

Prüfbericht-Nr.: <i>Test report no.:</i>	Auftrags-Nr.: 244591111 <i>Order no.:</i>	Seite 1 von 50 Page 1 of 50
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	2062211	Auftragsdatum: 23/01/2024 <i>Order date:</i>
Auftraggeber: <i>Client:</i>	Zhejiang Aiko Solar Technology Co., Ltd. No.655, Haopai Road, Suxi Town, Yiwu 322009 Zhejiang, P.R.China	
Prüfgegenstand: <i>Test item:</i>	Photovoltaic (PV) module	
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	See module type designation on page 3-4	
Auftrags-Inhalt: <i>Order content:</i>	Design qualification and type approval of photovoltaic (PV) modules	
Prüfgrundlage: <i>Test specification:</i>	Photovoltaic (PV) modules Testing follow Client's Requirements according to IEC 61215-2:2021	
Wareneingangsdatum: <i>Date of sample receipt:</i>	10/01/2024	
Prüfmuster-Nr.: <i>Test sample no.:</i>	See clause 6	
Prüfzeitraum: <i>Testing period:</i>	01/02/2024 - 01/03/2024	
Ort der Prüfung: <i>Place of testing:</i>	Refer to page 9	
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shanghai) Co., Ltd.	
Prüfergebnis*: <i>Test result*:</i>	Pass	
geprüft von: <i>tested by:</i> Elle Hu	x 	genehmigt von: <i>authorized by:</i> Jiayu Song
Datum: <i>Date:</i> 03/11/2025		x 
Stellung / Position: Project engineer		Ausstellungsdatum: <i>Issue date:</i> 03/11/2025
Stellung / Position: Authorizer		
Sonstiges / <i>Other:</i> - Testing follow Client's Requirements according to IEC 61215-2:2021 for module types listed on page 3-4.		
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>
* Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet * Legend: P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested		
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Anmerkungen
Remarks

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3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. <i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i> <i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i>
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2023, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. <i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2023, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i>

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Produktbeschreibung
Product description

I	General
1	New module types: Max. System Voltage: Up to 1500 VDC (Voc at STC): With 1/2 cut of mono c-Si cells (Under STC): AIKO-Axxx-MAH78Dw (xxx=650-685, in steps of 5, 156 cells) AIKO-Axxx-MAH72Dw (xxx=585-630, in steps of 5, 144 cells) AIKO-Axxx-MAH60Dw (xxx=490-525, in steps of 5, 120 cells) AIKO-Axxx-MAH54Dw (xxx=440-475, in steps of 5, 108 cells) AIKO-Axxx-MAH72Db (xxx=585-620, in steps of 5, 144 cells) AIKO-Axxx-MAH60Db (xxx=490-515, in steps of 5, 120 cells) AIKO-Axxx-MAH54Db (xxx=440-475, in steps of 5, 108 cells) AIKO-Axxx-MAE78Dw (xxx=650-685, in steps of 5, 156 cells) AIKO-Axxx-MAE72Dw (xxx=600-630, in steps of 5, 144 cells) AIKO-Axxx-MAE60Dw (xxx=500-525, in steps of 5, 120 cells) AIKO-Axxx-MCE60Dw (xxx=490-555, in steps of 5, 120 cells) AIKO-Axxx-MCE54Dw (xxx=445-500, in steps of 5, 108 cells) AIKO-Axxx-MCE60Db (xxx=490-555, in steps of 5, 120 cells) AIKO-Axxx-MCE54Db (xxx=445-500, in steps of 5, 108 cells) AIKO-Axxx-MDE72Dw (xxx=610-675, in steps of 5, 144 cells) AIKO-Axxx-MDE60Dw (xxx=510-560, in steps of 5, 120 cells) AIKO-Axxx-MDE54Dw (xxx=460-505, in steps of 5, 108 cells) AIKO-Axxx-GRH78Dw (xxx=740-790, in steps of 5, 156 cells) AIKO-Axxx-GRH66Dw (xxx=610-665, in steps of 5, 132 cells) AIKO-Gxxx-MCH72Dw (xxx=610-655, in steps of 5, 144 cells) AIKO-Gxxx-MCH60Dw (xxx=500-545, in steps of 5, 120 cells) AIKO-Gxxx-MCH54Dw (xxx=460-490, in steps of 5, 108 cells) With 1/2 cut of mono c-Si cells (Under BNPI): AIKO-Axxx-MAH78Dw (xxx=690-725, in steps of 5, 156 cells) AIKO-Axxx-MAH72Dw (xxx=615-660, in steps of 5, 144 cells) AIKO-Axxx-MAH60Dw (xxx=515-550, in steps of 5, 120 cells) AIKO-Axxx-MAH54Dw (xxx=460-495, in steps of 5, 108 cells) AIKO-Axxx-MAH72Db (xxx=615-650, in steps of 5, 144 cells) AIKO-Axxx-MAH60Db (xxx=515-540, in steps of 5, 120 cells) AIKO-Axxx-MAH54Db (xxx=460-495, in steps of 5, 108 cells) AIKO-Axxx-MAE78Dw (xxx=685-720, in steps of 5, 156 cells) AIKO-Axxx-MAE72Dw (xxx=630-660, in steps of 5, 144 cells) AIKO-Axxx-MAE60Dw (xxx=525-550, in steps of 5, 120 cells)

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Produktbeschreibung
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AIKO-Axxx-MCE60Dw (xxx=520-585, in steps of 5, 120 cells)
AIKO-Axxx-MCE54Dw (xxx=470-525, in steps of 5, 108 cells)
AIKO-Axxx-MCE60Db (xxx=520-585, in steps of 5, 120 cells)
AIKO-Axxx-MCE54Db (xxx=470-525, in steps of 5, 108 cells)
AIKO-Axxx-MDE72Dw (xxx=645-710, in steps of 5, 144 cells)
AIKO-Axxx-MDE60Dw (xxx=540-590, in steps of 5, 120 cells)
AIKO-Axxx-MDE54Dw (xxx=485-530, in steps of 5, 108 cells)

AIKO-Axxx-GRH78Dw (xxx=815-865, in steps of 5, 156 cells)
AIKO-Axxx-GRH66Dw (xxx=660-715, in steps of 5, 132 cells)

AIKO-Gxxx-MCH72Dw (xxx=665-710, in steps of 5, 144 cells)
AIKO-Gxxx-MCH60Dw (xxx=545-590, in steps of 5, 120 cells)
AIKO-Gxxx-MCH54Dw (xxx=500-530, in steps of 5, 108 cells)

xxx represents output power in Wp

2

Used materials

3

Address(es) of the manufacturing site(s)

Name / Description:	Guangdong Aiko Solar Technology Co., Ltd.
Street:	No.3, South Qili Avenue, Leping town, Sanshui District
Postcode / City, Country:	Foshan 528137 Guangdong, P.R.China
Type of production:	Crystalline PV-module
Inspection report No / Date:	CN22RFK9 005 / 30/09/2025

Name / Description:	Zhuhai Fushan Aiko Solar Technology Co., Ltd.
Street:	No.681, Fuguo Road, Doumen District
Postcode / City, Country:	Zhuhai 519175 Guangdong, P.R.China
Type of production:	Crystalline PV-module
Inspection report No / Date:	CN23G279 004 / 29/09/2025

Name / Description:	Zhejiang Aiko Solar Technology Co., Ltd.
Street:	No.888, Longqi Road, Suxi Town
Postcode / City, Country:	Yiwu 322009 Zhejiang, P.R.China
Type of production:	Crystalline PV-module
Inspection report No / Date:	CN244YJV 002 / 02/01/2025

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Produktbeschreibung
Product description

Name / Description:	Shandong Aiko Solar Technology Co., Ltd.
Street:	No.168, Zhongxing Avenue, Sungeng Street, Start-up District
Postcode / City, Country:	Jinan 250000 Shandong, P.R.China
Type of production:	Crystalline PV-module
Inspection report No / Date:	CN256MAB 001/ 04/03/2025
Name / Description:	Huansheng new energy (Tianjin) Co., Ltd
Street:	No. 750, Shenzhou Avenue, South District of future science and Technology City, Binhai high tech Zone
Postcode / City, Country:	Tianjin, P.R. China
Type of production:	Crystalline PV-module
Inspection report No / Date:	CN25AV9N 001/ 17/04/2025
Name / Description:	Guangzhou Gokin Solar Technology Co., Ltd.
Street:	No.2, Hejin Avenue, Automobile Industry Base, Huadu District
Postcode / City, Country:	Guangzhou City 510800 Guangdong, P.R. China
Type of production:	Crystalline PV-module
Inspection report No / Date:	CN258EG8 001/ 07/05/2025
Name / Description:	Huayao Green Energy Technology (Lankao County) Co., Ltd.
Street:	(State Power Investment Corporation) SPIC New Energy Industrial Park, Lankao County
Postcode / City, Country:	Kaifeng, Henan, P.R. China
Type of production:	Crystalline PV-module
Inspection report No / Date:	CN25UQCN 001/ 22/05/2025

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Produktbeschreibung
Product description

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Summary of test results

- Testing follow Client's Requirements according to IEC 61215-2:2021 for module types as listed in section 1.
 - The tests have been performed on AIKO-G630-MCH72Dw (144 pcs of ½ cut mono c-Si solar cell) with bill of materials as listed on page 11 as representative model. The test results are presented within this test report.
 - Below model types were introduced base on representative module type, the only different is solar cell type,
 1. AIKO-Axxx-MAH78Dw / AIKO-Axxx-MAH72Dw & AIKO-Axxx-MAH72Db / AIKO-Axxx-MAH60Dw & AIKO-Axxx-MAH60Db / AIKO-Axxx-MAH54Dw & AIKO-Axxx-MAH54Db are for module with 156/144/120/108 pcs of ½ cut 182×184-12BB BC, 182×184-20BB BC, 182×184-NBB BC, 182.2×187.75-20BB BC, 182.2×187.75-NBB BC solar cell.
 2. AIKO-Axxx-MAE78Dw / AIKO-Axxx-MAE72Dw / AIKO-Axxx-MAE60Dw are for module with 156/144/120 pcs of ½ cut 182.2×187.75-NBB BC solar cell.
 3. AIKO-Axxx-MCE60Dw & AIKO-Axxx-MCE60Db / AIKO-Axxx-MCE54Dw & AIKO-Axxx-MCE54Db are for module with 120/108 pcs of ½ cut 182.2×192.5-NBB BC solar cell.
 4. AIKO-Axxx-MDE72Dw / AIKO-Axxx-MDE60Dw / AIKO-Axxx-MDE54Dw are for module with 144/120/108 pcs of ½ cut 182.2×196.2-NBB BC solar cell.
 5. AIKO-Axxx-GRH78Dw / AIKO-Axxx-GRH66Dw are for module with 156/132 pcs of ½ cut 182.2×210-20BB BC, 182.3×210-NBB BC, 183×210-NBB BC solar cell.
 6. AIKO-Gxxx-MCH72Dw / AIKO-Gxxx-MCH60Dw / AIKO-Gxxx-MCH54Dw are for module with 144/120/108 pcs of ½ cut 182.2×192.5-20BB BC solar cell.
- Remark: Letters "w" is introduced for white module; Letters "b" is introduced for black module.

- necessary for the following modifications.

