

Presenting the GE ECM Commercial Refrigeration Evaporator and Condenser Motors



ARKTIC[™] 142



ARKTIC[™] 58



ARKTIC[™] 59

ICE[™] 59



ARKTIC[™] 51

SAVE 70% ON ENERGY COSTS WITH GE ECM TECHNOLOGY

ARKTIC[®] 51



Achieve up to 66% greater efficiency than shaded-pole motors for applications for 1 to 38 Watts air-moving applications.

- Direct drop-in replacement with universal mounting capabilities for mounting versatility
- Streamlined concentric design optimizing airflow
- Constant speed regardless of line voltage fluctuation

ARKTIC[®] 58



Achieve up to 70% more efficiency with the versatile fan/motor system for 5 to 38 Watt air-moving applications.

- The torque controlled motor can maintain a programmed speed over a wide range of operating conditions
- Operates at low temperatures which means greater compressor life
- Programmability provides greater design flexibility
- Offers constant speed

Reach-In Cases

Reach-In Coolers

FROZEN FOODS WALK-IN FREEZERS/COOLERS

ARKTIC[®]/ICE[®] 59



Achieve up to 65% more efficiency than shaded pole motors in applications up to 90 Watts and up to 40% more efficiency than PSC motors

- Form-fitting drop-in replacement for most 3.3" shaded-pole and PSC motors. Just plug in and go; no down switches or terminal configurations to set up.
- Up to 2 discrete speeds with line-voltage control, or real-time variable speeds with PWM control

SUPERMARKET

What's an ECM?

The highest efficiency motor there is! ... essentially a DC Motor

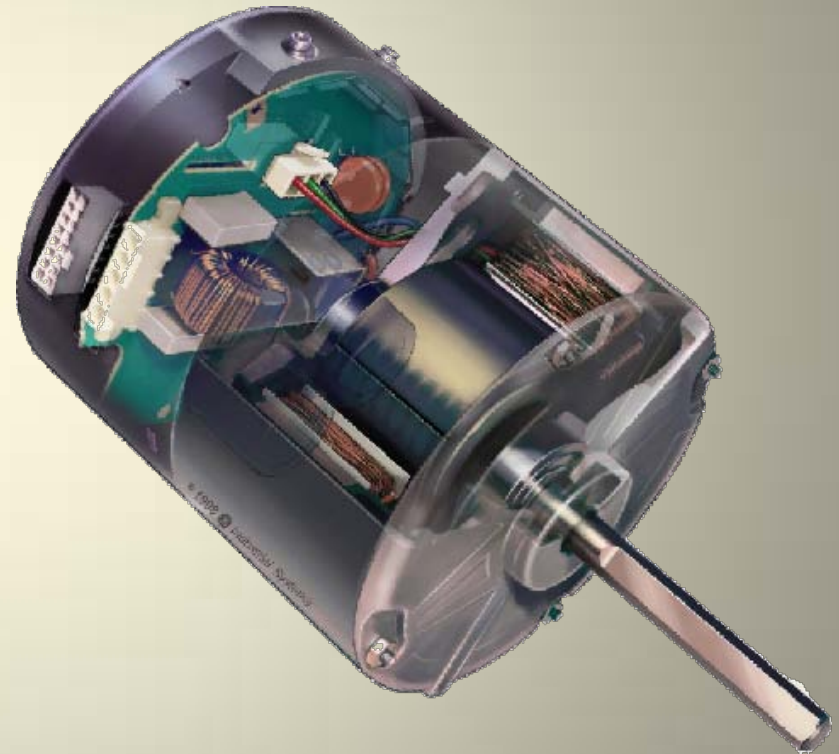
Without mechanical Brushes and Commutator—motor is electronically commutated

