Vari-Green Motor

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ELECTRICALLY COMMUTATED | CONTROLLABLE | EFFICIENT

Start saving now — with the new, low-cost, easy to control, electronically-commutated motor that offers high reliability and low maintenance.

The Greenheck Vari-Green motor blends technology, controllability and energy-efficiency into a low maintenance package that is changing the way the industry designs, specifies and operates air movement equipment.

GREENHECK
Building Value in Air.

Greenheck
GREEN
Supporting Green Building Initiatives Worldwide

Vari-Green Motor

THE FUTURE OF AIR MOVEMENT

VARI GREEN Motor

Greenheck's new high-efficiency Vari-Green motor is ideal for specification on Greenheck centrifugal fans, rooftop and sidewall exhaust fans, and inline exhaust and supply fans.

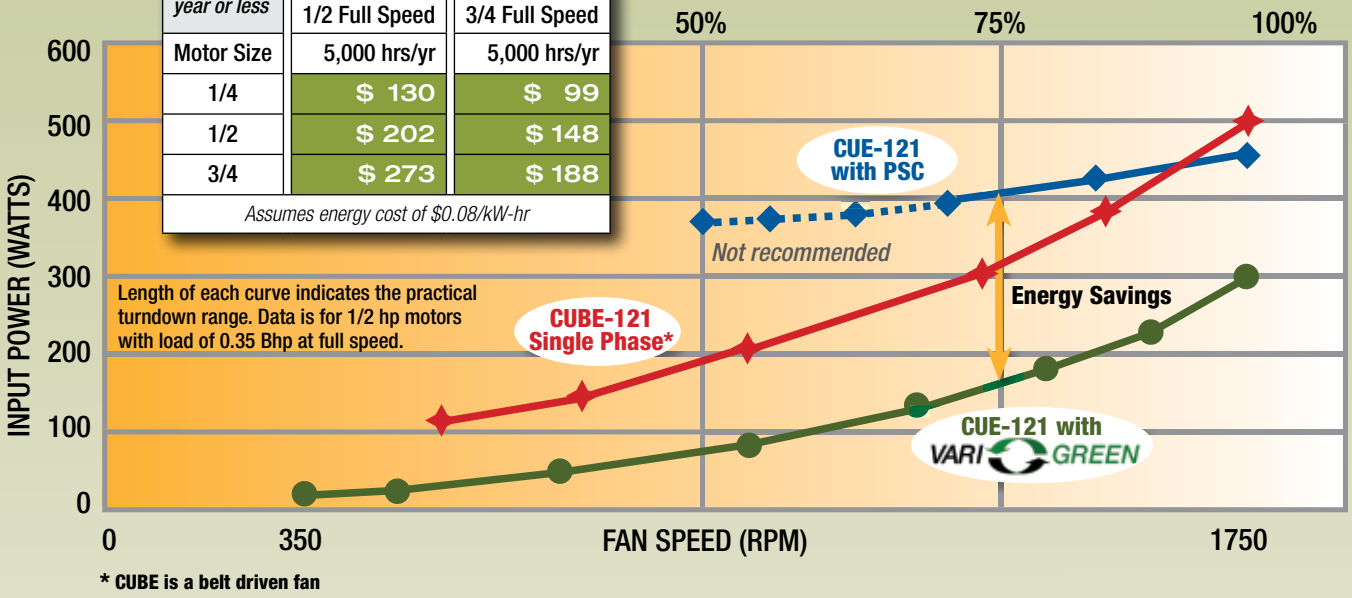
Advantages

ELECTRICALLY COMMUTATED | CONTROLLABLE | EFFICIENT

Energy Saved Using a Vari-Green Motor Versus a PSC

Payback 1 year or less	Operating at 1/2 Full Speed	Operating at 3/4 Full Speed
Motor Size	5,000 hrs/yr	5,000 hrs/yr
1/4	$ 130	$ 99
1/2	$ 202	$ 148
3/4	$ 273	$ 188

Assumes energy cost of $0.08/kW-hr



* CUBE is a belt driven fan

Better than a PSC

- Potentiometer dial pre-mounted on motor for speed control
- 80% usable turndown vs. 30%
- No speed controller to wire
- 20%-70% energy savings
- Full speed range for better adjustment

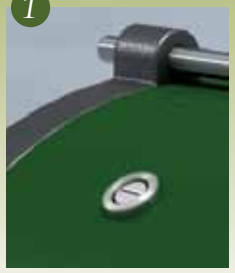
More Efficient than Belts

- Potentiometer dial pre-mounted on motor for speed control
- No belt and pulley losses
- Higher efficiency motor
- 40% energy savings
- Lower up-front cost
- No maintenance required

Easier than VFDs

- 0-10 volt control wires pre-installed in motor
- No VFD to buy or install
- 30% energy savings
- Lower up-front cost
- Eliminates stray current and carrier frequencies