Object	Manufacturer / trademark	Type / model	Technical data / ratings	Additional information
Solar cell 1	Manufactory 1: Guangdong Aiko Solar Technology Co., Ltd. Manufactory 2: Tianjin Aiko Solar Technology Co., Ltd. Manufactory 3: Zhejiang Aiko Solar Technology Co., Ltd. Manufactory 4: Zhuhai Fushan Aiko Solar Technology Co., Ltd.	182×184-12BB BC	Mono c-Si BC cell with 12 busbars 182mm×92mm(±0.5mm) ×135± 30µm	1. The production process and surface treatment process are the same for below cells: 182×184-12BB BC, 182.2×187.75-20BB BC, 182.2×192.5-20BB BC, 182×184-20BB BC, 182.2×187.75-NBB BC, 182×184-NBB BC, 182.2×210-20BB BC, 182.2×192.5-NBB BC, 182.2×196.2-NBB BC, 182.3×210-NBB BC, just 183×210-NBB BC, just
Solar cell 2		182.2×187.75-20BB BC	Mono c-Si BC cell with 20 busbars 182.2mm×93.875mm (±0.5mm)×131± 15µm	
Solar cell 3		182×184-20BB BC	Mono c-Si BC cell with 20 busbar 182mm×92mm(±0.5mm) ×135±30µm	
Solar cell 4		182.2×187.75-NBB BC	Mono c-Si BC cell with 0 busbar 182.2mm×93.875mm (±0.5mm)×140±15µm	
Solar cell 5		182×184-NBB BC	Mono c-Si BC cell with 0 busbar 182mm×92mm(±0.5mm) ×140±15µm	
Solar cell 6		182.2×210-20BB BC	Mono c-Si BC cell with 20 busbar 182.2mm×105mm (±0.5mm)×130±20µm	

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	Solar cell 7		182.2×192.5-NBB BC	Mono c-Si BC cell with 0 busbars 182.2mm×96.25mm (±0.5mm)×135±15µm	the cell size and the number of busbar is different.
	Solar cell 8		182.2×196.2-NBB BC	Mono c-Si BC cell with 0 busbars 182.2mm×98.1mm (±0.5mm)×135±15µm	
	Solar cell 9		182.3×210-NBB BC	Mono c-Si BC cell with 0 busbars 182.3mm×105mm (±1.0mm)×135±20µm	
	Solar cell 10		183×210-NBB BC	Mono c-Si BC cell with 0 busbars 91.5mm×210mm (±1.0mm)×130±15µm	

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Absatz	Photovoltaic (PV) modules	Messergebnisse - Bemerkungen	Ergebnis
<i>Clause</i>	<i>Anforderungen - Prüfungen / Requirements - Tests</i>	<i>Measuring results - Remarks</i>	<i>Result</i>

5	Test specification		
	IEC 61215-1:2021; EN 61215-1:2021: Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1: Test requirements	N/A	—
	IEC 61215-1-1:2021; EN 61215-1-1:2021: Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-1: Special requirements for testing of crystalline silicon photovoltaic (PV) modules	N/A	
	IEC 61215-2:2021; EN 61215-2:2021: Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 2: Test procedures	applicable	
	IEC 61730-1:2023; EN IEC 61730-1:2018: Photovoltaic (PV) module safety qualification – Part 1: Requirements for construction	N/A	
	IEC 61730-2:2023; EN IEC 61730-2:2018: Photovoltaic (PV) module safety qualification – Part 2: Requirements for testing	N/A	

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Clause	Anforderungen - Prüfungen / <i>Requirements - Tests</i>	<i>Measuring results - Remarks</i>	<i>Result</i>

6	List of test samples		
☐ The modules tested were taken at random from a production batch and subjected to manufacturer's normal quality control and inspection for safety testing			
☒ The modules tested were prototypes of a new design and not taken from a production batch.			
Module type: AIKO-G630-MCH72Dw			
Sample no.	Sample SN	Test sequence	Remarks / constructional characteristics (e.g. cell, backsheet, frame type)
1	Y1124107G0218000387	A	
2	Y1124105G0216000243	E2	
3	Y1124105G0216000182	E2	
Supplementary information: See test chart in Appendix A for full test sequences.			

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III	IEC 61215-2:2021 and IEC 61730-2:2023 – Test procedures
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9	Overview of tests and test results
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Initial examination	—	—
Visual inspection (MQT 01 / MST 01)	See table 9.1	P
Insulation test (MQT 03 / MST 16)	See table 9.2	P
Wet leakage current test (MQT 15 / MST 17)	See table 9.3	P
Accessibility test (MST 11)	N/A	N/A
Continuity test of equipotential bonding (MST 13)	N/A	N/A
Maximum power determination (MQT 02 / MST 03)	N/A	N/A
Initial stabilization (MQT 19.1)	N/A	N/A
Performance at STC (MQT 06.1 / MST 03)	See table 9.8	N/A
Gate #1 evaluation	N/A	N/A

Sequence A	—	—
Measurement of temperature coefficients (MQT 04)	N/A	N/A
Performance at low irradiance (MQT 07)	N/A	N/A

Sequence B1	—	—
Outdoor exposure test (MQT 08)	N/A	N/A

Sequence B2	—	—
Hot-spot endurance test (MQT 09 / MST 22)	N/A	N/A
Reverse current overload test (MST 26)	N/A	N/A

Sequence B3	—	—
Bypass diode thermal test (MQT 18.1 / MST 25)	N/A	N/A

Sequence C	—	—
UV preconditioning test (MQT 10 / MST 54)	N/A	N/A
Cyclic (dynamic) mechanical load test (MQT 20)	N/A	N/A
Thermal cycling test (50 cycles) (MQT 11 / MST 51)	N/A	N/A
Humidity-freeze test (MQT 12 / MST 52)	N/A	N/A

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Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Result
Sequence C1		—	—
Retention of junction box on mounting surface (MQT 14.1 / MST 42)		N/A	N/A
Test of cord anchorage (MQT 14.2)		N/A	N/A
Sequence D		—	—
Thermal cycling test (200 cycles) (MQT 11 / MST 51)		N/A	N/A
Sequence D1		—	—
Robustness of terminations test (MQT 14.1 / MST 42)		N/A	N/A
Sequence E		—	—
Damp heat test (MQT 13 / MST 53)		N/A	N/A
Sequence E1		—	—
Retention of junction box on mounting surface (MQT 14.1 / MST 42)		N/A	N/A
Static mechanical load test (MQT 16 / MST 34)		N/A	N/A
Sequence E2		—	—
Hail test (MQT 17)		See table 9.27	P
Sequence F		—	—
Materials creep test (MST 37)		N/A	N/A
Sequence Gf and CJ2		—	—
Damp heat test (200h) (MST 53)		N/A	N/A
UV test (front side) (MST 54)		N/A	N/A
Humidity-freeze test (MST 52)		N/A	N/A
Insulation thickness test (MST 04)		N/A	N/A
Sequence Gb and CJ2		—	—
Damp heat test (200h) (MST 53)		N/A	N/A
UV test (back side) (MST 54)		N/A	N/A
Humidity-freeze test (MST 52)		N/A	N/A
Insulation thickness test (MST 04)		N/A	N/A

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Sequence G1		—	—
Cold conditioning test 1 (MST 55)		N/A	N/A
Dry heat conditioning test (MST 56)		N/A	N/A
Humidity-freeze test 1 (MST 52)		N/A	N/A
Cold conditioning test 2 (MST 55)		N/A	N/A
Humidity-freeze test 2 (MST 52)		N/A	N/A
Sequence H		—	—
Impulse voltage test (MST 14)		N/A	N/A
Sequence M		—	—
Module breakage test (MST 32)		N/A	N/A
Sequence I		—	—
Ignitability test (MST 24)		N/A	N/A
Sequence K		—	—
Potential induced degradation test (MQT 21)		N/A	N/A
Sequence J		—	—
Fire test (MST 23)		N/A	N/A
Final measurements		—	—
Final stabilization (MQT 19.2 / MQT 19.3)		N/A	N/A
Maximum power determination (MQT 02 / MST 03)		N/A	N/A
Performance at STC (MQT 06.1 / MST 03)		See table 9.47	P
Gate #2 evaluation		N/A	N/A
Bypass diode functionality test (MQT 18.2 / MST 07)		N/A	N/A
Cut susceptibility test (MST 12)		N/A	N/A
Accessibility test (MST 11)		N/A	N/A
Continuity test of equipotential bonding (MST 13)		N/A	N/A
Screw connections test (MST 33)		N/A	N/A
Durability of markings (MST 05)		N/A	N/A
Sharp edge test (MST 06)		N/A	N/A
Component tests		—	—
Peel test (MST 35)		No cemented joints	N/A
Lap shear strength test (MST 36)		No cemented joints	N/A
Supplementary information: See Appendix A: Test charts for more details.			

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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

9.1	Visual inspection (initial) – MQT 01 / MST 01			
Test date (dd/mm/yyyy)		01/02/2024		—
Sample no.	Requirement		Nature and position of initial findings	
1	No major visual defects		No major visual defects	P
2			No major visual defects	P
3			No major visual defects	P
Supplementary information: N/A				

9.2	Insulation test (initial) – MQT 03 / MST 16					
Test date (dd/mm/yyyy)				06/02/2024		—
Maximum system voltage [V _{DC}]				1500		
Cemented joints?				☒ No ☐ Yes		
High voltage applied [V _{DC}]				8000		
Insulation resistance measured at [V _{DC}]				1500		
Sample no.	R _{iso} [GΩ]	A [m²]	R _{iso} ·A [GΩ·m²]	Dielectric breakdown		
				Yes (description)	No	
1	7.25	2.70	19.58	-	No	P
2	7.88	2.70	21.28	-	No	P
3	8.28	2.70	22.36	-	No	P
Supplementary information:						
Minimum requirement is 0.04 GΩ·m² for A > 0.1 m² and 0.4 GΩ for A ≤ 0.1 m².						

9.3	Wet leakage current test (initial) – MQT 15 / MST 17			
Test date (dd/mm/yyyy)		06/02/2024		—
Maximum system voltage [V _{DC}]		1500		
Cemented joints?		☒ No ☐ Yes		
Insulation resistance measured at [V _{DC}]		1500		
Solution resistivity [Ω·cm]		≤ 3500		
Solution temperature [°C]		22 ± 2		
Sample no.	R _{iso} [MΩ]	A [m²]	R _{iso} ·A [MΩ·m²]	
1	3820.0	2.70	10314.0	P
2	4250.0	2.70	11475.0	P
3	3590.0	2.70	9093.0	P
Supplementary information:				
Minimum requirement is 40 MΩ·m².				

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9.8 Performance at STC (initial) – MQT 06.1

9.8.1 Performance at STC (initial) (front side) – MQT 06.1

Test date (dd/mm/yyyy)			05/02/2024				—
Test method			☒ Simulator ☐ Natural sunlight				
Illuminated side			☒ Front side ☐ Rear side				
Ambient temperature [°C]			25 ± 2				
Irradiance [W/m²]			1000*				
Module temperature [°C]			25 ± 0.2				
Spectral mismatch			N/A				
Sample no.	P _{max} [W]	V _{mpp} [V]	I _{mpp} [A]	V _{oc} [V]	I _{sc} [A]	FF [%]	
1	630.8	45.63	13.824	53.33	14.756	80.2	N/A
2	624.3	45.37	13.763	53.16	14.735	79.7	N/A
3	626.1	45.43	13.782	53.20	14.740	79.8	N/A

Supplementary information: The non-illuminated side was covered with non-reflective background and aperture.

*A pulse solar simulator class AAA conforming to the requirements of IEC 60904-9 is used.

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9.27	Hail test – MQT 17		
Test date (dd/mm/yyyy)		27/02/2024 for 2; 28/02/2024 for 3	
Ice ball diameter [mm]		35	
Ice ball mass [g]		20.7 ± 5 %	
Ice ball velocity [m/s]		27.2 ± 5 %	
Number of impact locations		11	
Sample no.	—		—
2	—		
3	—		
Supplementary information: N/A			

9.27.1	Visual inspection after Hail test – MQT 01		
Test date (dd/mm/yyyy)		27/02/2024 for 2; 28/02/2024 for 3	—
Sample no.	Requirement	Nature and position of findings	
2	No major visual defects	No major visual defects	P
3	No major visual defects	No major visual defects	P
Supplementary information: N/A			

9.27.2		Insulation test after Hail test – MQT 03				
Test date (dd/mm/yyyy)				28/02/2024		—
Maximum system voltage [V _{DC}]				1500		
Cemented joints?				☒ No ☐ Yes		
High voltage applied [V _{DC}]				8000		
Insulation resistance measured at [V _{DC}]				1500		
Sample no.	R _{iso} [GΩ]	A [m²]	R _{iso} · A [GΩ · m²]	Dielectric breakdown		
				Yes (description)	No	
2	7.20	2.70	18.94	-	No	P
3	7.44	2.70	19.57	-	No	P
Supplementary information:						
Minimum requirement is 0.04 GΩ · m² for A > 0.1 m² and 0.4 GΩ for A ≤ 0.1 m².						

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9.27.3	Wet leakage current test after Hail test – MQT 15			
Test date (dd/mm/yyyy)		28/02/2024		—
Maximum system voltage [V _{DC}]		1500		
Cemented joints?		☒ No ☐ Yes		
Insulation resistance measured at [V _{DC}]		1500		
Solution resistivity [$\Omega \cdot \text{cm}$]		≤ 3500		
Solution temperature [$^{\circ}\text{C}$]		22 ± 2		
Sample no.	R _{iso} [M Ω]	A [m ²]	R _{iso} ·A [M $\Omega \cdot \text{m}^2$]	
2	3640.0	2.70	9573.2	P
3	3270.0	2.70	8600.1	P
Supplementary information: Minimum requirement is 40 M $\Omega \cdot \text{m}^2$.				

