



# ECM Collaboration Proposal

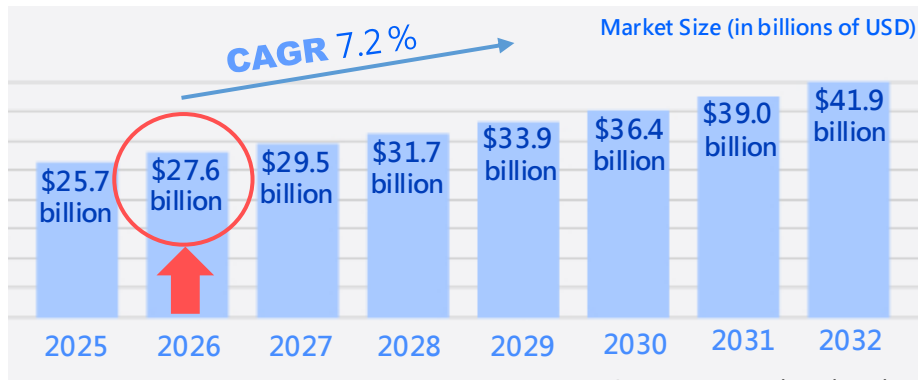
| ESA BG

# ECM Market Size Overview

■ 2026 Global Electronically Commutated Motor (ECM) market was valued at approximately USD 27.6B, and is projected to reach USD 41.9B by 2032, with a CAGR of 7.2%

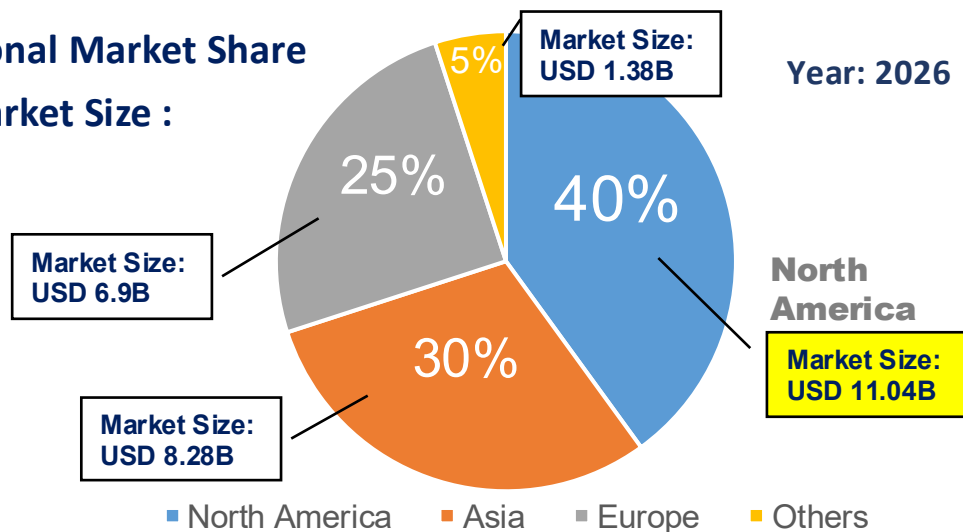
■ For North America, HVAC is the largest application segment for ECM  
 ■ HVAC-related (FCU, FFU, and AHU) equipment market size is estimated at approximately USD 6.36B. AHU is the largest market pool in North America, followed by FCU and FFU.