Permanent Magnet Rotor

Rotor losses are nearly zero

Motor has 3 windings and is powered from a single AC source

The “Electronic Inverter”
Speed and torque controlled



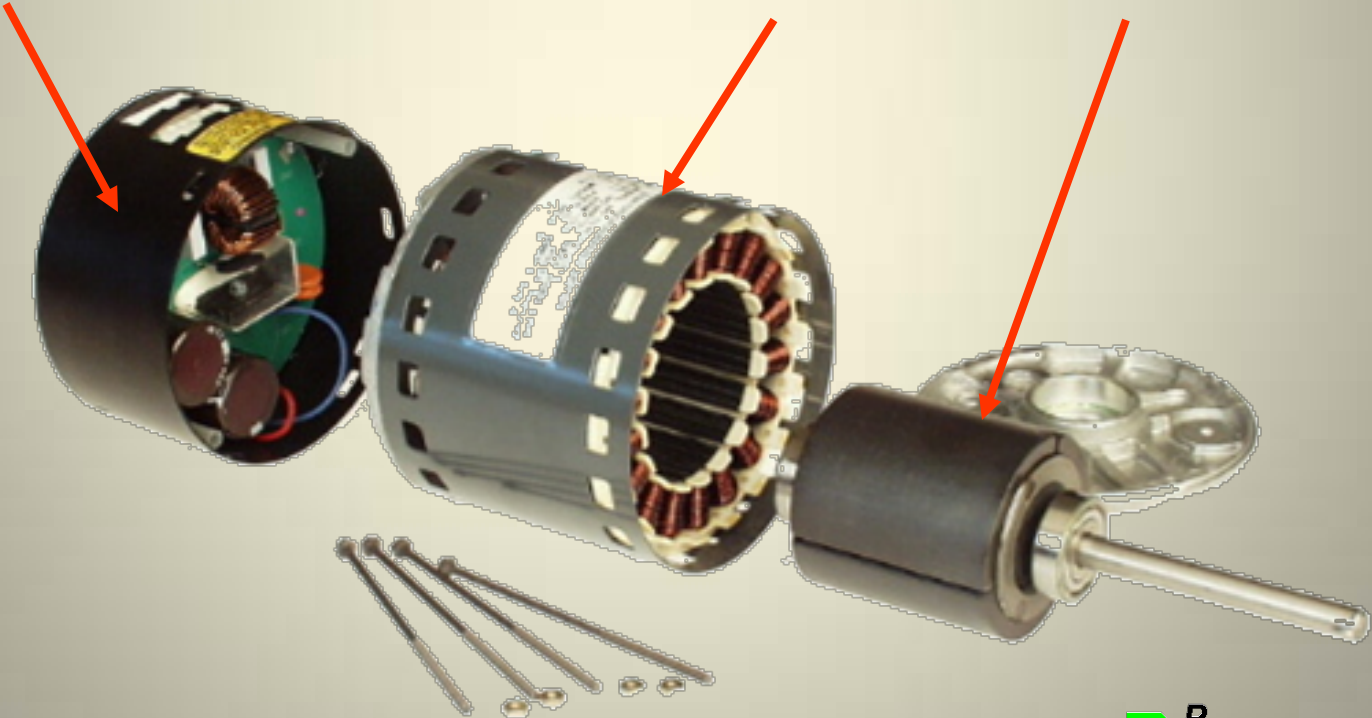
The ECM Motor

Simple construction minimizes the cost of the technology and takes advantage of the efficiency of DC motors

