

1KOMMA5°

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3.1 MODULE



N-Type Topcon module

- * Fullblack
- * Double glass
- * Bifacial



High Power up to 470 Wp



1KOMMA5° Warranty

- * 30 years product
- * 30 years linear performance warranty

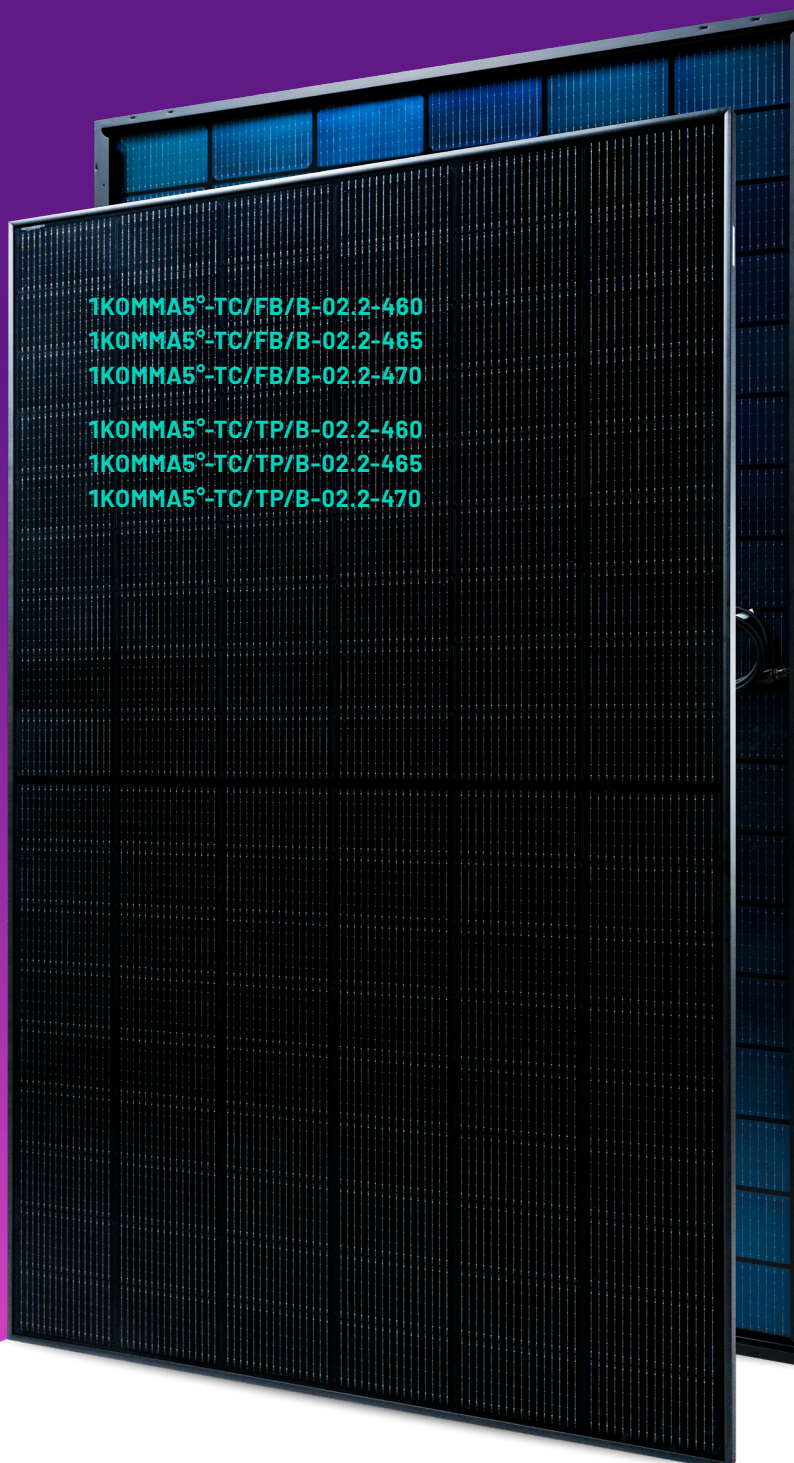


Highest Quality

- and standards
- * PFAS free
- * Zero carbon factory



Designed in DE



1KOMMA5° 3.1 MODULE

MODULE SPECIFICATION

Cell type	N type Mono-crystalline, 96 (6 × 16)
Dimensions [L × W × H, mm]	1,762 × 1,134 × 30
Weight [kg]	24.0
Front	2 mm heat strengthened glass, Anti-reflective coating
Rear	2 mm heat strengthened glass
Junction box	3 Diodes, IP68 » IEC 62790
Cable [mm]	4 mm ² / Portrait: 300 (+)/200 (-) Landscape: 1,100 (+)/1,100 (-) Length can be customized
Plug type (IEC)	PV-ZH202B or MC4-EVO 2A

