

DOC No. : 24E1FF5N_1 A-29, Sector 5, Noida, Gautam Buddha Nagar, Uttar
Telephone : +91 9871062220 Pradesh, India - 201301
FAX : -
E-Mail : testing.a29@urs-labs.com
BO Code : NA

**Test REPORT AS PER : IS/IEC 61730 : PART 2
(2004)**

QR Code/Barcode : 210292CRS

REPORT NO : SC24SPI02127_1

DATE : 27 Dec, 2024

PART A. PARTICULARS OF SAMPLE SUBMITTED

a) Customer Name & Address : INTEGRATED BATTERIES INDIA PVT LTD
Plot No 40 Ecotech 10 Greater Noida, NA, Uttar
Pradesh, India - 201301
b) Nature of sample : -
c) Grade/Variety/Type/Class Size etc : NA
d) Declare values, if any : -
e) Batch No. & Date of Manufacture : /
f) Quantity : 10
g) Date of Receipt : 15 Oct, 2024
h) BIS Seal : Verified by Sample Cell
i) IO's Signature : Verified by Sample Cell
j) Any other Information / Expiry Date, If any : /
k) Date of Commencement of Testing : 24 Oct, 2024
l) Date of Completion of Testing : 27 Dec, 2024
m) Section Code : 24E1FF5N
n) Section Report No. : 24E1FF5N_1
o) Report Type : New
p) Reference Report No. :
q) Remarks :

Anjali Kanojia
OIC SAMPLE CELL
(Authorized Signatory)
Authorized on: 27 Dec, 2024 20:53 PM

1.

This is a Computer Generated Report.

PART B. SUPPLEMENTARY INFORMATION

- | | |
|--|----------------|
| 1. Reference to sampling procedure, wherever applicable. | Not Applicable |
| 2. Supporting documents for the measurements taken and results derived like graphs, table sketches and or photographs as appropriate to test report, if any. | Yes |
| 3. Deviation from the test methods as prescribed in relevant ISS/Work instruction, if any. | Not Applicable |
| 3. NABL Report required ? | Yes |

Paras Singh

OIC Electrical

(Authorized Signatory)

Authorized on: 27 Dec, 2024 18:28 PM

This is a Computer Generated Report.

PART C. TEST RESULT

S.No.	Clause No Table No. Sl. No	Parameter - Method of test	Test Description	Min Limit	Max Limit	Unit	Result/ Observation
1	10.2 IS/IEC 61730-2	Visual inspection MST01	Compliance is checked by Visual Inspection. To detect and document any visual defects and changes in the PV module.	-	-	-	Test Not Applicable
2	10.3 IS/IEC 61730-2	Performance at STC MST 02	The module shall be stabilized according to MQT 19.1 of IEC 61215-2. The test procedure is equivalent to MQT 06.1 in IEC 61215-2.	-	-	-	Test Not Applicable
3	10.4 IS/IEC 61730-2	Maximum power determination MST 03	This test shall verify that the PV module shows the electrical characteristics of a fully functional photovoltaic device. This test is equivalent to MQT 02 in IEC 61215-2.	-	-	-	Test Not Applicable
4	10.5 IS/IEC 61730-2	Insulation thickness test MST 04	The test is to be performed on polymeric insulation sheets front side and /or back side. Applying a suitable method, measure the thickness of the individual layers separating the electric circuitry from the outer surface. The used method shall have a measurement uncertainty not greater than 10 % including reproducibility. Then determine the thickness of the part of the layers representing the relied upon insulation (see Figure 4 of IEC 61730-1:2016)	-	-	-	Test Not Applicable
5	10.6 IS/IEC 61730-2	Durability of marking MST 05	Compliance is checked by inspection and by rubbing the marking by hand using medium pressure for 15 s with a piece of cloth soaked with water and again for 15 s with a piece of cloth soaked with petroleum spirits. After this test, the marking shall be legible; it shall not be possible to remove marking plates easily and they shall show no curling.	-	-	-	Test Not Applicable

6	10.7 IS/IEC 61730-2	Sharp edge test MST 06	Compliance is checked by inspection. Alternatively a sharp edge test described in ISO 8124-1 can be performed to confirm compliance.	-	-	-	Test Not Applicable
7	10.8 IS/IEC 61730-2	Bypass diode functionality test MST 07	The test procedure and pass criteria are equivalent to MQT 18.2 in IEC 61215-2.	-	-	-	Test Not Applicable
8	10.9 IS/IEC 61730-2	Accessibility test MST 11	To determine if PV modules are constructed to provide adequate protection against accessibility to hazardous live parts (35 V).	-	-	-	Test Not Applicable
9	10.10 IS/IEC 61730-2	Cut susceptibility test MST 12	The test procedure is as follows: a) Position the PV module horizontally with the test surface facing upward. b) The test fixture is to be placed on the surface for 1 min and then drawn across the surface of the PV module at a speed of 150 mm/s 30 mm/s. Repeat the procedure five times in different directions considering the most critical points. c) Repeat a) and b) for other polymeric surfaces of the PV module if applicable.	-	-	-	Test Not Applicable
10	10.11 IS/IEC 61730-2	Continuity test of equipotential bonding MST 13	The purpose of this test is to verify the continuous path between accessible conductive parts that are in direct contact with each other (e.g. parts of a metallic frame).	-	-	-	Test Not Applicable
11	10.12 IS/IEC 61730-2	Impulse voltage test MST 14	The purpose of the test is to verify the capability of insulation of the PV module to withstand over-voltages of atmospheric origin. It also covers over-voltages due to switching of lowvoltage equipment. Apply the surge impulse voltage with a waveform as shown in Figure 4 by the impulse voltage generator. According to IEC 60060-1 the surge impulse voltage shall be within 3 % of the value given in Table B.1 of IEC 61730-1:2016.	-	-	-	Test Not Applicable

12	10.13 IS/IEC 61730-2	Insulation test MST 16	This test is identical to MQT 03 of IEC 61215-2 with test levels depending on the Class and the maximum system voltage. The maximum test voltage U _{Test} shall be equal to 2 000 V plus four times the maximum system voltage for Class II and equal to 1 000 V plus two times the maximum system voltage for Class 0. For Class III the test voltage is 500 V.	-	-	-	Test Not Applicable
13	10.14 IS/IEC 61730-2	Wet leakage current test MST 17	This test is equivalent to MQT 15 in IEC 61215-2. Cemented joints within PV modules shall be tested with an increased test voltage. The following applies: U _{Test} (cemented joint) = U _{Test} 1,35 as required by IEC 61730-1. All noncemented joints shall be tested with normal U _{Test} .	-	-	-	Test Not Applicable
14	10.15 IS/IEC 61730-2	Temperature test MST 21	This temperature test is designed to determine the maximum reference temperatures for various components and materials used to construct the PV module, in order to verify the suitability of their use. The test can be performed under natural sunlight or by use of a solar simulator with a cold sky. The measured component temperatures (TOBS) shall be normalised by the addition of the difference between the 40 °C reference environmental temperature and the measured environmental temperature (TENV) according to the formula: TCON = TOBS + (40°C-TENV)	-	-	-	Test Not Applicable
15	10.16 IS/IEC 61730-2	Hot-spot endurance test MST 22	This test is equivalent to MQT 09 in IEC 61215-2. Technology specific test descriptions are to be found in parts 1-x of the IEC 61215 series.	-	-	-	Test Not Applicable

16	10.17 IS/IEC 61730-2	Fire test MST 23	PV modules may be exposed to external fire conditions, and therefore should be tested for their fire-resistance characteristics when exposed to a fire source originating from outside the PV module, which may include the building on which they are installed or into which they are integrated, or from an adjacent building. Fire resistance requirements for a PV module intended for building applications are defined in local or national building codes. Fire test requirements are to be included as national differences in this standard. Countries where resistance of building products to external fire or radiant heat is not covered by building codes may refer to Annex B.	-	-	-	Test Not Applicable
17	10.18 IS/IEC 61730-2	Ignitability test MST 24	This test determines the ignitability of PV modules by direct small flame impingement under zero impressed irradiance by external heat sources using vertically oriented test specimens. The test does not replace a fire test; it assesses ignitability, not flammability of outer surfaces of a module. The test method is based on ISO 11925-2. If compliance to ISO 11925-2 can be proven by existing approvals, this test can be omitted.	-	-	-	Test Not Applicable
18	10.19 IS/IEC 61730-2	Bypass diode thermal test MST 25	This test is equivalent to MQT 18 in IEC 61215-2. Both, MQT 18.1 and MQT 18.2 shall be performed.	-	-	-	Test Not Applicable

19	10.20 IS/IEC 61730-2	Reverse current overload test MST 25	A laboratory DC power supply shall be connected to the PV module with positive output connected to the positive terminal of the PV module. The applied reverse current (I _{TEST}) shall be equal to 135 % of the PV module's overcurrent protection rating, as provided by the manufacturer. The test supply current should be limited to the value of I _{TEST} , and the test supply voltage shall be increased to cause the reverse current to flow through the PV module. The test shall be continued for 2 h, or until ultimate results are known (i.e. test failures as for example due to glass breakage or flaming), whichever occurs first. Throughout the test the current flow shall be kept stable within ± 2 % (this may require the voltage to be adjusted).	-	-	-	Test Not Applicable
20	10.21 IS/IEC 61730-2	Module breakage test MST 32	The purpose of this test is to provide confidence that risk of physical injuries can be minimized if the PV module is broken in its specified installation. The procedure is as follows: a) At rest the impactor bag shall hang no more than 13 mm from the surface of the PV module sample and no more than 50 mm from the centre of the PV module sample. b) Lift the impactor to a drop height of 300 mm from the surface of the PV module sample, allow the impactor to stabilize, and then release it to strike the PV module sample.	-	-	-	Test Not Applicable

21	10.22 IS/IEC 61730-2	Screw connections test MST 33	Test for general screw connections MST 33a: The test is made by means of a suitable test screwdriver or spanner, applying a torque as shown in Table 7, except that for screws of insulating material used in cord anchorage and bearing directly on the cable or cord, the torque is 0,5 Nm. Test for locking screws MST 33b: A thread-lock that softens on heating provides satisfactory locking only for screw connections not subject to torsion in normal use. Such connections shall be tested by attempting to loosen locked screws with the following torque: 2,5 Nm for thread size M 10 or corresponding diameters; 5,0 Nm for thread sizes M 10 or corresponding diameters.	-	-	-	Test Not Applicable
22	10.23 IS/IEC 61730-2	Static Mechanical load test MST 34	This test is equivalent to MQT 16 in IEC 61215-2.	-	-	-	Test Not Applicable
23	10.24 IS/IEC 61730-2	Peel test MST 35	The purpose of this test is to qualify insulation as a cemented joint. It shall provide confidence regarding the durability of the adhesion between different layers of rigid-to-flexible or flexible-to-flexible constructions of the PV module stack. The test method is taken from ISO 813 and determines the adhesive strength between polymeric materials bonded on a frontsheet or backsheet. The test is not required, if clearance and creepage distances as required by class, pollution degree and material group are in accordance with either the figures in Table 3 or Table 4 of IEC 61730-1, respectively.	-	-	-	Test Not Applicable

24	10.25 IS/IEC 61730-2	Lap shear strength test MST 36	A total of 20 bonded test coupons shall be prepared as described in 10.25.2. 10 bonded test coupons are used to determine the pre-weathering breaking force (M1) and 10 bonded test coupons are used to determine the post-weathering breaking force (M2). The test flow is given in Figure 12. In the first UV-test the front glass is exposed to the UV and in the second step the back glass. Record the highest force during rupture as the breaking force for that specimen.	-	-	-	Test Not Applicable
25	10.26 IS/IEC 61730-2	Materials creep test MST 37	The purpose of the material creep test is to validate that the materials used in the PV module will not show creep or lose adhesion when operated at the highest temperatures that PV modules normally experience in the field. In particular the test shall determine possible creep between the following interfaces: frontsheet to backsheet; frontsheet or backsheet to directly attached mounting system (e.g. back rail); junction box to backsheet respectively frontsheet. Test temperature: 105°C±5°C/ 90°C ±3°C, Test time: 200 h	-	-	-	Test Not Applicable
26	10.27 IS/IEC 61730-2	Robutness of terminations test MST 42	This test is equivalent to MQT 14.1 and MQT 14.2 in IEC 61215-2 and shall be performed subsequently. MQT 14.2 shall also be performed for junction boxes compliant to IEC 62790 as required by IEC 61730-1.	-	-	-	Test Not Applicable
27	10.28 IS/IEC 61730-2	Thermal cycling test MST 51	This test is equivalent to MQT 11 in IEC 61215-2. Technology specific variations of the test are to be found in the sub-parts IEC 61215-1-x (x is 1 to 4). Figure 1 shows which version (50 cycles or 200 cycles) is to be applied with the samples.	-	-	-	Test Not Applicable

28	10.29 IS/IEC 61730-2	Humidity-freeze test MST 52	This test is equivalent to MQT 12 in IEC 61215-2.	-	-	-	Test Not Applicable
29	10.30 IS/IEC 61730-2	Damp heat test MST 53	This test is equivalent to MQT 13 in IEC 61215-2. In this standard two versions of the test are applied. One with the standard duration as described in IEC 61215-2 (1 000 h) and one with a reduced duration of 200 h. The applicable test version is defined in Figure 1.	-	-	-	Test Not Applicable
30	10.31 IS/IEC 61730-2	UV test MST 54	This test is equivalent to MQT 10 in IEC 61215-2 except that in this standard two different UV doses are applied. One with the standard UV dose as described in IEC 61215-2 and one with an increased dose equal to four times the IEC 61215-2 dose that is applied twice during sequence B. The PV module for sequence B shall be irradiated during the first 60 kWh/m ² cycle from the front side of the specimen and from the backside during the second 60 kWh/m ² cycle. By doing so, the front side and back side of the PV module will be exposed to the same UV dose. The applicable UV dose of MST 54 to be applied is defined in Figure 1.	-	-	-	Test Not Applicable
31	10.32 IS/IEC 61730-2	Cold conditioning MST 55	Cold conditioning shall be performed as defined in IEC 60068-2-1, procedure Ab. a) Attach a suitable temperature sensor to the front or back surface of the PV module near the middle. b) Place the PV module in the climatic chamber. c) After closing the chamber, subject the PV module to -40°C±3 °C for 48 h.	-	-	-	Test Not Applicable

