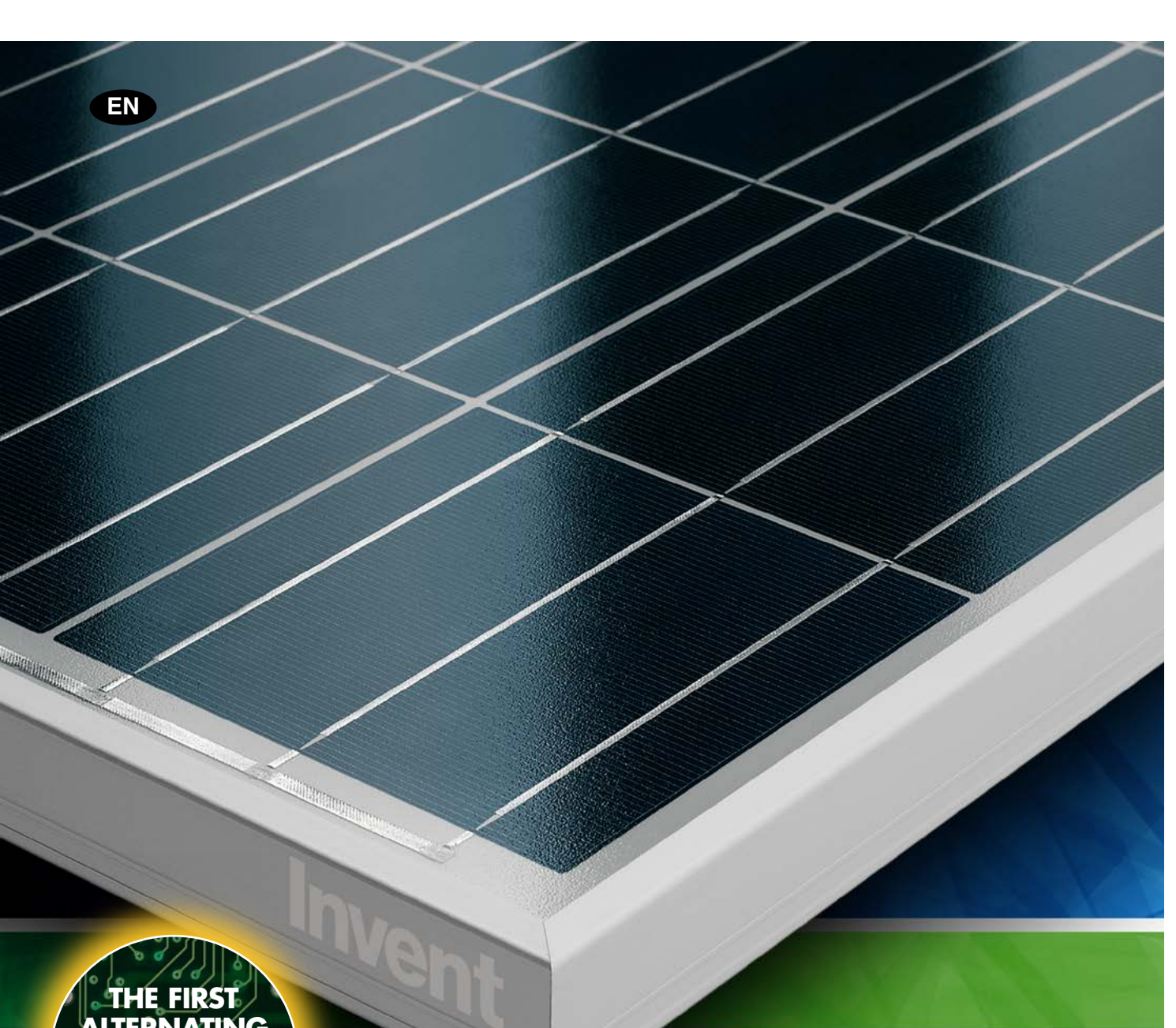


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THE FIRST  
ALTERNATING  
CURRENT  
PHOTOVOLTAIC  
MODULE

PHOTOVOLTAIC MODULES

**ALTERNa**  
QHP

MADE IN ITALY

**Invent**  
ENERGY IN ACTION

## INVENT QHP ALTERNA: THE REVOLUTION OF THE PHOTOVOLTAIC MODULE

Invent QHP Alterna is the first alternating current photovoltaic module.

With Invent QHP Alterna, you no longer need to prepare complicated technical spaces to install a photovoltaic system.