9.47	Performance at STC (final) – MQT 06.1
------	---------------------------------------

9.47.1	Performance at STC (final) – MQT 06.1							
Test date (dd/mm/yyyy)			01/03/2024					—
Test method			☒ Simulator ☐ Natural sunlight					
Illuminated side			☒ Front side ☐ Rear side					
Ambient temperature [°C]			25 ± 2					
Irradiance [W/m²]			1000 ± 10					
Module temperature [°C]			25 ± 0.2					
Spectral mismatch			N/A					
Sample no.	P _{max} [W]	V _{mpp} [V]	I _{mpp} [A]	V _{oc} [V]	I _{sc} [A]	FF [%]	Degradation [%]	
2	616.8	45.09	13.678	53.01	14.651	79.4	-1.20	P
3	621.8	45.38	13.700	53.08	14.664	79.9	-0.69	P
Supplementary information: Negative degradation means power loss.								

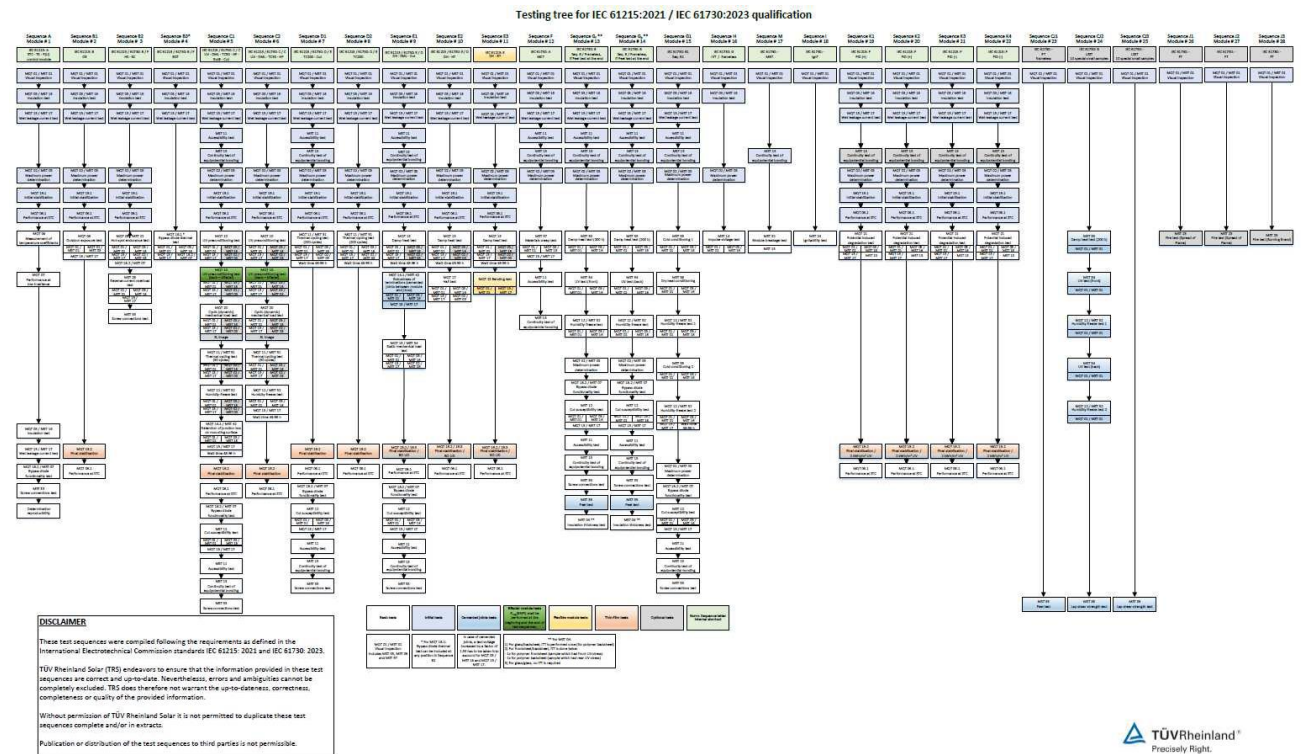
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Appendix A: Test charts

Acc. to IEC 61215:2021 / IEC 61730:2023:



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Appendix B: Abbreviations used in the report

STC	Standard Test Conditions
P_{max}	Maximum power
I_{mpp}	Maximum power point current
V_{mpp}	Maximum power point voltage
I_{sc}	Short circuit current
V_{oc}	Open circuit voltage
FF	Fill factor
α	Current temperature coefficient
β	Voltage temperature coefficient
γ	Power temperature coefficient
S	Series connection
SP	Series-parallel connection
PS	Parallel-series connection
R_{iso}	Electrical insulation resistance
A	Module area
BNPI	Bifacial nameplate irradiance
BSI	Bifacial stress irradiance
G_{BNPI}	Equivalent bifacial nameplate irradiance
aBSI	Applied bifacial stress irradiance
φ	Bifaciality refers to the ratios between the main I-V characteristics of the rear side and the front side of a bifacial device, typically at Standard Test Conditions (STC) unless otherwise specified. It is quantified with reference to bifaciality coefficients, namely as φ.
φ_{Pmax}	Maximum power bifaciality coefficient
φ_{Voc}	Open-circuit voltage bifaciality coefficient
φ_{Isc}	Short-circuit current bifaciality coefficient

Statement of the estimated uncertainty of the test verdicts

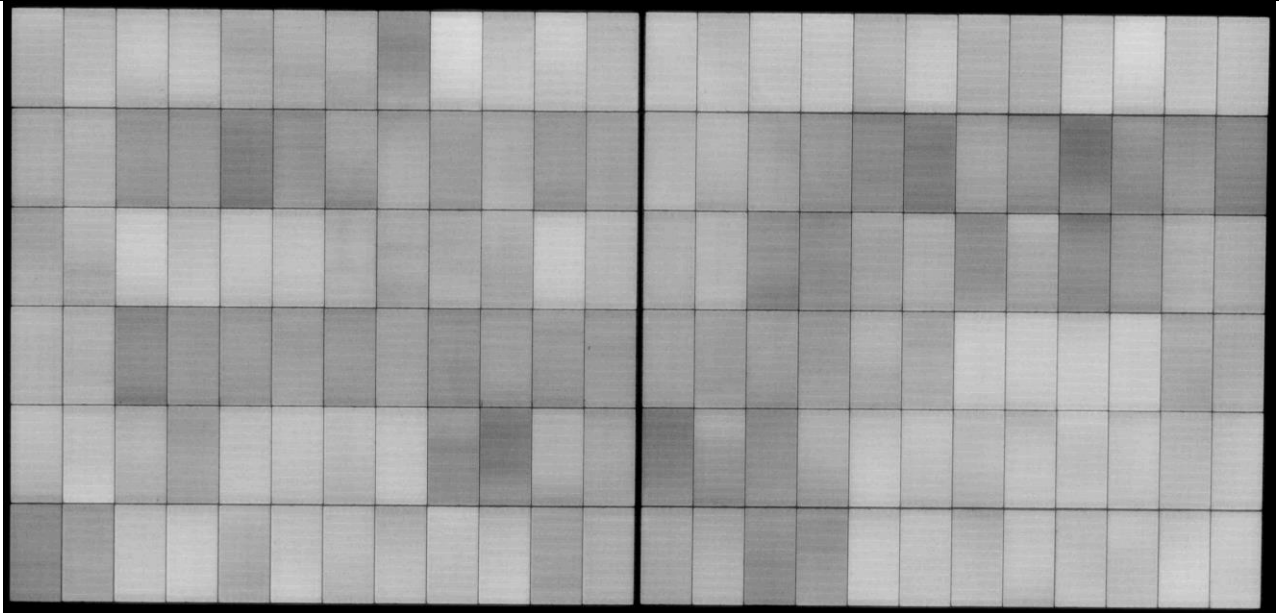
- Electrical performance rating is outside the scope of IEC 61215:2021 qualification testing. The verdicts of performance rating are only related to the test samples that were subjected to the tests. They cannot be generalised to the modules from the series production.
- The calibration to STC was performed with a class AAA solar simulator. The extended measurement uncertainty is:
 - o $2\sigma (P_{mpp}) \leq \pm 3.0 \%$
 - o $2\sigma (I_{sc}) \leq \pm 2.8 \%$
 - o $2\sigma (V_{oc}) \leq \pm 0.9 \%$
- The reproducibility parameter r with the solar simulator is N/A.
- Relative measurements were performed with a flash type solar simulator.

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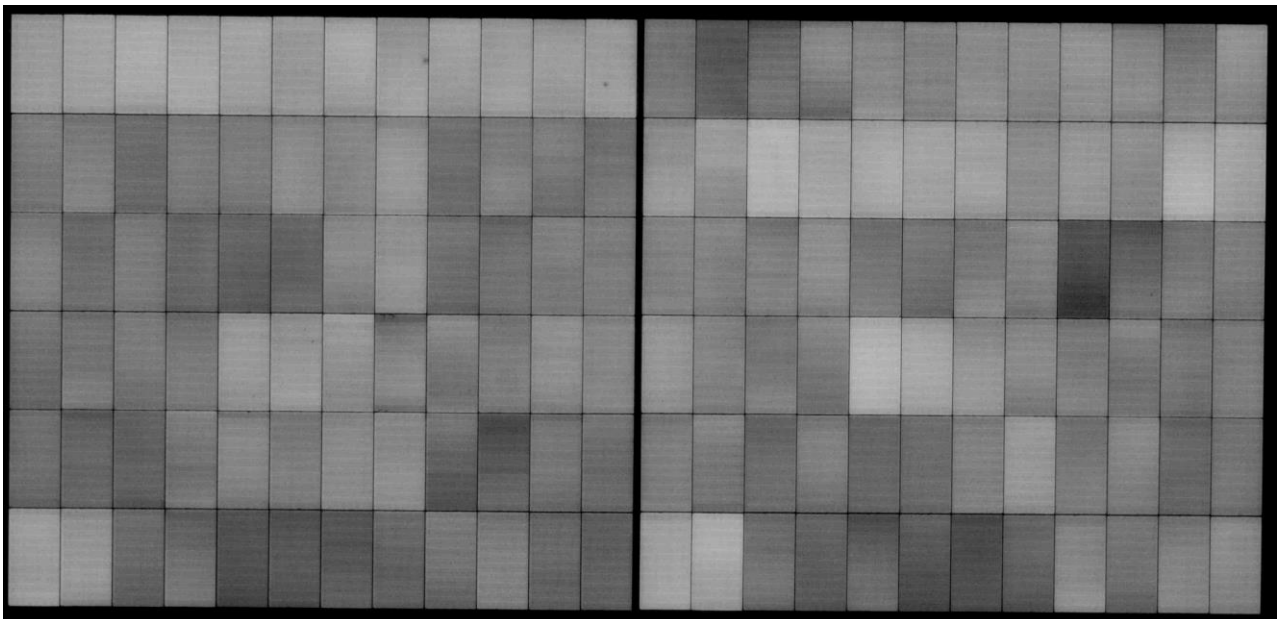
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Appendix C: Electroluminescence Images



EL-image of sample 1 (Initial)