32	10.33 IS/IEC 61730-2	Dry heat conditioning MST 56	Dry heat conditioning shall be performed as defined in IEC 60068-2-2, procedure Ab. a) Attach a suitable temperature sensor to the front or back surface of the PV module near the middle. b) Place the PV module in the climatic chamber. c) After closing the chamber, subject the PV module to 105 °C 5 °C less than 50 % relative humidity for 200 h. If the PV module type under assessment is designed for use in only open rack configurations the temperature is 90°C ±3°C instead.	-	-	-	Test Not Applicable
33	Cl.5, Table 7	Mechanical load test (MST 34)	MΩ, Visual inspection	-	-	-	Satisfactory (refer to attachment)
34	Cl.5, Table 7	Hot spot test (MST 22)	°C, MΩ, Visual inspection	-	-	-	Satisfactory (refer to attachment)
35	Cl.5, Table 7	Robustness of termination test (MST 42)	MΩ, Visual inspection	-	-	-	Satisfactory (refer to attachment)
36	Cl.5, Table 7	Wet leakage current test (MST 17)	MΩ	-	-	-	Satisfactory (refer to attachment)
37	Cl.5, Table 7	UV resistance (MST 54)	MΩ, Visual inspection	-	-	-	Satisfactory (refer to attachment)
38	Cl.5, Table 7	Damp heat (DH1000) (MST 53)	MΩ, Visual inspection	-	-	-	Satisfactory (refer to attachment)
39	Cl.5, Table 7	Humidity freeze (10HF) (MST 52)	MΩ, Visual inspection	-	-	-	Satisfactory (refer to attachment)
40	Cl.5, Table 7	Thermal cycling (T50) (MST 51)	MΩ, Visual inspection	-	-	-	Satisfactory (refer to attachment)
41	Cl.5, Table 7	Thermal cycling (T200) (MST 51)	MΩ, Visual inspection	-	-	-	Satisfactory (refer to attachment)
42	11.3	Terminal box knockout tests (MST 44)	mm, Visual inspection	-	-	-	Test Not Applicable
43	11.2	Conduit Bending test (MST 33)	Visual inspection	-	-	-	Test Not Applicable
44	11.1	Partial discharge-test (MST 15)	kV	-	-	-	Test Not Applicable
45	10.10	Module breakage test (MST 32)	mm, g, sq. cm., Visual inspection	-	-	-	Satisfactory (refer to attachment)
46	10.9	Reverse Current overload test (MST 26)	Visual inspection, MΩ	-	-	-	Satisfactory (refer to attachment)
47	10.8	Fire test (MST 23)	Visual inspection, m.	-	-	-	Satisfactory (refer to attachment)
48	10.7	Temperature test (MST 21)	°C	-	-	-	Satisfactory (refer to attachment)
49	10.6	Dielectric withstand test (MST 16)	MΩ	-	-	-	Satisfactory (refer to attachment)
50	10.5	Impulse voltage test (MST 14)	Visual inspection, MΩ	-	-	-	Satisfactory (refer to attachment)
51	10.4	Ground Continuity Test (MST 13)	Ω	-	-	-	Satisfactory (refer to attachment)

52	10.3	Cut susceptibility test (MST 12)	$\Omega, M\Omega$	-	-	-	Test Not Applicable
53	10.2	Accessibility test (MST 11)	Ω	-	-	-	Satisfactory (refer to attachment)
54	10.1	Visual Inspection (MST 01)	as per cl.10.1.3	-	-	-	Satisfactory (refer to attachment)

Paras Singh
OIC Electrical
(Authorized Signatory)
Authorized on: 27 Dec, 2024 18:28 PM

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Section Report No. : 24E1FF5N_1

IS/IEC 61730 : PART 2 (2004)

.....
PART D. REMARKS

Paras Singh
OIC Electrical
(Authorized Signatory)
Authorized on: 27 Dec, 2024 18:28 PM

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URS PRODUCTS AND TESTING PRIVATE LIMITED

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CIN NO U21014UP1987PTC008956



TC-6468

SUMMARY OF TEST REPORT

TEST REPORT NO:SC24SPI02127_1

DATE: 27/12/2024

(Total Number of Pages in Test Report:42)

TEST FORMAT AS PER IS/IEC 61730-2:2004 (First Edition) +A1:2017

1. Name of the Manufacturer: INTEGRATED BATTERIES INDIA PVT LTD

2. Product: Crystalline silicon terrestrial photovoltaic (PV) modules (Si wafer based).

3. Model Tested: IBMPH-640 (Representative Model) 156 Half cut cell family

Series Models:

156 Half cut cell family

IBMPH-635, IBMPH-630, IBMPH-625, IBMPH-620, IBMPH-615, IBMPH-610, IBMPH-605

144 Half cut cell family

IBMPH-600, IBMPH-595, IBMPH-590, IBMPH-585, IBMPH-580, IBMPH-575, IBMPH-570, IBMPH-565,

IBMPH-560, IBMPH-555, IBMPH-550

4. Model differences provided (if applicable): Yes

5. Model differences verified as per MNRE Guidelines for series approval: Yes

6. Test Results:

SL. NO.	TEST REQUIREMENT	CLAUSE	VERDICT
1	MST 01 – Visual inspection	10.1	P
2	MST 11 – Accessibility test	10.2	P
3	MST 12 – Cut susceptibility test	10.3	N/A
4	MST 13 – Ground continuity test	10.4	P
5	MST 14 – Impulse voltage test	10.5	P
6	MST 16 – Dielectric withstand test	10.6	P
7	MST 21 – Temperature test	10.7	P
8	MST 23 – Fire test	10.8	P
9	MST 25-Bypass diode thermal test	MST 25	P
10	MST 42-Robustness of terminations test	MST 42	P
11	MST 26 – Reverse current overload Test	10.9	P



ULR- TC646824100010014F



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CIN NO U21014UP1987PTC008956



Test Report No: SC24SPI02127_1
Dated : 27/12/2024

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12	MST 32 – Module breakage test	10.10	P
13	MST 17 – Wet leakage current test	MST 17	P
14	MST 22 – Hot-spot test	MST 22	P
15	MST 34 – Mechanical load test	MST 34	P
16	MST 51a – Thermal cycling test (TC200)	MST 51a	P
17	MST 51b – Thermal cycling test (TC50)	MST 51b	P
18	MST 52 – Humidity freeze test	MST 52	P
19	MST 53 – Damp heat test	MST 53	P
20	MST 54 – UV preconditioning test	MST 54	P
21	MST 15 – Partial discharge test	11.1	N/A
22	MST 33 – Conduit bending test	11.2	N/A
23	MST 44 –Terminal box knockout test	11.3	N/A

General Information:

1. The conformity certificates of components/parts wherever applicable are verified to ensure complete testing of products under test and details regarding harmonized IEC standards (where IEC standards are not available) are also provided in the list of components/parts (description of module construction) wherever applicable.

CONCLUSION:

1. Sample meets all relevant requirements of IS/IEC 61730-2:2004 (First Edition) + A1:2017

I, hereby undertake that the verdict stated in the test reports for all the test matches with the test results. The sample meets/~~does not meet~~ all relevant requirements stated above of IS/IEC61730-2:2004 (First Edition) + A1:2017.

Date: 27/12/2024



(Signature of Authorized person with Stamp)



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CIN NO U21014UP1987PTC008956



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Dated : 27/12/2024

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TEST REPORT	
IS/IEC 61730-2:2004 +A1:2017	
PV Module Safety Qualification	
Part 2: Requirements for testing	
Report Reference No. :	SC24SPI02127_1
Date of issue..... :	27/12/2024
Total number of pages	42
Testing Laboratory..... :	URS PRODUCTS AND TESTING PRIVATE LIMITED
Address..... :	A-29, Sector 5, Noida-201301, India
Applicant's name	INTEGRATED BATTERIES INDIA PVT LTD
Address..... :	Plot No 40 Ecotech 10 Greater Noida, Uttar Pradesh, 201301
Test specification:	
Standard	IS/IEC 61730-2:2004+A1:2017
Test procedure	Compliance Report
Non-standard test method.....:	N/A
Test Report Form No. :	IS/IEC61730-2_V1.0
Test Report Form(s) Originator	BIS
Master TRF	Dated19.02.2018
Test item description	Crystalline Silicon Terrestrial Photovoltaic (PV) Modules (Si Wafer Based)
Trade Mark.....:	
Manufacturer.....:	INTEGRATED BATTERIES INDIA PVT LTD
Address.....:	Plot No 40 Ecotech 10 Greater Noida, Uttar Pradesh, 201301
Model/Type reference	Model Tested: IBMPH-640 (Representative Model) 156 Half cut cell family Series Models: 156 Half cut cell family IBMPH-635, IBMPH-630, IBMPH-625, IBMPH-620, IBMPH-615, IBMPH-610, IBMPH-605 144 Half cut cell family IBMPH-600, IBMPH-595, IBMPH-590, IBMPH-585, IBMPH-580, IBMPH-575, IBMPH-570, IBMPH-565, IBMPH-560, IBMPH-555, IBMPH-550
Ratings.....:	See copy of Marking label and General product information.
General disclaimer.....:	The test results presented in this report relate only to the object tested.





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Testing procedure and testing location:		
☒ Testing Laboratory:	URS PRODUCTS AND TESTING PRIVATE LIMITED	
Testing location/ address.....:	A-29, Sector 5, Noida-201301, India	
Tested by (name + signature)	Avishek Mishra (Analyst)	
Approved by (name + signature).: 	Paras Singh (General Manager Technical)	
Issued by (name + signature):	Hebin Manuel (Lab Manager)	





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Dated : 27/12/2024

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List of Attachments (including a total number of pages in each attachment): 42 to 44– Photographs and Specification of PV modules

Summary of testing:

Tests performed (name of test and test clause):

10.1	MST 01 – Visual inspection
10.2	MST 11 – Accessibility test
10.3	MST 12 – Cut susceptibility test
10.4	MST 13 – Ground continuity test
10.5	MST 14 – Impulse voltage test
10.6	MST 16 – Dielectric withstand test
10.7	MST 21 – Temperature test
10.8	MST 23 – Fire test
MST 25	MST 25 – Bypass diode thermal test
MST 42	MST 42 – Robustness of terminations test
10.9	MST 26 – Reverse current overload test
10.10	MST 32 – Module breakage test
MST 17	MST 17 – Wet leakage current test
MST 22	MST 22 – Hot-spot test
MST 34	MST 34 – Mechanical load test
MST 51a	MST 51a – Thermal cycling test (TC200)
MST 51b	MST 51b – Thermal cycling test (TC50)
MST 52	MST 52 – Humidity freeze test
MST 53	MST 53 – Damp heat test
MST 54	MST 54 – UV preconditioning test

Testing location:

URS PRODUCTS AND TESTING PRIVATE LIMITED
A-29, Sector 5, Noida-201301, India

[X] The product fulfils the requirements of IS/IEC 61730-2:2004 +A1:2017





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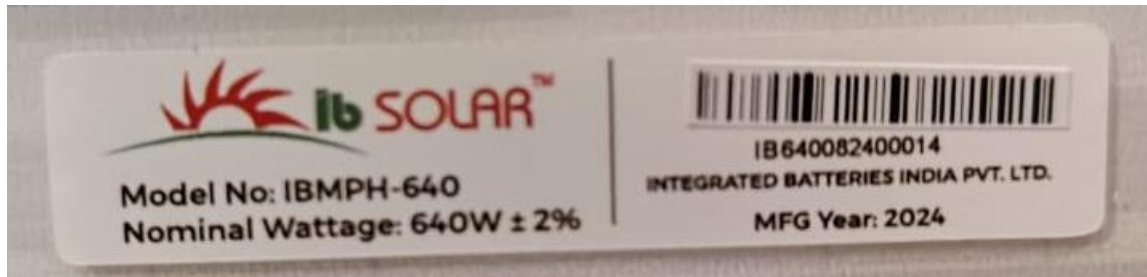
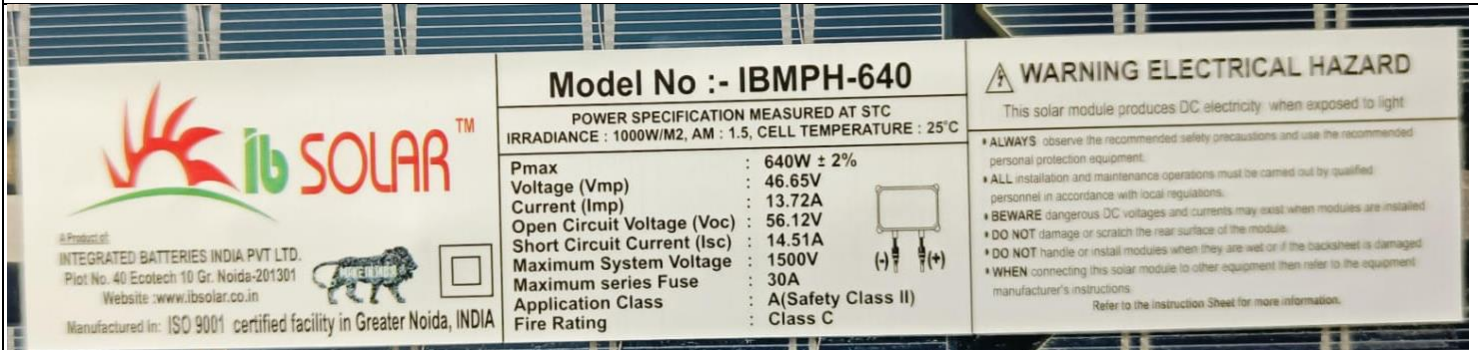
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Dated : 27/12/2024

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Copy of Marking Plate (Model Tested: IBMPH-640)



Date of manufacturing through serial no. traceability:

6th & 7th digit: 08(August)

8th & 9th digit: 24(Year 2024)

So, Date of manufacturing: 08/2024(MM/YYYY)





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CIN NO U21014UP1987PTC008956



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Polarity marking on Connectors



Polarity marking on Junction Box



The marking plate above represents all models covered by this report. See "General product information" for electrical ratings for all models.





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CIN NO U21014UP1987PTC008956



TC-6468

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156 Half cut cell family Series Models: IBMPH-635



A Product of:
INTEGRATED BATTERIES INDIA PVT LTD.
Plot No. 40 Ecotech 10 Gr. Noida-201301
Website : www.ibsolar.co.in

Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA



Model No :- IBMPH-635

POWER SPECIFICATION MEASURED AT STC
IRRADIANCE : 1000W/M2, AM : 1.5, CELL TEMPERATURE : 25°C

Pmax : 635W ± 2%
Voltage (Vmp) : 46.44V
Current (Imp) : 13.68A
Open Circuit Voltage (Voc) : 55.99V
Short Circuit Current (Isc) : 14.43A
Maximum System Voltage : 1500V
Maximum series Fuse : 30A
Application Class : A(Safety Class II)
Fire Rating : Class C



WARNING ELECTRICAL HAZARD

This solar module produces DC electricity when exposed to light

- ALWAYS observe the recommended safety precautions and use the recommended personal protection equipment.
- ALL installation and maintenance operations must be carried out by qualified personnel in accordance with local regulations.
- BEWARE dangerous DC voltages and currents may exist when modules are installed
- DO NOT damage or scratch the rear surface of the module.
- DO NOT handle or install modules when they are wet or if the backsheet is damaged
- WHEN connecting this solar module to other equipment then refer to the equipment manufacturer's instructions

Refer to the Instruction Sheet for more information.



MODEL NO : IBMPH-635
NOMINAL WATTAGE : 635W ± 2%
YEAR OF MFG : 2024
MFG ORIGIN : INDIA



IB635082400001

(Series Model: IBMPH-630)



A Product of:
INTEGRATED BATTERIES INDIA PVT LTD.
Plot No. 40 Ecotech 10 Gr. Noida-201301
Website : www.ibsolar.co.in

Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA



Model No :- IBMPH-630

POWER SPECIFICATION MEASURED AT STC
IRRADIANCE : 1000W/M2, AM : 1.5, CELL TEMPERATURE : 25°C

Pmax : 630W ± 2%
Voltage (Vmp) : 46.27V
Current (Imp) : 13.62A
Open Circuit Voltage (Voc) : 55.86V
Short Circuit Current (Isc) : 14.35A
Maximum System Voltage : 1500V
Maximum series Fuse : 30A
Application Class : A(Safety Class II)
Fire Rating : Class C



WARNING ELECTRICAL HAZARD

This solar module produces DC electricity when exposed to light

- ALWAYS observe the recommended safety precautions and use the recommended personal protection equipment.
- ALL installation and maintenance operations must be carried out by qualified personnel in accordance with local regulations.
- BEWARE dangerous DC voltages and currents may exist when modules are installed
- DO NOT damage or scratch the rear surface of the module.
- DO NOT handle or install modules when they are wet or if the backsheet is damaged
- WHEN connecting this solar module to other equipment then refer to the equipment manufacturer's instructions

Refer to the Instruction Sheet for more information.



