

INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY

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

TEST REPORT

(Development Test)

Non-Transferable

Test Report No

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Date: 23.11.2020

- 1.0 NAME AND ADDRESS OF THE CUSTOMER : M/s. Okaya Power Pvt. Ltd.
D-8, Udyog Nagar, Peeraghari, Delhi
- 2.0 CUSTOMER REFERENCE : CCDOKYAPLCSC122700 dated 28-Sep-2020
- 3.0 DESCRIPTION OF DEVICE UNDER TEST DUT: : Refer DUT Details Page no. 2
DUT Name: : DC Charger
Model No./Part No.: : DC Charger 50kW CCS-2/ ECFGD50SUD75000001
Quantity: : 01
- 4.0 DATE OF RECEIPT OF DUT : 28.09.2020
- 5.0 CONDITION OF DUT ON RECEIPT : SATISFACTORY, No Physical Damage Observed.
- 6.0 TEST OBJECTIVE : Verification of DC Charger as per EESL Tender
- 7.0 TEST METHOD : As per AIS -138, EESL Tender No. EESL/06/ICB-Elec-Charger-EV/192003043
- 8.0 FUNCTIONAL VERIFICATION : Satisfactory
- 9.0 TEST CONCLUSION : Complies with standard and requirement
- 10.0 TEST DESCRIPTION : As per AIS-138, EESL Tender No. EESL/06/ICB-Elec-Charger-EV/192003043
- 11.0 DATE OF PERFORMANCE OF TEST : 29.09.2020 to 11.11.2020
- 12.0 TEST OBSERVATION AND RESULTS : For Test Observations/Results & Photographs refer Annexure-I to Annexure-IV of this test report.

Disclaimer

This test report pertains only to the test samples / components / parts/ assemblies/ gensets/ materials /fuels/chemicals/engines/vehicles/Agrl. Tractors etc. actually tested /witnessed / verified by ICAT in the presented condition based on the documents / information produced / submitted by the customer. The issuance of this test report alone does not indicate any measure of approval, certification, supervision, COP, control of quality surveillance by ICAT of the test samples / items/ components. No extract, abridgment or abstraction from this test report may be published or used to advertise the product without the written consent of the Director, ICAT, who reserves the absolute right to agree or reject all or any of the details of any items of publicity for which consent may be sought. ICAT is in no way responsible for any misuse or copying of any design in connection with entire vehicle / components / systems and assemblies. Breach of any statutory provisions, of Indian laws or laws of other countries, will be sole responsibility of the customer. ICAT shall not be liable for any claims or damages made by the customer, whatsoever. The customer shall alone be liable for the same and undertakes to indemnify ICAT in this regard. Further, ICAT has the right to initiate cancellation / withdrawal of the certificate / report issued, in case of any fraud, misrepresentation, when it comes to the knowledge of ICAT. The appropriate local court at Gurgaon shall have the jurisdiction in respect of any dispute, claim or liability arising out of this report.

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C D O G P 8 3 3 4

Date: 23.11.2020

DUT Details:

DUT is as DC EV Charger with a maximum output capacity of 50kW CCS2 Type. Charger is a Floor mounted charger that operates on 3 phase, 5 wire AC supply and is provided with Single DC output gun 50 kW Max.

Gun used for DC charging with max output power 50 kW.

The charger will be supplied with offline and online authentication modes.

In online mode, charge point is authenticated by RFID card or through mobile app and makes the charger available for use.

In offline mode, the charge point can be plugged to the vehicle without a mobile app. makes the charges available for use. RFID cards or fixed password may be provided to start the charging process.

The charger is equipped with a surge protection device and RCD which prevent leakage current above 30mA.

The charger has an in-built metering system for the DC outlets. The charging session details from charge initiation to charge termination along with energy consumption details are set via OCPP 1.6J.

The charger is provided with a touch panel of resolution 800x480 Pixels.

