MT50e component layout





The HVJB in the central point for power distribution to all the high voltage system components such as the controls the charging input, e-axle, DC/DC and DC/AC converter, and AC Variable Frequency Drive (VFD).

The HVJB is located in the front passenger side of the chassis and can be accessed from under the hood or via the doghouse inside the body.

The HVJB has an access panel with captive fasteners or latches for ease of removal. However, these fasteners require a special tool to prevent access by untrained personnel.

Expected Vehicle Operational Ambient Temperature Range: -40 °C to 49 °C (-40°F to 120°F) Expected Vehicle Operational Elevation Range: Sea Level to 3000 m (9800 ft)

Fully mated assemblies are rated at IP67 & IP6K9K

Input connectors are rated at IP2xB

Input and Output connectors incorporate and (HVIL) High Voltage Interlock.

Access panel and cover incorporate an (HVIL) High Voltage Interlock.

Lock-Out / Tag-Out (LOTO) manual disconnect switch (HBD41) is accessible relative to the enclosure.

External ambient temperature is rated at -40c to +55c.



Custom Chassis

FREIGHTLINER

A **variable frequency drive** (**VFD**) is a type of motor controller that drives an electric motor by varying the frequency and voltage of its power supply. The **VFD** also has the capacity to control ramp-up and ramp-down of the motor during start or stop, respectively.

- On the MT50e the VFD performs 2 functions
 - Converts HV DC(700V) power to low voltage DC(14V) power @ 200A to support low voltage systems (Takes the place of an alternator traditionally found on an ICE vehicle
 - 2. Used as a HV controller for the power steering pump by varying frequency to control pump speed. Output-240V DC @ 200A





Custom Chassis-

FREIGHTLINER

The VFD is in the front box. This view is from the doghouse

Dana es9000r E-axle

In place of the standard ICE axle, the MT50E is equipped with a Dana es9000r E-axle

- The E-Axle is set up like a tradition rear differential and axle assembly but differs in the fact that an electric motor is coupled to the front of the housing to drive the axles
- The MT50E is equipped with a dedicated drive inverter that regulates the motor speed by varied frequency based on demand
 - 800V AC 3-phase
 - Max Torque: 6600 ft-lbs
 - Also used for regenerative braking to help recharge HV batteries





Custom Chassis_

FREIGHTLINER

HV Electric Water Heater

SYSTEM OVERVIEW:

The electric water heater (EWH) is an instant source of clean heat generation. This heat can be transferred to driver or cabin for passenger and driver comfort. By removing the need for a diesel-powered heater, the EWH enables vehicles to use less fuel, emit lower levels of pollutants and to reduce noise.

FEATURES & BENEFITS:

- · Removal of diesel heater
- · Utilizes waste energy to heat the vehicle
- High Voltage Capability (up to 800v)
- No Consumables
- No Annual Servicing
- Compact design
- Fully potted terminal box
- · Variety of kW outputs
- Cost Effective vs. Diesel Heater

SPECIFICATIONS:

Standard Power	(600V DC Version) 5kW,
Outputs	10kW, 20kW, 25kW
Example	42Ω element 2.9kW @ 350 VDC 15.2kW @ 800V DC
Orientation	North, South, East, or West
Weight	18.42kg / 40.60lb
Rating	IP67
Voltage	300 – 800V DC
Vehicle Type	Hybrid or Electric



FREIGHTLINER Custom Chassis_



2 HV Electric Water Heaters are located underneath the chassis in the front box.

- 20W is used to heat the batteries (BMS)
- 20kW is used to heat the cabin area

LINKS:

https://www.graysonts.com/

The MT50e utilizes a 3 phase 5 HP (3.7kW) electric motor coupled with a hydraulic pump to drive the power steering system. When the vehicle master control system determines that the power steering system should be activated, it enables the VFD which in turn provides the necessary power to spin the hydraulic pump.

The power steering pump is located under the front hood on the drivers side.



The power steering pump drives a conventional steering gear

FREIGHTLINER

Custom Chassis-

