

Intelligent Phase Control



Minimizes Current Consumption

Intelligent Phase Control technology automatically minimizes the phase difference between motor voltage and motor current. This results in an optimal energy efficiency across the entire rotation speed range. The optimal lead angle needs to be determined only for one rotation speed. For all other rotation speeds, it is automatically determined by the Intelligent Phase Control technology.

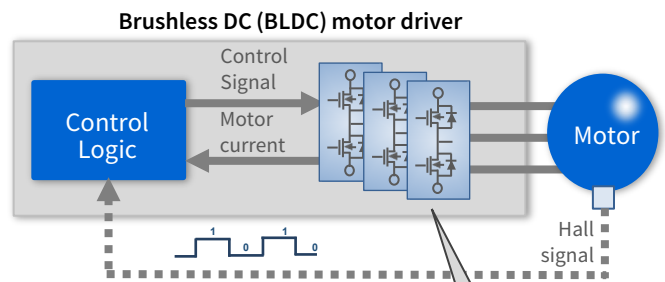
Applications

- Cooling fans for servers and industrial motors
- Fans for home appliances (i.e. air cleaners, ventilation fans)
- Pumps (i.e. hot water)
- Vacuum cleaner, robotic vacuum cleaner

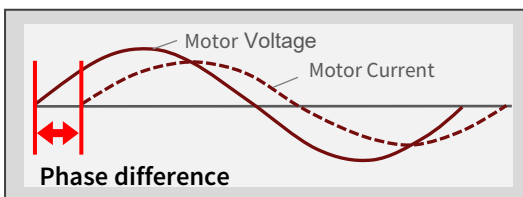
Features	Advantages	Benefits
<ul style="list-style-type: none"> • Automatic lead angle control 	<ul style="list-style-type: none"> • Automatically determines the optimal lead angle across the entire rotation speed range • Easy to use as no external MCU required 	<ul style="list-style-type: none"> • Optimal energy efficiency across the entire rotation speed range • Reduced heat generation • Reduced development cost and shorter Time-To-Market (TTM) • Minimized system complexity as no MCU involvement is required.

Realizing highly energy efficient drive

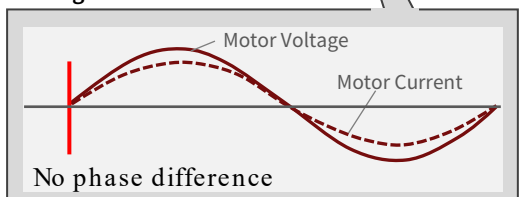
Hall sensors provide information about the polarity of the motor voltage. A change in polarity marks a zero crossing of the motor voltage. In addition to this, the motor current is measured inside the power stage. The zero crossing of the motor current is then detected via a comparator. The control logic block determines the phase difference between the motor current and voltage and determines a lead angle that eliminates the phase difference.

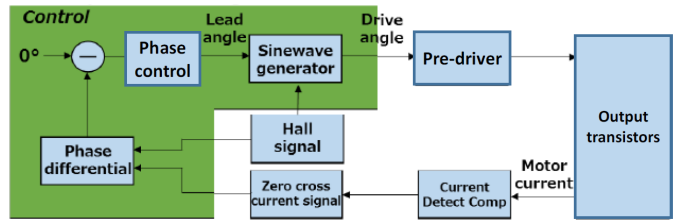
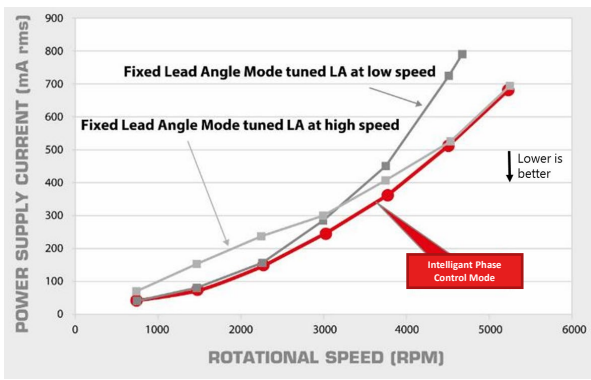


