Ratings as found on some Lear chargers:
Input: 100-240VAC / 15A 50-60Hz
Output #1   13.0VDC 30.8A (some sources state this is a max of 35A
Output #2   300-420VDC /11A 3300W max   This might be 200-420V, as seen in other data…
From empirical data and measurements:

The 240 Volt Single Charger AC Current maxes out at 14.34 Amps. The input was 3365 Watts. The output was 3107 Watts.

Using Two chargers at 240V, the AC current maxes out at 27.3Aac, which equates to 6552W. The output was 15.4A at 365Vdc.

Charger functional Overview:

The Lear chargers are identical and are designed to be capable of operating in a master / slave configuration. They are configured by utilizing inputs to configure them as either master or slave. To configure a charger as a master, pin F (M/S1) is connected to +12V and pin G (M/S2) is connected to ground. To configure a charger as a Slave, pin F (M/S1) is connected to ground and pin G (M/S2) is connected to +12V. There is also an enable input on pin A that is brought to +12V in order for the charger to begin charging.

CAN commands are transmitted from the GEVCU (or other Can enabled device) to the master charger including voltage and current setpoints. The master charger then takes that data and commands the slave charger (if present) to provide 50% of the total current request. The Coda had 2 chargers total. The EVTV Lear team has plans currently underway for a method of paralleling 3 or 4 chargers. To date, one method of paralleling 4 chargers is to configure the chargers as two sets of two chargers in parallel. Then to connect the AC inputs and DC outputs of all 4 chargers together. The configuration would require the use of 2 CAN ports from the GEVCU, one CAN port per set of 2 chargers. The GEVCU would then command each set of chargers 50% of the total desired current.

The Lear chargers may support an alternate method of charger paralleling by daisy chaining the CAN ports utilizing the CAN B ports of each charger. This method has been briefly explored using two Coda chargers and it was found that the master charger was not providing any command data out the CAN B port. With the two chargers configured in this arrangement, only the master charger provided charging current.

Some sources report that the Chevy Volt models actively use the 12V output to charge the aux battery when plugged into the EVSE. At this point in time it is suspected that the Coda used the DC-DC to charge the aux battery and did not use this functionality. The EVTV Lear team as yet to get the 12V output to turn on and charge the 12V aux battery.

Connectors:

It is suggested to try and get the mating connectors with a length of wire (pigtail) when the charger is purchased from the supplier or removed from the donor vehicle. Sourcing the connectors for the HV DC and HV AC is extremely difficult. Mating Delphi connectors for the IO can be easily found at Mouser. The mating connector for the 13V aux battery output is a Yazaki and difficult to source, however it can be found at New United Race Tech. This connector, however is not directly installed onto the charger but by way of a length of wire coming out of the charger. This connector can therefore be cut off and a common available connector installed.

The 12 pin IO connector on the charger is a Delphi GT150 part number 15326854. The terminals are part number 15326268, and the cable seals 15366021. The required mating connector (vehicle side) is Delphi GT150 part number 15326849 and uses terminals part number 12191818. The cable seals are also 15366021.

Charger IO connector

Vehicle Connector	Pin #	Charger Connector	Inside Charger	Function
Blue / Red	A	Purple / white	JA1 pin 1	Enable
Orange	B	Blue / Yellow	JA2 pin 2	CAN A High
Green	C	White	JA2 pin 1	CAN A Low
NA	D	Blue / Green	JA3 pin 2	CAN A High
NA	E	White	JA3 pin 1	CAN A Low
Blue / Red	F	Purple / Yellow	JA1 pin 2	M/S1
Black	G	Purple / Yellow	JA1 pin 3	M/S2
NA	H	Blue	JA2 pin 4	CAN B High
NA	J	White	JA2 pin 3	CAN B Low
NA	K	Blue	JA3 pin 4	CAN B High
NA	L	White	JA3 pin 3	CAN B Low
NA	M			N/C

The 2 pin Low Voltage power connector on the charger is a Yazaki part number 7282-5596-10. The terminals are part number 7114-4142-02, and the cable seals 7159-3083. The required mating connector (vehicle side) is Yazaki part number 7283-5596-10 and uses terminals part number 7116-4142-02. The cable seals are also 7158-3083.

