GELCOservices
Automotive Industry Consultants

Electric Vehicle Supply Equipment – EVSE – Vehicle Simulator

Equipment design and Operating Instructions – GS1007

A Technicians Service Tool to enable the functional, safety and operation of an installed EVSE in regard to all EV vehicle interfaces.

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EVSE Simulator Operating Instructions – Model GS-1007

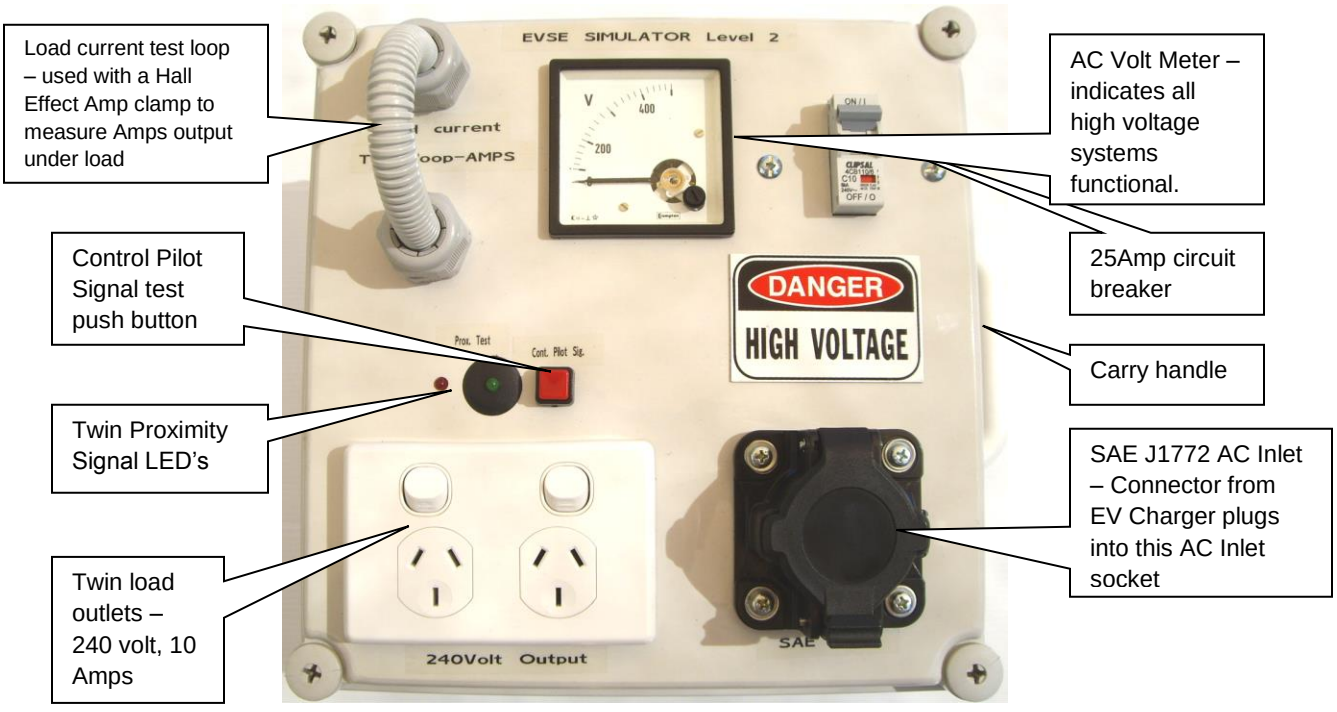
This EVSE Simulator is designed to allow full functionality testing of a SAE J1772 compliant EV Charger – Fixed or Mobile charger.

The EVSE Simulator can only be used with a fully compliant EV Charge system that has the SAE J1772 protocol employed. The EVSE Simulator load output voltage is protected by a 25A CB.

The instructions are to be followed to ensure the correct Level 2 EV Charger testing is accomplished.

DANGER: High Voltage present

EVSE Simulator face panel identification:



The EVSE Simulator is designed to enable a Level 2 Mobile or static EV Charger to be connected and various functions can be simulated.

- EVSE power ready recognition
- EVSE connected to vehicle function
- EVSE charge delivery function
- EVSE Control Pilot Signal communication test
- EVSE Proximity signal operation test.
- Load test – to a safe 2.5Kw capacity.

The EVSE Simulator is powered entirely from the output of the EV Charger system, thus fully replicating the connection to a vehicle.

Be sure EVSE Simulator is placed on a firm dry area before using.

Simulated load, using radiant heaters – 240 volts AC as typical of the output of the EVSE charger to the EV in Level 2 format.

Operation Instructions:

1. Do not use this EVSE Simulator in wet, rainy or extremely high humidity conditions without adequate protection
2. The EVSE Simulator will take the 240VAC – 50Hz or 60Hz outputs from the EV Charger SAE J1772 connector and deliver the simulation.

3. The load bank is designed to be a simple radiant heater device with a maximum capacity of 2400 watts. **DO NOT** attempt to exceed this load rating.
4. Power up the EVSE and be sure all self checks are performed.
5. Place the Heater Load Bank well clear of any flammable materials. **DO NOT** plug in the two heaters to the EVSE Simulator at this time.
6. Connect the EV Charger J1772 Connector to the J1772 AC Inlet socket on the EVSE Simulator.
7. The EV Charger will recognise that it is connected to the EVSE Simulator by illuminating the Vehicle Connected LED on the EV Charger.
8. The EV Charger will then engage the internal Contactors which will be recognised by a loud “click” and followed by the EV Charger “vehicle charging” LED being illuminated
9. The Voltmeter on the EVSE Simulator will indicate 240VAC is being delivered.