## Global ECM Market Size & CAGR (2025–2032) :

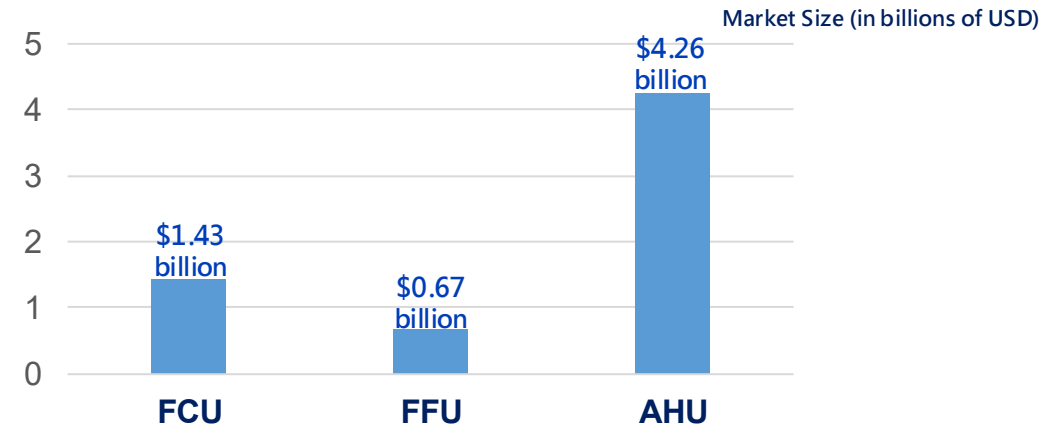


Source: researchandmarkets

## Regional Market Share & Market Size :



## North America ECM-related HVAC Equipment Market Size (2026):

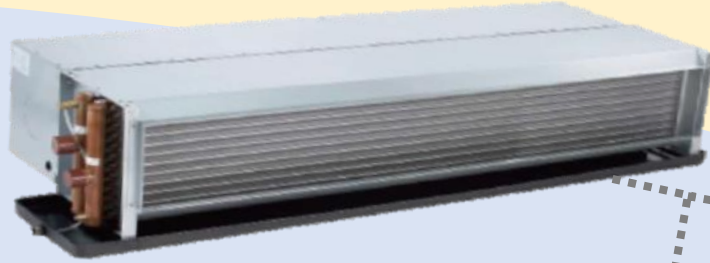


Equipment	Market Size	Key Application	Key Application Market Size (USD)
FCU	USD 1.43B	Residential / Commercial / Industrial & Public	<b>Residential:</b> 0.43B / <b>Commercial:</b> 0.79B / <b>Industrial &amp; Public:</b> 0.21B
FFU	USD 0.67B	Cleanroom / Biopharma & Medical / Local Clean-air zones	<b>Cleanroom:</b> 0.34B / <b>Biopharma &amp; Medical:</b> 0.23B / <b>Local Clean Zones:</b> 0.1B
AHU	USD 4.26B	Commercial Buildings / Hospitality Industry / Public Infrastructure / Healthcare	<b>Commercial Buildings:</b> 1.92B / <b>Hospitality Industry:</b> 1.28B / <b>Public Infrastructure:</b> 0.64B / <b>Healthcare:</b> 0.43B

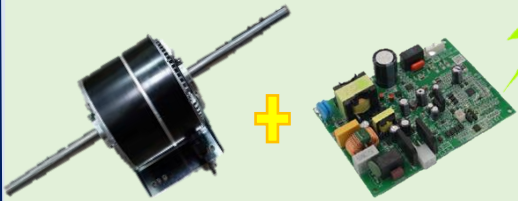
# ECM Solution Portfolio

“ From Driver to full FCU system,  
We provide a complete range of ECM solutions  
to accelerate your development  
and reduce system complexity ”

**Fan Coil Unit (FCU)**



**Motor + Drive**



**Distributor**

\* Open Discussion

FCU Assembly Integration



Blower

+ Dual-Shaft ECM



**Target Customers:**

\* End Users

**Potential lists (US)**

- Commercial Buildings
- Hospitality Industry
- Cleanroom

**Driver Board**



**Target Customers:**

\* ECM Motor Makers

**Potential lists (US)**

- NC / ZIEHL-ABEGG
- WI / Regal Rexnord
- IN / Hansen Motors

**Target Customers:**

\* FCU/FFU/AHU Makers

**Potential lists (US)**

- FL / Carrier
- TX / Lennox
- NC / Trane Technologies
- GA / Rheem
- MI / Whirlpool Corporation

