

DOCUMENTAZIONE TECNICA INTEGRATIVA

Punto 4)

Chiarimenti circa Scheda Tecnica e Certificazione Moduli DelSolar D6P230A3E

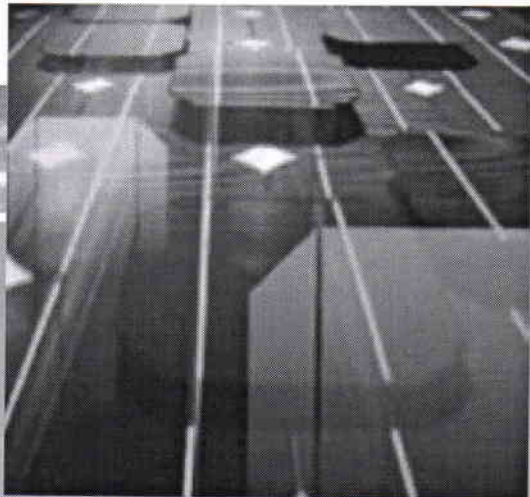
In allegato Scheda Tecnica e Certificazione con **evidenziata la sigla** e scheda tecnica delle celle policristalline

GAIA ENERGY SRL

Corso Cirillo
80028 Grumo Nevano (Na)
Sede Op. Via Borsellino, 118
80025 Casandrino (Na)
Partita IVA 04874961214

del 31/05/2014
M. S. P. A.
R. P. C.
D. P. C.

DeSolar Solar Modules



Product: Multi-Crystalline Module D6P 210/230A3 series

The Advantages of DeSolar Modules

- Power Tolerance of 0 to +3% increases PV system output
- Increased cell to frame clearance reduces the effects of soiling
- low temperature coefficients of power lead to better performance in hot climates
- High PV cell shunt resistance increases power output under low light conditions

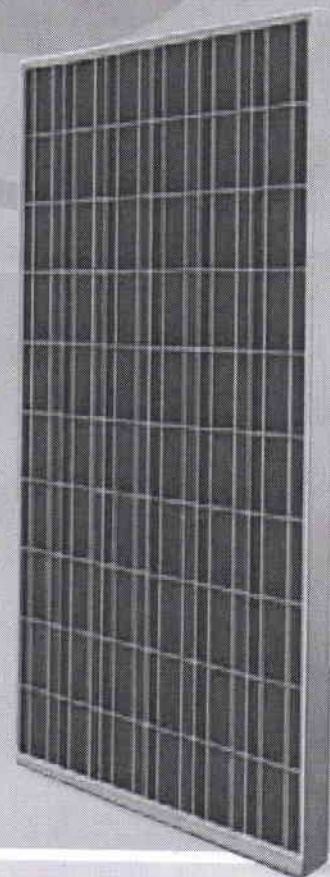
5-year Product Warranty

25-year Performance Warranty:

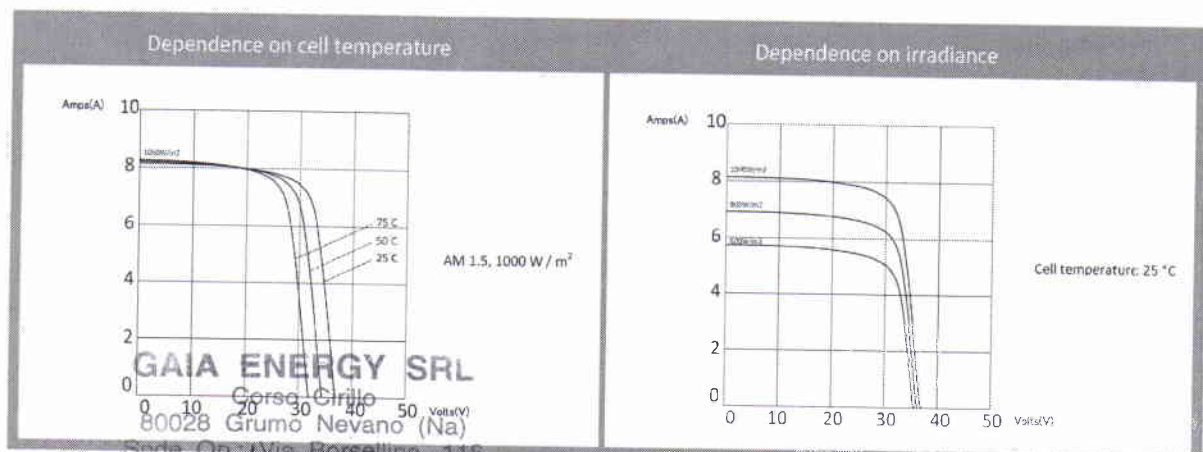
- 10 years: 90% minimum performance
- 25 years: 80% minimum performance

