

ELCO®



ENERGY SAVING MOTORS
ECM IP65-IP66

Our contribution to energy saving and CO₂ emissions reduction



Nowadays, the need to adopt effective actions to promote energy saving, as well as a drastic reduction in CO₂ emissions into the atmosphere, is universally recognised.

In Europe, there are in fact several million of sub-fractional horsepower electric motors used both in domestic appliances, or in air-conditioning and refrigerators. For the latter, especially for the ventilation of refrigerated display cases, sub-fractional HP motors with extremely low efficiency have always been used. For example, approximately 8 Watts of shaft output power are needed to operate a 230 mm diameter fan blade, which can be obtained from the following types of motor:

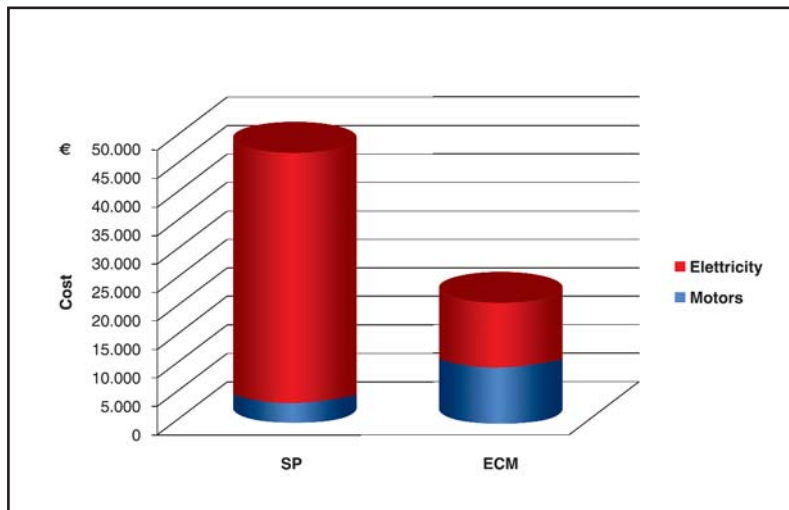
Shaded poles:
input power ~ 36 Watt
efficiency ~ 18%

Electronically commutated:
input power ~ 12 Watt
efficiency ~ 65%

The importance of choosing a high-efficiency motor is evident from considering a single supermarket with approximately 200 m of refrigerated display units installed, for an estimated total of 200 fan motors.

Considering an average energy cost of 0.11 Euro per kWh and CO₂ emissions of 0.6 kg per kWh consumed, we can calculate that if the same supermarket used "electronic control" motors instead of the equivalent "shaded pole" models, 68,500 kWh could be saved in one year, equivalent to approximately 7,500 Euro and a reduction in CO₂ emissions of **41 tonnes**.

Electricity cost vs purchase motors cost in 2 years of use



The sensible energy saving widely compensates the greater cost of high-efficiency motors, with payback in just few months: in fact, in the lifetime overall cost of a shaded-pole motor, energy consumption represents almost 97-98%, while its purchase costs only 2-3%.

Moreover, reduced CO₂ emissions is a topic of great interest in relation to the maximum quotas assigned to each country and the related “carbon trading” that regulates the “emission credits” market between virtuous users and less-virtuous ones.

Within this context, thanks to over 800,000 high-efficiency ECM motors already supplied to the market, ELCO has contributed to a reduction in environmental emissions of an estimated **116,000 tonnes of CO₂ per year**.

To confirm the high-efficiency and consequently the cost advantage of ECM motors, a two-months test was carried out by independent consultants at a large foodstore supermarket located in Tortona (Northern Italy), by monitoring a specific area of refrigerated display cases covering approximately 200 fan motors.

Energy consumption was monitored by initially recording the usage of the traditional shaded pole motors and then replacing them with ELCO's ECM models.

Tests results showed a saving of 142,423 kWh against a Total Energy Consumption of 614,466 kWh; the equivalent of approximately **85 tonnes of CO₂**.

Similar tests were carried out in some European supermarkets, where today only ELCO motors are used. The results have not only confirmed large savings, but also more uniform airflow thanks to the greater torque of ECM motors.

The advantages with towards the “shaded pole” solution are:

- **High efficiency 63÷68%**
- **Maximum moisture protection with the new IP65-IP66 versions**
- **Reduced depth compared to the standard N serie Shaded Pole motors**
- **Drop in replacement with the standard N series and possibility to use all standard accessories**

Simulation of a management cost over time of refrigerated MT and LT on Hypermarket with 400 motors



Construction specifications Certifications



General specifications

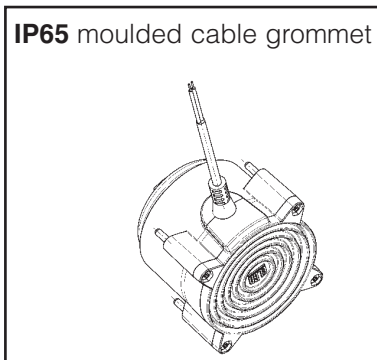
ELCO SpA has developed and patented a new range of high-efficiency sub-fractional horse power electronically commutated motors - the ECM series. This new generation of motors is specifically designed to satisfy the growing market demands of **“energy saving”**, granting first-rate results in terms of efficiency and life expectancy.