Conventional



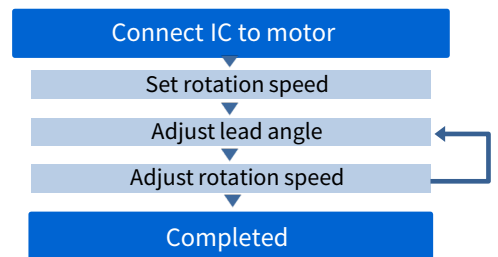
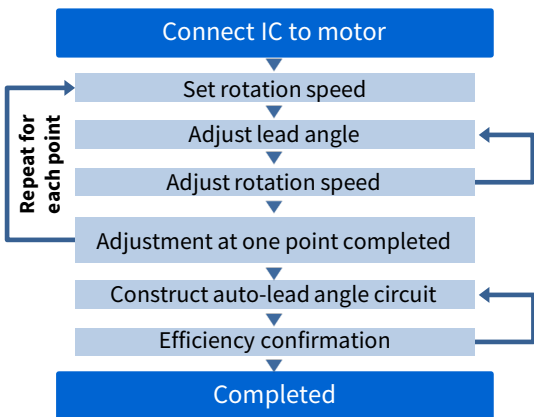
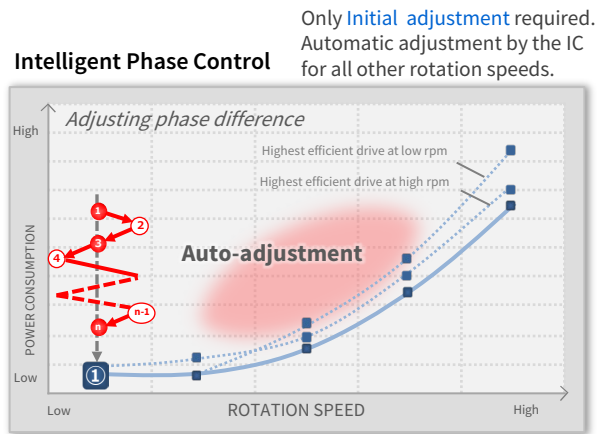
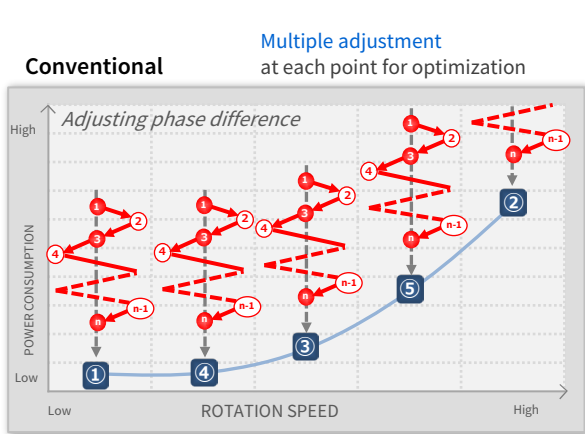
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Reducing development time and cost

With conventional technology, multiple lead angle adjustments need to be done during the development stage for different rotation speeds. By using the Intelligent Phase Control technology, this tuning is only necessary for a single rotation speed.



Product line-up of Intelligent Phase Control enabled devices

Part Number	Operating Voltage	Product Type	Output Current	Package	Other features
TC78B016FTG	6.0 - 30 V	Driver	3.0 A	WQFN36 (5x5mm ²)	<ul style="list-style-type: none"> Sine-wave PWM control Closed Loop Speed Control (only TC78B025FTG and TC78B027FTG) Various protection features
TC78B025FTG	5.5 - 16 V	Driver	3.5 A	VQFN24 (4x4mm ²)	
TC78B027FTG	5.0 - 16 V	Pre-Driver	0.2 A	VQFN24 (4x4mm ²)	
TC78B041FNG	6.0 - 16.5 V	Controller	n/a	SSOP30 (10.2x7.6mm ²)	
TC78B042FTG	6.0 - 16.5 V	Controller	n/a	VQFN32 (5x5mm ²)	