

## TRANSFORMERLESS CENTRAL MULTI-MPPT INVERTERS WITH A DC CABINET

### 500TL M400 DC Indoor / 750TL M400 DC Indoor / 1000TL M400 DC Indoor

The central multi-MPPT inverter model, in any of its configurations, can be supplied with either two, three or four independent power blocks. Each of these modules has its own maximum power point tracking system (MPPT), delivering optimum power output levels in each specific case.

It is also possible to connect up to two inverters, with four power blocks each, to the same medium voltage transformer winding.

#### DC and AC supplies in the same cabinet

The input and output lines are integrated into the same cabinet, facilitating maintenance and repair work, whilst still maintaining the highest level of safety.

#### Maximum protection

These three phase inverters are equipped with a manual DC load break switch and a DC automatic contactor for each power block, in order to decouple the PV generator from the inverter. Optionally, the inverters can be supplied with an AC thermal magnetic breaker with door control, in addition to fuses and current monitoring.

#### Enhanced functionality

This new INGECON® SUN PowerMax range features a revamped, improved enclosure which, together with its innovative air cooling system, makes it possible to increase the ambient operating temperature to deliver its rated power up to 45 °C.

#### Maximum efficiency values

Through the use of innovative electronic conversion topologies, efficiency values of up to 98.8% can be achieved. Furthermore, an advanced MPPT algorithm makes it possible to harness the maximum energy from the PV array at all times, even in difficult situations, such as scattered clouds and partial shading.

#### A complete range of equipment for all types of projects

Versions available:

- Indoor inverters with integrated DCAC cabinet.
- Indoor inverters with DC cabinet.
- Outdoor inverters with integrated DCAC cabinet.
- Symmetrical indoor inverters, with the connection cabinet on the opposite side, to make it possible to install two inverters facing each other, with a common power supply point.



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**Long-lasting design**

The inverters have been designed to guarantee a service life of more than 20 years, as demonstrated by the stress tests they are subjected to. Standard 5 year warranty, extendable for up to 25 years.

**Grid support**

The INGECON® SUN PowerMax family has been designed to comply with the grid connection requirements in different countries, contributing to the quality and stability of the electricity system. These inverters therefore feature a low voltage ride-through capability, and can deliver reactive power and control the active power delivered to the grid.

**Ease of maintenance**

Easily replaceable modular power blocks for shorter maintenance times.

**Easy to operate**

The INGECON® SUN PowerMax inverters feature an LCD screen for the simple and convenient monitoring of the inverter status and a range of internal variables. The display also includes a number of LEDs to show the inverter operating status with warning lights to indicate any incidents. All this helps to simplify and facilitate maintenance tasks.

**Monitoring and communication**

RS-485 communications supplied as standard. Ethernet, Bluetooth and GSM / GPRS are also available. The following applications are included at no extra cost: INGECON® SUN Manager, INGECON® SUN Monitor and its Smartphone version iSun Monitor, available on the App Store. These applications are used for monitoring and recording the inverter's internal operating variables through the Internet (alarms, real time production, etc.), in addition to the historical production data.

PROTECTIONS

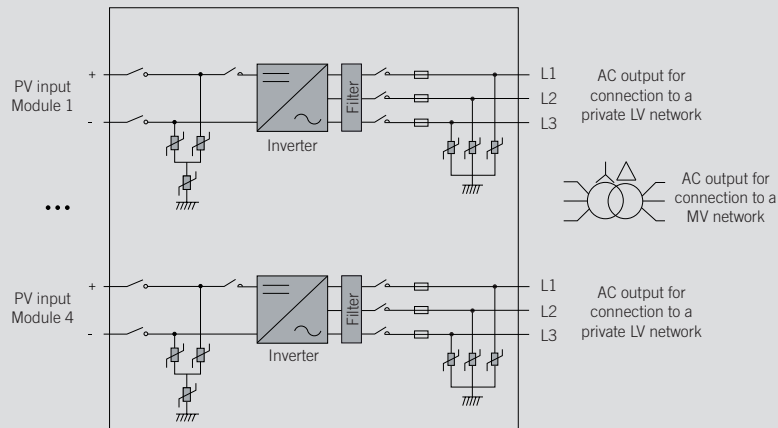
For each power module:

- Reverse polarity.
- Short-circuits and overloads at the output.
- Anti-islanding system with automatic disconnection.
- DC load breaker with door control.
- DC isolation monitor.
- DC and AC surge arresters, type 2.
- DC contactor for the automatic disconnection of the inverter from the PV array.

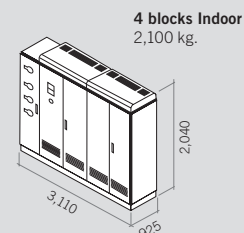
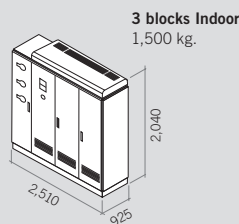
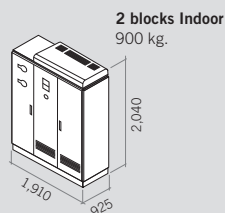
OPTIONAL ACCESSORIES

- AC thermal magnetic breaker monitoring kit.
- Inter-inverter communication via Ethernet, Bluetooth or GSM / GPRS.
- Insulation failure AC.
- Kit for operating at ambient temperatures of -30 °C.
- Low voltage ride-through kit.
- Extendable up to 4 pairs of fuse holders per power block.