Supply Components

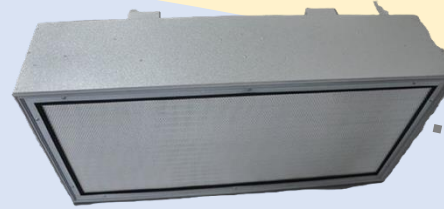
Supply System modules

# ECM Solution Portfolio



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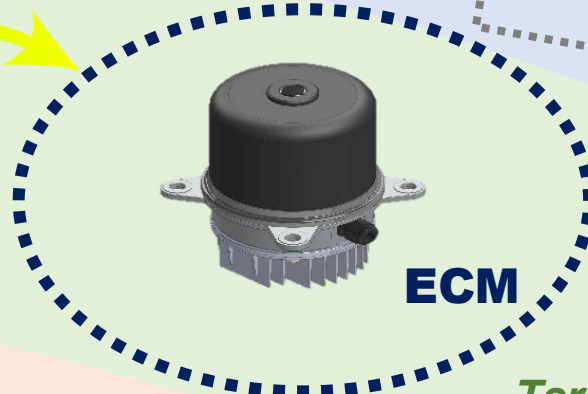
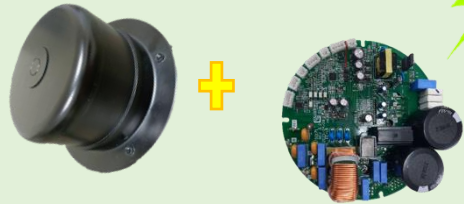
## Fan Filter Unit (FFU)



**Distributor**

\* Open Discussion

## Motor + Drive



**ECM**

**Target Customers:**

\* FCU/FFU/AHU Makers

**Potential lists (US)**

- FL / Carrier
- TX / Lennox
- NC / Trane Technologies
- GA / Rheem
- MI / Whirlpool Corporation

## Driver Board



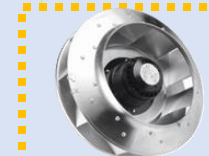
**Target Customers:**

\* ECM Motor Makers

**Potential lists (US)**

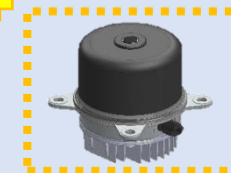
- NC / ZIEHL-ABEGG
- WI / Regal Rexnord
- IN / Hansen Motors

FFU Assembly Integration



Centrifugal fan

+ External Rotor ECM



**Target Customers:**

\* End Users

**Potential lists (US)**

- Commercial Buildings
- Hospitality Industry
- Cleanroom

Supply Components

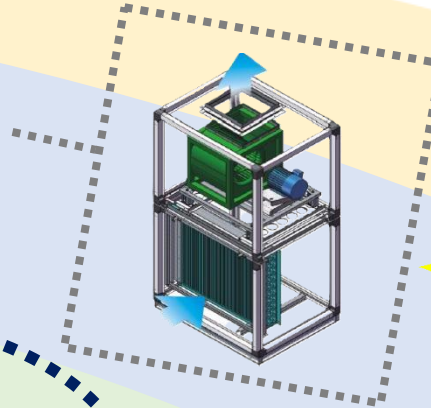
Supply System modules

# ECM Solution Portfolio



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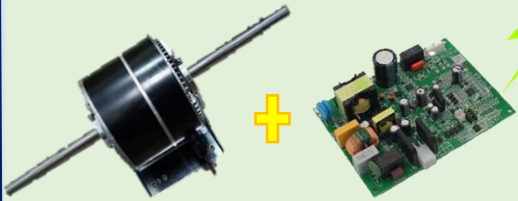
**Air Handling Unit (AHU)**