The motor, totally enclosed in a thermoplastic housing, contributes to limiting external heat emission, which results in a particularly cool motor body during operation and hence generate a further energy savings. Thanks to a special, permanent lubrication system and based on laboratory tests, the life expectancy is approximately 30,000 hours for the Standard version and 60,000 hours for the Long Life version.

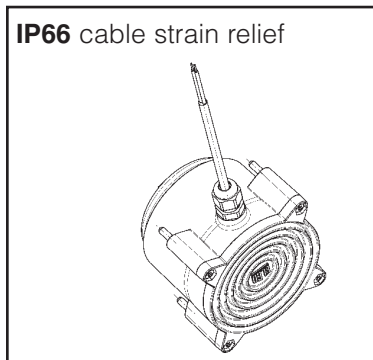
The ECM series is currently available in two single-speed versions, to be selected according to power requirements.

Type	Protection Rating	Bearing
Standard	IP65	Sleeve-bearings
Long-Life	IP65	Ball-bearings
Long-Life	IP66	Ball-bearings

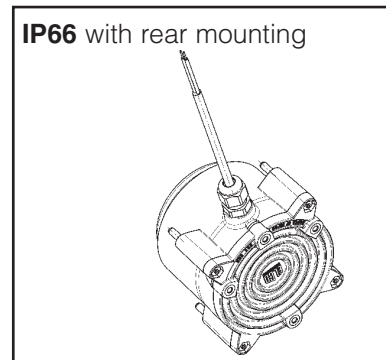
IP65 moulded cable grommet



IP66 cable strain relief



IP66 with rear mounting



Certifications

All products are designed and manufactured according to European regulations
 CENELEC EN 60335-1, electromagnetic compatibility EN 61000-3-2 +A1/A2, EN55014-1 and CE marked.

All components are UL compliant.

UL XEIT listed versions are available.



Technical data

	ECM Standard	ECM Long Life
Working temperature	-40°C ÷ +55°C*	
Insulation class	B	
Protection rating	IP65	IP65-IP66
Voltage	100V / 50÷60HZ • 115-127V / 50÷60Hz • 230-240V / 50÷60Hz	
RPM at 115-127V	1450 • 1550 • 1850	
RPM at 230-240V	1400 • 1600 • 1850	
IN power	9÷14W	9÷14W • 20÷25W
Standards	CENELEC EN 60335-1 • EN 61000-3-2 + A1/A2 • EN 55014-1	
Approvals		
Supports	Sleeve-bearings	Ball-bearings
Life expectancy at 20°C	30,000 hours	60,000 hours

* > 55°C upon request ** Approval pending

Applications

The ECM series motors may be universally applied, but are particularly suited to the refrigeration and ventilation industry, especially for refrigerated display cases, freezers, drink dispensers and small condensers; they can be coupled with various types of fan blades, particularly axial fans with diameters up to 300 mm.

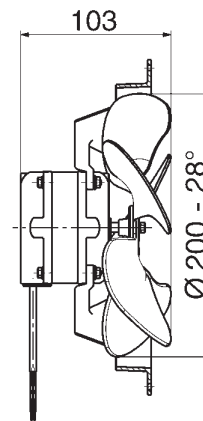
Interchangeability:

The ECM motor was also designed to comply with the same principle of standardization that ELCO developed for the N-series motors.

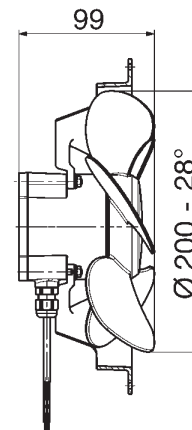
In fact, ELCO's **"energy saving"** motors are, drop-in replacements of the traditional shaded pole ones, and use all the same accessories, such as brackets, fans, rings and guards, with no extra work - or hidden costs, to the full benefit of rapidity and convenience.



