

INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY

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

TEST REPORT

Non-Transferable





C T O G M 0 6 5 1

Date: 20.12.2017

- 1.0 NAME AND ADDRESS OF THE CUSTOMER : M/s Godawari Techno Solutions Pvt Ltd.
391, Surendra nagar, Jhalra Road Kunchaman City, Nagaur
Rajasthan 341 508
- 2.0 CUSTOMER LETTER REF : CVTNBGOTSMK CSC54348 Dated 30-Aug-2017
- 3.0 DESCRIPTION OF TEST VEHICLE:
 Vehicle Category : E-Rickshaw
 Vehicle Model : G-ONE
 Motor Details : Make: M/s. Karan Trading Company., Model ID: KTC M-1000
 Controller Details: Make: M/s. Karan Trading Company., Model ID: KTC C48-50A
 Battery Details : Make: M/s. Exide Industries., Model ID: 12ERRED100L, Qty: 4 Nos.,
 Rating: 12V- 80Ah (C5) each, Type: Lead Acid; AIS048 approved (CTOLL 0287, Dated 23.03.2016)
 Charger Details : Make: M/s Axiom EV products Pvt. Ltd., Model ID: C2AK480012.
 Chassis No. : MD9GER11HAR204001
 Working voltage : 48VDC
- 4.0 OBJECTIVE OF THE TEST:
To validate the battery operated vehicle (E-Rickshaw) for construction and functional safety requirements as per AIS: 038 as published in September 2003.
- 5.0 TEST RESULTS:
Please refer the Test requirements and Results in Annexure-I of this report.
- 6.0 CONCLUSION:
Battery operated vehicle (E-Rickshaw) model "G-ONE" specified in Sr. No. 3.0 above, submitted by M/s Godawari Techno Solutions Pvt Ltd., met all the test requirements of construction and functional safety when tested as per AIS: 038 as published in September 2003.
*Note: Cl. Nos. are referred from AIS 038 as published on September 2003.

DISCLAIMER

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Page
1 of 7
[54348]

Annexure – I

1.0 TEST REQUIREMENTS AND RESULTS:




Cl No.*	TEST REQUIREMENTS	OBSERVATIONS/RESULTS
3.1 Traction battery:		
3.1.1	Installation of the traction battery in the vehicle shall not allow any potential dangerous accumulation of gases.	Ventilation Provided Satisfactory
3.1.2	Battery compartments containing battery modules, which may produce hazardous gases, shall be safely ventilated.	Ventilation Provided. Satisfactory
3.1.3	The traction battery and the power train shall be protected by properly rated fuse or circuit breakers. The components on the vehicle shall be as per the specifications declared by the manufacturer as per information provided in AIS 007.	MCB Provided, Satisfactory
3.1.4	Mounting of Batteries: The mounting of batteries in the battery operated vehicle shall be such that batteries / battery packs are not displaced from their place and there is no spillage of electrolyte when vehicle is driven on gradient or any other type of road. This condition shall be deemed to be satisfied if no spillage of electrolyte is observed while conducting various tests for type approval.	Batteries mounted to chassis with the help of clamp. Satisfactory
3.1.5	Creepage distance measurement for traction batteries: This clause deals with additional leakage current hazard between the connection terminals of a traction battery module including any conductive fittings attached to them and any conductive parts, due to the risk of electrolyte spillage in normal operating conditions. It does not apply to traction batteries, for which electrolyte leakage will not occur under normal operating conditions e.g. sealed traction batteries. Creepage distance between two battery connection terminals should be greater than or equal to 0.25U+5 i.e. 8mm Creepage distance between live parts and electrical chassis should be greater than or equal to 0.125U+5 i.e. 6.5mm	Creepage distance between two battery terminals (approx. 100 mm) and between live parts and electrical chassis (approx. 95 mm) was measured and found greater than minimum requirement. Satisfactory
3.2 Protection Against Electric Shock:		
3.2.1 and 3.2.2	Protection against direct contacts with live parts of power train and indirect contacts with exposed conductive parts of power train:	
3.2.1.1 and 3.2.2.1	If the working voltage of the electric circuit is lower than 60 V DC or 25 V AC, requirements specified in paragraph 3.2.1 and 3.2.2 are not applicable.	Working voltage: 48VDC Not Applicable

Prepared By	Checked By	
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		Page 2 of 7 [54348]

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Annexure – I (Continued)