Hi reliability electronic drive

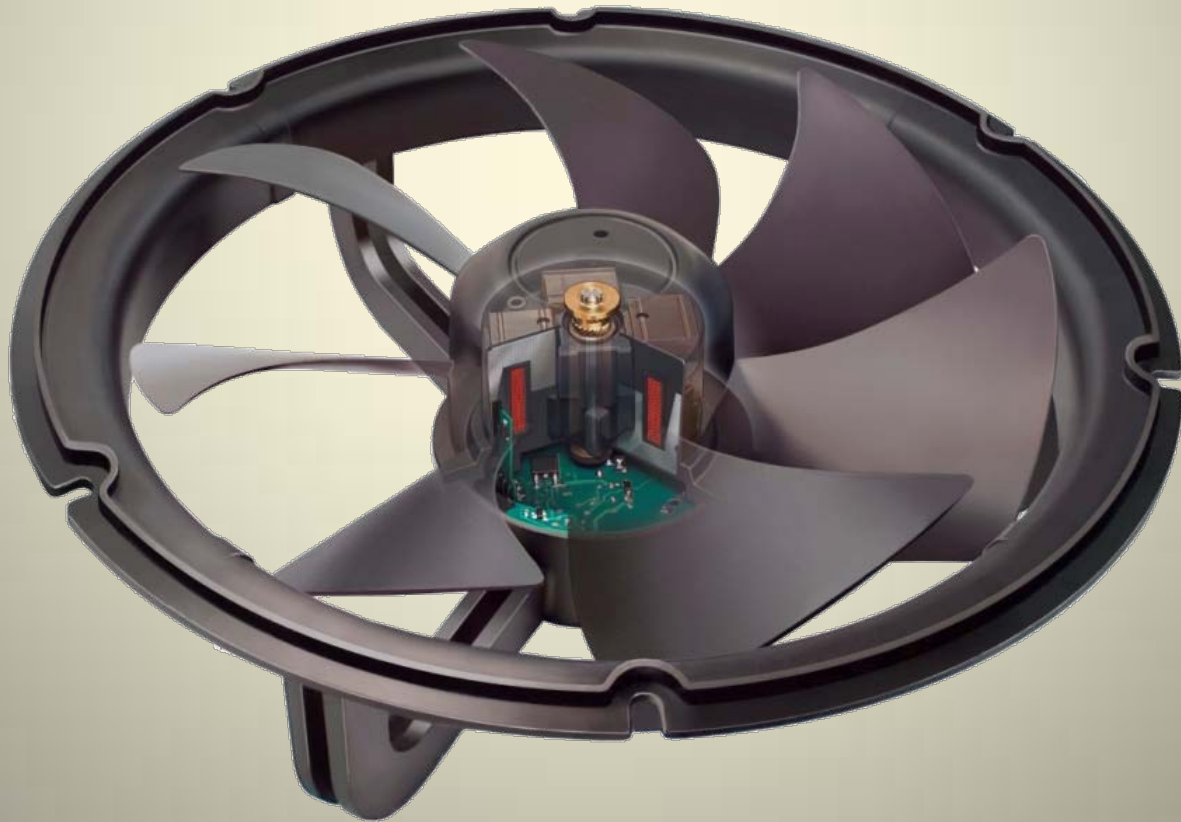
Salient pole stator

Ferrite magnets



ARKTIC™ 58

Evaporator Fan Motor System



ARKTIC™ 58

ECM 58 Series

vs.

Shaded Pole Motor

- Brushless DC construction
- Permanent Magnet Rotor
- Highest Efficiency
- Constant Speed
- Customer Programmable (950 rpm —1900 rpm)
- 115v/230v
- 50/60 hz

- AC design
- Squirrel Cage Rotor
- Low Efficiency
- 115v/230v
- 50/60 hz

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SPECIFICATIONS

General

- 8 pole
- variable speed
- single coil
- permanent magnet

Output

120V Control

CFM (nominal)

350

Max Watts In

36.5 Watts

Static Pressure

16"

Max Noise

65 dba

240V Control

CFM (nominal)

360

Max Watts In

38 Watts

Static Pressure

16"

Max Noise

65 dba

Speed

- Constant Speed
- Programmable speed range from 950 - 1900 RPM
- Tolerance on nominal RPM: ± 20 RPM
- Tolerance on min/max RPM: ± 60 RPM from nominal
- Speed is programmable at final test or at customer facility.

Rated Voltage

- 12-24 Volt DC
- 120 Volt
- 240 Volts
- 50/60 Hertz (except 12-24 V DC)

Operating Temperatures

- Insulation Class A - maximum total temperature not to exceed 105°C.
- Control operating temperature range: -40°C to 40°C

Bearing System

- Single sleeve bearing
- Porous bronze
- Oil impregnated, 217 Chemlube
- Permanently lubricated
- 80,000 hours expected life

Plastics

- Shroud - Hytrel 8238
- Rotor - Minlon FE6190
- Stator - Rynite 815
- Bearing caddy and bobbin - Rynite 530

ARKTIC™ 58

Applications



- Vending Machines
- Walk-in Coolers
- Display Cases
- Medical Equipment
- Ice Machines
- Vent Fans



