

29.10. **Annexure 10: Specifications of EV Chargers**

The empanelment shall be done only for the following EV chargers:

1. AC001
2. LEV AC*
3. DC001

The specifications of the EV Chargers have been given below.

1. AC001

As per order from Department of Heavy Industry, Ministry of Heavy Industries & Public Enterprises, dated 21st November 2017, Reference No. 7(8)/2015-AEI(pt.)(11976)¹

Sl. No.	Parameter	Specifications
General Requirements		
1.	EVSE Type	AC
2.	Energy Transfer Mode	Conductive
Input Requirements		
3.	AC Supply System	Three-Phase, 5 Wire AC System (3Ph.+N+PE)
4.	Nominal Input Voltage	415V (+6% and -10%) as per IS12360
5.	Input Frequency	50Hz, +/-1.5Hz
6.	Input Supply Failure Backup	Battery backup for minimum 1 hour for the control system and billing unit. Data logs should be synchronized with CMS during back up time, in case battery drains out.
Environmental Requirements		
7.	Ambient Temperature Range	0 °C to +55 °C
8.	Ambient Humidity	5 to 95%
9.	Ambient Pressure	86kpa to 106kpa

10.	Storage Temperature	0 °C to +60 °C
Mechanical Requirements		
11.	Suggested cable Security	Public metered AC outlet (PMAO) and the vehicle connector outlet to have provision for locking mechanism during charging to ensure the safety of the cable
12.	Mechanical Stability	Shall not be damaged by mechanical impact energy: 20J (5kg at 0.4m)
13.	IP Rating	IP 54
14.	Cooling	Air cooled or forced air cooled to protect the equipment against temperature hazards
Output Requirements		
15.	Number of outputs	3
16.	Type of each outputs	230V (+6% and -10%) single phase, 15A as per IS12360 A.C
17.	Output Details	3 Independent charging sockets
18.	Output Current	Three Vehicles charging simultaneously, each at 15A current
19.	Output Connector Compatibility	IEC 60309
20.	Limiting output current	Circuit breaker for each outlet limited to 16A current output. Breaker should be reset to resume operation.
21.	Connector Mounting	Angled connector mounted looking downwards for outdoor use
22.	Isolation	Class 1 and Class 2 insulation as per AIS 138 (3.3.1 and 3.3.2)
User Interface & Display Requirements		
23.	ON-OFF (Start-Stop) switches	Mandatory
24.	Emergency stop switch	Mushroom headed Push Button Type (Red

		Colour), visible and easily accessible
25.	Visual Indicators	Error indication, Presence of input supply indication, Charge process indication and other relevant information
26.	Display Size	Minimum 3.5" inches with 720x480 pixels, user interface through touch screen/keypad
27.	Display Messages	<p>EVSE should display appropriate messages for user during the various charging states like</p> <ul style="list-style-type: none"> • Vehicle plugged in/ vehicle plugged out • Fault conditions, metering, unit consumption, duration since start of charge, time to charge, kWh
28.	User Authentication	Using mobile application or User Interface (OCPP gives only a field mandate, media to be used is open)
29.	Metering Information	Consumption Units
Billing & Payment Requirements		
30.	Metering	Metering as per units' consumption for charging each vehicle
31.	Billing	Grid responsive billing
32.	Payment	BHIM/ Bharat QR or UPI compliant mobile application payment
Communication Requirements		
33.	Communication between EVSE and Central Server	Open Charge Point Protocol (OCPP) 1.5 protocol or higher version compatible to OCPP 1.5
34.	Metering	Grid responsive metering as per units' consumption of each vehicle
35.	Interface between charger and central management system (CMS)	Reliable internet connectivity

Protection & Safety Requirements		
36.	Safety parameters	Safety and protection to be ensured for India specific environment (as per AIS 138 part 1)
37.	Start of Charging	<ul style="list-style-type: none"> • The outlet will be locked and covered, the connector will be exposed to charging only after user authentication using user interface or mobile application. • Only when the lock opens and connector is properly connected, the switch/relay will turn ON to feed power to the EV. Lock will be opened only after full charging and authentication by user or the operator. Once disconnected, the charging session terminates.
38.	Power failure	If there is a power failure, user is indicated about this. The charging resumes when power comes on. If the user wants to terminate the session during power failure, the user can shut-off the switch and remove the plug.
39.	Interruption of Charging	<ul style="list-style-type: none"> • Connector terminals to be mounted with temperature sensors to avoid burning of the connectors. Safety mechanism to trigger switching off the charging at temperature > 80°C for a duration <10s. In such situation, an appropriate signal will be sent to turn the switch/relay OFF to stop the charging. Once disconnected, the charging session terminates. • If the above locking mechanism is mandated then the following point won't be required: If plug is taken out (for more than 2 seconds) and then reinserted for charging, the charging session will disconnect. A new session will be required to continue charging to ensure that no one can remove a

		vehicle being charged and insert their own cable and use the infrastructure without paying or at someone else's account.
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Type Testing