Connector is provided with 5 colour LED indicators:

1. First LED out of 5 LED's is Blue and always on: Standby state
2. All LED's are blue and always on: Charger gun connected
3. All LED's are blue and flashing: charging state
4. Fault Red light is always on: Fault state




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C D O G P 8 3 3 4

Date: 23.11.2020

7.0 Clause Verification as per EESL Tender Specification: Test method




Sr. No.	Parameters	Observation	Results
General Requirements			
1	EVSE Type	CCS-2	Complies
2	Energy Transfer Mode	Conductive	Complies
3	Charging mode	CCS2 – Type-2/Combo-2	Provided
4	Reliability and Serviceability	Modularity, self-diagnostic features, fault codes and easy serviceability in the field	Complies
System Structure			
1	Regulation Method	Regulated D.C. EV Charging station with combination of CVC or CCC but not simultaneously	Provided
2	Isolation	Each output isolated from each other with proper insulation	Single Output
3	Environmental conditions	Outdoor use	Outdoor use
4	Power supply	EV charging station connected to A.C. mains	Provided
5	DC output voltage rating	200-750V or higher CCS-2	Complies 200 - 1000VDC Provided
6	Charge control communication	Communicate by digital and analog signals	Provided
7	Interface inter-operability	Inter-operable with any EV supporting CCS2	Complies
Input Requirements			
1	AC Supply System	3-Phase, 5 Wire AC system (3Ph+N+E)	Provided
2	Nominal Input voltage	3Ø, 415V (+6% and -10%) as per IS 12360	Verified Vide Report No: TEST/R&D/CHG/01 Ok (370-440Vac)

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C D O G P 8 3 3 4

Date: 23.11.2020




Sr. No.	Parameters	Observation	Results
3	Input Frequency	50Hz, $\pm 1.5\text{Hz}$	Complies
4	Input Supply Failure backup	Battery backup for minimum 1 hour for control system and billing unit, to enable activities such as billing, to be provided.	Provided
Output Requirements			
1	No. of output	1 out put	Provided
2	Output connectors	1 output connectors	CCS-2
3	Output Connector Compatibility	CCS2: IEC 61851-23/ -24, IEC 62196-3, DIN 70121	Complies
4	Converter Efficiency	>95% at nominal voltage and full load	Verified Vide Report No: TEST/R&D/CHG/01 OK (96%)
Cable Requirements			
1	Charging Cable Length Usable	5 Meter, Straight Cable	Provided
2	Cable Type	Charging cable and connector permanently attached to EVSE Life of 10 years is required.	Complies
Environmental Requirements			
1	Ambient Temperature Range	-20°C to 55°C	Based on manufacturer's declaration. Test conducted and it complies the requirements Annexure-II
2	Ambient Humidity	5 to 95%	
3	Ambient Pressure	86 kpa to 106 kpa	
4	Storage Temperature	0 to 60°C	

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Page 4 of 20 + Drawing (01 No.) [122700]		

C D O G P 8 3 3 4

Date: 23.11.2020




Sr. No.	Parameters	Observation	Results
Mechanical Requirements			
1	Ingress Protection	IP 54	Satisfactory Annexure-III
2	Mechanical Stability	Shall not be damaged by mechanical impact as defined in Section 11.11.2 of IEC 61851-1	No deviation observed Satisfactory
3	Cooling	Air Cooled	Fans are provided,Complies
4	Mechanical Impact	Shall not be damaged by mechanical impact as defined in Section 11.11.3 of IEC 61851-1	Complies
5	Dimension(W*H*D)/Weight	As per manufacturer design	(L: 550mm, W:450mm , H: 1800 mm)/ Weight: 140kg
6	Mounting	CCS2 (50kW): Floor Mounting Pillar Type	Floor mount
User Interface & Display Requirements			
1	ON/OFF (Start-Stop) switches	Mandatory	Through display touch screen option provided
2	Emergency stop switch	Mushroom headed Push button type, latchable type in Red Color, visible and shall be protected by freely floating transparent acrylic sheet	Provided
3	Visual Indicators	Error indication, Presence of input supply indication, State of charge process indication	Complies
4	Graphical User Interface	The graphical user interface shall designed in such a way that user feels ease to use the charger. In future, The bidder shall be asked to change/modify the GUI for standard-ization to bring different make of chargers on one common platform for the ease of users.	Complies

