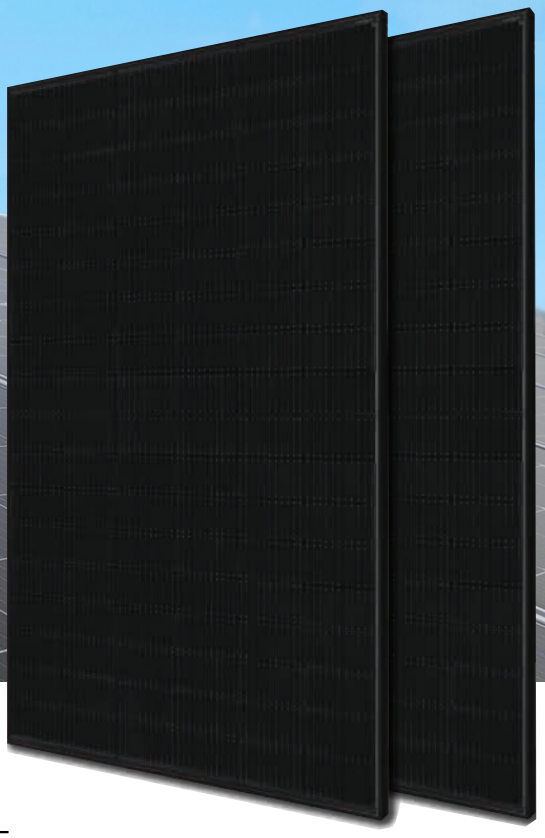
VH SOLAR
renewable energy solutions

Mono

405W MBB Half-Cell Black Module 400-420-54MHPH

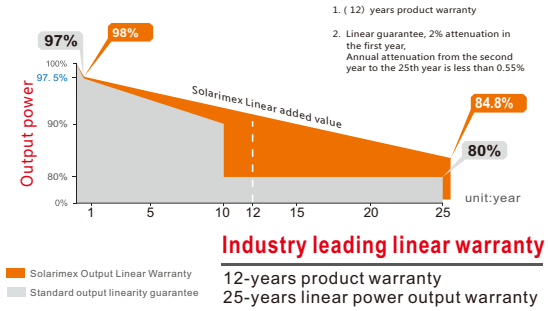


Module features

High efficiency PERC cell with multi main gate can effectively reduce the cost of single watt system with higher output power;
The product has excellent performance in shielding loss and temperature coefficient, Combined with cell cutting technology, the risk of hot spot of high-power components is effectively reduced, which shows better performance in system application Power generation performance and reliability.

- MBB technology with Circular Ribbon
- Half-cell Technology
- Higher output power
- Lower LCOE
- Load certificates: wind to 2400Pa and snow to 5400Pa
- Certified for salt/ammonia corrosion resistance

12 years
product warranty



Industry leading linear warranty

12-years product warranty
25-years linear power output warranty

30 years
linear power output warranty

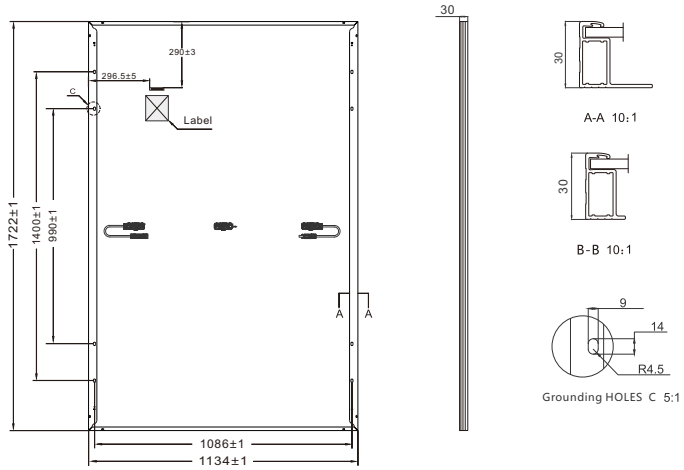
IEC 61215,
IEC 61730,
IEC TS 62941(Quality System)

