

Residential Heat Pump

- > for Home & Building Heating
- > for Transition to Renewable Energy



Residential Heat Pump

EBV Elektronik together with Infineon Technologies are strong partners to support heating system manufacturers and their suppliers with latest semiconductor components and design know-how.

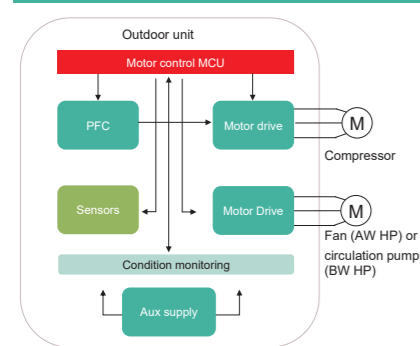
As a consequence of the ongoing transition to renewable energies, energy efficient heat pumps for residential heating are in focus nowadays. Although a lot of varieties and regional differences exist in EMEA, the electric building blocks are very similar. The main technical differences arise from heating power and the handling of liquid or gaseous heat media by pumps or fans. On the one hand, development of heat pumps requires power electronics addressing longevity, efficiency and noise. On the other hand, usability, convenience features and IoT security are more and more important to consumers. As heat pumps will be major consumers of electricity, their smart interaction with the electrical grid (public or private) holds promises for optimization and cost-savings for the end-customer.

European countries are in the process of banning fossil heating systems.

In northern countries centralized hydronic heating is the standard. Here, low temperatures create challenges to the efficiency of heat pumps.

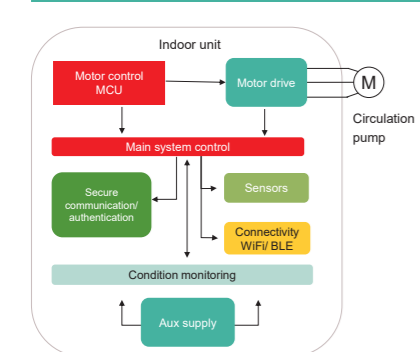
In the south, small decentralized heating is typically found in addition to decentralized air conditioning. Hence, air-to-air heat pumps in combination with cooling makes a lot of sense technically.

Functional block diagram

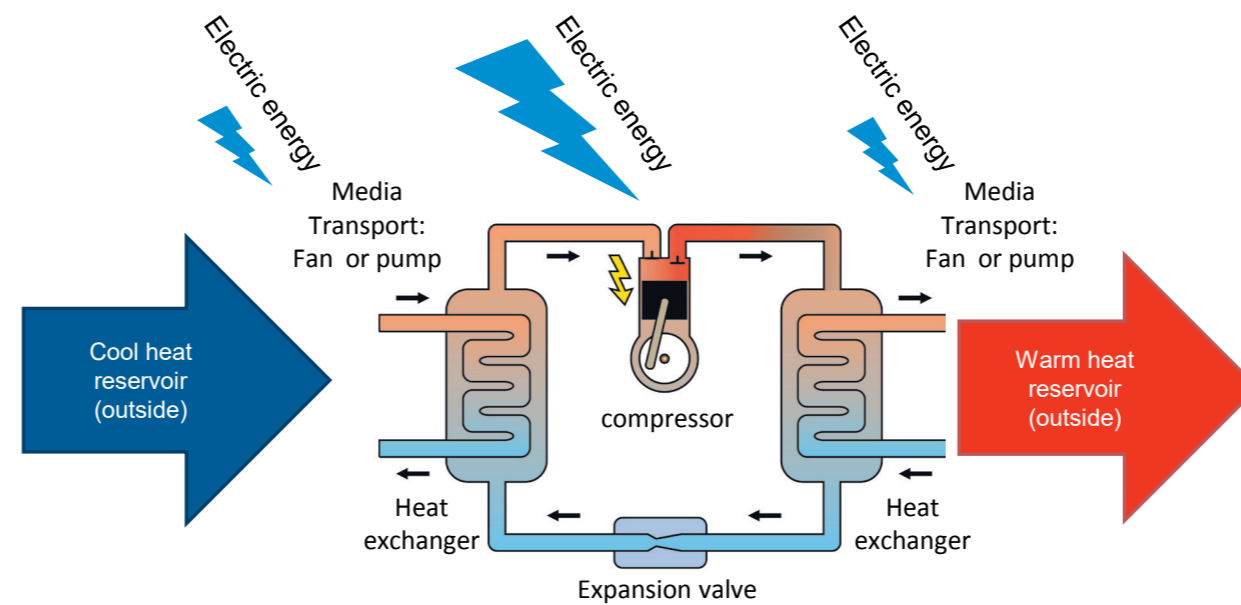


Heat pumps essentially use a motor drive that operates a compressor to convert electricity into heat using a refrigerant cycle. The heat from the environment is transferred to the refrigerant cycle by a fan (air type) or circulation pump (water and ground type) via a heat exchanger. To extract the heat from the refrigerant cycle, a heat exchanger transfers the heat to the hydronic heating system via a circulation pump or to ventilation via a fan. All components - circulation pump, fan, and compressor - are operated by a motor drive to increase energy efficiency and reduce losses. Furthermore, the state-of-the-art heat pump is connected to the smart home via the Internet and must be easily controlled via a touch screen.