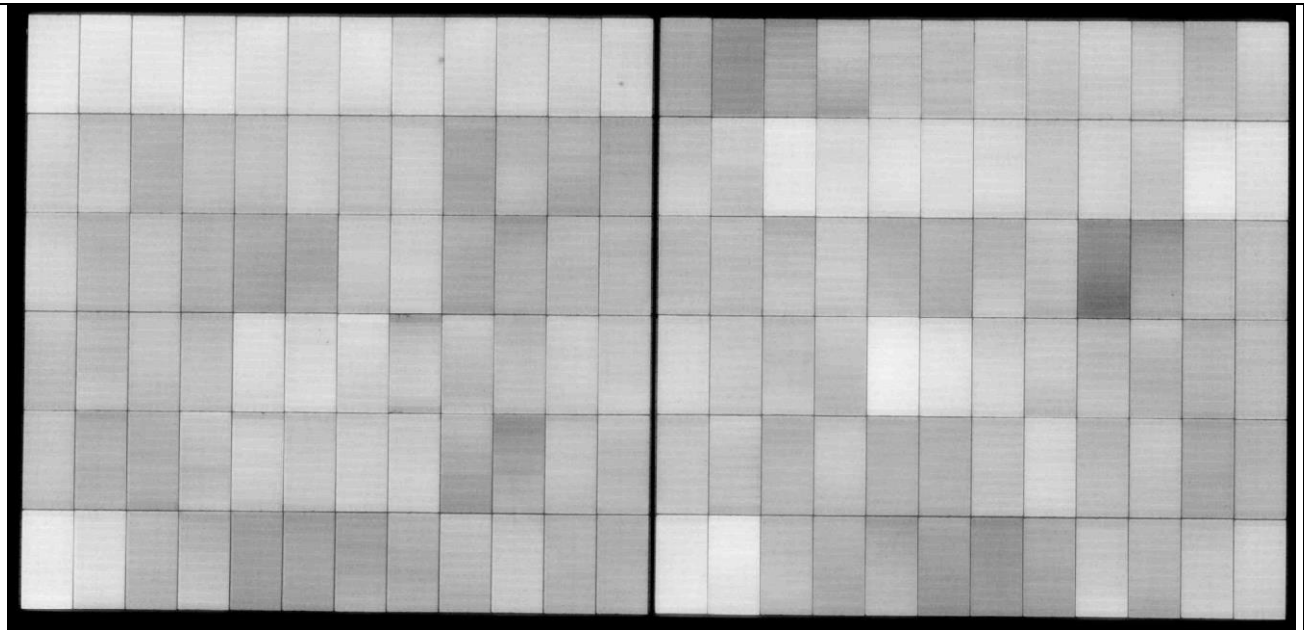


EL-image of sample 2 (Initial)

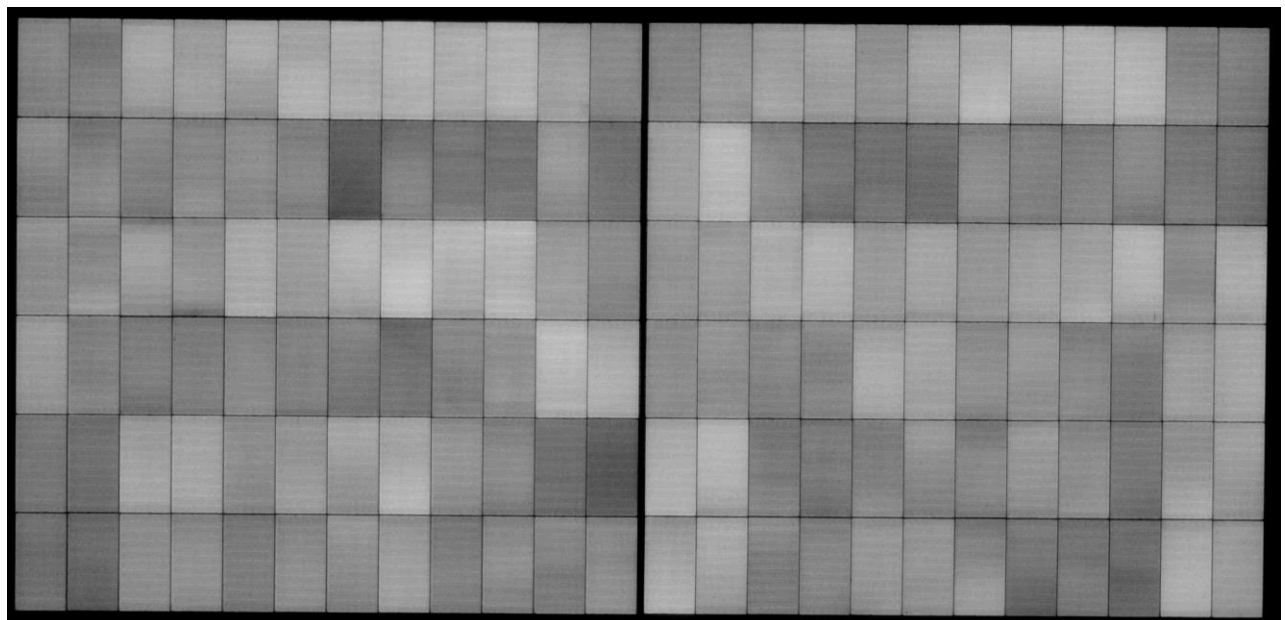
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EL-image of sample 2 (Final)

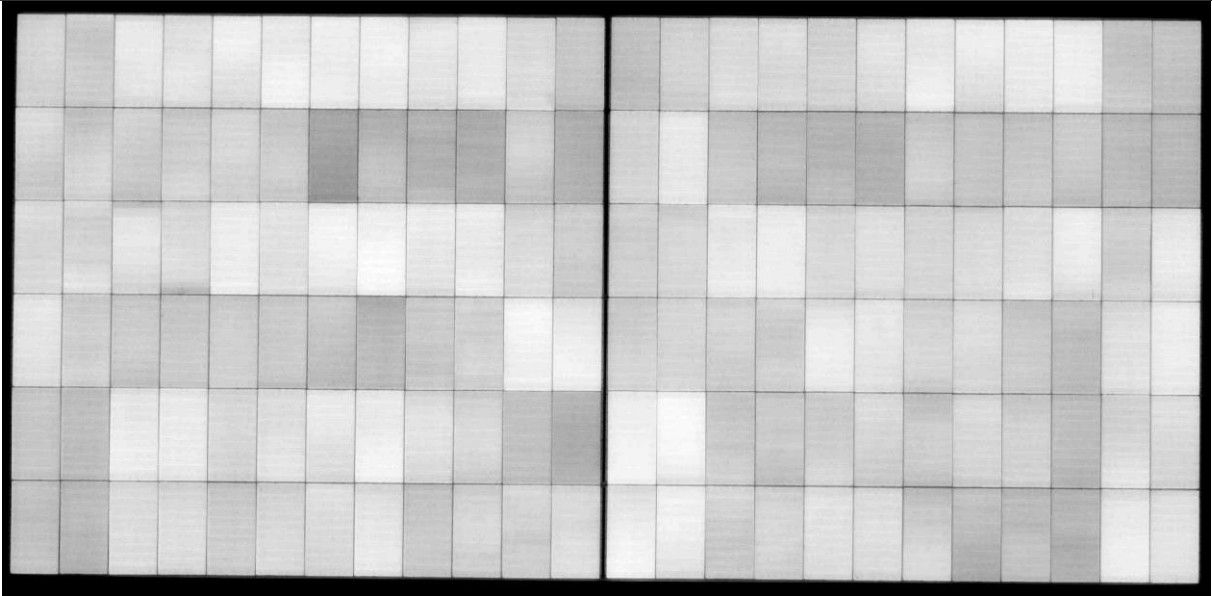


EL-image of sample 3 (Initial)

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EL-image of sample 3 (Final)

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Appendix D: Measurement reports

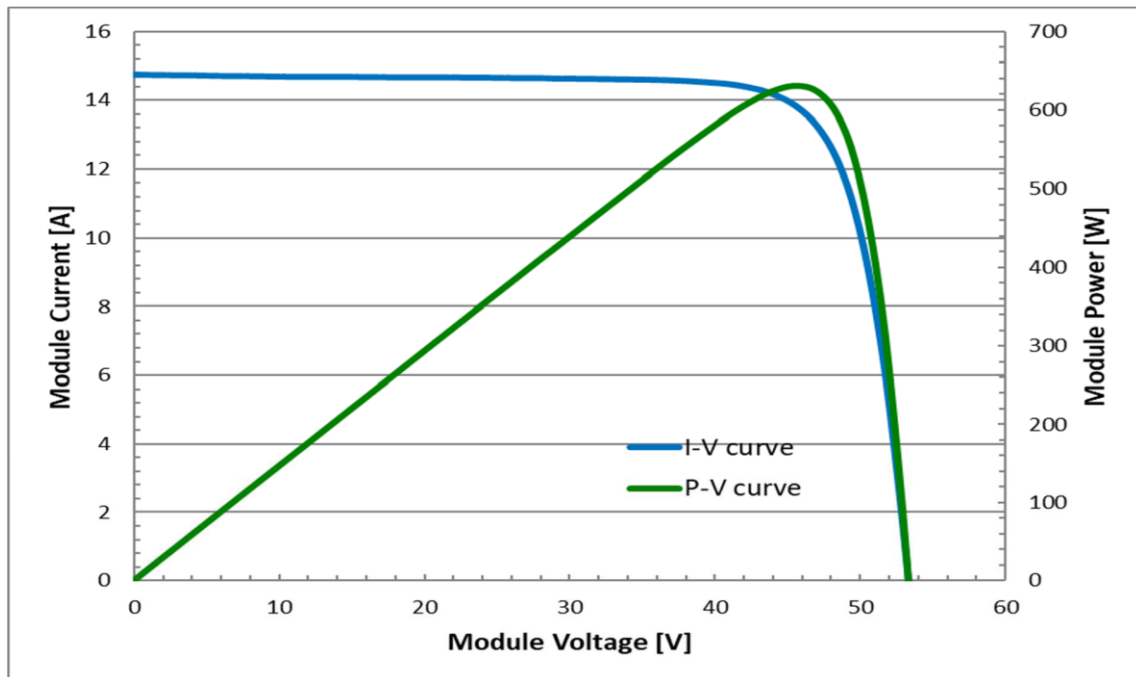


Fig. 1: IV-curves of module no. Y1124107G0218000387 (initial)

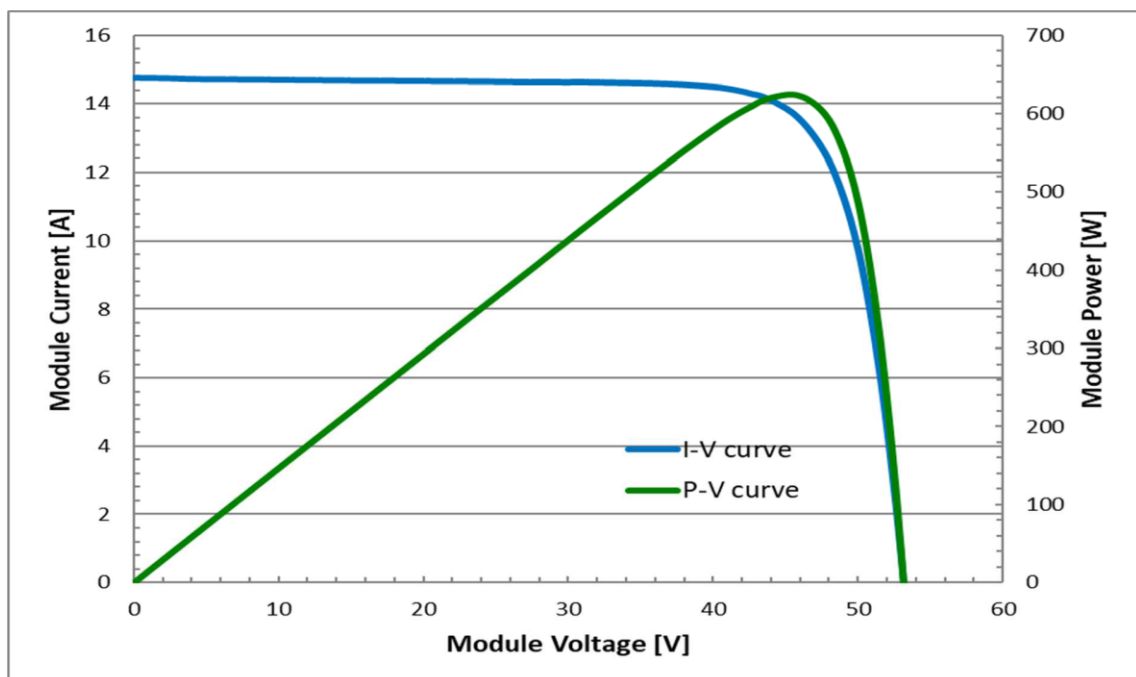


Fig. 2: IV-curves of module no. Y1124105G0216000243 (initial)

