



# Vspeed

## Variable Speed Technology

HIGH PERFORMANCE ELECTRONIC DRIVE AND MOTOR SOLUTION FOR LEVITOR II AND MICROCHANNEL APPLICATIONS

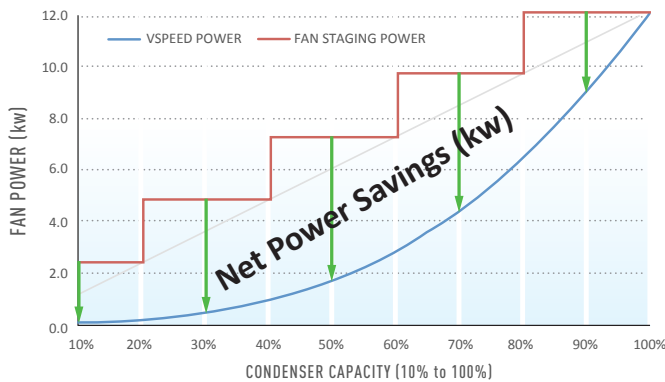


### Why Vspeed?

- **Energy Efficiency:** Vspeed uses more efficient brushless permanent magnet motor and electronic drive versus 3-phase motor.
- **Energy Savings:** Vspeed varies the fan speed to match the system capacity leading to increased energy savings.
- **System Longevity:** Vspeed keeps condensing temperatures consistent reducing compressor cycling resulting in less wear and tear on system components.
- **Sound Reduction:** Vspeed decibels decrease at a constant rate with the fan speed resulting in lower sound.
- **Retrofittable:** Vspeed is an easy drop-in solution for existing Krack condensers.
- **Isolated:** Vspeed's separate electronics are isolated from vibration and rain.

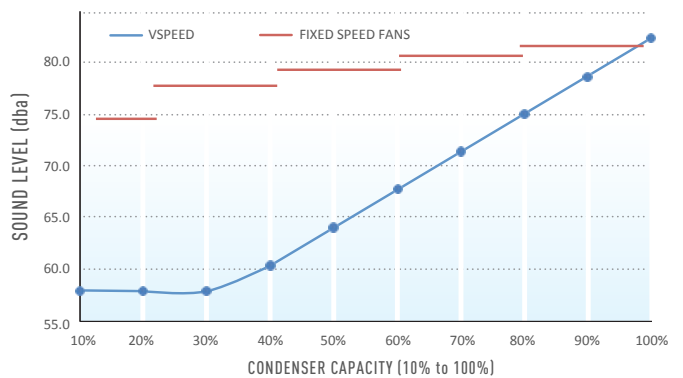
**California Title 24 Regulations:** Meets requirements for variable speed and efficiency for Refrigerated Warehouses and Commercial Refrigeration in retail applications.

Power to Capacity - Vspeed vs. Fan Staging



Vspeed matches the required capacity by varying the speed of all fans delivering significant energy savings versus staging fixed speed fans. Graph of a 10 fan model above has savings of >5 kw when operating at 60 to 80%.

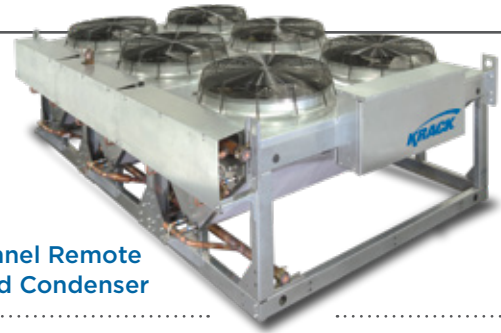
Sound Level - Vspeed vs. Staging Fixed Speed Fans



Vspeed Technology achieves significant sound reduction by varying all the fan speeds versus turning off fixed speed fans.



**Levitor II Series  
Air-Cooled Condenser**



**Microchannel Remote  
Air-Cooled Condenser**


**Vspeed Voltages Available**

- 208-240V 3-phase 50 or 60 hz  
OR
- 380-460V 3-phase 50 or 60 hz

**Vspeed Qualified and Tested Controllers**

- Control options from Emerson, Danfoss and Micro Thermo have been tested to ensure proper control by providing a 0-10V signal with failsafe full speed operation at 0V.

## Vspeed Variable Speed Air-Cooled Condensers

 <b>Condenser Comparison</b>	Levitor II Air-Cooled Condensers			Microchannel Air-Cooled Condensers		
	<b>GOOD</b>	<b>BETTER</b>	<b>BEST</b>	<b>GOOD</b>	<b>BETTER</b>	<b>BEST</b>
	LAVF 1140 RPM 3-Phase Motors with VFD	LAVH 1200 RPM EC Fan Assembly	Vspeed LAVK 1140 RPM BPM Motor and Drive	MXF 1140 RPM 3-Phase Motors with VFD	MXH 1200 RPM EC Fan Assembly	Vspeed MXK 1140 RPM BPM Motor and Drive
Cost* (2 Fans)	146%	120%	100%	140%	118%	100%
Cost* (2x3 with 6 Fans)	110%	124%	100%	108%	121%	100%
Cost* (2x6 with 12 Fans)	95%	126%	100%	95%	123%	100%
Capacity**	100%	109%	100%	100%	109%	100%
Energy Efficiency**	98%	98%	102%	98%	98%	102%
Variable Speed	YES with VFD (25 to 100%)	YES (0 to 100%)	YES (0 to 100%)	YES with VFD (25 to 100%)	YES (0 to 100%)	YES (0 to 100%)
Meets California Title 24	YES	YES (with REDUCED MAX SPEED)	YES	YES	YES (with REDUCED MAX SPEED)	YES
Motor Type	3-Phase ODP	Electronically Commutated	BPM TEAO	3-Phase TEAO	Electronically Commutated	BPM TEAO
Integral Fan Assembly	NO	YES	NO	NO	YES	NO
Motor Replacement Cost	Low	Medium	Low	Low	Medium	Low
Electronic Replacement Cost	High to Very High	High	Low	High to Very High	High	Low
Electrical Service Size	100%	180% to 200%	100%	100%	180% to 200%	100%
Additional Field Installation	Install and Wire VFD Plus Bypass Panel	Larger Electrical SVC (No Bypass Needed)	None (No Bypass Needed)	None (No Bypass Needed)	Larger Electrical SVC (No Bypass Needed)	None (No Bypass Needed)

\* Cost is based on condenser with basic options including non-fused disconnect, fuses per fan, and control board.

\*\* Energy efficiency and capacities are comparing operation at 1140 RPM for a consistent rating point.  
Capacity is full speed operation comparison.



LEVITOR II



MICROCHANNEL

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