Cl. No.	TEST REQUIREMENTS	OBSERVATIONS/RESULTS
3.2.3	Insulation Resistance of Traction Batteries:	
3.2.3.1	The insulation resistance measurement is performed after maintaining the vehicle for a conditioning time of 8 hours with the following conditions: Temperature: 20 to 35°C and Humidity: 90% + 10/-5%	Vehicle maintained at temperature between (20°C to 35°C) and humidity between (85% to 100%) conditions as specified.
3.2.3.2	Using a measuring DC voltage equal to the nominal voltage of the traction battery, insulation resistances (IR) between any exposed conductive part and each polarity of the traction battery shall have a minimum value of 500 Ω /V of the nominal voltage (NV).	IR/NV = 3.88 kΩ/V Satisfactory
3.2.3.3	Resistance of the Protective Conductor: The potential equalization resistance between any two exposed conductive parts shall be lower than 0.1 Ω. This test shall be performed by a current of at least 0.2 A.	No exposed conducting parts at equalized potential present. Not Applicable
3.2.4	Connection of the Vehicle to Mains Network:	
3.2.4.1	In no case the vehicle shall be capable to move by its own means when it is electrically connected to an energy supply network or to an off-board charger.	Vehicle was connected to power supply through charger, no movement observed. Satisfactory
3.2.4.2	The components used when charging the battery from an external source shall allow the charging current to be cut without physical damage in case of disconnection. This shall be checked by reconnection and ensuring that there is no fault in the system.	Checked by removing & inserting charger from & into plug socket, observing battery SoC indicator in ON condition. No fault or effect on indicator observed. Satisfactory
3.2.4.3	The coupling system parts likely to be live shall be protected against any direct contact in all operating conditions.	Coupling parts are protected by insulation covers. Male-female connector provided, therefore, no direct contact is possible. Satisfactory
3.2.4.4	For on-board charger all exposed conductive parts, shall be electrically linked through a conducting wire plugged to earth when charging.	Off-board charger only. Not Applicable
3.3 Functional Safety Requirements:		
3.3.1	Power ON procedure:	
3.3.2	The power ON procedure shall be applied via a key switch.	Power ON by Key. Satisfactory
3.3.3	It shall not be possible to remove this key in any position that energizes the drive train or that makes active driving possible.	It is not possible to switch ON vehicle without key & in no way, key can be removed while vehicle is in driving mode. Satisfactory

Prepared By		Checked By	Page 3 of 7 [54348]
			
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Annexure – I (Continued)




Cl. No.	TEST REQUIREMENTS	OBSERVATIONS/RESULTS
3.3.4	Running and Stopping Conditions:	
3.3.5	<p>At least a momentary, optical or audible indication shall be given to the driver when:</p> <p>a) The vehicle is in “active driving possible mode”</p> <p>b) At least one further action is required to place the vehicle in “active driving possible mode”.</p> <p>There shall also be an indication to the driver when state of charge of the battery reaches a level where re-charging is recommended.</p> <p>When this condition is reached, the user shall be warned to perceive this situation quickly enough to be able to drive the vehicle, on its own power, at least out of the traffic zone. The manufacturers shall provide the information regarding the state of charge after the warning indication comes on.</p> <p>There shall be an additional indication indicating that the state of charge of battery has reached a level at which driving the vehicle further may cause damage to the battery. This indication is not necessary if the emergency power reduction (paragraph 3.3.12 below) takes into account this state of charge of battery. This shall be declared by the manufacturer.</p>	<p>a) Optical indication: 10 nos. of Red LEDs in battery state of charge indicator lit up as soon as vehicle is switched ON.</p> <p>b) Accelerator handles to be rotated to place the vehicle in active driving mode after vehicle is switched ON. When battery SoC indicator reaches 30% mark, re-charging is recommended. Automatic cut off at 42 volt prevents the damage to the battery. This information is declared by customer and checked by draining battery. When battery voltage was below 42.9 V, rickshaw was not able to move.</p> <p>Satisfactory</p>
3.3.6	<p>Unintentional acceleration, deceleration and reversal of the drive train shall be prevented. In particular, a failure (e.g. in the power train) shall not cause more than 0.1 m movement of a standing unbraked vehicle on level road.</p>	<p>Drive train consists of motor and controller. If any of the components fails, vehicle comes to OFF position.</p> <p>Movement checked by observing vehicle in OFF condition in unbraked condition on level road. No movement observed. Satisfactory</p>
3.3.7	<p>When leaving the vehicle, the driver shall be informed by an optical or audible signal if the drive train is still in the active driving possible mode.</p> <p>This condition shall be deemed to be satisfied if the indication specified in 3.3.5 (a) above is not momentary and continues to be displayed.</p>	<p>LED indication provided for active driving position.</p> <p>Satisfactory</p>

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			Page 4 of 7 [54348]

Annexure – I (Continued)

CL No.	TEST REQUIREMENTS	OBSERVATIONS/RESULTS
3.3.8	Reversing:	
3.3.9	Reversing shall be possible only after a specific action. a) The combination of two different actuators for example gear and clutch, Or b) An electric switch, which allows reverse to be engaged only when the vehicle is moving at a forward speed not exceeding 5 km/h. It shall not be possible for the vehicle to move in reverse direction, if the switch is operated at any vehicle is moving forward at a speed beyond 5 km/h. The device shall have only one stable position for achieving the reverse motion of the vehicle.	Switch and optical indication with marking R. Vehicle was driven in forward direction at a speed of less than 5 km/hr and reverse switch was pressed, the vehicle speed reduced, came to zero and reverse was engaged after coming to a stable position. Satisfactory
3.3.10	The state of the drive direction control unit shall be easily identifiable.	LED & audible signal switches ON as soon as the reverse switch is pressed. Satisfactory
3.3.11	The maximum speed achieved in reverse direction shall not be more than 20 km/h.	Measured reverse speed less than 20 km/h. Satisfactory
3.3.12	Emergency power reduction:	
3.3.13	If the vehicle is equipped with a device to limit the performance in an emergency (e.g. overheating of a component) the user shall be informed by an obvious signal indicating state of limited performance.	Performance limiter not provided. MCB provided to switch OFF the vehicle in emergency conditions. Satisfactory
3.3.14	On board charger:	Off board charger provided. Not Applicable
3.4 On-Board Indicators		
3.4.1	All the indicators meant for the driver referred above shall be suitably located so as to be visible to the driver easily (e.g. on the dashboard). Additionally, the battery-operated vehicle shall have the battery state of charge indicator. For additional indications of temperatures like motor temperature, the existing water temperature symbol may be suitably modified.	All indicators provided at front panel and are suitably located and visible to driver easily. Battery indicator also provided in front panel. Satisfactory

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