



Thermal Management System in BEVs

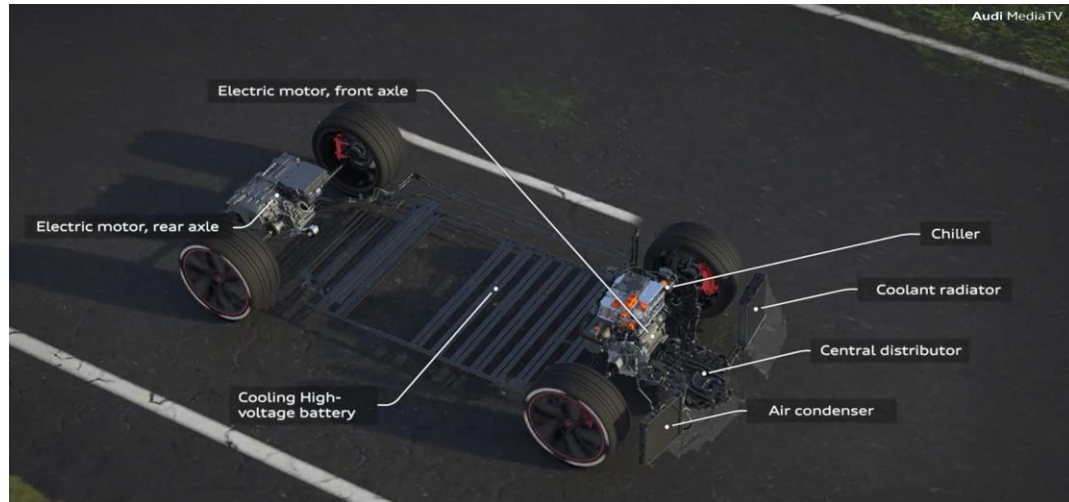
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Thermal Management Layout

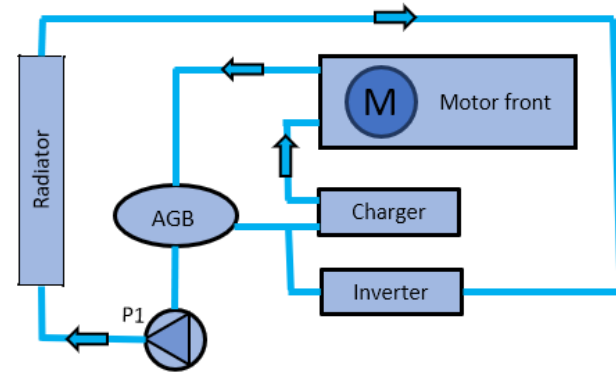
In Modern BEVs the thermal management layout should be designed and adapted according to multiple factors:

- Vehicle class and target customer
- Price range
- Type and number of e-Motors
- Size and type of the HV battery
- HV Architecture
- Efficiency and range
- Fast charging capabilities
- “Off the shelf” components
- Design
- Weight



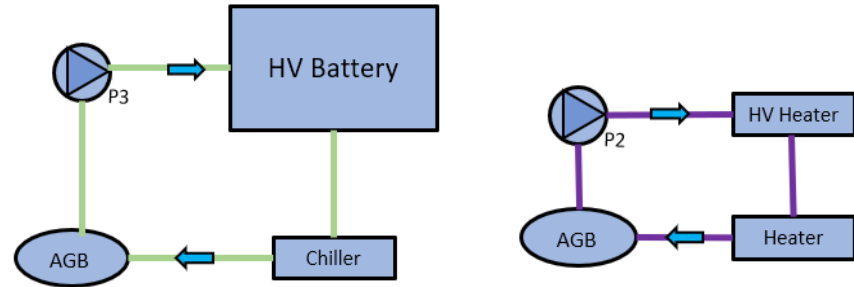
Source: www.audi-mediacycenter.com

Thermal Management Layout – Example



Opel Ampera-e

- Compact 4 door vehicle
- 400V Architecture
- Low price range
- 1x eMotor with 150kW
- 50kW rated fast charging
- No heat pump system

