



TEST REPORT

SGS-CSTC
Standards Technical Services
(Shanghai) Co., Ltd.
No.588 West Jindu Road,
Songjiang District,
Shanghai, China



SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Testing Center E&C, Songjiang District, Shanghai

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Report reference no.: Horay Rights -01
Date of issue.....: Dec. 05, 2022
Total number of pages: 11
Testing laboratory: SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Address: 588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Applicant's name.....: HORAY SOLAR CO., LTD
Address: No. 30-5 Yanxin Road, Huishan District, Wuxi, Jiangsu, China
Test specification: Clause MQT 01, MQT 02, MQT 03, MQT 15 of IEC 61215-2:2016
Test item description: Photovoltaic (PV) module(s)
Trade mark: **HORAY**

Manufacturer: HORAY SOLAR CO., LTD
Address: No. 30-5 Yanxin Road, Huishan District, Wuxi, Jiangsu, China
Model/Type reference: HS500-MHO
Ratings: Refer to marking plate of sample



 Signature

Tested by: Janine Tian



 Signature

Approved by: Van Hua



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List of tests performed			
Test item	Requirement + Test	Result	Verdict
1	Visual inspection	See Table 1	P
2	Maximum power determination	See Table 2	P
3	Insulation test	See Table 3	P
4	Wet leakage current test	See Table 4	P

Pre-conditioning has been performed with an irradiance dose of 5.0 kWh/m².



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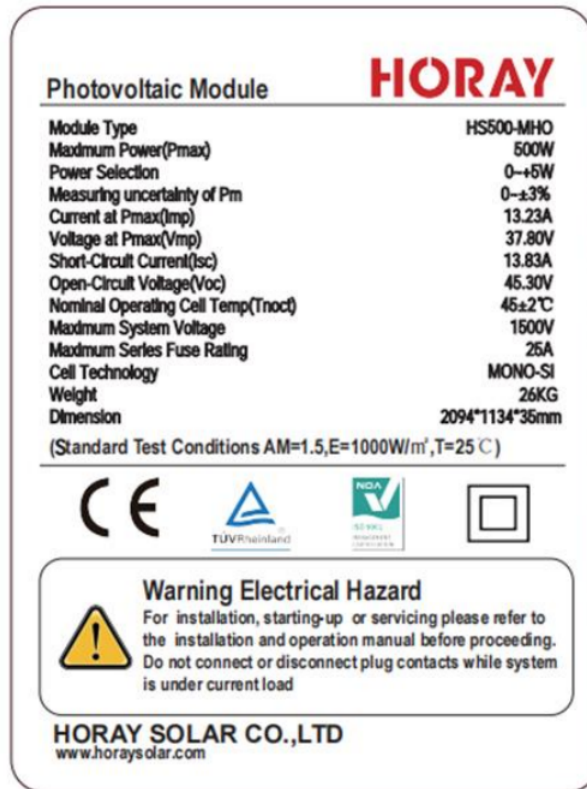
Summary of testing

Submitted samples are tested according to Clause MQT 01, MQT 02, MQT 03, MQT 15 of IEC 61215-2:2016. The test results are present within this test report.

<p>Tests performed (name of test and test clause):</p> <p>IEC 61215-2-2016: Visual inspection (MQT 01) Performance at STC (MQT 02) Insulation test (MQT 03) Wet leakage current test (MQT 15)</p>	<p>Testing location:</p> <p>Guoce Testing Technology (suzhou) Co., Ltd. Building 11, No. 18, Yaofeng East Road, Mudu Town, Wuzhong District, Suzhou, Jiangsu, 215151, China</p>
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Copy of marking plate / device under test:

