# Lear Charger Quick-Start Guide

The Lear High Voltage Charger is a CAN-controlled charger removed from production Coda EVs. It can charge battery packs of 200 to 420 VDC with 120VAC or 240VAC input. It has a maximum output current of 11A and maximum power output of 3300W and is liquid-cooled. The Lear charger may be controlled using charge controllers from Thunderstruck (e.g. the Dilithium MCU and EVCC). This charger looks identical to Chevy Volt chargers, but has unique canbus and connection requirements.


The MCU and EVCC kits include canbus wires and a 120 ohm resistor, which is used if tests show it is needed for CAN functionality. Note that the Lear charger has a **CAN data rate of 500kbps**. The charge controller must be configured for this canbus rate.

Connections required for installation

1) **12V Connections (connector to the right)**
   Connect Pin A to +12V power
   Connect Pin F to +12V power
   Connect Pin G to 12V ground
2) **EVCC CAN Connection (connector to the right)**
   Pin B - CANH
   Pin C - CANL
   120 ohm resistor across CANH and CANL
        near connector (if needed)
3) **120VAC or 240VAC Input Power (3-wire connector)**
   (Connector: Orange Delphi 13861587)
   Facing the connector on the charger in figure:
   Ground is the middle pin; other wires are Line
4) **200-420VDC Output (2-wire connector)**
   (Connector: Orange Delphi 13861585)
   Facing the connector on the charger in figure:
   Right-hand side: Positive**,** left-hand side: Negative
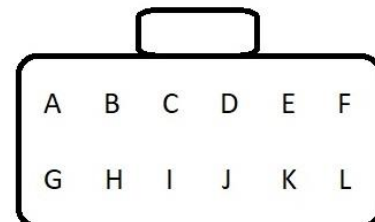
Male Connector Pins
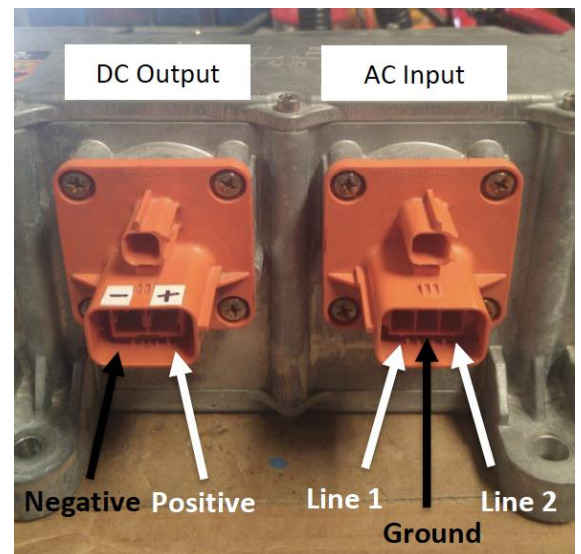
Configuring the Charge Controller for Lear Charger

To configure the MCU or EVCC, a device with terminal software must be used. To find the software, go to https://www.thunderstruck-ev.com/chargers-ev/ . The MCU and EVCC links on this page provide many resources including user interface software, manuals and tutorials. A list of applicable controller parameters is shown below, with significantly more information included in the online manuals.

Charger Type: Use the command ***set charger lear***

Canbus Data Rate: To set the data rate, use the command:
- MCU: ***set can1br 500*** or ***set can2br 500***
- EVCC: ***set canbr 500***

Maximum Voltage: Set your maximum charging voltage here. For example, enter ***set maxv 380*** to set the maximum charging voltage to 380V.

Maximum Current: The Lear charger can only output maximum current, relative to what is available from the AC input. The EVCC will disregard the *maxc*, so the value of *maxc* is not important.

Line Current: The Lear charger receives canbus commands for AC input current, so a *linec* setting is required for it to operate. If using J1772, enter ***set linec j1772*** to get the maximum line current that the charging handle can supply. Otherwise, line current can manually be set. For example, if you want to set the line current to 15A, enter ***set linec 15***.

Line Voltage: Line voltage can also be manually set by entering ***set linev 120*** or ***set linev 240*** This is not needed if using J1772.

Battery Management System: When using the EVCC, the BMS can be set to bmsc, none, loop or loop and bmsc. See the complete EVCC manual for more information on configuring for BMS. The MCU includes BMS settings within its user interface.

Troubleshooting Notes: Reports show the following suggestions may help for troubleshooting:
- Check the controller canbus baud rate – must be 500 kbps
- Note that wire colors may vary between installations – use connector pin letters for identification. Diagram above shows the inside of the connector on the charger side
- The two-pin connector (aux. 12v output) does not need to be connected for operation
- Ensure that the charger case is grounded to 12v negative when using J1772 EVSEs
- If there is no can communication, check canbus Hi/Lo orientation
- Check the connector terminals for continuity – poor connections have been reported