



MULTI-FIT FAN MOTORS

BALL BEARING MOTORS

Long life, high quality design
for all refrigeration duties



**MULTI-FIT MOTORS ARE
EX-STOCK IN PARCEL OR
PALLET QUANTITIES**

HIGH QUALITY COMPONENTS FOR REFRIGERATION

General multi-fit motor specifications

- BALL BEARING
- MULTI-FIT
- FAN MOTORS
- SPARES FOR
- REFRIGERATION



- ▶ Ball Bearing Multi-fit Refrigeration Motors
- ▶ Latest compact design with shorter body
- ▶ Quality ball bearings give increased life
- ▶ Operates with shaft horizontal or vertical
- ▶ Ambient temperature range - 40°c to + 80°c
- ▶ 1 metre x double insulated 3 core cable
- ▶ Full range of mountings and accessories
- ▶ Brackets, guards, rings, grids, fixings
- ▶ Multi-fit motors are individually boxed
- ▶ All fixing nuts, screws, washers supplied
- ▶ 3 tapped holes at both ends, 18mm foot, 26mm foot, corner bolts for ring/guard.
- ▶ 5W, 7W, 10W, 16W, 18W, 25W & 34W

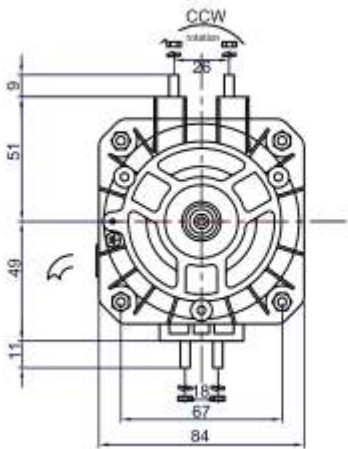
MOTOR SPECIFICATIONS	
Motor Type	Shaded Pole
Voltage	220/240V
Frequency	50/60Hz
Rotation	ACWSE
Protection	Imp or T.O.P.
Insulation	Class B
Enclosure Rating	IP 42
Temperature Rise	75°c (max)
Minimum Temp	Minus 40°c
Maximum Temp	Plus 80°c
Angle of Operation	360°
Bearings	Ball Race
Approvals	VDE, CE



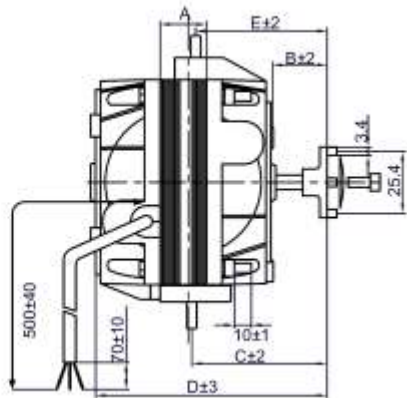
POLE STAR MULTI-FITS

Table of multi-fit physical dimensions

End View (shaft end or drive end)
Rotation ACW (anti clockwise)
or CCW (counter clockwise)



Motor Side View
Physical dimensions vary
depending on motor model



MULTI-FIT MOTORS - PHYSICAL DIMENSIONS							
Model	Power	A	B	C	D	E	Weight
PS5BM-1	5W	13	25	45	88	49	0.80
PS7BM-1	7W	19	18	52	88	48	1.00
PS10BM-1	10W	19	18	52	88	48	1.10
PS16BM-1	16W	25	25	55	100	47	1.40
PS18BM-1	18W	30	20	63	100	50	1.50
PS25BM-1	25W	40	19	72	109	49	1.80
PS34BM-1	34W	45	25	85	120	55	2.00

A = Motor stack length - thickness of the lamination pack

B = Visible shaft extension - distance from body to fan hub

C = Distance from bracket with studs on 18mm centres to fan hub

D = Overall length of the motor from lead end-shield to fan hub

E = Distance from bracket with studs on 26mm centres to fan hub

All dimensions listed above are in millimetres. Motor weight in kg
Dimensions listed are nominal. Allow for manufacturing tolerances.



