

ISMG Solar Inverter



ISMG 1 60 IT

- High PV input voltage range (suitable for voltage between 100 VDC to 450VDC) and efficient MPP Tracking
- Up to 2 / 3 independent MPP Tracking controlled by an exclusive Smart MPPT Technology
- Transformerless
- Integrated security and filtering system according to relevant EMC standards
- RS232/RS485 serial communication for local/remote control
- Integrated data display (2 x 16 LCD) and LEDs for monitoring of the operational status and signalling of failures
- Active anti-islanding protection for grid monitoring able to ensure high safety level for qualified installers and end users
- Integrated interface protection device for monitoring the grid according to the national standards
- High reliability, light weight, easy to install and start up, large cost saving
- IP 65 protection degree (can be installed outdoors or indoors)

General description

The Carlo Gavazzi ISMG PV solar inverter series converts direct current from the solar cells into alternating current. This enables you to feed your self-produced solar energy into the public grid. The integrated security and monitoring system guarantees a high disturbance immunity according to relevant electromagnetic compatibility standards and enable the highest levels of efficiency.

The exclusive Smart MPPT technology allows to control up to 2/3 independent strings of PV panels and it ensures the increase of energy up to 20%, thanks to the fully functional PV string control software. The maximum capacity utilization of the solar energy plant is guaranteed even in case of a misty and clouded over sky. The high input voltage range of the solar inverter enables to use

PV modules from different manufacturers. Integrated data display ensures an immediate monitoring of the inverter operational status and failure messages. The internal temperature control protects the device against too high temperatures in the interior of the solar inverter. In case of high ambient temperatures, the external cooling fans switch them on. The solar

inverter is functional in grid parallel operation exclusively. The automatically-acting isolation point, guarantees secure disconnection in case of circuit isolation or interruptions in power supply and it avoids isolated operation.

Ordering key

ISMG 1 50 ES

Model _____
 Grid connection _____
 Max. DC power _____
 Country _____

Type selection

Grid connection	Single Phase	1
Max. DC power	4.5kW	45
	5.0kW	50
	6.0kW	60
Country	ES IT DE	Spain Italy Germany

Approvals



RD 1663/2000¹
RD 661/2007

DK5940²
 Ed. 2.2 Aprile 2007

VDE0126-1-1³

Notes: ¹ Spanish Recommendation
² Italian Recommendation
³ German Recommendation

Photovoltaic DC input data

Model	ISMG 1 45	ISMG 1 50	ISMG 1 60
Nominal DC power	3.48kW	4.0kW	4.85kW
Max. DC power	4.0kW	4.64kW	5.38kW
Max. recommended PV power per each string	4.5kW	5.0kW	6.0kW
Nominal voltage	450V		
Max. DC voltage	500V		
Min. DC voltage (P _{nom})	150V		
MPP voltage range	100...450V		
Full MPP range	300...400V		
Distortion factor (THD)	< 3%		
Max. DC current per each string	10A		
DC current range per each string	0...10A		
Number of MPP trackers	1~2		1~3
Max. No. of parallel strings for MPP	2		3
All Pole sensitive RCB	Yes		
Overvoltage protection	Yes		
Ground fault monitoring	Yes		
Polarity safeguard	Short circuit diode		
Overvoltage protection	MOV varistor		

AC output data

Model	ISMG 1 45	ISMG 1 50	ISMG 1 60
Nominal AC power	3.3kW	3.8kW	4.6kW
Max. AC power	3.8kW	4.4kW	5.1kW
Power factor	> 0.99%		
Grid connection	Single phase; True sine-wave		
AC voltage range	Spain: 196...253V (VAC _{nom} : 230V) - Italy: 184...265V (VAC _{nom} : 230V) - Germany: 184...264V (VAC _{nom} : 230V)		
AC nominal current	14.34A	16.52A	20A
AC current range	0...16.52A	0...19.13A	0...22A
Frequency range	Spain: 48...51Hz (f _{nom} : 50Hz) - Italy: 49.7...50.3Hz (f _{nom} : 50Hz) - Germany: 47.5...50.2Hz (f _{nom} : 50Hz)		
Safety class	II		

General features

Model	ISMG 1 45	ISMG 1 50	ISMG 1 60
Max. efficiency	96.3% @ 350VDC		96.2% @ 350VDC
EU efficiency	95.4% @ 350VDC	95.1% @ 350VDC	95.1% @ 350VDC
Stand-by consumption	< 10W		
Night consumption	0W		
Protection device	Grid monitoring system		
Anti-islanding monitoring	Yes		
Grid monitoring	Integrated interface protection (Spain: according to RD 1663/2000; RD 661/2007) (Italy: according to DK5940 Ed. 2.2 Aprile 2007) (Germany: according to VDE0126-1-1)		