You don't need any other equipment in addition to the module because the work undertaken by the external inverter is now performed by the module itself.



**THE FIRST  
ALTERNATING  
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MODULE**



### INNOVATIVE DESIGN

With QHP Alterna the PV module changes shape.

The components are no longer visible, but are all contained within a single rear panel with special ventilation system and of a compact, linear design.

The panel, which is made in standard sizes is now easy to handle and prevents components from breaking accidentally.

- Power tolerance **0/+6%**
- Warranties until **25 years** on power
- Tested at a pressure of **765kg/m<sup>2</sup>** 7500 Pa
- Tested with hail **30 mm** Ø
- Prismatic glass **4mm** high transmittance
- Nanoclean Treatment
- Electronic conversions with integrated **MPPT**
- Tested **C class** fire resistance
- Ammonia test
- Tested **Salt spray**

### QHP ALTERNA QUALITY

They are provided with positive tolerance (only 0/+6%). This ensures that the module will in any case, produce the same or more than the declared one energy, with consequent advantages for purchasers.

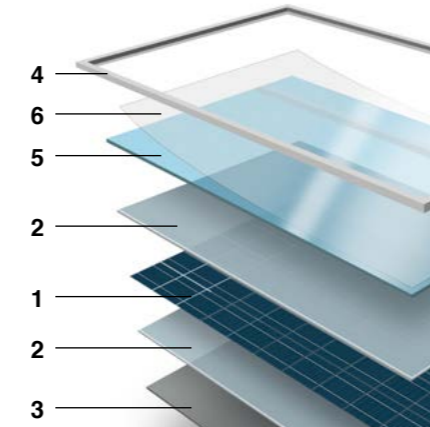
QHP panel consists of 60 polycrystalline silicon photovoltaic (class A) cells (1), which generate high power in each module.

Cells are laminated between two layers of EVA (ethylene-vinyl acetate) (2). In addition, a polyester laminate (PYE) (3) guarantees an effective sealing of the module and long lived, creating a barrier to oxygen and moisture.

The structure (4), is available in different oxidations, it is made of a solid aluminum alloy, stress-resistant, corrosion-resistant, and easy to fasten.

The front part of the module consists of tempered solar glass 4mm thick (5), high light transmittance and it is treated with the procedure NanoClean (6).

Each module is tested by a solar simulator that generates a flash of 1000W/m<sup>2</sup> and quantifies its power.



### INDEPENDENT MODULES FOR MAXIMUM PERFORMANCE

Unlike standard systems, each module in an Invent QHP Alterna system is independent from each other. Thus, if one were to have a problem (shadow on the module, dirt or faulty modules) this would not cause a drop in the energy output of the entire system, but would limit its effect to the affected module only.

### PERFORMANCE INCREASE

In a PV system, Invent QHP Alterna modules allow:

- increased system performance up to 25%;
- optimized system performance, even if modules are inclined or positioned differently;
- system efficiency even with failing modules;
- reduced installation space.

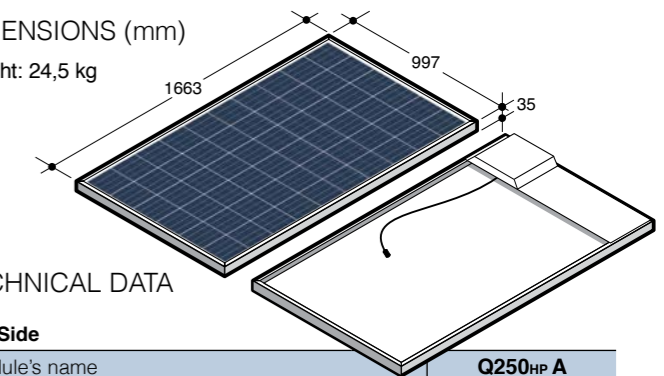
### COMPACT TECHNOLOGY

In the Invent QHP Alterna module all technology is compacted into a single fixed panel at the rear of the module.

The panel contains the control and management systems with AC output.

### DIMENSIONS (mm)

Weight: 24,5 kg



### NANOCLEAN TREATMENT

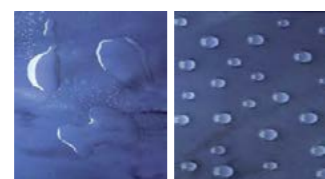
To guarantee the high efficiency of the photovoltaic system among the years, the modules Invent are treated with a special nano-technologic procedure to keep the modules clean. Surfaces treated with NanoClean do not absorb neither water nor oil. The nanotechnologic treatment allows the surfaces to gather the dirt or the limescale facilitating the periodic cleaning. In the images the difference of water and limescale reaction on treated and untreated surfaces is visible.