N Fan

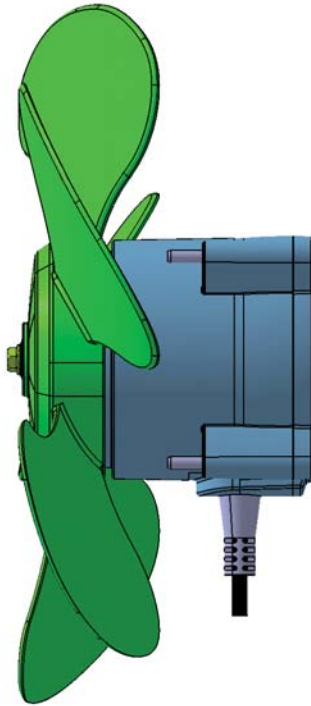


ECM Fan

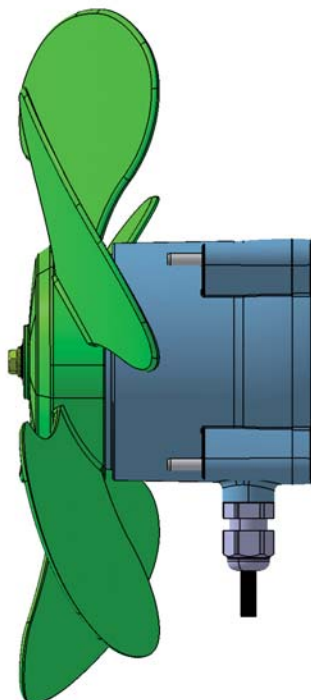


Construction differences

IP65 Standard



IP66 Long Life



Product description:

The ECM IP65 and IP66 Series is a new product, derived from the well-known range of **energy-saving** motors and designed for operation in environments with high humidity or moisture.

The IP65 version comes with an O-ring to seal the rear plastic end-shield to the motor housing and moulded cable grommet, sleeve or ball-bearings and a new fan profile integrated with the internal watherproof labyrinth.

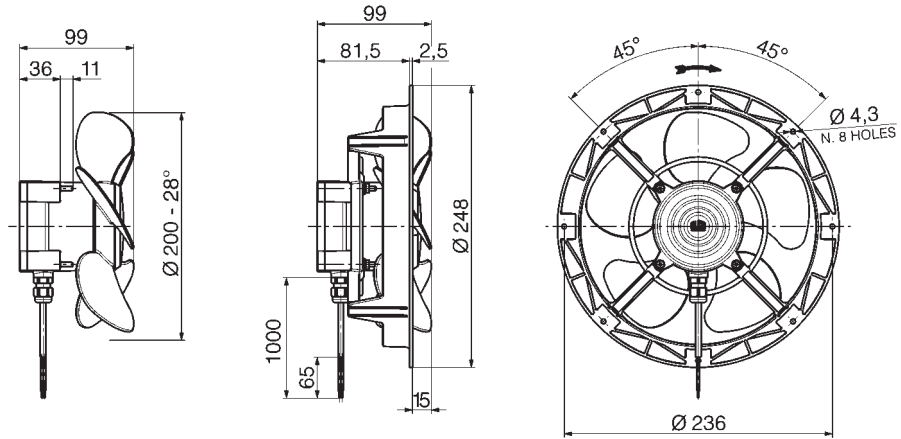
While in the IP66 version, the motor has a double-sided rubber sealed ball-bearings and cable exit fitted with an IP68 strain relief.

The electronic control unit is provided with various safety features:

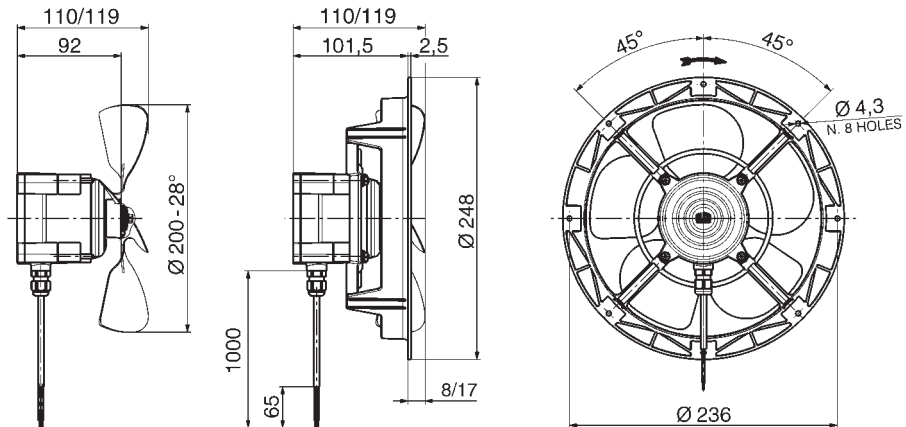
- Overload control function, which switches the motor to standby mode if an external mechanical action causes the speed to drop below a preset level.
- Locked rotor control function, which switches the motor to standby mode after twenty restart attempts, in case of fan blocked by icing or other reasons.
- Auto-reset function, which allows the microprocessor to reset and restart the control functions, in cases of electrical interference or power supply fluctuations.
- Self-diagnostics function during switch-on and switch-off. In cases of ON/OFF alternative use, each cycles should be at least 20 seconds apart.
- Power shut-down function in cases of microprocessor failure.

