

Test Report
No. TRSHV03057/19/01

Commission Testing
according to IEC61215-2

Applicant: **Jiangsu Sunport Power Corp., Ltd.**
No.20, Xishi Road, Xinwu District,
Wuxi City, Jiangsu Province, 214028, P.R. China

File No.: SHV03057/19

Designed: *April. 26. 2019* by: *[Signature]*

Reviewed: *April. 26. 2019* by: *Bella Hu*

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Applicant..... :	Jiangsu Sunport Power Corp., Ltd. No.20, Xishi Road, Xinwu District, Wuxi City, Jiangsu Province, 214028, P.R. China
Manufacturer :	Nanjing Sunport Power New Energy Co., Ltd. No.28-10, Lanhua Road, Qiaolin Industrial Park, Pukou District, Nanjing City, Jiangsu Province, 211806,P.R. China
Order No. :	QT-SHV03057/19_R1
Date of Application :	03/25/2019
Product :	Crystalline Silicon Photovoltaic Modules
Module type(s)..... :	PV Modules with 6" Mono-crystalline Silicon Solar Cells: 72 cells: SPP390M72
General Information • Maximum System Voltage.... :	DC 1000V
• Application Class :	Class A
• Electrical Protection Class.... :	Class II
• Fire Safety Class :	N/A
Type of examination :	Commission testing only
Testing Period :	03/21/2019 - 03/28/2019
Testing Laboratory..... :	National Center of Supervision & Inspection on Solar Photovoltaic Products Quality (Attached to Wuxi Test Center of Supervision and Inspection for Product Quality) Suite A, 5 Xinhua Rd., WND, 214028 Wuxi Jiangsu, CHINA

Test results listed in this test report refer exclusively to the mentioned test sample.

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The submitted test samples as described in the reports hereunder are based on the requirements:
IEC 61215-2:2016 "Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 2: Test procedures"

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Summary of testing

According to the enquiry of the applicant, a commission testing was performed according to IEC 61215-2:2016 MQT 19 Stabilization, the total irradiation dosage is 20 KWh/m².

Module type SPP390M72 was delivered to testing lab as test samples and conducted with all the related tests.

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General remarks

Test item particulars:	
Accessories and detachable parts included in the evaluation	N/A
Options included.....	N/A
Abbreviations used in the report:	
HF - Humidity Freeze	TC - Temperature Cycling
DH - Damp Heat	Vmpp - Maximum power voltage
Impp - Maximum power current	Voc - Open circuit voltage
Isc - Short circuit current	FF - Fill factor
Pmpp - Maximum power	α - Current temperature coefficient
NOCT - Nominal Operating Cell Temperature	β - Voltage temperature coefficient
STC - Standard Test Conditions	γ - power temperature coefficient
CTI - Comparative Tracking Index	PD - Partial Discharge
Possible test case verdicts:	
Test case does not apply to the test object	Not Applicable (N/A)
Test object does meet the requirement.....	Pass (P)
Test object does not meet the requirement.....	Fail (F)
Other remarks:	
<p>The test verdicts presented in this report relate only to the object tested. This report shall not be reproduced, except in full, with the written approval of the issuing testing laboratory.</p> <p>“(see Annex #)” refers to additional information appended to the report. “(see Table #)” refers to a table appended to the report.</p> <p>Throughout this report, a point is used as the decimal separator.</p>	

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General product information

Module type: SPP390M72

Product Electrical Ratings at STC:	
Nominal maximum power (Pmax) [W].....:	390
Nominal open circuit voltage at (Voc) [V]	47.8
Nominal maximum power voltage (Vmpp) [V].....:	39.2
Nominal short circuit current at (Isc) [A]	10.34
Nominal maximum power current (Impp) [A].....:	9.96
Product Safety Ratings:	
Maximum system voltage [V].....:	1000
Fuse rating [A]	15
Application class.....:	Class A
Safety class in accordance with IEC 61140	Class II
Fire safety class.....:	N/A
Recommended maximum series module configurations ..:	N/A
Recommended maximum parallel module configurations :	N/A

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Module group assignment

Module type: SPP390M72

Sample #	Serial number	Dimension (l x w x h) [mm]	Remark
1	37B21310025	1956 x 990 x 40	LID
2	37B21310028	1956 x 990 x 40	LID

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Clause	Requirement + Test	Result - Remark	Verdict
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Test result overview