Certifications

- IEC 61215 / 61730 certified
- UL 1703 certified



IV-Curve

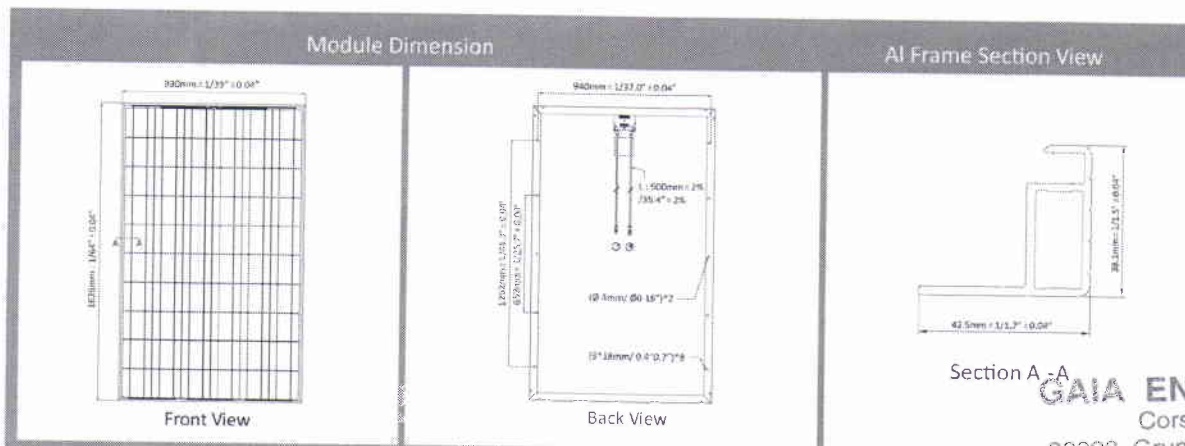


Specification

MODEL	D6P210A3	D6P220A3	D6P230A3
Dimension	1626mm(L) X 990 mm(W) X 38.1mm (D)/ 64"(L) X 39"(W) X 1.5"(D)		
Quantity of Cell	60 cells in series (6X10)		
Module Weight	20Kg/ 44.09lbs		
Open Circuit Voltage (Voc)	36.60 V	36.90 V	37.20 V
Maximum Power Voltage (Vpm)	28.72 V	29.20 V	29.49 V
Short Circuit Current (Isc)	7.93 A	8.13 A	8.39 A
Maximum Power Current (Ipm)	7.32 A	7.54 A	7.80 A
Maximum Rating Power (Pmax)	210 W	220 W	230 W
Output Power Measurement Tolerance	0 ~ +3%		
Module Efficiency	13.00 %	13.60 %	14.30%
Maximum System Voltage	IEC : DC 1000 V / UL : DC 600 V		
Series Fuse Rating	15 A		
Operating Temperature	- 40 to 90 °C		
Temperature Coefficient of Voltage	- 0.32% / °C		
Temperature Coefficient of Current	0.08% / °C		
Temperature Coefficient of Power	- 0.38% / °C		
Normal Operating Cell Temperature	46 ± 1 / °C		
Wind / Snow Load	5400 Pa testing load		

* Electrical data under Standard Test Conditions (STC): 25 °C, 1000 W/m², AM 1.5

* Values w/o tolerance are typical numbers



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Certificate

Registration No.: PV 50167253

Page 1

Report No.: 12605452 003

License Holder:

DeSolar Co., Ltd.
No. 2, R&D 2nd Road
Science-Based Industrial Park
Hsinchu, 30076, Taiwan, R. O. C.