Environmental data

Model	ISMG 1 45	ISMG 1 50	ISMG 1 60
Operating temperature @ 350VDC	0°C...+60°C / 32°F...140°F without derating; Shut-down at 75°C/167°F	0°C...+55°C / -32°F...131°F without derating; Shut-down at 75°C/167°F	
Max. acceptable temperature @ P _{nom}	+55°C / 131°F		
Storage temperature	-25°C...+80°C / -13°F...176°F		
Humidity	0...98%		
Temperature control	Automatic temperature control by software		
Cooling	Forced ventilation (2 x IP54 external fans)		
Protection degree	IP 65 (according to DIN EN60529)		
Installation location	Outdoor / Indoor		
Noise level	< 40dB		

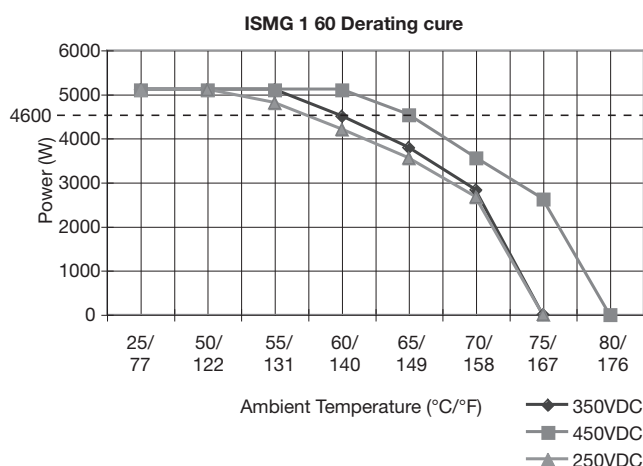
Mechanical data

Model	ISMG 1 45	ISMG 1 50	ISMG 1 60
User interface	2 x 16 LCD Data display and 3 monitoring LEDs		
AC connectors	1 x Wieland		
DC connectors	2 x 2 Multicontact (MC4 series)		3 x 2 Multicontact (MC4 series)
Serial interface connectors	2 x RJ45		
Housing material	Powder coated aluminium		
Weight	22.5kg/49.60lb		23.0kg/50.70lb

Standard Norms and Certifications

Model	ISMG 1 45	ISMG 1 50	ISMG 1 60
Safety Standard	EN50178		
EMC capability	EN61000-3-2, EN61000-3-3 EN61000-3-11, EN61000-3-12 EN61000-6-2, EN61000-6-3		
Monitoring grid	Spain: according to RD 1663/2000; RD 661/2007 Italy: according to DK5940 Ed. 2.2 Aprile 2007 Germany: according to VDE0126-1-1		