Overall dimensions

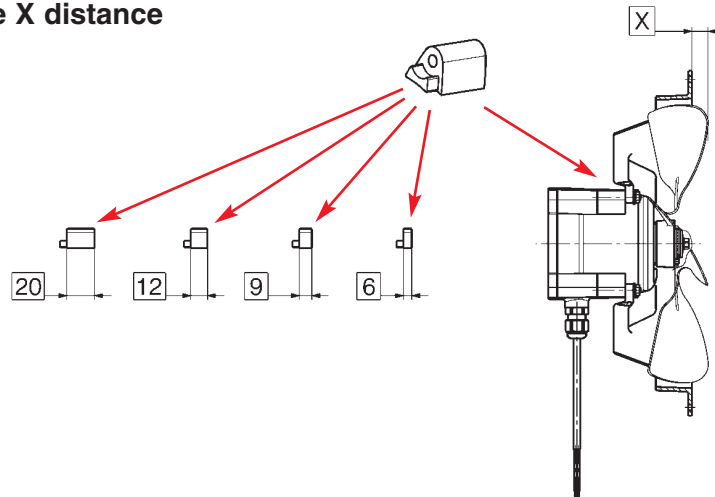
With integrated fan



With Aluminium/Plastic fan

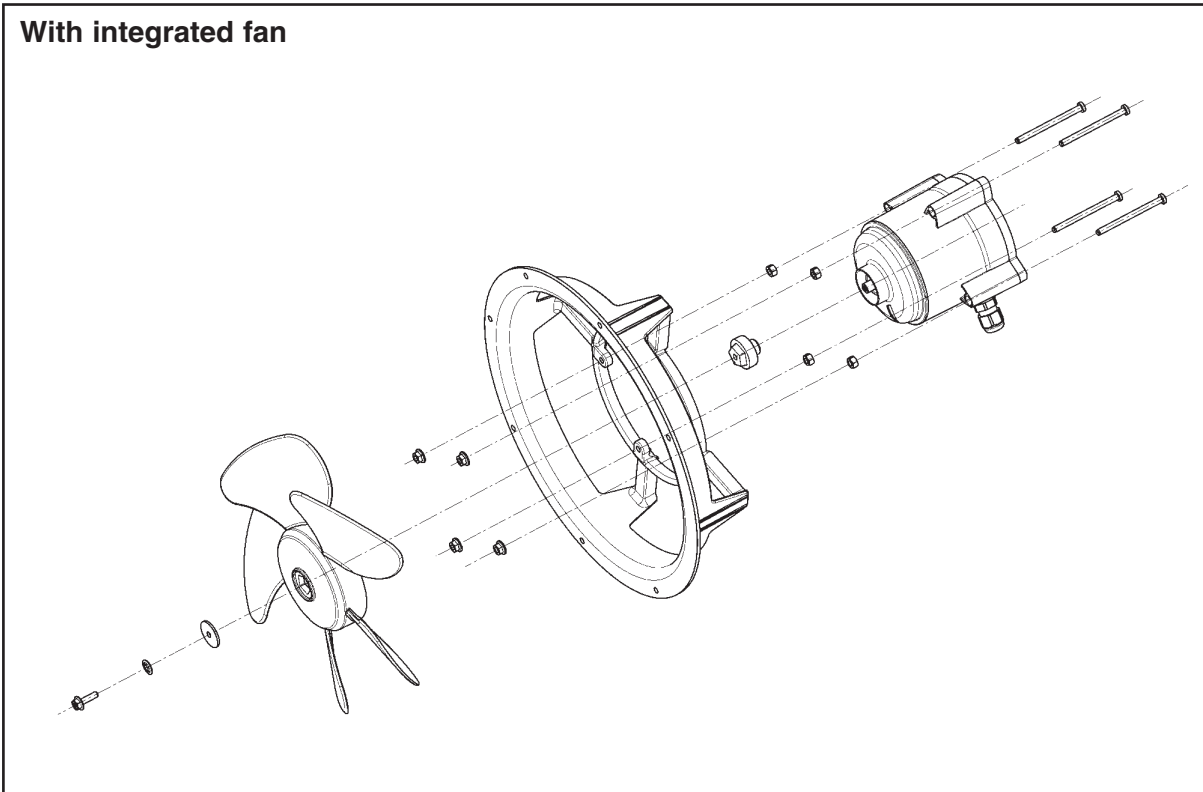


Spacers to adjust the X distance

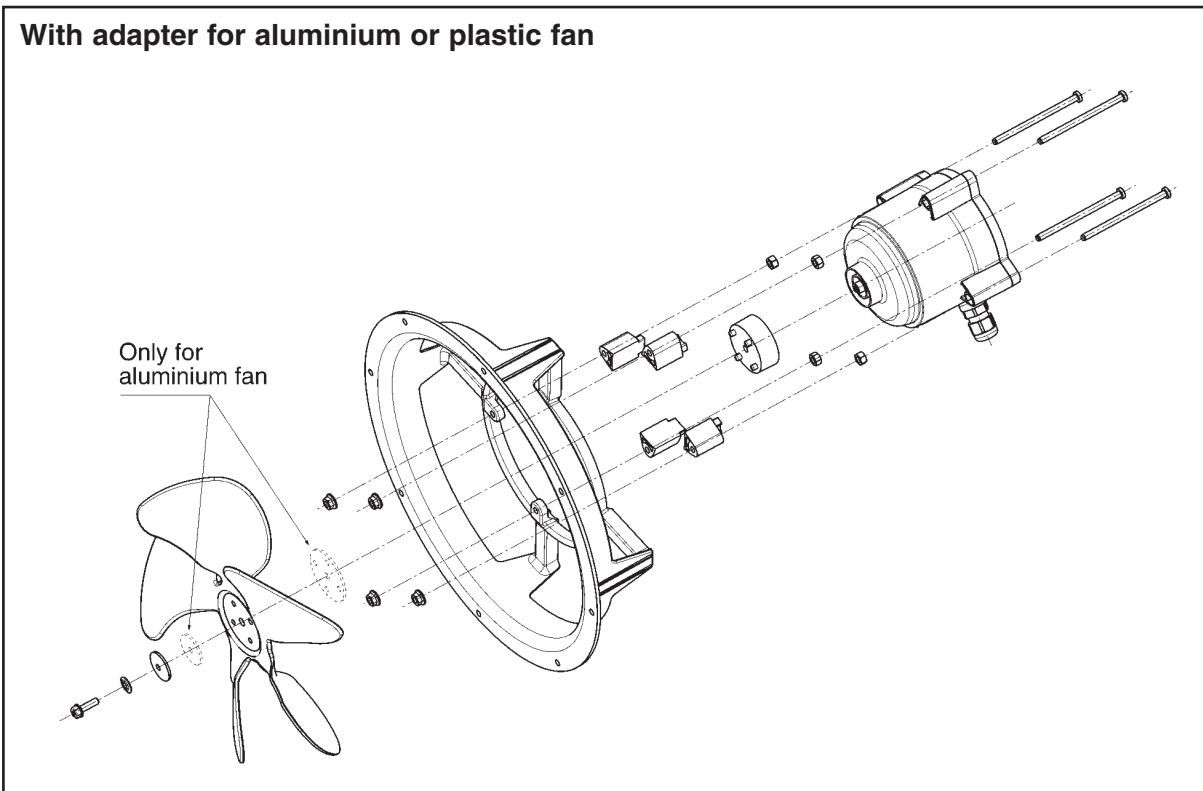


Fan assembly Accessory

With integrated fan

