



## 2.5TL M / 3TL M / 3.3TL M / 3.68TL M / 4.6TL M / 5TL M / 6TL M

Single-phase TL inverter with a double MPPT system

The INGECON® SUN 1Play TL M inverters have been designed to maximize the power generation and also to facilitate user access to the PV plant. This solar inverter family is valid for low kilowatt residential applications, and also for decentralized commercial and industrial systems rated up to several hundred kilowatts.

In domestic installations, these inverters present the great advantage of being compatible with 30 mA RCDs, the most commonly used to protect the people against electric discharges.

### High efficiency system

Ingeteam has developed its own technology to maximize the efficiency rates of the INGECON® SUN 1Play TL M inverter family.

Thanks to this *High efficiency system* and to the use of innovative electronic conversion topologies, values of up to 98% can be achieved. Furthermore, an advanced double-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 shadings.

### Easy to install

The INGECON® SUN 1Play TL M inverters feature fast-on connectors on the DC side (type 4) and the AC side for a fast and easy connection to the system. Every country-specific configuration and language can be easily selected from the inverter screen. Moreover, the INGECON® SUN 1Play TL M inverters are compatible with all the PV module technologies on the market.

### Simple operation and maintenance

Ingeteam is at the forefront of innovative firmware. As a result, the INGECON® SUN 1Play TL M inverters are extremely easy to operate. The menu displayed on the LCD screen has been designed so that it is simple and easy to use. These inverters feature an internal datalogger for several months data storage, accessible from a PC.

Every inverter can be accessed from either a remote PC or onsite from the inverter front touch key-pad through its LCD screen. The display also features a number of LEDs to indicate the inverter operating status.

These LED indicators light up whenever any incident is detected, thereby simplifying and facilitating equipment maintenance tasks.

### Firmware updating

The INGECON® SUN 1Play TL M inverters allow the user to perform the firmware (FW) updating himself. It is as easy as to download the latest version of the firmware from the Ingeteam website: [www.ingeteam.com](http://www.ingeteam.com), and update it using a simple SD memory card.

### Monitoring and communication

The internal operating variables and the internal datalogger can be monitored through a number of media such as USB communications, supplied as standard. Also, RS-485, Ethernet, Wi-Fi, and 3G communications are available upon demand.

Included at no extra cost are the INGECON® SUN Manager, INGECON® SUN Monitor and its Smartphone version iSun

Monitor -available on the App Store- for monitoring and recording the inverter data over the Internet.

### Able to withstand extreme conditions

The INGECON® SUN 1Play TL M inverter housing is suitable for outdoor use (IP65 protection rating). Likewise, it can be used under extreme atmospheric conditions with temperature ranges from -25 °C to +65 °C, although its main cooling system is air convection.

### SiC technology

This solar inverter presents silicon carbide (SiC) components. SiC technology allows higher efficiency levels and also a more reliable, light and compact equipment.

### Long life expectancy

Ingeteam takes every care in the selection and sizing of the electronic components used for its inverters. The 1Play inverters have been designed to guarantee a long life expectancy, as demonstrated as demonstrated by the stress tests they are subjected to.

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

#### PROTECTIONS

- Reverse polarity.
- Input and output overvoltages with type 3 surge arresters.
- Output shortcircuits and overloads.
- Anti-islanding with automatic disconnection.
- Insulation failures.

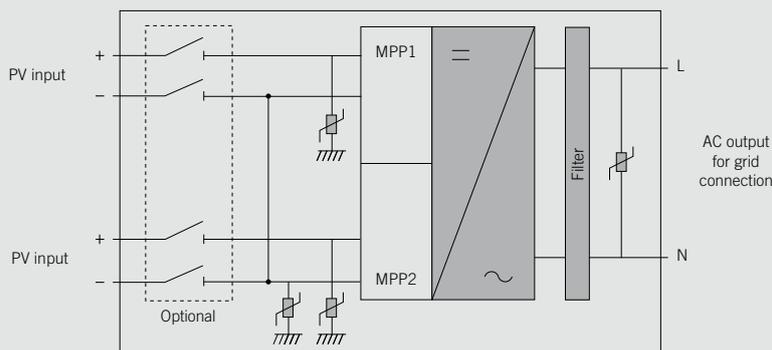
#### MAIN FEATURES

- Compatible with 30 mA RCDs.
- Double-MPPT system.
- Available from 2.5 up to 6 kW.
- 98% maximum efficiency.
- SiC Technology inside.
- Inverter updating by the user through a SD memory card.
- USB communications supplied as standard.
- Two digital inputs as standard.
- Software INGECON® SUN Manager for PV plant access and data registration.
- Software INGECON® SUN Monitor for PV plant monitoring.
- LCD Display.
- Easy maintenance.
- Suitable for indoor and outdoor installations (IP65).
- Display-configurable potential free contact, to indicate insulation fault or grid connection.
- Compact design.
- Language, Country Code and rated voltage configurable by display.

#### OPTIONAL ACCESSORIES

- Inverter communication via RS-485, Ethernet, Wi-Fi or 3G.
- DC switch.
- INGECON® SUN WeatherBox for meteorological values measurement and registration.
- Four additional digital inputs.
- Self-consumption kit.

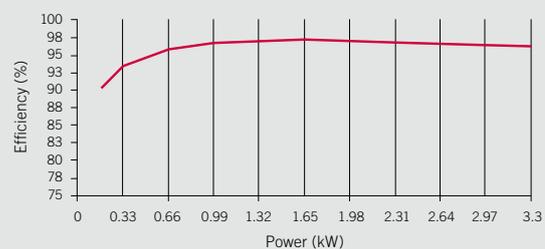
### 1Play TL M



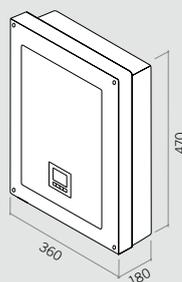
	2.5TL M	3TL M	3.3TL M	3.68TL M
<b>Input (DC)</b>				
Recommended PV array power range <sup>(1)</sup>	2.8 - 3.3 kWp	3.2 - 4 kWp	3.8 - 4.4 kWp	3.9 - 4.8 kWp
Voltage range MPP1 <sup>(2)</sup>	125 - 750 V			
Voltage range MPP2 <sup>(2) (3)</sup>	90 - 750 V			
Maximum voltage <sup>(4)</sup>	850 V			
Maximum current (Input 1 / Input 2)	11 / 11 A			
Inputs (Input 1 / Input 2) <sup>(5)</sup>	1 / 1			
MPPT	2			
<b>Output (AC)</b>				
Rated power	2.5 kW	3 kW	3.3 kW	3.68 kW
Max. temperature at rated power <sup>(6)</sup>	60 °C	55 °C	52 °C	50 °C
Maximum current	16 A			
Rated voltage	230 V			
Voltage range	122 - 265 V			
Frequency	50 / 60 Hz			
Power Factor	1			
Power Factor adjustable	Yes. Smax=2.5 kVA	Yes. Smax=3 kVA	Yes. Smax=3.3 kVA	Yes. Smax=3.68 kVA
THD	<3%			
<b>Efficiency</b>				
Maximum efficiency	97.6%	97.7%	97.7%	97.8%
Euroefficiency	97.3%	97.4%	97.4%	97.5%
<b>General Information</b>				
Refrigeration system	Air convection			
Stand-by consumption <sup>(7)</sup>	<10 W			
Consumption at night	0 W			
Ambient temperature	-25 °C to +65 °C			
Relative humidity (non-condensing)	0 - 100%			
Protection class	IP65			
Marking	CE			
EMC & Security standards	EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, 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	RD1699/2011, DIN V VDE V 0126-1-1, EN 50438, CEI 0-21, VDE-AR-N 4105:2011-08, G59/2, G83/2 <sup>(8)</sup> , P.O.12.3, AS4777.2, AS4777.3, IEC 62116, IEC 61727, UNE 206007-1, ABNT NBR 16149, ABNT NBR 16150, South African Grid code, Chilean Grid Code, Romanian Grid Code, Ecuadorian Grid Code, Peruvian Grid code, IEEE 929, Thailand MEA & PEA requirements, DEWA (Dubai) Grid Code, Jordan Grid Code			