Product:

PV Module
Type: D6PxxxA1E
xxx = 110, 115, 120, 125, 130 (for 36 cells)
D6PxxxA2E
xxx = 160, 165, 170, 175, 180, 185, 190 (for 48 cells)
D6PxxxA5E
xxx = 180, 185, 190, 195, 200, 205, 210
(for 54 cells)
D6PxxxA3E
xxx = 200, 205, 210, 215, 220, 225, ~~230~~, 235, 240
(for 60 cells)
D6PxxxA4E
xxx = 250, 255, 260, 265, 270, 275, 280, 285, 290
(for 72 cells)

Manufacturing Plant:

0002-12605452 001

Basis:

- IEC 61215:2005**
EN 61215:2005
"Crystalline silicon terrestrial photovoltaic (PV) modules - Design qualification and type approval"
- Factory Inspection**
To document the consistent quality of the product factory inspections are performed periodically.



- **Periodic inspection**
- **Qualified, IEC 61215**
- **Safety tested, IEC 61730**

Remarks:

Conditions:

The product test is voluntarily according to technical regulations. Any change of the design, materials, components or processing may require the repetition of some of the qualification tests in order to retain type approval.
The certificate is valid until 27 July 2014.

GAIA ENERGY SRL
Corso Cirillo
80028 Grumo Nevano (Na)
Sede CO: Via Borsellino, 118
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Partita IVA 04874961214



Certification body

S. Hartter

Dipl.-Ing. S. Hartter

Yokohama, 29 October 2009

TÜV Rheinland Japan Ltd. – Yokohama 222-0033, Japan

Certificate

Registration No.: PV 50167254

Page 1

Report No.: 12605452 004

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No. 2, R&D 2nd Road
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xxx = 110, 115, 120, 125, 130 (for 36 cells)

D6PxxxA2E

xxx = 160, 165, 170, 175, 180, 185, 190 (for 48 cells)

D6PxxxA5E

xxx = 180, 185, 190, 195, 200, 205, 210

(for 54 cells)

D6PxxxA3E

xxx = 200, 205, 210, 215, 220, 225, **230**, 235, 240

(for 60 cells)

D6PxxxA4E

xxx = 250, 255, 260, 265, 270, 275, 280, 285, 290

(for 72 cells)

Manufacturing Plant:

0002-12605452 002

Basis:



IEC 61730-1:2004

IEC 61730-2:2004

EN 61730-1:2007

EN 61730-2:2007

"Photovoltaic (PV) module safety qualification"



- **Periodic inspection**
- **Qualified, IEC 61215**
- **Safety tested, IEC 61730**



Factory Inspection

To document the consistent quality of the product factory inspections are performed periodically.

Remarks:

- IEC EN 61730 consists of part 1 (Requirements for construction) and part 2 (Requirements for testing).
- The above listed PV modules fulfil the requirements of Application Class A (Safety Class II). They may be used in PV plants at a maximum system voltage (Voc at STC) of up to 1000 VDC.
- The fire test (IEC 61730-2 / MST 23) was not performed.

Conditions:

The product test is voluntarily according to technical regulations. Any change of the design, materials, components or processing may require the repetition of some of the qualification tests in order to retain type approval.

The certificate is valid until 27 July 2014.

GAIA ENERGY SRL

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Sede Via Borsellino, 118
80013 Casandrino (Na)
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Certification body

S. Hartter

Yokohama, 29 October 2009

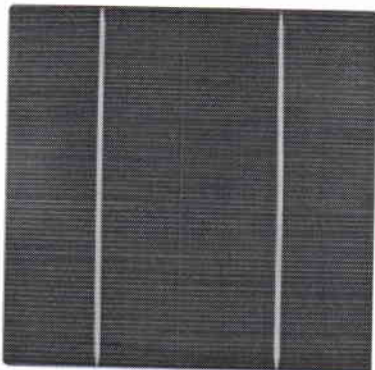
Dipl.-Ing. S. Hartter

TÜV Rheinland Japan Ltd. – Yokohama 222-0033, Japan

D6P

About DelSolar

Founded in 1971, the Delta Group is a global leader in power management and renewable energy solutions. DelSolar, as a subsidiary of Delta Group/Electronics, has become a leading solar cell and module provider with proven process innovation, state-of-art manufacturing technology, world-class cell efficiency, and record productivity yields since its inception in 2004.