Module Type: HS500-MHO



Marking plate of Sample

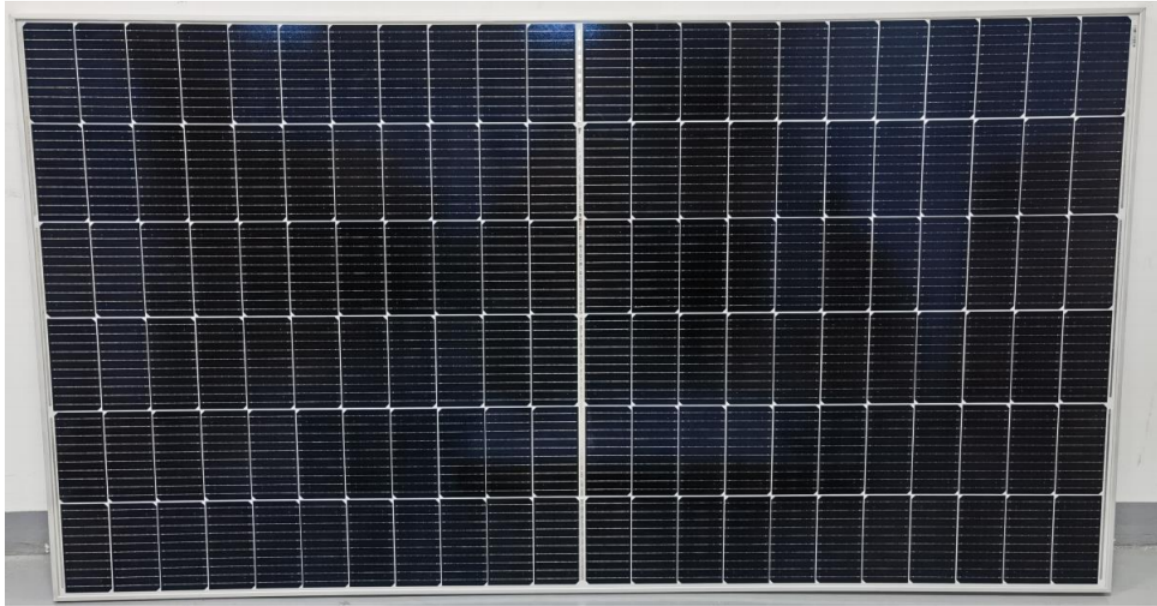


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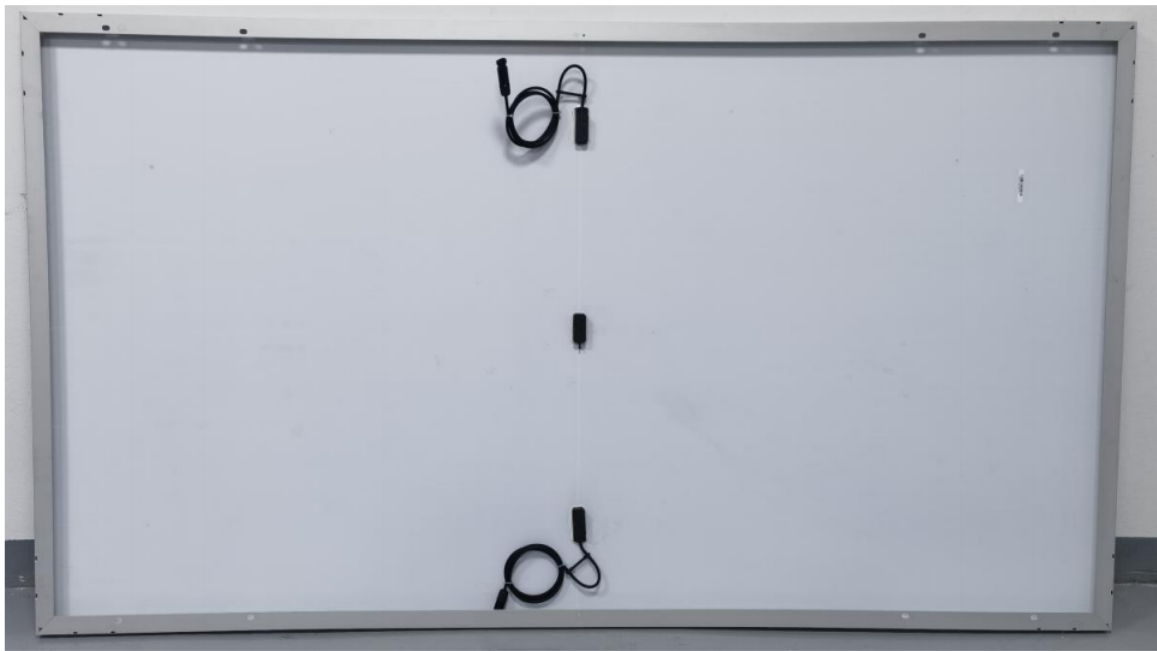
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Front view of sample