**Distributor**

\* Open Discussion

**Motor + Drive**



**ECM**

AHU Assembly Integration



Blower

+ Dual-Shaft ECM



**Driver Board**



**Target Customers:**

\* ECM Motor Makers

**Potential lists (US)**

- NC / ZIEHL-ABEGG
- WI / Regal Rexnord
- IN / Hansen Motors

**Target Customers:**

\* FCU/FFU/AHU Makers

**Potential lists (US)**

- FL / Carrier
- TX / Lennox
- NC / Trane Technologies
- GA / Rheem
- MI / Whirlpool Corporation

**Target Customers:**

\* End Users

**Potential lists (US)**

- Commercial Buildings
- Hospitality Industry
- Cleanroom

Supply Components

Supply System modules

# Motor / Driver Board Specifications

## EC Motor (Internal Rotor)



Item	D98	D125
<b>Rated Output Power Range</b>	60 W ~ 200 W	350 W ~ 750 W
<b>Input Power Supply</b>	1Ø 100 ~ 240 ±10% Vac, 50/60 Hz	1Ø 220 ~ 240 ±10% Vac, 50/60 Hz
<b>Speed Control Range</b>	500 ~ 1,550 RPM	500 ~ 1,350 RPM
<b>Compatible Blower Size</b>	Forward-curved centrifugal blower (6"x8", 7"x8", 9"x9")	Forward-curved centrifugal Blower (8"x8", 9"x9", 10"x10")
<b>Efficiency</b>	Rated load > 80%	Rated load > 85%
<b>Speed Control Method</b>	Stepless speed control: smooth acceleration without vibration, and precise full-range airflow control	
<b>Speed Deviation</b>	100% rated load: THD-A < 15%	
<b>Protection Functions</b>	Overload, over temperature, over voltage, under voltage, and stall protection	
<b>Application</b>	Small air handling units, ducted fan coil units	Ducted air handling units / large air handling units

## EC Motor (External Rotor)



Item	OD102	OD180
<b>Rated Output Power Range</b>	60 ~ 350 W	3000 ~ 3700 W
<b>Input Power Supply</b>	1Ø 200 ~ 277 ±10% Vac, 50/60 Hz	3Ø 350 ~ 440 ±10% Vac, 50/60 Hz
<b>Speed Control Range</b>	500 ~ 1600 ±10 RPM	600 ~ 1800 ±10 RPM
<b>Compatible Blower Size</b>	Forward-curved centrifugal Blower (6"x8", 7"x8")	Backward-curved centrifugal Blower & Axial flow Blower
<b>Efficiency</b>	Rated load > 80%	
<b>Speed Control Method</b>	Stepless speed control: smooth acceleration without vibration, and precise full-range airflow control	
<b>Speed Deviation</b>	100% rated load: THD-A < 10%	
<b>Protection Functions</b>	Overload, over temperature, over current, under voltage, and stall protection	
<b>Application</b>	Exhaust ventilation units, 2×4 FFU, 4×4 FFU	Fans / Cooling towers