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C D O G P 8 3 3 4

Date: 23.11.2020



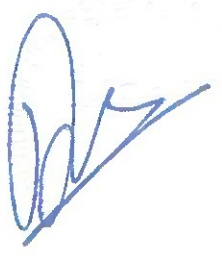
Sr. No.	Parameters	Observation	Results
5	Support Language	English (with provision for additional regional languages including Hindi)	Provided
6	Display Messages	EVSE should display appropriate messages for user during the various charging states like:	Verified
		Vehicle plugged in / Vehicle plugged out	Verified
		Duration since start of charge, kWh.	Verified
		User authorization status	Verified
		Idle / Charging in progress: SOC	Verified
		Fault conditions	Verified
7	Authentication	Metering Information: Consumption Units	Verified
		As per OCPP 1.6 or higher (through mobile application)	Through RFID , Offline OTP, Mobile APP and OCPP 1.6 J or Higher- Complies with RFID, Offline OTP, Mobile APP and Ocpp 1.6 J With provision to support future upgrade

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C D O G P 8 3 3 4

Date: 23.11.2020




Sr. No.	Parameters	Observation	Results
Performance Requirements			
1	DC Output voltage and current tolerance	Voltage measurement: $\pm 0.2\% > 50V$, $\pm 0.5\% < 50V$ Current measurement: $\pm 1 A$	Verified Vide Report No: TEST/R&D/CHG/01 Ok (Volt: 0.35% & Current: 0.78%)
2	Control delay of charging current in CCC	DC output current Demand Response Time: $< 1 s$ Ramp up rate: 20 A/s or more Ramp Down rate: 100 A/s or more	Verified Vide Report No: TEST/R&D/CHG/01 Ok (Ramp Up Rate: 50.7A/s, Ramp Down Rate: 118A/s)
3	Descending rate of charging current	EVSE should be able to reduce DC current with the descending rate of 100 A/s or more	Vide Report No: TEST/R&D/CHG/01 Ok (Descending Rate: 118A/s)
4	Periodic and random deviation (current ripple)	DC output current ripple limit of EVSE: 1.5 A below 10 Hz, 6 A below 5kHz, 9A below 150 kHz	Vide Report No: TEST/R&D/CHG/01 Ok (0.67A below 10Hz, 1.28A below 5kHz, 2.67A below 150kHz)
5	Periodic and random deviation (voltage ripple)	Max. ripple voltage: $\pm 5 V$. Max slew rate: $\pm 20 V/ms$	Ok (Max. Ripple Voltage: 1.78V, Max. Slew Rate: 17V/m s)
Communication Requirements			
1	Communication between EVSE and Vehicle	As specified by CCS2 protocols	Verified and complies CCS2: DIN 70121
2	Communication interface between charger and central management system (CMS)	All of: Ethernet, Wi-Fi, and 2G,3G,4G	Provided

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C D O G P 8 3 3 4

Date: 23.11.2020




Sr. No.	Parameters	Observation	Results
3	Communication between EVSE and Central Server	Open Charge Point Protocol (OCPP) 1.6 protocol or higher versions compatible to OCPP 1.6.	Verified and complies
		Metering: Grid responsive metering	
Billing Requirements			
1	Software Solution	CMS and User App	Provided and verified
2	Billing	Grid responsive metering	Provided
3	Payment	BHIM / Bharat QR or UPI compliant mobile application payment	Provided
Protection & Safety Requirements			
1	Safety Parameters	Over current, under voltage, over voltage, Residual current, Surge protection, Short circuit, Earth fault at input and output, Input phase reversal, Emergency shut-down with alarm, Fire/Smoke shutdown with alarm, Over temperature, Protection against electric shock	Verified Refer Annexure-I
Marking of EVSE			
1	Marking Requirements	The EVSE shall bear the markings in a clear manner. Logo, markings and paint of EVSE provision according to customer	Complies, Based on markings on charger

