

Technical Report No.: 61.410.20.038.01

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Client: Win Win Precision Technology Co., Ltd. (001256)
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Manufacturing place: 105758

Test subject: Product:
Mono-crystalline Silicon Photovoltaic (PV) Module(s)

WSP-xxxMG, xxx = 355~380 in step of 5 (for 120 cells);
WST-xxxMG, xxx = 355~380 in step of 5 (for 120 cells);
WSP-xxxMG, xxx = 320~335 in step of 5 (for 108 cells);
WSP-333MG (for 108 cells);
WST-xxxMG, xxx = 320~335 in step of 5 (for 108 cells);
WST-333MG (for 108 cells);
WSP-xxxMGL, xxx = 355~380 in step of 5 (for 120 cells);
WST-xxxMGL, xxx = 355~380 in step of 5 (for 120 cells);
WSP-xxxMGL, xxx = 320~335 in step of 5 (for 108 cells);
WSP-333MGL (for 108 cells);
WST-xxxMGL, xxx = 320~335 in step of 5 (for 108 cells);
WST-333MGL (for 108 cells).
xxx is standing for rated output power at STC.

Test specification: IEC TS 62782:2016 (Cyclic (dynamic) mechanical load testing)

Purpose of examination: • Test according to the test specification

Test result: The test results show that the presented product is in compliance with the specified requirements.

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1 Description of the test subject

1.1 Function

Manufacturer's specification for intended use:
Use sunlight to generate electricity through PV modules with maximum system voltage of 1000V DC.

1.2 Consideration of the foreseeable misuse

- Not applicable
- Covered through the applied standard
- Covered by the following comment
- Covered by attached risk analysis

1.3 Technical Data (test sample)

Model : WSP-375MG
 Rated Voltage : 1000 Vdc
 Rated Power : 375W
 Protection Against Moisture : Yes
 Construction : Framed
 Supply connection : Junction box, Cable and Connectors
 Module dimension : 1759 x 1034 x 35 [mm]
 Weight : 21.8KG

1.4 General product information of test samples

Product Electrical Ratings:

Type or model number	WSP-375MG
Voc (Vdc)	41.08
Vmp (Vdc)	34.46
Imp (Adc)	10.95
Isc (Adc)	11.47
Pmp (W)	375
Min. Value of Pmax, Voc, Isc or Deviation at STC	±3%(Pmax); ±10%(Voc); ±10%(Isc)
Maximum over-current protection rating (A)	20

List of test samples:

Sample No.	Type / model	Sample S/N	Remark
1	WSP-375MG	W208A8E222700018	Dynamic mechanical load test

Copy of marking plate (representative):

		<h1>WSP-375MG</h1> 
WINAICO®		Serial No.: W19A649172830653
<p> Maximum power (Pmax) 375 W Power tolerance -0/+5 W Open circuit voltage (Voc) 41.08 V Short circuit current (Isc) 11.47 A Maximum power voltage (Vmp) 34.46 V Maximum power current (Imp) 10.95 A Maximum system voltage IEC/UL 1000 V Maximum series fuse 20 A Maximum load (Positive/Negative) 5400/2400 pa Safety factor 1.5 All electrical data at Standard Test Condition (STC): 1000 W/m² irradiance, AM 1.5 spectrum, cell temperature 25°C. Power measurement tolerance: ±3%. Tolerance of Voc/Isc data: ±10%. </p> <p> Module Fire Performance Type 4 Application Class A Class II (IEC 61140) System fire class rating: see installation instructions for installation requirements to achieve a specified system fire class rating with this product. For field connections, use minimum No. 12 AWG copper wires insulated for a minimum 90°C. </p>		<p>CONNECTOR MATING SEE MODULE INSTALLATION INSTRUCTIONS FOR APPROPRIATE MATING CONNECTORS.</p>    <p>Tested to IEC 61215-2:2016 and IEC 61730- 1:2016</p>
<p>  WARNING - ELECTRIC HAZARD AVERTISSEMENT - RISQUE ÉLECTRIQUE This unit produces electricity if exposed to light. DO NOT disconnect under load. </p> <p>  Cette unité produit de l'électricité si elle est exposée à la lumière. NE PAS se déconnecter sous charge. </p>		<p> Production Facility(ies): 105758 </p> 
Win Win Precision Technology Co., Ltd. www.winaico.com 4F., No.180, Sec. 2, Gongdao 5th Rd., Hsinchu City 30070, Taiwan		

