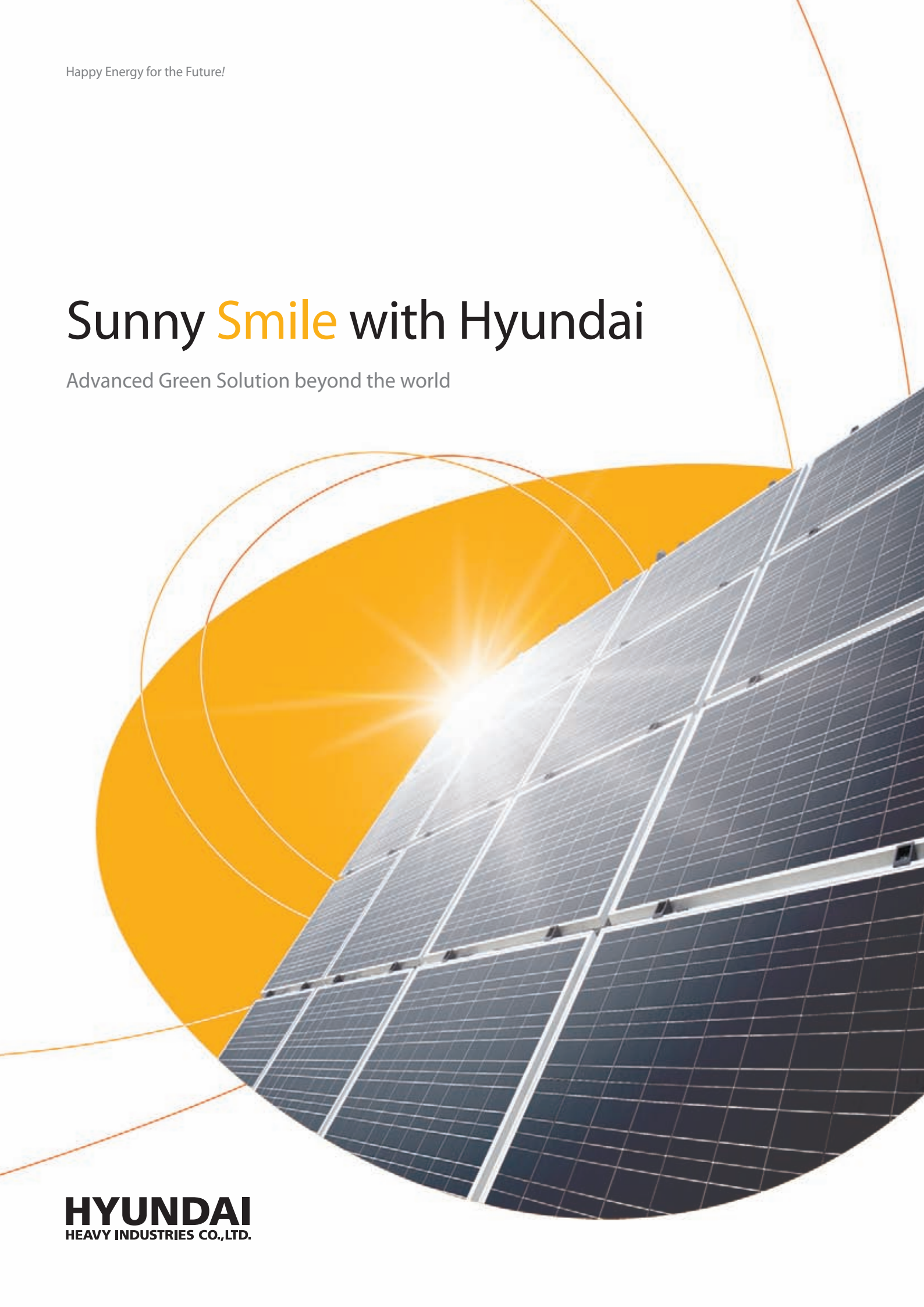


Happy Energy for the Future!

# Sunny Smile with Hyundai

Advanced Green Solution beyond the world

**HYUNDAI**  
HEAVY INDUSTRIES CO.,LTD.





# Hyundai Heavy Industries' Happy Energy for the Future

Hyundai Heavy Industries provides green solution for happy energy.  
Happy energy makes this green planet greener.