Vari-Green Motor



Speed Control Options

1. Motor mounted dial
2. Control wire inputs (0-10V)
3. Remote mounted dial

Direct Drive Fan Models Available with Vari-Green Motors	Models	Location		Mounting			Airflow		Application		Performance				
		Outdoor	Indoor	Base/Floor	Hanging	Wall	Exhaust	Supply	General/Clean Air	Contaminated Air	Maximum Volume (cfm)	Maximum Static Pressure (in. wg)	AMCA Sound & Air	UL/cUL 705 Listed	Maximum Fan Size
Centrifugal Exhaust	G	✓					✓		✓		2,875	1.5	✓	✓	143
Centrifugal Upblast & Sidewall Exhaust	CUE	✓					✓		✓	✓	5,000	2.25	✓	✓	180
	CW	✓				✓	✓		✓	✓					
Inline Exhaust & Supply	SQ		✓	✓	✓		✓	✓	✓	✓	2,400	1.375	✓	✓	160

Reliability

With industry leading technology comes a new standard in motor reliability

- No shaft grounding required regardless of the turndown
- Bearing life is greater since the motor runs cooler the further it is turned down
- No voltage or current spikes as in VFD controlled motors

Electronic Commutation

Electronic commutation uses electronic circuitry to control the motor's functions:

Solid state circuitry controls the output of power and the speed of rotation

Internal circuitry converts 115 volt single phase AC power to DC voltage for increased efficiencies and full controllability of speed

Motor and Fan Sizes

Vari-Green motors come in three fractional horsepowers; 1/4, 1/2, 3/4 and are available in both 50 and 60 Hz power on models G, CUE, CW, and SQ.

Greenheck
GREEN
Supporting Green Building Initiatives Worldwide

green – It's not just what we make. It's where we work. How we work. Who we are.

LEED

Greenheck is driving the fan industry in the Green Building and LEED charge. As one of the first manufacturers in the air movement industry to join the United States Green Building Council in 2005, we have been actively researching how our products can be applied. This commitment to the green movement continues with product development that qualifies within the LEED rating system—it's prerequisites and credits. The Vari-Green motor is equipped to play a large role in the green building movement, specifically Prerequisite Two; Minimum Energy Performance and Credit One; Optimize Energy Performance.

EC Motor Specification

Motor to be a DC electronic commutation type motor (ECM) specifically designed for fan applications. AC induction type motors are not acceptable. Examples of unacceptable motors are: Shaded Pole, Permanent Split Capacitor (PSC), Split Phase, Capacitor Start and 3 phase induction type motors. Motors shall be permanently lubricated with heavy duty ball bearings to match the fan load and pre-wired to the specific voltage and phase. Internal motor circuitry shall convert AC power supplied to the fan to DC power to operate the motor. Motor shall be speed controllable down to 20% of full speed (80% turndown). Speed shall be controlled by either a potentiometer dial mounted at the motor or by a 0-10 VDC signal. Motor shall be a minimum of 85% efficient at all speeds.

for better air – specify Greenheck fans.

To learn more about the Vari-Green Motor, contact your nearby Greenheck representative or visit our Web site to view the video at greenheck.com/library.

GREENHECK
Building Value in Air.

U.S. GREEN BUILDING COUNCIL MEMBER

Prepared to Support Green Building Efforts

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Vari-Green Motor Brochure | June 2010 RG |

VARI GREEN Motor

Electrically Commutated, Controllable, Efficient

Common questions and answers

Q: ***What sizes and voltages of the Vari-Green motor are available?***

A: The Vari-Green (VG) motor is currently available in ¼, ½, and ¾ hp, 115 volt single-phase power which can be either 60 or 50 cycle power. However, Greenheck is moving forward and will have up to a 3 hp in multiple voltages available soon.

Q: ***How is the speed adjusted on the Vari-Green motor?***

A: There are two motor options that offer three different speed control options for the VG motor.

Motor Mounted Dial:

- A motor-mounted speed control dial (potentiometer) mounted directly on the motor housing. The speed of the motor is adjusted by turning the dial. This option will require no controls wiring.

0-10 VDC External Signal:

- Control wire inputs - A motor with control wires that will accept a 0-10 VDC analog control signal. The active range is 2-10 with 2 VDC correlating to 350 RPM and 10 translating to the max speed the motor can spin (typically 1725) This option allows, controls by others, to control the speed of the fan, such as a Building Management System.
- Remote mounted dial - With the turn of a dial, this option allows you to remotely vary the speed of the motor with controls provided by Greenheck.

Q: ***Is any additional wring required besides the power wires with the Vari-Green motor?***

A: The dial mounted speed control option does not require any additional control wiring. The motor that utilizes the 0-10VDC control signal requires a 3-wire control cable that will need to be run from the motor to the location of the control signal. To avoid any interference with the control signal the control wire should be run in a separate conduit from the power wires. Also, 24 VAC power is required with the 0-10V option.

Q: ***Does the Vari-Green Motor qualify for LEED points?***

A: Individual products don't earn LEED points, but the systems do. If a system is designed around Vari-Green motors it should be eligile for LEED points.