MODEL NO : IBMPH-630
NOMINAL WATTAGE : 630W ± 2%
YEAR OF MFG : 2024
MFG ORIGIN : INDIA



IB630082400001





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CIN NO U21014UP1987PTC008956

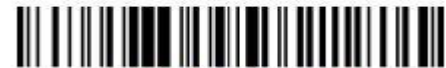


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(Series Model: IBMPH-625)

 A Product of: INTEGRATED BATTERIES INDIA PVT LTD. Plot No. 40 Ecotech 10 Gr, Noida-201301 Website : www.ibsolar.co.in Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA	Model No :- IBMPH-625 POWER SPECIFICATION MEASURED AT STC IRRADIANCE : 1000W/M2, AM : 1.5, CELL TEMPERATURE : 25°C <table><tr><td>Pmax</td><td>: 625W ± 2%</td></tr><tr><td>Voltage (Vmp)</td><td>: 46.1V</td></tr><tr><td>Current (Imp)</td><td>: 13.56A</td></tr><tr><td>Open Circuit Voltage (Voc)</td><td>: 55.72V</td></tr><tr><td>Short Circuit Current (Isc)</td><td>: 14.27A</td></tr><tr><td>Maximum System Voltage</td><td>: 1500V</td></tr><tr><td>Maximum series Fuse</td><td>: 30A</td></tr><tr><td>Application Class</td><td>: A(Safety Class II)</td></tr><tr><td>Fire Rating</td><td>: Class C</td></tr></table> 	Pmax	: 625W ± 2%	Voltage (Vmp)	: 46.1V	Current (Imp)	: 13.56A	Open Circuit Voltage (Voc)	: 55.72V	Short Circuit Current (Isc)	: 14.27A	Maximum System Voltage	: 1500V	Maximum series Fuse	: 30A	Application Class	: A(Safety Class II)	Fire Rating	: Class C	WARNING ELECTRICAL HAZARD This solar module produces DC electricity when exposed to light • ALWAYS observe the recommended safety precautions and use the recommended personal protection equipment. • ALL installation and maintenance operations must be carried out by qualified personnel in accordance with local regulations. • BEWARE dangerous DC voltages and currents may exist when modules are installed. • DO NOT damage or scratch the rear surface of the module. • DO NOT handle or install modules when they are wet or if the backsheet is damaged. • WHEN connecting this solar module to other equipment then refer to the equipment manufacturer's instructions Refer to the Instruction Sheet for more information.
Pmax	: 625W ± 2%																			
Voltage (Vmp)	: 46.1V																			
Current (Imp)	: 13.56A																			
Open Circuit Voltage (Voc)	: 55.72V																			
Short Circuit Current (Isc)	: 14.27A																			
Maximum System Voltage	: 1500V																			
Maximum series Fuse	: 30A																			
Application Class	: A(Safety Class II)																			
Fire Rating	: Class C																			
	<table><tr><td>MODEL NO</td><td>: IBMPH-625</td></tr><tr><td>NOMINAL WATTAGE</td><td>: 625W ± 2%</td></tr><tr><td>YEAR OF MFG</td><td>: 2024</td></tr><tr><td>MFG ORIGIN</td><td>: INDIA</td></tr></table>	MODEL NO	: IBMPH-625	NOMINAL WATTAGE	: 625W ± 2%	YEAR OF MFG	: 2024	MFG ORIGIN	: INDIA	 IB625082400001										
MODEL NO	: IBMPH-625																			
NOMINAL WATTAGE	: 625W ± 2%																			
YEAR OF MFG	: 2024																			
MFG ORIGIN	: INDIA																			

(Series Model:IBMPH-620)

 A Product of: INTEGRATED BATTERIES INDIA PVT LTD. Plot No. 40 Ecotech 10 Gr, Noida-201301 Website : www.ibsolar.co.in Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA	Model No :- IBMPH-620 POWER SPECIFICATION MEASURED AT STC IRRADIANCE : 1000W/M2, AM : 1.5, CELL TEMPERATURE : 25°C <table><tr><td>Pmax</td><td>: 620W ± 2%</td></tr><tr><td>Voltage (Vmp)</td><td>: 45.93V</td></tr><tr><td>Current (Imp)</td><td>: 13.5A</td></tr><tr><td>Open Circuit Voltage (Voc)</td><td>: 55.58V</td></tr><tr><td>Short Circuit Current (Isc)</td><td>: 14.19A</td></tr><tr><td>Maximum System Voltage</td><td>: 1500V</td></tr><tr><td>Maximum series Fuse</td><td>: 30A</td></tr><tr><td>Application Class</td><td>: A(Safety Class II)</td></tr><tr><td>Fire Rating</td><td>: Class C</td></tr></table> 	Pmax	: 620W ± 2%	Voltage (Vmp)	: 45.93V	Current (Imp)	: 13.5A	Open Circuit Voltage (Voc)	: 55.58V	Short Circuit Current (Isc)	: 14.19A	Maximum System Voltage	: 1500V	Maximum series Fuse	: 30A	Application Class	: A(Safety Class II)	Fire Rating	: Class C	WARNING ELECTRICAL HAZARD This solar module produces DC electricity when exposed to light • ALWAYS observe the recommended safety precautions and use the recommended personal protection equipment. • ALL installation and maintenance operations must be carried out by qualified personnel in accordance with local regulations. • BEWARE dangerous DC voltages and currents may exist when modules are installed. • DO NOT damage or scratch the rear surface of the module. • DO NOT handle or install modules when they are wet or if the backsheet is damaged. • WHEN connecting this solar module to other equipment then refer to the equipment manufacturer's instructions Refer to the Instruction Sheet for more information.
Pmax	: 620W ± 2%																			
Voltage (Vmp)	: 45.93V																			
Current (Imp)	: 13.5A																			
Open Circuit Voltage (Voc)	: 55.58V																			
Short Circuit Current (Isc)	: 14.19A																			
Maximum System Voltage	: 1500V																			
Maximum series Fuse	: 30A																			
Application Class	: A(Safety Class II)																			
Fire Rating	: Class C																			
	<table><tr><td>MODEL NO</td><td>: IBMPH-620</td></tr><tr><td>NOMINAL WATTAGE</td><td>: 620W ± 2%</td></tr><tr><td>YEAR OF MFG</td><td>: 2024</td></tr><tr><td>MFG ORIGIN</td><td>: INDIA</td></tr></table>	MODEL NO	: IBMPH-620	NOMINAL WATTAGE	: 620W ± 2%	YEAR OF MFG	: 2024	MFG ORIGIN	: INDIA	 IB620082400001										
MODEL NO	: IBMPH-620																			
NOMINAL WATTAGE	: 620W ± 2%																			
YEAR OF MFG	: 2024																			
MFG ORIGIN	: INDIA																			





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(Series Model: IBMPH-615)

 A Product of: INTEGRATED BATTERIES INDIA PVT LTD. Plot No. 40 Ecotech 10 Gr. Noida-201301 Website : www.ibsolar.co.in Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA	Model No :- IBMPH-615 POWER SPECIFICATION MEASURED AT STC IRRADIANCE : 1000W/M2, AM : 1.5, CELL TEMPERATURE : 25°C <table border="1"><tr><td>Pmax</td><td>: 615W ± 2%</td></tr><tr><td>Voltage (Vmp)</td><td>: 45.77V</td></tr><tr><td>Current (Imp)</td><td>: 13.44A</td></tr><tr><td>Open Circuit Voltage (Voc)</td><td>: 55.44V</td></tr><tr><td>Short Circuit Current (Isc)</td><td>: 14.11A</td></tr><tr><td>Maximum System Voltage</td><td>: 1500V</td></tr><tr><td>Maximum series Fuse</td><td>: 30A</td></tr><tr><td>Application Class</td><td>: A(Safety Class II)</td></tr><tr><td>Fire Rating</td><td>: Class C</td></tr></table>	Pmax	: 615W ± 2%	Voltage (Vmp)	: 45.77V	Current (Imp)	: 13.44A	Open Circuit Voltage (Voc)	: 55.44V	Short Circuit Current (Isc)	: 14.11A	Maximum System Voltage	: 1500V	Maximum series Fuse	: 30A	Application Class	: A(Safety Class II)	Fire Rating	: Class C	 WARNING ELECTRICAL HAZARD This solar module produces DC electricity when exposed to light • ALWAYS observe the recommended safety precautions and use the recommended personal protection equipment. • ALL installation and maintenance operations must be carried out by qualified personnel in accordance with local regulations. • BEWARE dangerous DC voltages and currents may exist when modules are installed • DO NOT damage or scratch the rear surface of the module. • DO NOT handle or install modules when they are wet or if the backsheet is damaged • WHEN connecting this solar module to other equipment then refer to the equipment manufacturer's instructions Refer to the Instruction Sheet for more information.
	Pmax	: 615W ± 2%																		
Voltage (Vmp)	: 45.77V																			
Current (Imp)	: 13.44A																			
Open Circuit Voltage (Voc)	: 55.44V																			
Short Circuit Current (Isc)	: 14.11A																			
Maximum System Voltage	: 1500V																			
Maximum series Fuse	: 30A																			
Application Class	: A(Safety Class II)																			
Fire Rating	: Class C																			
 <table border="1"><tr><td>MODEL NO</td><td>: IBMPH-615</td></tr><tr><td>NOMINAL WATTAGE</td><td>: 615W ± 2%</td></tr><tr><td>YEAR OF MFG</td><td>: 2024</td></tr><tr><td>MFG ORIGIN</td><td>: INDIA</td></tr></table>	MODEL NO	: IBMPH-615	NOMINAL WATTAGE	: 615W ± 2%	YEAR OF MFG	: 2024	MFG ORIGIN	: INDIA	 IB615082400001											
MODEL NO	: IBMPH-615																			
NOMINAL WATTAGE	: 615W ± 2%																			
YEAR OF MFG	: 2024																			
MFG ORIGIN	: INDIA																			

(Series Model: IBMPH-610)

 A Product of: INTEGRATED BATTERIES INDIA PVT LTD. Plot No. 40 Ecotech 10 Gr. Noida-201301 Website : www.ibsolar.co.in Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA	Model No :- IBMPH-610 POWER SPECIFICATION MEASURED AT STC IRRADIANCE : 1000W/M2, AM : 1.5, CELL TEMPERATURE : 25°C <table border="1"><tr><td>Pmax</td><td>: 610W ± 2%</td></tr><tr><td>Voltage (Vmp)</td><td>: 45.6V</td></tr><tr><td>Current (Imp)</td><td>: 13.38A</td></tr><tr><td>Open Circuit Voltage (Voc)</td><td>: 55.31V</td></tr><tr><td>Short Circuit Current (Isc)</td><td>: 14.03A</td></tr><tr><td>Maximum System Voltage</td><td>: 1500V</td></tr><tr><td>Maximum series Fuse</td><td>: 30A</td></tr><tr><td>Application Class</td><td>: A(Safety Class II)</td></tr><tr><td>Fire Rating</td><td>: Class C</td></tr></table>	Pmax	: 610W ± 2%	Voltage (Vmp)	: 45.6V	Current (Imp)	: 13.38A	Open Circuit Voltage (Voc)	: 55.31V	Short Circuit Current (Isc)	: 14.03A	Maximum System Voltage	: 1500V	Maximum series Fuse	: 30A	Application Class	: A(Safety Class II)	Fire Rating	: Class C	 WARNING ELECTRICAL HAZARD This solar module produces DC electricity when exposed to light • ALWAYS observe the recommended safety precautions and use the recommended personal protection equipment. • ALL installation and maintenance operations must be carried out by qualified personnel in accordance with local regulations. • BEWARE dangerous DC voltages and currents may exist when modules are installed • DO NOT damage or scratch the rear surface of the module. • DO NOT handle or install modules when they are wet or if the backsheet is damaged • WHEN connecting this solar module to other equipment then refer to the equipment manufacturer's instructions Refer to the Instruction Sheet for more information.
	Pmax	: 610W ± 2%																		
Voltage (Vmp)	: 45.6V																			
Current (Imp)	: 13.38A																			
Open Circuit Voltage (Voc)	: 55.31V																			
Short Circuit Current (Isc)	: 14.03A																			
Maximum System Voltage	: 1500V																			
Maximum series Fuse	: 30A																			
Application Class	: A(Safety Class II)																			
Fire Rating	: Class C																			
 <table border="1"><tr><td>MODEL NO</td><td>: IBMPH-610</td></tr><tr><td>NOMINAL WATTAGE</td><td>: 610W ± 2%</td></tr><tr><td>YEAR OF MFG</td><td>: 2024</td></tr><tr><td>MFG ORIGIN</td><td>: INDIA</td></tr></table>	MODEL NO	: IBMPH-610	NOMINAL WATTAGE	: 610W ± 2%	YEAR OF MFG	: 2024	MFG ORIGIN	: INDIA	 IB610082400001											
MODEL NO	: IBMPH-610																			
NOMINAL WATTAGE	: 610W ± 2%																			
YEAR OF MFG	: 2024																			
MFG ORIGIN	: INDIA																			





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(Series Model: IBMPH-605)



A Product of:
INTEGRATED BATTERIES INDIA PVT LTD.
Plot No. 40 Ecotech 10 Gr, Noida-201301
Website : www.ibsolar.co.in
Manufactured in: ISO 9001 certified facility in Greater Noida, INDIA



Model No :- IBMPH-605

POWER SPECIFICATION MEASURED AT STC
IRRADIANCE : 1000W/M2, AM : 1.5, CELL TEMPERATURE : 25°C

Pmax : 605W $\pm$ 2%
Voltage (Vmp) : 45.42V
Current (Imp) : 13.32A
Open Circuit Voltage (Voc) : 55.17V
Short Circuit Current (Isc) : 13.95A
Maximum System Voltage : 1500V
Maximum series Fuse : 30A
Application Class : A(Safety Class II)
Fire Rating : Class C



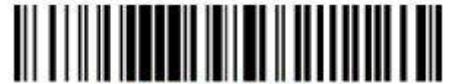
WARNING ELECTRICAL HAZARD

This solar module produces DC electricity when exposed to light

- ALWAYS observe the recommended safety precautions and use the recommended personal protection equipment.
 - ALL installation and maintenance operations must be carried out by qualified personnel in accordance with local regulations.
 - BEWARE dangerous DC voltages and currents may exist when modules are installed
 - DO NOT damage or scratch the rear surface of the module.
 - DO NOT handle or install modules when they are wet or if the backsheet is damaged
 - WHEN connecting this solar module to other equipment then refer to the equipment manufacturer's instructions
- Refer to the Instruction Sheet for more information.