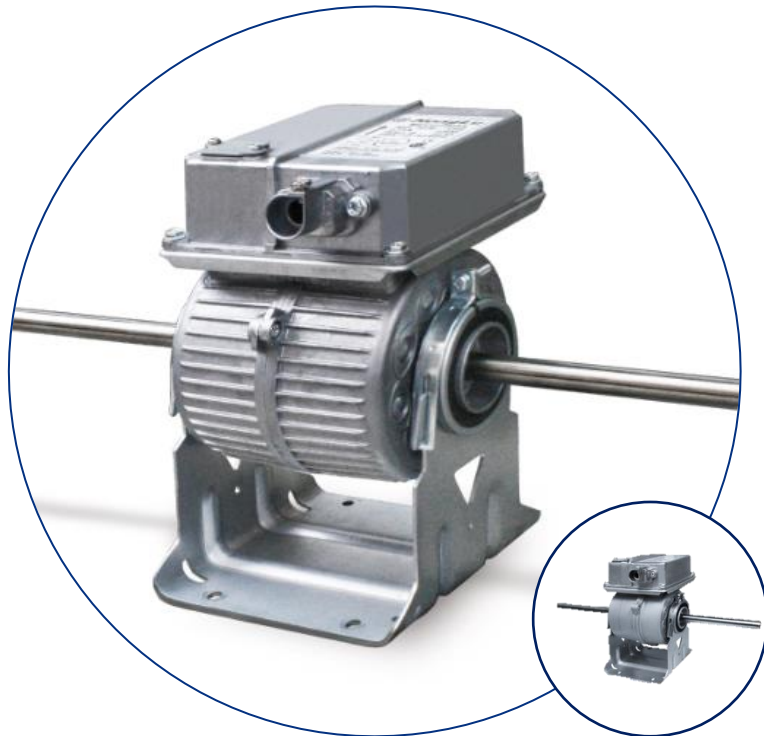
## EC Driver Board



Item	Specifications
<b>Input</b>	
<b>Rated Voltage / Frequency</b>	1Ø 100 ~ 240 Vac, 50/60 Hz
<b>Allowable Voltage Variation</b>	±10% (recommended), ±15% (maximum)
<b>Maximum Current Consumption</b>	1.4 A (at input voltage 100 V)
<b>Output</b>	
<b>Motor Speed Control Range</b>	500 ~ 1300 RPM ±10 RPM
<b>Motor Torque Control Range</b>	9.8 kg·cm (500 ~ 1200 RPM)



# ECM Specifications



## Product Features

- High Efficiency : using permanent magnet synchronous motor (PMSM).
- Low Vibration noise : SVPWM & Shaft current closed design
- Wide speed operation with step-less. : Analog speed
- Stable and smooth speed operation: closed loop control & Not affected by load and external power supply
- Several protections: over current, over temperature and rotor locked of motor.
- Motor Driver board : 3-speeds 、 Analog speed 、 communication control

## Technology SPEC

	Item	Description
Input	Rated voltage, frequency	1φ – 100~240Vac - 50/60Hz
	Allowable voltage, frequency variation range	V±10% 、 Hz±5%
	Maximum current consumption	1.4A (in-voltage : 100V )
Output	Motor Maximum speed setting range	500 -1300 RPM ± 10 RPM
	Motor Torque Control Range	9.8 kg-cm (500 – 1200 RPM)

