



The three phase grid connected inverter ELIOS TPH series represents the last power technology designed in medium transformer-less inverter system. Reliability, electrical performance, exceptionally compact size and outstanding cost-efficiency, housed in an attractive enclosure are only some features of this new grid connected inverter solution.

Designed in a waterproof chassis IP65, the ELIT PV inverter, ELIOS TPH series, is suitable to be connected to the grid. The control speed of fan cooling and the transform less technology reduce the losses and optimize the efficiency, reducing the cluttered, weight and parts liable to wear, for the maximum reliability with time and an efficiency till 98%.

Monitoring and control data are shown on an easy to understand front panel display featuring pushbutton controls, LCD read out for diagnostics and a mimic diagram for system status. The power protection system can be remotely monitored via RS232, RS485, dry contact or SNMP interface.

## PRINCIPLE OF WORKING

Some materials as the silicon can produce electric energy if irradiated by the sun light. The photovoltaic cells connected among them

compose a photovoltaic module to be able to transform the sun light in direct current.

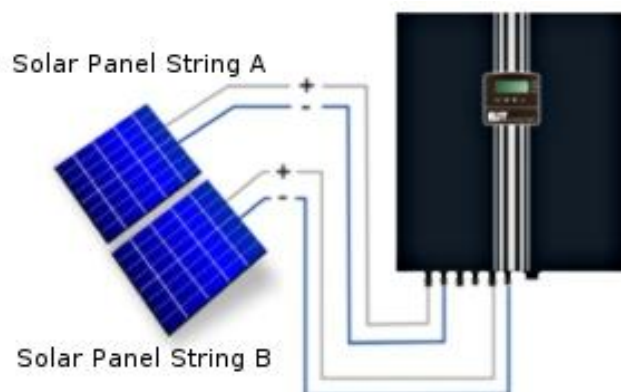
The ELIT PV inverter interfacing PV modules with the grid involves two major tasks. One is to ensure that the PV modules are operated at the maximum power point (MPP). The other is to inject a sinusoidal current into the grid. The ELIT PV inverter provides to detect an islanding situation, and take appropriate measures in order to protect persons and equipment.

The ELIT PV inverter, ELIOS TPH series, has been designed to transform the dc link voltage, produced by solar panels, into an alternating sinusoidal stabilized voltage, with a PWM modulation, to put in the grid to feed the local electric energy consumption and to be counted in credit by a special meter of the public utility. Since the control unit is fed by solar panels, the ELIT PV inverter, ELIOS TPH series, is completely off during the night, without any energy consumption.

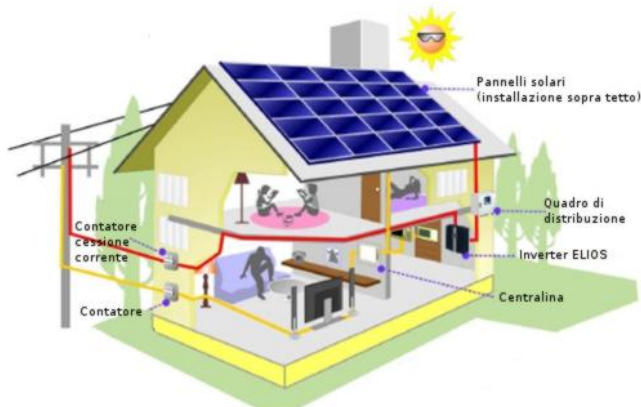
## MAXIMUM POWER POINT TRACKER

The power produced by photovoltaic module is called peak power (abbreviated  $W_p$ ).

The photovoltaic modules have a optimal ideal voltage at which they can put out the maximum power, called exactly Maximum Power Point. This point varies continuously with sunlight and with solar cell temperature. Connected to the grid, the ELIT PV inverter, ELIOS TPH series, ensures that the PV modules are operated at the maximum power point with his MPPT boosters. The ELIT PV inverter, ELIOS TPH are provided with two independent MPPT boosters allow to manage the solar panel strings with different inclinations, improving the flexibility of their use and ease configurations.



According to local the system can be realized with a bidirectional meter or with two meters, consumption and feed-in meter.



## FEATURES

- Three phase inverter.
- High operation voltage till 1000Vdc.
- Two built-in independent MPPT boosters to increase efficiency system even with solar panel strings with different inclinations.
- Sinusoidal output waveform.
- Detection anti islanding device.
- Inverter working from 300Vdc.
- MPPT booster working from 350Vdc.
- Control fan cooling according to the temperature.
- Compact size and light weight.
- Up to 98% high conversion efficiency.
- LCD display for measures and signaling.
- High MTBF industrial components used.
- IP65 chassis for indoor and outdoor use.
- Optional monitoring software to visual status and electricity generated data.



## CONTROL PANEL

The user friendly control panel si composed by three parts:

- Power Management LCD Display (PMD).
- LED indicators.
- Keys.