**Notes:** <sup>(1)</sup> Depending on the type of installation and geographical location <sup>(2)</sup> The output power will be conditioned by the voltage and current configuration selected at each input <sup>(3)</sup> To drop to 90 V, the other input must be at least at 125 V <sup>(4)</sup> Must not be exceeded under any circumstances. Consider the voltage increase of the 'Voc' at low temperatures <sup>(5)</sup> Optionally, the DC inputs could be duplicated <sup>(6)</sup> For each °C of increase, the output power will be reduced at the rate of 1.8% <sup>(7)</sup> Consumption from PV field <sup>(8)</sup> Related only inverters up to 16 A.

#### Efficiency INGECON® SUN 3.3TL M V<sub>dc</sub> = 680 V



#### Size and weight (mm)

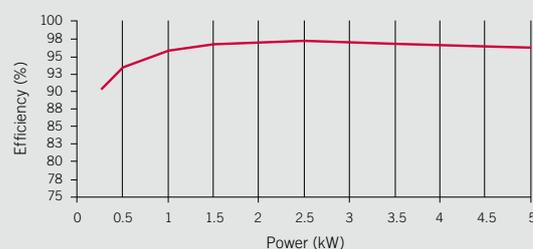


2.5TL M / 3TL M / 3.3TL M / 3.68TL M  
20 kg.

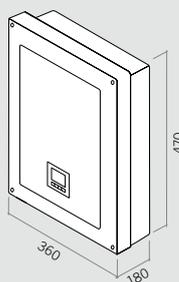
	4.6TL M	5TL M	6TL M
<b>Input (DC)</b>			
Recommended PV array power range <sup>(1)</sup>	5.2 - 6 kWp	5.7 - 6.5 kWp	6.3 - 7 kWp
Voltage range MPP1 <sup>(2)</sup>	125 - 750 V		
Voltage range MPP2 <sup>(2) (3)</sup>	90 - 750 V		
Maximum voltage <sup>(4)</sup>	850 V		
Maximum current (Input 1 / Input 2)	11 / 11 A		
Inputs (Input 1 / Input 2) <sup>(5)</sup>	1 / 1		
MPPT	2		
<b>Output (AC)</b>			
Rated power	4.6 kW	5 kW	6 kW
Max. temperature at rated power <sup>(6)</sup>	58 °C	55 °C	45 °C
Maximum current	26.2 A		
Rated voltage	230 V		
Voltage range	122 - 265 V		
Frequency	50 / 60 Hz		
Power Factor	1		
Power Factor adjustable	Yes. Smax=4.6 kVA	Yes. Smax=5 kVA	Yes. Smax=6 kVA
THD	<3%		
<b>Efficiency</b>			
Maximum efficiency	97.9%	98%	98%
Euroefficiency	97.5%	97.6%	97.6%
<b>General Information</b>			
Refrigeration system	Air convection		
Stand-by consumption <sup>(7)</sup>	<10 W		
Consumption at night	0 W		
Ambient temperature	-25 °C to +65 °C		
Relative humidity (non-condensing)	0 - 100%		
Protection class	IP65		
Marking	CE		
EMC & Security standards	EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, 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	RD1699/2011, DIN V VDE V 0126-1-1, EN 50438, CEI 0-21, VDE-AR-N 4105:2011-08, G59/2, G83/2 <sup>(8)</sup> , P.O.12.3, AS4777.2, AS4777.3, IEC 62116, IEC 61727, UNE 206007-1, ABNT NBR 16149, ABNT NBR 16150, South African Grid code, Chilean Grid Code, Romanian Grid Code, Ecuadorian Grid Code, Peruvian Grid code, IEEE 929, Thailand MEA & PEA requirements, DEWA (Dubai) Grid Code, Jordan Grid Code		

**Notes:** <sup>(1)</sup> Depending on the type of installation and geographical location <sup>(2)</sup> The output power will be conditioned by the voltage and current configuration selected at each input <sup>(3)</sup> To drop to 90 V, the other input must be at least at 125 V <sup>(4)</sup> Must not be exceeded under any circumstances. Consider the voltage increase of the 'Voc' at low temperatures <sup>(5)</sup> Optionally, the DC inputs could be duplicated <sup>(6)</sup> For each °C of increase, the output power will be reduced at the rate of 1.8% <sup>(7)</sup> Consumption from PV field <sup>(8)</sup> Related only inverters up to 16 A.

#### Efficiency INGECON® SUN 5TL M V<sub>dc</sub> = 680 V



#### Size and weight (mm)



4.6TL M / 5TL M / 5.5TL M / 6TL M  
21 kg.



## 2.8TL U M / 3.3TL U M / 5TL U M / 6TL U M

Single-phase TL inverter with a double MPPT system

The INGECON® SUN 1Play TL U M inverters have been designed to maximize the power generation and also to facilitate user access to the PV plant. This solar inverter family is valid for low kilowatt residential applications, and also for decentralized commercial and utility-scale systems rated up to several hundred kilowatts. In domestic installations, these inverters present the great advantage of integrating an arc fault circuit interruption system (AFCI). Moreover, they are compatible with 30 mA RCDs, the most commonly used to protect the people against electric discharges.

### High efficiency system

Ingeteam has developed its own technology to maximize the efficiency rates of the INGECON® SUN 1Play TL U M inverter family. Thanks to this high efficiency system and to the use of innova-

tive electronic conversion topologies, values of up to 98.9% can be achieved. Furthermore, an advanced double-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 shadings.

### Easy to install

Every country-specific configuration and language can be easily selected from the inverter screen. Moreover, the INGECON® SUN 1Play TL U M inverters are compatible with all the PV module technologies on the market.

### Simple operation and maintenance

Ingeteam is at the forefront of innovative firmware. As a result, the INGECON® SUN 1Play TL U M inverters are extremely easy to operate. The menu displayed on the LCD screen has been designed so that it is simple and easy to

use. These inverters feature an internal datalogger for several months data storage, accessible from a PC. Every inverter can be accessed from either a remote PC or on-site from the inverter front touch keypad through its LCD screen. The display also features a number of LEDs to indicate the inverter operating status. These LED indicators light up whenever any incident is detected, thereby simplifying and facilitating equipment maintenance tasks.

### Firmware updating

The INGECON® SUN 1Play TL U M inverters allow the user to perform the firmware (FW) updating himself. It is as easy as to download the latest version of the firmware from the Ingeteam website: [www.ingeteam.com](http://www.ingeteam.com), and update it using a simple SD memory card. These photovoltaic inverters feature a SD input slit to facilitate the firmware updating by the user.