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C D O G P 8 3 3 4

Date: 23.11.2020

ANNEXURE -I			
1.1 TEST SPECIFICATIONS			
TEST DETAILS	Safety Function Verification as per AIS-138 (Part-2): 2017	DUT Supply Voltage	415±5%
1.2 LABORATORY ENVIRONMENT TEST CONDITION			
Ambient	25.6°C	Relative Humidity	55.8% RH
1.3 DUT Supply Voltage			
A.C. Supply Voltage	415 A.C. System	Current Consumption	
AC Mains Supply	(415±5V)	<50A	
1.4 Test Results			
Sr. no.	Test Title	Description	Observation
1	Earth Presence Detection (Socket - EVSE)	The EVSE should detect the vehicle chassis ground. Charging should not start if there is no earth detection. Also, the charging should be stopped if there earth presence detection is lost during charging.	Verified
2	Earth Continuity Check (EVSE-EV)	The EVSE earth pin should be having continuity with the vehicle chassis when the coupler is inserted. This is to ensure safety in situations where the vehicle chassis is exposed to hazardous high voltage	Verified
3	Over current and short-circuit protection	The EVSE should have active protection against an unlikely event like short-circuit one over-current	EVSE has multiple stages of protection in the form of circuit breakers, contactors and programmable safety limits which restricts current to safe operating limits Verified
4	Leakage current protection (RCD)	Residual current device should cut off the supply whenever the current through user accessible parts (enclosure) is measured to be more than 30 mA	RCD present in the EVSE output to vehicle ensuring safety. Component data-sheet were referred as well
5	Dielectric Withstand Voltage	AC withstand test is performed as per AIS 138-1. The Voltage level used is 2 kV rms as the equipment is class I as basic protection bonding is used	EVSE complies with the requirement. There was no breakdown observed

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C D O G P 8 3 3 4

Date: 23.11.2020

ANNEXURE -II

2.0 Environmental Tests

2.1 TEST Procedure The DUTs were placed in the temperature and humidity cycle chamber and subjected to the climatic environmental test as given below:

2.2 Ambient Air Temperature

Test Reference: IEC 60068-2-14/IS 9000 (Part-14) --sec 2

Temperature at start of test	25°C	
Test Temperature	-20°C	55°C
Ramp Rate	1°C per min	
No. of cycles	2	
DUT Condition	Power On with output loading for maximum power and current	
Ambient	26°C	
Start Date and End Date	30-10-2020to 05-11-2020	

2.3 Acceptance Criteria:

- 2.3.1 There shall be no visual deterioration to the DUT
- 2.3.2 No deviation in functionality must be observed during and after the test

2.4 Test Observation:

- 2.4.1 No Visual deterioration was observed on the DUT at the end of the test.
- 2.4.2 No deviation in functionality was observed during and after the test.

2.5 Ambient Humidity

Test Reference: The test shall be carried out in accordance with IEC 60068-2-30/IS 9000 (Part-5 /sec 2).