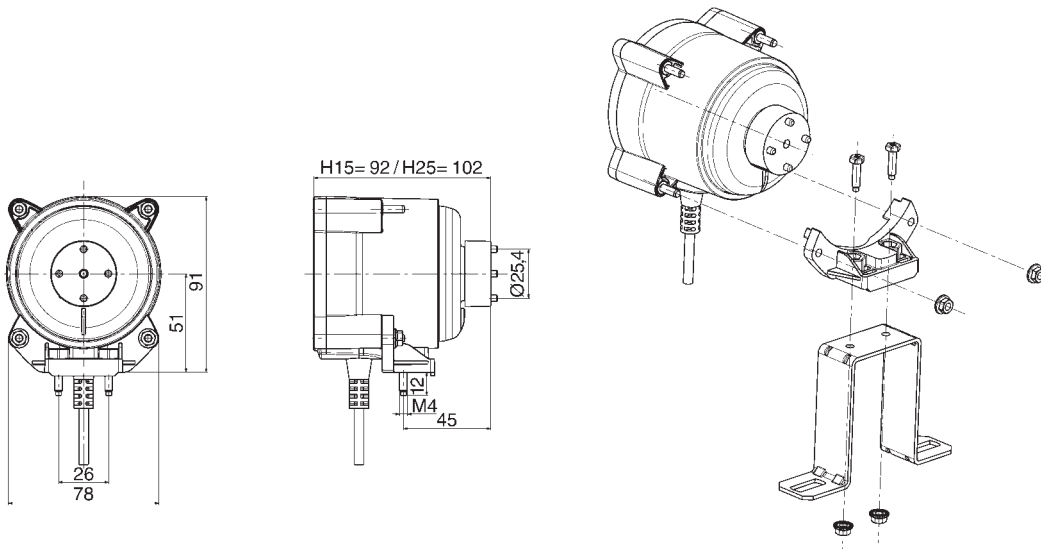


With adapter for aluminium or plastic fan



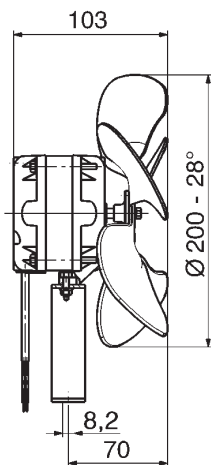
Mountings

ECM with aluminium or plastic fan with bracket

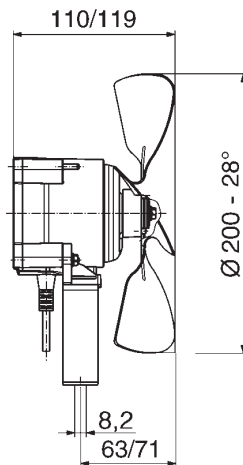


Comparison of overall dimensions with bracket