## TL U M Series

### Monitoring and communication

The internal operating variables and the internal datalogger can be monitored through a number of media such as USB communications, supplied as standard. Also, RS-485, Ethernet, Wi-Fi, and GSM / GPRS communications are available upon demand. Included at no extra cost are the INGECON® SUN Manager, INGECON® SUN Monitor and its Smartphone version Web Monitor -available on the App Store- for monitoring and recording the inverter data over the Internet.

### Able to withstand extreme conditions

The INGECON® SUN 1Play TL U M inverter housing is suitable for outdoor use (NEMA 4). Likewise, it can be used under extreme atmospheric conditions with temperature ranges from -13 °F to +149 °F, although its main cooling system is natural air convection.

### SiC technology

This solar inverter presents silicon carbide (SiC) components. SiC technology allows higher efficiency levels and also a more reliable, light and compact equipment.

### Easy rooftop installation

Vertical or horizontal mounting, enabling the location of the inverter next to the PV modules and avoiding the installation of any additional rapid shutdown device.

### Standard 10 year warranty, extendable for up to 20 years

#### OPTIONAL ACCESSORIES

- Inverter communication via RS-485, Ethernet or GSM / GPRS.
- Combiner Box with DC switch.
- INGECON® SUN WeatherBox for meteorological values measurement and registration.
- Four additional digital inputs.
- Self-consumption kit.

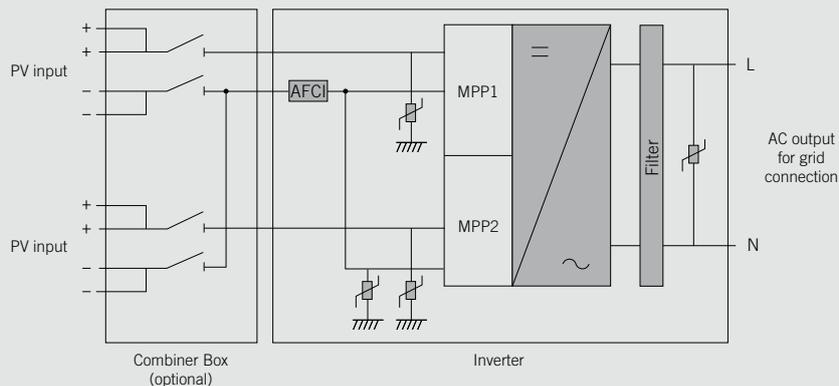
#### PROTECTIONS

- Reverse polarity.
- Input and output overvoltages with type 3 surge arresters.
- Out shortcircuits and overloads.
- Anti-islanding with automatic disconnection.
- Insulation failures.

#### MAIN FEATURES

- AFCI (Arc Fault Circuit Interrupt).
- Compatible with 30 mA RCDs.
- Easy rooftop installation.
- Double-MPPT system.
- Available from 2.8 up to 6 kW.
- 98.9% maximum efficiency.
- SiC Technology inside.
- Inverter updating by the user through a SD memory card.
- USB communications.
- Two digital inputs as standard.
- Software INGECON® SUN Manager for PV plant access and data registration.
- Software INGECON® SUN Monitor for PV plant monitoring.
- LCD Display.
- Easy maintenance.
- Suitable for indoor and outdoor installations (NEMA 4).
- Display-configurable potential free contact, to indicate insulation fault or grid connection.
- Compact design.
- Plug & Play technology.
- Language, Country Code and rated voltage configurable by display.

### 1Play TL U M



### Combiner Box

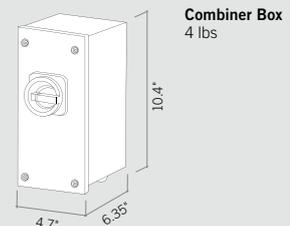
The Combiner Box is supplied with two inputs per MPPT, DC switch.

#### COMBINER BOX MAIN FEATURES

- DC switch.
- 2 MPPTs (2 inputs per MPPT).
- Fuses not required, according to NEC 2014 690.9.



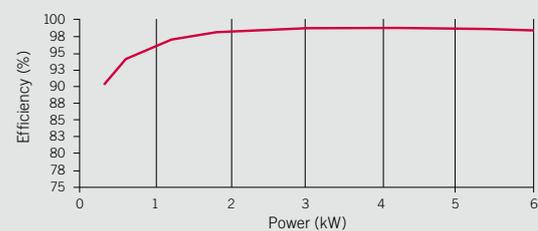
### Size and weight (inches)



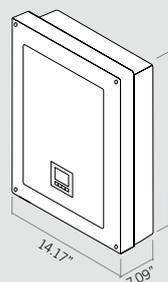
	2.8TL U M	3.3TL U M	5TL U M	6TL U M
<b>Input (DC)</b>				
Recommended PV array power range <sup>(1)</sup>	2.8 - 3.6 kW	3.4 - 4.3 kW	5.1 - 6.5 kW	6.1 - 7.8 kW
Voltage range MPP <sup>(2)</sup>	125 - 750 V			
Voltage range MPP2 <sup>(2)(3)</sup>	90 - 750 V			
Maximum voltage <sup>(4)</sup>	850 V			
Maximum current (Input 1 / Input 2)	11 / 11 A			
Inputs (Input 1 / Input 2)	1 / 1			
MPPT	2			
<b>Output (AC)</b>				
Rated power	2.8 kW	3.3 kW	5 kW	6 kW
Max. temperature at rated power <sup>(5)</sup>	113 °F			
Maximum current	16 A	16 A	26.2 A	26.2 A
Rated voltage	208 / 240 V	208 / 240 V	208 / 240 V	240 V
Frequency	60 Hz			
Power Factor	1			
Power Factor adjustable	Yes. Smax=2.8 kVA	Yes. Smax=3.3 kVA	Yes. Smax=5 kVA	Yes. Smax=6 kVA
THD	<3%			
<b>Efficiency</b>				
Maximum efficiency	98.6%	98.5%	98.4%	98.9%
CEC - Weighted efficiency	97%	97.5%	97.5%	98%
<b>General Information</b>				
Refrigeration system	Natural air convection		Forced ventilation	
Stand-by consumption <sup>(6)</sup>	<10 W			
Consumption at night	0 W			
Ambient temperature	-13 °F to 149 °F			
Relative humidity (non-condensing)	0 - 100%			
Protection class	NEMA 4			
DC AFCI	✓			
Marking	CE, ETL			
EMC & Security standards	UL1741, FCC Part 15, IEEE C37.90.1, IEEE C37.90.2			
Grid connection standards	IEC 62116, UL1741, IEEEE1547, IEEEE1547.1, NEC CODE			

**Notes:** <sup>(1)</sup> Depending on the type of installation and geographical location <sup>(2)</sup> The output power will be conditioned by the voltage and current configuration selected at each input <sup>(3)</sup> To drop to 90 V, the other input must be at least at 125 V <sup>(4)</sup> Must not be exceeded under any circumstances. Consider the voltage increase of the 'Voc' at low temperatures <sup>(5)</sup> The output power will be reduced at the rate of 1% for each 1 °F of increase <sup>(6)</sup> Consumption from PV field.

#### Efficiency INGECON® SUN 6TL U M V<sub>dc</sub> = 680 V



#### Size and weight (mm)



**2.8TL U M / 3.3TL U M**  
44.1 pounds

**5TL U M / 6TL U M**  
46.3 pounds



## 10TL / 15TL / 20TL / 28TL / 33TL

Three-phase TL inverters with the maximum efficiency at the best price

A three-phase inverter family for domestic, industrial and large-scale PV plants.