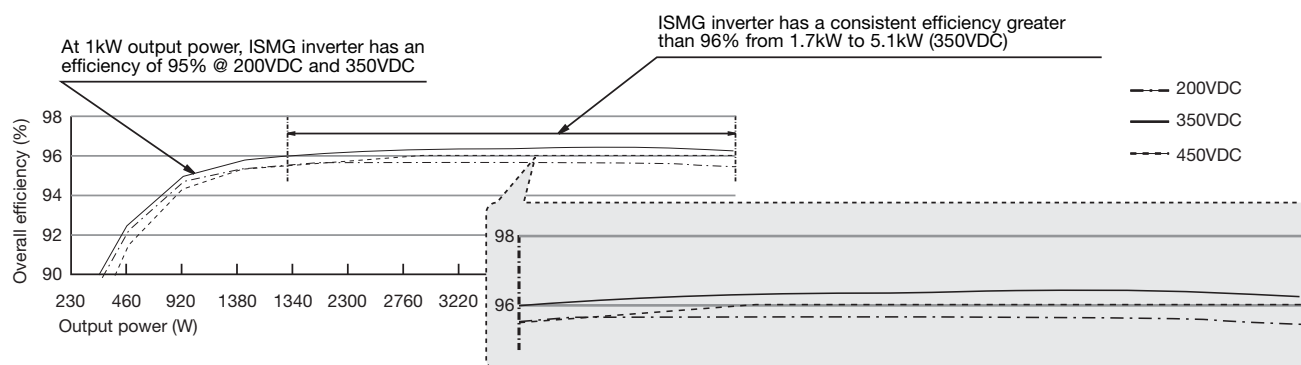
Temperature range



Cooling FAN control

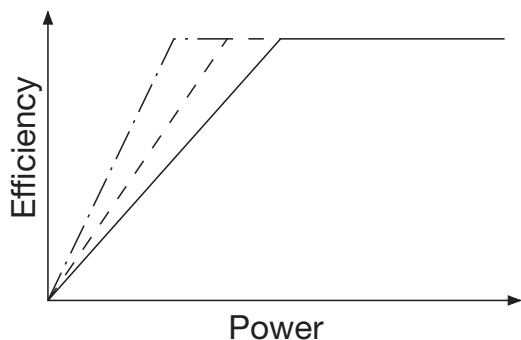
Command	Heat-sink temperature (°C)
FAN start	50/122
FAN stop	45/113
Derating temperature	72/161.6
Inverter shut-down temperature	80/176

Efficiency



Model	ISMG 1 45	ISMG 1 50	ISMG 1 60
Efficiency 5% P_{nom}	84.42%	85.70%	87.65%
Efficiency 10% P_{nom}	91.19%	90.94%	92.04%
Efficiency 20% P_{nom}	94.27%	94.43%	94.86%
Efficiency 30% P_{nom}	95.37%	95.36%	95.62%
Efficiency 50% P_{nom}	96.04%	95.58%	96.11%
Efficiency 100% P_{nom}	96.28%	96.07%	96.10%

