

# INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY

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

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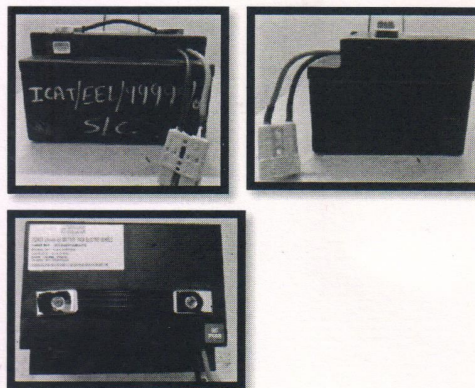
## TEST REPORT

ULR No.: TC536020040000056F  
Test Report No.: C T 0 G P 8 1 1 7

Date: 15.07.2020

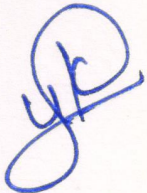
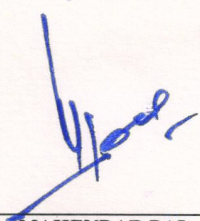
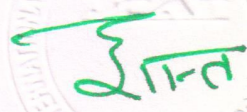
- 1.0 NAME AND ADDRESS OF THE CUSTOMER : M/s. Computech Systems  
G-4 Harsha House Commercial Complex  
Karampura, New Delhi
- 1.1 NAME AND ADDRESS OF THE MANUFACTURER : Same as serial No. 1.0
- 2.0 CUSTOMER LETTER REF : IOCS No. CCTNCOMSPGEEL99999 Dated 09-June-2020
- 3.0 DESCRIPTION OF DEVICE UNDER TEST (DUT):

DUT Name	Battery Pack, 25.6 V
Battery Type	LiFePO4 Traction Battery
Battery Capacity(Ah)	24Ah (Ah in 5 hrs)
Rated Voltage	25.6 V DC
Id/Model No.	8S8P 25V24AH(LFP)
Quantity	02 Nos. of Battery Pack and 4 Nos. of Cell (ICAT/EEL/99999/01-06)
Trade Name	IPOWER BATTERIES
Configuration of cell	8S8P
Drawing No.	Assem12



- 4.0 DATE OF RECEIPT OF SAMPLE : 26.06.2020
- 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 FUNCTIONAL VERIFICATION: Functional verification done and battery was found satisfactory.
- 9.0 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.
- 10.0 ANY DEVIATION FROM TEST METHOD: No
- 11.0 LOCATION OF TEST: ICAT Center-I
- 12.0 TEST DESCRIPTION: Please refer the Annexure-I of this report.
- 13.0 DATE OF PERFORMANCE OF TEST: Please refer the Annexure-I of this report.
- 14.0 TEST RESULTS:

Please refer the Test requirements and Results in Annexure-I of this report.



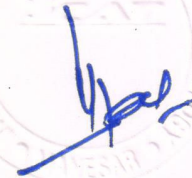
Prepared By	Checked By	Approved By
		
UDIT KAUL Dy. Manager	MAHENDAR PAL Asst. General Manager	PAMELA TIKKU Sr. General Manager

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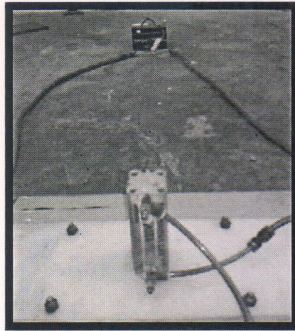
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<b>UDIT KAUL</b>		<b>MAHENDAR PAL</b>	
<b>Dy. Manager</b>		<b>Asst. General Manager</b>	




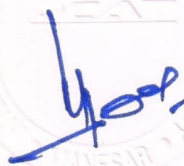
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Annexure-I

1.0 TEST REQUIREMENTS AND RESULTS:


Cl. No.	Test	Test Description	Observations/Results
<b>2.1 Electrical Tests</b>			
2.1.1	<b>Short Circuit test</b> (Test ID: ICAT/EEL/99999/01) Date of Test: 03.07.2020	 <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 <b>Acceptance Criteria:</b> 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 : 28°C</p> <p>Conductor of <math>\leq 5\text{m}\Omega</math> was used and short was applied for 10 minutes.</p> <p>No physical damage, explosion or melting observed.</p> <p><b>Satisfactory.</b></p>



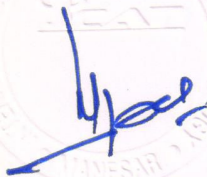
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UDIT KAUL Dy. Manager		MAHENDAR PAL Asst. General Manager	