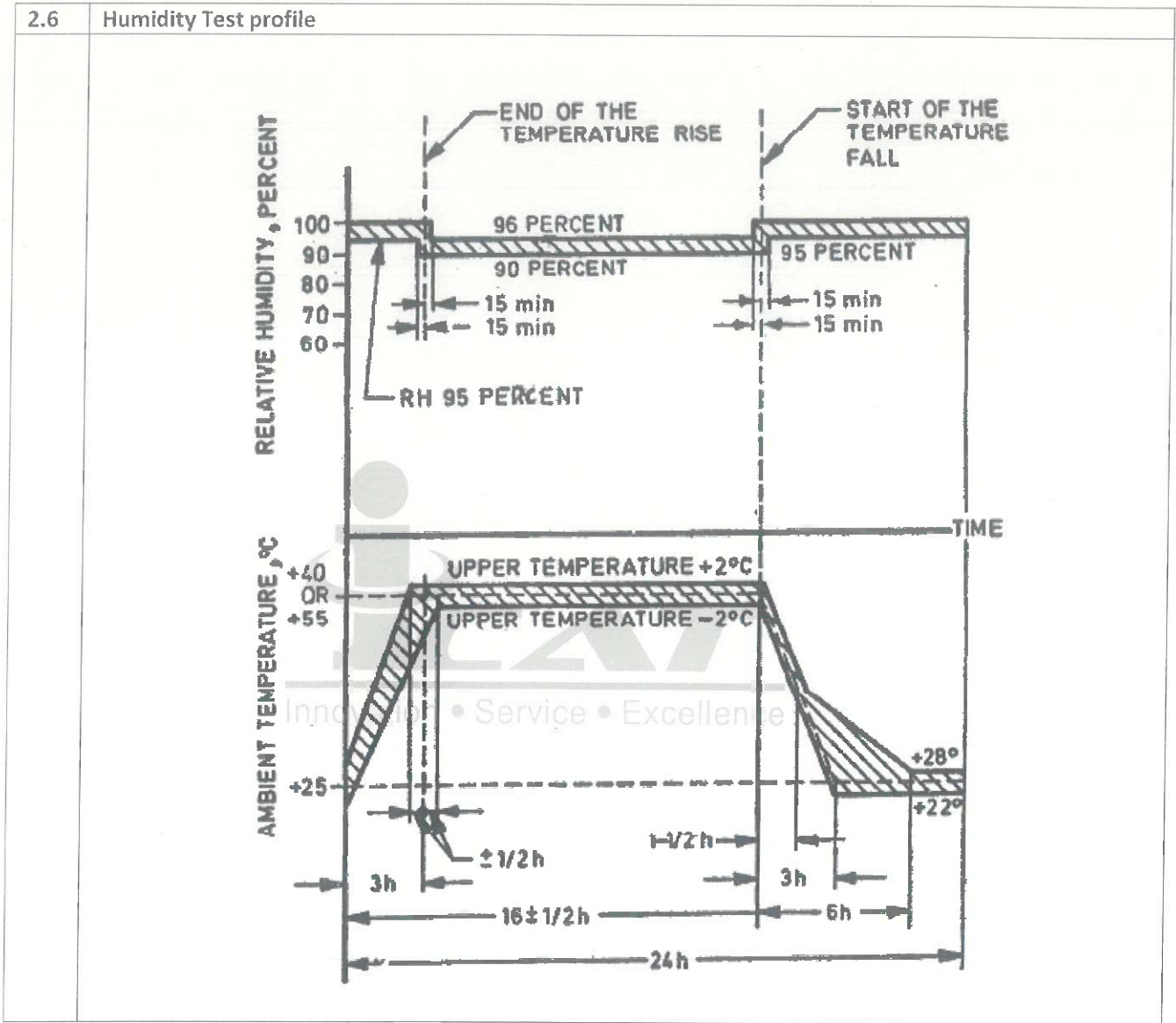
Test Db, @ 55°C for six cycles

Temperature at start of test	25°C
Test Temperature	55°C
Humidity	95%
Ramp Rate	1°C per min
No. of cycles	6
DUT Condition	Power On with output loading for maximum power and current
Ambient	26°C
Start Date and End Date	30-10-2020 to 05-11-2020

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C D O G P 8 3 3 4

Date: 23.11.2020






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C D O G P 8 3 3 4

Date: 23.11.2020

2.7	Test Condition <ul style="list-style-type: none"> Insulation Resistance test was carried out before and after humidity test. The test was carried out immediately after humidity at room temperature. A test voltage of 500V DC for duration of 60 seconds was applied between all inputs/outputs connected together (power source included) and the accessible parts
2.8	Acceptance Criteria <ul style="list-style-type: none"> There shall be no visual deterioration to the DUT No deviation in functionality must be observed during and after the test. The Insulation resistance shall be >1 MΩ
2.9	Test Observation: <ul style="list-style-type: none"> No Visual deterioration was observed on the DUT at the end of the test No deviation in functionality was observed during and after the test DUT functionality OK Insulation resistance found >1 MΩ and was observed within the limits of acceptance criteria