### **Maximum efficiency at the best price**

A single DC-to-AC power conversion stage with an advanced single maximum power point tracking system (MPPT), that makes it possible to harness the maximum energy from the PV array at the most competitive price.

### **Plug & Play technology**

Extremely easy to install. The inverter connection is fast and simple. The country-specific configuration and language can be easily selected from the inverter screen.

### **Rugged design**

Steel casing, especially designed for indoor and outdoor applications (IP65). Able to withstand extreme temperatures.

The INGECON® SUN 3Play TL inverters have been designed to guarantee a long life expectancy, as demonstrated by the stress tests they are subjected to.

### **Ease of maintenance**

Internal datalogger for up to 3 months data storage. Control either from a remote PC or on-site from the inverter front keypad. Status and alarm LED indicators. LCD screen.

### **Easy to operate**

The INGECON® SUN 3Play TL inverters feature a LCD screen for the simple and convenient monitoring of the inverter status and a range of internal variables. The display also includes three LEDs to show the inverter operating status.

All this helps to simplify and facilitate maintenance tasks.

### **Software included**

Included at no extra cost are the INGECON®SUN Manager, INGECON®SUN Monitor and its smartphone version Web Monitor for monitoring and recording the inverter data over the internet. RS-485 communications are supplied as standard. In addition, users can download the latest version of the firmware from the Ingeteam website: [www.ingeteam.com](http://www.ingeteam.com), and update it using a simple SD memory card.

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



## TL Series

### Different versions to choose from

In order to satisfy its clients' needs, Ingeteam has created different versions for the INGECON® SUN 3Play TL family:

- "S": Standard version
- "S+": Advanced Standard version
- "P": Premium version
- "P+": Advanced Premium version

All the versions are supplied with DC and AC surge arresters type 3. The "S" version represents the most basic model of all. It features a single MPPT input with terminal blocks. The Advanced Standard version also integrates a DC switch.

On the other hand, the Premium version includes two options for DC connection: conventional terminal blocks or fused and monitored PV connectors.

Moreover, it also features DC fuses, the input current measuring kit and a DC switch. The Advanced Premium version "P+" is supplied with DC surge arresters, type 2.

### MAIN FEATURES

- MPPT system.
- 98.5% maximum efficiency.
- Digital inputs.
- RS-485 communications supplied as standard.
- Inverter firmware updating by the user through a SD memory card.
- Software INGECON® SUN Manager for PV plant access and data registration.
- Software INGECON® SUN Monitor for PV plant monitoring.
- LCD display.
- Easy maintenance.
- Display-configurable potential-free contact, to indicate insulation fault or grid connection.
- Plug & Play technology.
- Suitable for indoor and outdoor installations (IP65).
- High temperature performance.
- Different versions to satisfy every project needs.
- Compact design.
- Language, rated voltage and Country Code configurable by display.

### PROTECTIONS

- Reverse polarity.
- Shortcircuits and overloads at the output.
- Anti-islanding with automatic disconnection.
- Insulation faults.
- Input and output overvoltages with type 3 surge arresters.

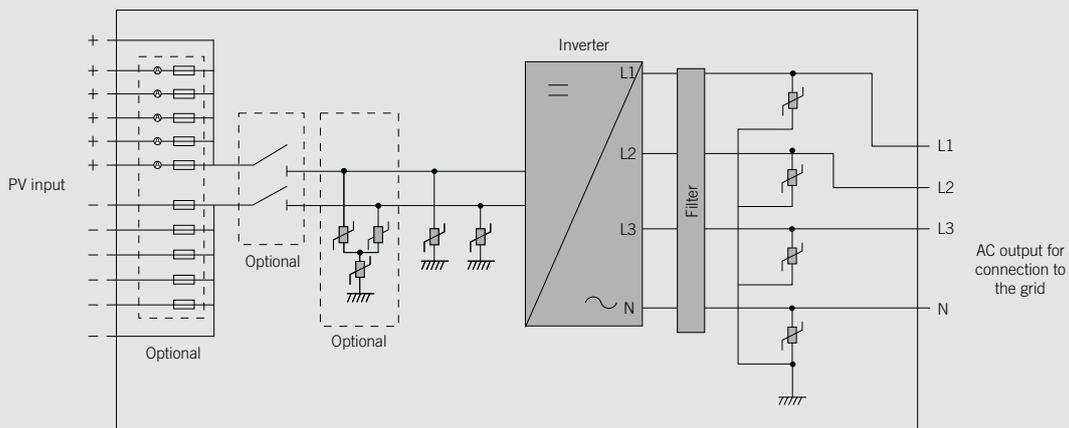
### OPTIONAL ACCESSORIES

- Inverter communication via Ethernet, GSM / GPRS or Wi-Fi. A second RS-485 communication card is available.
- Self-consumption kit.

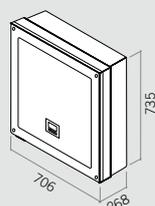
### BENEFITS

- The best possible price.
- High efficiency rates.
- Easy maintenance.

### 3Play TL P+ version (33 kW)



### Size and weight (mm)



**10TL / 15TL / 20TL**  
46.8 kg.

**28TL / 33TL**  
51.5 kg.

	10TL	15TL	20TL	28TL	33TL
<b>Input (DC)</b>					
Recommended PV array power range <sup>(1)</sup>	10.3 - 13.4 kW	15.5 - 20.1 kW	20.6 - 26.8 kW	28.9 - 37.5 kW	34 - 45 kW
Voltage range MPP <sup>(2)</sup>	560 - 820 V				
Min. voltage for P <sub>nom</sub> at rated Vac	560 V				
Maximum voltage <sup>(3)</sup>	1,000 V				
Maximum current <sup>(4)</sup>	19 A	28 A	37 A	52 A	61 A
Inputs with terminal blocks (Input 1 / Input 2)	1				
Inputs with PV connectors (Input 1 / Input 2) <sup>(5)</sup>	5	5	5	8	8
MPPT	1				
<b>Output (AC)</b>					
Rated power	10 kW	15 kW	20 kW	28 kW	33 kW
Max. temperature at rated power <sup>(6)</sup>	55 °C	55 °C	55 °C	51 °C	51 °C
Maximum current	15 A	22 A	29 A	41 A	48 A
Rated voltage	400 V				
Voltage range	187 - 528 V	187 - 528 V	187 - 528 V	304 - 528 V	304 - 528 V
Frequency	50 / 60 Hz				
Power Factor	1				
Power Factor adjustable	Yes. S <sub>max</sub> =10 kVA; Q <sub>max</sub> =10 kVAR	Yes. S <sub>max</sub> =15 kVA; Q <sub>max</sub> =15 kVAR	Yes. S <sub>max</sub> =20 kVA; Q <sub>max</sub> =20 kVAR	Yes. S <sub>max</sub> =28 kVA; Q <sub>max</sub> =20 kVAR	Yes. S <sub>max</sub> =33 kVA; Q <sub>max</sub> =20 kVAR
THD	<3%				
<b>Efficiency</b>					
Maximum efficiency	98.5%				
Euroefficiency	98.3%	98.4%	98.3%	98.3%	98.3%
<b>General Information</b>					
Refrigeration system	Forced ventilation				
Air flow	200 m <sup>3</sup> /h	200 m <sup>3</sup> /h	200 m <sup>3</sup> /h	400 m <sup>3</sup> /h	400 m <sup>3</sup> /h
Stand-by consumption <sup>(7)</sup>	10 W				
Consumption at night	1 W				
Ambient temperature	-25 °C to 65 °C				
Relative humidity (non-condensing)	0 - 100%				
Protection class	IP65				
Marking	CE				
EMC and security standards	EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, EN 61000-3-2, EN 61000-3-3, EN 61000-3-11, EN 61000-3-12, EN 62109-1, EN 62109-2, IEC62103, EN 50178, FCC Part 15, AS3100				
Grid connection standards	RD1699/2011, DIN V VDE V 0126-1-1, EN 50438, CEI 0-16 Ed. III, CEI 0-21, VDE-AR-N 4105:2011-08, G59/2, G83/2 <sup>(8)</sup> , P.O.12.3, AS4777.2, AS4777.3, IEC 62116, IEC 61727, UNE 206007-1, ABNT NBR 16149, ABNT NBR 16150, South African Grid code, Chilean Grid Code, Romanian Grid Code, Ecuadorian Grid Code, Peruvian Grid code, IEEE 929, Thailand MEA & PEA requirements, DEWA (Dubai) Grid Code, Jordan Grid Code				
<b>Versions available</b>					
<b>Standard version</b>	S		✓	✓	✓
	S+		✓	✓	✓
<b>Premium version</b>	P	✓	✓	✓	✓
	P+		✓	✓	✓