2 Order

2.1 Date of Purchase Order, Customer's Reference

2020-12-08, Order No.: 718852916

2.2 Receipt of Test Sample, Location

Telecom Technology Center Communication and Photovoltaic Laboratory - Telecom Technology Center
No.3, Luke 1'st Rd., Lujhu, Kaohsiung city, Taiwan CHINESE TAIPEI

2.3 Date of Testing

2020-12-22 ~ 2021-02-19

2.4 Location of Testing

Telecom Technology Center Communication and Photovoltaic Laboratory - Telecom Technology Center
No.3, Luke 1'st Rd., Lujhu, Kaohsiung city, Taiwan CHINESE TAIPEI

2.5 Points of Non-compliance or Exceptions of the Test Procedure

N/A

3 Test Results

3.1 Positive Test Results

TABLE 01: MQT 01 ini: Initial Visual inspection		P
Test Date [YYYY-MM-DD].....:	2020-12-22	—
Sample #	Nature and position of initial findings – comments or attach photos	—
1	No major defects	P
Supplementary information: N/A		

TABLE 02: MQT 19.1 ini: Initial stabilization							P
TABLE 02.1: MQT 06.1 ini: Performance at STC before initial stabilization							
Test Date [YYYY-MM-DD].....:	2020-12-22						—
Test method.....:	<input checked="" type="checkbox"/> Simulator <input type="checkbox"/> Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmax [W]	FF [%]	
1	11.44	40.84	10.89	34.24	373.0	79.82	
Supplementary information: N/A							

TABLE 02.2: MQT 19.1 ini: Initial Stabilization procedure							
Light exposure method.....:	<input checked="" type="checkbox"/> Simulator <input type="checkbox"/> Natural sunlight						
Abbreviation: Regarding light source “S” for Solar simulator and “N” for Natural sunlight							
Stabilization criterion x per IEC 61215-1-x	1						
Sample #	1	Test Date (YYYY-MM-DD) start/end			2020-12-29 ~ 2020-12-30		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	P _{max} – P _{min} / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	373.0	—	—
1	15	1000	50 ± 10	3.2	370.9	—	—
2	5	1000	50 ± 10	3.2	370.4	0.7	Yes
3							
4						—	—
Supplementary information:							
From three consecutive power measurements, stabilization occurs when (P _{max} -P _{min})/P _{average} x 100% < 1%							
<input type="checkbox"/> Other stabilization procedures							
Sample #	Test Date (YYYY-MM-DD) start/end						



N/A	N/A
Test method description:	
Supplementary information: N/A	

TABLE 03: MQT 06.1 ini: Performance at STC after initial stabilization										P
Test Date [YYYY-MM-DD]..... :					2020-12-30					—
Pmax(lab) lower limit (W)					See table below: Pmax [W] – Min calc.					—
$\bar{P}_{max}(Lab)$ lower limit (W)					≥ 365.15					—
Voc(lab) upper limit (V)					See table below: Voc [V] Max. calc.					—
Isc (lab) upper limit (A)					See table below: Isc [A] Max. calc.					—
Test method..... :					<input checked="" type="checkbox"/> Simulator <input type="checkbox"/> Natural sunlight					—
Sample #	Isc [A]		Voc [V]		Imp [A]	Vmp [V]	Pmax [W]		FF [%]	Result
	Meas.	Max. calc.	Meas.	Max. calc.			Meas.	Min. calc.		
1	11.43	12.29	40.70	44.90	10.88	34.05	370.4	354.19	79.66	P
Supplementary information:										
Type of Solar simulator: Steady state, Class AAA										
The limit values are calculated considering manufacturer's tolerances t of rated nameplate values and laboratory measurement uncertainties m .										

