



Shenzhen Megmeet Electrical has developed a next-generation electronic controller for Voltas's inverter air conditioners, which has not only overcome the shortage in key components but is also more efficient and cost-effective.

## THE CONTEXT

The demand for inverter air conditioners is rising so rapidly that some manufacturers have stopped producing fixed-speed air conditioners entirely in favour of the former. The electronic controller in an inverter air-conditioner uses semiconductor components like the intelligent power module (IPM) integrated circuit (IC). However, rising demand has led to a huge shortage and monopolistic pricing of these components. Voltas felt an urgent need to address this issue as well as to design a super energy-efficient air-conditioner with a high ISEER rating that would use next-generation refrigerants like R410, R32 and hydrocarbon.

## THE INNOVATION

On Voltas's demand, Shenzhen Megmeet Electrical Co has developed a next-generation electronic controller (PCBA) that is designed to meet the future needs of inverter air conditioners as it is compatible with all types of refrigerants. Moreover, the new controller does not use the IPM IC at all, thus overcoming the problem of short supply in these components. It is also more efficient in terms of performance, reliability, temperature range, and compactness. It can work from around 100V to 300V compared to the 140V to 290V range of the previous controller, and thus has the ability to start at a low voltage.

The new controller also uses fewer parts than the earlier one, resulting in savings of around \$7 per unit, and its overall structural design is less complex too. For example, existing inverter air conditioners use a large and heavy reactor component weighing around 500gm, which is clamped with a special metal sheet in the outdoor unit. In the new design, a compact reactor is mounted on the main controller itself, thus eliminating the use of the sheet metal.



## KEY CHALLENGE

### TO DESIGN A CONTROLLER WITHOUT AN IPM

The team had to not only design a circuit that would replace the IPM but it had to also ensure that the circuit equalled or even bettered the IPM in performance. This entailed a lot of calculations and considerations. It also devised an algorithm to drive the circuit smartly.

## THE IMPACT

This new controller will result in numerous direct and indirect benefits in every sphere from sourcing, logistics and the production process to manpower requirements, safety and reliability to customer satisfaction. It not only costs less than the older controller but its compressed production process will result in greater productivity.