ULR No.: TC536020040000056F  
Test Report No.: C T 0 G P 8 1 1 7

Date: 15.07.2020

2.1.2	<p><b>Over Charge test</b> (Test ID: ICAT/EEL/99999/02) Date of Test: 07.07.2020</p>	 <p>Battery Condition: Fully charged (100% SOC), contained at ambient temperature at <math>27 \pm 5^\circ\text{C}</math>. Duration: 10 hours The battery is to be overcharged at a constant charging current of 0.1 (<math>C_{10}</math>). <b>Acceptance Criteria:</b> 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 Pack was charged with 0.30 A for 10 hours.</p> <p>No physical damage, melting or explosion observed.</p> <p><b>Satisfactory.</b></p>
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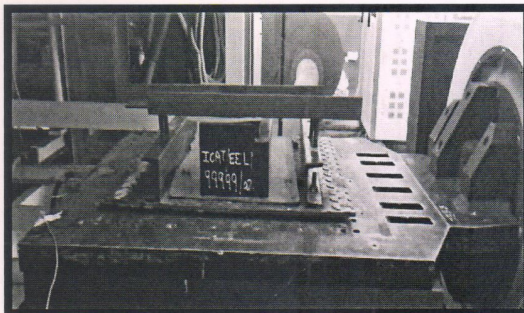
<p>Prepared By</p>  <p><b>UDIT KAUL</b> Dy. Manager</p>		<p>Checked By</p>  <p><b>MAHENDAR PAL</b> Asst. General Manager</p>	<p>Page 04 of 07 + Dwg(01) [99999]</p>
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## 2.2 Mechanical Tests

2.2.1

**Vibration test**  
(Test ID:  
ICAT/EEL/99999/03)  
Date of test: 09.07.2020



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  $I = 0.2 \times \text{Battery capacity}(C_5)$

### 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

No electrolyte loss observed during test.

Immediately after the test, battery was discharged at 4.8 A And deterioration observed was not more than 10%.

No physical damage or explosion observed.

**Satisfactory.**

Prepared By

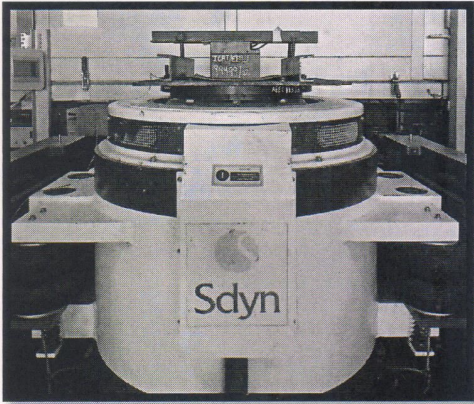
UDIT KAUL  
Dy. Manager



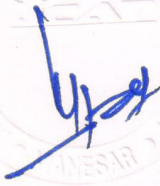


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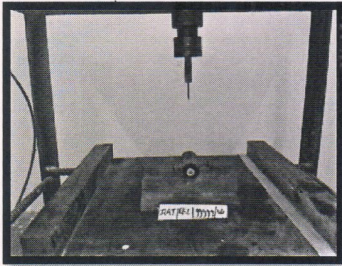
MAHENDAR PAL  
Asst. General Manager