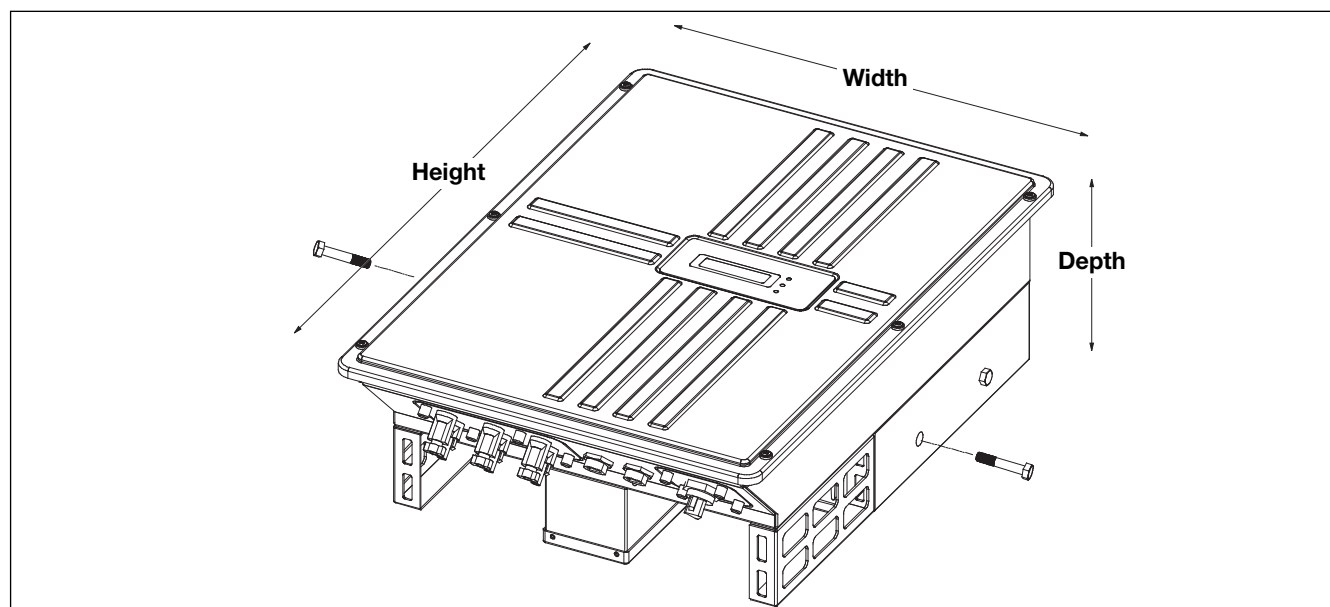
Multiple/Single Panel String mode



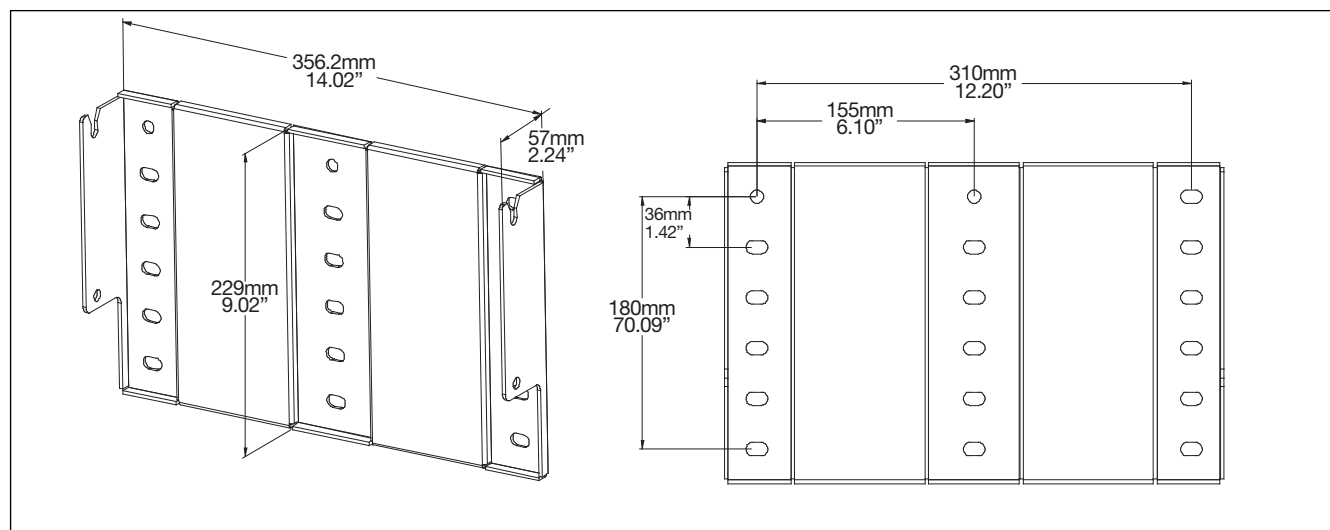
- Multiple/Independent mode (String A + String B, String C)
- ... Independent mode (String A, String B, String C)
- Multiple mode (String A + String B + String C)

