



Sensors

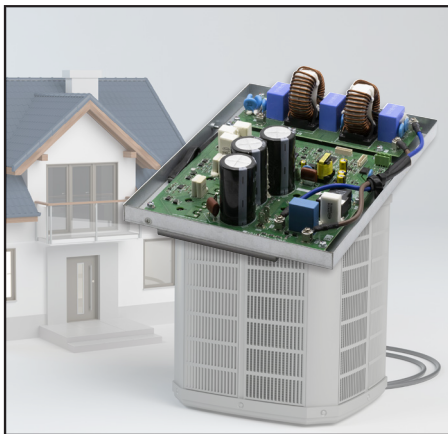


Switches



Controls

Application notes



Application Note : March 2022

Market involved : HVAC (Heat pumps)

Product : RVPM

Customer : OEMs

Subject : Improving heat pump seasonal efficiency

CUSTOMER ISSUE :

Heat pumps are forecasted to grow with a CAGR >7% fuelled by the milestone set by the EU to become carbon neutral by 2050.

Efficiency regulations set forth by the standard EN14825 force heat pump OEMs to opt for variable speed compressors to minimise the electrical consumption for part load operations. Variable speed scroll compressors available on the market are of brushless DC (BLDC) or permanent magnet (PMAC) types.

Therefore, the OEMs need tailored and cost-effective solutions to control such compressors and maximise the seasonal efficiency of the heat pump, also known as SCOP.

Another challenging requirement in heat pumps is that the speed controller must respect residential limits (Class B) when it comes to EMC disturbances.

OUR SOLUTION :

The RVPM is a variable frequency drive (VFD) designed for both PMAC, and BLDC compressors as well as induction (IM) compressors. It comes in two versions: heatsink or cold-plate to maximise user installation flexibility. The cold-plate feature is very relevant to heat pumps as it allows OEMs to save panel space and product cost by utilising the heat exchanger plate as a heatsink. The RVPM is also equipped with a EMC filter to respect residential requirements. A DC choke (for 3-phase model) and PFC reactor (for 1-phase model) are also provided to achieve compliance with requirements on harmonics. The RVPM comes in a single phase model up to 4.5 kW and a 3-phase model up to 8.0 kW output power allowing coverage of the majority of variable speed scroll compressors available on the market. The control algorithm on the RVPM is very robust and re-quires only 7 parameters by the user for its configuration. User software is also available to facilitate the process further.

BENEFITS :

- **Space-saving design** with cold-plate version
- **Cost-effective solution** with quick connection
- **No additional filtering** required
- **Easy configuration** – few parameters required
- **Fast commissioning** - pre-defined list for selected compressors