Sl. No.	Criteria	Parameter	Clause No. of AIS 138 Part 1
1.	Safety functions Verification	Earth Presence Detection (Socket - EVSE)	6.4.1.1
		Earth Continuity Check (EVSE-EV)	6.4.1.2
		Over Current and Short-Circuit Protection	6.4.1.5
		Leakage Current (RCD)	6.4.1.6
		Dielectric withstand voltage	11.6.1
2.	Mechanical Stability	Mechanical impact	11.11.2.2
		IP Testing	11.11.2.4
3.	Climatic environmental tests	Ambient air temperature	11.11.1.2
		Ambient humidity	11.11.1.4
4.	EMC Verification	Immunity to electrostatic discharges	11.11.3.2
		Supply voltage dips and interruptions	11.11.3.2
		Fast transient bursts	11.11.3.2
		Voltage surges	11.11.3.2

LEV AC

As per letter, from Department of Science and Technology (DST) to Dialogue and Development Commission of Delhi (DDCD), dated 14th January 2021, Reference No. G-30011-44/2020-PROJ.

Sl. No.	Parameter	Specifications
General Requirements		
1.	Charger Type	AC
2.	Energy Transfer Mode	Conductive
3.	Number of Output Ports	One
4.	Input Supply	Single Phase, 50 Hz, 230 V AC +10%
5.	Charging Outlet	Single Phase, 50 Hz Rated Voltage: 230V AC Maximum Current: 15A
6.	EV AC Charge Point Socket – Outlet and Plug	As per IS/IEC 60309-1:2002
7.	Energy Measurement	Required, with 2% accuracy
8.	Mounting Arrangement	Pole or wall mounted
9.	Operating Temperature	-5 °C to +55 °C
Communication & Protocol		
10.	Communication	With Mobile App using Bluetooth Low Energy (BLE) 4.0
11.	Protocol	Shall be compatible to standardize Mobile Application protocol
User Interface Requirements		
12.	User Authentication	Through Mobile Phone Application
13.	Charging Start/Stop Operation	Through Mobile Phone Application
14.	Visual Indicators	Presence of input supply, Presence of earth, Charge process indication, Authentication status, Back-up power enabled, etc. at least through LED

		indicators with appropriate colour coding.
15.	Trigger for pairing through BLE in case of Power Failure	Mobile phone pairing using push button type of a switch or any other suitable means to complete the charging session with actual energy consumed feedback with backup power in case of power failure.
16.	Energy Measurement Information	Through Mobile Phone Application
Protections		
17.	Electric Shock Protection function	Residual Leakage current detection, Trip time: Nominal 30ms Trip current: Nominal 30mA
18.	Short-Circuit Protection function	Required
19.	Overhead Protection function	Required
20.	Type Testing Requirements	As per approved BIS standards whenever notified

3. DC001

As per order from Department of Heavy Industry, Ministry of Heavy Industries & Public Enterprises, dated 21st November 2017, Reference No. 7(8)/2015-AEI(pt.)(11976)²

Sl. No.	Parameter	Specifications
General Requirements		
1.	EVSE Type	Dual connector DC EVSE
2.	Energy Transfer Mode	Conductive
3.	Charging Mode	4
4.	Reliability and Serviceability	Modularity, self-diagnostic features, fault codes and easy serviceability in the field