10. The green Proximity Signal 5 volt DC LED will illuminate on low power.
11. The red Proximity Signal LED correct circuit will illuminate on low power

The EVSE Simulator is now ready for functionality testing.

Control Pilot Signal Test:

1. Maintain the EV Charger SAE J1772 connector to the AC Inlet socket.
2. Press the red Control Pilot Signal button on the Simulator face panel and the “Vehicle Charging” and “Vehicle Connected” LED’s on the EV Charger will extinguish.

3. The Voltmeter will return to zero volts
4. <u>Release</u> the Control Pilot Signal red press button and the EV Charger will engage the internal Contactors and once again indicate the “Vehicle Connected” and “Vehicle Charging” LED’s will illuminate..
5. Press the Proximity button on the EV Charger J1772 Connector and remove the Connector from the AC Inlet.

6. The EV Charger will immediately dis-engage the internal power contactor and extinguish both the Vehicle Charging LED and the Vehicle Connected LED
7. If all above functions test correctly then the Control Pilot Signal operation is fully functional.

Proximity Test:

1. Leave the EV Charger unit on and connected to the EVSE Simulator.
2. Leave the EV Charger SAE J 1772 Connector in the AC Inlet socket.
3. Note the glowing **green** (5 VDC being delivered) and **red** (J1772 Connector circuit engaged) LED's are operating.

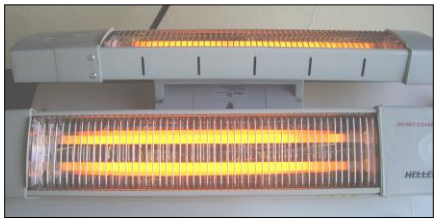
4. Press the Proximity button on top of the J1772 EV Connector as though you were going to remove the EV Charger Connector from the car.
5. Visually both the green and red LED's will increase in light intensity, thus demonstrating that the release button reed switch for the Proximity Signal is operating.
6. As the Simulator is not gaining access to the Command Logic of the EV itself, there is no disconnect function transmitted to the EV Charger.
7. Confirm that both LED's light emission intensifies, and if so then the Proximity Signal function is all correct.

Load Test:

1. Leave the EV Charger unit on and connected to the EVSE Simulator.
2. Leave the EV Charger SAE J 1772 Connector in the AC Inlet socket.
3. Note the Voltage reading as indicated on the Voltmeter. – should be 240 VAC.

4. Plug in both Heaters from the Load Bank.
5. Switch on each heater in turn by pulling the switch activation cord located on each Heater. Two pulls to reach maximum heat radiation.
6. Note the EVSE Simulator voltage as delivered – should remain at 240 VAC.

7. **DO NOT** use non recommended Heaters as an alternate or additional Load Bank. The system protection CB will trip if this is done.



Load Current – AMPS Test:

1. Leave the EV Charger unit on and connected to the EVSE Simulator.
2. Leave the EV Charger SAE J 1772 Connector in the AC Inlet socket.
3. Note the Voltage reading as indicated on the Voltmeter. – should be 240 VAC.
4. Plug in both Heaters from the Load Bank.
5. Switch on each heater in turn by pulling the switch activation cord located on each Heater.
6. Place a Hall Effect Amp Clamp around the Load Current Test Loop and register to display Amps in AC Mode. Be sure to select correct Amp range and zero tester before placing on loop.

7. With full load as detailed above – 2400Watts, the current draw should be around 10.26 - 10.50 Amps.

GFCI (RCD) – Earth Leakage Testing:

The following procedure allows the regular compliance testing for GFCI (RCD) operation of the EVSE.

1. Insert the Digitech QP-2000 Power Point and Earth Leakage Tester into one of the Level 1 - 10/15 amp AC outlets.
2. Read the illuminated neon's to be sure both top neon's are lit, indicating AC Outlet is correctly wired and that there is power delivered to this AC Outlet.

3. To determine ELCB trip levels simply slide the switch from 10mA up toward 100mA, pressing the RCD test button at each leakage calibration. The EVSE should trip before 100mA. Switch positions are 10mA, 15mA, 30mA and 100mA. An AeroVironment EVSE-RS charger is set at 30mA.

4. The Tester should trip the permanently installed RCD at the 30mA switch position. Using the Volt Finder determine that the 240 VAC delivery to the Level 1 AC Outlet is no longer present.

5. Check that the two neon's on the Tester are also NOT illuminated.

6. The EVSE Charge Controller Computer performs this GFCI process every time the SAE J1772 connector is engaged with the Electric Vehicle.

7. Should a GFCI fault be found then the EVSE will deliver a red illuminated LED – TROUBLE – and shut down power delivery.

8. The technical representative will demonstrate the GFCI trip, using a specially developed EVSE – EV Car simulator. Test re-set is by activating the Control Pilot signal circuit.

Closing Down Tests:

1. Turn off Load Bank
2. Remove heater plugs from EVSE Simulator
3. Allow heaters to cool before moving
4. Remove SA J1772 Connector

All tests complete. Record results on Commissioning Form.

Support:

EVSE Simulator Constructed and Supplied by:

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