A full range of cell processing, including

- Mono- and Multi-crystalline Silicon-based cells
- 6 inch cell size with 2 busbars and 3 busbars
- Wafer thickness of 180 to 200 μm

High efficiency and thin wafer handling capabilities

- Dynamic optimized setting system
- Soft-touch wafer handling system

Robust-in-house automation systems

- Improved quality, efficiency and yield increase
- Highly automated wafer transport system

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Contact DelSolar

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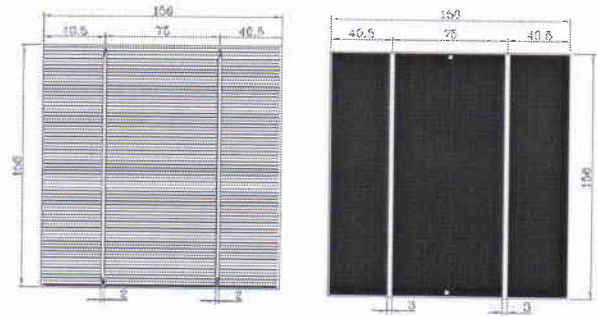
DeSolar

a company of Delta Group

MECHANICAL SPECIFICATION

Product	Multicrystalline silicon solar cell
Dimension	156 mm x 156 mm \pm 0.5 mm
Thickness	200 μ m \pm 30 μ m, 180 μ m \pm 30 μ m
Front	2.0 \pm 0.1 mm busbar (silver) Silicon nitride antireflection coating
Back	3.0 mm continuous soldering pads (silver/ aluminum) Back surface field (aluminum)

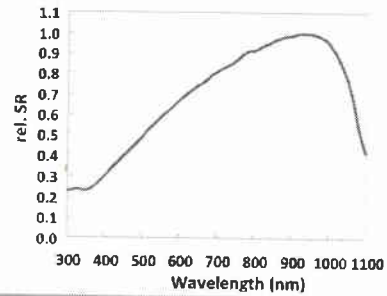
DIMENSION



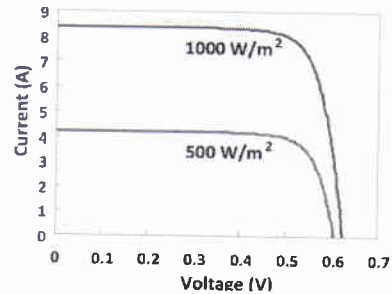
ELECTRICAL PROPERTIES

Series	Efficiency	P_{mp}	V_{oc}	I_{sc}
H	17.0 %	4.14 W	0.625 V	8.45 A
	16.8 %	4.09 W	0.623 V	8.40 A
	16.6 %	4.04 W	0.621 V	8.35 A
	16.4 %	3.99 W	0.619 V	8.30 A
	16.2 %	3.94 W	0.617 V	8.25 A
	16.0 %	3.89 W	0.614 V	8.20 A
G	15.8 %	3.85 W	0.612 V	8.14 A
	15.6 %	3.80 W	0.609 V	8.08 A
	15.4 %	3.75 W	0.607 V	8.02 A
	15.2 %	3.70 W	0.604 V	7.94 A
	15.0 %	3.65 W	0.601 V	7.86 A

SPECTRAL RESPONSE



I-V CURVES



* Testing conditions: 1000 W/m², AM 1.5, 25 °C, Tolerance: Efficiency \pm 0.2% abs., P_{mp} \pm 1.5% rel.