ARKTIC™ 58

versus Shaded Pole and PSC Motors

Input Energy cost  **\$0.10** Dollars per KWH

Application	Current System	ARKTIC™ 58	Energy Savings ** (per Year)
25 Watt S.P. Motor 8.0", 50° Blade	313 CFM @ .12" 67.8 Watts	*316 CFM @ .12" 20.0 Watts	\$73.28
9 Watt S.P. Motor 8.0", 34° Blade	208 CFM @ .12" 46.2 Watts	*219 CFM @ .12" 14.4 Watts	\$48.75
12 Watt PSC Motor 8.0", 34° Blade	221 CFM @ .12" 33.3 Watts	*219 CFM @ .12" 14.4 Watts	\$28.97
9 Watt S.P. Motor 8.75", 25° Blade	174 CFM @ .18" 47.3 Watts	185 CFM @ .18" 20.2 Watts	\$41.54
9 Watt S.P. Motor 8.75", 20° Blade	134 CFM @ .18" 36.8 Watts	137 CFM @ .18" 12.4 Watts	\$37.41
5 Watt S.P. Motor 6.0", 25° Blade	79 CFM @ .08" 21.4 Watts	82 CFM @ .08" 3.6 Watts	\$27.29

.....**ECM provides the "best" motor Value**

* Utilized optimized fan blade (8.25", 25°)

** Based upon cont duty and systems savings equal to 1.75 x motor savings due to reduced heat load on compressor

ARKTIC™.59 / ICE™.59

Evaporator Fan Motor



ARKTIC™.59 / ICE™.59

Evaporator Fan Motor for walk-in cooler/freezers

Form/fit – direct replacement for all 3.3” motors in commercial refrigeration evaporators

- Front Mount / Back Mount / Belly Band Mount

High Efficiency

- ECM Technology
- 70% at 1550 RPM

Increased reliability

- fully encapsulated electronics

Enhanced programming module

- Two Speed Program Available
- Real-time variable speed with PWM control



ARKTIC™.59 / ICE™.59

Product Overview – Electrical

- 115V (90-132Vac) 50/60Hz and 208-230V (180-264Vac) 50/60Hz (separate models by voltage)
- Peak output 50W on shaft (46.3oz-in) - 1/15hp at 1550RPM
- ~70% peak efficiency (efficiency in application will depend on load and operating point)
- Max Line Amps: ~1.1A for 115V and ~0.6"A for 208-230V
- Inrush Amps: 20A for 115V and 40A for 208-230V decaying to running Amps in 2-4 milliseconds
- Motor operating range is 500-1800RPM; Speed regulated within +/-6%
- Discrete speeds are line voltage enabled; Up to two available depending on model
- PWM controlled variable speed models require constant line voltage; PWM signal 15-30Vdc @ 40-200Hz (no multiples of line voltage); Turn on at 10% and off at 5%
- CW or CCW rotation; Rotation specified viewing Opposite Shaft End (also known as Lead End)
- Motor is programmable for discrete operating points and rotation
- Grounding through motor studs; Optional ground via pig tail from under one of the control clamp screws
- UL 60730 compliant

Product Overview – Environmental

- -40 to 80 deg C storage ambient; -40 to 55 deg C operating ambient
- IP44 rated
- 145,000 hours bearing grease life at 50 deg C; 67,000 hours at 60 deg C
- Design Life: 10 Years, 83,720 hrs. on time, 14,560 on/off cycles
- Air over ECM required

ARKTIC™.59 / ICE™.59

Product Overview – Mechanical

- ~3.3" diameter motor – totally enclosed, non-vented
- Belly band mountable
- Standard 0.5" - #10-32 studs on shaft end (2.8" bolt circle)
- Optional 0.5" - #10-32 studs on opposite shaft end (2.8" bolt circle)
- All orientation mountable; Leads down desired
- Ball bearings w/ low temperature grease
- 10lb max. axial load
- 5/16" diameter (Optional 8mm) shaft with .001" TIR/in of length
- Single or double flat
- RoHS Compliant
- Standard cables available:
 - 11.0" long #18/2 SPT-3 rip cord with .3" bare wire strip
 - 13.0" or 15.0" long #18/2 SPT-3 rip cord with Lyall M-2-24/EMFP-2-1-075/equivalent
 - 10.0" or 12.0" long #18/2 SPT-3 rip cord with two Lyall M-1-51/equivalent
 - 10.0" or 12.0" long #18/2 SPT-3 rip cord with two Tyco 2-520102-2/equivalent
 - 11.0" long #18/2 SPT-3 rip cord plus 18/1 SPT-3 cord with .3" bare wire strip
 - 11.0" or 15.0" long #18/2 SPT-3 rip cord plus 18/1 SPT-3 cord with three Tyco 2-520102-2/equivalent

