

INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY

[A Division of NATRiP Implementation Society (NATIS), Govt. of India]

Non-Transferable


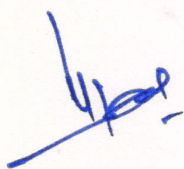

TEST REPORT

ULR No.: TC536019010000133P
Test Report No.: C T O B O 5 3 2 0

Date: 09.12.2019

- 1.0 NAME AND ADDRESS OF THE : M/s. COMPUTECH SYSTEMS
CUSTOMER G-4 ,Harsha House ,Karampura Complex ,
New Delhi- 110015 , India
- 1.1 NAME AND ADDRESS OF THE :
MANUFACTURER Same as serial No. 1.0
- 2.0 CUSTOMER LETTER REF : IOCS No. CCTNCOMSOMEEL73886 Dated 25-Nov-2019
- 3.0 DESCRIPTION OF DEVICE UNDER TEST (DUT):
- | | |
|-----------------------|---|
| DUT Name | Battery Module, 50.9 V |
| Battery Type | Lithium-ion |
| Battery Capacity(Ah) | 40Ah (Ah in 5 hrs) |
| Rated Voltage | 50.9 V DC |
| Id/Model No. | LI4840 |
| Quantity | 06 Nos. of Battery Pack
(ICAT/EEL/73886/01-06) |
| Trade Name | iPower |
| Drawing No. | IP4840-01 |
| Configuration of cell | 14S14P |
- 4.0 DATE OF RECEIPT OF SAMPLE : 07.10.2019
- 5.0 CONDITION OF SAMPLE: No physical damage observed.
- 6.0 TEST OBJECTIVE: To validate the safety requirements of traction battery as per AIS: 048 as amended upto date.
- 7.0 TEST METHOD: Test method referred from AIS: 048 as amended upto date.
- 8.0 ANY DEVIATION OR EXCLUSION FROM TEST METHOD: NA
- 9.0 FUNCTIONAL VERIFICATION: Functional verification done and battery was found satisfactory.
- 10.0 CONCLUSION: The battery specified in Sr. No. 3.0 of this test report met all the test requirements when tested as per AIS: 048 as amended upto date as mentioned in Annexure-I of this report.
- 11.0 TEST DESCRIPTION: Please refer the Annexure-I of this report.
- 12.0 DATE OF PERFORMANCE OF TEST: Please refer the Annexure-I of this report.
- 13.0 LOCATION OF TEST: ICAT CENTER-I.
- 14.0 TEST RESULTS: Please refer the Test requirements and Results in **Annexure-I** of this report.



Prepared By	Checked By	Approved By
		
UDIT KAUL Dy. Manager	MAHENDAR PAL Asst. General Manager	PAMELA TIKKU Sr. General Manager

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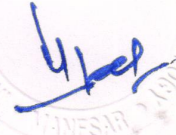
Office Address : Centre-I : Plot No.-26, Sector-3, HSIIDC, IMT-Manesar, Gurugram-122050. Haryana (India)
Centre-II : Plot No.-01, Sector-M-11, HSIIDC, IMT-Manesar, Gurugram-122050. Haryana (India)
Phone : 0124-4586111, Fax : +91-124-2290005. E-mail: team@icat.in, Website : www.icat.in
(An ISO 9001, ISO 14001 and ISO 45001 certified, scope wise NABL accredited and BIS recognised Test House)

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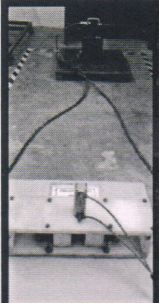
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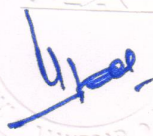
ULR No.: TC536019010000133P
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Annexure – I


1.0 TEST REQUIREMENTS AND RESULTS:

Cl. No.	Test	Test Description	Observations/Results
2.1 Electrical Tests			
2.1.1	Short Circuit test (Test ID:ICAT/EEL/73886/01) Date of Test : 22.11.2019	 <p>Battery Condition: Fully charged (100% SOC), contained at ambient temperature. Apply a hard short in less than one second to the battery module with a conductor specified in the standard. Test Duration: 10 minutes, or until another condition occurs which prevents completion of test (i.e. component melting, etc.) Lab temperature: Not exceeding 30°C Acceptance Criteria: After 2 hours of observation: At the end of the test, there shall be no: a) Physical damage to the casing or mechanical parts. b) Melting of components. c) Fire or explosion. It is acceptable for the battery to become dry at the end of the test.</p>	<p>Ambient temperature : 27°C</p> <p>Conductor of $\leq 5\text{m}\Omega$ was used and short was applied for 10 minutes.</p> <p>No physical damage, explosion or melting observed.</p> <p>Satisfactory.</p>