Rear view of sample



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Connector



Junction Box

Possible test case verdicts

- Test case does not apply to the test object	N/A
- Test object does meet the requirement	Pass (P)
- Test object does not meet the requirement	Fail (F)

General remarks

The test results presented in this report relate only to the object tested.
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 "(See Enclosure #)" refers to additional information appended to the report.
 "(See appended table)" refers to a table appended to the report.
 Throughout this report a point is used as the decimal separator.
 List of test equipment must be kept on file and available for review.
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Contents:

- 1) The main report
- 2) Appendix 1: List of measurement equipment
- 3) Appendix 2: Statement of the estimated uncertainty of the test results

General product information

The product is photovoltaic (PV) module.

Description of module construction

Model	Cell Type	No. of cells	Dimension [mm]
HS500-MHO	Mono-crystalline	132	2094x1134x35

Technical Data

Type/Model	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	Max.System Voltage [V]
HS500-MHO	45.30	37.80	13.83	13.23	500	1500

Type/Model	Module Efficiency [%]	Energy Efficiency Class
HS500-MHO	21.06	A

Supplementary information: Energy efficiency >13.5%: Class A.

Energy efficiency classes	A>13.5%
	13%<B≤13.5%
	12%<C≤13%
	11%<D≤12%
	E<11%



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1. Sampling procedure

<input type="checkbox"/> Random sampling from production (e.g. during factory audit (FA) or inline inspection)
<input type="checkbox"/> Random sampling from the warehouse, container or transportation boxes
<input checked="" type="checkbox"/> Modules have been submitted by the manufacturer/ client without random sampling by SGS

2. Test sample

Sample #	Model Type	Serial Number
01	HS500-MHO	E22711082222801621
02	HS500-MHO	E22711082222801598

3. Test specification and test result

TABLE 1: MQT 01 Visual inspection		
Test Date [YYYY-MM-DD]	: 2022-12-02	—
Sample #	Nature and position of initial findings	Verdict
01	No Major visual defects	P
02	No Major visual defects	P
Supplementary information: N/A		