MODEL NO : IBMPH-605
NOMINAL WATTAGE : 605W $\pm$ 2%
YEAR OF MFG : 2024
MFG ORIGIN : INDIA



IB605082400001





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144 Half cut cell family (Series Model): IBMPH-600

 A Product of: INTEGRATED BATTERIES INDIA PVT LTD. Plot No. 40 Ecotech 10 Gr. Noida-201301 Website : www.ibsolar.co.in Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA	Model No :- IBMPH-600 POWER SPECIFICATION MEASURED AT STC IRRADIANCE : 1000W/M2, AM : 1.5, CELL TEMPERATURE : 25°C	WARNING ELECTRICAL HAZARD This solar module produces DC electricity when exposed to light • ALWAYS observe the recommended safety precautions and use the recommended personal protection equipment. • ALL installation and maintenance operations must be carried out by qualified personnel in accordance with local regulations. • BEWARE dangerous DC voltages and currents may exist when modules are installed • DO NOT damage or scratch the rear surface of the module. • DO NOT handle or install modules when they are wet or if the backsheet is damaged • WHEN connecting this solar module to other equipment then refer to the equipment manufacturer's instructions Refer to the Instruction Sheet for more information.																									
	<table><tr><td>Pmax</td><td>: 600W ± 2%</td></tr><tr><td>Voltage (Vmp)</td><td>: 43.78V</td></tr><tr><td>Current (Imp)</td><td>: 13.71A</td></tr><tr><td>Open Circuit Voltage (Voc)</td><td>: 52.1V</td></tr><tr><td>Short Circuit Current (Isc)</td><td>: 14.61A</td></tr><tr><td>Maximum System Voltage</td><td>: 1500V</td></tr><tr><td>Maximum series Fuse</td><td>: 30A</td></tr><tr><td>Application Class</td><td>: A(Safety Class II)</td></tr><tr><td>Fire Rating</td><td>: Class C</td></tr></table> 	Pmax	: 600W ± 2%	Voltage (Vmp)	: 43.78V	Current (Imp)	: 13.71A	Open Circuit Voltage (Voc)	: 52.1V	Short Circuit Current (Isc)	: 14.61A	Maximum System Voltage	: 1500V	Maximum series Fuse	: 30A	Application Class	: A(Safety Class II)	Fire Rating	: Class C	 <table><tr><td>MODEL NO</td><td>: IBMPH-600</td></tr><tr><td>NOMINAL WATTAGE</td><td>: 600W ± 2%</td></tr><tr><td>YEAR OF MFG</td><td>: 2024</td></tr><tr><td>MFG ORIGIN</td><td>: INDIA</td></tr></table>  IB600082400001	MODEL NO	: IBMPH-600	NOMINAL WATTAGE	: 600W ± 2%	YEAR OF MFG	: 2024	MFG ORIGIN
Pmax	: 600W ± 2%																										
Voltage (Vmp)	: 43.78V																										
Current (Imp)	: 13.71A																										
Open Circuit Voltage (Voc)	: 52.1V																										
Short Circuit Current (Isc)	: 14.61A																										
Maximum System Voltage	: 1500V																										
Maximum series Fuse	: 30A																										
Application Class	: A(Safety Class II)																										
Fire Rating	: Class C																										
MODEL NO	: IBMPH-600																										
NOMINAL WATTAGE	: 600W ± 2%																										
YEAR OF MFG	: 2024																										
MFG ORIGIN	: INDIA																										

(Series Model: IBMPH-595)

 A Product of: INTEGRATED BATTERIES INDIA PVT LTD. Plot No. 40 Ecotech 10 Gr. Noida-201301 Website : www.ibsolar.co.in Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA	Model No :- IBMPH-595 POWER SPECIFICATION MEASURED AT STC IRRADIANCE : 1000W/M2, AM : 1.5, CELL TEMPERATURE : 25°C	WARNING ELECTRICAL HAZARD This solar module produces DC electricity when exposed to light • ALWAYS observe the recommended safety precautions and use the recommended personal protection equipment. • ALL installation and maintenance operations must be carried out by qualified personnel in accordance with local regulations. • BEWARE dangerous DC voltages and currents may exist when modules are installed • DO NOT damage or scratch the rear surface of the module. • DO NOT handle or install modules when they are wet or if the backsheet is damaged • WHEN connecting this solar module to other equipment then refer to the equipment manufacturer's instructions Refer to the Instruction Sheet for more information.																									
	<table><tr><td>Pmax</td><td>: 595W ± 2%</td></tr><tr><td>Voltage (Vmp)</td><td>: 43.61V</td></tr><tr><td>Current (Imp)</td><td>: 13.64A</td></tr><tr><td>Open Circuit Voltage (Voc)</td><td>: 51.9V</td></tr><tr><td>Short Circuit Current (Isc)</td><td>: 14.53A</td></tr><tr><td>Maximum System Voltage</td><td>: 1500V</td></tr><tr><td>Maximum series Fuse</td><td>: 30A</td></tr><tr><td>Application Class</td><td>: A(Safety Class II)</td></tr><tr><td>Fire Rating</td><td>: Class C</td></tr></table> 	Pmax	: 595W ± 2%	Voltage (Vmp)	: 43.61V	Current (Imp)	: 13.64A	Open Circuit Voltage (Voc)	: 51.9V	Short Circuit Current (Isc)	: 14.53A	Maximum System Voltage	: 1500V	Maximum series Fuse	: 30A	Application Class	: A(Safety Class II)	Fire Rating	: Class C	 <table><tr><td>MODEL NO</td><td>: IBMPH-595</td></tr><tr><td>NOMINAL WATTAGE</td><td>: 595W ± 2%</td></tr><tr><td>YEAR OF MFG</td><td>: 2024</td></tr><tr><td>MFG ORIGIN</td><td>: INDIA</td></tr></table>  IB595082400001	MODEL NO	: IBMPH-595	NOMINAL WATTAGE	: 595W ± 2%	YEAR OF MFG	: 2024	MFG ORIGIN
Pmax	: 595W ± 2%																										
Voltage (Vmp)	: 43.61V																										
Current (Imp)	: 13.64A																										
Open Circuit Voltage (Voc)	: 51.9V																										
Short Circuit Current (Isc)	: 14.53A																										
Maximum System Voltage	: 1500V																										
Maximum series Fuse	: 30A																										
Application Class	: A(Safety Class II)																										
Fire Rating	: Class C																										
MODEL NO	: IBMPH-595																										
NOMINAL WATTAGE	: 595W ± 2%																										
YEAR OF MFG	: 2024																										
MFG ORIGIN	: INDIA																										





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CIN NO U21014UP1987PTC008956



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(Series Model: IBMPH-590)

A Product of:
INTEGRATED BATTERIES INDIA PVT LTD.
Plot No. 40 Ecotech 10 Gr. Noida-201301
Website :www.ibsolar.co.in
Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA

Model No :- IBMPH-590

POWER SPECIFICATION MEASURED AT STC
IRRADIANCE : 1000W/M2, AM : 1.5, CELL TEMPERATURE : 25°C

Pmax	: 590W ± 2%
Voltage (Vmp)	: 43.45V
Current (Imp)	: 13.58A
Open Circuit Voltage (Voc)	: 51.7V
Short Circuit Current (Isc)	: 14.45A
Maximum System Voltage	: 1500V
Maximum series Fuse	: 30A
Application Class	: A(Safety Class II)
Fire Rating	: Class C

WARNING ELECTRICAL HAZARD

This solar module produces DC electricity when exposed to light

- ALWAYS observe the recommended safety precautions and use the recommended personal protection equipment.
- ALL installation and maintenance operations must be carried out by qualified personnel in accordance with local regulations.
- BEWARE dangerous DC voltages and currents may exist when modules are installed
- DO NOT damage or scratch the rear surface of the module.
- DO NOT handle or install modules when they are wet or if the backsheet is damaged
- WHEN connecting this solar module to other equipment then refer to the equipment manufacturer's instructions

Refer to the Instruction Sheet for more information.

MODEL NO : IBMPH-590
NOMINAL WATTAGE : 590W ± 2%
YEAR OF MFG : 2024
MFG ORIGIN : INDIA

(Series Model: IBMPH-585)

A Product of:
INTEGRATED BATTERIES INDIA PVT LTD.
Plot No. 40 Ecotech 10 Gr. Noida-201301
Website :www.ibsolar.co.in
Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA

Model No :- IBMPH-585

POWER SPECIFICATION MEASURED AT STC
IRRADIANCE : 1000W/M2, AM : 1.5, CELL TEMPERATURE : 25°C

Pmax	: 585W ± 2%
Voltage (Vmp)	: 43.27V
Current (Imp)	: 13.52A
Open Circuit Voltage (Voc)	: 51.5V
Short Circuit Current (Isc)	: 14.36A
Maximum System Voltage	: 1500V
Maximum series Fuse	: 30A
Application Class	: A(Safety Class II)
Fire Rating	: Class C

WARNING ELECTRICAL HAZARD

This solar module produces DC electricity when exposed to light

- ALWAYS observe the recommended safety precautions and use the recommended personal protection equipment.
- ALL installation and maintenance operations must be carried out by qualified personnel in accordance with local regulations.
- BEWARE dangerous DC voltages and currents may exist when modules are installed
- DO NOT damage or scratch the rear surface of the module.
- DO NOT handle or install modules when they are wet or if the backsheet is damaged
- WHEN connecting this solar module to other equipment then refer to the equipment manufacturer's instructions

Refer to the Instruction Sheet for more information.

MODEL NO : IBMPH-585
NOMINAL WATTAGE : 585W ± 2%
YEAR OF MFG : 2024
MFG ORIGIN : INDIA





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(Series Model: IBMPH-580)

 A Product of: INTEGRATED BATTERIES INDIA PVT LTD. Plot No. 40 Ecotech 10 Gr. Noida-201301 Website : www.ibsolar.co.in Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA	Model No :- IBMPH-580 POWER SPECIFICATION MEASURED AT STC IRRADIANCE : 1000W/M ² , AM : 1.5, CELL TEMPERATURE : 25°C	WARNING ELECTRICAL HAZARD This solar module produces DC electricity when exposed to light																	
	<table><tr><td>Pmax</td><td>: 580W ± 2%</td></tr><tr><td>Voltage (Vmp)</td><td>: 42.59V</td></tr><tr><td>Current (Imp)</td><td>: 13.62A</td></tr><tr><td>Open Circuit Voltage (Voc)</td><td>: 51.47V</td></tr><tr><td>Short Circuit Current (Isc)</td><td>: 14.37A</td></tr><tr><td>Maximum System Voltage</td><td>: 1500V</td></tr><tr><td>Maximum series Fuse</td><td>: 30A</td></tr><tr><td>Application Class</td><td>: A(Safety Class II)</td></tr><tr><td>Fire Rating</td><td>: Class C</td></tr></table>	Pmax	: 580W ± 2%	Voltage (Vmp)	: 42.59V	Current (Imp)	: 13.62A	Open Circuit Voltage (Voc)	: 51.47V	Short Circuit Current (Isc)	: 14.37A	Maximum System Voltage	: 1500V	Maximum series Fuse	: 30A	Application Class	: A(Safety Class II)	Fire Rating	: Class C
Pmax	: 580W ± 2%																		
Voltage (Vmp)	: 42.59V																		
Current (Imp)	: 13.62A																		
Open Circuit Voltage (Voc)	: 51.47V																		
Short Circuit Current (Isc)	: 14.37A																		
Maximum System Voltage	: 1500V																		
Maximum series Fuse	: 30A																		
Application Class	: A(Safety Class II)																		
Fire Rating	: Class C																		
 MODEL NO : IBMPH-580 NOMINAL WATTAGE : 580W ± 2% YEAR OF MFG : 2024 MFG ORIGIN : INDIA	 IB580082400001																		

(Series Model: IBMPH-575)

 A Product of: INTEGRATED BATTERIES INDIA PVT LTD. Plot No. 40 Ecotech 10 Gr. Noida-201301 Website : www.ibsolar.co.in Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA	Model No :- IBMPH-575 POWER SPECIFICATION MEASURED AT STC IRRADIANCE : 1000W/M ² , AM : 1.5, CELL TEMPERATURE : 25°C	WARNING ELECTRICAL HAZARD This solar module produces DC electricity when exposed to light																	
	<table><tr><td>Pmax</td><td>: 575W ± 2%</td></tr><tr><td>Voltage (Vmp)</td><td>: 42.44V</td></tr><tr><td>Current (Imp)</td><td>: 13.55A</td></tr><tr><td>Open Circuit Voltage (Voc)</td><td>: 51.27V</td></tr><tr><td>Short Circuit Current (Isc)</td><td>: 14.31A</td></tr><tr><td>Maximum System Voltage</td><td>: 1500V</td></tr><tr><td>Maximum series Fuse</td><td>: 30A</td></tr><tr><td>Application Class</td><td>: A(Safety Class II)</td></tr><tr><td>Fire Rating</td><td>: Class C</td></tr></table>	Pmax	: 575W ± 2%	Voltage (Vmp)	: 42.44V	Current (Imp)	: 13.55A	Open Circuit Voltage (Voc)	: 51.27V	Short Circuit Current (Isc)	: 14.31A	Maximum System Voltage	: 1500V	Maximum series Fuse	: 30A	Application Class	: A(Safety Class II)	Fire Rating	: Class C
Pmax	: 575W ± 2%																		
Voltage (Vmp)	: 42.44V																		
Current (Imp)	: 13.55A																		
Open Circuit Voltage (Voc)	: 51.27V																		
Short Circuit Current (Isc)	: 14.31A																		
Maximum System Voltage	: 1500V																		
Maximum series Fuse	: 30A																		
Application Class	: A(Safety Class II)																		
Fire Rating	: Class C																		
 MODEL NO : IBMPH-575 NOMINAL WATTAGE : 575W ± 2% YEAR OF MFG : 2024 MFG ORIGIN : INDIA	 IB575082400001																		





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(Series Model: IBMPH-570)

 A Product of: INTEGRATED BATTERIES INDIA PVT LTD. Plot No. 40 Ecotech 10 Gr. Noida-201301 Website : www.ibsolar.co.in Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA	Model No :- IBMPH-570 POWER SPECIFICATION MEASURED AT STC IRRADIANCE : 1000W/M2, AM : 1.5, CELL TEMPERATURE : 25°C <table><tr><td>Pmax</td><td>: 570W ± 2%</td></tr><tr><td>Voltage (Vmp)</td><td>: 42.29V</td></tr><tr><td>Current (Imp)</td><td>: 13.48A</td></tr><tr><td>Open Circuit Voltage (Voc)</td><td>: 51.07V</td></tr><tr><td>Short Circuit Current (Isc)</td><td>: 14.25A</td></tr><tr><td>Maximum System Voltage</td><td>: 1500V</td></tr><tr><td>Maximum series Fuse</td><td>: 30A</td></tr><tr><td>Application Class</td><td>: A(Safety Class II)</td></tr><tr><td>Fire Rating</td><td>: Class C</td></tr></table> 	Pmax	: 570W ± 2%	Voltage (Vmp)	: 42.29V	Current (Imp)	: 13.48A	Open Circuit Voltage (Voc)	: 51.07V	Short Circuit Current (Isc)	: 14.25A	Maximum System Voltage	: 1500V	Maximum series Fuse	: 30A	Application Class	: A(Safety Class II)	Fire Rating	: Class C	WARNING ELECTRICAL HAZARD This solar module produces DC electricity when exposed to light • ALWAYS observe the recommended safety precautions and use the recommended personal protection equipment. • ALL installation and maintenance operations must be carried out by qualified personnel in accordance with local regulations. • BEWARE dangerous DC voltages and currents may exist when modules are installed • DO NOT damage or scratch the rear surface of the module. • DO NOT handle or install modules when they are wet or if the backsheet is damaged • WHEN connecting this solar module to other equipment then refer to the equipment manufacturer's instructions Refer to the Instruction Sheet for more information.
Pmax	: 570W ± 2%																			
Voltage (Vmp)	: 42.29V																			
Current (Imp)	: 13.48A																			
Open Circuit Voltage (Voc)	: 51.07V																			
Short Circuit Current (Isc)	: 14.25A																			
Maximum System Voltage	: 1500V																			
Maximum series Fuse	: 30A																			
Application Class	: A(Safety Class II)																			
Fire Rating	: Class C																			
 MODEL NO : IBMPH-570 NOMINAL WATTAGE : 570W ± 2% YEAR OF MFG : 2024 MFG ORIGIN : INDIA	 IB570082400001																			

