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## Performance analysis of vapor injection heat pump system for electric vehicle in cold startup condition

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### Highlights

- Mathematical and experimental analysis for a vapor-injection(VI) cycle for electric vehicle (EV).
- The optimal injection position of the scroll compressor and intermediate pressure ratio were evaluated.
- For the increase of heating capacity, the optimal injecting port position was observed.

### ABSTRACT

In this study, a vapor-injection (VI) cycle designed for indoor heating of electric vehicle (EV) was investigated for low temperature heating purpose. The heating capacity variation was observed both in mathematical and experimental ways to verify the influence of vapor injection at different injecting positions and under different intermediate pressure. From the study, the optimal injection position of the scroll compressor and intermediate pressure ratio were evaluated that maximizes heating capacity and coefficient of performance (COP) of the

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