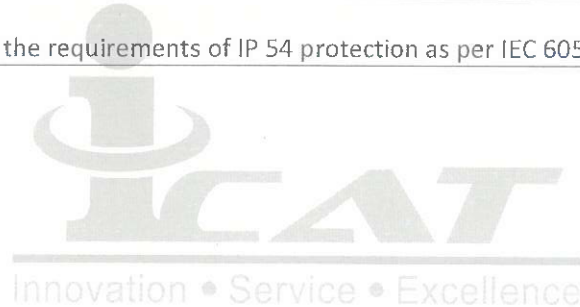





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C D O G P 8 3 3 4

Date: 23.11.2020

ANNEXURE -III	
3.0 Ingress Protection IP 54 as per IEC 60529	
3.1 TEST Procedure	<p>Dust test for First Numeral '5': On inspection after the test as per Clause 13.5 of IEC 60529, talcum powder should not accumulate in a quantity or location such that, as with any other kind of dust, It could interface with the correct operation of the equipment.</p> <p>Water for Second Numeral '4': On inspection after the test as per Clause 14.2.4 of Clause 14.3 of IEC 60529, water entered inside the equipment shall not</p> <ul style="list-style-type: none"> ➤ Be sufficient to interfere with satisfactory operation of the equipment. ➤ Reach live part or windings not designated to operate when wet ➤ Accumulate near the conduit hole (Cable entry) or enter the cable
3.2	Test Results
3.3	Dust test for First Numeral '5'. No dust ingress was observed inside the charger
3.4	Water Test for second Numeral '4'. No water ingress was observed inside the charger
3.5	Conclusion: AC charger meets the requirements of IP 54 protection as per IEC 60529.



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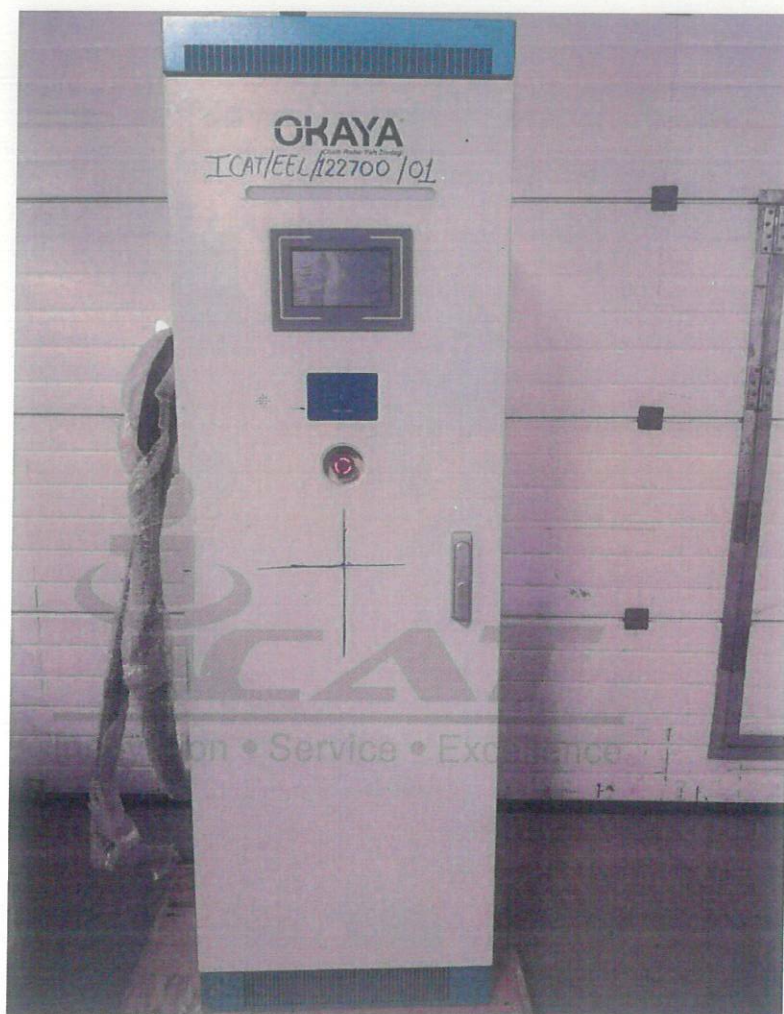
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ANNEXURE -IV