**PowerMax M DC**



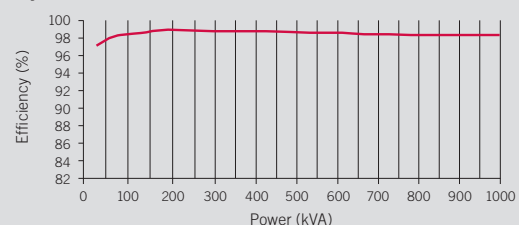
**Size and weight (mm)**



	500TL M400 DC Indoor	750TL M400 DC Indoor	1000TL M400 DC Indoor
<b>Input (DC)</b>			
Recommended PV array power range <sup>(1)</sup>	515.8 - 662.9 kWp	773.7 - 994.4 kWp	1,031.6 - 1,325.7 kWp
Voltage Range MPP	581 - 820 V	581 - 820 V	581 - 820 V
Maximum voltage <sup>(2)</sup>	1,050 V	1,050 V	1,050 V
Maximum current	900 A	1,350 A	1,800 A
N° inputs with fuse holders	8	12 (extendable up to 16)	12 (extendable up to 16)
Fuse dimensions <sup>(3)</sup>	63 A / 1,000 V to 400 A / 1,000 V fuses		
Type of connection	Connection to copper bars		
Power blocks	2	3	4
MPPT <sup>(4)</sup>	2	3	4
Max. current at each input	From 40 A to 260 A for positive and negative poles		
<b>Input protections</b>			
Overvoltage protections	Type 2 surge arresters		
DC switch	Yes, manual DC switch with door control and automatic DC contactor		
Other protections	Reverse polarity / Insulation failure monitoring / Anti-islanding protection		
<b>Output (AC)</b>			
Power @30 °C / @45 °C <sup>(5)</sup>	554.3 kVA / 509.9 kVA	831.4 kVA / 764.9 kVA	1,108.5 kVA / 1,019.8 kVA
Current @30 °C / @45 °C	800 A / 736 A	1,200 A / 1,104 A	1,600 A / 1,472 A
Rated voltage	400 V IT System	400 V IT System	400 V IT System
Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Phi Cosine <sup>(6)</sup>	1	1	1
Phi Cosine adjustable	Yes. S <sub>max</sub> =554.3 kVA	Yes. S <sub>max</sub> =831.4 kVA	Yes. S <sub>max</sub> =1,108.5 kVA
THD (Total Harmonic Distortion) <sup>(7)</sup>	<3%	<3%	<3%
<b>Output protections</b>			
Overvoltage protections	Type 2 surge arresters		
Anti-islanding protection	Yes, with automatic disconnection (for each power stage)		
Other protections	AC short circuits and overloads		
<b>Features</b>			
Maximum efficiency	99.1%	99.1%	99.1%
Euroefficiency	98.7%	98.7%	98.7%
Stand-by consumption <sup>(8)</sup>	60 W	90 W	120 W
Consumption at night	60 W	90 W	120 W
<b>General Information</b>			
Ambient temperature	-20 °C to +55 °C	-20 °C to +55 °C	-20 °C to +55 °C
Relative humidity (non-condensing)	0 - 95%	0 - 95%	0 - 95%
Protection class	IP20	IP20	IP20
Maximum altitude <sup>(9)</sup>	3,000 m	3,000 m	3,000 m
Cooling system	Air forced with temperature control (230 V phase + neutral power supply)		
Air flow	2,670 m <sup>3</sup> /h (fans: 1,000 VA)	4,640 m <sup>3</sup> /h (fans: 1,300 VA)	5,340 m <sup>3</sup> /h (fans: 1,500 VA)
Acoustic emission	< 67 dB (A) at 1 m with fans working at maximum power		
Marking	CE		
EMC and security standards	EN 61000-6-1, EN 61000-6-2, EN 61000-6-4, EN 61000-3-11, EN 61000-3-12, EN 62109-1, EN 62109-2, IEC62103, EN 50178, FCC Part 15, AS3100		
Grid connection standards	IEC 62116, Arrêté 23-04-2008, CEI 0-16 Ed. III, Terna A68, G59/2, BDEW-Mittelspannungsrichtlinie:2011, P.O.12.3, South African Grid code (ver 2.6), Chilean Grid Code, Romanian Grid Code, Ecuadorian Grid Code, Peruvian Grid code, IEEE 929, Thailand MEA & PEA requirements, IEC61727, UNE 206007-1, ABNT NBR 16149, ABNT NBR 16150, IEEE 1547, IEEE1547.1, GGC&CGC China, DEWA (Dubai) Grid Code, Jordan Grid Code		

**Notes:** <sup>(1)</sup> Depending on the type of installation and geographical location. Data for STC conditions <sup>(2)</sup> Consider the voltage increase of the 'Voc' at low temperatures <sup>(3)</sup> For other configurations, consult with Ingeteam <sup>(4)</sup> The MPPT connected to the same transformer through TL inverters must have the same voltage configuration <sup>(5)</sup> For each °C of increase between 30 °C and 45 °C, the output power will be reduced at the rate of 0.57% / °C. Over 45 °C, the output power will be reduced at the rate of 1.8% / °C <sup>(6)</sup> For P<sub>out</sub>>25% of the rated power <sup>(7)</sup> For P<sub>out</sub>>25% of the rated power and voltage in accordance with IEC 61000-3-4 <sup>(8)</sup> Consumption from PV field <sup>(9)</sup> Over 1,000 m temperature for rated power is reduced at the rate of 4.5 °C for each 1,000 m.

**Efficiency INGECON® SUN 1000TL M400** V<sub>dc</sub> = 650 V





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