Module type: SPP390M72

Initial examinations			-
MQT19.1	Stabilization..... :	Performed by testing lab, see table 4.19.5	-
MQT01	Visual inspection	See table 4.1	N/A
MQT06.1	Performance at STC (after stabilzition)..... :	See table 4.6.1	N/A
MQT03	Insulation test..... :	See table 4.3	N/A
MQT15	Wet leakage current test..... :	See table 4.15	N/A
MQT02	Maximum power determination..... :	N/A	N/A
MST13	Continuity test for equipment bonding	N/A	N/A
MST11	Accessibility test..... :	N/A	N/A

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IEC61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

Test results of IEC 61215

Module type: SPP390M72

4.1 Visual inspection (initial) - MQT01			-
Test date [MM/DD/YYYY].....:		03/25/2019	-
Sample #	Nature and position of findings - comments or attach photos		-
1	No visual defects		N/A
2	No visual defects		N/A
Supplementary information: N/A			-

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IEC61215-2							
Clause	Requirement + Test			Result - Remark			Verdict
4.19.5 Stabilization - MQT19.1							
Sample #		1					-
Light exposure method		<input checked="" type="checkbox"/> Solar simulator / <input type="checkbox"/> Natural sunlight / <input type="checkbox"/> Others					-
Test date [MM/DD/YYYY] / start - end ..		03/21/2019 - 03/25/2019					-
Test cycle	Integrated irradiation [kWh/m ²]	Irradiance [W/m ²]	Module temperature [°C]	Resistive load [Ω]	Pmpp at the end of cycle [W]	(P _{max} - P _{min}) / P _{average} [%]	Stable? [Y / N]
Initial(P1)	N/A	>500	N/A	N/A	387.8	-	-
1 (P2)	5.0	>500	N/A	N/A	386.7	-	-
2 (P3)	5.0	>500	N/A	N/A	386.7	N/A	N/A
3 (P4)	5.0	>500	N/A	N/A	385.4	N/A	N/A
4 (P5)	5.0	>500	N/A	N/A	384.3	N/A	N/A
Sample #		2					-
Light exposure method		<input checked="" type="checkbox"/> Solar simulator / <input type="checkbox"/> Natural sunlight / <input type="checkbox"/> Others					-
Test date [MM/DD/YYYY] / start - end ..		03/21/2019 - 03/25/2019					-
Test cycle	Integrated irradiation [kWh/m ²]	Irradiance [W/m ²]	Module temperature [°C]	Resistive load [Ω]	Pmpp at the end of cycle [W]	(P _{max} - P _{min}) / P _{average} [%]	Stable? [Y / N]
Initial(P1)	N/A	>500	N/A	N/A	384.8	-	-
1 (P2)	5.0	>500	N/A	N/A	384.7	-	-
2 (P3)	5.0	>500	N/A	N/A	383.8	N/A	N/A
3 (P4)	5.0	>500	N/A	N/A	385.2	N/A	N/A
4 (P5)	5.0	>500	N/A	N/A	384.7	N/A	N/A
Supplementary information: N/A							

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IEC61215-2							
Clause	Requirement + Test			Result - Remark			Verdict
4.6.1 Performance at STC (after stabilization) - MQT06.1							-
Test date [MM/DD/YYYY].....:		03/25/2019					-
Test method		<input checked="" type="checkbox"/> Simulator / <input type="checkbox"/> Natural sunlight					-
Irradiance [W/m ²].....:		1000					-
Module temperature [°C]		25.0					-
P _{max} (lab) lower limit [W]		N/A					-
P̄ _{max} (lab) lower limit [W]		N/A					-
V _{OC} (lab) upper limit [V]		N/A					-
I _{SC} (lab) upper limit [A]		N/A					-
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]	-
1	48.30	39.89	10.14	9.63	384.3	78.49	N/A
2	48.38	39.96	10.13	9.63	384.7	78.47	N/A
Average	-	-	-	-	384.5	-	N/A
Supplementary information: N/A							

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IEC61215-2				
Clause	Requirement + Test		Result - Remark	Verdict
4.3 Insulation test (initial) - MQT03				-
Test date [MM/DD/YYYY].....:		03/25/2019		-
Test voltage applied [V].....:		2 minutes of 1000 and 1 minute of 6000		-
Sample #	Required [MΩ]	Measured [MΩ]	Dielectric breakdown?	
1	20.6	>1000	No	N/A
2	20.6	>1000	No	N/A
Supplementary information: Minimum requirement according to the standard is 40MΩ·m ² . Area of the module is 1.94m ² .				-