Functional block diagram



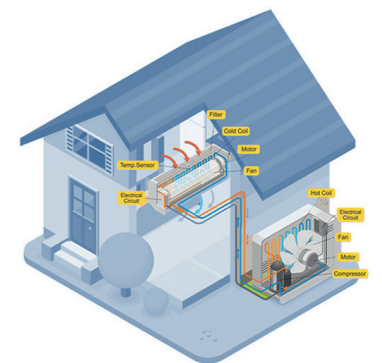
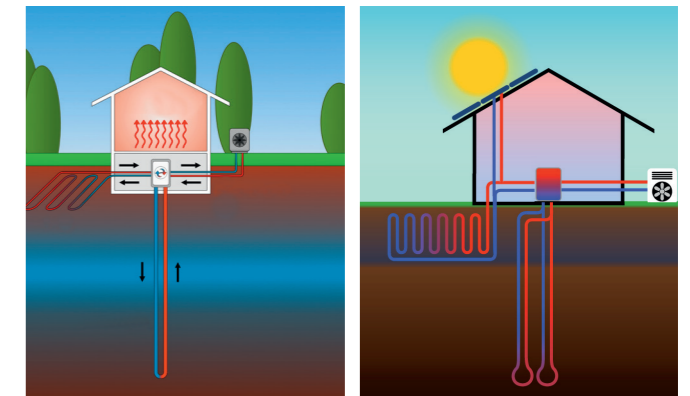
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- Outside heat media:**
- Air
 - Water
 - Ground
 - Solar heat

- Requirements**
- Silence
 - Efficiency
 - Usability
 - Long Life Time
 - Convenience
 - IoT Security

- Inside heat media**
- Air (Ventilation)
 - Water for:
 - Hydronic Heating
 - Sanitary Water



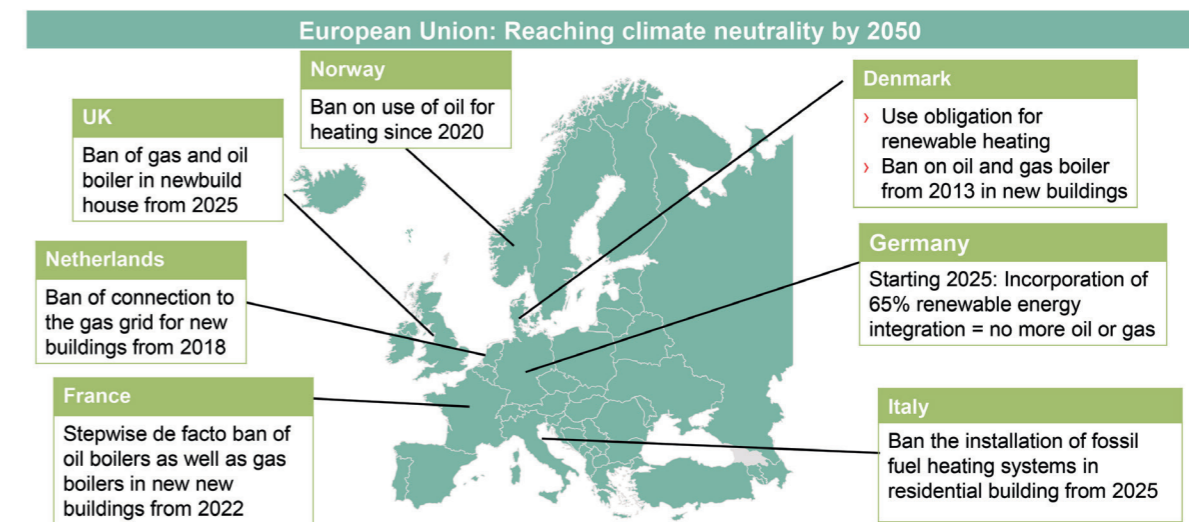
Market segmentation of heat pump according to heating power

Application market segments					
Heating power	Overview electrical power requirement				
	Voltage supply	Compressor	Circu. pump	Fan	
Residential to commercial	2 kW to 8 kW	230 V/ 1 PN/ 50 Hz	< 3 kW	< 60 W	< 125 W
	8 kW to 13 kW	230 V/ 1 PN/ 50 Hz,	< 4 kW	< 180 W	< 230 W
		400 V/ 3 PN/ 50 Hz	< 5 kW	< 300 W	< 290 W
13 kW to 20 kW	400V/ 3 PN/ 50 Hz	< 8 kW	< 300 W	< 290 W	
Commercial	> 20 kW	400 V/ 3 PN/ 50 Hz	> 8 kW	> 500 W	> 580 W



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Regulation change in Europe regarding heating system



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