Dimensions

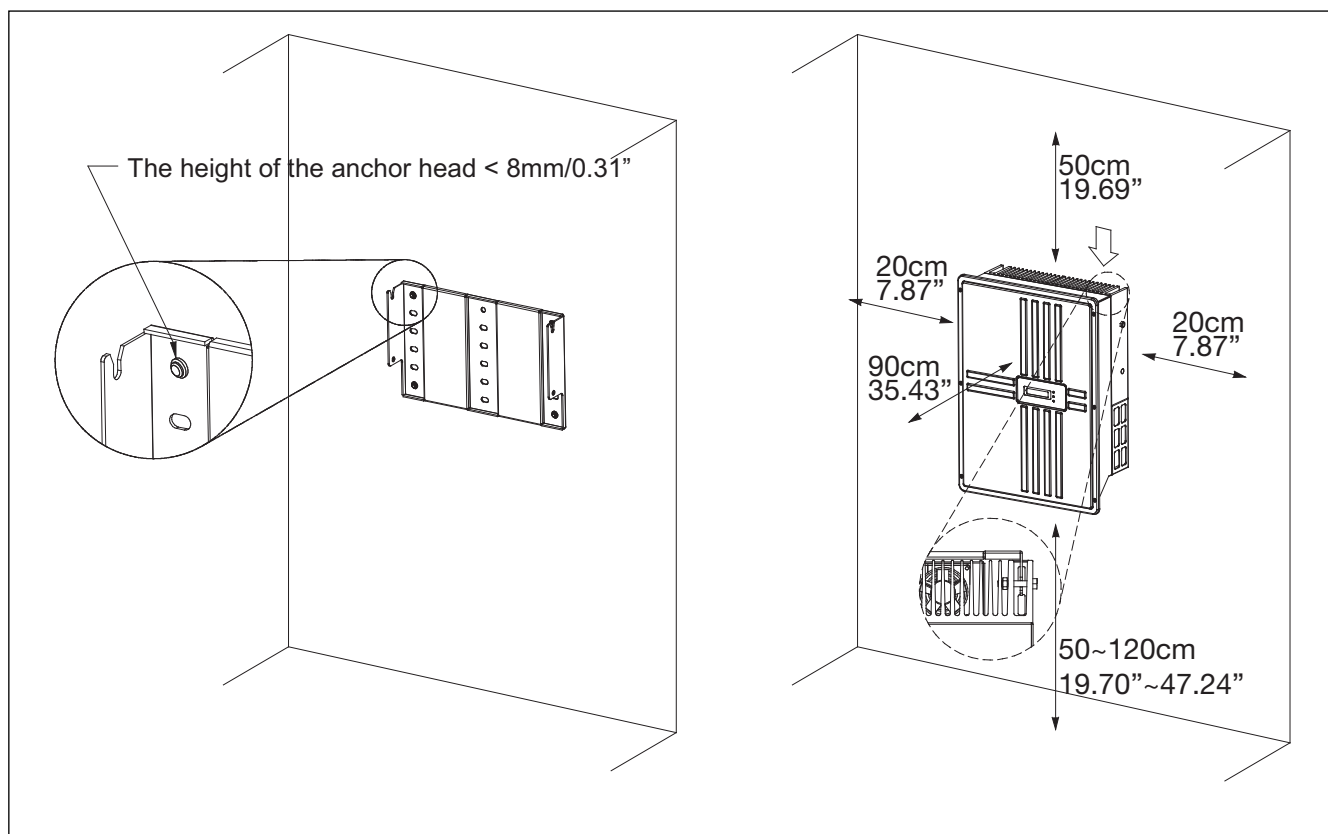
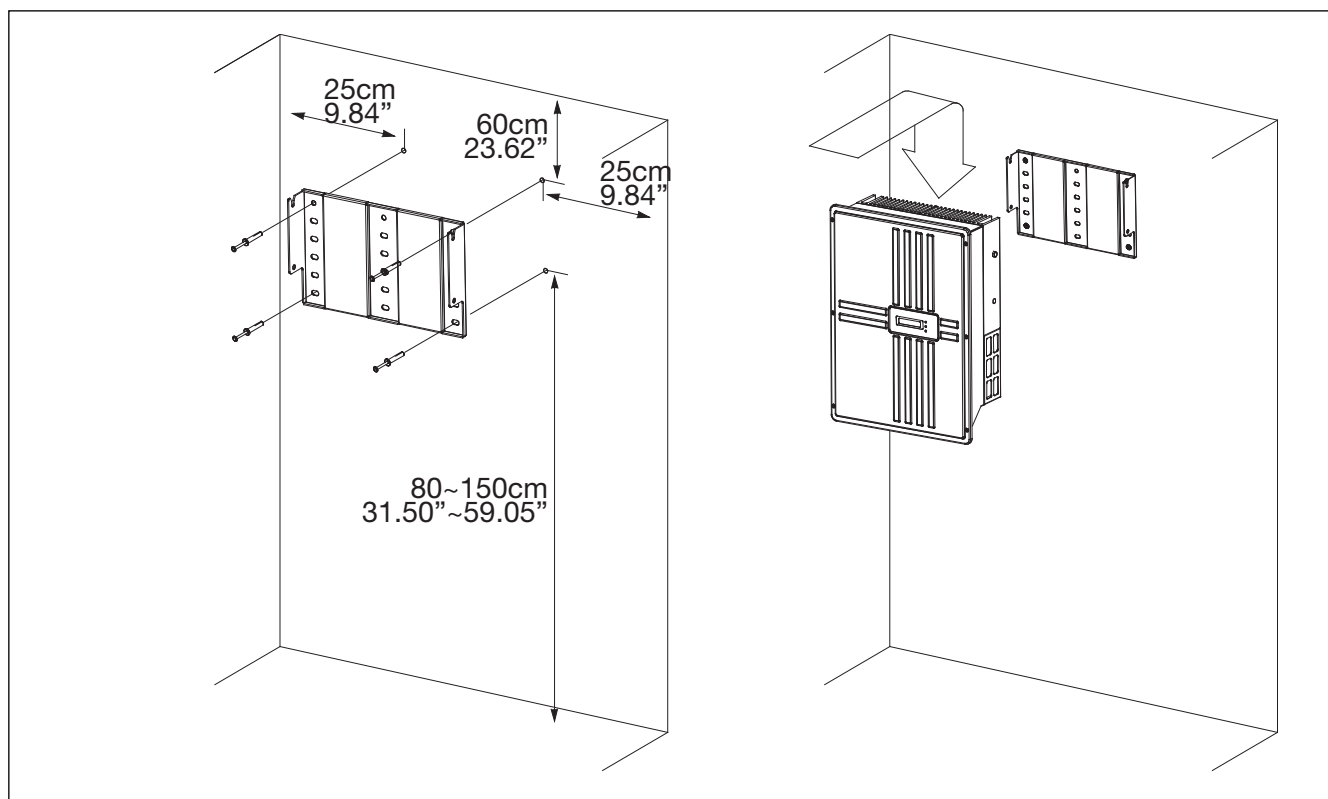
Model	ISMG 1 45	ISMG 1 50	ISMG 1 60
H x W x D mm	580 x 422 x 182 (+6.5 mounting support)		
inches	22.83" x 16.61" x 7.17" (+0.26" mounting support)		