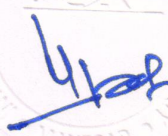
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2.1.2	Over Charge test (Test ID:ICAT/ EEL/73886/02) Date of Test : 04.12.2019	 <p>Battery Condition: Fully charged (100% SOC), contained at ambient temperature at $27 \pm 5^{\circ}\text{C}$. Duration: 10 hours The battery is to be overcharged at a constant charging current of 0.1 (C_{10}). Acceptance Criteria: At the end of the test, there shall be no: a) Physical damage to the casing or other mechanical parts. b) Melting of components. c) Fire or explosion.</p>	<p>Battery Module was charged with 0.32 A for 10 hours.</p> <p>No physical damage, melting or explosion observed.</p> <p>Satisfactory.</p>
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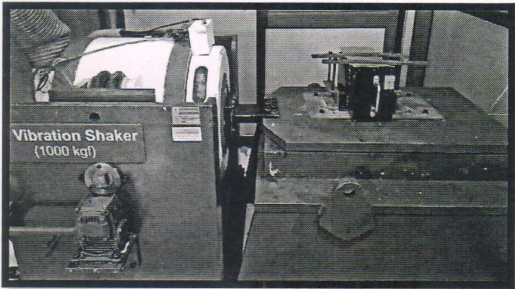
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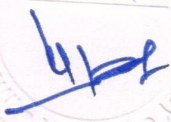
<p>Prepared By</p> 		<p>Checked By</p> 	
<p>UDIT KAUL Dy. Manager</p>		<p>MAHENDAR PAL Asst. General Manager</p>	<p>Page 04 of 07 + Dwg(01) [73886]</p>

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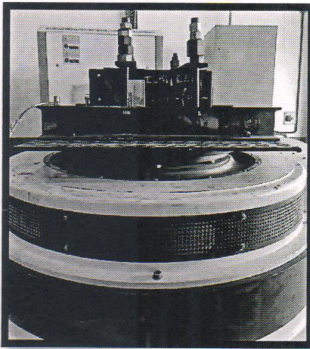
2.2 Mechanical Tests




2.2.1	<p>Vibration test (Test ID: ICAT/EEL/73886/03) Date of test : 05.12.2019</p>	 <p>Battery Condition: Fully charged (100% SOC), contained at ambient temperature, firmly held on the vibration table in vehicle mounting position. Axis: Vertical and Horizontal axis, with battery positioned in longitudinal direction. Acceleration: 3 g (sinusoidal vibration) Frequency: 30-150 Hz Sweep rate: 1 octave per minute Duration: 2 hours in each axis Immediately after the test, discharge the battery at room temperature not exceeding 30°C, at the rate of $I = 0.2 \times \text{Battery capacity}(C_5)$</p> <p>Acceptance Criteria: During test, there shall be no electrolyte loss. The deterioration of battery rated capacity during discharging shall not be more than 10%. At the end of the test, there shall be no: a) Physical damage to the casing or other mechanical parts b) Fire or explosion</p>	<p>No electrolyte loss observed during test.</p> <p>Immediately after the test, battery was discharged at 8.0A And deterioration observed was not more than 10%.</p> <p>No physical damage or explosion observed.</p> <p>Satisfactory.</p>
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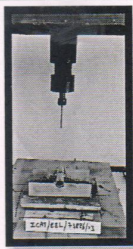
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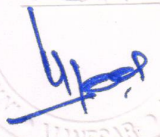
2.2.2	<p>Shock test (Test ID: ICAT/EEL/73886/04) Date of test : 06.12.2019</p>	 <p>Battery Condition: Fully charged (100% SOC), contained at ambient temperature not exceeding 30°C, firmly held on the vibration table in vehicle mounting position. Axis: Vertical and Horizontal axis, with battery positioned in longitudinal direction. Acceleration: 30 g (half-sine wave) No. of shocks: 10 in each axis Duration: 15 ms of each shock Immediately after the test, discharge the battery at room temperature, at the rate of $I = 0.2 \times \text{Battery capacity}(C_5)$ Acceptance Criteria: The deterioration of battery rated capacity during discharging shall not be more than 10%. At the end of the test, there shall be no: a) Physical damage to the casing or other mechanical parts b) Fire or explosion.</p>	<p>Immediately after the test, battery was discharged at 8.0A and deterioration observed was not more than 10%.</p> <p>No physical damage or explosion observed.</p> <p>Satisfactory.</p>
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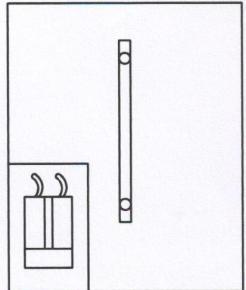
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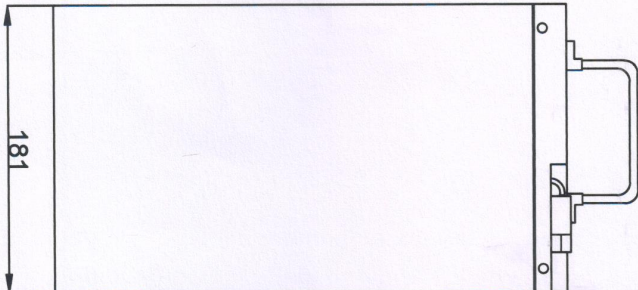
2.2.3	Roll-Over Test	<p>Rotate the battery module one complete revolution in one direction, for one minute in a continuous, slow-roll fashion, and observe leakage, if any.</p> <p>Then rotate the battery module in 90° increments in same direction for one full revolution. Hold the battery module for one hour at each position.</p> <p>Acceptance Criteria: The volume of electrolyte spilled in each position shall not be more than 25 ml per module.</p>	Not Applicable.
2.2.4	Penetration Test (Test ID: ICAT/EEL/73886/05) Date of test :04.12.2019	 <p>The battery Cell shall be penetrated with a mild steel (conductive) pointed rod, which will be electrically insulated from the test fixture.</p> <p>Rate of penetration: 8 cm/s.</p> <p>Diameter of Rod: 3mm</p> <p>Orientation of penetration: perpendicular to the electrode plates.</p> <p>Minimum Depth of penetration: Through cell</p> <p>The battery Cell should be observed, with the rod remaining in place, for a minimum of one hour after the test.</p> <p>Acceptance Criteria: At the end of the test, there shall be no: a) Melting of components. b) Fire or explosion.</p>	<p>After penetration, up to a depth through cell with a pointed mild steel rod of diameter 3mm, electrically insulated from the test fixture, no explosion, no fire and no melting observed.</p> <p>Satisfactory.</p>

