WITH FOUR MODULES OF 1.14 MVA

AC-DC modular converter for 1500 V battery storage systems

SLD (Single Line Diagram) of the inverter



SLD with 2 inverters per power station



Specifications included in this datasheet could change without notice. Please contact Ingeteam's sales department in case of any queries.

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INGECON® SUN STORAGE 4540TL

INPUT (DC)	M600		M630		M660		M690	
	M3	M4	M3	M4	M3	M4	M3	M4
Battery voltage range for off-grid mode [V]	854 to 1,500		896 to 1,500		938 to 1,500		980 to 1,500	
Battery voltage for grid-tied mode ⁽¹⁾ [V]	938 to 1,500		984 to 1,500		1,035 to 1,500		1,077 to 1,500	
N° DC inputs per module	5							
N° DC inputs per inverter	15	20	15	20	15	20	15	20
N° independent DC inputs	1/3	1/2/4	1/3	1/2/4	1/3	1/2/4	1/3	1/2/4
Fuse dimensions	Up to 630 A / 1,500 V / aR (optional)							
DC short circuit withstand capacity per DC Input [kA]	250 (< 5ms)							
Type of connection	Connection to copper bars							
INPUT PROTECTION								
Overvoltage protection	Type I+II surge arresters							
DC Switch	Motorized DC load break disconnect							
Other protections	Up to 5 pairs of DC fuses per power module (optional) / Reverse polarity / Insulation failure monitoring / Anti-islanding protection							
OUTPUT (AC)								
Discharge/charge power (104 °F)[kVA]	2,961	3,948	3,111	4,148	3,258	4,344	3,405	4,540
Discharge/charge current (104 °F)[A]	2,850	3,800	2,850	3,800	2,850	3,800	2,850	3,800
AC output voltage [V]	600		630		660		690	
Frequency [Hz]	50 / 60							
Power factor ⁽²⁾	1							
Power factor adjustable	Yes, 0 - 1 (leading / lagging)							
THD (total harmonic distortion) ⁽³⁾	<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							
GENERAL INFORMATION								
Maximum efficiency	98.9%							
CEC	98.5%							
Operating ambient temperature [°F]	-4 to +140							
Operating ambient temperature (with heating kit) [°F]	-40 to +140							
Relative humidity (non-condensing)	0-100% (Outdoor)							
Protection class	IP65							
Corrosion protection	C5M External corrosion protection							
Maximum altitude [ft]	14,770 (for installations beyond 3,300 ft, 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, 60 Hz)							
StandBy or no-switching [W]	925							
Air flow range [ft³/s]	0–265							
Average air flow [ft³/s]	177							
Dimensions (L x W x H) [in]	204.72 × 35.43 × 86.61							
Marking	UL Marking by NRTL							
EMC and security standards	UL1741 Ed.3, Supplement SB (IEEE 1547, IEEE 1547.1, California rule No 21, Hawaii Rule No. 14), IEEE 2800, CSA C22.2 No 107.1, CEC-300							
Grid connection standards ⁽⁴⁾	IEC 62116, OGPE listed, Grid Code Mexico, Grid Code Brazil							

Notes

⁽¹⁾ Maximum voltage DC (VDC,min) for Vgrid,max= 1.1 pu and Power Factor=1. If Vgrid,max is higher than this value, minimum voltage should be corrected as VDC,min * Vgrid,max / 1.1.

⁽²⁾ For P_{out}>25% of the rated power

⁽³⁾ For P_{out}>25% of the rated power and voltage in accordance with IEC 61000-3-4.

⁽⁴⁾ If needed, ask for additional Grid Code compliance certificates.

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