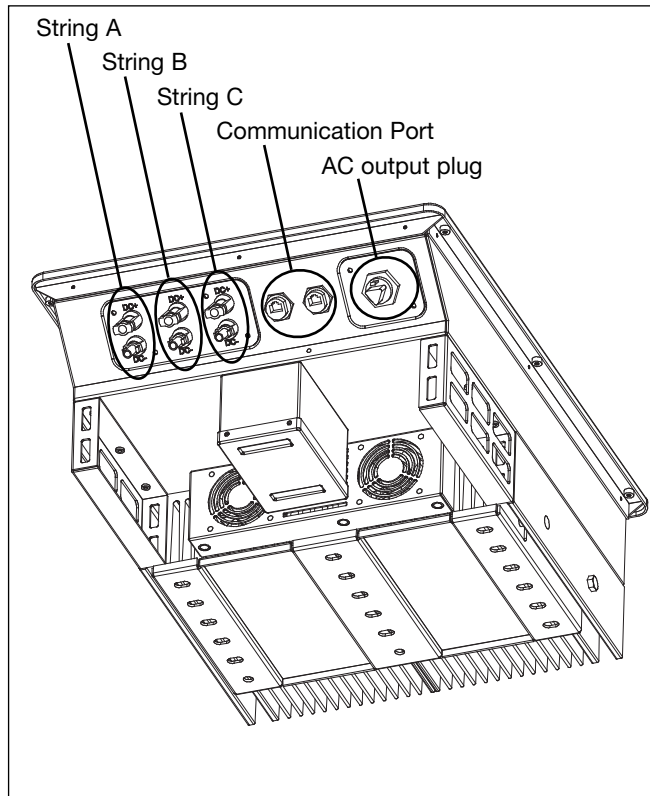
Mounting Plate



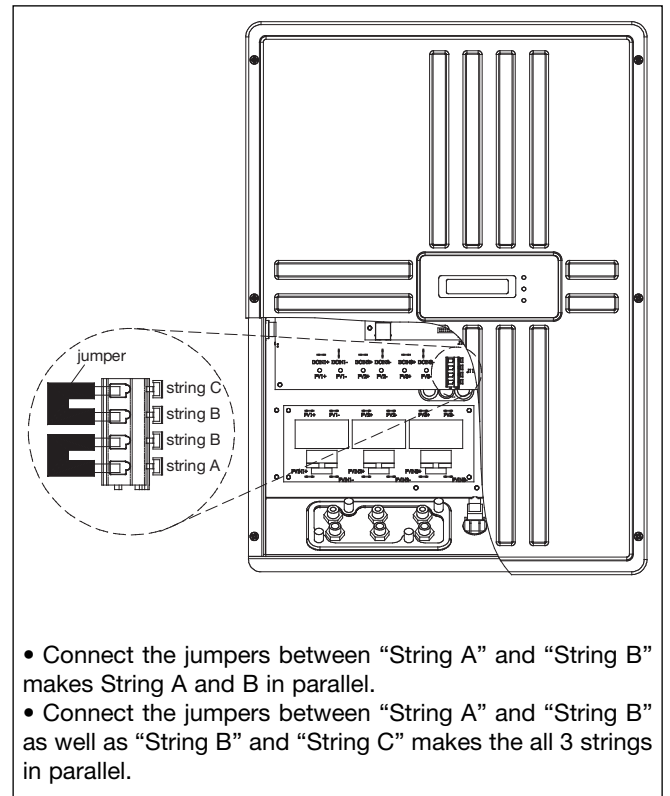
Drilling Plan mm/inches



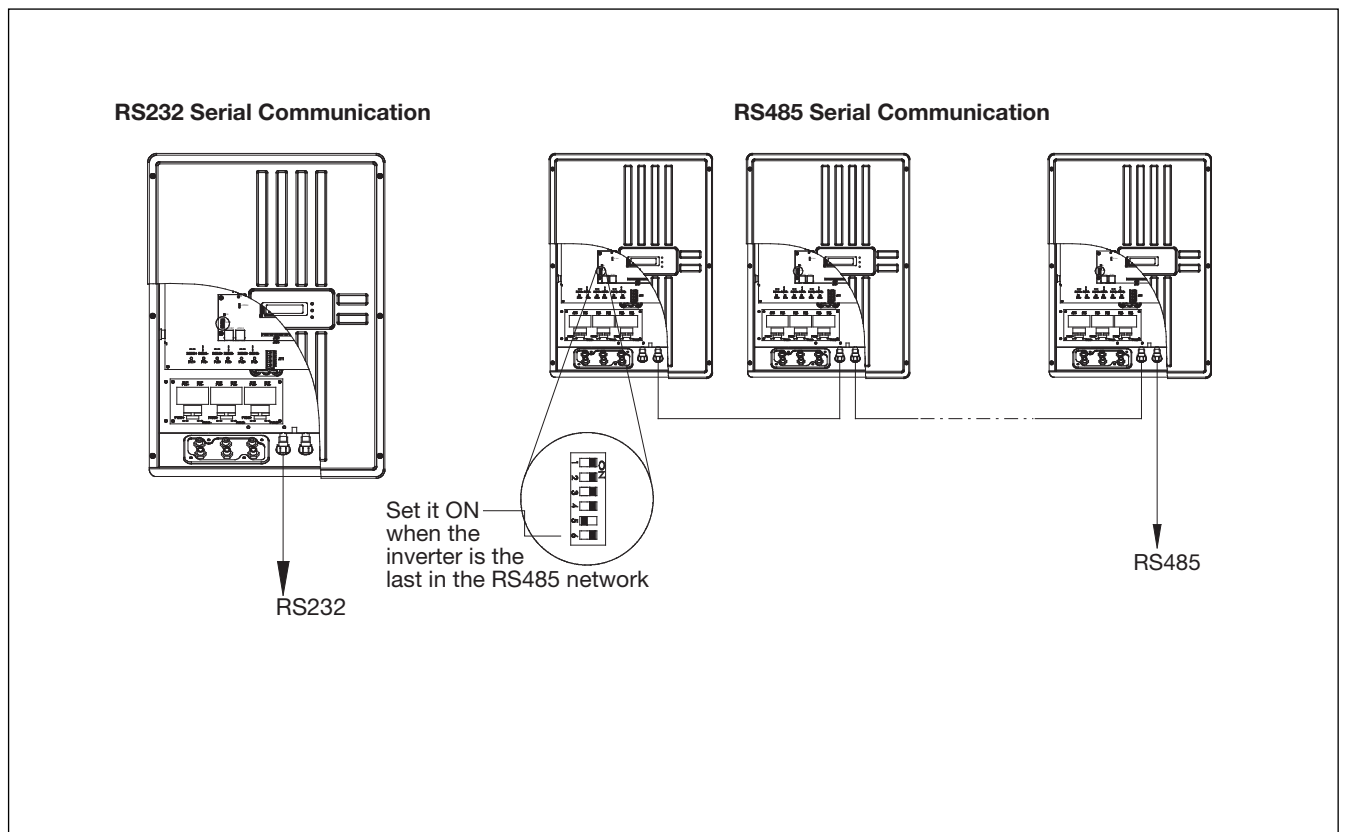
Connectors



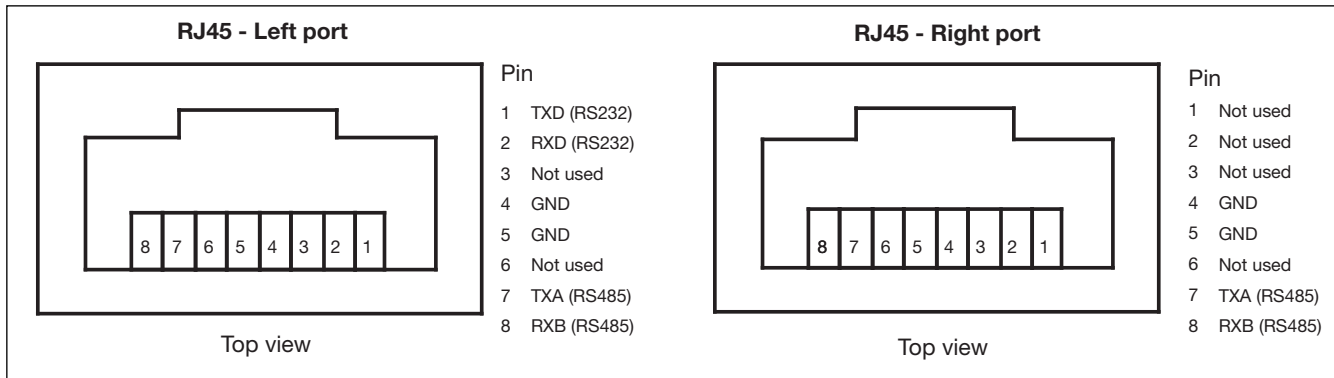
Smart MPPTs configuration



