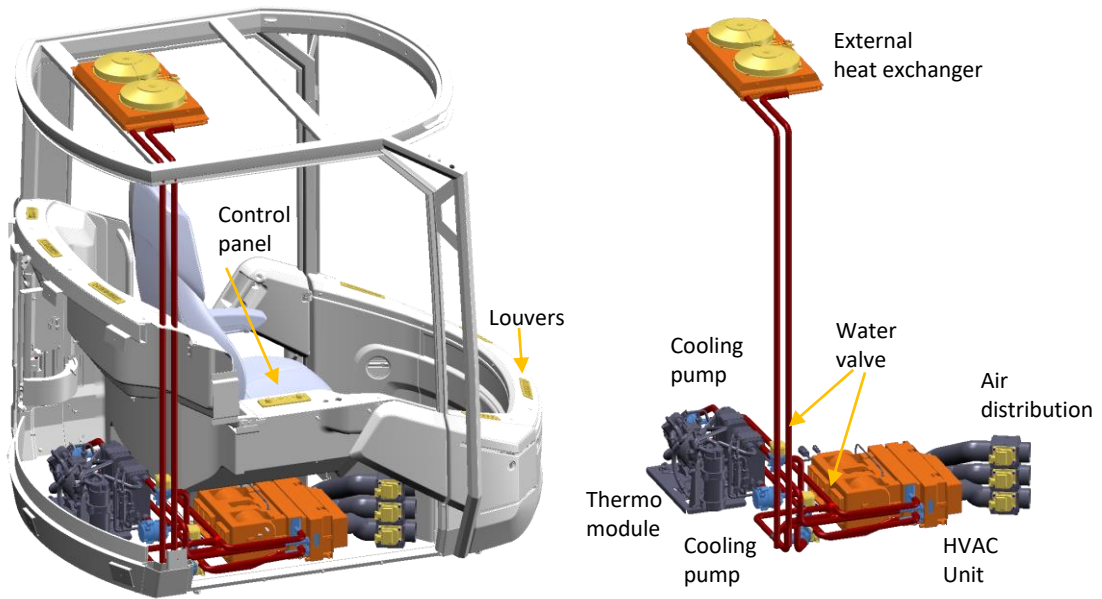


E-mobility – Heat Pump System for Off-Road Vehicles



Goals

- Optimal cab temperature comfort level @ ambient -10...40°C
- Thermo management battery, motor and inverter
- COP up to 3 (Coefficient of Performance = energy output / energy input)

Function

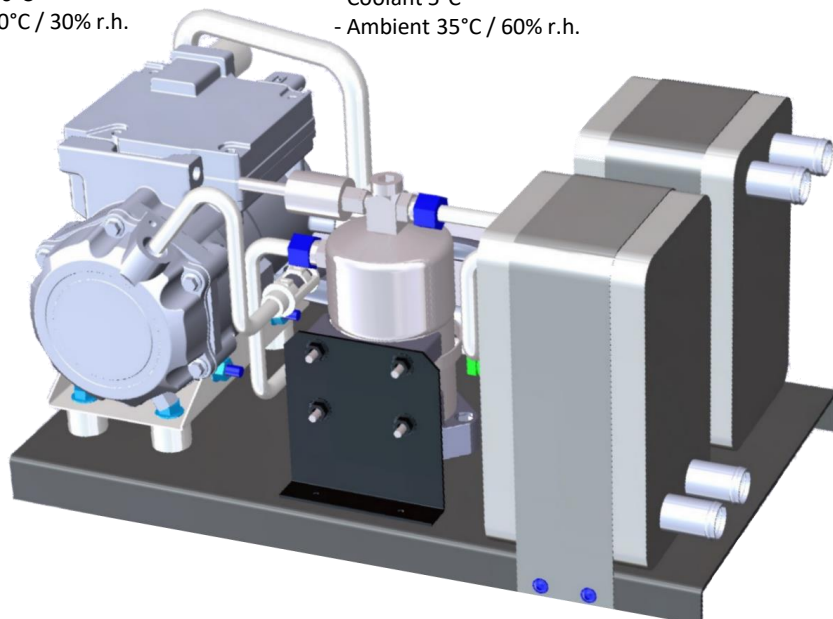
- Usage of waste heat of heat sources in the cabin (compressor, power inverter, hydraulic, battery, motors)
- Usage of heat sources from environment

Benefit

- Maximum milage
- Maximum hours of operation
- Minimized design of heat exchangers for optimal temperature comfort level

Technical Data

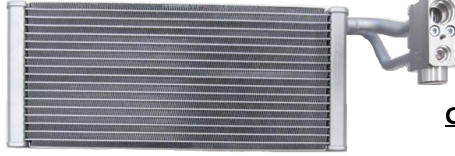
- | | |
|---|--|
| <ul style="list-style-type: none"> <input type="checkbox"/> Heating: <ul style="list-style-type: none"> - Capacity 10kW - COP 3,5 - Coolant 50°C - Ambient 0°C / 30% r.h. | <ul style="list-style-type: none"> <input type="checkbox"/> Cooling: <ul style="list-style-type: none"> - Capacity 8kW - COP 2,5 - Coolant 5°C - Ambient 35°C / 60% r.h. |
|---|--|



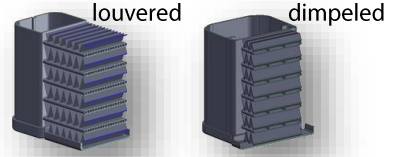
Aluminum Flat Tube Heat Exchangers

Automotive Technology Customized for Off-Road Applications

Evaporator



Heater core



Comparison

| | Round Tube | Flat Tube |
|----------------------|-----------------|-----------|
| | Copper-Alu | Aluminium |
| Performance | 100 % | 100% |
| Installation space | 100 % | 70 % |
| weight | 100 % | 60 % |
| Refrigerant volume | 100 % | 40 % |
| Lifetime / corrosion | Al/Cu corrosion | all Al |
| recyclability | Al/Cu recy. | all Al |

Round Nozzle with color options



Round Nozzle with outside diameter 83mm
 New attractive design
 Robust, flat and air tight design
 Maximum air volume flow
 Variable fixed positions
 Multiple clip range 2-3-4-5 mm
 Option: Hose adapter connectors for air hoses
 Option: colored application ring or colored vanes
 Optional with air flaps or grille
 Material polyamide PA6 GF35 black UL certified

Vector Nozzle



Rectangular Defrost nozzle
 New attractive design
 Robust, flat and air tight design
 Maximum air volume flow
 Optional: Adjustable vanes by control wheel
 Optional: Fix grill (not adjustable)
 Optional: Screw version
 Optional: Clip at 3mm wall version
 Material polyamide PA6 GF35 black UL certified

CAN Controller HCP-mini



CAN/I/O Controller for heating and air conditioning systems

Technical data: Voltage 9-34V
 temperature range -40°C until +80°C

Inputs: 2 digital
 3 analogue voltage
 5 analogue sensors
 1 frequency

Outputs: 8 digital 0,5A (up to 3 servo motors)
 1 analogue / PWM

Bus interface: 1 CAN-Bus (+1 optional)
 1 LIN-Bus (optional)