ARKTIC™.59 / ICE™.59

versus Shaded Pole and PSC Motors

Motors Operated with 10" Fan Blade 44 Degree Pitch

Motor Size	Motor Description	Input Watts	Annual Motor Watt Usage Continuous Operation	Annual Motor Energy Usage at \$0.10 Energy Rate
1/20 HP	Shaded Pole 115V 1550 RPM	137.95	1,208,442	\$ 120.84
1/15HP	Permanent Split Capacitor 115V 1575 RPM	95.55	837,018	\$ 83.70
1/20HP	Permanent Split Capacitor 115V 1575 RPM	78.25	685,470	\$ 68.55
ICE/ARTIC 1/5 HP	Ice/Artic ECM Motor 115V Operating at 1550 RP	45.81	401,296	\$ 40.13
ICE/ARTIC 1/5 HP	Ice/Artic ECM Motor 115V Operating 50% at 1550RPM and 50% at 500RPM Reduced Speed	26.81	234,856	\$ 23.49

ARKTIC[™] 59 / ICE[™] 59

Annual Motor to Motor Watt Savings

Retrofit 1/20HP Shaded Pole with Ice CR 59 =	\$ 120.84- \$40.13 = \$80.71 Savings
Retrofit 1/15HP PSC with Ice CR59 =	\$ 83.70-\$40.13 = \$43.57 Savings
Retrofit 1/20HP PSC with Ice CR59 =	\$ 68.55-\$40.13= \$28.42 Savings
Retrofit 1/20HP Shaded Pole with Two Speed Ice CR 59 =	\$ 120.84-\$23.49= \$97.35 Savings
Retrofit 1/15HP PSC with Two Speed Ice/Arktic CR59 =	\$ 83.70-\$23.49= \$60.21 Savings
Retrofit 1/20HP PSC with Two Speed Ice/Arktic CR59 =	\$ 68.55-\$23.49= \$45.06 Savings

ARKTIC™ 59 / ICE™ 59

System Savings Generated by Reducing Motor Input Watts

In addition to the motor watt savings the reduction of heat generated by the motors will provide a significant refrigeration system savings. Based on our past metered results the (contribution savings) will average:

Medium Temperature Walk-In Coolers = Motor Watts Saved X 1.5 = Total System Savings

Low Temperature Walk-In Freezers = Motor Watts Saved X 1.8 = Total System Savings

Annual Total System Savings

Retrofit 1/20HP SP with Ice 59- Medium Temp Applications =	\$80.71 X 1.5 =	\$ 121.06 Savings
Retrofit 1/20HP SP with Ice 59- Low Temp Applications =	\$80.71 X 1.8 =	\$ 145.28 Savings
Retrofit 1/15HP PSC with ICE 59- Medium Temp Applications =	\$43.57 X 1.5 =	\$ 65.36 Savings
Retrofit 1/15HP PSC with Ice 59- Low Temp Applications =	\$43.57 x 1.8 =	\$ 78.43 Savings
Retrofit 1/20HP SP with Two Speed Ice 59 Med Temp Applications =	\$97.35 x 1.5 =	\$ 146.03 Savings
Retrofit 1/20HP SP with Two Speed Ice 59 Low Temp Applications =	\$97.35 x 1.8 =	\$ 175.23 Savings
Retrofit 1/15HP PSC with Two Speed Ice 59 Med Temp Applications =	\$60.21 x 1.5 =	\$ 90.31 Savings
Retrofit 1/15HP PSC with Two Speed Ice 59 Low Temp Applications =	\$60.21 x 1.8 =	\$ 108.39 Savings

ARKTIC™ · 51

Evaporator Fan Motor



ARKTIC™ 51

Evaporator Fan Motor

Offers up to 66% greater efficiency than shaded-pole motors for applications from 1 to 38 watts and is perfect for drop-in replacements.