(Series Model: IBMPH-565)

 A Product of: INTEGRATED BATTERIES INDIA PVT LTD. Plot No. 40 Ecotech 10 Gr. Noida-201301 Website : www.ibsolar.co.in Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA	Model No :- IBMPH-565 POWER SPECIFICATION MEASURED AT STC IRRADIANCE : 1000W/M2, AM : 1.5, CELL TEMPERATURE : 25°C <table><tr><td>Pmax</td><td>: 565W ± 2%</td></tr><tr><td>Voltage (Vmp)</td><td>: 42.14V</td></tr><tr><td>Current (Imp)</td><td>: 13.41A</td></tr><tr><td>Open Circuit Voltage (Voc)</td><td>: 50.87V</td></tr><tr><td>Short Circuit Current (Isc)</td><td>: 14.19A</td></tr><tr><td>Maximum System Voltage</td><td>: 1500V</td></tr><tr><td>Maximum series Fuse</td><td>: 30A</td></tr><tr><td>Application Class</td><td>: A(Safety Class II)</td></tr><tr><td>Fire Rating</td><td>: Class C</td></tr></table> 	Pmax	: 565W ± 2%	Voltage (Vmp)	: 42.14V	Current (Imp)	: 13.41A	Open Circuit Voltage (Voc)	: 50.87V	Short Circuit Current (Isc)	: 14.19A	Maximum System Voltage	: 1500V	Maximum series Fuse	: 30A	Application Class	: A(Safety Class II)	Fire Rating	: Class C	WARNING ELECTRICAL HAZARD This solar module produces DC electricity when exposed to light • ALWAYS observe the recommended safety precautions and use the recommended personal protection equipment. • ALL installation and maintenance operations must be carried out by qualified personnel in accordance with local regulations. • BEWARE dangerous DC voltages and currents may exist when modules are installed • DO NOT damage or scratch the rear surface of the module. • DO NOT handle or install modules when they are wet or if the backsheet is damaged • WHEN connecting this solar module to other equipment then refer to the equipment manufacturer's instructions Refer to the Instruction Sheet for more information.
Pmax	: 565W ± 2%																			
Voltage (Vmp)	: 42.14V																			
Current (Imp)	: 13.41A																			
Open Circuit Voltage (Voc)	: 50.87V																			
Short Circuit Current (Isc)	: 14.19A																			
Maximum System Voltage	: 1500V																			
Maximum series Fuse	: 30A																			
Application Class	: A(Safety Class II)																			
Fire Rating	: Class C																			
 MODEL NO : IBMPH-565 NOMINAL WATTAGE : 565W ± 2% YEAR OF MFG : 2024 MFG ORIGIN : INDIA	 IB565082400001																			





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(Series Model: IBMPH-560)



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INTEGRATED BATTERIES INDIA PVT LTD.
Plot No. 40 Ecotech 10 Gr. Noida-201301
Website : www.ibsolar.co.in
Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA



Model No :- IBMPH-560

POWER SPECIFICATION MEASURED AT STC
IRRADIANCE : 1000W/M2, AM : 1.5, CELL TEMPERATURE : 25°C

Pmax : 560W ± 2%
Voltage (Vmp) : 41.95V
Current (Imp) : 13.35A
Open Circuit Voltage (Voc) : 50.67V
Short Circuit Current (Isc) : 14.13A
Maximum System Voltage : 1500V
Maximum series Fuse : 30A
Application Class : A(Safety Class II)
Fire Rating : Class C



WARNING ELECTRICAL HAZARD

This solar module produces DC electricity when exposed to light

- ALWAYS observe the recommended safety precautions and use the recommended personal protection equipment.
- ALL installation and maintenance operations must be carried out by qualified personnel in accordance with local regulations.
- BEWARE dangerous DC voltages and currents may exist when modules are installed.
- DO NOT damage or scratch the rear surface of the module.
- DO NOT handle or install modules when they are wet or if the backsheet is damaged.
- WHEN connecting this solar module to other equipment then refer to the equipment manufacturer's instructions.

Refer to the Instruction Sheet for more information.



MODEL NO : IBMPH-560
NOMINAL WATTAGE : 560W ± 2%
YEAR OF MFG : 2024
MFG ORIGIN : INDIA



IB560082400001

(Series Model: IBMPH-555)



A Product of:
INTEGRATED BATTERIES INDIA PVT LTD.
Plot No. 40 Ecotech 10 Gr. Noida-201301
Website : www.ibsolar.co.in
Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA



Model No :- IBMPH-555

POWER SPECIFICATION MEASURED AT STC
IRRADIANCE : 1000W/M2, AM : 1.5, CELL TEMPERATURE : 25°C

Pmax : 555W ± 2%
Voltage (Vmp) : 41.78V
Current (Imp) : 13.28A
Open Circuit Voltage (Voc) : 50.49V
Short Circuit Current (Isc) : 14.06A
Maximum System Voltage : 1500V
Maximum series Fuse : 30A
Application Class : A(Safety Class II)
Fire Rating : Class C



WARNING ELECTRICAL HAZARD

This solar module produces DC electricity when exposed to light

- ALWAYS observe the recommended safety precautions and use the recommended personal protection equipment.
- ALL installation and maintenance operations must be carried out by qualified personnel in accordance with local regulations.
- BEWARE dangerous DC voltages and currents may exist when modules are installed.
- DO NOT damage or scratch the rear surface of the module.
- DO NOT handle or install modules when they are wet or if the backsheet is damaged.
- WHEN connecting this solar module to other equipment then refer to the equipment manufacturer's instructions.

Refer to the Instruction Sheet for more information.



MODEL NO : IBMPH-555
NOMINAL WATTAGE : 555W ± 2%
YEAR OF MFG : 2024
MFG ORIGIN : INDIA



IB555082400001





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(Series Model: IBMPH-550)

 A Product of: INTEGRATED BATTERIES INDIA PVT LTD. Plot No. 40 Ecotech 10 Gr. Noida-201301 Website : www.ibsolar.co.in Manufactured In: ISO 9001 certified facility in Greater Noida, INDIA	Model No :- IBMPH-550 POWER SPECIFICATION MEASURED AT STC IRRADIANCE : 1000W/M2, AM : 1.5, CELL TEMPERATURE : 25°C <table><tr><td>Pmax</td><td>: 550W ± 2%</td></tr><tr><td>Voltage (Vmp)</td><td>: 41.63V</td></tr><tr><td>Current (Imp)</td><td>: 13.21A</td></tr><tr><td>Open Circuit Voltage (Voc)</td><td>: 50.28V</td></tr><tr><td>Short Circuit Current (Isc)</td><td>: 13.99A</td></tr><tr><td>Maximum System Voltage</td><td>: 1500V</td></tr><tr><td>Maximum series Fuse</td><td>: 30A</td></tr><tr><td>Application Class</td><td>: A(Safety Class II)</td></tr><tr><td>Fire Rating</td><td>: Class C</td></tr></table> 	Pmax	: 550W ± 2%	Voltage (Vmp)	: 41.63V	Current (Imp)	: 13.21A	Open Circuit Voltage (Voc)	: 50.28V	Short Circuit Current (Isc)	: 13.99A	Maximum System Voltage	: 1500V	Maximum series Fuse	: 30A	Application Class	: A(Safety Class II)	Fire Rating	: Class C	WARNING ELECTRICAL HAZARD This solar module produces DC electricity when exposed to light • ALWAYS observe the recommended safety precautions and use the recommended personal protection equipment. • ALL installation and maintenance operations must be carried out by qualified personnel in accordance with local regulations. • BEWARE dangerous DC voltages and currents may exist when modules are installed • DO NOT damage or scratch the rear surface of the module. • DO NOT handle or install modules when they are wet or if the backsheet is damaged • WHEN connecting this solar module to other equipment then refer to the equipment manufacturer's instructions Refer to the Instruction Sheet for more information.
Pmax	: 550W ± 2%																			
Voltage (Vmp)	: 41.63V																			
Current (Imp)	: 13.21A																			
Open Circuit Voltage (Voc)	: 50.28V																			
Short Circuit Current (Isc)	: 13.99A																			
Maximum System Voltage	: 1500V																			
Maximum series Fuse	: 30A																			
Application Class	: A(Safety Class II)																			
Fire Rating	: Class C																			
	<table><tr><td>MODEL NO</td><td>: IBMPH-550</td></tr><tr><td>NOMINAL WATTAGE</td><td>: 550W ± 2%</td></tr><tr><td>YEAR OF MFG</td><td>: 2024</td></tr><tr><td>MFG ORIGIN</td><td>: INDIA</td></tr></table>	MODEL NO	: IBMPH-550	NOMINAL WATTAGE	: 550W ± 2%	YEAR OF MFG	: 2024	MFG ORIGIN	: INDIA	 IB550082400001										
MODEL NO	: IBMPH-550																			
NOMINAL WATTAGE	: 550W ± 2%																			
YEAR OF MFG	: 2024																			
MFG ORIGIN	: INDIA																			





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Similarities & difference between representative model and series/family models:

Sr. No	Series/Family Models	Electrical Specifications						Model difference	Model similarities
		Maximum System Voltage, (Vdc)	Open Circuit Voltage @STC/Voc (Vdc)	Rated Voltage @ STC/ Vmp (V dc)	Short Circuit Current @ STC/Isc (A)	Rated Current @ STC/Imp (A)	Rated Maximum Power at STC, (Watts)	• Pmp • Voc • Isc • Vmp • Imp • Module size	• Maximum System Voltage • Cell technology • Encapsulation • Superstrate • Module size • Backsheet/ substrate • Frame and/or mounting structure • Junction box/electrical termination • Cell interconnect materials or technique • Electrical circuit Of an identical package • Power output (by 10%) in the identical package including size and using the identical cell process. • Bypass diode
1.	IBMPH-640 (Representative Model)	1500	56.12	46.65	14.51	13.72	640		
156 Half cut cell family(Series Models):									
2.	IBMPH-635	1500	55.99	46.44	14.43	13.68	635		
3.	IBMPH-630	1500	55.86	46.27	14.35	13.62	630		
4.	IBMPH-625	1500	55.72	46.10	14.27	13.56	625		
5.	IBMPH-620	1500	55.58	45.93	14.19	13.50	620		
6.	IBMPH-615	1500	55.44	45.77	14.11	13.44	615		
7.	IBMPH-610	1500	55.31	45.60	14.03	13.38	610		
8.	IBMPH-605	1500	55.17	45.42	13.95	13.32	605		
144 Half cut cell family(Series Models):									
9.	IBMPH-600	1500	52.10	43.78	14.61	13.71	600		
10.	IBMPH-595	1500	51.90	43.61	14.53	13.64	595		
11.	IBMPH-590	1500	51.70	43.45	14.45	13.58	590		
12.	IBMPH-585	1500	51.50	43.27	14.36	13.52	585		
13.	IBMPH-580	1500	51.47	42.59	14.37	13.62	580		
14.	IBMPH-575	1500	51.27	42.44	14.31	13.55	575		
15.	IBMPH-570	1500	51.07	42.29	14.25	13.48	570		
16.	IBMPH-565	1500	50.87	42.14	14.19	13.41	565		
17.	IBMPH-560	1500	50.67	41.95	14.13	13.35	560		
18.	IBMPH-555	1500	50.49	41.78	14.06	13.28	555		
19.	IBMPH-550	1500	50.28	41.63	13.99	13.21	550		





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Test item particulars.....: Crystalline Silicon Terrestrial Photovoltaic (PV) Modules (Si Wafer Based)	
Accessories and detachable parts included in the evaluation.....:	N/A
Mounting system used.....:	As per Installation Manual
Other options included.....:	N/A
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P(Pass)
- test object does not meet the requirement.....:	F(Fail)
Abbreviations used in the report:	
Pmax – Maximum power	PD – Partial Discharge
Vpm – Maximum power voltage	RTI/RTE – Relative Thermal Endurance Index
Ipm – Maximum power current	STC – Standard Test Conditions
Isc – Short circuit current	TC – Thermal Cycling
Voc – Open circuit voltage	CTI – Comparative Tracking Index
FF –Fill factor	MST – Module Safety Test
Testing.....:	
Date of receipt of test item.....:	15/10/2024
Date(s) of performance of tests.....:	15/10/2024 to 27/12/2024

General remarks:	
"(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 [] comma/ [X] point is used as the decimal separator.	
This Test Report Form is intended for the investigation of PV modules in accordance with IS/IEC 61730-2:2004 +A1:2017. It can only be used together with IS/IEC 61730-1:2004 +A1:2017+A2:2017 Test Report.	
Name and address of factory (ies).....:	INTEGRATED BATTERIES INDIA PVT LTD Plot No 40 Ecotech 10 Greater Noida, Uttar Pradesh, 201301





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General Product Information:

PV module type reference.....: **IBMPH-640 (Representative Model)**

Product Electrical Ratings at STC

Nominal maximum power (Pmax).....: 640W
Nominal open circuit voltage at (Voc).....: 56.62V
Nominal short circuit current at (Isc).....: 14.51A
Nominal maximum power voltage (Vpm).....: 46.65V
Nominal maximum power current (Ipm).....: 13.72A

Product Safety Ratings

Maximum system voltage.....: 1500 V
Maximum over-current protection rating.....: 30A
Safety application class.....: Class A
Safety class in accordance with IS 61140.....: Class II
Fire safety class.....: Class C
Recommended maximum series/parallel module configurations.....:
24 for 156 cell family series
28 for 144 cell family series

Scope of Module Safety Qualification Testing:

☒ Initial module safety qualification
☐ Extension of module safety qualification
original test report ref. no.....: N/A
Model differences and modification:
☐ Change in cell technology
☐ Change in cell interconnect materials/technique
☐ Modification to encapsulation system
☐ Modification to junction box/el. Termination
☐ Modification to superstrate
☐ Change in el. circuit of an identical package
☐ Modification to backsheet/substrate
☐ Higher or lower output by 10 %
☐ Modification to frame/mounting structure
☐ Increase in module size
☐ Removal of frame

- Note (1)** Use the "General product information" field to give any information on model differences within a product type family covered by the test report.
- Note (2)** Use the "General product information" field to describe the range of electrical and safety ratings, if the TRF covers a type family of modules.
- Note (3)** Use Annex 1 to list the used materials and components of the module (manufacturer/supplier and type reference)