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Electrical data, prices & carriage

MULTI-FIT MOTORS - ELECTRICAL DETAILS							
Model	Voltage	Frequency	Speed	Output	Input	Current	Protection
PS5BM-1	220/240	50/60	1300	5	33	0.19	Impedance
PS7BM-1	220/240	50/60	1300	7	38	0.24	Impedance
PS10BM-1	220/240	50/60	1300	10	40	0.24	Impedance
PS16BM-1	220/240	50/60	1300	16	70	0.40	T.O.P.
PS18BM-1	220/240	50/60	1300	18	73	0.50	T.O.P.
PS25BM-1	220/240	50/60	1300	25	95	0.55	T.O.P.
PS34BM-1	220/240	50/60	1300	34	120	0.66	T.O.P.

Impedance protection = safety winding design incorporated

T.O.P. = Automatic reset thermal overload protector fitted

Voltage = Volts, Frequency = Hertz, Speed = RPM

Output = Watts, Input = Watts, Current = Amperes

Multi-fit Prices	
Model No.	Power
PS05BM-1	5W
PS07BM-1	7W
PS10BM-1	10W
PS16BM-1	16W
PS18BM-1	18W
PS25BM-1	25W
PS34BM-1	34W



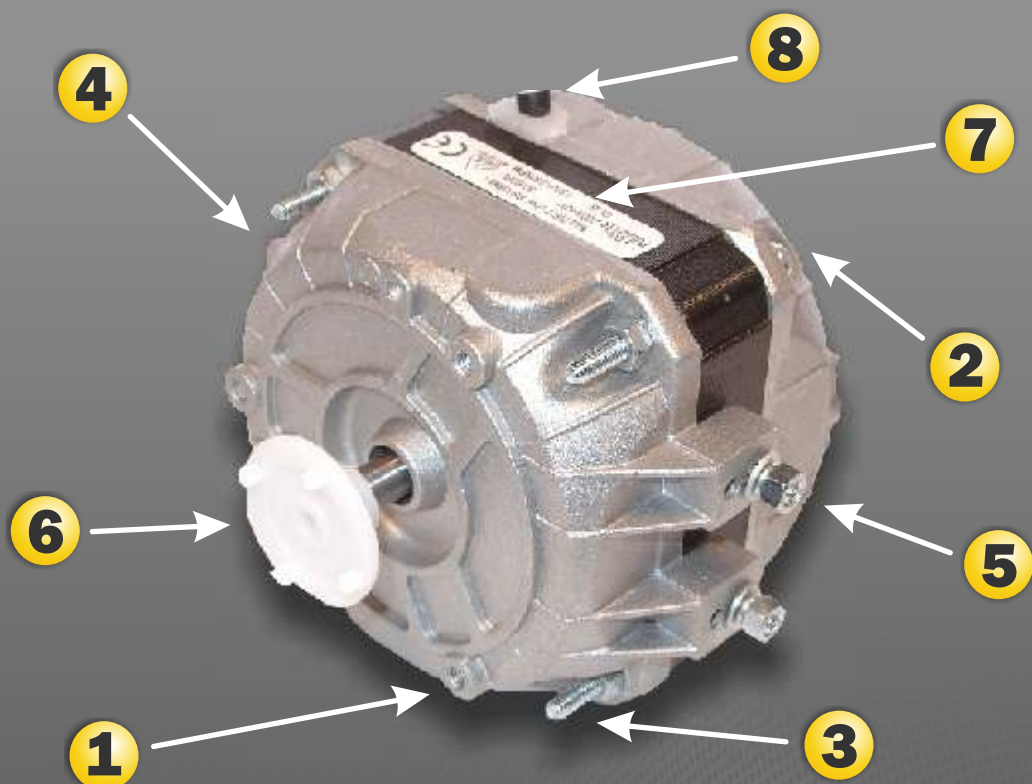
NEXT DAY DELIVERY - FREE OF CHARGE *

We have no minimum order quantity or invoice value
Free delivery on all multi-fit orders for 10 + motors
Any mix of models will qualify. You choose from list
£8 carriage charge for shipping less than 10 motors
Standard delivery next working day. Not guaranteed
Timed deliveries before 9, 10 and 12am are available
Please refer to our catalogue or office for details