Features and Benefits:

- Ultimate commutated technology
- Unit bearing construction
- Direct drop-in replacement benefits
- Streamlined concentric design optimizing airflow
- Constant speed regardless of line voltage fluctuation

Applications:

Bottle Coolers

Display Cases

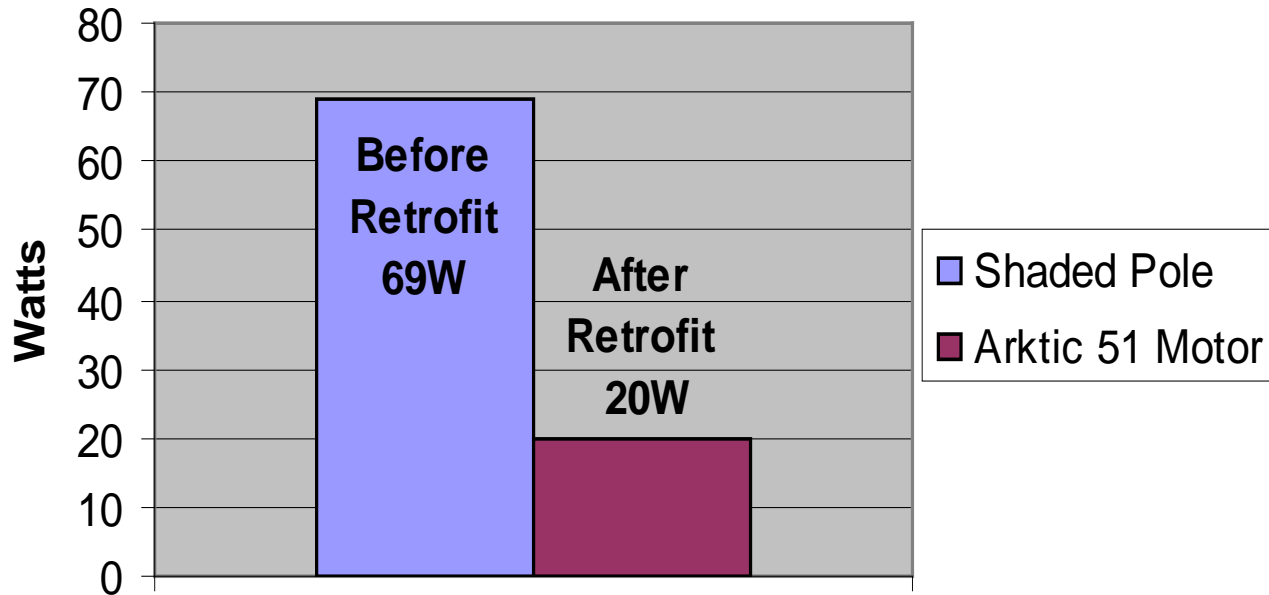
Commercial Refrigeration/Freezers

Vending Machines

ARKTIC™ · 51

Evaporator Fan Motor

Shaded Pole vs. ARKTIC™ · 51



Average Energy Savings = 70%

ARKTIC™ 142

Evaporator/Condenser Fan Motor



ARKTIC™ 142

Introducing ARKTIC 142, the next generation of high-efficiency, fractional-horsepower commercial refrigeration motor. ARKTIC 142 is ideally suited to refrigeration applications that require a 3/4, 1/2, 1/3 or 1/5 horsepower, 300-1200 RPM motor such as walk-in coolers/freezers, condensers, or parallel racks. The ARKTIC 142 uses 15% less power than a PSC motor.

Features and Benefits:

- Three phase drive, NEMA 48fr BLDC Motor; TEAO
- Up to 3 line voltage enabled discrete speeds
- Regulated speed; +/-6% full scale
- Rotation: CW, CCW, or CW/CCW
- Models (UL file # E306123)
 - 1/5hp , 115V or 208-230V, 50/60Hz, 300-1200RPM
 - 1/3hp , 115V or 208-230V, 50/60Hz, 300-1200RPM
 - 1/2hp , 208-230V, 50/60Hz, 300-1200RPM
 - 3/4hp , 208-230V, 50/60Hz, 300-1200RPM
 - 3/4hp , 208-230V, 50/60Hz, 1200-1800RPM
- -40 deg C to 55 deg C Amb.
- ½" dia., single flat shaft ext. up to 6.0"
- Mounting: Welded base and #8-32 studs front or rear
- Leads: Standard 18AWG, 2/64" Ins. with bare wire strip

Applications:

- Walk-In Coolers/Freezers
- Condensers
- Parallel Racks