LV Aux Battery Connector

Vehicle Connector	Pin #	Charger Connector	Function
Black	1	Black	13V -
Blue	2	Red / White	13V +

The High Voltage DC connector on the charger is a Delphi HV280 part number 13757523. There are two mating connectors (vehicle side), the power connector and the interlock connector. The interlock is not necessary for the charger to function, it is there to interlock with the vehicle HV battery system. The pins are simply shorted together inside the charger. The function is such that if the interlock is disconnected, then the HV battery will shut off HV to the entire vehicle. In order to remove the HV connector, you must first remove the interlock connector as they are mechanically interlocked. The mating power connector is part number 13861585 and the mating interlock connector is a Delphi OCS 1.2 part number 13738744.

Battery HV DC connector		
Vehicle Connector	**Pin #**	**Function**
Orange	A	HV Positive
Orange / Black	B	HV Negative
Blue	1	HVIL connector
Brown	2	HVIL connector

The High Voltage AC connector on the charger is a Delphi HV150 part number 13737769. There are two mating connectors (vehicle side), the power connector and the interlock connector. The interlock is not necessary for the charger to function, and the Coda simply left this connector unpopulated. The intended function is the same as the HV DC interlock. The mating power connector is part number 13861587 and the mating interlock connector (not used) is a Delphi OCS 1.2 part number 13738743

AC Input connector		
Vehicle Connector	**Pin #**	**Function**
White	A	L1
Black	B	Ground
Brown	C	L2/N1
NA	1	HVIL connector
HA	2	HVIL connector

Coolant ports:

The coolant ports are angled hose barbed fittings. It looks like the angled hose barbs are press fit into the charger casting, so it might not be possible to remove them to install AN fittings. The hose barb size is 5/8" ID. There is very little if no restriction in flow from inlet to outlet. If using a Pierburg pump, that pump is larger either ¾" ID, so a reducer will be necessary.

CAN data information

The CAN data bus is at 500K and uses 11 bit ID's.
The Coda transmitted ID 0x50 with 8 data bytes of 00, DC, 0F, F7, 00, 00, 78, 01
It was transmitted at a fast data rate of 10ms And if the message was lost for 10 seconds the charger stopped charging. In EVTV tests it seemed adequate to transmit the command at a rate of 100ms and the charger didn't seem to object to this.

Command ID 0x50

Byte 0 ??

Byte 1 ??

Byte 2 Voltage Limit MSB

Byte 3 Voltage Limit LSB

The voltage limit is a 16 bit value which controls the maximum charge voltage. The charger will charge at constant current to this voltage and then reduce current to maintain this voltage.

The value is obtained by combining the two bytes and then dividing by 10. For example the Coda Sent 0F (MSB) F7 (LSB) which would be 0x0FF7 or 4087 which is 408.7Vdc

Byte 4 ?

Byte 5 AC Current Limit MSB

Byte 6 AC Current Limit LSB

The AC current limit is a 16 bit value which controls the maximum AC input current. The charger will charge at this current limit until it gets to the voltage limit. When it hits the voltage limit, current will be reduced to limit the battery voltage to the battery voltage limit. It is scaled in amps with an offset of 10. Thus a value of 0x0078 = 120 = 12.0A ac.

Byte 7 Charger command

Bit 0 charger enable. A 1 is this bit enables the charger, a 0 disables the charger.
Bit 1 ?
Bit 2 ?
Bit 3 ?
Bit 4 ?
Bit 5 ?
Bit 6 ?
Bit 7 ?