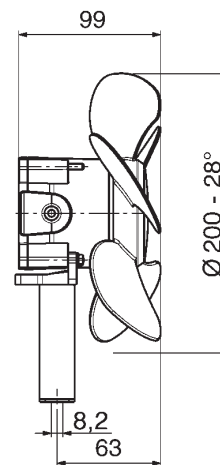
N
Aluminium/Plastic Fan



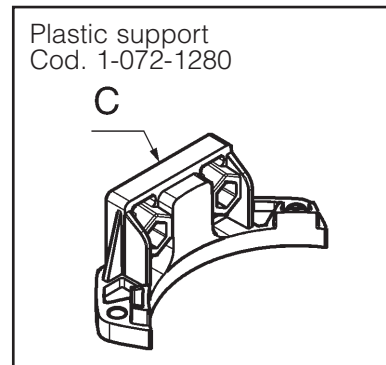
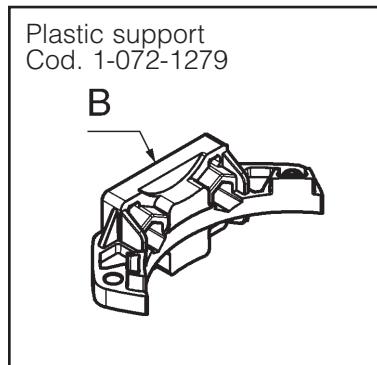
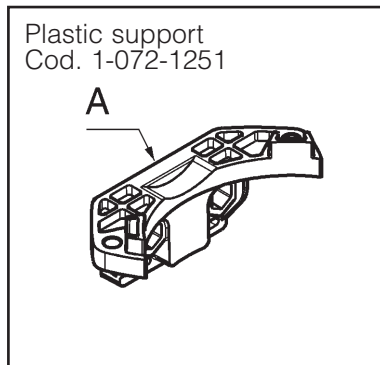
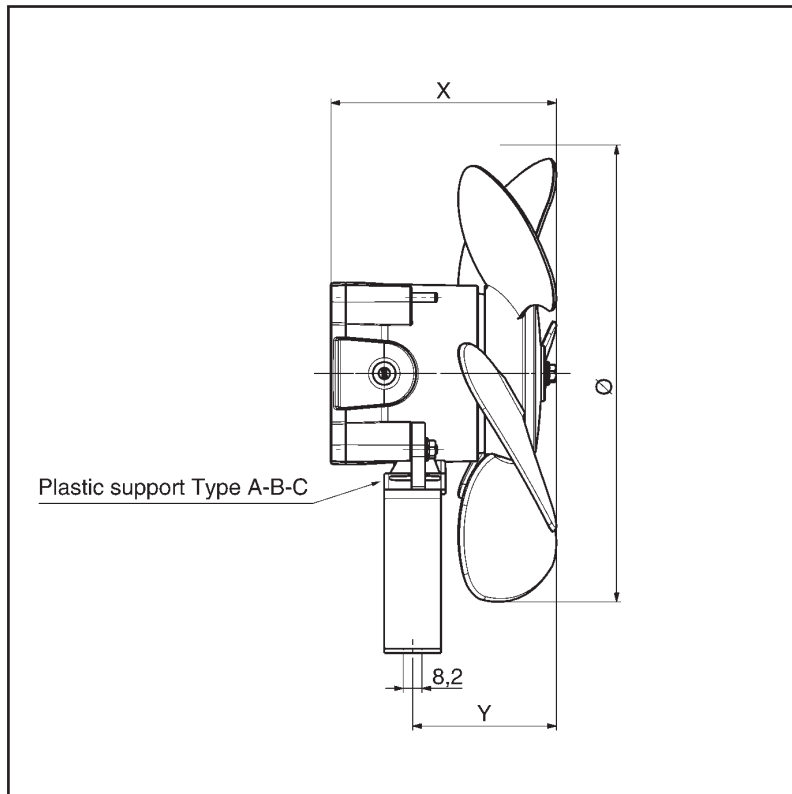
ECM
Aluminium/Plastic Fan