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Clause	Requirement + Test	Result – Remark	Verdict
3	Application Classes		P
	The module has been evaluated for the following Application Class (Class A, B, C).....:	Class A	P
6	Sampling		P
	[X] The modules tested (modules and laminate) were taken at random from a production batch and subjected to manufacturer's normal quality control and inspection for safety testing.	-	P
	[] The modules tested (modules and laminate) were prototypes of a new design and not taken from a production batch.	-	N/A
	[X] Preconditioning of test samples was performed within IS 14286 (2010) or IS 16077:2013/IEC 61646:2008 performance testing.	-	P
	[] Preconditioning of test samples was performed separately from IS 14286 (2010) or IS 16077:2013/IEC 61646:2008 performance testing.	-	N/A

List of test samples		
Sample No.	Type / model	Remark Serial number
Full Testing		
9	IBMPH-640	IB640082400009
10		IB640082400010
11		IB640082400011
12		IB640082400006
13		IB640082400019
14		IB640082400014
15		IB640082400018
16		IB640082400035
17		IB640082400032
18		IB640082400022
Supplementary information: NIL		





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Clause	Requirement + Test	Result – Remark	Verdict
9	Pass Criteria		P
	The module under evaluation was judged to have passed all safety qualification test. The test samples met all of the criteria of each individual safety test.	See appended tables	P
Supplementary information: NIL			

10	Test Procedures		P
Safety qualification testing includes the following Module Safety Tests (MST) of IS/IEC 61730-2			
10.1	MST 01 - Visual inspection.....:	see table 10.1	P
10.2	MST 11 - Accessibility test.....:	see table 10.2	P
10.3	MST 12 - Cut susceptibility test.....:	see table 10.3	N/A
10.4	MST 13 - Ground continuity test.....:	see table 10.4	P
10.5	MST 14 - Impulse voltage test.....:	see table 10.5	P
10.6	MST 16 - Dielectric withstand test.....:	see table 10.6	P
10.7	MST 21 - Temperature test.....:	see table 10.7	P
10.8	MST 23 - Fire test.....:	see table 10.8	P
MST 25	MST 25 - Bypass diode thermal test.....:	See table A2.9	P
MST 42	MST 42 - Robustness of terminations test.....:	See table A2.4	P
10.9	MST 26 - Reverse current overload Test.....:	see table 10.9	P
10.10	MST 32 - Module breakage test.....:	see table 10.10	P
MST 17	MST 17 - Wet leakage current test.....:	see table MST 17	P
MST 22	MST 22 - Hot-spot test.....:	see table A 2.10	P
MST 34	MST 34 - Mechanical load test.....:	see table A 2.7	P
MST 51a	MST 51a - Thermal cycling test (TC200).....:	see table A 2.8	P
MST 51b	MST 51b - Thermal cycling test (TC50).....:	see table A 2.2	P
MST 52	MST 52 - Humidity freeze test.....:	see table A 2.3	P
MST 53	MST 53 - Damp heat test.....:	see table A 2.5	P
MST 54	MST 54 - UV preconditioning test.....:	see table A 2.1	P
Component tests:			
11.1	MST 15 - Partial discharge test.....:	see table 11.1	N/A
11.2	MST 33 - Conduit bending test.....:	see table 11.2	N/A
11.3	MST 44 - Terminal box knockout test.....:	see table 11.3	N/A
Supplementary information: NIL			





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Clause	Requirement + Test	Result – Remark	Verdict
--------	--------------------	-----------------	---------

10.1	TABLE: Visual Inspection - MST 01 (Initial)		P
	Sample No.	Nature and position of findings	-
	09	No visual defect	P
	10	No visual defect	P
	11	No visual defect	P
	12	No visual defect	P
	13	No visual defect	P
	14	No visual defect	P
	15	No visual defect	P
	16	No visual defect	P
	17	No visual defect	P
	18	No visual defect	P

Supplementary information: NIL

10.2	TABLE: Accessibility Test - MST 11 (Initial)		P
	Maximum system voltage [V _{DC}].....:	1500	-
	Sample No.	Result [MΩ]	-
	10	Resistance between the test fixture and the electrical circuit of module is > 1MΩ	P
	11	Resistance between the test fixture and the electrical circuit of module is > 1MΩ	P
	12	Resistance between the test fixture and the electrical circuit of module is > 1MΩ	P
	13	Resistance between the test fixture and the electrical circuit of module is > 1MΩ	P

Supplementary information: NIL

10.4	TABLE: Ground Continuity Test - MST 13 (Initial)		P
	Maximum system voltage [V _{DC}].....:	1500	-
	Current applied [A].....:	75	-
	Location of designated grounding point.....:	Ground holes on the sides of the frame	-
	Location of second contacting point.....:	Greatest physical displacement from the grounding point.	-
	Sample No.	Voltage [V _{DC}]	Resistance [mΩ]
	10	0.45	6.000
	11	0.49	6.533
	12	0.39	5.200
	13	0.47	6.267

Supplementary information: NIL





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Clause	Requirement + Test		Result – Remark	Verdict
10.6	TABLE: Dielectric Withstand Test - MST 16 (Initial)			P
	Maximum system voltage [V _{DC}].....:	1500	-	-
	Test voltage applied V _{TEST} [V _{DC}].....:	8000 for 1min/1500 for 2min	-	-
	Module area A [m ²].....:	2.80	-	-
Sample No.	Dielectric breakdown	Insulation resistance at V _{TEST} [GΩ]	Insulation resistance x A [MΩ.m ²] [#]	-
10	[X]	18.34	40	P
11	[X]	17.48	40	P
12	[X]	19.58	40	P
13	[X]	16.93	40	P
Supplementary information: [X]: No breakdown occurred. ; # : Limit				

MST 17	TABLE: Wet Leakage Current Test - MST 17 (Initial)			P
	Maximum system voltage [V _{DC}].....:	1500	-	
	Test voltage applied V _{TEST} [V _{DC}].....:	1500	-	
	Module area A [m ²].....:	2.80	-	
	Resistivity of wetting agent [Ω.cm].....:	2556	-	
	Average wetting agent temperature [°C].....:	23.3	-	
Sample No.		Insulation resistance at V _{TEST} [GΩ]	Insulation resistance x A [MΩ.m ²] [#]	-
10		8.49	40	P
11		9.37	40	P
12		9.28	40	P
13		7.38	40	P
Supplementary information: [#] : Limit				

10.3	TABLE: Cut Susceptibility Test - MST 12		N/A
	Applied force [N].....:	-	-
Sample No.			-
-	-		-
-	-		-

Supplementary information: NIL

10.1	TABLE: Visual Inspection - MST 01 (after Cut Susceptibility Test)		-
Sample No.	Nature and position of findings		-
-	-		-
-	-		-

Supplementary information: NIL





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Clause	Requirement + Test		Result – Remark	Verdict
10.6	TABLE: Dielectric Withstand Test - MST 16 (after Cut Susceptibility Test)			-
	Maximum system voltage [V _{DC}].....:	-	-	-
	Test voltage applied V _{TEST} [V _{DC}].....:	-	-	-
	Module area A [m ²].....:	-	-	-
Sample No.	Dielectric breakdown	Insulation resistance at V _{TEST} [GΩ]	Insulation resistance x A [MΩ.m ²] [#]	-
-	-	-	-	-
-	-	-	-	-
Supplementary information: [X]: No breakdown occurred. ; [#] : Limit.				

MST 17	TABLE: Wet Leakage Current Test - MST 17 (after Cut Susceptibility Test)			-
	Maximum system voltage [V _{DC}].....:	-		-
	Test voltage applied VTEST [V _{DC}].....:	-		-
	Module area A [m²].....:	-		-
	Resistivity of wetting agent [Ω.cm].....:	-		-
	Average wetting agent temperature [°C].....:	-		-
Sample No.	Insulation resistance at V _{TEST} [GΩ]	Insulation resistance x A [MΩ.m²]ⁱ		-
-	-	-		-
-	-	-		-
Supplementary information: ⁱ - Limit.				

10.2	TABLE: Accessibility test - MST 11			-
	Maximum system voltage [V _{DC}].....:	1500		-
Sample No.	Nature and position of findings			-
-	-			-
-	-			-
Supplementary information: NIL				

10.4	TABLE: Ground Continuity Test - MST 13			-
	Maximum system voltage [V _{DC}].....:	-		-
	Current applied [A].....:	-		-
	Location of designated grounding point.....:	-		-
	Location of second contacting point.....:	-		-
Sample No.	Voltage [V _{DC}]	Resistance [mΩ]		-
-	-	-		-
-	-	-		-
Supplementary information: NIL				





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10.5	TABLE: Impulse Voltage Test - MST 14			P
	Maximum system voltage [V _{DC}].....:	1500		-
	Impulse voltage [V].....:	16000		-
	Thickness of conductive foil [mm].....:	0.05		-
Sample No.				-
13	No dielectric breakdown or surface tracking			P
Supplementary information: NIL				
10.1	TABLE: Visual Inspection - MST 01 (after Impulse Voltage Test)			P
Sample No.	Nature and position of findings			-
13	No visual defect			P
Supplementary information: NIL				
10.6	TABLE: Dielectric Withstand Test - MST 16 (after Impulse Voltage Test)			P
	Maximum system voltage [V _{DC}].....:	1500		-
	Test voltage applied V _{TEST} [V _{DC}].....:	8000V for 1min/1500 V for 2min		-
	Module area A [m²].....:	2.80		-
Sample No.	Dielectric breakdown	Insulation resistance at V _{TEST} [GΩ]	Insulation resistance x A [MΩ.m²]#	-
13	[X]	12.89	40	P
Supplementary information: [X]: No breakdown occurred. ; # - Limit.				





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10.7	TABLE: Temperature Test - MST 21				P
	Sample No.:	15			-
	Reference solar irradiance [W/m ²].....:	1000			-
	Reference ambient temperature [°C].....:	40			-
Measuring location	Component temperature T _{OBS} [°C]	Normalised temperature T _{CON} [°C]	Component temperature limit [°C]		-
Module open-circuited					
Module superstrate above the centre cell	66.56	77.66	Not specified		-
Module substrate below the centre cell	65.65	76.75	Not specified		-
Terminal enclosure interior surface	62.45	73.55	85		P
Terminal enclosure interior air space	61.23	72.33	85		P
Field wiring terminals	60.75	71.85	90		P
Insulation of the field wiring leads	59.76	70.86	90		P
External connector bodies	58.98	70.08	85		P
Diode D1	59.45	70.55	200		P
Diode D2	58.45	69.55	200		P
Diode D3	58.12	69.22	200		P
Module short-circuit					
Module superstrate above the centre cell	74.54	86.24	Not specified		-
Module substrate below the centre cell	73.65	85.35	Not specified		-
Terminal enclosure interior surface	61.67	73.37	85		P
Terminal enclosure interior air space	62.74	74.44	85		P
Field wiring terminals	64.45	76.15	90		P
Insulation of the field wiring leads	60.75	72.45	90		P
External connector bodies	59.76	71.46	85		P
Diode D1	72.45	84.15	200		P
Diode D2	71.54	83.24	200		P
Diode D3	71.34	83.04	200		P
Supplementary information: T _{CON} = T _{OBS} + (40 °C - T _{AMB}), temperature limits are given in Table 9 of IS/IEC 61730-2.					

10.8	TABLE: Fire Test - MST 23			P
	Module fire resistance class (A, B, C).....:	Class C		-
	No. of modules provided to create the test assembly....:	3		-
Sample No.				-
16 [#]	[X] Modules comply with the requirements for the fire resistance class			P
17 [#]				P
18 [*]				P
Supplementary information: # - Spread of flame, * - Brand				





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10.9	TABLE: Reverse Current Overload Test - MST 26		P
	Module over-current protection rating [A].....:	30	-
	Test current [A].....:	40.5	-
	Range of applied voltage [V].....:	49.06—52.64	-
	Test duration.....:	2 hours	-

Sample No.		-
15	[X] No flaming of the module [X] No flaming or charring of the cheesecloth [X] No flaming of the tissue paper	P

Supplementary information: Nil

MST 17	TABLE: Wet Leakage Current Test - MST 17 (after Reverse Current Overload Test)		P
	Maximum system voltage [V _{DC}].....:	1500	-
	Test voltage applied V _{TEST} [V _{DC}].....:	1500	-
	Module area A [m ²].....:	2.80	-
	Resistivity of wetting agent [Ω.cm].....:	2584	-
	Average wetting agent temperature [°C].....:	23.8	-

Sample No.	Insulation resistance at V _{TEST} [GΩ]	Insulation resistance x A [MΩ.m ²] [#]	-
15	6.39	40	P

Supplementary information: [#] : Limit

	TABLE: Module Breakage Test - MST 32		P
	Weight of impactor [kg].....:	45.5	-
	Thickness of sample [mm].....:	5.3	-
	Mounting technique used.....:	As instructed in manual	-
	Module breakage.....:	[] No breakage [] Breakage at 300 mm [] Breakage at 450 mm [X] Breakage at 1220 mm	-
	Weight of particles in case of breakage [g].....:	No particle ejected from the sample	-

Sample No.		-
14	[] Breakage occurred, but no shear or opening large enough for a 76 mm diameter sphere to pass freely has developed.	N/A
	[] Disintegration occurred, but the ten largest crack-free particles selected 5 min subsequent to the test did not weigh more in grams than 16 times the thickness of the sample in millimetres.	N/A
	[X] Breakage occurred, but no particles larger than 6.5 cm ² have been ejected from the sample.	P

Supplementary information: NIL

11	Component Tests		N/A
	MST 15 - Partial discharge test.....:	No such construction	N/A
	MST 33 - Conduit bending test.....:	No such construction	N/A
	MST 44 - Terminal box knockout test.....:	No such construction	N/A





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11.1	TABLE: Partial Discharge Test - MST 15		N/A
	Manufacturer.....:	-	-
	Type reference.....:		-
	Materials and thicknesses.....:		-
	Ambient temperature [°C].....:		-
	Relative humidity [%].....:		-
	Test medium (air/oil).....:		
Sample No.	PD inception voltage, U_i [V]	PD extinction voltage, U_e [V]	
-	-	-	
-	-	-	
-	-	-	
-	-	-	
-	-	-	
-	-	-	
-	-	-	
-	-	-	
-	-	-	
-	-	-	
Mean value of PD extinction voltage, $\bar{U}_e$, avg [V]		-	
Standard deviation of PD extinction voltage, σ [V].....		-	
Mean value minus standard deviation of PD extinction voltage [V]		-	
Resulting maximum system voltage, U_{SYS} [V].....		-	

Supplementary information: No such construction
Calculation of maximum system voltage:
Safety factor $F_1 = 1.2$ (Basic safety factor)
 $F_2 = 1$ (Hysteresis factor)
 $F_3 = 1.25$ (Additional safety factor: reinforced insulation)
Allowable maximum system voltage: $U_{SYS} = 2 \times (U_{e,avg} - \sigma) / (F_1 \times F_2 \times F_3) V_{DC}$

11.2	TABLE: Conduit Bending Test - MST 33		N/A
	Manufacturer and type reference of conduit.....:		-
	Trade size of conduit [mm].....:		-
	Distance between the ends of the conduit in the box:		-
	Distance between supports.....:		-
	Force load in accordance with Table 10 of IS/IEC 61730-2 [N].....:		-
Sample No.			-
	[] No rupture of the attachment walls of the junction box		
	[] No separation of junction box from the conduit		
Supplementary information: No such construction			
Distance between supports = 760 mm + Distance between the ends of the conduit in the box			