Q: ***What controls are offered with the Vari-Green motor?***

A: Greenheck offers two controlling methods.

Speed control - Using options described in previous answer.

Greenheck's GreenVent Constant Pressure Control System - This is a system of integrated controllers. The controllers will monitor the pressure in a duct and then appropriately adjust the speed of the fan to maintain a slight negative or positive pressure in the duct work. This system is very similar to what is also known as a MDVS or Modulating Dryer Venting System. A pressure tap measures the static pressure in a riser (chase) that has multiple fans or dryers blowing into it. As more of the fans are turned on, the pressure in the riser goes up. The pressure transducer signals the controller which then speeds up the Vari-Green fan. Other controls will soon be available and include; a system that uses occupancy sensors to operate a variable volume exhaust in schools or hospitals and a system that will react to CO2 or CO sensors which will adjust fan speed based on how much gas is present.

Q: *I have many Vari-Green motors in my building. Do I need to consider anything special for my power service?*

A: KVA ratings of building transformers may need to be up-sized when many (20-30+) VG motors are used. Contact Greenheck for further details.

Q: ***Will the Vari-Green motor perform reliably in cold weather?***

A: Yes—we have done testing down to -20˚F with no starting or operating problems.

Q: ***Why does my CAPS selection show a required BHP of 0.05 and it says I will receive a ¾ hp motor—Won't I be better off with a ¼ hp motor?***

A: We have carefully selected the motor sizes to work best with the entire performance range of the fan. A ¾ hp motor will consume the same amount of energy as a ¼ hp for a given load (0.05 BHP in this instance).

Q: ***Is the Vari-Green motor premium efficient?***

A: The VG motor is 20-30% more efficient than other single phase motors on the market today. However, it is not what NEMA (National Electrical Manufactures Association) has deemed a premium efficient motor. The NEMA premium efficient tables govern motors that are over 1 hp and 142T frame. The VG motor is under 1 hp and under the 142T frame size—therefore it is not governed by the NEMA premium tables. That said, the VG motor typically operates at or above 85-90% efficiency. This efficiency value is at or above the NEMA table minimum. So, although the VG motor is not governed by the NEMA premium tables, it's efficiency is high enough that it would meet the requirements if it was.

Q: ***Is the Vari-Green motor an ECM motor?***

A: ECM is the GE trademark for an Electronically Commutated Motor (ECM). EC or Electronic Commutation is the control of the magnetic poles in a motor through electronic means. The VG motor is an EC motor. It has an internal circuit that converts the input AC power to DC power. The DC power is controlled by the circuits which regulate when and where the magnetic poles in the motor are created—this in turn, will induce the rotation. This type of technology is most commonly referred to as EC but is also known as a Brush Free DC (BFDC) motor within the motor industry.

Q: ***Can the Vari-Green motor do constant CFM?***

A: The VG motor is not set up the same way as the GE ECM. Teach GE motor must be programmed for it's specific installation application before it ships. Because many of these applications are not used in the fan industry, Greenheck removed the unused functions. Example—in most cases, the VG motor is being used on a fan that has a Backward Inclined (BI) wheel. The BI wheel is unable to perform in the constant CFM application. Therefore, Greenheck removed that functionality from the motor. By doing this, the cost of the VG motor becomes significantly less compared to a similarly sized EC motor by other manufacturers.

Q: ***What are the differences between the Vari-Green and the GE ECM?***

A: The biggest difference between the two is price. Because the VG motor does not need the large controller and unnecessary functions have been removed, it costs less and is smaller. In addition the VG motor does not require any type of programming. Simply turn the dial to the speed needed or adjust the 0-10 VDC signal that is sent to the motor and it will change speed.

Q: ***How much more does the Vari-Green motor cost?***

A: This will depend on what you are comparing. When comparing a VG unit to a standard direct drive unit, the cost is 20-30% more. If compared to a unit with similar functionality like a direct drive unit with a PSC motor and a speed controller, the VG unit will cost about 10% more. And, when a VG unit is compared to a small belt driven fan the difference will vary. Smaller VG units will cost less than an equally sized belt drive while the larger units will be 3-5% more. However, it is important to note, in any of the above examples the VG motor will pay for itself in less than 2 years and have no maintenance costs.

Q: ***Do I need a VFD?***

A: No. The VG motor model with the 0-10 VDC control wires is designed to be connected directly to a controller with no need for a VFD. In 3-phase power applications the VFD actually regulates the speed of the motor by changing the frequency of the power that is being sent to the motor. Controlling circuits are built directly into VG motors so there's no need for any external device, just a controller to send the 0-10 V signal.

Q: ***Is this motor thermally protected?***

A: The motor is thermally protected. It has a built-in fuse so in the event it should overheat it would trip the fuse and prevent a fire or other issues caused by the motor. Note, the VG motor will not overload itself. If it's operating hot or being overloaded it slows down to operate within its acceptable range. Therefore it's unlikely the motor would overheat even if it were to become overloaded.

July 2010