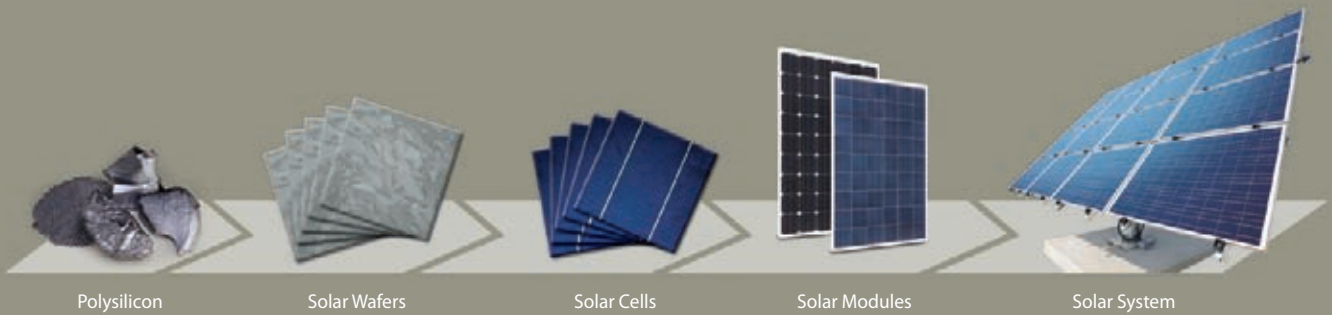
Hyundai Heavy Industries was founded in 1972 and is a Fortune 500 company. We are one of the ten largest companies in South Korea. We deliver Offshore Engineering, Industrial Plant Engineering and produce world class Ships, Engine, Machinery products, Construction equipment, and Green Energy products for clients in various industries around the world. The company employs more than 48,000 people, and had global sales of 60.2 Billion USD in 2012. As one of our core businesses of the company, Hyundai Heavy Industries is committed to develop and invest heavily in the field of renewable energy .

Hyundai Solar is the largest and the longest standing PV cell and module manufacturer in South Korea. We have 600MW of module production capacity and provide high-quality solar PV products to more than 3,000 customers worldwide. We strive to achieve one of the most efficient PV modules by establishing an R&D laboratory and investing more than 20 Million USD on innovative technologies.



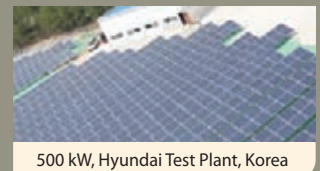
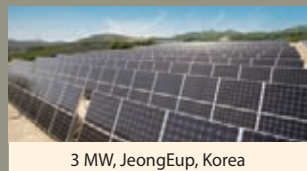
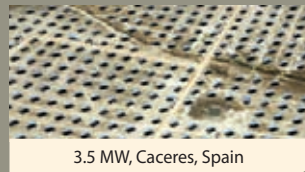
# Solar Power Systems

## Value Chain of HYUNDAI's Solar business

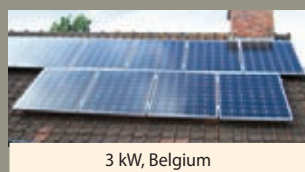
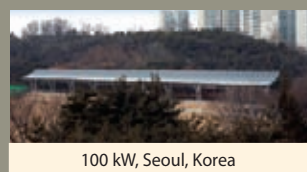
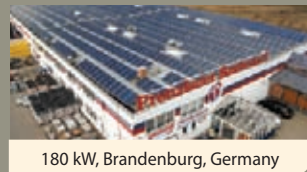
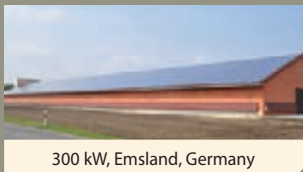


## Major References

### ► Power Plants



### ► Others



## Operating Environment

Nominal Operating Cell Temperature	46°C ± 2
Operating Temperature	-40 - 85°C
Maximum System Voltage	DC 1,000 V (IEC) DC 600 V (UL)

## High Quality

- IEC 61215 (Ed.2) and IEC 61730 by TÜV Rheinland
- UL listed (UL 1703), Class C Fire Rating
- Output power tolerance +3/-0 %
- ISO 9001:2000 and ISO 14001:2004 Certified
- Advanced Mechanical Test (5,400 Pa) Passed (IEC) / Mechanical Load Test (40 lbs/ft<sup>2</sup>) Passed (UL)
- Ammonia Corrosion Resistance Test Passed
- IEC 61701 (Salt Mist Corrosion Test) Passed

## Limited Warranty

- 10 years for product defect
- 10 years for 90 % of warranted min. power
- 25 years for 80 % of warranted min. power

※ For some regions, the warranties will not be applied.