ELECTRICAL SPECIFICATIONS¹

1KOMMA5°-TC/FB/B-02.2- 1KOMMA5°-TC/TP/B-02.2-	460		465		470	
Test conditions	STC ²	BNPI ³	STC ²	BNPI ³	STC ²	BNPI ³
Nominal power [Pmpp/Wp]	460	508	465	514	470	519
Nominal voltage [Vmpp/V]	30.95	30.99	31.21	31.25	31.47	31.51
Nominal current [Impp/A]	14.87	16.41	14.91	16.45	14.95	16.50
Open circuit voltage [Voc/V]	36.32	36.32	36.46	36.46	36.60	36.60
Short-circuit current [Isc/A]	15.83	17.42	15.88	17.47	15.93	17.53
Efficiency [%]	23		23.3		23.5	

BIFACIAL POWER GAIN

10 % P _{max} (STC)[Wp]	497	502	508
20 % P _{max} (STC)[Wp]	534	539	545
30 % P _{max} (STC)[Wp]	570	577	583

MODULE CHARACTERISTICS

Maximum System Voltage [V]	1,500 DC (IEC)
Overcurrent Protection Rating [A]	30
Power Output Tolerance [%]	0~3
Max. Test Load, Push/Pull [Pa]	Front 5,400 / Back 2,400
Max. Design Load, Push/Pull (Pa)	Front 3,600 / Back 1,600
Annual Degradation (1st year)	≤ 1.0 %
Annual Degradation (2nd – 30th year)	Max. 0.4 % per year
Protection Class	II
Fire Protection Class	UL Type 29 IEC Class C
Hail Class	HW3 ₄

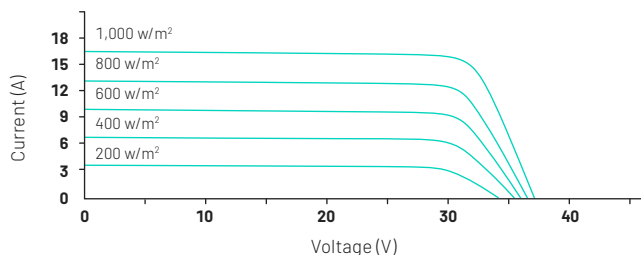
TEMPERATURE CHARACTERISTICS

Nominal Module Operating Temperature [NMOT]	42±2°C
Temperature Coefficient [P _{mpp}]	-0.29 %/°C
Temperature Coefficient [V _{oc}]	-0.25 %/°C
Temperature Coefficient [I _{sc}]	+0.048 %/°C
Operating Temperature [°C]	-40 to +85

¹ Measurements according to IEC 60904-3, Measurement tolerance: I_{sc}: ±4%, V_{oc}: ±3%, Test uncertainty for P_{max}: ±3%, Bifaciality: 80%±5% ² STC Radiation 1,000 W/m², Module temperature 25°C, AM = 1.5 ³ BNPI Front radiation 1,000 W/m², Rear radiation 135 W/m², Module temperature 25°C, AM = 1.5 ⁴ Reference diameter of ice balls-VKF 30mm, ice ball storage temperature -20°C ⁴ Reference diameter of ice balls-VKF 30mm, ice ball storage temp -20°C.

POWER CURVES

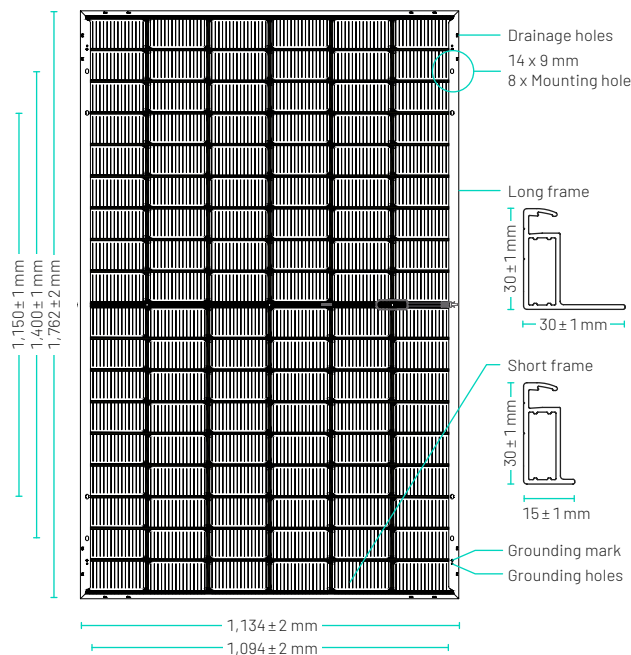
Current-voltage curve (470 W)



PACKAGING INFORMATION

Container	40' HQ
Pallet dimensions [L × W × H, mm]	1,800 × 1,140 × 1,250
Pieces per pallet	36
Pieces per container	936

TECHNICAL DRAWING



CERTIFICATIONS

IEC 61215, IEC 61730

Additional Certificates on request



IEC 61215
IEC 61730
Regular Production
Surveillance
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