#### Limescale



UNTREATED TREATED

#### Water



UNTREATED TREATED

Nanoclean, when applied on the module's surface, greatly facilitates the module's cleaning due to:

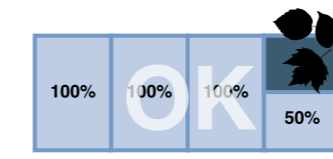
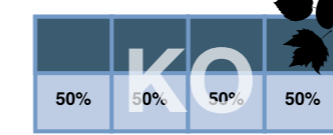
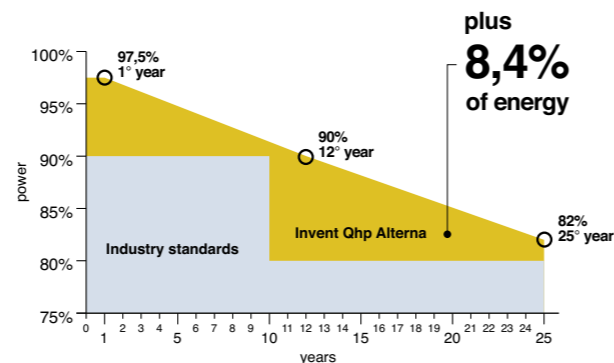
- spherical shape of dirt on the surface
- easy removal of limescale, soap, stains and dirt in general
- reduction of cleaning efforts
- less aggressive cleaners (neutral ph) are required

### WARRANTY

Power is guaranteed: 97,5% the first year, the 12th year >= 90%, the 25th year >= 82% of the power.

Invent grants a 12 year warranty for manufacturing defects and materials.

Electronic parts are guaranteed for 20 years by substituting the faulty components.



### QUICK CONNECTION PLUG&PLAY

An important characteristic of Alterna is a special quick plug&play connection.

The electric connection of the modules has never been so easy and affordable.



### MONITORING

Monitoring operations becomes easy also, with each panel being checked individually (optional).

### TECHNICAL DATA

CC Side		Q250HP A
Module's name		Q250HP A
Power class	Wp	250
Nominal tension	Vmp	30,2
Nominal power	A	8,27
No load voltage	Voc	37,6
Short-circuit current	A(Isc)	8,86
Full load voltage	V	1.000
Short-circuit current's temperature coefficient	α	4,60 m A/°C
No load voltage's temperature coefficient	β	- 0,132 V/°C
Power's temperature coefficient	δ	- 1,021 W/°C
Power tolerance		0/+6%
Efficiency	%	15,08
NOCT	°C	41,73

AC Side	
Electronic conversion on board	Yes
Plug&play connections	Yes
Maximum output power	Wp 238
MPPT	1

Values obtained under standard conditions: 1.000 W/m - 25°C - AM 1,5

## CERTIFICATIONS

Invent photovoltaic modules are certified according to the European standard **IEC 61215 (Ed.2)**. Safety tests were performed according to **CEI EN 61730** (Safety class II). In the laboratory the modules successfully pass all tests demonstrating high resistance to different types of stress.

**EN 61215 (2005) - 10.17**  
**Hail resistance test**  
 ice ball of 25mm launched at a speed of 23,0 m/s-1 directed to 11 points of impact. An impact of energy equal to that of a sphere of ice of 30mm diameter is also simulated.

**EN 61215 (2005) - 10.16**  
**Mechanical load test**  
 the module is subjected to a pressure of 5400 Pa. In addition, Invent tests the modules at a pressure of 7500 Pa, thus guaranteeing greater panel strength.

**EN 61730-2 (2007) - MST 21**  
**Temperature test**  
 5 hours exposure to 1,000 Wm

**EN 61215 (2005) - 10.11**  
**Thermal cycle test (50 and 200 cycles)**  
 50 and 200 cycles from -40°C to +85°C with the supply current peak

**EN 61215 (2005) - 10.13**  
**Damp heat test**  
 the module is put into operation with an ambient temperature of 85°C and relative humidity of 85%.

**EN 61215 (2005) - 10.12**  
**Moisture and freezing test**  
 the module is put into service with an ambient temperature of -45°C and relative humidity of 85%.

**IEC 61730-2:2004 annex 2, IEC 61730-2:2004 annex 20.12**  
**Test of resistance to fire class C**  
 the module passes the "burner test and the "pile of wood" test.