# MG Series

## Mechanical Characteristics

Dimensions	983 mm (38.7") (W) × 1,645 mm (64.76") (L) × 35 mm (1.38") (H)
Weight	Approx. 18.5 kg (40.8 lbs)
Solar cells	60 cells in series (6 × 10 matrix) (Hyundai cell, Made in Korea)
Output cables	4 mm <sup>2</sup> (12AWG) cables with polarized weatherproof connectors, IEC certified (UL listed), Length 1.0 m (39.4")
Junction box	IP65, weatherproof, IEC certified (UL listed)
Bypass diodes	3 bypass diodes to prevent power decrease by partial shade
Construction	Front : High transmission low-iron tempered glass, 3.2 mm (0.126") Encapsulant : EVA Back Sheet : Weatherproof film
Frame	Clear anodized aluminum alloy type 6063



## Electrical Characteristics

### ► Multi-crystalline Type

		HiS-M□□□MG		
		240	245	250
Nominal output (Pmpp)	W	240	245	250
Voltage at Pmax (Vmpp)	V	30.5	30.7	30.9
Current at Pmax (Impp)	A	7.9	8.0	8.1
Open circuit voltage (Voc)	V	37.7	38.0	38.2
Short circuit current (Isc)	A	8.3	8.4	8.6
Output tolerance	%	+3/-0		
No. of cells & connections	pcs	60 in series		
Cell type	-	6" Multi-crystalline silicon (Hyundai cell, Made in Korea)		
Module efficiency	%	14.8	15.2	15.5
Temperature coefficient of Pmpp	%/K	-0.43	-0.43	-0.43
Temperature coefficient of Voc	%/K	-0.32	-0.32	-0.32
Temperature coefficient of Isc	%/K	0.048	0.048	0.048

※ All data at STC (Standard Test Conditions). Above data may be changed without prior notice.

### ► Mono-crystalline Type

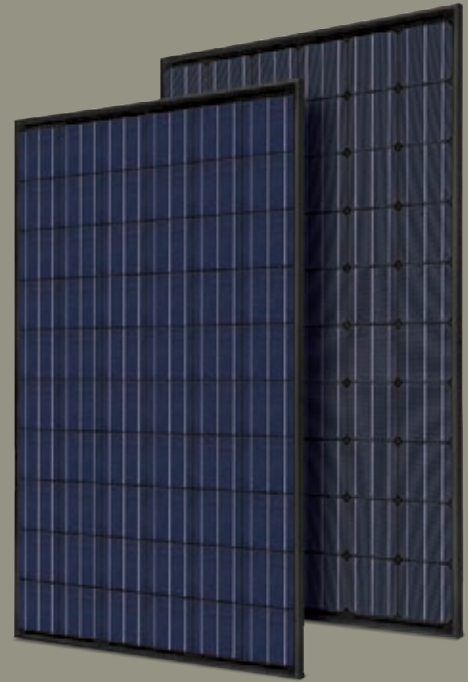
		HiS-S□□□MG		
		255	260	265
Nominal output (Pmpp)	W	255	260	265
Voltage at Pmax (Vmpp)	V	30.8	31.0	31.2
Current at Pmax (Impp)	A	8.3	8.4	8.4
Open circuit voltage (Voc)	V	37.7	37.8	37.9
Short circuit current (Isc)	A	8.8	8.9	9.0
Output tolerance	%	+3/-0		
No. of cells & connections	pcs	60 in series		
Cell type	-	6" Mono-crystalline silicon (Hyundai cell, Made in Korea)		
Module efficiency	%	15.8	16.1	16.4
Temperature coefficient of Pmpp	%/K	-0.45	-0.45	-0.45
Temperature coefficient of Voc	%/K	-0.33	-0.33	-0.33
Temperature coefficient of Isc	%/K	0.032	0.032	0.032

※ All data at STC (Standard Test Conditions). Above data may be changed without prior notice.

# Black-Black MG Series

## Mechanical Characteristics

Dimensions	983 mm (38.7")(W) × 1,645 mm (64.76")(L) × 35 mm (1.38")(H)
Weight	Approx. 19.0 kg (41.9 lbs)
Solar cells	60 cells in series (6 X 10 matrix) (Hyundai cell, Made in Korea)
Output cables	4 mm <sup>2</sup> (12AWG) cables with polarized weatherproof connectors, IEC certified (UL listed), Length 1.0 m (39.4")
Junction box	IP65, weatherproof, IEC certified (UL listed)
Bypass diodes	3 bypass diodes to prevent power decrease by partial shade
Construction	Front : High transmission low-iron tempered glass, 3.2 mm (0.126") Encapsulant : EVA Back Sheet : Weatherproof film
Frame	Clear anodized aluminum alloy type 6063 (Black)