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11.3	TABLE: Terminal Box Knockout Test - MST 44		N/A
	Manufacturer of terminal box.....:		-
	Type reference.....:		-
	Number of knockouts in the junction box.....:		-
	Force applied to knockout [N].....:		-
Knockout No.			-
	[] The knockout remains in place		
	[] The clearance between knockout and opening is < 0.75 mm		
	[] The knockout remains in place		
	[] The clearance between knockout and opening is < 0.75 mm		
	[] The knockout remains in place		
	[] The clearance between knockout and opening is < 0.75 mm		
	[] The knockout remains in place		
	[] The clearance between knockout and opening is < 0.75 mm		
Supplementary information: No such construction			





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ANNEX 1: PRODUCT DESCRIPTION SHEET (MANUFACTURERS AND TYPE REFERENCES)

A1.1	MODULE TYPE/S
	Model Tested: IBMPH-640

A1.2	MODULE DESIGN –DIMENSIONS
	Module dimensions (L x W x H) [mm].....: 2466 x 1135x 35 for 156 cell family 2278 x 1134 x 35 for 144 cell family

A1.3	SOLAR CELL
	Cell type reference.....: Primary: TN182A-R16D1, Monocrystalline Bifacial TOPCon Cell, Manufactured by: Solar N Plus New Energy Technology Co., Ltd
	Cell dimensions L x W x T (± %) [mm].....: Primary: 182mmx91mm (±0.5mm)
	Cell thickness [µm].....: Primary: 130µm (±13µm)
	Cell area [cm ²].....: Primary: 165.62

A1.4	IDENTIFICATION OF MATERIALS
	Front cover.....: Primary: Low Iron Solar AR Coated Patterned Glass; Thickness: 2.0mm ± 0.2mm; Manufactured by: Borosil Renewables Limited Alternative: Low Iron Solar Anti-Reflective Coated Patterned Glass), Thickness: 2.0 mm ± 0.2 mm, Manufactured by: Triveni Renewables Pvt. Limited Alternate Front cover having same strengthening process and same surface treatment and same material all technical details are same as the main model, only change in manufacturer name as per declared by manufacturer
	Rear cover.....: Primary: Low Iron Solar AR Coated Patterned Glass; Thickness: 2.0mm ± 0.2mm; Manufactured by: Borosil Renewables Limited. Alternative: Low Iron Solar Anti-Reflective Coated Patterned Glass, Thickness: 2.0 mm ± 0.2 mm, Manufactured by: Triveni Renewables Pvt. Limited Alternate Rear cover having same strengthening process and same surface treatment and same material all technical details are same as the main model, only change in manufacturer name as per declared by manufacturer
	Encapsulation material.....: Primary: CONSERV P - 14 FC, Thickness: 0.45±5%, Width: upto 1240 mm,





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		Manufactured by: Renewsys India Private Limited. Alternative: ALISHAN FC, Manufactured by: Alishan Green Energy Pvt. Ltd Alternate Encapsulation material having same technical details as per declared by Manufacturer.
	Frame parts.....:	Primary: 6005 T6, Cross section: 35mm x 35 mm; Manufactured by Perfect Alex Pvt. Ltd. Alternative: DV-A-700, Cross section: 35mm x 35 mmManufactured by: Jiangsu Yuejia Metallic Technology Co.Ltd Alternate Frame having same technical details only change in manufacturer name as per declared by manufacturer
	Mounting parts.....:	as per installation manual
	Adhesive for frame.....:	Primary: 1527 Silicone Sealant For PV Modules, White colour; Manufactured by Tonsan Adhesive, Inc. Alternative: Manufactured by: Shanghai Huitian new material Co., Ltd Alternate Adhesives having same technical details only change in manufacturer name as per declared by manufacturer
	Cell connector.....:	Primary: Type: TPVIR2660, Sn60%/Pb40%, Dimensions [mm]: 0.26 mm; Manufactured by: VALEO PRODUCTS LLP Alternative: Manufactured by: VIDYA WIRES PVT LTD. Alternate cell connector having same technical details only change in manufacturer name as per declared by manufacturer.
	String connector.....:	Primary: Type: TPV1603580, Sn60%/Pb40%, Dimensions [mm]: 6x 0.35mm Manufactured by: Valeo Products LLP Alternative: Manufactured by: VIDYA WIRES PVT LTD. Alternate string connector having same technical details only change in manufacturer name as per declared by manufacturer.
	Fluxing agent.....:	Primary: 952-S, Low-Solids, No-Clean Liquid Flux, Manufactured by Kester
	Junction box.....:	Primary: GXSB-01, Rated voltage: 1.5KVDC, Rated Current: 45A, IP68, Ambient Temperature: -40°C to +85°C, Manufactured by GENX PV INDIA PRIVATE LIMITED.





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		Certified by TUV SUD; certificate no.: B1157770002
	Cable	Primary: 1X4mm ² , Electric Cables for Photovoltaic Systems for Rated Voltage 1500V d.c., for sizes upto and including 400 Sqmm, Conductor Class-5, Manufactured by APAR INDUSTRIES LTD (CM/L- 7100058704).
	Connector.....:	Primary: GXC-01, Rated voltage: 1500VDC, Rated current: 40A, IP68, Ambient Temperature: -40°C to 85°C, Manufactured by Genx Pv India Private Limited. Certificate no.: B 115777 0001 Rev. 00, Tested by TUV SUD.
	Bypass diode.....:	Primary: MK6045, Tj [°C]: -55 to +200°C, V _{RMS} : 45 V; I _{FSM} : 450A; RθJC:1.2°C/W, VDC 45V, Manufactured by Genx Pv India Private Limited.
	Potting material.....:	Primary: 1521 Potting Materials, White colour; Manufactured by Tonsan Adhesive Inc. Alternative: Manufactured by: Shanghai Huitian new material Co., Ltd Alternate Potting material having same technical details only change in manufacturer name as per declared by manufacturer
	Adhesive for junction box.....:	Primary: 1527 Silicone Sealant For PV Modules, White colour; Manufactured by Tonsan Adhesive, Inc. Alternative: Manufactured by: Shanghai Huitian new material Co., Ltd Alternate Adhesives having same technical details only change in manufacturer name as per declared by manufacturer
	Soldering Material.....:	Primary: Alpha Telecore HF-850, Manufactured by: ALPHA Global
	Additional material (e. g. insulation tape)....:	N/A





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A1.5	MODULE DESIGN - MINIMUM DISTANCES	
	Between cells.....:	1.4 mm
	Between cell and edge of laminate.....:	17 mm
	Between any current carrying part and edge of laminate....:	15 mm

A1.6	MODULE DESIGN - ELECTRICAL CONFIGURATION	
	Total number of cells.....:	156 for 156 cell family 144 for 144 cell family
	Serial-parallel connection of cells.....:	78 cells in series and parallel connection:2 72 cells in series and parallel connection:2
Note: Bill of material are same for all series family models.		
	Cells per bypass diode.....:	52 for 156 cell family 48 for 144 cell family
	No. of bypass diodes.....:	3

Note: Bill of material are same for all series family models.





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ANNEX 2

Preconditioning Tests		P
MST 51 - Thermal cycling (TC50 MST 51b).....:	See table A2.2	P
MST 51 - Thermal cycling (TC200 MST 51a).....:	See table A2.8	P
MST 52 - Humidity freeze (HF10 MST 52).....:	See table A2.3	P
MST 53 - Damp heat (DH 1000 MST 53).....:	See table A2.5	P
MST 54 - UV preconditioning test (MST 54).....:	See table A2.1	P

Electrical shock hazard tests		P
MST 17 - Wet leakage test (MST 17).....:	See table A2.6	P
MST 42 - Robustness of terminal test (MST 42).....:	See table A2.4	P

Fire hazard tests		P
MST 22 - Hot - spot test (MST 17).....:	See table A2.10	P
MST 25 - Bypass diode thermal test (MST 25).....:	See table A2.9	P

Mechanical stress tests		P
MST 34 - Mechanical load test (MST 34).....:	See table A2.7	P

A2.1	TABLE: UV preconditioning test MST 54			P
Test Date [MM/DD/YYYY] start/end.....:		10/28/2024 to 11/05/2024		-
Module temperature [°C].....:		60 ± 5		-
Irradiation 280 - 400 nm [kWh/m2] UV - A		15.0		-
Irradiation 280 - 320 nm [kWh/m2] UV – B		5.0		-
Sample No.:		Open circuits (yes/no)		-
10		No open circuit found		P
Supplementary information: NIL				
A2.1	TABLE: Visual Inspection MST 01 (after UV preconditioning test MST 54)			P
Sample No.:		Nature and position of findings		-
10		No visual defect		P
Supplementary information: NIL				
A2.1	TABLE: Dielectric withstand test - MST 16 (after UV preconditioning test MST 54)			P
		Maximum system voltage [V _{DC}].....:	1500	-
		Test voltage applied V _{TEST} [V _{DC}].....:	8000V for 1min/1500 V for 2min	-
		Module area A [m ²].....:	2.80	-
Sample No.:		Dielectric breakdown	Insulation resistance at V _{TEST} [GΩ]	Insulation resistance X A [MΩ.m ²] #
10		[X]	17.93	40
Supplementary information: [X]: No breakdown occurred. ; #: Limit				





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Clause	Requirement + Test		Result – Remark	Verdict
A2.2	TABLE: Thermal cycling 50 test MST 51b			P
Test Date [MM/DD/YYYY] start/end.....:		11/16/2024 to 11/28/2024		-
Total cycles (50).....:		50		-
Sample No.:		Open circuits (yes/no)		-
10		No		P
Supplementary information: NIL				
A2.2	TABLE: Visual Inspection MST 01 (after Thermal cycling 50 test MST 51b)			P
Sample No.:		Nature and position of findings		-
10		No visual defect		P
Supplementary information: NIL				
A2.2	TABLE: Dielectric withstand test - MST 16 (after Thermal cycling 50 test MST 51b)			P
Maximum system voltage [V _{DC}].....:		1500		-
Test voltage applied V _{TEST} [V _{DC}].....:		8000 V for 1min/1500 V for 2min		-
Module area A [m ²].....:		2.80		-
Sample No.:	Dielectric breakdown	Insulation resistance at V _{TEST} [GΩ]	Insulation resistance X A [MΩ.m ²] #	-
10	[X]	15.83	40	P
Supplementary information: [X]: No breakdown occurred.; # : Limit				
A2.3	TABLE: Humidity freeze test MST 52			P
Test Date [MM/DD/YYYY] start/end.....:		11/29/2024 to 12/10/2024		-
Total cycles (10).....:		10		-
Sample No.:		Open circuits (yes/no)		-
10		No		P
Supplementary information: NIL				
A2.3	TABLE: Visual Inspection MST 01 (after Humidity freeze test MST 52)			P
Sample No.:		Nature and position of findings		-
10		No visual defect		P
Supplementary information: NIL				
A2.3	TABLE: Dielectric withstand test - MST 16 (after Humidity freeze test MST 52)			P
Maximum system voltage [V _{DC}].....:		1500		-
Test voltage applied V _{TEST} [V _{DC}].....:		8000V for 1min/1500 V for 2min		-
Module area A [m ²].....:		2.80		-
Sample No.:	Dielectric breakdown	Insulation resistance at V _{TEST} [GΩ]	Insulation resistance X A [MΩ.m ²] #	-
10	[X]	12.58	40	P
Supplementary information: [X]: No breakdown occurred. ; # : Limit				





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Clause	Requirement + Test		Result – Remark	Verdict
A2.4	TABLE: Robustness of terminations test MST 42			P
Test Date [MM/DD/YYYY] start/end.....:		12/18/2024	-	
Types of terminations.....:		[X] Type A: wire of flying lead [] Type B: tags, threaded stubs, screws, etc. [] Type C: connector	-	
Applied force in all directions [N].....:		40 for tensile test, 20 for bending test	-	
Sample No.:		Open circuits (yes/no)	-	
10		No	P	
Supplementary information: NIL				
A2.4	TABLE: Visual Inspection MST 01 (after Robustness of terminations test MST 42)			P
Sample No.:		Nature and position of findings	-	
10		No visual defect	P	
Supplementary information: NIL				
A2.4	TABLE: Dielectric withstand test - MST 16 (after Robustness of terminations test MST 42)			P
Maximum system voltage [V _{DC}].....:		1500	-	
Test voltage applied V _{TEST} [V _{DC}].....:		8000V for 1min/1500 V for 2min	-	
Module area A [m ²].....:		2.80	-	
Sample No.:	Dielectric breakdown	Insulation resistance at V _{TEST} [GΩ]	Insulation resistance X A [MΩ.m ²] #	-
10	[X]	11.19	40	P
Supplementary information: [X]: No breakdown occurred. ; #: Limit				
A2.5	TABLE: Damp heat test MST 53			P
Test Date [MM/DD/YYYY] start/end.....:		10/28/2024 to 12/10/2024	-	
Total hours (1000).....:		1000	-	
Sample No.:		Open circuits (yes/no)	-	
11		No	P	
Supplementary information: NIL				
A2.5	TABLE: Visual Inspection MST 01 (after Damp heat test MST 53)			P
Sample No.:		Nature and position of findings	-	
11		No visual defect	P	
Supplementary information: NIL				
A2.5	TABLE: Dielectric withstand test - MST 16 (after Damp heat test MST 53)			P
Maximum system voltage [V _{DC}].....:		1500	-	
Test voltage applied V _{TEST} [V _{DC}].....:		8000V for 1min/1500 V for 2min	-	
Module area A [m ²].....:		2.80	-	
Sample No.:	Dielectric breakdown	Insulation resistance at V _{TEST} [GΩ]	Insulation resistance X A [MΩ.m ²] #	-
11	[X]	14.48	40	P
Supplementary information: [X]: No breakdown occurred. ; #: Limit				





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Clause	Requirement + Test	Result – Remark	Verdict
A2.6	TABLE: Wet leakage current test MST 17		P
Test Date [MM/DD/YYYY] start/end.....:	12/18/2024		-
Test voltage applied [V].....:	1500		-
Solution resistivity [Ω cm].....:	< 3500 Ω cm at 22 $\pm$ 3°C	2658	-
Surface tension [Nm^{-1}].....:	< 0.03 Nm^{-1} at 22 $\pm$ 3°C	-	-
Solution temperature [°C].....:	22.9		-
Sample No.:	Measured [$\text{G}\Omega$]	Insulation resistance X A [$\text{M}\Omega\cdot\text{m}^2$] #	-
11	6.93	40	P
Supplementary information: Size of module 2.80 [m^2]. ; # : Limit			

A2.7	TABLE: Mechanical load test MST 34		P
Sample No.:	11		-
Test Date [MM/DD/YYYY].....:	12/18/2024		-
Mounting method.....:	As per manual	As per manual	-
Load applied to.....:	Front side	Back side	-
Mechanical load [Pa].....:	2400	2400	-
First cycle time (start/end).....:	09:30 to 10:30	10:45 to 11:45	-
Intermittent open - circuit (yes/no).....:	No	No	-
Mechanical load [Pa].....:	2400	2400	-
Second cycle time (start/end).....:	11:55 to 12:55	13:20 to 14:20	-
Intermittent open - circuit (yes/no).....:	No	No	-
Mechanical load [Pa].....:	5400	2400	-
Third cycle time (start/end).....:	14:30 to 15:30	15:45 to 16:45	-
Intermittent open - circuit (yes/no).....:	No	No	-
Supplementary information: NIL			