	Standard version		Premium version	
	S	S+	P	P+
Terminal blocks	✓	✓	✓ <sup>(*)</sup>	✓ <sup>(*)</sup>
PV connectors			✓	✓
DC switch		✓	✓	✓
DC surge arresters, type 2				✓
DC and AC surge arresters, type 3	✓	✓	✓	✓
DC fuses			✓	✓
Current measuring kit			✓	✓

<sup>(\*)</sup> Terminal blocks not available for the Premium versions of the INGECON® SUN 28TL and 33TL inverters.

**Notes:** <sup>(1)</sup> Depending on the type of installation and geographical location <sup>(2)</sup>  $V_{mpp,min} = 560$  V when  $V_{ac} = 400$  V. Otherwise:  $V_{mpp,min} = 1.4 \times V_{ac}$  <sup>(3)</sup> Must not be exceeded under any circumstances. Consider the voltage increase of the 'Voc' at low temperatures <sup>(4)</sup> The maximum current per PV connector is 11 A for Premium versions <sup>(5)</sup> Branch plugs and sockets available to connect two cables to each input <sup>(6)</sup> For each °C of increase, the output power will be reduced at the rate of 1.8% <sup>(7)</sup> Consumption from PV field <sup>(8)</sup> Related only to inverters up to 16 A.

**Efficiency INGECON® SUN 20TL**  $V_{dc} = 600$  V





## 10TL M / 15TL M / 20TL M / 28TL M / 33TL M / 24TL M480 / 40TL M480

Maximum efficiency with Multi-MPPT three-phase technology

A three-phase inverter family for domestic, industrial and large-scale PV plants.

### Maximum efficiency with two independent MPPT inputs

A single DC-to-AC power conversion stage with an advanced maximum power point tracking system (MPPT), making it possible to harness the maximum energy from the PV array at all times, including difficult situations such as scattered clouds and partial shading. Great flexibility for configuring the solar array, thanks to the two independent MPPT trackers with a wide input voltage range. Moreover, it enables to connect different DC input powers to each MPP tracker (asymmetric configuration).

### Plug & Play technology

Extremely easy to install. The inverter connection is fast and simple. The

country-specific configuration and language can be easily selected from the inverter screen.

### Rugged design

Steel casing, especially designed for indoor and outdoor applications (IP65). Able to withstand extreme temperatures. The 3Play TL M inverters have been designed to guarantee a service life of more than 20 years, as demonstrated by the stress tests they are subjected to.

### Ease of maintenance

Internal datalogger for up to 3 months data storage. Control either from a remote PC or on-site from the inverter front keypad. Status and alarm LED indicators. LCD screen.

### Easy to operate

The INGECON® SUN 3Play TL M inverters feature a LCD screen for the simple and convenient monitoring of

the inverter status and a range of internal variables.

The display also includes three LEDs to show the inverter operating status. All this helps to simplify and facilitate maintenance tasks.

### Software included

Included at no extra cost are the INGECON® SUN Manager, INGECON® SUN Monitor and its smartphone version iSun Monitor for monitoring and recording the inverter data over the internet. In addition, users can download the latest version of the firmware from the Ingeteam website [www.ingeteam.com](http://www.ingeteam.com), and update it using a simple SD memory card. RS-485 communications are supplied as standard.

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

### Different versions to choose from

In order to satisfy its clients' needs, Ingeam has created different versions for the INGECON® SUN 3Play TL M family:

- "S": Standard version
- "S+": Advanced Standard version
- "P": Premium version
- "P+": Advanced Premium version

All the versions are supplied with DC and AC surge arresters type 3. The "S" version represents the most basic model of all. It features a double MPPT input with terminal blocks. The Advanced Standard version also integrates a DC switch.

On the other hand, the Premium version includes two options for DC connection: conventional terminal blocks or fused and monitored PV connectors.

Moreover, it also features DC fuses, the input current measuring kit and the DC. The Advanced Premium version "P+" is supplied with DC surge arresters, type 2.

#### MAIN FEATURES

- Double-MPPT system.
- 98.5% maximum efficiency.
- Digital inputs.
- RS-485 communications supplied as standard.
- Inverter firmware updating by the user through a SD memory card.
- Software INGECON® SUN Manager for PV plant access and data registration.
- Software INGECON® SUN Monitor for PV plant monitoring.
- LCD display.
- Easy maintenance.
- Display-configurable potential-free contact, to indicate insulation fault or grid connection.
- Plug & Play technology.
- Suitable for indoor and outdoor installations (IP65).
- High temperature performance.
- Different versions to satisfy every project needs.
- Compact design.
- Language, rated voltage and Country Code, rated voltage configurable by display.

#### PROTECTIONS

- Reverse polarity.
- Shortcircuits and overloads at the output.
- Anti-islanding with automatic disconnection.
- Insulation faults.
- Input and output overvoltages with type 3 surge arresters.

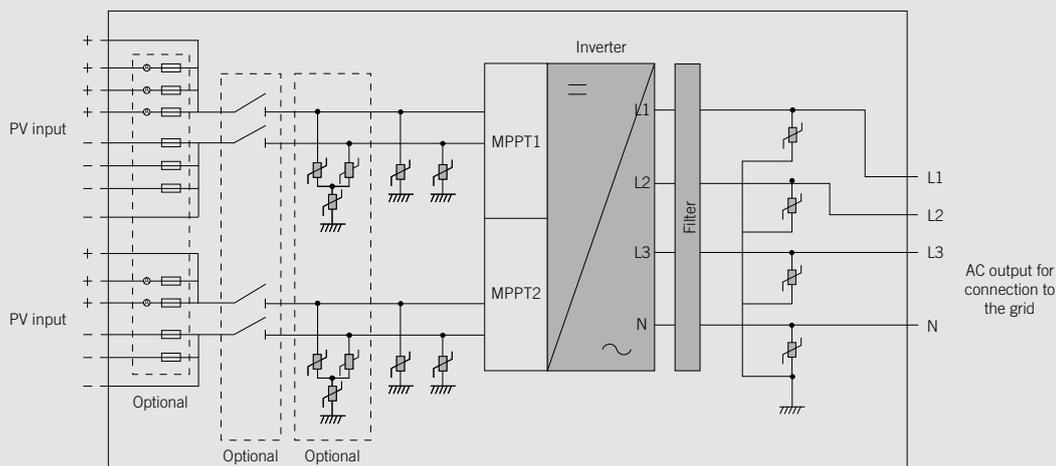
#### OPTIONAL ACCESORIES

- Inverter communication via Ethernet, GSM / GPRS or Wi-Fi. A second RS-485 communication card is available.
- Self-consumption kit.