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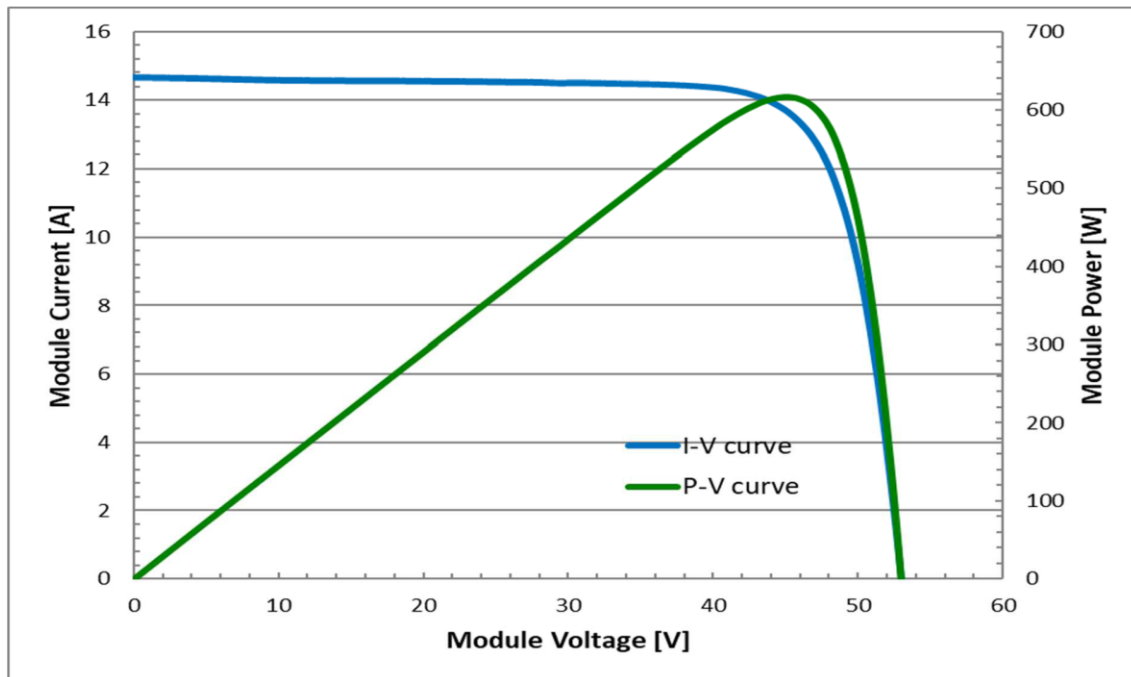


Fig. 3: IV-curves of module no. Y1124105G0216000243 (final)

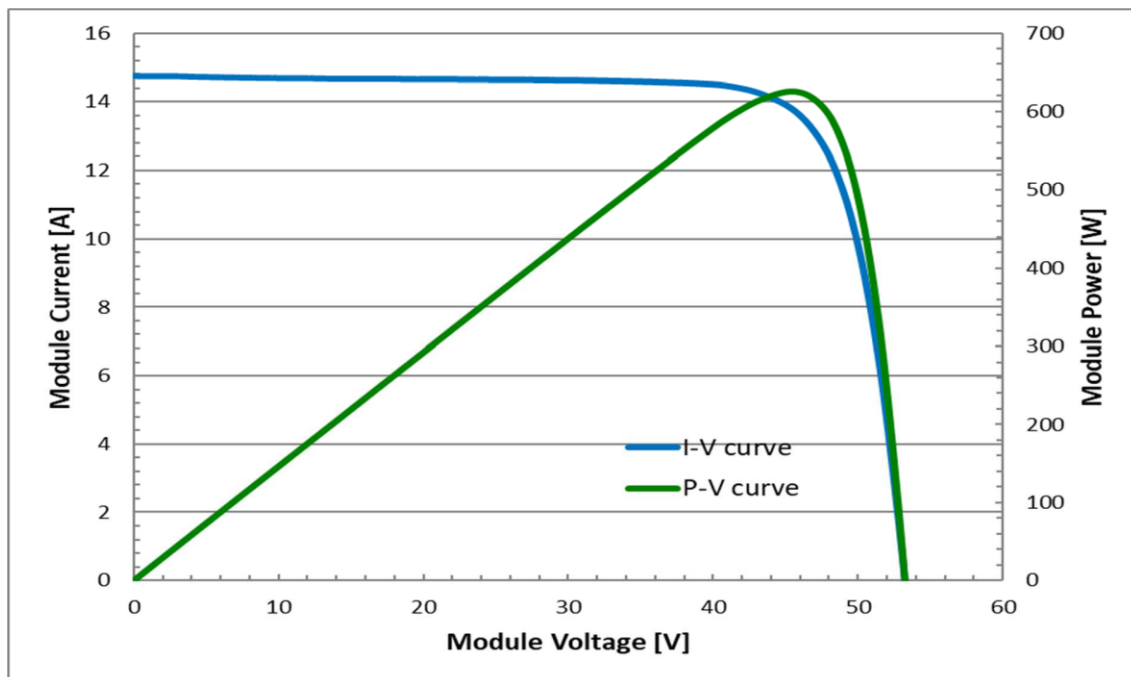


Fig. 4: IV-curves of module no. Y1124105G0216000182 (initial)

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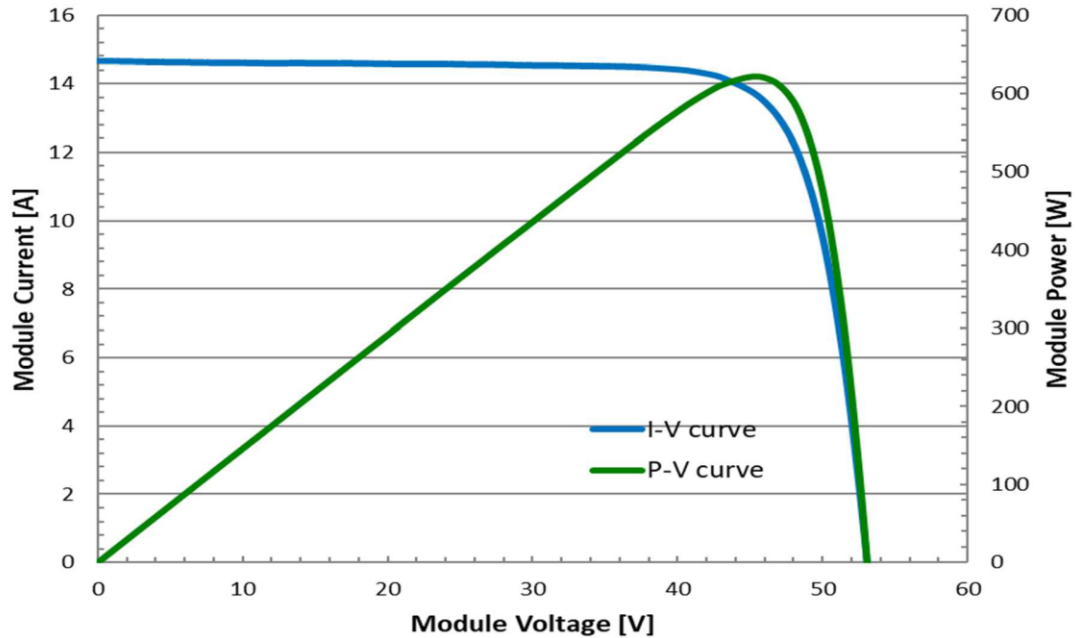


Fig. 5: IV-curves of module no. Y1124105G0216000182 (final)

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Appendix F: Constructional Data Form (CDF) No.



Customers reference
no.: 2062211

TÜV Rheinland report no.:
CN248WVV 004
TÜV Rheinland project no.:
244591111

Certificate:
PV 50614584
File: N/A

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Constructional Data Form for Photovoltaic Modules

License Holder..... : (full address)	Zhejiang Aiko Solar Technology Co., Ltd. No.655, Haopai Road, Suxi Town, Yiwu 322009 Zhejiang, P.R.China		
Production Factory 1..... : (full address)	Guangdong Aiko Solar Technology Co., Ltd. No.3, South Qili Avenue, Leping Town, Sanshui District, Foshan 528137 Guangdong, P.R.China		
Production Factory 2..... : (full address)	Zhuhai Fushan Aiko Solar Technology Co., Ltd. No.681, Fuguo Road, Doumen District, Zhuhai 519175 Guangdong, P.R.China		
Production Factory 3..... : (full address)	Zhejiang Aiko Solar Technology Co., Ltd. No.888, Longqi Road, Suxi Town, Yiwu 322009 Zhejiang, P.R.China		
Production Factory 4..... : (full address)	Shandong Aiko Solar Technology Co., Ltd. No.168, Zhongxing Avenue, Sungeng Street, Start-up District, Jinan 250000 Shandong, P.R.China		
Production Factory 5..... : (full address)	Huansheng new energy (Tianjin) Co., Ltd. No. 750, Shenzhou Avenue, South District of future science and Technology City, Binhai high tech Zone, Tianjin, P.R. China		
Production Factory 6..... : (full address)	Guangzhou Gokin Solar Technology Co., Ltd. No.2, Hejin Avenue, Automobile Industry Base, Huadu District, Guangzhou City, 510800 Guangdong, P.R. China		
Production Factory 7..... : (full address)	Huayao Green Energy Technology (Lankao County) Co., Ltd. (State Power Investment Corporation) SPIC New Energy Industrial Park, Lankao County, Kaifeng, Henan, P.R. China		
Type of Product	Photovoltaic (PV) Modules		
Trademark			
Module family A: With 1/2 cut of mono c-Si cells (BC 12BB/20BB/NBB with cell size: 182mm×92mm; 20BB/NBB with cell size: 182.2mm×93.875mm)			
Type Name or Model No (STC).....	AIKO-Axxx-MAH72Dw (xxx=585-630, in steps of 5, 144 cells)	AIKO-Axxx-MAH60Dw (xxx=490-525, in steps of 5, 120 cells)	AIKO-Axxx-MAH54Dw (xxx=440-475, in steps of 5, 108 cells)
Type Name or Model No (BNPI).....	AIKO-Axxx-MAH72Dw (xxx=615-660, in steps of 5, 144 cells)	AIKO-Axxx-MAH60Dw (xxx=515-550, in steps of 5, 120 cells)	AIKO-Axxx-MAH54Dw (xxx=460-495, in steps of 5, 108 cells)
Maximum System Voltage [V _{DC}] .. :	1500	1500	1500
Rated Maximum Power [W] (STC) :	585;590;595;600;605; 610;615;620;625;630	490;495;500;505;510; 515;520;525	440;445;450;455;460; 465;470;475
Rated Maximum Power [W] (BNPI):	615;620;625;630;635; 640;645;650;655;660	515;520;525;530;535; 540;545;550	460;465;470;475;480; 485;490;495
Tolerance of Rating [%]	±3	±3	±3
Rated Short Circuit Current [A] (STC):	13.90;13.98;14.06;14.14; 14.22;14.30;14.38;14.46;	13.93;13.99;14.05;14.11; 14.17;14.23;14.29;14.35	13.92;14.02;14.12;14.22; 14.25;14.29;14.32;14.35
Shenzhen (Place) (stamp and/or signature of TÜV Rheinland)	2025-10-29 (date)	Zhejiang (Place) (stamp and/or signature of applicant)	2025-10-29 (date)

Note: Any errors or omissions in the CDF shall be reported to TÜV Rheinland immediately upon receipt by the applicant.