A2.7	TABLE: Visual Inspection MST 01 (after Mechanical load test MST 34)		P
Sample No.:	Nature and position of findings		-
11	No visual defect		P
Supplementary information: NIL			
A2.7	TABLE: Wet leakage current test MST 17 (after Mechanical load test MST 34)		P
Test Date [MM/DD/YYYY] start/end.....:	12/18/2024		-
Test voltage applied [V].....:	1500		-
Solution resistivity [Ω cm].....:	< 3500 Ω cm at 22 $\pm$ 3°C	2593	-
Surface tension [Nm^{-1}].....:	< 0.03 Nm^{-1} at 22 $\pm$ 3°C	-	-
Solution temperature [°C].....:	23.7		-
Sample No.:	Measured [$\text{G}\Omega$]	Insulation resistance X A [$\text{M}\Omega\cdot\text{m}^2$] #	-
11	5.48	40	P
Supplementary information: Size of module 2.80 [m^2]. ; # : Limit			





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A2.8	TABLE: Thermal cycling test MST 51a		P
Test Date [MM/DD/YYYY] start/end.....:		11/09/2024 to 12/25/2024	-
Total hours (200).....:		200	-
Applied current [A].....:		13.72	-
Sample No.:		Open circuits (yes/no)	-
12		No	P
Supplementary information: NIL			
A2.8	TABLE: Visual Inspection MST 01 (after Thermal cycling test MST 51a)		P
Sample No.:		Nature and position of findings	-
12		No visual defect	P
Supplementary information: NIL			

A2.8	TABLE: Dielectric withstand test - MST 16 (after Thermal cycling test MST 51a)			P
	Maximum system voltage [V _{DC}].....:	1500		-
	Test voltage applied V _{TEST} [V _{DC}].....:	8000V for 1min/1500 V for 2min		-
	Module area A [m ²].....:	2.80		-
Sample No.:	Dielectric breakdown	Insulation resistance at V _{TEST} [GΩ]	Insulation resistance X A [MΩ.m ²] #	-
12	[X]	15.83	40	P
Supplementary information: [X]: No breakdown occurred. ; #: Limit				

A2.9	TABLE: Dielectric withstand test - MST 16 (Before Bypass diode thermal test MST 25)			P
	Maximum system voltage [V _{DC}].....:	1500		-
	Test voltage applied V _{TEST} [V _{DC}].....:	8000V for 1min/1500V for 2min		-
	Module area A [m ²].....:	2.80		-
Sample No.:	Dielectric breakdown	Insulation resistance at V _{TEST} [GΩ]	Insulation resistance X A [MΩ.m ²] #	-
15	[X]	18.38	40	P
Supplementary information: [X]: No breakdown occurred. ; #: Limit				





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A2.9	TABLE: Bypass diode thermal test MST 25			P
Sample No.:	15			-
Test Date [MM/DD/YYYY] start/end.....:	11/13/2024			-
Module temperature [°C].....:	75±5			-
Number of diodes in junction box.....:	3			-
Diode manufacturer.....:	Genx Pv India Private Limited.			-
Diode type designation.....:	MK6045			-
Max. permissible junction temperature Tjmax [°C] (According to diode datasheet).....:	200			-
	Diode 1	Diode 2	Diode 3	-
Current flow applied [A].....:	14.51	14.51	14.51	-
Max. diode surface temperature [°C] a or b.....:	138.5	136.5	139.7	-
Voltage drop [V].....:	0.39	0.38	0.41	-
Power dissipation [W].....:	5.66	5.51	5.95	-
Thermal resistance junction to leads (RTHJL)/to case (RTHJC) [K/W] (according to datasheet).....:	1.2	1.2	1.2	-
Calculated max. junction temperature Tjcalc [°C] a or b.....:	144.6	142.6	144.8	-
Tjcalc < Tjmax (test passed)? yes/no.....:	Yes	Yes	Yes	P
Current flow (1.25*Isc) [A].....:	18.14	18.14	18.14	-
Max. diode surface temperature [°C] a or b.....:	153.6	151.6	152.8	P
Supplementary information: NIL				
A2.9	TABLE: Visual Inspection MST 01 (after Bypass diode thermal test MST 25)			P
Sample No.:	Nature and position of findings			-
15	No visual defect			P
Supplementary information: NIL				
A2.9	TABLE: Dielectric withstand test - MST 16 (after Bypass diode thermal test MST 25)			P
	Maximum system voltage [V _{DC}].....:	1500		-
	Test voltage applied V _{TEST} [V _{DC}].....:	8000V for 1min/1500V for 2min		-
	Module area A [m ²].....:	2.80		-
Sample No.:	Dielectric breakdown	Insulation resistance at V _{TEST} [GΩ]	Insulation resistance X A [MΩ.m ²] #	-
15	[X]	16.34	40	P
Supplementary information: [X]: No breakdown occurred. ; #: Limit				
A2.9	TABLE: Wet leakage current test MST 17 (after Bypass diode thermal test MST 25)			P
Test Date [MM/DD/YYYY] start/end.....:	11/13/2024			-
Test voltage applied [V].....:	1500			-
Solution resistivity [Ω cm].....:	< 3500 Ωcm at 22 ± 3°C		2573	-
Surface tension [Nm ⁻¹].....:	< 0.03 Nm ⁻¹ at 22 ± 3°C		-	-
Solution temperature [°C].....:	23.9			-
Sample No.:	Measured [GΩ]	Insulation resistance X A [MΩ.m ²] #		-
15	7.73	40		P
Supplementary information: Size of module 2.80 [m ²]. ; #: Limit				





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A2.10	TABLE: Hot-spot endurance test MST 22			P
Sample No.:	15			-
Test Date [MM/DD/YYYY] start/end.....:	11/16/2024			-
Cell interconnection circuit.....:	[] S [X] SP [] SPS			-
Module temperature at thermal equilibrium [°C].....:	52.8			-
Determination of worse case cell				-
Maximum measured cell temperature in 5 hours [°C]	81.8			-
Shading rate [%]	100			-
Supplementary information: NIL				

A2.10	TABLE: Visual Inspection MST 01 (after Hot-spot endurance test MST 22)		P
Sample No.:	Nature and position of findings		-
15	No visual defect		P
Supplementary information: NIL			

A2.10	TABLE: Dielectric withstand test - MST 16 (after Hot-spot endurance test MST 22)			P
	Maximum system voltage [V _{DC}].....:	1500		-
	Test voltage applied V _{TEST} [V _{DC}].....:	8000 for 1min/1500V for 2min		-
	Module area A [m ²].....:	2.80		-
Sample No.:	Dielectric breakdown	Insulation resistance at V _{TEST} [GΩ]	Insulation resistance X A [MΩ.m ²] #	-
15	[X]	13.53	40	P
Supplementary information: [X]: No breakdown occurred. ; #: Limit				

A2.10	TABLE: Wet leakage current test MST 17 (after Hot-spot endurance test MST 22)			P
	Test Date [MM/DD/YYYY] start/end.....:	11/16/2024		-
	Test voltage applied [V].....:	1500		-
	Solution resistivity [Ω cm].....:	< 3500 Ωcm at 22 ± 3°C	2561	-
	Surface tension [Nm ⁻¹].....:	< 0.03 Nm ⁻¹ at 22 ± 3°C	-	-
	Solution temperature [°C].....:	23.5		-
Sample No.:	Measured [GΩ]	Insulation resistance X A [MΩ.m ²] #		-
15	6.81	40		P
Supplementary information: Size of module 2.80 [m ²]. ; #: Limit				





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A2.10	TABLE: Visual Inspection MST 01		P
Sample No.:	Nature and position of findings		-
09	No visual defect		P
10	No visual defect		P
11	No visual defect		P
12	No visual defect		P
13	No visual defect		P
14	No visual defect		P
15	No visual defect		P
16	No visual defect		P
17	No visual defect		P
18	No visual defect		P
Supplementary information: NIL			





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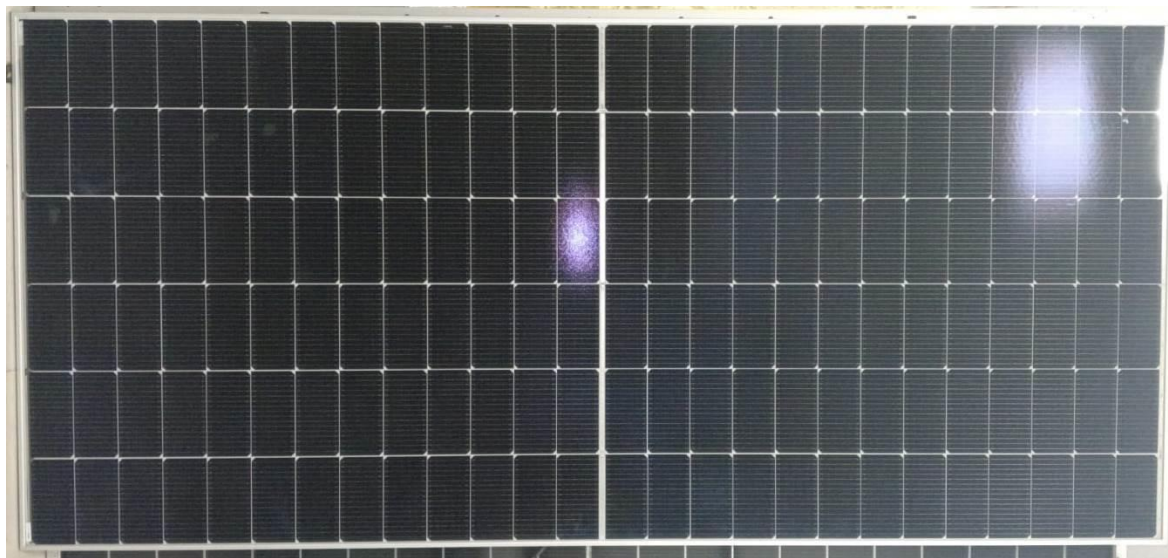
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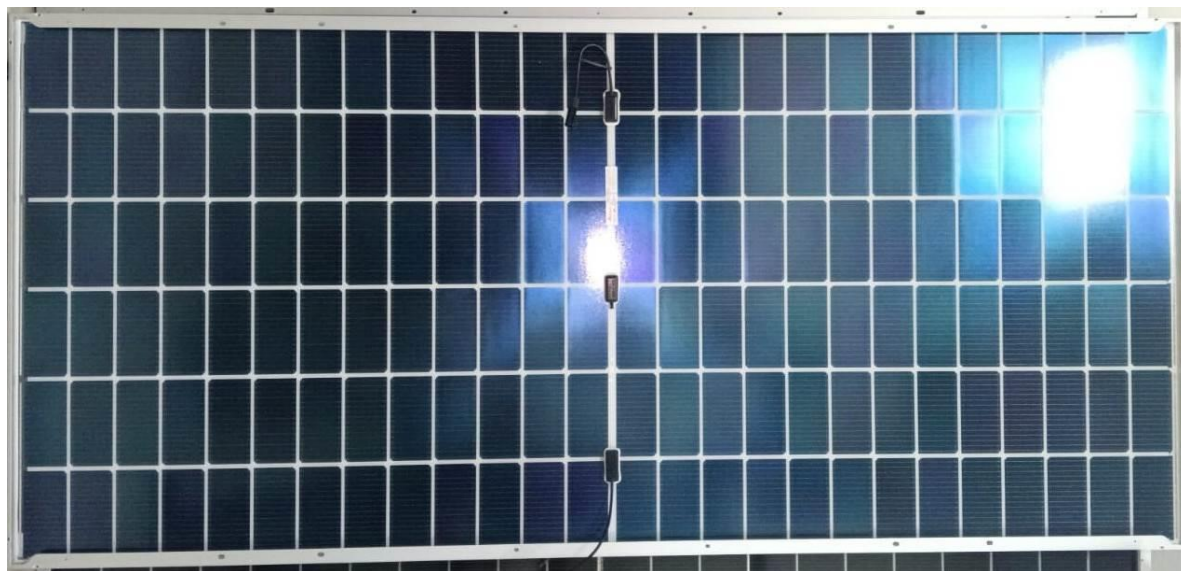
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ANNEX 3: PHOTOGRAPHS OF EUT



Front view



Rear view





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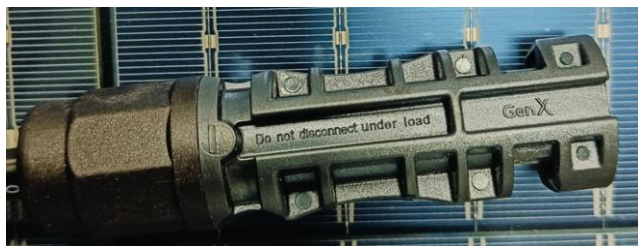
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Junction Box closed view



Junction Box opened view



Negative Connector



Positive Connector





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ANNEX 4: SPECIFICATION OF PV MODULES

Model	System Voltage (V)	Electrical Rating					Fuse Rating (A)	Dimension			Total no. of cells (Half cut cells) (no.)	No of cells per by bypass diode (no.)
		Voc (V)	Vm (V)	Isc (A)	Im (A)	Pm (W)		L (mm)	W (mm)	H (mm)		
156 Half cut cell family												
IBMPH-640	1500	56.12	46.65	14.51	13.72	640	30	2466	1135	35	156	52
IBMPH-635	1500	55.99	46.44	14.43	13.68	635	30	2466	1135	35	156	52
IBMPH-630	1500	55.86	46.27	14.35	13.62	630	30	2466	1135	35	156	52
IBMPH-625	1500	55.72	46.1	14.27	13.56	625	30	2466	1135	35	156	52
IBMPH-620	1500	55.58	45.93	14.19	13.5	620	30	2466	1135	35	156	52
IBMPH-615	1500	55.44	45.77	14.11	13.44	615	30	2466	1135	35	156	52
IBMPH-610	1500	55.31	45.6	14.03	13.38	610	30	2466	1135	35	156	52
IBMPH-605	1500	55.17	45.42	13.95	13.32	605	30	2466	1135	35	156	52
144 Half cut cell family												
IBMPH-600	1500	52.10	43.78	14.61	13.71	600	30	2278	1134	35	144	48
IBMPH-595	1500	51.90	43.61	14.53	13.64	595	30	2278	1134	35	144	48
IBMPH-590	1500	51.70	43.45	14.45	13.58	590	30	2278	1134	35	144	48
IBMPH-585	1500	51.50	43.27	14.36	13.52	585	30	2278	1134	35	144	48
IBMPH-580	1500	51.47	42.59	14.37	13.62	580	30	2278	1134	35	144	48
IBMPH-575	1500	51.27	42.44	14.31	13.55	575	30	2278	1134	35	144	48
IBMPH-570	1500	51.07	42.29	14.25	13.48	570	30	2278	1134	35	144	48
IBMPH-565	1500	50.87	42.14	14.19	13.41	565	30	2278	1134	35	144	48
IBMPH-560	1500	50.67	41.95	14.13	13.35	560	30	2278	1134	35	144	48
IBMPH-555	1500	50.49	41.78	14.06	13.28	555	30	2278	1134	35	144	48
IBMPH-550	1500	50.28	41.63	13.99	13.21	550	30	2278	1134	35	144	48

..... End of test report