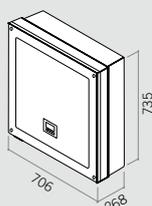
#### BENEFITS

- Greater performance thanks to the double MPPT system.
- Easy maintenance.
- Higher inverter life expectancy.

### 3Play TL M P+ version (20 kW)



### Size and weight (mm)



**10TL M / 15TL M / 20TL M / 24TL M480**  
57.8 kg.

**28TL M / 33TL M / 40TL M480**  
62.5 kg.

	10TL M	15TL M	20TL M	28TL M	33TL M	
<b>Input (DC)</b>						
Recommended PV array power range <sup>(1)</sup>	10.3 - 13.4 kW	15.5 - 20.1 kW	20.6 - 26.8 kW	28.9 - 37.5 kW	34 - 45 kW	
Voltage range MPP1 <sup>(2)</sup>	200 - 820 V					
Voltage range MPP2 <sup>(2)</sup>	200 - 820 V					
Maximum voltage <sup>(3)</sup>	1,000 V					
Maximum current (Input 1 / Input 2) <sup>(4)</sup>	30 / 20 A	30 / 20 A	30 / 20 A	40 / 40 A	40 / 40 A	
Inputs with terminal blocks (Input 1 / Input 2)	1 / 1					
Inputs with PV connectors (Input 1 / Input 2) <sup>(5)</sup>	3 / 2	3 / 2	3 / 2	5 / 5	5 / 5	
MPPT	2					
<b>Output (AC)</b>						
Rated power	10 kW	15 kW	20 kW	28 kW	33 kW	
Max. temperature at rated power <sup>(6)</sup>	55 °C	55 °C	55 °C	51 °C	51 °C	
Maximum current	15 A	22 A	29 A	41 A	48 A	
Rated voltage	400 V					
Voltage range	187 - 528 V	187 - 528 V	187 - 528 V	304 - 528 V	304 - 528 V	
Frequency	50 / 60 Hz					
Power Factor	1					
Power Factor adjustable	Yes. Smax=10 kVA; Qmax=10 kVAR	Yes. Smax=15 kVA; Qmax=15 kVAR	Yes. Smax=20 kVA; Qmax=20 kVAR	Yes. Smax=28 kVA; Qmax=20 kVAR	Yes. Smax=33 kVA; Qmax=20 kVAR	
THD	<3%					
<b>Efficiency</b>						
Maximum efficiency	98.5%					
Euroefficiency	98.3%					
<b>General Information</b>						
Refrigeration system	Forced ventilation					
Air flow	200 m³/h	200 m³/h	200 m³/h	400 m³/h	400 m³/h	
Stand-by consumption <sup>(7)</sup>	10 W					
Consumption at night	1 W					
Ambient temperature	-25 °C to 65 °C					
Relative humidity (non-condensing)	0 - 100%					
Protection class	IP65					
Marking	CE					
EMC and security standards	EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, EN 61000-3-2, EN 61000-3-3, EN 61000-3-11, EN 61000-3-12, EN 62109-1, EN 62109-2, IEC62103, EN 50178, FCC Part 15, AS3100					
Grid connection standards	RD1699/2011, DIN V VDE V 0126-1-1, EN 50438, CEI 0-16 Ed. III, CEI 0-21, VDE-AR-N 4105:2011-08, G59/2, G83/2 <sup>(8)</sup> , P.O.12.3, AS4777.2, AS4777.3, IEC 62116, IEC 61727, UNE 206007-1, ABNT NBR 16149, ABNT NBR 16150, South African Grid code, Chilean Grid Code, Romanian Grid Code, Ecuadorian Grid Code, Peruvian Grid code, IEEE 929, Thailand MEA & PEA requirements, DEWA (Dubai) Grid Code, Jordan Grid Code					
<b>Versions available</b>						
Standard version	S		✓	✓	✓	✓
	S+		✓	✓	✓	✓
Premium version	P	✓	✓	✓	✓	✓
	P+		✓	✓	✓	✓

	Standard version		Premium version	
	S	S+	P	P+
Terminal blocks	✓	✓	✓ (*)	✓ (*)
PV connectors			✓	✓
DC switch		✓	✓	✓
DC surge arresters, type 2				✓
DC and AC surge arresters, type 3	✓	✓	✓	✓
DC fuses			✓	✓
Current measuring kit			✓	✓

(\*) Terminal blocks not available for the Premium versions of the INGECON® SUN 28TL M, 33TL M and 40TL M480 inverters.

**Notes:** <sup>(1)</sup> Depending on the type of installation and geographical location <sup>(2)</sup> The output power will be conditioned by the voltage and current configuration selected at each input <sup>(3)</sup> Must not be exceeded under any circumstances. Consider the voltage increase of the 'Voc' at low temperatures <sup>(4)</sup> The maximum current per PV connector is 11 A for Premium versions <sup>(5)</sup> Branch plugs and sockets available to connect two cables to each input <sup>(6)</sup> For each °C of increase, the output power will be reduced at the rate of 1.8% <sup>(7)</sup> Consumption from PV field <sup>(8)</sup> Related only to inverters up to 16 A.

**Efficiency INGECON® SUN 33TL M**  $V_{dc} = 720 V$



	24TL M480	40TL M480	
<b>Input (DC)</b>			
Recommended PV array power range <sup>(1)</sup>	24.7 - 32.2 kW	41.2 - 53.6 kW	
Voltage range MPP1 <sup>(2)</sup>	200 - 820 V		
Voltage range MPP2 <sup>(2)</sup>	200 - 820 V		
Maximum voltage <sup>(3)</sup>	1,000 V		
Maximum current (Input 1 / Input 2) <sup>(4)</sup>	30 / 20 A	40 / 40 A	
Inputs with terminal blocks (Input 1 / Input 2)	1 / 1		
Inputs with PV connectors (Input 1 / Input 2) <sup>(5)</sup>	3 / 2	5 / 5	
MPPT	2		
<b>Output (AC)</b>			
Rated power	24 kW	40 kW	
Max. temperature at rated power <sup>(6)</sup>	55 °C	51 °C	
Maximum current	29 A	48 A	
Rated voltage	480 V		
Voltage range	187 - 528 V	304 - 528 V	
Frequency	50 / 60 Hz		
Power Factor	1		
Power Factor adjustable	Yes. Smax=24 kVA; Qmax=24 kVAR	Yes. Smax=40 kVA; Qmax=24 kVAR	
THD	<3%		
<b>Efficiency</b>			
Maximum efficiency	98.5%		
Euroefficiency	98.3%		
<b>General Information</b>			
Refrigeration system	Forced ventilation		
Air flow	200 m³/h	400 m³/h	
Stand-by consumption <sup>(7)</sup>	10 W		
Consumption at night	1 W		
Ambient temperature	-25 °C to 65 °C		
Relative humidity (non-condensing)	0 - 100%		
Protection class	IP65		
Marking	CE		
EMC and security standards	EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, EN 61000-3-2, EN 61000-3-3, EN 61000-3-11, EN 61000-3-12, EN 62109-1, EN 62109-2, IEC62103, EN 50178, FCC Part 15, AS3100		
Grid connection standards	RD1699/2011, DIN V VDE V 0126-1-1, EN 50438, CEI 0-16 Ed. III, CEI 0-21, VDE-AR-N 4105:2011-08, G59/2, G83/2 <sup>(8)</sup> , P.O.12.3, AS4777.2, AS4777.3, IEC 62116, IEC 61727, UNE 206007-1, ABNT NBR 16149, ABNT NBR 16150, South African Grid code, Chilean Grid Code, Romanian Grid Code, Ecuadorian Grid Code, Peruvian Grid code, IEEE 929, Thailand MEA & PEA requirements, DEWA (Dubai) Grid Code, Jordan Grid Code		
<b>Versions available</b>			
<b>Standard version</b>	S	✓	✓
	S+	✓	✓
<b>Premium version</b>	P	✓	✓
	P+	✓	✓