System Structure		
5.	Regulation Method	Regulated DC EV Charging station with combination of CVC or CCC but not simultaneously
6.	Isolation	Each output isolated from each other with proper isolation
7.	Environmental Conditions	Outdoor use
8.	Power supply	DC EV Charging station connected to AC mains
9.	DC output voltage rating	Up to and including 100V
10.	Charge control communication	Communicate by digital and analog signals
11.	Interface inter-operability	Inter-operable with any EV (non-dedicated, can be used by any consumer)
12.	Operator	Operated by a trained person or EV Owner
Input Requirements		
13.	AC Supply System	Three-Phase, 5 Wire AC System (3Ph.+N+PE)
14.	Nominal Input Voltage	3-Phase, 415V (+6% and -10%) as per IS12360
15.	Input Frequency	50Hz, +/-1.5Hz
16.	Input Supply Failure Backup	Battery backup for minimum 1 hour for the control system and billing unit, to enable activities such as billing, to be provided.
Environmental Requirements		
17.	Ambient Temperature Range	0 °C to +55 °C
18.	Ambient Humidity	5 to 95%
19.	Ambient Pressure	86kpa to 106kpa
20.	Storage Temperature	0 °C to +60 °C

Mechanical Requirements		
21.	Mechanical Stability	Shall not be damaged by mechanical impact as defined in Section 11.11.2 of IEC 61851-1
22.	Mechanical Impact	Shall not be damaged by mechanical impact as defined in Section 11.11.3 of IEC 61851-1
23.	IP Rating	IP 54
24.	Cooling	Air cooled
25.	Dimension (W*H*D)/Weight	To be decided e.g. W*H*D mm, xxx kg
Output Requirements		
26.	Number of outputs	2
27.	Charger Configuration Types	<ul style="list-style-type: none"> • Type 1: Single vehicle charging 48V/60V/72V with a maximum of 10kW power, or a 2W vehicle charging at 48V with maximum power of 3.3kW. • Type 2: Single vehicle charging at 48V with a maximum 10kW power or 60V/72V with a maximum of 15kW power or a 2W vehicle charging at 48V with a maximum power of 3.3kW
28.	Output Details	Suitable for 48V/60V/72V vehicle battery configuration
29.	Output Current	200A max
30.	Output connectors	2 output connectors
31.	Output connector compatibility	One connector with GB/T 20234.2 +1 connector to be defined
32.	Converter Efficiency	>92% at nominal output power
33.	Power factor	>/= 0.90 (Full load)
User Interface & Display Requirements		

34.	ON-OFF (Start-Stop) switches	Mandatory
35.	Emergency stop switch	Simple Push Button Type (Red Colour), visible and easily accessible
36.	Visual Indicators	Error indication, Presence of input supply indication, Charge process indication and other relevant information
37.	Display Size	Minimum 3.5" inches with 720x480 pixels, user interface through touch screen/keypad
38.	Support Language	English
39.	Display Messages	<p>EVSE should display appropriate messages for user during the various charging states like</p> <ul style="list-style-type: none"> • Vehicle plugged in/ vehicle plugged out • Idle/ Charging in progress: SOC • Fault conditions • Metering Information: Consumption units • Duration since start of charge, time to charge, kWh
40.	User Authentication	As per OCPP (Using mobile application or Card reader)
Cable Requirements		
41.	Charging cable length	5 meter, straight cable
42.	Cable Type	Charging cable and connector permanently attached to DC FC
Billing & Payment Requirements		
43.	Billing	Grid responsive metering
44.	Payment	BHIM/ Bharat QR or UPI compliant mobile application payment

Communication Requirements		
45.	Communication between EVSE and vehicle	CAN based as per Annexure G of AIS 138-2
46.	Communication Interface between charger and central management system (CMS)	Ethernet (Standard)/Wi-Fi/2G/3G/4G
47.	Communication between EVSE and central server	Open Charge Point Protocol (OCPP) 1.5 protocol or higher versions compatible to OCPP 1.5. Metering: Grid responsive metering
Performance Requirements		
48.	DC Output Voltage and current tolerance	DC Output current regulation in Constant Current Charging (CCC): +/- 2.5A for the requirement below 50A, and +/- 5% of the required value for 50A or more DC Output voltage regulation in Constant Voltage Charging (CVC): Max. 2% for the max rated voltage of the EVSE
49.	Control delay of charging current in CCC	DC output current Demand Response Time: <1s Ramp up rate: 20A/s or more Ramp down rate: 100A/s or more
50.	Descending rate of charging current	EVSE should be able to reduce DC current with the descending rate of 100A/s or more
51.	Periodic and random deviation (current ripple)	DC output current ripple limit of EVSE: 1.5A below 10Hz 6A below 5kHz 9A below 150kHz