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TÜV Rheinland project no.:
244591111

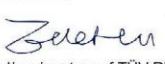
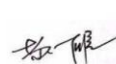
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	14.54;14.62		
Rated Short Circuit Current [A] (BNPI):	14.52;14.60;14.68;14.76; 14.84;14.92;15.00;15.08; 15.16;15.24	14.70;14.77;14.84;14.91; 14.98;15.05;15.12;15.19	14.53;14.63;14.73;14.83; 14.93;15.03;15.13;15.23
Tolerance of Rating [%].....:	±3	±3	±3
Rated Short Circuit Current [A] (BSI):	15.76±3%		
Rated Open Circuit Voltage [V] (STC):	53.84;53.94;54.04;54.14; 54.24;54.34;54.44;54.57; 54.70;54.83	44.82;44.92;45.02;45.12; 45.22;45.32;45.42;45.52	40.82;40.88;40.94;41.00; 41.06;41.12;41.18;41.24
Rated Open Circuit Voltage [V] (BNPI):	53.93;54.03;54.13;54.23; 54.33;54.43;54.53;54.63; 54.73;54.83	44.82;44.92;45.02;45.12; 45.22;45.32;45.42;45.52	40.82;40.88;40.94;41.00; 41.06;41.12;41.18;41.24
Tolerance of Rating [%].....:	±3	±3	±3
Over-current protection rating [A]:	25	25	25
Number of solar cells.....:	144	120	108
Cells per bypass diode.....:	48	40	36
Number of diodes.....:	3	3	3
Serial/parallel connection of cells (S, SP, SPS)	SP	SP	SP
Protection Class	Class II	Class II	Class II
Fire Class (UL 790)	Class C or A	Class C or A	Class C or A
Pollution Degree.....:	I	I	I
Dimensions (l x w x h) [mm]	2323×1134×30/35/40 2278×1134×30/35/40	1954×1134×30/35/40 1946×1134×30/35/40 1907×1134×30/35/40	1757×1134×30/35/40 1722×1134×30/35/40
Module area [m²]	2.63/ 2.58	2.22/ 2.21/ 2.16	1.99/ 1.95
Min- creepage distance [mm].....:	13.4±1.0;22.2±1.0 (to string connector)/ 12.0±1.0;13.4±1.0; 22.2±1.0 (to string connector) 12.9±1.0;13.4±1.0 (to cell)/ 13.0±1.0;13.75±1.0; 13.75±1.0 (to cell)	17.65±1.0 (to string connector)/ 13.6±1.0 (to string connector)/ 11.5±0.5 (to string connector) 12.9±1.0 (to cell)/ 12.9±1.0 (to cell)/ 13.0±1.0 (to cell)	13.5±1.0;19.9±1.0 (to string connector) / 11.5±0.5 (to string connector) 12.9±1.0;13.4±1.0 (to cell)/ 13.0±1.0 (to cell)
Max. operational altitude [mas].....:	≤2000	≤2000	≤2000

Shenzhen	2025-10-29	Zhejiang	2025-10-29
(Place)	(date)	(Place)	(date)
			
(stamp and/or signature of TÜV Rheinland)		(stamp and/or signature of applicant)	

Note: Any errors or omissions in the CDF shall be reported to TÜV Rheinland immediately upon receipt by the applicant.

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CN248WVV 004
TÜV Rheinland project no.:
244591111

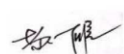
Certificate:
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Design load – downwards [Pa].....:	3600	3600	3600
Design load – upwards [Pa].....:	1600	1600	1600
Safety factor for mechanical load.:	1.5	1.5	1.5
Type Name or Model No (STC).....:	AIKO-Axxx-MAH78Dw (xxx=650-685, in steps of 5, 156 cells)	N/A	N/A
Type Name or Model No (BNPI).....:	AIKO-Axxx-MAH78Dw (xxx=690-725, in steps of 5, 156 cells)	N/A	N/A
Maximum System Voltage [V _{DC}] .. :	1500	N/A	N/A
Rated Maximum Power [W] (STC) :	650;655;660;665;670; 675;680;685	N/A	N/A
Rated Maximum Power [W] (BNPI):	690;695;700;705;710; 715;720;725	N/A	N/A
Tolerance of Rating [%]	±3	N/A	N/A
Rated Short Circuit Current [A] (STC):	14.14;14.21;14.28;14.35; 14.42;14.49;14.56;14.63	N/A	N/A
Rated Short Circuit Current [A] (BNPI):	15.03;15.10;15.17;15.24; 15.31;15.38;15.45;15.52	N/A	N/A
Tolerance of Rating [%].....:	±3	N/A	N/A
Rated Short Circuit Current [A] (BSI):	15.76±3%	N/A	N/A
Rated Open Circuit Voltage [V] (STC):	58.68;58.74;58.80;58.86; 58.92;58.98;59.04;59.10	N/A	N/A
Rated Open Circuit Voltage [V] (BNPI):	58.68;58.74;58.80;58.86; 58.92;58.98;59.04;59.10	N/A	N/A
Tolerance of Rating [%].....:	±3	N/A	N/A
Over-current protection rating [A]:	30	N/A	N/A
Number of solar cells.....:	156	N/A	N/A
Cells per bypass diode.....:	52	N/A	N/A
Number of diodes.....:	3	N/A	N/A
Serial/parallel connection of cells (S, SP, SPS)	SP	N/A	N/A
Protection Class	Class II	N/A	N/A

Shenzhen	2025-10-29	Zhejiang	2025-10-29
(Place)	(date)	(Place)	(date)
			
(stamp and/or signature of TÜV Rheinland)		(stamp and/or signature of applicant)	

Note: Any errors or omissions in the CDF shall be reported to TÜV Rheinland immediately upon receipt by the applicant.

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no.: 2062211

TÜV Rheinland report no.:
CN248WVV 004
TÜV Rheinland project no.:
244591111

Certificate:
PV 50614584
File: N/A

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Constructional Data Form for Photovoltaic Modules

Fire Class (UL 790)	Class C or A	N/A	N/A
Pollution Degree.....	I	N/A	N/A
Dimensions (l x w x h) [mm]	2492×1134×30/35/40 2465×1134×30/35/40	N/A	N/A
Module area [m ²]	2.83/ 2.80	N/A	N/A
Min- creepage distance [mm].....	13.1±1.0 (to string connector)/ 14.4±1.0;14.4±1.0 (to string connector) 13.4±1.0 (to cell)/ 13.5±1.0;13.75±1.0 (to cell)	N/A	N/A
Max. operational altitude [mas].....	≤2000	N/A	N/A
Design load – downwards [Pa].....	3600	N/A	N/A
Design load – upwards [Pa].....	1600	N/A	N/A
Safety factor for mechanical load.:	1.5	N/A	N/A
Type Name or Model No (STC).....	AIKO-Axxx-MAH72Db (xxx=585-620, in steps of 5, 144 cells)	AIKO-Axxx-MAH60Db (xxx=490-515, in steps of 5, 120 cells)	AIKO-Axxx-MAH54Db (xxx=440-475, in steps of 5, 108 cells)
Type Name or Model No (BNPI).....	AIKO-Axxx-MAH72Db (xxx=615-650, in steps of 5, 144 cells)	AIKO-Axxx-MAH60Db (xxx=515-540, in steps of 5, 120 cells)	AIKO-Axxx-MAH54Db (xxx=460-495, in steps of 5, 108 cells)
Maximum System Voltage [V _{DC}] ..	1500	1500	1500
Rated Maximum Power [W] (STC) :	585;590;595;600;605; 610;615;620	490;495;500;505;510; 515	440;445;450;455;460; 465;470;475
Rated Maximum Power [W] (BNPI):	615;620;625;630;635; 640;645;650	515;520;525;530;535; 540	460;465;470;475;480; 485;490;495
Tolerance of Rating [%]	±3	±3	±3
Rated Short Circuit Current [A] (STC):	13.85;13.93;14.01;14.09; 14.17;14.25;14.33;14.41	13.93;13.99;14.05;14.11; 14.17;14.23	13.92;14.02;14.12;14.22; 14.25;14.29;14.32;14.35
Rated Short Circuit Current [A] (BNPI):	14.46;14.54;14.62;14.70; 14.78;14.86;14.94;15.02	14.70;14.77;14.84;14.91; 14.98;15.05	14.53;14.63;14.73;14.83; 14.93;15.03;15.13;15.23
Tolerance of Rating [%].....	±3	±3	±3
Rated Short Circuit Current [A] (BSI):	15.76±3%		
Rated Open Circuit Voltage [V] (STC):	54.04;54.14;54.24;54.34; 54.44;54.57;54.70;54.83	44.82;44.92;45.02;45.12; 45.22;45.32	40.82;40.88;40.94;41.00; 41.06;41.12;41.18;41.24
Shenzhen 2025-10-29 (Place) (date)  (stamp and/or signature of TÜV Rheinland)		Zhejiang 2025-10-29 (Place) (date)  (stamp and/or signature of applicant)	

Note: Any errors or omissions in the CDF shall be reported to TÜV Rheinland immediately upon receipt by the applicant.

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Customers reference
no.: 2062211

TÜV Rheinland report no.:
CN248WVV 004
TÜV Rheinland project no.:
244591111

Certificate:
PV 50614584
File: N/A

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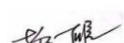
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Constructional Data Form for Photovoltaic Modules

Rated Open Circuit Voltage [V] (BNPI):	54.13;54.23;54.33;54.43; 54.53;54.63;54.73;54.83	44.82;44.92;45.02;45.12; 45.22;45.32	40.82;40.88;40.94;41.00; 41.06;41.12;41.18;41.24
Tolerance of Rating [%]:	±3	±3	±3
Over-current protection rating [A]:	25	25	25
Number of solar cells:	144	120	108
Cells per bypass diode:	48	40	36
Number of diodes:	3	3	3
Serial/parallel connection of cells (S, SP, SPS):	SP	SP	SP
Protection Class:	Class II	Class II	Class II
Fire Class (UL 790):	Class C or A	Class C or A	Class C or A
Pollution Degree:	I	I	I
Dimensions (l x w x h) [mm]:	2323×1134×30/35/40 2278×1134×30/35/40	1954×1134×30/35/40 1946×1134×30/35/40 1907×1134×30/35/40	1757×1134×30/35/40 1722×1134×30/35/40
Module area [m²]:	2.63/ 2.58	2.22/ 2.21/ 2.16	1.99/ 1.95
Min- creepage distance [mm]:	13.4±1.0;22.2±1.0 (to string connector)/ 12.0±1.0;13.4±1.0; 22.2±1.0 (to string connector) 12.9±1.0;13.4±1.0 (to cell)/ 13.0±1.0;13.75±1.0; 13.75±1.0 (to cell)	17.65±1.0 (to string connector)/ 13.6±1.0 (to string connector)/ 11.5±0.5 (to string connector) 12.9±1.0 (to cell)/ 12.9±1.0 (to cell)/ 13.0±1.0 (to cell)	13.5±1.0;19.9±1.0 (to string connector) / 11.5±0.5 (to string connector) 12.9±1.0;13.4±1.0 (to cell)/ 13.0±1.0 (to cell)
Max. operational altitude [mas]:	≤2000	≤2000	≤2000
Design load – downwards [Pa]:	3600	3600	3600
Design load – upwards [Pa]:	1600	1600	1600
Safety factor for mechanical load:	1.5	1.5	1.5

Module family B: With 1/2 cut of mono c-Si cells (BC 20BB with cell size: 182.2mm×96.25mm)

Type Name or Model No (STC):	AIKO-Gxxx-MCH72Dw (xxx=610-655, in steps of 5, 144 cells)	AIKO-Gxxx-MCH60Dw (xxx=500-545, in steps of 5, 120 cells)	AIKO-Gxxx-MCH54Dw (xxx=460-490, in steps of 5, 108 cells)
Type Name or Model No (BNPI):	AIKO-Gxxx-MCH72Dw (xxx=665-710, in steps of	AIKO-Gxxx-MCH60Dw (xxx=545-590, in steps of	AIKO-Gxxx-MCH54Dw (xxx=500-530, in steps of

Shenzhen	2025-10-29	Zhejiang	2025-10-29
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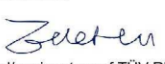
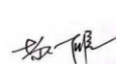
Certificate:
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Constructional Data Form for Photovoltaic Modules

	5, 144 cells)	5, 120 cells)	5, 108 cells)
Maximum System Voltage [V _{DC}] .. :	1500	1500	1500
Rated Maximum Power [W] (STC) :	610;615;620;625;630; 635;640;645;650;655	500;505;510;515;520; 525;530;535;540;545	460;465;470;475;480; 485;490
Rated Maximum Power [W] (BNPI):	665;670;675;680;685; 690;695;700;705;710	545;550;555;560;565; 570;575;580;585;590	500;505;510;515;520; 525;530
Tolerance of Rating [%]	±3	±3	±3
Rated Short Circuit Current [A] (STC):	14.58;14.64;14.70;14.76; 14.82;14.88;14.94;15.00; 15.06;15.12	14.32;14.40;14.48;14.56; 14.64;14.72;14.80;14.88; 14.96;15.04	14.69;14.75;14.82;14.89; 14.96;15.03;15.10
Rated Short Circuit Current [A] (BNPI):	15.73;15.81;15.89;15.97; 16.05;16.13;16.21;16.29; 16.37;16.45	15.44;15.52;15.60;15.68; 15.76;15.84;15.92;16.00; 16.08;16.16	15.76;15.86;15.96;16.06; 16.16;16.26;16.36
Tolerance of Rating [%].....:	±3	±3	±3
Rated Short Circuit Current [A] (BSI):	17.62±3%		
Rated Open Circuit Voltage [V] (STC):	53.20;53.30;53.40;53.50; 53.60;53.70;53.80;53.90; 54.00;54.10	44.92;45.00;45.08;45.16; 45.24;45.32;45.40;45.48; 45.56;45.64	40.27;40.37;40.50;40.63; 40.76;40.89;41.02
Rated Open Circuit Voltage [V] (BNPI):	53.20;53.30;53.40;53.50; 53.60;53.70;53.80;53.90; 54.00;54.10	44.92;45.00;45.08;45.16; 45.24;45.32;45.40;45.48; 45.56;45.64	40.33;40.43;40.53;40.63; 40.73;40.83;40.93
Tolerance of Rating [%].....:	±3	±3	±3
Over-current protection rating [A]:	30	30	30
Number of solar cells.....:	144	120	108
Cells per bypass diode.....:	48	40	36
Number of diodes.....:	3	3	3
Serial/parallel connection of cells (S, SP, SPS)	SP	SP	SP
Protection Class.....:	Class II	Class II	Class II
Fire Class (UL 790)	Class C or A	Class C or A	Class C or A
Pollution Degree.....:	I	I	I
Dimensions (l x w x h) [mm]	2382×1134×30/35/40	1995×1134×30/35/40	1802×1134×30/35/40
Module area [m²]	2.70	2.26	2.04