## Electrical Characteristics

### ► Multi-crystalline Type

		HIS-M□□□MG		
		240	245	250
Nominal output (Pmpp)	W	240	245	250
Voltage at Pmax (Vmpp)	V	30.5	30.7	30.9
Current at Pmax (Impp)	A	7.9	8.0	8.1
Open circuit voltage (Voc)	V	37.7	38.0	38.2
Short circuit current (Isc)	A	8.3	8.4	8.6
Output tolerance	%	+3/-0		
No. of cells & connections	pcs	60 in series		
Cell type	-	6" Multi-crystalline silicon (Hyundai cell, Made in Korea)		
Module efficiency	%	14.8	15.2	15.5
Temperature coefficient of Pmpp	%/K	-0.43	-0.43	-0.43
Temperature coefficient of Voc	%/K	-0.32	-0.32	-0.32
Temperature coefficient of Isc	%/K	0.048	0.048	0.048

※ All data at STC (Standard Test Conditions). Above data may be changed without prior notice.

### ► Mono-crystalline Type

		HIS-S□□□MG		
		250	255	260
Nominal output (Pmpp)	W	250	255	260
Voltage at Pmax (Vmpp)	V	30.5	30.8	31.0
Current at Pmax (Impp)	A	8.2	8.3	8.4
Open circuit voltage (Voc)	V	37.5	37.7	37.8
Short circuit current (Isc)	A	8.7	8.8	8.9
Output tolerance	%	+3/-0		
No. of cells & connections	pcs	60 in series		
Cell type	-	6" Mono-crystalline silicon (Hyundai cell, Made in Korea)		
Module efficiency	%	15.5	15.8	16.1
Temperature coefficient of Pmpp	%/K	-0.45	-0.45	-0.45
Temperature coefficient of Voc	%/K	-0.33	-0.33	-0.33
Temperature coefficient of Isc	%/K	0.032	0.032	0.032

※ All data at STC (Standard Test Conditions). Above data may be changed without prior notice.

# MI Series

## Mechanical Characteristics

Dimensions	987 mm (38.86")(W) × 1,965.5 mm (77.38")(L) × 50 mm (1.97")(H)
Weight	Approx. 29.0 kg (63.8 lbs)
Solar cells	72 cells in series (6 × 12 matrix) (Hyundai cell, Made in Korea)
Output cables	4 mm <sup>2</sup> (12AWG) cables with polarized weatherproof connectors, IEC certified (UL listed), Length 1.2 m (47.2")
Junction box	IP65, weatherproof, IEC certified (UL listed)
Bypass diodes	3 bypass diodes to prevent power decrease by partial shade
Construction	Front : High transmission low-iron tempered glass, 4.0 mm (0.157") Encapsulant : EVA Back Sheet : Weatherproof film
Frame	Clear anodized aluminum alloy type 6063



## Electrical Characteristics

### ► Multi-crystalline Type

		HiS-M□□□MI		
		290	295	300
Nominal output (Pmpp)	W	290	295	300
Voltage at Pmax (Vmpp)	V	37.0	37.3	37.7
Current at Pmax (Impp)	A	7.9	7.9	8.0
Open circuit voltage (Voc)	V	45.1	45.4	45.7
Short circuit current (Isc)	A	8.3	8.3	8.3
Output tolerance	%	+3/-0		
No. of cells & connections	pcs	72 in series		
Cell type	-	6" Multi-crystalline silicon (Hyundai cell, Made in Korea)		
Module efficiency	%	14.9	15.2	15.5
Temperature coefficient of Pmpp	%/K	-0.43	-0.43	-0.43
Temperature coefficient of Voc	%/K	-0.32	-0.32	-0.32
Temperature coefficient of Isc	%/K	0.048	0.048	0.048

※ All data at STC (Standard Test Conditions). Above data may be changed without prior notice.

### ► Mono-crystalline Type

		HiS-S□□□MI		
		305	310	315
Nominal output (Pmpp)	W	305	310	315
Voltage at Pmax (Vmpp)	V	37.6	37.8	38.0
Current at Pmax (Impp)	A	8.0	8.2	8.3
Open circuit voltage (Voc)	V	45.6	45.9	46.1
Short circuit current (Isc)	A	8.4	8.5	8.5
Output tolerance	%	+3/-0		
No. of cells & connections	pcs	72 in series		
Cell type	-	6" Mono-crystalline silicon (Hyundai cell, Made in Korea)		
Module efficiency	%	15.7	16.0	16.2
Temperature coefficient of Pmpp	%/K	-0.45	-0.45	-0.45
Temperature coefficient of Voc	%/K	-0.33	-0.33	-0.33
Temperature coefficient of Isc	%/K	0.032	0.032	0.032

※ All data at STC (Standard Test Conditions). Above data may be changed without prior notice.

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