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IEC61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
4.15 Wet leakage current test (initial) - MQT15			-
Test date [MM/DD/YYYY].....:	03/25/2019		-
Test voltage applied [V].....:	2 minutes of 1000		-
Solution resistivity [Ω /cm] / <3500	1806		-
Solution temperature [$^{\circ}$ C] / 22 \pm 2	20.8		-
Sample #	Required [$M\Omega$]	Measured [$M\Omega$]	-
1	20.6	>1000	N/A
2	20.6	>1000	N/A
Supplementary information: Minimum requirement according to the standard is 40 $M\Omega \cdot m^2$. Area of the module is 1.94 m^2 .			-

Annex 1: Critical materials declared by applicant

Object	Manufacturer	Type	Technical Data	Remark
Components				
6" mono cell	Xuzhou Guyang New Energy Co., Ltd.	MWT (MONO)	Dimension (w x l)= 158.75mm x 158.75 mm Thickness = 180±20µm Cell area = 249.86cm ² 0 busbars, 36 conductive holes Perc cells	Tested with PV modules
Front cover	Xinyi PV Products (Anhui) Holdings Co., Ltd.	Tempered AR coating glass	Thickness = 3.2mm	Tested with PV modules
Rear cover	ZhongTian Photovoltaic Materials Co., Ltd.	ZTT-KPK	Thickness = 0.320±0.03 mm Material: PVDF / PET / PVDF Thickness = 25µm / 250µm / 25µm Color: white	Tested with PV modules Certificate no. R50302139
Conductive paste	ELSOLD GmbH & Co. Kg	Solder Paste AP-10	Bi: 57±1.0 Sn:42±1.0, Ag:1±0.2	Tested with PV modules
Conductive core board	Xuzhou Sunport Materials Co., Ltd.	Cu/GPS	CU/GPS 0.35mm/0.17mm	Tested with PV modules
Encapsulation material	Hangzhou First Applied Material Co. Ltd.	F406P+F806P	Thickness = 0.45mm+0.35mm	Tested with PV modules
Frame	Nanjing hongfa non-ferrous metals manufacturing Co., Ltd.	6063-T5	Thickness =40mm/35mm Color: silvery Connected by: buckle slot	Tested with PV modules
Adhesive (frame)	Suzhou Tosan Adhesive Co., Ltd.	1527	Color: white	Tested with PV modules
Internal wiring (for inter-string connection)	Jiangsu Gangtai Industrial Co., Ltd	Copper belt with tin plated	Width =6.0mm Thickness = 0.25mm Sn60%Pb40%	Tested with PV modules
Soldering material	Hangzhou Youbang Solder Material Co., Ltd.	Sn63PbA	Sn63Pb37	Tested with PV modules
Fluxing agent	Wuxi Asahi Co., Ltd.	SF56	-	Tested with PV modules
Junction box set				
Junction box	Jiangsu Tonglin Electric Co., Ltd.	TL-BOX026-ienp	Rated voltage = 1000VDC Rated current = 12A Number of diodes: 3	Certificate no. R50330137
Adhesive (junction box)	Suzhou Tosan Adhesive Co., Ltd.	TS1527	Color: white	Tested with PV modules
Potting material	Suzhou Tosan Adhesive Co., Ltd.	TS1521	Color: white	Tested with PV modules
Bypass diodes	Yangzhou Hongyang Electronics Co., Ltd.	15SQ045	Tj max = 200°C If = 12A	Tested with PV modules
Cable	Jiangsu Tonglin Electric Co., Ltd.	H1Z2Z2-K 1x4.0mm ²	Rated voltage = 1500VDC	Certificate no. R50362278
Connectors	Jiangsu Tonglin Electric Co., Ltd.	TL-CABLE01	Rated voltage = 1000VDC Rated current =30A	Certificate no. R50372077

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Annex 2: List of measurement equipment

Measurement / testing	Measuring equipment	Equipment ID	Calibration due date
Stabilization	Pulsed Solar Simulator	EV20-51	03/19/2020
	Steady-state Sunlight Simulator	ES21-24	03/18/2020
Insulation test / Wet leakage current test	Withstanding voltage/Insulation resistance tester	EV21-56	09/02/2019
Others	Temperature-hydrometer	TT21-44	05/01/2019
	Steel Tape	LS21-05	08/06/2019

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Annex 3: Statement of the estimated uncertainty of the test results