# FCU/FFU/AHU Specifications

## Fan Coil Unit (FCU)



## Fan Filter Unit (FFU)



## Air Handling Unit (AHU)

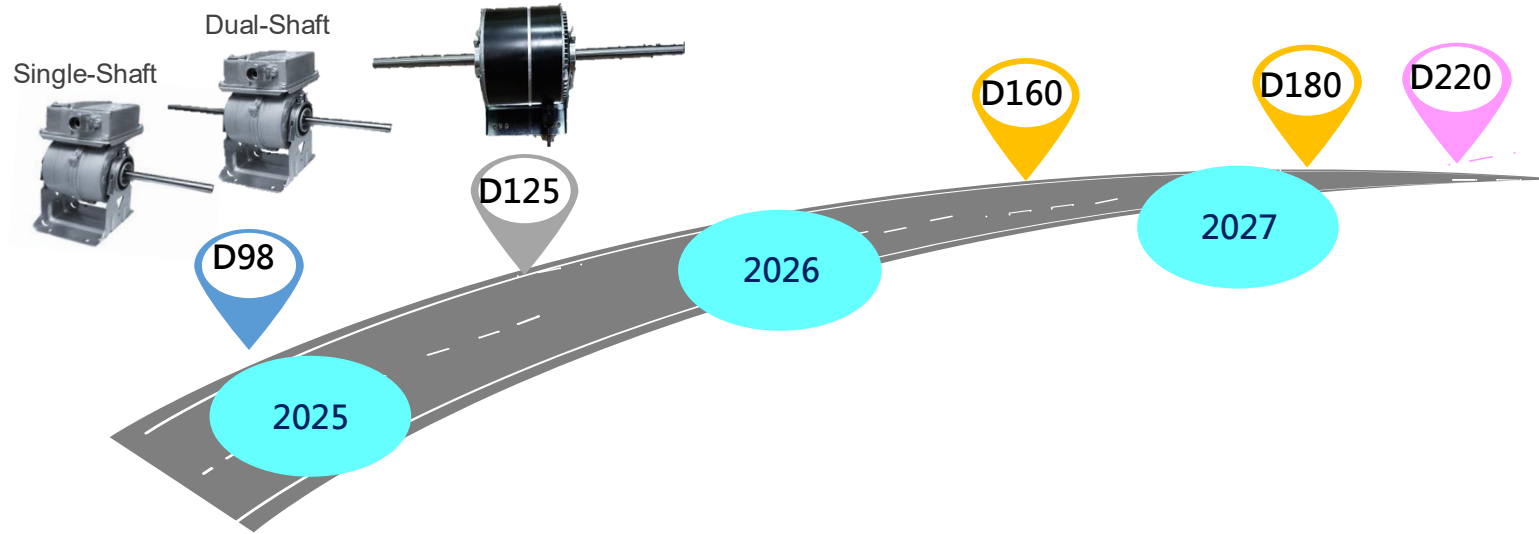


Item	FCU-#300	FCU-#600
<b>Motor Type</b>	Ø98 EC-PMSM (Single-Shaft)	Ø98 EC-PMSM (Dual-Shaft)
<b>Drive Type</b>	3-speed / Analog (stepless) / Communication control	
<b>Input Power</b>	1Ø 100 ~ 240 ±10% Vac, 50/60 Hz	
<b>Total Input Power (W)</b>	20-60	60-130
<b>Rated Current</b>	1.4 A (at 110 V condition)	
<b>Speed Range</b>	500 ~ 1550 RPM	
<b>Protection / Insulation Class</b>	IP54 / Class B	
<b>Motor Efficiency / PFC</b>	Rated load > 80% / PF > 95%	
<b>Harmonic Distortion</b>	100% rated load: THD-A < 15%	
<b>Protection Functions</b>	Overload, IPM over temperature, over current, over voltage, under voltage, stall protection	
<b>Communication Functions</b>	Modbus / Current, voltage, power monitoring / Operation status monitoring / Remote control	
<b>Blower Specifications</b>		
<b>Type</b>	Forward-curved centrifugal Blower (D160 / L200)	
<b>Quantity</b>	1	2
<b>Airflow (CFM)</b>	300	600
<b>Certification</b>	CE Certified	

Item	FFU-4×2	FFU-4×4
<b>Motor Type</b>	Internal rotor Ø98 EC-PMSM	External rotor Ø102 EC-PMSM
<b>Drive Type</b>	5-speed / VR (variable resistor) / RS485	
<b>Input Power</b>	1Ø 200 ~ 277 ±10% Vac, 50/60 Hz	
<b>Max Input Power (W)</b>	170	350
<b>Rated Current (A)</b>	0.43	0.9
<b>Speed Range</b>	500 ~ 1250 RPM	500 ~ 1350 RPM
<b>Protection / Insulation Class</b>	IP55 / Class B	
<b>Motor Efficiency / PFC</b>	Rated load > 80% / PF > 95%	
<b>Harmonic Distortion</b>	100% rated load: THD-A < 15%	
<b>Protection Functions</b>	Overload, IPM over temperature, over current, over voltage, under voltage, stall protection	
<b>Communication Functions</b>	Modbus / Current, voltage, power monitoring / Operation status monitoring / Remote control	
<b>Blower Specifications</b>		
<b>Type</b>	Backward-curved centrifugal Blower (D400 / H75)	Backward-curved centrifugal Blower (D420 / H72)
<b>Quantity</b>	1	1
<b>Airflow (CFM)</b>	350 (950 rpm / 150 Pa)	1580 (1350 rpm / 150 Pa)