**IEC 61215/61646, EN 61730-1, EN 61730-2, IEC 61701**  
**Ammonia test**

**EN 61701 (2000)**  
**Salt spray test**

Certifying authorities:



Certifying authorities:  
 ISO 9001:2008  
 BS OHSAS 18001:2007  
 ISO 14001:2004



Invent is a PV CYCLE's member

Credits

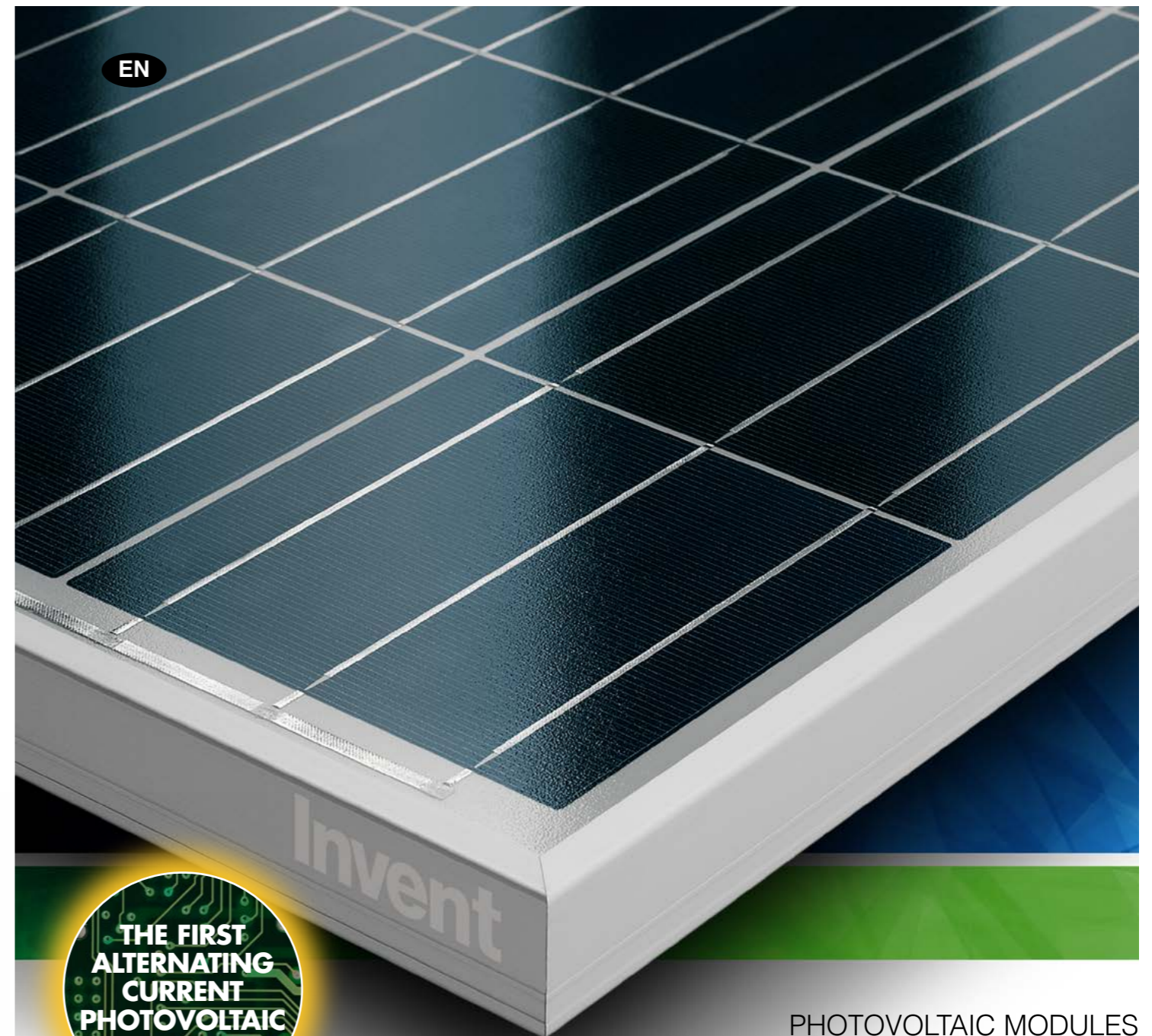


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**ALTERNÀ**  
 QHP

**Invent**  
 ENERGY IN ACTION

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