LIGHT INTENSITY DEPENDENCE

Intensity W/m ²	V_{mp} *	I_{mp} *
1000	1	1
800	0.99	0.80
600	0.99	0.60
400	0.97	0.40
200	0.94	0.20

* Ratio of V_{mp}/I_{mp} at reduced intensity to V_{mp}/I_{mp} at 1000 W/m²

TEMPERATURE COEFFICIENTS

Current	4.46 mA/ °K
Voltage	-2.13mV/ °K
Power	-0.44%/ °K

SOLDERING ABILITY

Peel Strength: > 1.0 N/mm (Pull soldered ribbon from busbar in 4 mm/s of 90°)

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QWRD-01-02-04 Ver 1.7

A4)

Scheda tecnica Trasformatori a perdite ridottissime

GAIA ENERGY SRL

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AREZZO - ITALY

TRASFORMATORI DI DISTRIBUZIONE ISOLATI IN RESINA - SERIE 24 KV CAST RESIN TRANSFORMERS FOR DISTRIBUTION - SERIES 24 KV

PERDITE RIDOTTE - REDUCED LOSSES
CEI 14-12 / HD538-1 / DIN42523

Rev. 0 del 01/01/08

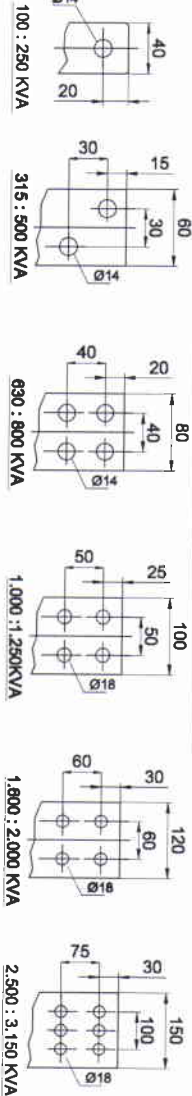
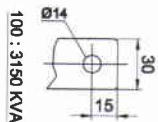
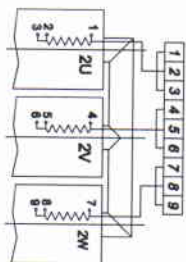
TAB - 24 PR

GAIA ENERGY
Corso Cirillo
80028 Grumo Nevano (Na)
Sede Op: Via Borsellino, 11c
80023 Trosperandino (Na)
Partita IVA 04874961214

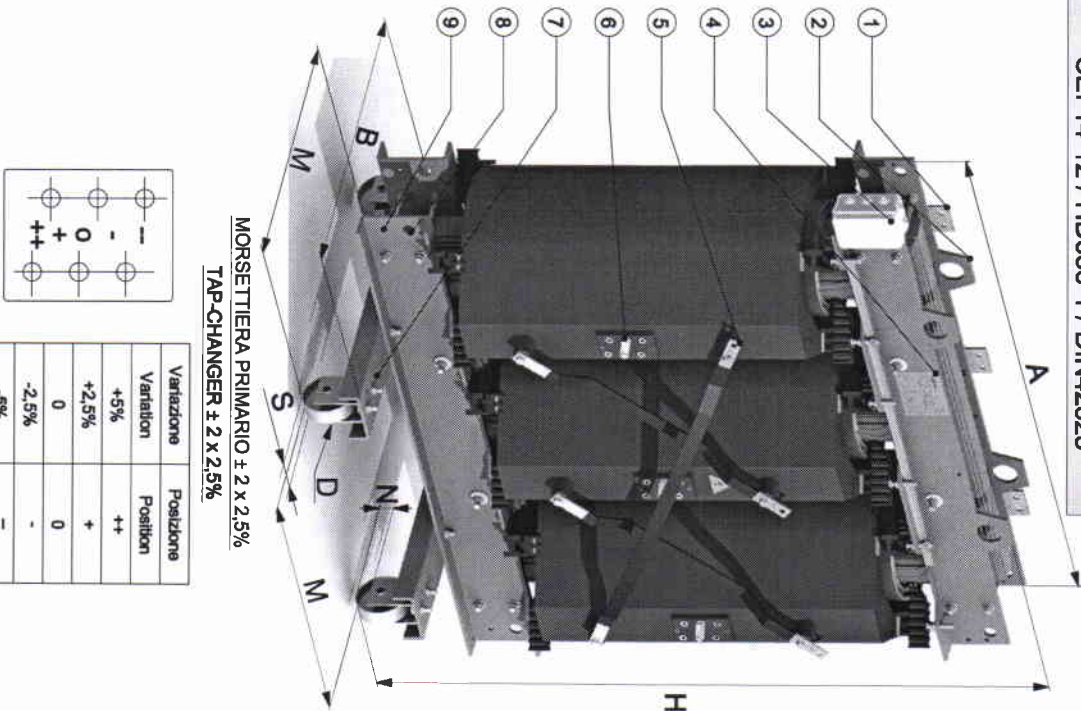
- 1 - Terminale B.T. - Low voltage terminal
- 2 - Goffone di sollevamento - lifting eye
- 3 - Scatola IP55 per PT100 - Connection Box IP55 for PT100
- 4 - Targa caratteristiche - Rating plate
- 5 - Terminale primario - High voltage terminal
- 6 - Morsettiere variazione P - Tap-changer
- 7 - Carrello reversibile - Trolley for shifting
- 8 - Attacchi per traino - Couplers
- 9 - Morsetto di terra - Grounding clamp