Shenzhen	2025-10-29	Zhejiang	2025-10-29
(Place)	(date)	(Place)	(date)
			
(stamp and/or signature of TÜV Rheinland)		(stamp and/or signature of applicant)	

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244591111

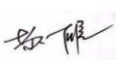
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Constructional Data Form for Photovoltaic Modules

Min- creepage distance [mm]..... :	13.3±1.0 (to string connector) 12.9±1.0 (to cell)	13.5±1.0 (to string connector) 13.65±1.0 (to cell)	13.8±1.0 (to string connector) 12.9±1.0 (to cell)
Max. operational altitude [mas].....:	≤2000	≤2000	≤2000
Design load – downwards [Pa].....:	3600	3600	3600
Design load – upwards [Pa].....:	1600	1600	1600
Safety factor for mechanical load.:	1.5	1.5	1.5
Module family C: With 1/2 cut of mono c-Si cells (BC 20BB with cell size: 182.2mm×105mm; NBB with cell size: 182.3mm×105mm for AIKO-A-GRH66D model type and BC NBB with cell size:91.5mm×210mm for AIKO-A-GRH78D model type)			
Type Name or Model No (STC).....:	AIKO-Axxx-GRH78Dw (xxx=740-790, in steps of 5, 156 cells)	AIKO-Axxx-GRH66Dw (xxx=610-665, in steps of 5, 132 cells)	N/A
Type Name or Model No (BNPI).....:	AIKO-Axxx-GRH78Dw (xxx=815-865, in steps of 5, 156 cells)	AIKO-Axxx-GRH66Dw (xxx=660-715, in steps of 5, 132 cells)	N/A
Maximum System Voltage [V _{DC}] .. :	1500	1500	N/A
Rated Maximum Power [W] (STC) :	740;745;750;755;760; 765;770;775;780;785; 790	610;615;620;625;630; 635;640;645;650;655; 660;665	N/A
Rated Maximum Power [W] (BNPI):	815;820;825;830;835; 840;845;850;855;860; 865	660;665;670;675;680; 685;690;695;700;705; 710;715	N/A
Tolerance of Rating [%]	±3	±3	N/A
Rated Short Circuit Current [A] (STC):	16.22;16.29;16.36;16.43; 16.50;16.57;16.64;16.71; 16.78;16.85;16.92	16.06;16.13;16.20;16.27; 16.34;16.41;16.48;16.55; 16.64;16.72;16.80;16.88	N/A
Rated Short Circuit Current [A] (BNPI):	17.78;17.86;17.94;18.02; 18.10;18.18;18.26;18.34; 18.42;18.50;18.58	17.20;17.27;17.34;17.41; 17.48;17.55;17.62;17.81; 17.88;17.94;18.00;18.06	N/A
Tolerance of Rating [%].....:	±3	±3	N/A
Rated Short Circuit Current [A] (BSI):	19.86±3%	18.66±3%	N/A
Rated Open Circuit Voltage [V] (STC):	58.12;58.22;58.32;58.42; 58.52;58.62;58.72;57.82; 58.92;59.02;59.12	48.50;48.60;48.70;48.80; 48.90;49.00;49.10;49.60; 49.70;49.80;49.90;50.00	N/A

Shenzhen	2025-10-29	Zhejiang	2025-10-29
(Place)	(date)	(Place)	(date)
			
(stamp and/or signature of TÜV Rheinland)		(stamp and/or signature of applicant)	
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Appendix 1 of Preparing a Constructional Data Form/ Critical Component Lists (CDF) (MS-0004352)
Constructional Data Form for Electrical Products Version 6.1

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CN248WVV 004
TÜV Rheinland project no.:
244591111

Certificate:
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Constructional Data Form for Photovoltaic Modules

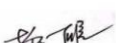
Rated Open Circuit Voltage [V] (BNPI):	58.12;58.22;58.32;58.42; 58.52;58.62;58.72;57.82; 58.92;59.02;59.12	48.50;48.60;48.70;48.80; 48.90;49.00;49.10;49.60; 49.70;49.80;49.90;50.00	N/A
Tolerance of Rating [%]:.....	±3	±3	N/A
Over-current protection rating [A]:	30	30	N/A
Number of solar cells:.....	156	132	N/A
Cells per bypass diode:.....	52	44	N/A
Number of diodes:.....	3	3	N/A
Serial/parallel connection of cells (S, SP, SPS) :.....	SP	SP	N/A
Protection Class:.....	Class II	Class II	N/A
Fire Class (UL 790) :.....	Class C or A	Class C or A	N/A
Pollution Degree:.....	I	I	N/A
Dimensions (l x w x h) [mm] :.....	2465×1303×30/35/40	2382×1134×30/35/40	N/A
Module area [m²] :.....	3.21	2.70	N/A
Min- creepage distance [mm]:.....	14.6±1.0 (to string connector) 14.25±1.0 (to cell)	13.9±1.0 (to string connector) 13.4±1.0 (to cell)	N/A
Max. operational altitude [mas]:.....	≤2000	≤2000	N/A
Design load – downwards [Pa]:.....	3600	3600	N/A
Design load – upwards [Pa]:.....	1600	1600	N/A
Safety factor for mechanical load:.	1.5	1.5	N/A

Remark:

- The upper listed Type Name or Model No. have been approved according to the standard of IEC 61215-1:2021; IEC 61215-1-1:2021; IEC 61215-2:2021; IEC 61730-1:2016; IEC 61730-2:2016; EN 61215-1:2021; EN 61215-1-1:2021; EN 61215-2:2021; EN IEC 61730-1:2018; EN IEC 61730-2:2018 and IEC 61730-1:2023; IEC 61730-2:2023.
- The model type AIKO-Axxx-GRH78Dw has been approved according to the standard of IEC 61215-1:2021; IEC 61215-1-1:2021; IEC 61215-2:2021; IEC 61730-1:2023; IEC 61730-2:2023; EN 61215-1:2021; EN 61215-1-1:2021; EN 61215-2:2021; EN IEC 61730-1:2018; EN IEC 61730-2:2018.
- Fire Class please see in the Qualified Material for Fire Class for detail.

Module family D: With 1/2 cut of mono c-Si cells (BC NBB with cell size: 182.2mm×93.875mm)

Type Name or Model No (STC):.....	AIKO-Axxx-MAE78Dw (xxx=650-685, in steps of 5, 156 cells)	AIKO-Axxx-MAE72Dw (xxx=600-630, in steps of 5, 144 cells)	AIKO-Axxx-MAE60Dw (xxx=500-525, in steps of 5, 120 cells)
Type Name or Model No (BNPI):.....	AIKO-Axxx-MAE78Dw	AIKO-Axxx-MAE72Dw	AIKO-Axxx-MAE60Dw

Shenzhen	2025-10-29	Zhejiang	2025-10-29
(Place)	(date)	(Place)	(date)
			
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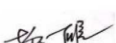
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	(xxx=685-720, in steps of 5, 156 cells)	(xxx=630-660, in steps of 5, 144 cells)	(xxx=525-550, in steps of 5, 120 cells)
Maximum System Voltage [V _{DC}] .. :	1500	1500	1500
Rated Maximum Power [W] (STC) :	650;655;660;665;670; 675;680;685	600;605;610;615;620; 625;630	500;505;510;515;520; 525
Rated Maximum Power [W] (BNPI):	685;690;695;700;705; 710;715;720	630;635;640;645;650; 655;660	525;530;535;540;545; 550
Tolerance of Rating [%]	±3	±3	±3
Rated Short Circuit Current [A] (STC):	14.03;14.09;14.15;14.21; 14.28;14.35;14.42;14.49	14.05;14.11;14.17;14.23; 14.30;14.37;14.44	14.05;14.11;14.17;14.23; 14.29;14.35
Rated Short Circuit Current [A] (BNPI):	14.80;14.86;14.92;14.98; 15.05;15.12;15.19;15.26	14.82;14.88;14.94;15.00; 15.07;15.14;15.21	14.84;14.91;14.98;15.05; 15.12;15.19
Tolerance of Rating [%]	±3	±3	±3
Rated Short Circuit Current [A] (BSI):	14.88±3%		
Rated Open Circuit Voltage [V] (STC):	58.40;58.50;58.60;58.70; 58.80;58.90;59.00;59.10	53.90;54.00;54.10;54.20; 54.30;54.40;54.50	45.02;45.12;45.22;45.32; 45.42;45.52
Rated Open Circuit Voltage [V] (BNPI):	58.40;58.50;58.60;58.70; 58.80;58.90;59.00;59.10	53.90;54.00;54.10;54.20; 54.30;54.40;54.50	45.02;45.12;45.22;45.32; 45.42;45.52
Tolerance of Rating [%]	±3	±3	±3
Over-current protection rating [A]:	30	25	25
Number of solar cells	156	144	120
Cells per bypass diode	52	48	40
Number of diodes	3	3	3
Serial/parallel connection of cells (S, SP, SPS)	SP	SP	SP
Protection Class	Class II	Class II	Class II
Fire Class (UL 790)	Class C or A	Class C or A	Class C or A
Pollution Degree	I	I	I
Dimensions (l x w x h) [mm]	2465×1134×30/35/40	2278×1134×30/35/40	1907×1134×30/35/40
Module area [m²]	2.8	2.58	2.16
Min- creepage distance [mm]	14.1±1.0 (to string connector) 13.65±1.0 (to cell)	14.1±1.0 (to string connector) 13.65±1.0 (to cell)	15.6±1.0 (to string connector) 13.65±1.0 (to cell)

Shenzhen	2025-10-29	Zhejiang	2025-10-29
(Place)	(date)	(Place)	(date)
			
(stamp and/or signature of TÜV Rheinland)		(stamp and/or signature of applicant)	

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Max. operational altitude [masl].....:	≤2000	≤2000	≤2000
Design load – downwards [Pa].....:	3600	3600	3600
Design load – upwards [Pa].....:	1600	1600	1600
Safety factor for mechanical load.:	1.5	1.5	1.5
Module family E: With 1/2 cut of mono c-Si cells (BC NBB with cell size: 182.2mm×96.25mm)			
Type Name or Model No (STC).....:	AIKO-Axxx-MCE60Dw (xxx=490-555, in steps of 5, 120 cells)	AIKO-Axxx-MCE54Dw (xxx=445-500, in steps of 5, 108 cells)	N/A
Type Name or Model No (BNPI).....:	AIKO-Axxx-MCE60Dw (xxx=520-585, in steps of 5, 120 cells)	AIKO-Axxx-MCE54Dw (xxx=470-525, in steps of 5, 108 cells)	N/A
Maximum System Voltage [V _{DC}] .. :	1500	1500	N/A
Rated Maximum Power [W] (STC) :	490;495;500;505;510; 515;520;525;530;535; 540;545;550;555	445;450;455;460;465; 470;475;480;485;490; 495;500	N/A
Rated Maximum Power [W] (BNPI):	520;525;530;535;540; 545;550;555;560;565; 570;575;580;585	470;475;480;485;490; 495;500;505;510;515; 520;525	N/A
Tolerance of Rating [%]	±3	±3	N/A
Rated Short Circuit Current [A] (STC):	14.51;14.54;14.57;14.60; 14.63;14.66;14.69;14.72; 14.76;14.80;14.84;14.88; 14.92;14.96	14.57;14.60;14.63;14.66; 14.69;14.72;14.76;14.80; 14.84;14.88;14.92;14.96	N/A
Rated Short Circuit Current [A] (BNPI):	15.24;15.28;15.32;15.36; 15.40;15.44;15.48;15.52; 15.56;15.60;15.64;15.68; 15.72;15.76	15.37;15.40;15.43;15.46; 15.49;15.52;15.56;15.60; 15.64;15.68;15.72;15.76	N/A
Tolerance of Rating [%].....:	±3	±3	N/A
Rated Short Circuit Current [A] (BSI):	16.48±3%		
Rated Open Circuit Voltage [V] (STC):	44.60;44.70;44.80;44.90; 45.00;45.10;45.20;45.30; 45.40;45.50;45.60;45.70; 45.80;45.90	40.20;40.30;40.40;40.50; 40.60;40.70;40.80;40.90; 41.00;41.10;41.20;41.30	N/A
Rated Open Circuit Voltage [V] (BNPI):	44.60;44.70;44.80;44.90; 45.00;45.10;45.20;45.30; 45.40;45.50;45.60;45.70;	40.20;40.30;40.40;40.50; 40.60;40.70;40.80;40.90; 41.00;41.10;41.20;41.30	N/A