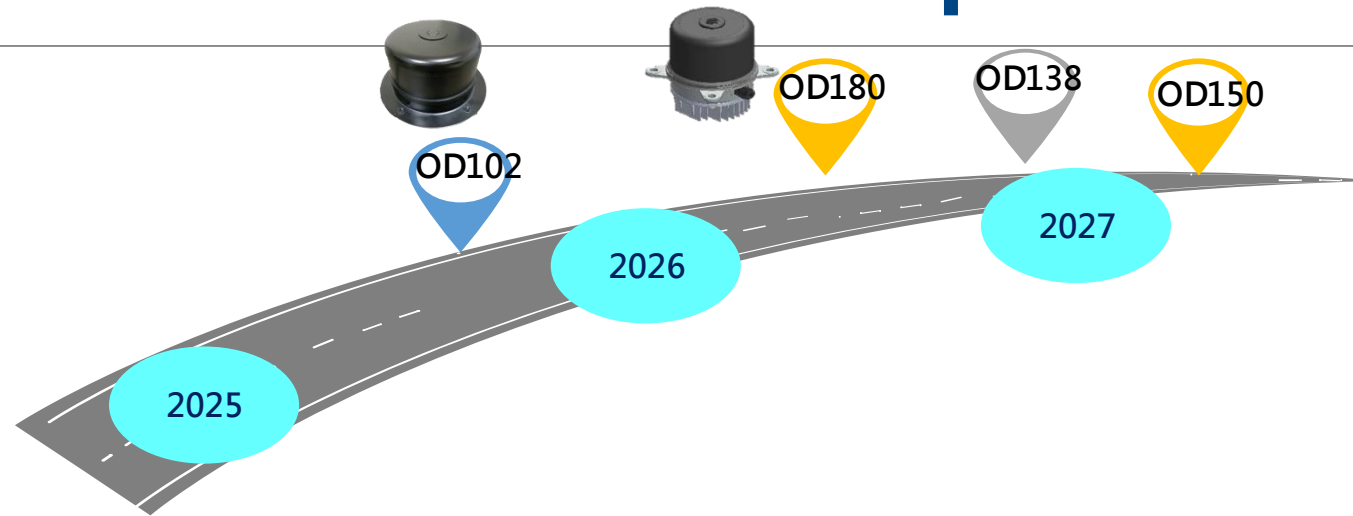
Item	AHU-#800	AHU-#1600
<b>Motor Type</b>	Ø98 EC-PMSM (Single-Shaft)	Ø125 EC-PMSM (Dual-Shaft)
<b>Drive Type</b>	PWM power control / RS485 communication	
<b>Input Power</b>	1Ø 200 ~ 240 ±10% Vac, 50/60 Hz	
<b>Total Input Power (W)</b>	30-240	50-500
<b>Rated Current (A)</b>	1.1	2.5
<b>Speed Range</b>	500 ~ 1350 RPM	
<b>Protection / Insulation Class</b>	IP54 / Class B	
<b>Motor Efficiency / PFC</b>	Rated load > 80% / PF > 95%	
<b>Harmonic Distortion</b>	100% rated load: THD-A < 15%	
<b>Protection Functions</b>	Overload, IPM over temperature, over current, over voltage, under voltage, stall protection	
<b>Communication Functions</b>	Modbus / Current, voltage, power monitoring / Operation status monitoring / Remote control	
<b>Blower Specifications</b>		
<b>Type</b>	Forward-curved centrifugal Blower (D200 / L200)	
<b>Quantity</b>	1	2
<b>Airflow (CFM)</b>	800	1600
<b>Certification</b>	CE Certified	-