POLE STAR MULTI-FITS

Multi-fit motor mounting information



- (1)** 3 x M4 tapped mounting holes equi-spaced on 72mm PCD at shaft end
- (2)** 3 x M4 tapped mounting holes equi-spaced on 72mm PCD at lead end
- (3)** 4 x M4 x 15mm extended corner bolts on 95mm PCD at shaft end
- (4)** 2 x M4 x 11mm studs, 18mm centres, side bracket, 48mm shaft centre height
- (5)** 2 x M4 x 9mm studs, 26mm centres, side bracket, 51mm shaft centre height
- (6)** White plastic fan hub adaptor, UCP standard, 4 drive lugs on 25.4mm PCD
- (7)** Motor nameplate, model no, 220/240V, 50/60Hz, Class B, 1300/1550RPM
- (8)** Rubber grommet at lead exit seals double insulated black 3 core cable



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Ring mounted fans – popular sizes

RING MOUNT FANS + BALL BEARING MOTORS



Motor Power	Fan Blade		Rotation S.E.	Mounting P.C.D.	Airflow Direction	Lead Length
	Diameter	Pitch				
5W	154	31°	ACW	190	Blowing	1000
5W	154	31°	ACW	190	Sucking	1000
5W	172	31°	ACW	208	Blowing	1000
5W	172	31°	ACW	208	Sucking	1000
10W	200	31°	ACW	236	Blowing	1000
10W	200	31°	ACW	236	Sucking	1000
10W	230	31°	ACW	266	Blowing	1000
10W	230	31°	ACW	266	Sucking	1000
18W	254	31°	ACW	290	Blowing	1000
18W	254	31°	ACW	290	Sucking	1000
25W	300	31°	ACW	344	Blowing	1000
25W	300	31°	ACW	344	Sucking	1000

∴ Alternative blade pitch angles may include 19°, 22°, 25°, 28°, 31° & 34°
with a choice of blade , any available angle, sucking or blowing airflow
assembled using ball bearing motors, longer life, - 40°c to + 80°c, etc.
the combination of components - motor power and choice of fan blade



POLE STAR MULTI-FITS

Guard mounted fans – popular sizes

GUARD MOUNT FANS + BALL BEARING MOTORS



Guard Mount Fan Part Number	Motor	Fan Blade		Rotation	Mounting	Airflow	Lead
	Power	Diameter	Pitch	S.E.	P.C.D.	Direction	Length
PS05BM-G154B-31	5W	154	31'	ACW	190	Blowing	1000
PS05BM-G154S-31	5W	154	31'	ACW	190	Sucking	1000
PS05BM-G172B-31	5W	172	31'	ACW	208	Blowing	1000
PS05BM-G172S-31	5W	172	31'	ACW	208	Sucking	1000
PS10BM-G200B-31	10W	200	31'	ACW	236	Blowing	1000
PS10BM-G200S-31	10W	200	31'	ACW	236	Sucking	1000
PS10BM-G230B-31	10W	230	31'	ACW	266	Blowing	1000
PS10BM-G230S-31	10W	230	31'	ACW	266	Sucking	1000
PS18BM-G254B-31	18W	254	31'	ACW	290	Blowing	1000
PS18BM-G254S-31	18W	254	31'	ACW	290	Sucking	1000
PS25BM-G300B-31	25W	300	31'	ACW	344	Blowing	1000
PS25BM-G300S-31	25W	300	31'	ACW	344	Sucking	1000

Aluminium Fan Blades: Alternative blade pitch angles may include 19', 22', 25', 28', 31' & 34'

Fans are assembled with a choice of blade , any available angle, sucking or blowing airflow

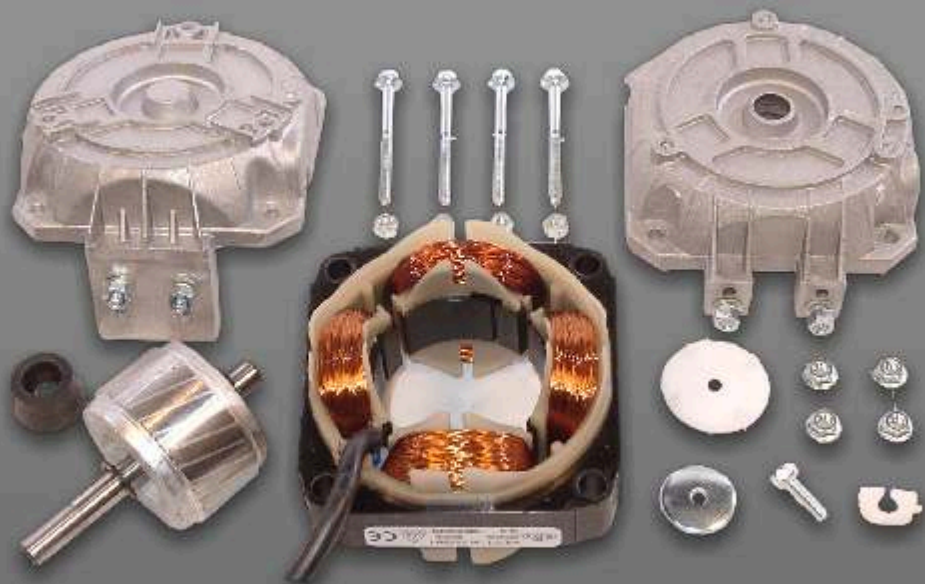
Guard mount fans are assembled using ball bearing motors, longer life, - 40'c to + 80'c, etc.