ECM
Integrated Fan

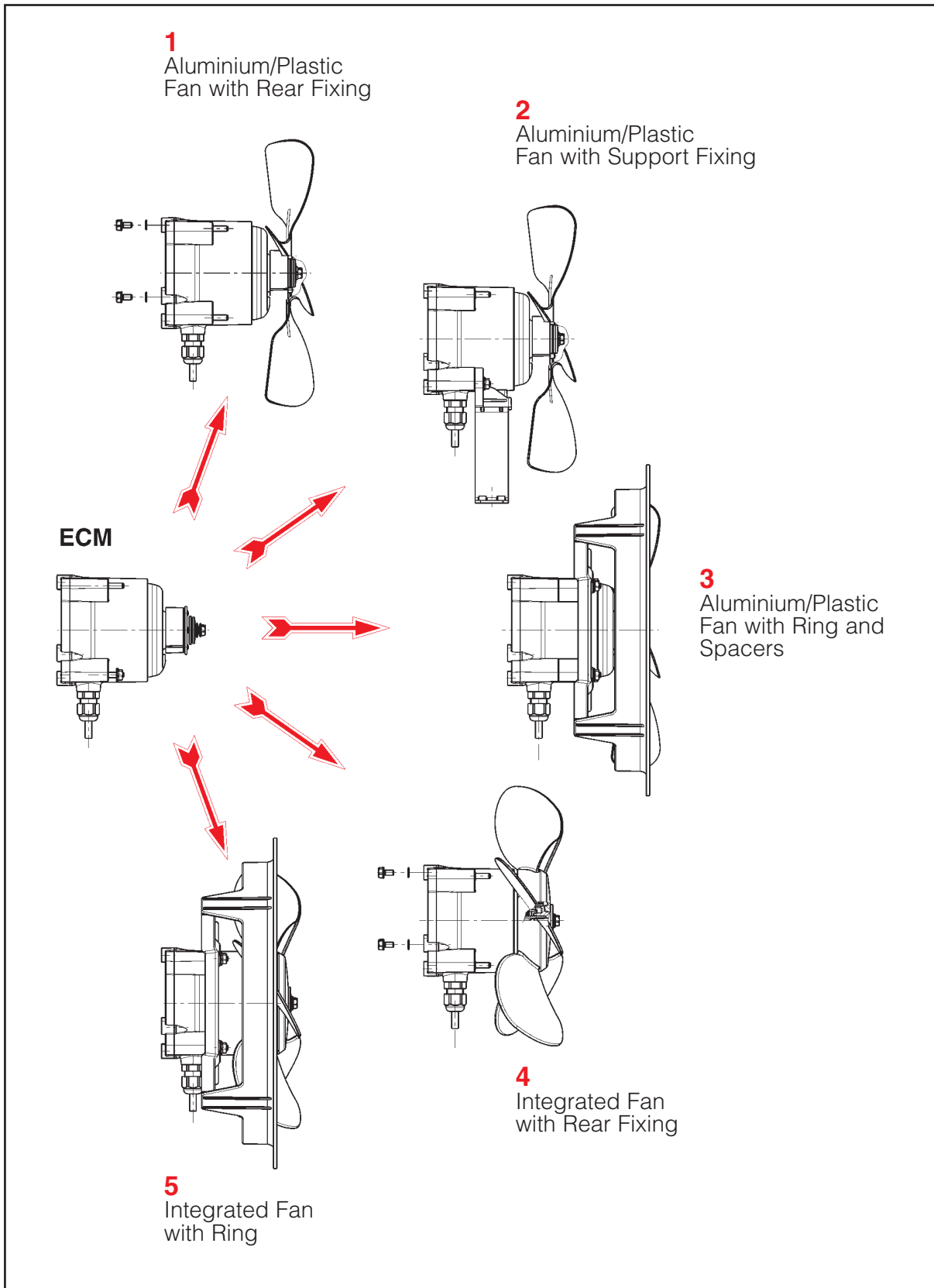


ECM with integrated fan and bracket



Motor	Fan	Plastic support	Y	X
ECM 12W	Ø 154 19°	A	44	92
	Ø 172 28°	B	60	96
	Ø 200 28°	B	63	99
	Ø 200 34°	C	77	102
	Ø 230 19°	B	57	93
	Ø 230 25°	C	70	95
ECM 20W	Ø 230 31°	C	70	105
	Ø 254 22°	B	65	111