4.0 PHOTOGRAPHS

Front View






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C D O G P 8 3 3 4

Date: 23.11.2020

Side View






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C D O G P 8 3 3 4

Date: 23.11.2020

Back View






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C D O G P 8 3 3 4

Date: 23.11.2020

Water Test





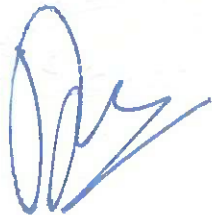
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C D O G P 8 3 3 4

Date: 23.11.2020

Dust Test






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C D O G P 8 3 3 4

Date: 23.11.2020

Impact test



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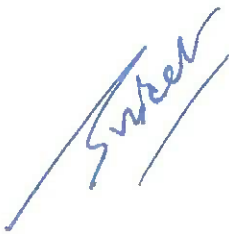


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Date: 23.11.2020

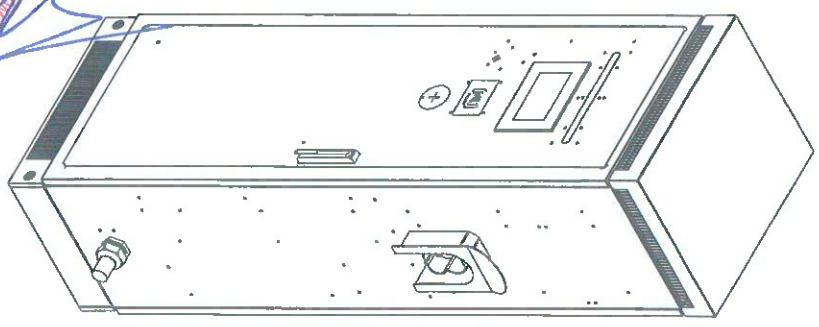
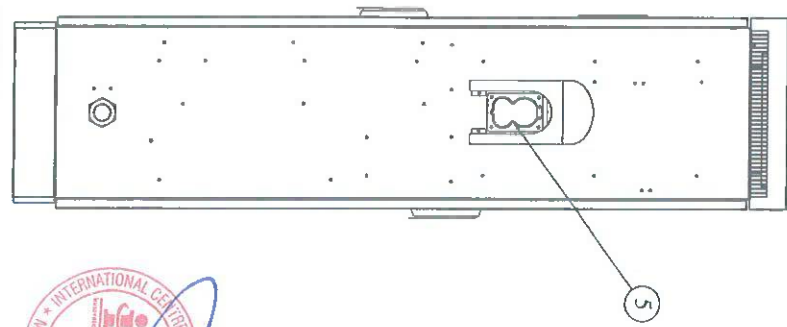
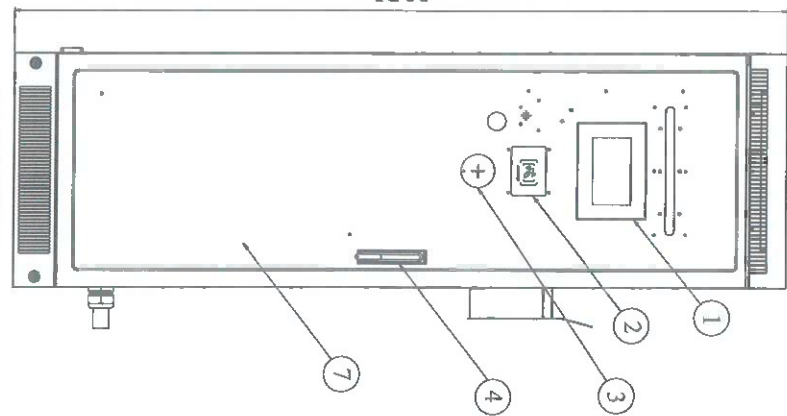
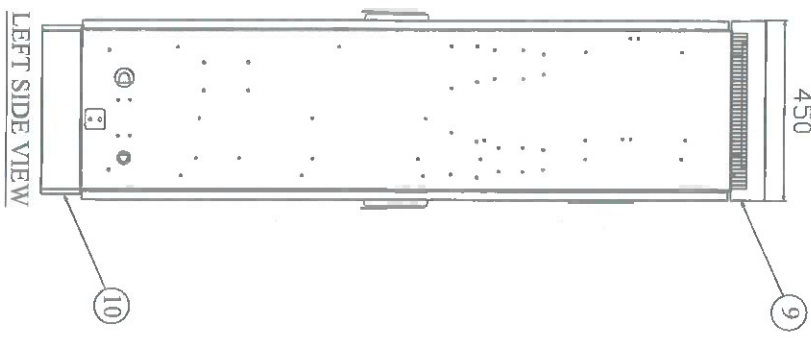
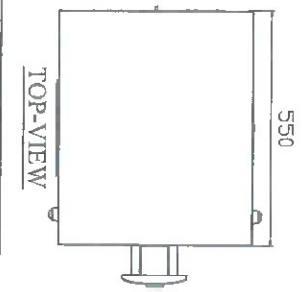
Dielectric Test