### LED indicators:

Red LED: leakage current fault or DC input insulation fault.

Yellow LED: Utility parameters are not conforms to the inverter specifications.

Green LED fixed: MPPT booster ON.

Green LED flashing: Sleep power inverter.

### Backlit LCD:

LCD simplifies the communication and provides the necessary monitoring information about the inverter. The menu driven LCD enables the access to:

Vdc input: V, A and kW.

Vac output: V, A, Hz, kW and KWh.

Temperature (Surroundings heat sink), error code, alarm code. Block diagram.

### keys:

The keys allow the user to operate with the inverter to perform settings and adjustments.

## INTERFACES

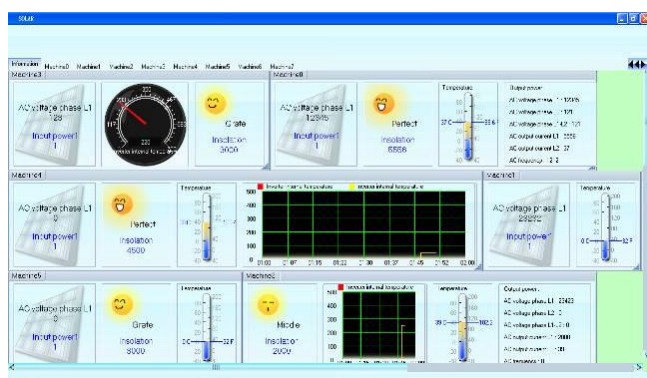
Every ELIT PV inverter, ELIOS TPH series, is provided with a standard RS232 and RS485 port. This interface can be employed with the software supplied in standard package.

The Emergency Power Off facility must use a normally NO contact, which closes to operate the emergency stop procedure.

In addition to the standard interfaces, it is possible, using the customer option communication slot, supply as alternative, the following accessory interfaces:



- SNMP card for monitoring and integration in network management.
- USB port.
- Dry contact card to provide isolated contacts for industrial and remote alarm application.



Daily and monthly photovoltaic generation trend graph, status information, measurements and energy generation block diagram as option.

The software is compatible with many operating systems such as Windows 98, 2000, XP, Vista and Windows 7. For other applications like Novell, NetWare, Unix, Linux, please contact your local distributor for a proper solution.

## ELECTRICAL CONNECTIONS

The three phase PV inverter, ELIOS TPH series, is provided with the following user interface parts:



- LCD display and LEDs for status and measurement information.
- Input Vdc switch to insert or disconnect the voltage fed by the solar arrays.
- Quick PV array connections to connect up two PV strings.
- Output Vac terminals to connect the users.
- RS232 & RS485 communication interfaces.
- Slot for accessory interfaces.

## ACCESSORIES

- Network software: An optional data collecting and analysis system is able to measure up to 200 ELIT PV inverter, ELIOS TPH series, through a RS485 port.

- EMD, Energy Management System allows to collect several PV data system as event log, daily and monthly photovoltaic generation trend graph etc..



- Joint box: It is available, for the ELIOS TPH series, with plug & play connection design a distribution box to get easier the installation process.



Model	ELIOS TPH 10
Nominal active power	10kW
Max apparent power	10kVA
Topology	High frequency PWM transform less
<b>INPUT</b>	
Nominal voltage	720Vdc
Maximum voltage	1000Vdc
Working range	300Vdc ÷ 1000Vdc
MPPT range	350Vdc ÷ 850Vdc
No. input connections and max current for each connection	2 x 18.6 A
<b>OUTPUT</b>	
Nominal voltage	400Vac 4w
Operation range	320Vac ÷ 460Vac
Nominal frequency	50 or 60Hz
Rated current for ph	14.5A
Waveform	Sinusoidale
Power factor	Cosφ 0.8 – 1
Harmonic distortion THD	< 3%
Max efficiency	98%
European efficiency	97.2%
Protections	Over voltage, voltage sag, over frequency, under frequency, ground fault, dc insulation fault, downgraded output power for over temperature
Active antisliding ctrl	Reactive power control
Passive antisliding ctrl	Voltage phase jump detection
<b>MISCELLANEOUS</b>	
Protection degree	IP 65
Operating temperature	from -25°C to + 60°C
Altitude w/o derating	0-2000 mt sl
Humidity	90% without condensing
Interfaces	RS232 & RS485 standard (USB, dry contacts and SNMP as option)
Cooling	Forced, control speed according to temperature
Dimensions (mm)	585x247x445
Weight (kgs)	41
<b>STANDARDS</b>	
Safety	Directive 2006/95/EC EN 62040-1-1, EN50178
EMC	Directive 2004/108/EC EN61000-6-1, EN61000-6-3, EN61000-3-3
Performance	DK5940, VDE0126-1-1, RD1663