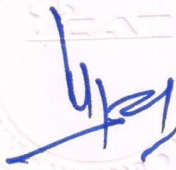


2.2.2	<p><b>Shock test</b>          (Test ID:          ICAT/EEL/99999/04)          Date of test: 06.07.2020</p>	 <p>Battery Condition: Fully charged (100% SOC), contained at ambient temperature not exceeding 30°C, firmly held on the vibration table in vehicle mounting position.          Axis: Vertical 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 <math>I = 0.2 \times \text{Battery capacity}(C_5)</math>  <b>Acceptance Criteria:</b>          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 4.8 A and deterioration observed was not more than 10%.</p> <p>No physical damage or explosion observed.</p> <p><b>Satisfactory.</b></p>
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<p>Prepared By</p>  <p>UDIT KAUL Dy. Manager</p>		<p>Checked By</p>  <p>MAHENDAR PAL Asst. General Manager</p>	<p>Page 06 of 07 + Dwg(01) [99999]</p>
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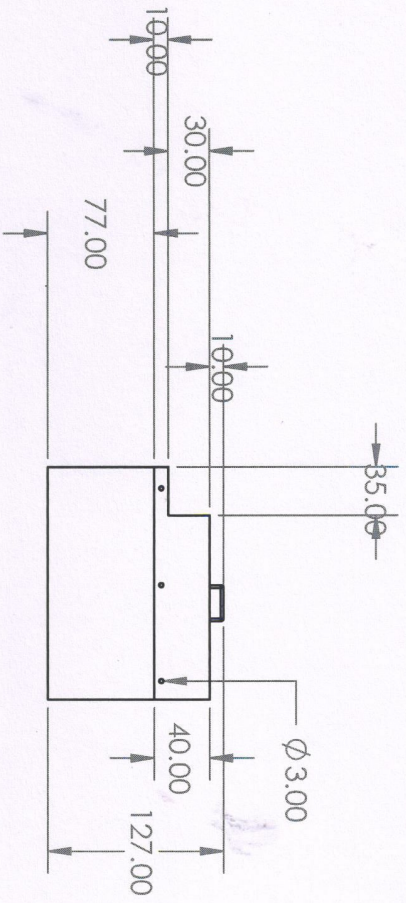
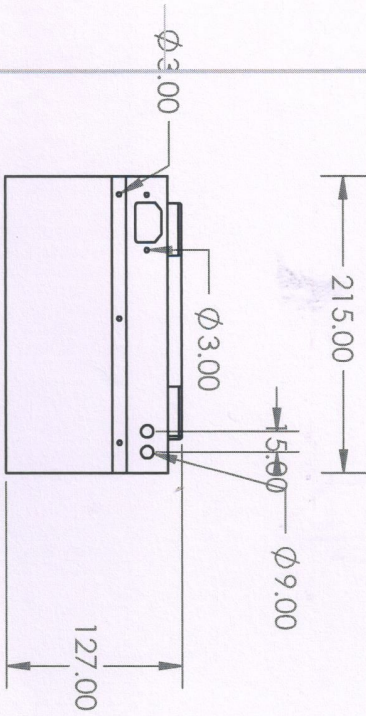
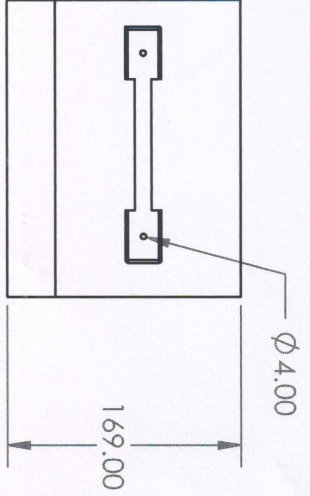
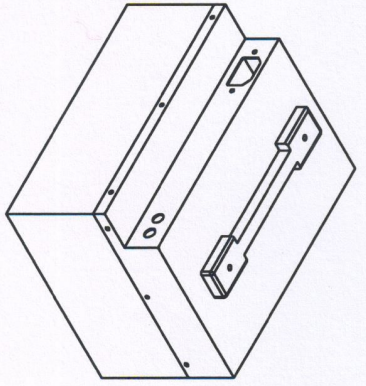
2.2.3	<b>Roll-Over Test</b>	<p>Rotate the battery module one complete revolution in one direction, for one minute in a continuous, slow-roll fashion, and observe leakage, if any.</p> <p>Then rotate the battery module in 90° increments in same direction for one full revolution. Hold the battery module for one hour at each position.</p> <p><b>Acceptance Criteria:</b> The volume of electrolyte spilled in each position shall not be more than 25 ml per module.</p>	Not Applicable
2.2.4	<b>Penetration Test</b> (Test ID: ICAT/EEL/99999/05) Date of test: 03.07.2020	 <p>The battery Cell shall be penetrated with a mild steel (conductive) pointed rod, which will be electrically insulated from the test fixture. The test will be carried out with 100% SOC of the Battery cell/Battery module.</p> <p>Rate of penetration: <b>8 cm/s.</b> Diameter of Rod: <b>3mm</b> Orientation of penetration: <b>perpendicular to the electrode plates.</b> Minimum Depth of penetration: <b>Through three cells or 100 mm</b></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><b>Acceptance Criteria:</b> 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 pack 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><b>Satisfactory.</b></p>

Prepared By		Checked By	
			
UDIT KAUL Dy. Manager		MAHENDAR PAL Asst. General Manager	Page 07 of 07 + Dwg(01) [99999]



Test report No:- CT06P 8117 Dated:- 15.07.2020

SIZE 215\*169\*127  
(L\*W\*H) TOLERANCE  
0 MM



A

B

A

B



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UNLESS OTHERWISE SPECIFIED:				TITLE: CUSTOMER NAME- COMPUTECH SYSTEMS			
DIMENSIONS ARE IN INCHES				MANUFACTURE NAME- COMPUTECH SYSTEMS			
TOLERANCES:				MAKE-IPower BATTERIES			
FRACTIONAL: ±				BATTERY TYPE- LiFePO4 TRACTION BATTERY			
ANGULAR: MACH ±				ID/MODEL NO.- 8S8P 25V24AH(LFP)			
TWO PLACE DECIMAL ±							
THREE PLACE DECIMAL ±							
INTERPRET GEOMETRIC							
TOLERANCING PER:							
MATERIAL							
FINISH							
DO NOT SCALE DRAWING							
APPLICATION							
NEXT ASSY							
USED ON							
TRADE NAME- IPower							
BATTERIES							
SCALE: 1:5				SHEET 1 OF 1			
WEIGHT:							
SIZE DWG. NO.							
A Assem12							
REV							