Customer can specify the combination of components - motor power and choice of fan blade



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Components for shaded pole motors



PEDESTAL BRACKETS MOUNTING
V FORM



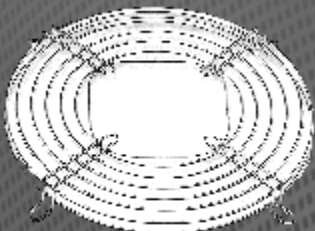
PEDESTAL BRACKETS MOUNTING
STRAIGHT LEG



STEEL MOUNTING RINGS



STEEL MOUNTING GUARDS



POLE STAR MULTI-FITS

Motor power matched to fan blade

MOTOR POWER OUTPUT MATCHED TO ALUMINIUM FAN BLADE SIZES								
Supply	Power	Stack	Motor Power Output Matched to Aluminium Fan Blade Sizes					
Frequency	Output	Length	154mm (6")	172mm (7")	200mm (8")	230mm (9")	254mm (10")	300mm (12")
50Hz	5W	13mm	34'	34'	34'	25'		
60Hz	5W	13mm	34'	34'	34'	22'		
50Hz	7W	19mm	34'	34'	34'	28'		
60Hz	7W	19mm	34'	34'	34'	25'		
50Hz	10W	19mm		34'	34'	34'	28'	
60Hz	10W	19mm		34'	34'	28'	22'	
50Hz	16W	25mm				34'	34'	25'
60Hz	16W	25mm				34'	28'	22'
50Hz	18W	30mm				34'	34'	28'
60Hz	18W	30mm				34'	28'	25'
50Hz	25W	40mm					34'	31'
60Hz	25W	40mm					34'	31'
50Hz	34W	45mm						34'
60Hz	34W	45mm						28'

MOTOR POWER OUTPUT MATCHED TO PLASTIC FAN BLADE SIZES								
Supply	Power	Stack	Motor Power Output Matched to Plastic Fan Blade Sizes					
Frequency	Output	Length	154mm (6")	172mm (7")	200mm (8")	230mm (9")	254mm (10")	300mm (12")
50Hz	5W	13mm	28'	31'	28'			
60Hz	5W	13mm	28'	31'	28'			
50Hz	7W	19mm		31'	28'	25'		
60Hz	7W	19mm		31'	28'	25'		
50Hz	10W	19mm			34'	31'	22'	
60Hz	10W	19mm			34'	31'	22'	
50Hz	16W	25mm				31'	28'	
60Hz	16W	25mm				31'	28'	
50Hz	18W	30mm				31'	28'	
60Hz	18W	30mm				31'	28'	
50Hz	25W	40mm					28'	
60Hz	25W	40mm					28'	
50Hz	34W	45mm						
60Hz	34W	45mm						



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Ball Bearings versus Sleeve Bearings

Bearing Types

Bearing type and quality is an important factor in determining the reliability and life expectancy of fractional horsepower electric motors and fans. The choice is generally between sleeve bearings and ball bearings. When choosing, design engineers must consider factors such as: application, fan longevity, mounting, angle of operation, noise, ambient temperature, duty, lubrication issues, etc.

Ball Bearing Construction

Ball bearings consist of two hardened metal rings, one inside the other, separated by a set number of perfectly spherical steel balls spaced evenly within a bearing cage. The balls run along concave grooves set into each of the rings. The ball system requires a small amount of lubrication to reduce friction, prevent corrosion, etc. Precision components ensure quieter operation and longer life.