Different solution of using



Fans for ECM motors



ECM 12W 1400 Rpm



ECM 20W 1400 Rpm

Integrated plastic fan

Type	Fan Ø					
	154	172	200	230	254	
VIA	19°			19°		
					22°	
				25°		
		28°	28°			
				31°		
		34°				



Plastic fan with fan hub

Type	Fan Ø						
	140	154	172	200	222	230	254
VEA							22°
						25°	
	28°	28°		28°		28°	28°
			31°		31°	31°	
VEP		19°					19°
							25°
	28°						
				31°			



Aluminium fan with fan hub and silencer

Type	Fan Ø						
	154	172	200	230	254	275	300
A	19°	19°	19°	19°	19°		19°
	22°	22°	22°	22°	22°	22°	
	25°	25°	25°	25°	25°	25°	
	28°	28°	28°	28°	28°		
	31°	31°	31°	31°	31°		
	34°	34°	34°	34°			
AO	19°	19°	19°	19°	19°		19°
	22°	22°	22°	22°	22°		
	25°	25°	25°	25°	25°	25°	
	28°	28°	28°	28°	28°		
	31°	31°	31°	31°	31°		
	34°	34°	34°	34°			



ECM_H

The consolidated experience, result of more than 10 years of studies, analysis, research and production of ECM motor, sold world wide, and the continuous demand of higher performances, has been the basic premise to develop a new version of electronically commutated motor that can satisfy the market requests.

The new solution covers a wider range of aeraulic performances with smaller dimensions, keeping under control the motor efficiency.

Compared to the actual one, the motor presents the following features:

- Better efficiency
- Wider range of performances
- Motor speed up to 2700 rpm
- Better exploitation of electronic power and control
- Several kinds of hardware and software protections

Technical data:

- 230V - 50Hz; 115-127V 50/60Hz motor
- Protection rating IP65, IP66
- Rotation speed: 1500-1600-1850-2200 rpm
- Working temperature: -40°C +55°C
- Protection by hardware and software
- Protection against electromagnetic disturbance in accordance with EMC
- Standard EN60335-1; EN61000-3-2 +A1/A2; EN55014-1
- Sleeve or ball bearings
- Totally made of thermoplastic material with double insulation

As the actual one, this new version is totally interchangeable with shaded pole motors and mainly used for refrigerating appliances.

**Motors ECM_H
Matching motor-fan**

Fan	1600 RPM						1850 RPM						2200 RPM					
	19°	22°	25°	28°	31°	34°	19°	22°	25°	28°	31°	34°	19°	22°	25°	28°	31°	34°
154	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15
172	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 20-25	ECM_H 20-25	ECM_H 20-25	ECM_H 20-25	ECM_H 20-25	ECM_H 20-25
200	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 12-15	ECM_H 20-25	ECM_H 20-25	ECM_H 20-25			
230	ECM_H 12-15	ECM_H 12-15	ECM_H 20-25	ECM_H 20-25	ECM_H 20-25	ECM_H 20-25	ECM_H 20-25	ECM_H 20-25										
254	ECM_H 12-15	ECM_H 20-25																
300																		

ECM_H 12-15

ECM_H 20-25

Fans for ECM_H motors

ECM_H 12W 1500 Rpm
ECM_H 20W 1500 Rpm

Integrated plastic fan

Type	Fan Ø					
	154	172	200	230	254	
VIA	19°			19°		
					22°	
				25°		
		28°	28°			
				31°		
		34°				



Plastic fan with fan hub

Type	Fan Ø						
	140	154	172	200	222	230	254
VEA							22°
						25°	
	28°	28°		28°		28°	28°
			31°		31°	31°	
VEP		19°					19°
							25°
	28°						
				31°			




Aluminium fan with fan hub and silencer

Type	Fan Ø						
	154	172	200	230	254	275	300
A	19°	19°	19°	19°	19°		19°
	22°	22°	22°	22°	22°	22°	22°
	25°	25°	25°	25°	25°	25°	
	28°	28°	28°	28°	28°		
	31°	31°	31°	31°	31°		
	34°	34°	34°	34°			
AO	19°	19°	19°	19°	19°		19°
	22°	22°	22°	22°	22°		22°
	25°	25°	25°	25°	25°	25°	
	28°	28°	28°	28°	28°		
	31°	31°	31°	31°	31°		
	34°	34°	34°	34°			





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