	Standard version		Premium version	
	S	S+	P	P+
Terminal blocks	✓	✓	✓ (*)	✓ (*)
PV connectors			✓	✓
DC switch		✓	✓	✓
DC surge arresters, type 2				✓
DC and AC surge arresters, type 3	✓	✓	✓	✓
DC fuses			✓	✓
Current measuring kit			✓	✓

(\*) Terminal blocks not available for the Premium versions of the INGECON® SUN 28TL M, 33TL M and 40TL M480 inverters.

**Notes:** <sup>(1)</sup> Depending on the type of installation and geographical location <sup>(2)</sup> The output power will be conditioned by the voltage and current configuration selected at each input <sup>(3)</sup> Must not be exceeded under any circumstances. Consider the voltage increase of the 'Voc' at low temperatures <sup>(4)</sup> The maximum current per PV connector is 11 A for Premium versions <sup>(5)</sup> Branch plugs and sockets available to connect two cables to each input <sup>(6)</sup> For each °C of increase, the output power will be reduced at the rate of 1.8% <sup>(7)</sup> Consumption from PV field <sup>(8)</sup> Related only to inverters up to 16 A.

**Efficiency INGECON® SUN 40TL M480** V<sub>dc</sub> = 720 V





## 24TL U M480 / 40TL U M480

Maximum efficiency with Multi-MPPT three-phase technology

A three-phase inverter family for residential, commercial and large-scale PV plants. It integrates an arc fault circuit interruption system (AFCI).

### Maximum efficiency with two independent MPPT inputs

A single DC-to-AC power conversion stage with an advanced maximum power point tracking system (MPPT), making it possible to harness the maximum energy from the PV array at all times, including difficult situations such as scattered clouds and partial shading. Great flexibility for configuring the solar array, thanks to the two independent MPPT trackers with a wide input voltage range. Moreover, it enables to connect different DC input powers to each MPP tracker (asymmetric configuration).

### Plug & Play technology

Extremely easy to install. The inverter connection is fast and simple. The country-specific configuration and language can be easily selected from the inverter screen.

### Rugged design

Steel casing, especially designed for indoor and outdoor applications (NEMA 4). It with stands extreme temperatures. The 3Play inverters have been designed to guarantee a long life expectancy.

### Ease of maintenance

Internal datalogger for up to 3 months data storage. Control either from a remote PC or on-site from the inverter front keypad. Status and alarm LED indicators. LCD screen. Integrated DC arc-fault circuit interruption system.

### Easy to operate

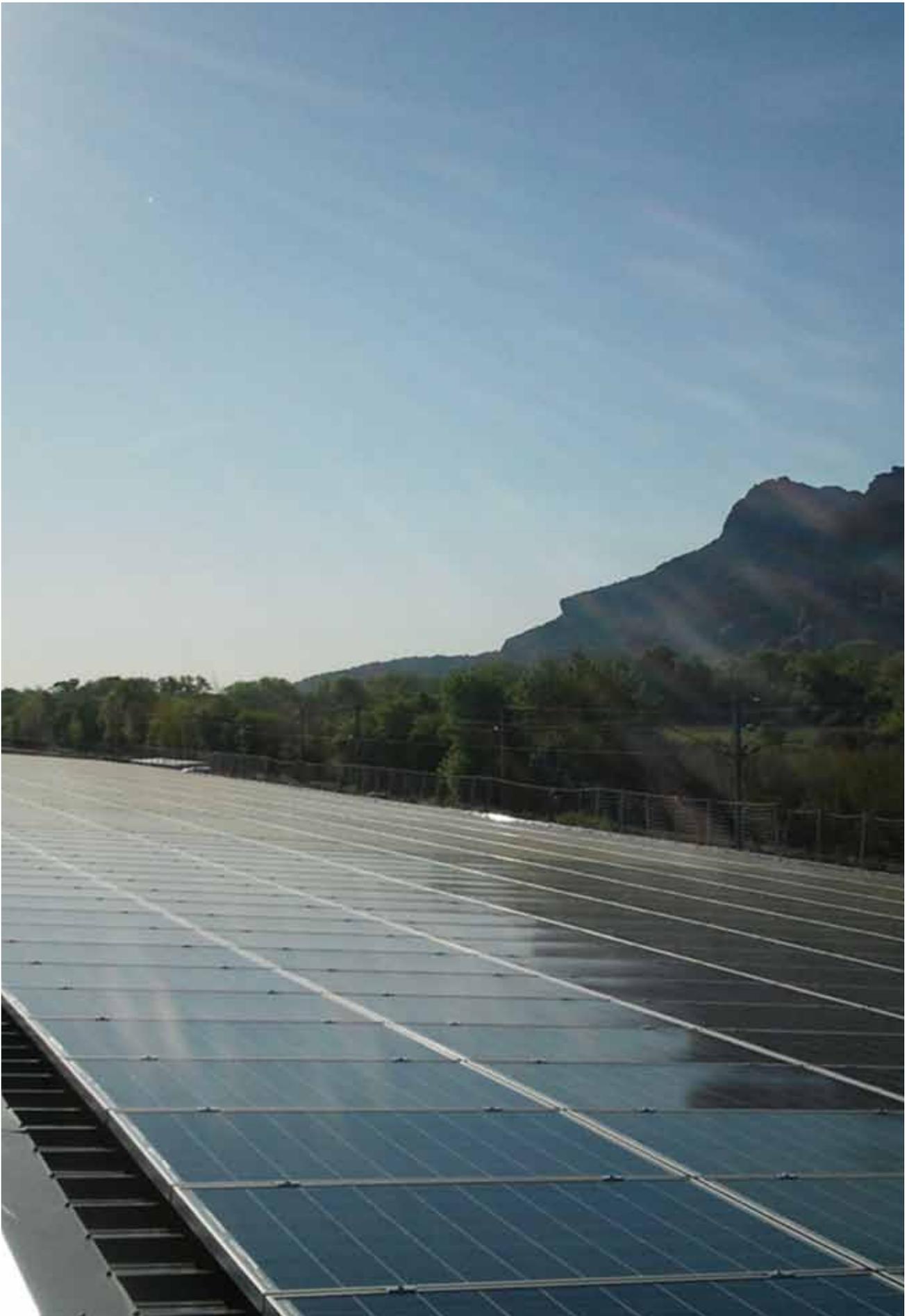
The INGECON® SUN 3Play TL U M inverters feature a LCD screen for the

simple and convenient monitoring of the inverter status and a range of internal variables. The display also includes three LEDs to show the inverter operating status. All this helps to simplify and facilitate maintenance tasks.