Feedback ID 0x54 (Unknown at this time)

Byte 0 ?
Byte 1 ?
Byte 2 ?
Byte 3 ?
Byte 4 ?
Byte 5 ?
Byte 6 ?
Byte 7 ?

Feedback ID 0x274 (Temperature)

Byte 0 This value has always been observed to be 0
Byte 1 This value has always been observed to be 0

Byte 2 This value has always been observed to be 0
Byte 3 This value has always been observed to be 0
Byte 4 This value has always been observed to be 0
Byte 5 This value has always been observed to be 0
Byte 6 Coolant or baseplate temperature of MASTER Charger
Temperature in degrees C with a -40C offset.
A value of 0x55 = 85 = 45 degrees Celsius (85-40).
Byte 7 Coolant or baseplate temperature of SLAVE charger
Scaling is the same as byte 6.
This value is 0xFF (255-40=215C) when a slave is not present.

Feedback ID 0x277 (Unknown at this time)

Byte 0 ?
Byte 1 ?
Byte 2 ?
Byte 3 ?
Byte 4 ?
Byte 5 ?
Byte 6 ?
Byte 7 ?

Feedback ID 0x279 (Unknown at this time)

Byte 0 ?
Byte 1 ?
Byte 2 ?
Byte 3 ?
Byte 4 ?
Byte 5 ?
Byte 6 ?
Byte 7 ?

Feedback ID 0x27D (Unknown at this time)

Byte 0 ?
Byte 1 ?
Byte 2 ?
Byte 3 ?
Byte 4 ?
Byte 5 ?
Byte 6 ?
Byte 7 ?

Feedback ID 0x615 (Unknown at this time)

Byte 0 ?
Byte 1 ?
Byte 2 ?
Byte 3 ?
Byte 4 ?
Byte 5 ?
Byte 6 ?

Byte 7 ?

Feedback ID 0x616 (command echo)

This data is the command feedback that the charger echoes back from the vehicle controller. See command 0x50 for byte description and scaling.

Feedback ID 0x617 (DC voltage and current feedback)

Byte 0 High voltage battery pack voltage MSB
Byte 1 High voltage battery pack voltage LSB

The battery pack voltage is a 16 bit value which displays the HV battery voltage. The value is obtained by combining the two bytes and then dividing by 10. For example if the charger Sent 0E (MSB) F1 (LSB) which would be 0x0EF1 or 3825 which is 382.5Vdc

Byte 2 High Voltage Battery Current MSB
Byte 3 High Voltage Battery Current LSB

The battery pack current is a 16 bit value which displays the HV battery current. The value is obtained by combining the two bytes and then dividing by 10. For example if the charger Sent 00 (MSB) 43 (LSB) which would be 0x0043 or 67 which is 6.7Adc

Byte 4 Low Voltage Aux Battery Voltage.
The value is obtained by combining dividing by 10. For example if the charger Sent 122 that would be 12.2Vdc
Byte 5 ?
Byte 6 ?
Byte 7 ?

Feedback ID 0x618 (AC Feedback)

Byte 0 AC line current MSB
Byte 1 AC line current LSB

The AC line current is a 16 bit value which displays the AC supply current. The value is obtained by combining the two bytes and then dividing by 10. For example if the charger Sent 00 (MSB) 6E (LSB) which would be 0x006E or 110 which is 11.0A ac**. NOTE:** this scaling assumes that there are TWO chargers, a master and a slave. IF there is only 2 chargers the current is reported as double. Thus to get the AC current value when using a single charger you would divide by 20 not 10

Byte 2 ?
Byte 3 ?
Byte 4 ?
Byte 5 ?
Byte 6 ?
Byte 7 ?

Feedback ID 0x619 (Unknown at this time)

Byte 0 ?
Byte 1 ?
Byte 2 ?
Byte 3 ?
Byte 4 ?
Byte 5 ?
Byte 6 ?
Byte 7 ?