# Internal Rotor ECM Roadmap



Item	D98	D125	D160	D180	D220
Rated Output Power Range	60 W~200W	350W ~ 750W	600W -1400W	1800~2200W	3000~3700W
Input Power Supply	1Ø 100~240Vac	1Ø 220~240Vac	3Ø 220Vac	3Ø 380Vac	3Ø 380Vac
Speed Range	500 -1550 RPM	500~1350 RPM	500~1350 RPM	200~1500 RPM	200~1500 RPM
Drive Location	Integrated with motor	Integrated with motor	External	Integrated with motor	Integrated with motor
Protection Class	FCU IP54 / FFU IP55	IP55	Motor IP55 / Drive IP20	IP55	IP55
Efficiency	Rated load > 80%	Rated load > 85%	Rated load > 85%	Rated load > 85%	Rated load > 85%
Production Stage	MP	MP	26Y Q4	27Y Q1	27Y Q3

# External Rotor ECM Roadmap



Item	OD102	OD138	OD150	OD180
Rated Output Power Range	60 ~ 350 W	300 ~ 750 W	1500 ~ 2200 W	3000 ~ 3700 W
Input Power Supply	1Ø 200 ~ 277 Vac	1Ø 200 ~ 277 Vac	3Ø 380 Vac	3Ø 380 Vac
Speed Range	500 ~ 1600 ±10 RPM	500 ~ 1250 ±10 RPM	600 ~ 1800 ±10 RPM	600 ~ 1800 ±10 RPM
Drive Location	External	Integrated with motor / External	Integrated with motor	Integrated with motor
Protection Class	Motor IP54 / Drive IP20	Motor IP55	Motor IP55	Motor IP55
Compatible Blower Types	Forward-curved centrifugal blower (6"x8", 7"x8") Backward-curved centrifugal blower (D318 ~ D420)	Backward-curved centrifugal blower (D400 ~ D450) Axial flow blower (28" ~ 32")	Backward-curved centrifugal blower (D450 ~ D580)	Backward-curved centrifugal blower (D450 ~ D580)
Applications	2'x4' FFU / 4'x4' FFU	Fan wall systems / Outdoor units	Fan wall systems	Fan wall systems
Production Stage	MP	26Y Q4	27Y Q2	26Y Q2

# Success Cases – (JP) SINKO

## EC Motor Model

Model equipped with an EC motor for energy savings.

空気をデザインする会社  
**SINKO**  
A/R DES/GN COMPANY

### Model GSRC



Energy-saving model.

Equipped with an EC motor, it reduces power consumption by up to 70% compared to conventional models (Lo operation), can achieve 50% in actual operation.(depend on condition)  
The use of a brushless PMSM motor achieves high efficiency performance.

### TECO ECM



### Model GTCRH



Energy saving FCU.

Equipped with an EC motor, it can reduce power consumption by 70% (Lo operation) compared to AC motor models.  
The controller is integrated with the motor, making it easy to replacement.

## SINKO FAN COIL UNIT LINEUP

### Model SRC

Applicable to Various Kinds of Static Pressure Requirement and Specially Designed for Low Sound Operation.



Model SRC (4-Pipe)

### Model TCRH

Larger Air Volume, High Static and Low Profile Unit.



Model TCRH (2-Pipe)



Ceiling Mount Exposed Model



Floor Mount Exposed Model



Floor Mount Recessed Model

### ENERGY SAVING TYPE

UP TO 70%

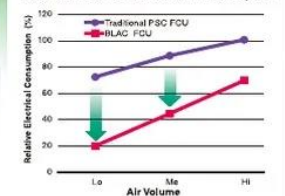
### Model GSRC

BLAC FAN COIL UNIT SERIES

NEW



BLAC and PSC FCU Electrical Consumption



# Authorized Distributor Business Model

Selling Types	Products	Customers Types	End Applications
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