END OF REPORT

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S.NO.	PARTICULAR	QTY.	UOM	MATERIAL	REMARKS
1.	DISPLAY	01	EA	STD	
2.	CARD READER	01	EA	STD	
3.	LOCK	01	EA	STD	
4.	AIRCOOL FILTER	01	EA	STD	
5.	GUN	01	EA	STD	
6.	CHARGER ENCLOSURE	01	EA	CRCAGI	POWDER COATED
7.	FRONT DOOR	01	EA	CRCAGI	POWDER COATED
8.	EMERGENCY STOP SWITCH	01	EA	STD	
9.	CANOPY	01	EA	CRCAGI	POWDER COATED
10.	BASE	01	EA	CRCAGI	POWDER COATED






























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Date: 23.11.2020

NOTES :-

- # ALL SHARP EDGE SHOULD BE REMOVED.
- # ALL SHARP EDGE SHOULD BE WELDED PROPERLY.
- # ALL DIMENSIONS ARE IN mm.

PLEASE DO NOT SCALE THE DRAWING, IF IN DOUBT, ASK.

DIMENSION	0-10	11-50	51-120	121-500	501-1000	1001-2000	2001-3150	3150		ALL ROUND WELD		
FABRICATION (REF IT 15)	4058	412	414	428	436	460	486	493		FILLET WELD		
MACHINING REF IT 12	4015	403	4035	407	409	415	421	4012		SINGLE V-BUTT WELD		
Grade												
Ra	0025	005	01	02	04	08	16	32	63	125	25	50
µm												

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Material:	CRCAGI	Document Type:	GAID	Description:	50KW Single Gun EV CHARGER (CCS-2)
Surface:	Powder Coated	Legal Owner:	OKAYA	Drawn by:	AV
Unlaid Oblique Steel:	Linear Tol: 0.2, Angular Tol: 0.15	Checked/Approved by:	DP	Drawn Date:	16.10.2020
Surface Finish: 0.8µm		Part Number: SAV ID/GC CODE		Checked/Approved Date:	
All Dimensions: mm		Drawing Number:	OPG-056-1020-001	Sheet:	01 OF 01
Drawing Scale: NTS		Legal Owner:	OKAYA	Revision:	00
Approx Weight:		Legal Owner:	OKAYA		
Projection Method:	THIRD ANGLE	Legal Owner:	OKAYA		
Sheet Size:	A0	Legal Owner:	OKAYA		
		Legal Owner:	OKAYA		

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