TABLE 04: MQT 03 ini: Initial Insulation test										P
Test Date [YYYY-MM-DD]..... :					2021-01-29					—
Test Voltage applied [V]					6000/1000					—
Size of module [m ²]					1.82					—
Required Resistance [MΩ]					21.98					—
Sample #	Measured		Dielectric breakdown						Result	
	MΩ		Yes (description)				No			
1	9999						X	P		
Supplementary information:										
Size of module [m ²] = 1.82m ²										
Required Resistance = 40 MΩ* m ² /1.82 m ² = 21.98MΩ										

TABLE 05: MQT 15 ini: Initial Wet leakage current test			P
Test Date [YYYY-MM-DD].....	2021-01-29		—
Test Voltage applied [V].....	1000		—
Solution temperature [°C]	22.7		—
Size of module [m ²].....	1.82		—
Required Resistance [MΩ]	21.98		—
Sample #	Measured [MΩ]	Required Resistance [MΩ]	Result
1	2863	21.98	P
Supplementary information: Size of module [m ²] = 1.82m ² Required Resistance = 40 MΩ* m ² /1.82 m ² = 21.98MΩ			

TABLE 06: Dynamic Mechanical Load test			P
Test Date [MM/DD/YYYY].....	2021-02-19		—
Sample #	1		—
Temperature of tested module(°C).....	22.0		—
Maximum pressure (Pa)	1000		—
Pressure tolerance (Pa).....	± 10		—
Monitoring current (A).....	0.1		—
Rate per minute(cycles)	10		—
Number of cycles	1000		—
Pressure provider (Air pressure or vacuum).....	vacuum		—
Current continuous (continuous/ disconnection occurred)	continuous		—
Supplementary information: N/A			

TABLE 07: MQT 01 fin: Final Visual inspection			P
Test Date [YYYY-MM-DD].....	2021-02-19		—
Sample #	Nature and position of initial findings – comments or attach photos		—
1	No changes		P
Supplementary information: N/A			

TABLE 08: MQT 06.1 fin: Final Performance at STC			P
Test Date [YYYY-MM-DD].....	2021-02-19		—



Test method.....:							<input checked="" type="checkbox"/> Simulator	<input type="checkbox"/> Natural sunlight	—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmax [W]	FF [%]	Pmax [W] (Lab _GateNo.1)	Power Degradation [%]	Result
1	11.41	40.71	10.86	34.07	370.1	79.66	370.4	-0.08	P
Supplementary information: Type of Solar simulator: Steady state, Class AAA									

TABLE 09: MQT 03 fin: Final Insulation test					P
Test Date [YYYY-MM-DD]..... :				2021-02-19	—
Test Voltage applied [V]				6000/1000	—
Size of module [m ²]..... :				1.82	—
Required Resistance [MΩ]				21.98	—
Sample #	Required	Measured	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
1	9999	21.98		X	P
Supplementary information: Size of module [m ²] = 1.82m ² Required Resistance = 40 MΩ* m ² /1.82 m ² = 21.98MΩ					

TABLE 10: MQT 15 fin: Final Wet leakage current test					P
Test Date [YYYY-MM-DD].....:				2021-02-19	—
Test Voltage applied [V].....:				1000	—
Solution temperature [°C]				22.9	—
Size of module [m ²]..... :				1.82	—
Required Resistance [MΩ]				21.98	—
Sample #	Measured [MΩ]		Limit [MΩ]		Result
1	2477		21.98		P
Supplementary information: Size of module [m ²] = 1.82m ² Required Resistance = 40 MΩ* m ² /1.82 m ² = 21.98MΩ					