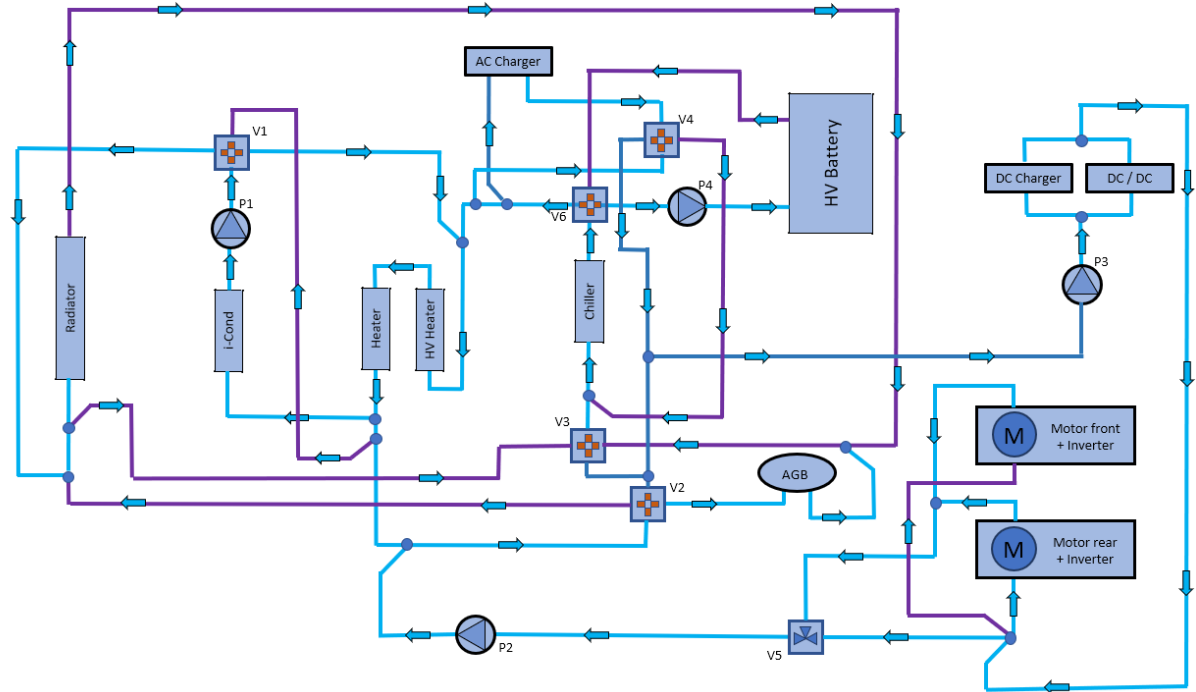


Thermal Management Layout – Example



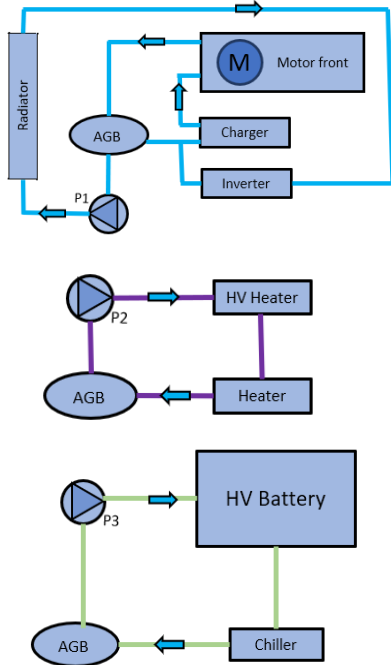
Porsche Taycan

- Sport performance 4 door coupe
- 800V Architecture
- High price range
- 2x eMotors with 580kW
- 270kW rated fast charging
- Heat pump system