SCHEMA COLLEG. PT 100 ohm
CONNECTION OUTLINE PT 100 ohm

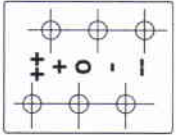
TERMINALE PRIMARIO
HIGH VOLTAGE TERMINAL



TERMINALI BASSA TENSIONE - LOW VOLTAGE TERMINAL



MORSETTIERA PRIMARIO ± 2 x 2,5%
TAP-CHANGER ± 2 x 2,5%



Variazione	Posizione
+5%	++
+2,5%	+
0	0
-2,5%	-
-5%	--

POTENZA Rating KVA	Un./ind	Pc.ciclo 75°C Watt	PERDITE Losses		Vac. %	Io %	Lpa db(A)	A mm	B mm	H mm	M mm	D mm	S mm	N mm	Peso Weight Kg.
			75°C Watt	130°C Watt											
100	380	1.950	2.250	2.3	51	1.100	700	1.150	550	550	520	650	70	50	6.200
160	500	2.600	3.000	2	52	1.120	700	1.200	650	650	520	700	70	50	6.200
250	670	3.300	3.800	1.7	53	1.260	700	1.250	1.000	1.000	520	700	70	50	6.200
315	800	4.000	4.600	1.4	54	1.330	800	1.270	1.100	1.100	520	700	70	50	6.200
400	940	4.800	5.550	1.2	55	1.350	800	1.380	1.200	1.200	520	700	70	50	6.200
500	1.100	5.900	6.800	1.1	56	1.370	800	1.460	1.300	1.300	520	700	70	50	6.200
630	1.270	6.900	7.950	1	57	1.440	800	1.560	1.400	1.400	520	700	70	50	6.200
800	1.500	8.200	9.450	0.9	58	1.470	800	1.660	1.500	1.500	520	700	70	50	6.200
1.000	1.750	9.600	11.050	0.85	60	1.560	1.000	1.860	1.700	1.700	520	700	70	50	6.200
1.250	2.000	11.800	13.600	0.8	63	1.660	1.000	2.030	1.800	1.800	520	700	70	50	6.200
1.600	2.400	14.000	16.100	0.7	64	1.770	1.000	2.120	1.900	1.900	520	700	70	50	6.200
2.000	3.000	17.000	19.550	0.6	65	1.890	1.300	2.300	2.000	2.000	520	700	70	50	6.200
2.500	3.800	20.000	23.000	0.55	66	2.020	1.300	2.370	2.100	2.100	520	700	70	50	6.200
3.150	4.800	23.000	26.450	0.5	67	2.230	1.300	2.450	2.200	2.200	520	700	70	50	6.200

Ci riserviamo di apportare modifiche ai dati sopra riportati senza nessun preavviso - We reserve ourselves to bring modifications to the data without no warning

A 6), A 6.1) e A 6.2)

Vengono confermati i requisiti minimi a base di gara

GAIA ENERGY SRL

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