### Software included

Included at no extra cost are the INGECON® SUN Manager, INGECON® SUN Monitor and its smartphone version Web Monitor for monitoring and recording the inverter data over the internet. In addition, users can download the latest version of the firmware from the Ingeteam website [www.ingeteam.com](http://www.ingeteam.com), and update it using a simple SD memory card. RS-485 communications are supplied as standard.

**Standard 10 year warranty, extendable for up to 20 years**



# INGECON SUN 3Play

## TL U M Series

### A versatile equipment

The INGECON® SUN 3Play TL U M inverters integrate an arc-fault circuit interruption system.

The standard inverter features a double MPPT input with terminal blocks. It also integrates DC and AC surge arresters, type 3. Optionally, it can be supplied with DC surge arresters, type 2.

### Easy rooftop installation

Vertical or horizontal mounting, enabling the location of the inverter next to the PV modules and avoiding the installation of any additional rapid shutdown device.

#### MAIN FEATURES

- AFCI (Arc Fault Circuit Interrupt).
- Double-MPPT System.
- Easy rooftop installation.
- 98.5% maximum efficiency.
- Inverter firmware updating by the user through a SD memory card.
- Software INGECON® SUN Manager for PV plant access and data registration.
- Software INGECON® SUN Monitor for PV plant monitoring.
- LCD display.
- RS-485 communications supplied as standard.
- Display-configurable potential-free contact, to indicate insulation fault or grid connection.
- Plug & Play technology.
- Suitable for indoor and outdoor installations (NEMA 4).
- High temperature performance. Rated power up to 131 °F (55 °C) for the 24 kW inverters.
- Language, rated voltage and Country Code configurable by display.

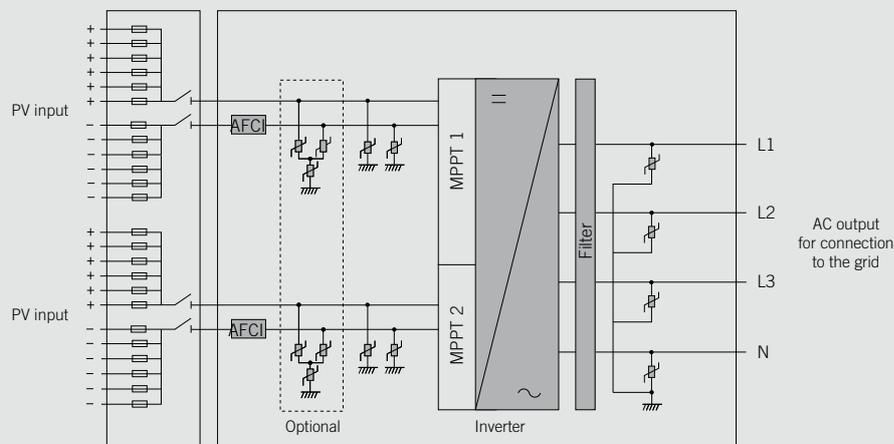
#### PROTECTIONS

- Reverse polarity.
- DC arc-fault circuit interruption.
- Shortcircuits and overloads at the output.
- Anti-islanding with automatic disconnection.
- Insulation faults.

#### OPTIONAL ACCESSORIES

- Inter-inverter communication via Ethernet, GSM / GPRS or Wi-Fi.
- Combiner Box with DC fuses and DC switch.
- DC surge arresters, type 2.

### 3Play TL U M (40 kW)



### Combiner Box

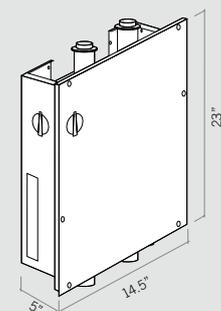
The Combiner Box is supplied with four or six inputs per MPPT with fuses on each pole and a DC switch. It can be located immediately under the PV inverter or in a different place.

#### COMBINER BOX MAIN FEATURES

- DC switch.
- 2 MPPTs (4 inputs / MPPT for the 24 kW models, and 6 inputs / MPPT for the 40 kW model).
- 4 fuses per pole for the 24 kW models and 6 fuses per pole for the 40 kW model.
- Max. short-circuit current per input: 12 A.
- Max. current per MPPT: 30 A for the 24 kW models, and 40 A for the 40 kW model.



#### Size and weight (inches)



**Combiner Box**  
15 lbs

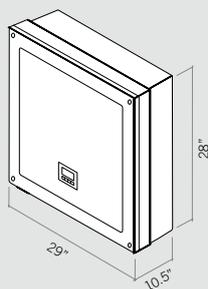
	24TL U M480	40TL U M480
<b>Input (DC)</b>		
Recommended PV array power range <sup>(1)</sup>	24.7 - 32.2 kW	41.2 - 53.6 kW
Voltage range MPP1 <sup>(2)</sup>	200 - 820 V	
Voltage range MPP2 <sup>(2)</sup>	200 - 820 V	
Maximum voltage <sup>(3)</sup>	1,000 V	
Maximum current (Input 1 / Input 2)	27 / 27 A	40 / 40 A
Inputs (Input 1 / Input 2)	1 / 1	
MPPT	2	
<b>Output (AC)</b>		
Rated power	24 kW	40 kW
Temperature at rated power <sup>(4)</sup>	131 °F	124 °F
Maximum current	29 A	48 A
Rated voltage	480 V	
Frequency	60 Hz	
Power Factor <sup>(5)</sup>	1	
Power Factor adjustable	Yes. Smax=24 kVA	Yes. Smax=40 kVA; Qmax=24 kVAR
THD	<3%	
<b>Efficiency</b>		
Maximum efficiency	98.5%	
CEC - Weighted efficiency	98%	
<b>General Information</b>		
Refrigeration system	Forced ventilation	
Air flow	200 m <sup>3</sup> /h	400 m <sup>3</sup> /h
Stand-by consumption <sup>(6)</sup>	10 W	
Consumption at night	1 W	
Ambient temperature	-13 °F to 149 °F	
Relative humidity (non-condensing)	0 - 100%	
Protection class	NEMA 4	
DC AFCI	✓	
Marking	CE, ETL	
EMC and security standards	UL1741, FCC Part 15, IEEE C37.90.1, IEEE C37.90.2	
Grid connection standards	IEC 62116, UL1741, IEEE1547, IEEE1547.1, NEC CODE	

**Notes:** <sup>(1)</sup> Depending on the type of installation and geographical location <sup>(2)</sup> The output power will be conditioned by the voltage and current configuration selected at each input <sup>(3)</sup> Must not be exceeded under any circumstances. Consider the voltage increase of the 'Voc' at low temperatures <sup>(4)</sup> The output power will be reduced at the rate of 1% for each 1 °F of increase <sup>(5)</sup> For Pout>25% of the rated power <sup>(6)</sup> Consumption from PV field.

#### Efficiency INGECON® SUN 40TL U M480 $V_{DC} = 720 V$



#### Size and weight (inches)



**24TL U M / 40TL U M**  
129 / 137.8 lbs