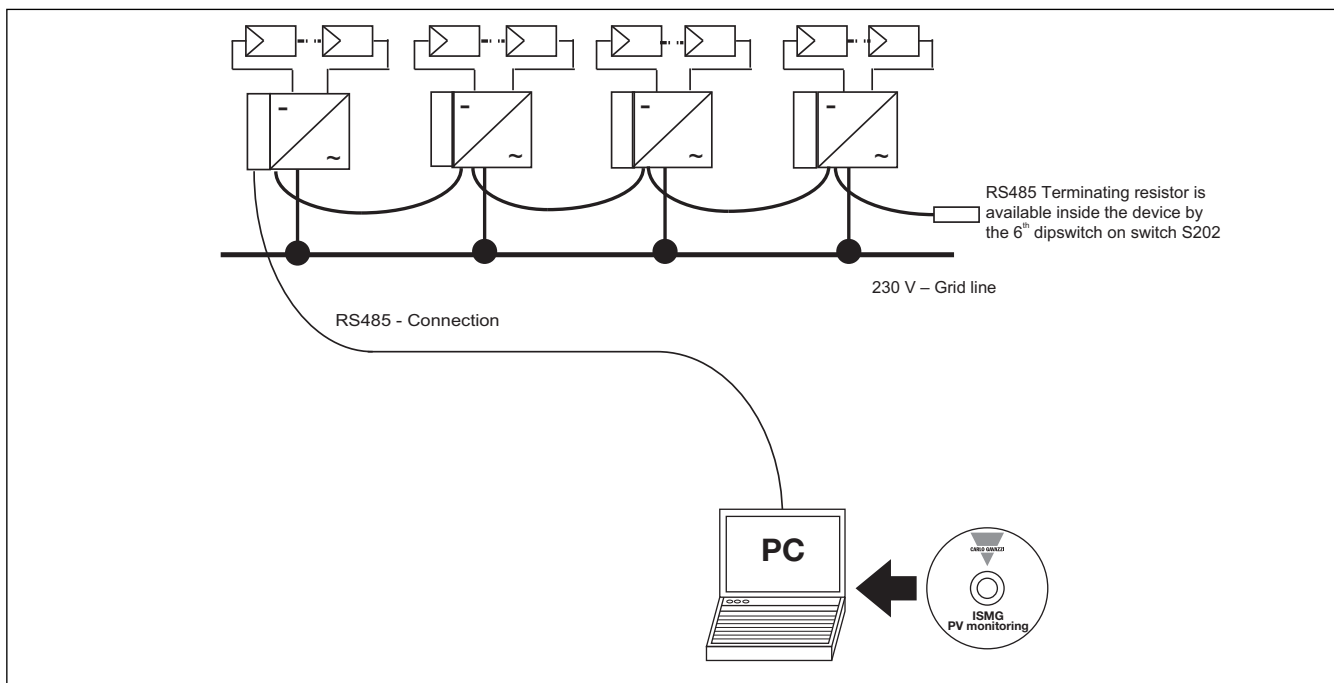
Serial communication RS232 / RS485



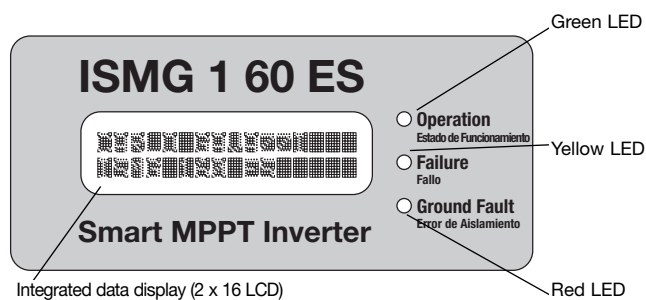
Serial communication pin view



Serial communication flow-chart



Display and LEDs



Inverter software tools

Monitoring system software	ISMG PV monitoring
PV panel configurator	Carlo Gavazzi PV Generator Design
Auto-test software	ISMG Smart MPPT Inverter Auto Test (available only for Italian Market, according to DK5940 Ed. 2.2 April 2007)