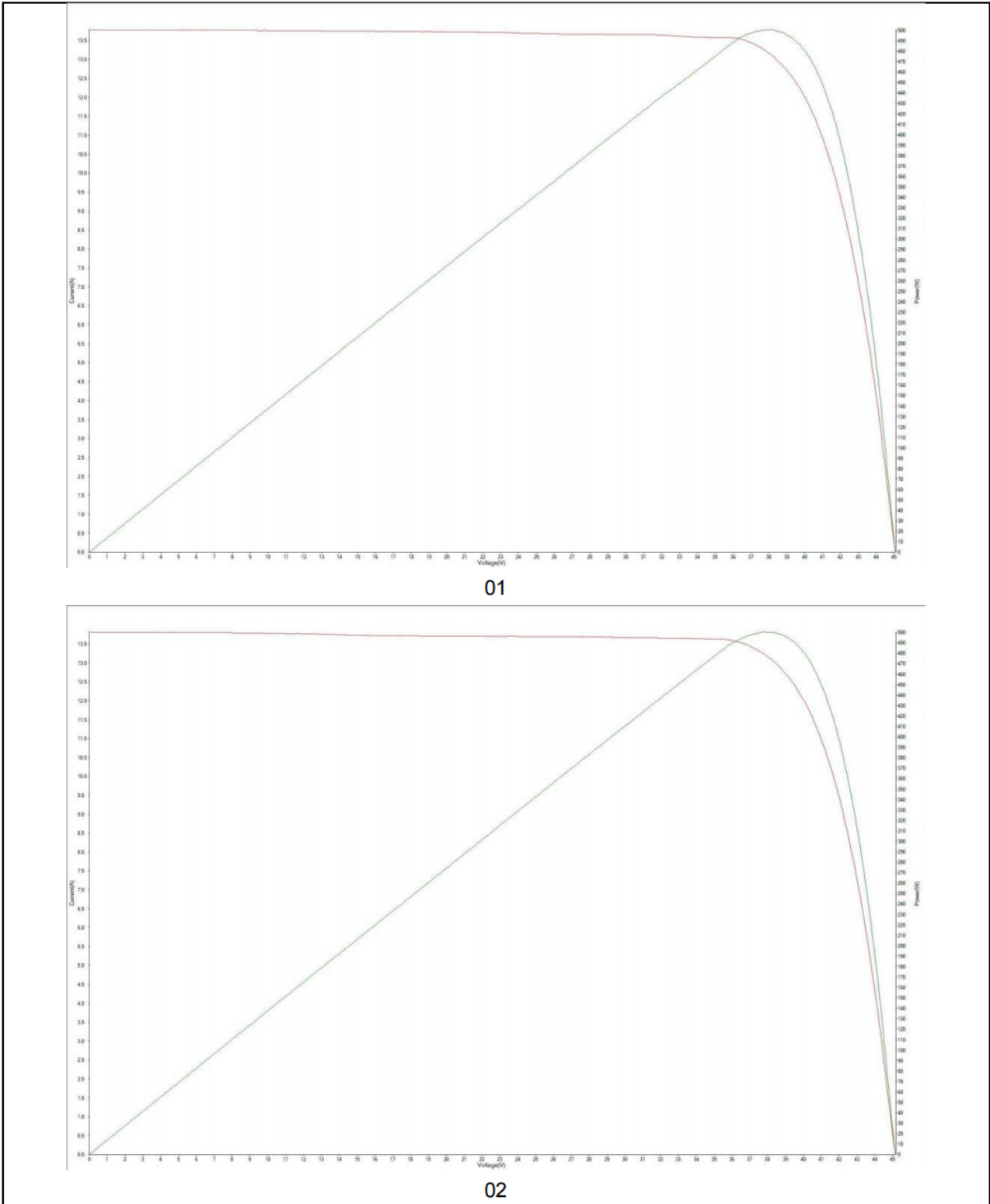
TABLE 2: MQT 02 Maximum power determination						
Test Date [YYYY-MM-DD]:		2022-12-02			—	
Test method		<input checked="" type="checkbox"/> indoor	<input type="checkbox"/> outdoor		—	
Module temperature [°C]:		Corrected to 25.0			—	
Irradiance [W/m ²]:		Corrected to 1000			—	
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]
01	45.06	37.97	13.79	13.18	500.34	80.55
02	45.13	37.98	13.82	13.17	500.27	80.22
IV Curve:						



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Supplementary information: Refer to Appendix 2: Statement of the estimated uncertainty of the test verdicts. The discrepancy between the labelled power value and the measured value shall not exceed the limit of -5%~10%.

TABLE 3: MQT 03 Insulation test					
Test Date [YYYY-MM-DD]		2022-12-03		—	
Test Voltage applied [V]		4000V 1min/1500V 2min		—	
Size of module [m ²]		2.37		—	
Sample #	Measured	Required Resistance	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
01	>1000	≥16.88	—	No	P
02	>1000	≥16.88	—	No	P

Supplementary information: Minimum requirement acc. to IEC 61215:2016 is 40 MΩ *m².

TABLE 4: MQT 15 Wet leakage current test					
Test Date [YYYY-MM-DD]		2022-12-03		—	
Test Voltage applied [V]		1500V 2min		—	
Solution resistivity [Ω cm]		2081		—	
Solution temperature [°C]		22.5		—	
Size of module [m ²]		2.37		—	
Sample #	Required Resistance [MΩ]	Measured [MΩ]	Result		
01	≥16.88	>1000	P		
02	≥16.88	>1000	P		

Supplementary information: Minimum requirement acc. to IEC 61215:2016 is 40 MΩ *m².

Appendix 1: List of measurement equipments



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Clause	Measurement / testing	Testing / measuring equipment / material used	Equipment ID	Calibration due date
4.1 10.2	Visual inspection	Luminometer	PM6612L	2023.02.14
4.3 10.13	Insulation test	Withstanding voltage/Insulation resistance tester	AN16313HG	2023.08.18
4.6	Performance at STC	Pulsed Solar Simulator	GIV-20A2616	2023.08.02
4.15 10.14	Wet leakage current test	Withstanding voltage/ Insulation resistance tester	AN16313HG	2023.08.18
		Conductive meter	DDS-307	2023.11.01

Appendix 2: Statement of the estimated uncertainty of the test results

The estimated uncertainty fulfils the requirements from the CTL decision sheet DSH 251B / 2009.

----- End of Test Report -----



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