Shenzhen	2025-10-29	Zhejiang	2025-10-29
(Place)	(date)	(Place)	(date)
			
(stamp and/or signature of TÜV Rheinland)		(stamp and/or signature of applicant)	
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Customers reference
no.: 2062211

TÜV Rheinland report no.:
CN248WVV 004
TÜV Rheinland project no.:
244591111

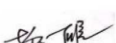
Certificate:
PV 50614584
File: N/A

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Constructional Data Form for Photovoltaic Modules

	45.80;45.90		
Tolerance of Rating [%].....:	±3	±3	N/A
Over-current protection rating [A]:	30	30	N/A
Number of solar cells.....:	120	108	N/A
Cells per bypass diode.....:	40	36	N/A
Number of diodes.....:	3	3	N/A
Serial/parallel connection of cells (S, SP, SPS)	SP	SP	N/A
Protection Class.....:	Class II	Class II	N/A
Fire Class (UL 790)	Class C or A	Class C or A	N/A
Pollution Degree.....:	I	I	N/A
Dimensions (l x w x h) [mm]	1954×1134×30/35/40	1762×1134×30/35/40	N/A
Module area [m²]	2.22	2.00	N/A
Min- creepage distance [mm].....:	14.35±1.0 (to string connector) 13.65±1.0 (to cell)	14.3±1.0 (to string connector) 13.65±1.0 (to cell)	N/A
Max. operational altitude [mas].....:	≤2000	≤2000	N/A
Design load – downwards [Pa].....:	3600	3600	N/A
Design load – upwards [Pa].....:	1600	1600	N/A
Safety factor for mechanical load.:	1.5	1.5	N/A
Type Name or Model No (STC).....:	AIKO-Axxx-MCE60Db (xxx=490-555, in steps of 5, 120 cells)	AIKO-Axxx-MCE54Db (xxx=445-500, in steps of 5, 108 cells)	N/A
Type Name or Model No (BNPI).....:	AIKO-Axxx-MCE60Db (xxx=520-585, in steps of 5, 120 cells)	AIKO-Axxx-MCE54Db (xxx=470-525, in steps of 5, 108 cells)	N/A
Maximum System Voltage [V _{DC}] ..:	1500	1500	N/A
Rated Maximum Power [W] (STC) :	490;495;500;505;510; 515;520;525;530;535; 540;545;550;555	445;450;455;460;465; 470;475;480;485;490; 495;500	N/A
Rated Maximum Power [W] (BNPI):	520;525;530;535;540; 545;550;555;560;565; 570;575;580;585	470;475;480;485;490; 495;500;505;510;515; 520;525	N/A
Tolerance of Rating [%]	±3	±3	N/A

Shenzhen	2025-10-29	Zhejiang	2025-10-29
(Place)	(date)	(Place)	(date)
			
(stamp and/or signature of TÜV Rheinland)		(stamp and/or signature of applicant)	

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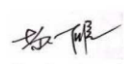
TÜV Rheinland report no.:
CN248WVV 004
TÜV Rheinland project no.:
244591111

Certificate:
PV 50614584
File: N/A
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Constructional Data Form for Photovoltaic Modules

Rated Short Circuit Current [A] (STC):	14.51;14.54;14.57;14.60; 14.63;14.66;14.69;14.72; 14.76;14.80;14.84;14.88; 14.92;14.96	14.57;14.60;14.63;14.66; 14.69;14.72;14.76;14.80; 14.84;14.88;14.92;14.96	N/A
Rated Short Circuit Current [A] (BNPI):	15.24;15.28;15.32;15.36; 15.40;15.44;15.48;15.52; 15.56;15.60;15.64;15.68; 15.72;15.76	15.37;15.40;15.43;15.46; 15.49;15.52;15.56;15.60; 15.64;15.68;15.72;15.76	N/A
Tolerance of Rating [%].....:	±3	±3	N/A
Rated Short Circuit Current [A] (BSI):	16.48±3%		N/A
Rated Open Circuit Voltage [V] (STC):	44.60;44.70;44.80;44.90; 45.00;45.10;45.20;45.30; 45.40;45.50;45.60;45.70; 45.80;45.90	40.20;40.30;40.40;40.50; 40.60;40.70;40.80;40.90; 41.00;41.10;41.20;41.30	N/A
Rated Open Circuit Voltage [V] (BNPI):	44.60;44.70;44.80;44.90; 45.00;45.10;45.20;45.30; 45.40;45.50;45.60;45.70; 45.80;45.90	40.20;40.30;40.40;40.50; 40.60;40.70;40.80;40.90; 41.00;41.10;41.20;41.30	N/A
Tolerance of Rating [%].....:	±3	±3	N/A
Over-current protection rating [A]:	30	30	N/A
Number of solar cells.....:	120	108	N/A
Cells per bypass diode.....:	40	36	N/A
Number of diodes.....:	3	3	N/A
Serial/parallel connection of cells (S, SP, SPS)	SP	SP	N/A
Protection Class.....:	Class II	Class II	N/A
Fire Class (UL 790)	Class C or A	Class C or A	N/A
Pollution Degree.....:	I	I	N/A
Dimensions (l x w x h) [mm]	1954×1134×30/35/40	1762×1134×30/35/40	N/A
Module area [m²]	2.22	2.00	N/A
Min- creepage distance [mm].....:	14.35±1.0 (to string connector) 13.65±1.0 (to cell)	14.3±1.0 (to string connector) 13.65±1.0 (to cell)	N/A
Max. operational altitude [mas].....:	≤2000	≤2000	N/A

Shenzhen	2025-10-29	Zhejiang	2025-10-29
(Place)	(date)	(Place)	(date)
			
(stamp and/or signature of TÜV Rheinland)		(stamp and/or signature of applicant)	

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Customers reference
no.: 2062211

TÜV Rheinland report no.:
CN248WVV 004
TÜV Rheinland project no.:
244591111

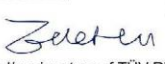
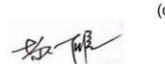
Certificate:
PV 50614584
File: N/A

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Constructional Data Form for Photovoltaic Modules

Design load – downwards [Pa].....:	3600	3600	N/A
Design load – upwards [Pa].....:	1600	1600	N/A
Safety factor for mechanical load.:	1.5	1.5	N/A
Module family F: With 1/2 cut of mono c-Si cells (BC NBB with cell size: 182.2mm×98.1mm)			
Type Name or Model No (STC).....:	AIKO-Axxx-MDE72Dw (xxx=610-675, in steps of 5, 144 cells)	AIKO-Axxx-MDE60Dw (xxx=510-560, in steps of 5, 120 cells)	AIKO-Axxx-MDE54Dw (xxx=460-505, in steps of 5, 108 cells)
Type Name or Model No (BNPI).....:	AIKO-Axxx-MDE72Dw (xxx=645-710, in steps of 5, 144 cells)	AIKO-Axxx-MDE60Dw (xxx=540-590, in steps of 5, 120 cells)	AIKO-Axxx-MDE54Dw (xxx=485-530, in steps of 5, 108 cells)
Maximum System Voltage [V _{DC}] .. :	1500	1500	1500
Rated Maximum Power [W] (STC) :	610;615;620;625;630; 635;640;645;650;655; 660;665;670;675	510;515;520;525;530; 535;540;545;550;555; 560	460;465;470;475;480; 485;490;495;500;505
Rated Maximum Power [W] (BNPI):	645;650;655;660;665; 670;675;680;685;690; 695;700;705;710	540;545;550;555;560; 565;570;575;580;585; 590	485;490;495;500;505; 510;515;520;525;530
Tolerance of Rating [%]	±3	±3	±3
Rated Short Circuit Current [A] (STC):	14.74;14.76;14.78;14.80; 14.82;14.88;14.94;15.00; 15.06;15.12;15.18;15.24; 15.30;15.36	14.71;14.77;14.83;14.89; 14.95;15.01;15.07;15.13; 15.19;15.25;15.31	14.75;14.81;14.87;14.93; 14.99;15.05;15.11;15.17; 15.23;15.29
Rated Short Circuit Current [A] (BNPI):	15.56;15.58;15.60;15.62; 15.64;15.70;15.76;15.82; 15.88;15.94;16.00;16.06; 16.12;16.18	15.52;15.58;15.64;15.70; 15.76;15.82;15.88;15.94; 16.00;16.06;16.12	15.56;15.62;15.68;15.74; 15.80;15.86;15.92;15.98; 16.04;16.10
Tolerance of Rating [%].....:	±3	±3	±3
Rated Short Circuit Current [A] (BSI):	16.74±3%		
Rated Open Circuit Voltage [V] (STC):	53.20;53.30;53.40;53.50; 53.60;53.70;53.80;53.90; 54.00;54.10;54.20;54.40; 54.60;54.80	44.48;44.58;44.68;44.78; 44.88;44.98;45.08;45.18; 45.28;45.38;45.48	40.06;40.16;40.26;40.36; 40.46;40.56;40.66;40.76; 40.86;40.96
Rated Open Circuit Voltage [V] (BNPI):	53.20;53.30;53.40;53.50; 53.60;53.70;53.80;53.90; 54.00;54.10;54.20;54.40; 54.60;54.80	44.48;44.58;44.68;44.78; 44.88;44.98;45.08;45.18; 45.28;45.38;45.48	40.06;40.16;40.26;40.36; 40.46;40.56;40.66;40.76; 40.86;40.96

Shenzhen	2025-10-29	Zhejiang	2025-10-29
(Place)	(date)	(Place)	(date)
			
(stamp and/or signature of TÜV Rheinland)		(stamp and/or signature of applicant)	

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Certificate:
PV 50614584
File: N/A

(For TÜV Rheinland of
N.A., Inc. use only)

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Constructional Data Form for Photovoltaic Modules

Tolerance of Rating [%].....:	±3	±3	±3
Over-current protection rating [A]:	30	30	30
Number of solar cells.....:	144	120	108
Cells per bypass diode.....:	48	40	36
Number of diodes.....:	3	3	3
Serial/parallel connection of cells (S, SP, SPS)	SP	SP	SP
Protection Class.....:	Class II	Class II	Class II
Fire Class (UL 790)	Class C or A	Class C or A	Class C or A
Pollution Degree.....:	I	I	I
Dimensions (l x w x h) [mm]	2382×1134×30/35/40	1995×1134×30/35/40	1800×1134×30/35/40
Module area [m²]	2.70	2.26	2.04
Min- creepage distance [mm].....:	14.25±1.0 (to string connector) 13.65±1.0 (to cell)	16.35±1.0 (to string connector) 13.65±1.0 (to cell)	16.65±1.0 (to string connector) 13.65±1.0 (to cell)
Max. operational altitude [mas].....:	≤2000	≤2000	≤2000
Design load – downwards [Pa].....:	3600	3600	3600
Design load – upwards [Pa].....:	1600	1600	1600
Safety factor for mechanical load.:	1.5	1.5	1.5

Remark:

- The upper listed Type Name or Model No. have been approved according to the standard of IEC 61215-1:2021; IEC 61215-1-1:2021; IEC 61215-2:2021; IEC 61730-1:2023; IEC 61730-2:2023; EN 61215-1:2021; EN 61215-1-1:2021; EN 61215-2:2021; EN IEC 61730-1:2018; EN IEC 61730-2:2018.
- Fire Class please see in the Qualified Material for Fire Class for detail.

Shenzhen	2025-10-29	Zhejiang	2025-10-29
(Place)	(date)	(Place)	(date)
			
(stamp and/or signature of TÜV Rheinland)		(stamp and/or signature of applicant)	

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