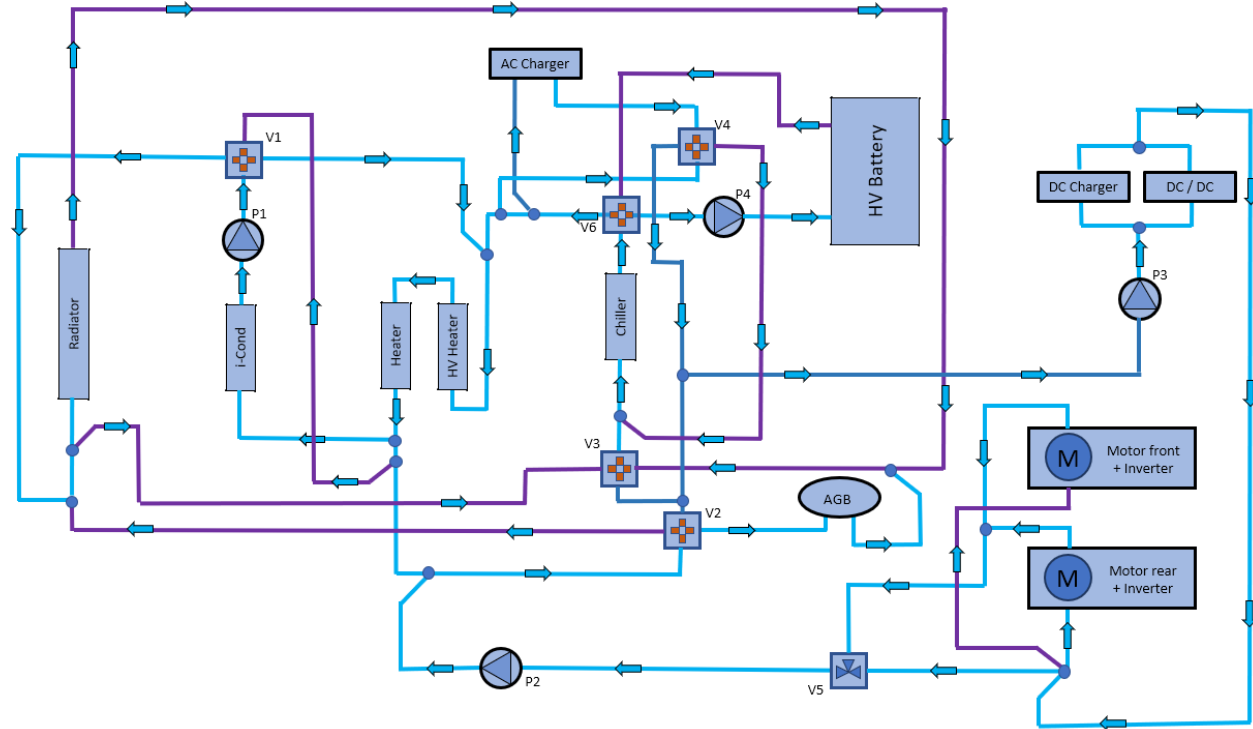


Thermal Management Layout

Opel Ampera-e



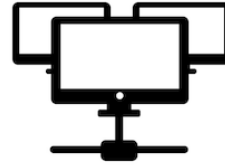
Porsche Taycan



Thermal Management Application

Outside and inside cabin temperature
Evaporator temperature
Fresh air/recirculation flap position
CO2 sensor in cabin
Solar sensor
HV components temperature
Coolant massflow

Gathered
Data



Software
and
Application



Functions
and
Features

GPS Position and destination
Bluetooth connection with telephone
Load on e-motors
Battery SOC /range
Steering wheel sensor
Pressure sensors in seat
User inputs

Waste energy usage from:
Powertrain
Battery
Ambient air
Cabin

Preconditioning
cabin
components

Predictive Management
Fast charging
Mountain roads / Vmax
Regular trips

Driving modes
Eco
Sport
Comfort



DRIVING **EXCELLENCE.**
INSPIRING **INNOVATION.**