Sleeve Bearing Construction

Sleeve bearings have no moving parts. They are a low cost option, made from sintered iron, bronze, etc. These materials are pressed into moulds using powder metallurgy. The bearings are porous bushes impregnated with oil which can be 50% by volume. Most systems use a felt wick to feed oil into the bearings. The oil circulates due to shaft load pressure through interconnecting pores.

Low Temperatures

When the ambient temperature is relatively low, sleeve bearing motors can last as long as ball bearing motors. However, sleeve bearing motors can have problems starting at very low temperatures due to the oil viscosity and bearing stiction - especially with low power models. Shaded pole motor designs are inherently inefficient and the surplus heat generated can help to free bearings in some cases.

High Temperatures

Motor reliability is crucial in achieving long life. Small motors and fans operating in the range from 25 to 60 degrees centigrade using ball bearings will out last their sleeve bearing equivalents by an average of 50 percent. Ball bearing motors can operate beyond 70 degrees centigrade, with reduced life, whilst sleeve bearing motors may be inoperable. Ball bearing motors tolerate higher temperatures.

Bearing Noise

Motors with ball bearings may be slightly noisier than motors with sleeve bearings in very low speed applications. The difference is small however, between 1 and 3dBA, which is not significant when air noise is taken into consideration. Motor noise accounts for only 5% of total noise compared to 95% air noise from the fan blade. Pre-loaded ball bearings have higher tolerances to reduce noise.

Bearing Quality

Ball bearings are manufactured using precision components. Steel balls are precision ground and super finished to provide exact tolerances. Sleeve bearings can deteriorate at high temperatures because they are made from porous powdered metals in a sintering process. Micro hardness makes secondary machining difficult. Sleeve bearing quality depends on shaft clearance and oil supply.

Mounting Position

Ball bearing motors can be mounted in any position without affecting life expectancy. Sleeve bearing motors are designed to operate with the shaft in a horizontal position and any variation in angle can reduce life span. Ball bearings are preloaded with a spring or wave washer during manufacturing. A ball bearing motor can be used with heavier fan blade when the shaft angle is vertical up or down.

Lubrication

Sealed for life ball bearings use thicker grade lubricants with more additives and are less prone to evaporation. The lubricants in sleeve bearings have a greater quantity of oil, but the bearing bushes can only hold a fixed amount and the rest is more likely to evaporate. Ball bearing races are sealed but sleeve bearings are open and can attract dust, etc. which absorbs oil and causes early failure.

Low Speed Running

Motors with ball bearings will operate at all speeds, whilst those fitted with sleeve bearings should not be used at low speeds. Sleeve bearings are thin walled tubes within which the shaft spins on a thin film of oil. When properly lubricated, there is no contact between the bearing and shaft, but at low speeds the oil film breaks down causing metal to metal contact and quick bearing failure.

Bearing End Float

Motors with ball bearings have no axial movement. The relative position between shaft and bearing is fixed. To allow for thermal expansion, sleeve bearing motors are manufactured with a clearance which ranges from 0.1mm to 1.0mm. This prevents the motor from seizing when it gets hot. This "end float" is not usually a problem, though exact fan positioning with ball bearings is preferable.

Bearing Contact

Excessive friction can cause bearing failure. In addition to the amount of lubricant, the point of contact also dictates the amount of friction a motor sustains. Sleeve bearings are line contact type with broad contact between the shaft and bearing during the back and forth sliding motion only avoided by a thin film of oil. Ball bearings are point contact type and generate minimal friction.

Bearing Loads

Bearings can be subjected to two types of load - radial and axial. Radial (side) loads are perpendicular to the motor shaft (example: pull by tension of pulley belt). Axial (thrust) loads are parallel to the shaft (example: pull or push caused by air from a fan blade). As a general rule use ball bearing motors in preference to sleeve bearing types when radial or axial loads are a determining factor.

Bearing Quality

Ball bearings are manufactured using precision components. Steel balls are precision ground and super finished to provide exact tolerances. Sleeve bearings can deteriorate at high temperatures because they are made from porous powdered metals in a sintering process. Micro hardness makes secondary machining difficult. Sleeve bearing quality depends on shaft clearance and oil supply.

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