The total measuring uncertainty of P_{mpp} is $\leq 2.5\%$

The total measuring uncertainty of I_{sc} is $\leq 2.3\%$

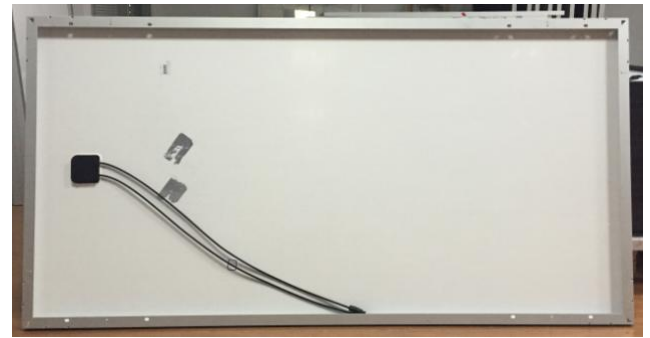
The total measuring uncertainty of V_{oc} is $\leq 0.8\%$

Annex 4: Photos

Module type: SPP390M72



Front overview



Back overview

NO.14207A/2

日托光伏

单晶硅高效光伏组件
Monocrystalline High Efficiency PV Module

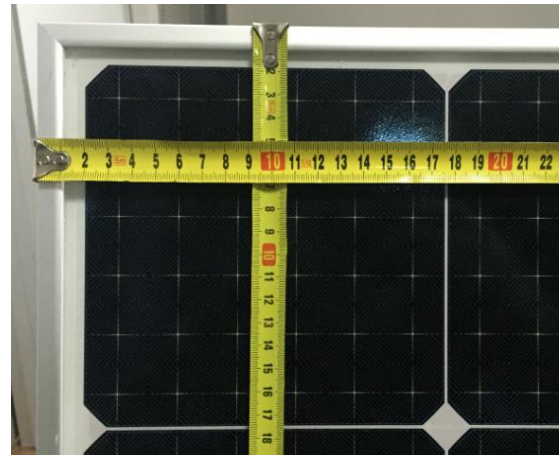
型号 Model	SPP390M72
最大功率 Maximum Power (Pmax)	390W
功率公差 Maximum Power Tolerance	0 ~ +3%
最佳工作电压 Maximum Power Voltage (Vmp)	39.2V
最佳工作电流 Maximum Power Current (Imp)	9.96A
开路电压 Open Circuit Voltage (Voc)	47.835V
短路电流 Short Circuit Current (Isc)	10.3415A
额定工作温度 NMOT	43±2°C
最大系统电压 Maximum System Voltage	DC1000V
最大保险丝额定电流 Maximum Series Fuse Rating	15A
应用等级 Application Class	Class A
重量 Weight	22.9Kg
尺寸(长*宽*高) Dimension(L*W*H)	1956*992*40mm

警告 CAUTION

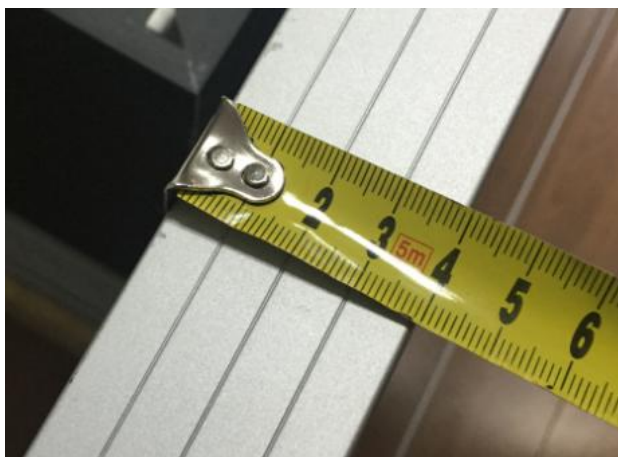
• 组件暴露在阳光下发电，须遵守防电措施。
Be careful. This unit produces electricity if exposed to light.
• 仅允许专业人员安装或维护组件。
Only qualified personnel are allowed to do installing or maintenance.
• 连接组件时，须小心高压。
Be care of dangerous high DC voltage when connecting modules.
• 潮湿环境下，禁止搬运或安装组件。
Do not handle or install modules when wet.

江苏日托光伏科技股份有限公司
Jiangsu Support Power Corp., Ltd.
http://www.supportpower.com
Tel: +86-25-86124811
Fax: +86-25-86120811
Made in China

Label



Solar cell



Frame



Grounding Mark

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Junction box (TL-BOX026-ienp)



Junction box (opened)

Junction box is potted



Cable (H1Z2Z2-K 1x4.0mm²)

Bypass diode



Mark (Do not disconnect under load)



Connectors (TL-CABLE01)

----- End of test report -----