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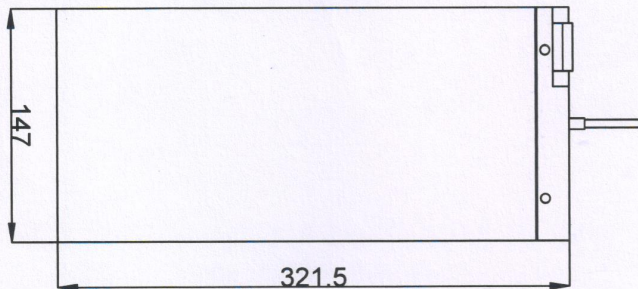
Test report No. CT0805320 Dated 09.12.2019



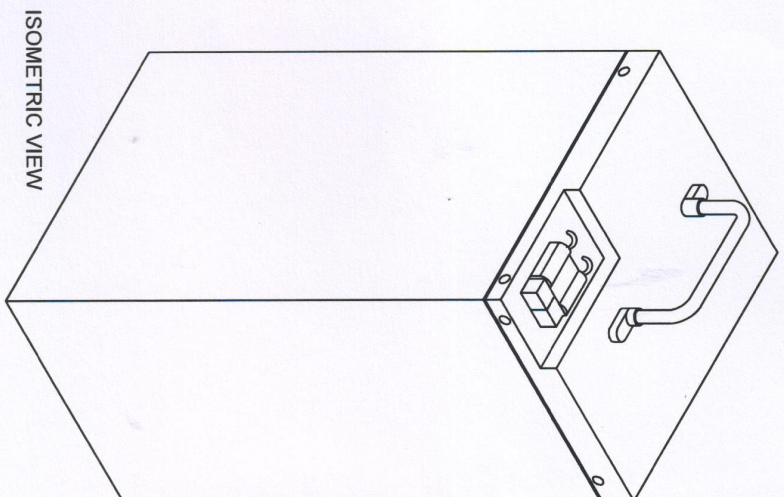
TOP VIEW



FRONT VIEW



RIGHT VIEW



ISOMETRIC VIEW



Trade Name :	iPower	Cell Configuration:	14S14P
Model No. :	LI4840	DRAWING NO. :	IP4840-01
Rating :	50.9V, 40 AH at C5	SCALE:	1:1
Drawing By :	Manoj	DATE :	05/11/2019
Approved By :	Vikas Agrawal	SHEET :-	1/1
All Dimensions are in mm			

- NOTES:-
1. VEHICLE DRAWN IN LADEN CONDITION.
 2. ALL DIMENSIONS ARE INmm.
 3. CAUTION - DO NOT WELD OR DRILL IN FRAME.