www.vh-solar.com

VH SOLAR
renewable energy solutions

(400~420)-54MHPH

Engineering Drawings



Back Side

Mechanical characteristics

Cell Type	Monocrystalline 182*182mm ,
No.of cells	108 (6 x 18) pieces in series and parallel
Dimension	1134*1722*30mm
Weight	21.3 Kg
Glass	High transparency, low iron, AR coated tempered glass 3.2 mm
Frame	Anodized aluminum alloy
Junction Box	IP68 rated, with 3 bypass diode
Output Cables	4 mm² (EU)/12 AWG (US), 300mm Cable length

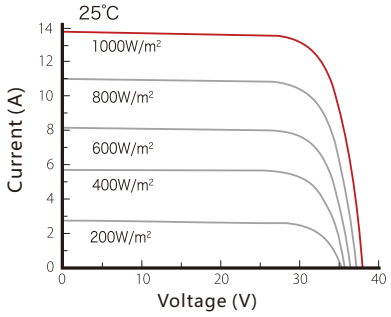
Note: frame / back panel color & cable length can be customized as required

Packaging Configuration

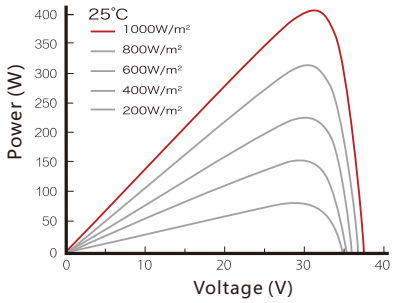
Packaging Configuration	36 pcs/ pallet	(Two pallets=One stack)
		72pcs/stack
		936pcs/40'HQ Container

I-V Curve

I-V Curves at Different Irradiances
410-54MHPH



Power curve under different irradiance
410-54MHPH



Electrical Performance (STC)

Model Number	400	405	410	415	420
Maximum Power (Pmax/W)	400	405	410	415	420
Open Circuit Voltage (Voc/V)	37.21	37.40	37.59	37.77	37.95
Short Circuit Current (Isc/A)	13.74	13.81	13.88	13.95	14.02
Voltage at Maximum Power (Vmp/V)	31.11	31.30	31.49	31.68	31.87
Current at Maximum Power (Imp/A)	12.86	12.94	13.02	13.10	13.18
Module Efficiency(%)	20.5	20.7	21.0	21.3	21.5

Electrical Performance (NOTC)

Model Number	400	405	410	415	420
Maximum Power (Pmax/W)	301.9	306.3	310.6	315.0	319.3
Open Circuit Voltage (Voc/V)	34.01	34.20	34.39	34.57	34.75
Short Circuit Current (Isc/A)	11.57	11.64	11.71	11.78	11.85
Voltage at Maximum Power (Vmp/V)	28.01	28.20	28.39	28.58	28.77
Current at Maximum Power (Imp/A)	10.78	10.86	10.94	11.02	11.10

Working parameters

Operational Temperature	-40℃~+85℃
Maximum System Voltage	1500V DC
Maximum Series Fuse Rating	25A
Power Output Tolerance	0~+4.99W
Voc and Isc Tolerance	±3%
Nominal Operating Cell Temperature(NOTC)	45±2℃
Safety Class	Class Ⅱ
Fire Rating	Class A

Temperature Ratings(STC)

Temperature Coefficient of Pmax	-0.35%/℃
Temperature Coefficient of Voc	-0.28%/℃
Temperature Coefficient of Isc	+0.044%/℃

Mechanical Loading

Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Hailstone Test	25mm Hailstone at the speed of 23m/s

Remark: Electrical data do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.

Due to continuous updating, R & D and product improvement, VH reserves the right to adjust the information in this technical parameter document at any time without prior notice.

STC(Standard test environment): AM1.5, Irradiance 1000W/㎡ , 25°C)
NOCT(Nominal operating temperature of cell):AM1.5, Irradiance 800W/㎡, Ambient 20°C, Wind 1m/s