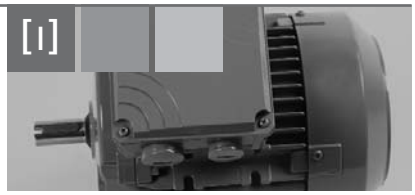
Customised Motors
Three-phase Motors
Single-phase Motors
Brake Motors

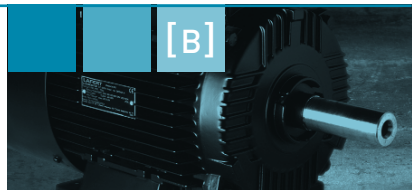
www.lafert.com

TECHNICAL CATALOGUE

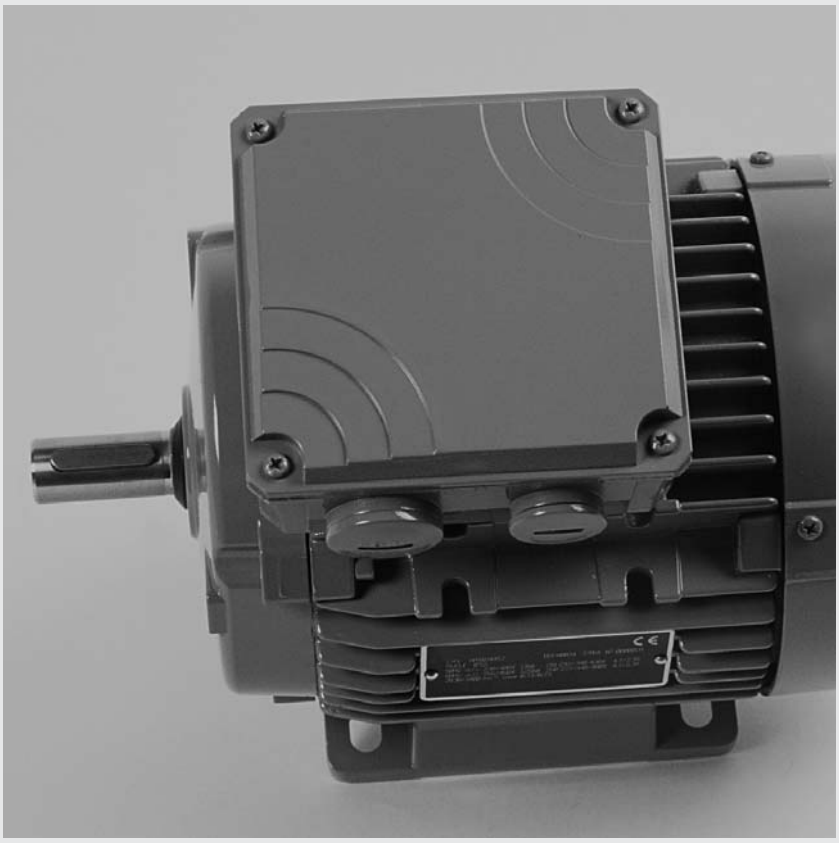
2010

LAFERTMOTORS





GENERAL INFORMATION



Lafert Group product policy

In the next few pages we offer a detailed overview of our manufacturing program of electric motors.

The main scope of our core business is the development of dedicated solutions that improves our Customer's product design, thereby giving our customers a competitive advantage. The core business of our Company stands on the ability to adapt and engineer our standard Product design to any specific market demand.

Lafert's range of products is divided in 5 product sectors:

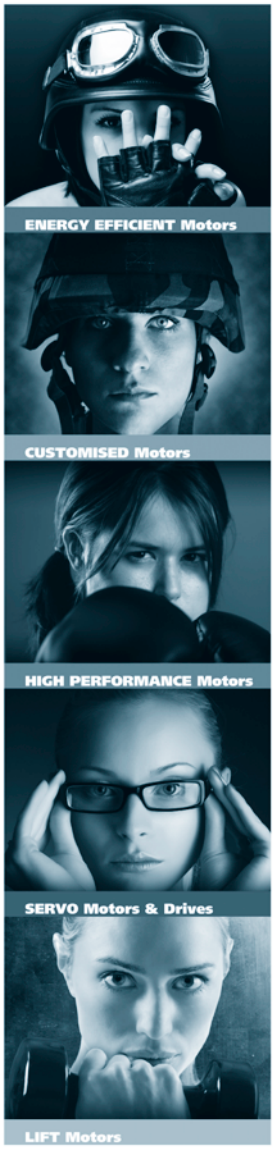
ENERGY EFFICIENT Motors, standard high efficiency motors, in the range 56 to 315

CUSTOMISED Motors, special and customised motors, brake motors and single-phase motors

HIGH PERFORMANCE Motors, high performance, permanent magnet motors and generators as well as the relevant drives.

SERVO Motors & Drives, brushless servomotors and drives for industrial automation

LIFT Motors, synchronous gearless machines with permanent magnet rotor for elevators



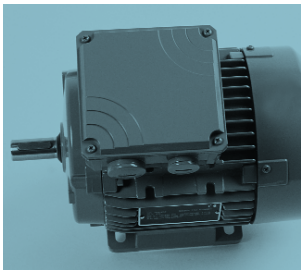
ENERGY EFFICIENT MOTORS

High Efficiency Three-phase Motors

The standard design includes the following basic features to give a high level of flexibility:

- Multi Mount Construction for an easy change of terminal box position
- Terminal box rotates by 90° to allow cable entry from any direction
- Easy-to-change flanges with over-sized and smaller-sized dimensions
- Provision for oil seal at Drive End

IE1



Motors conforming to the higher efficiency standards for Europe, North America and Australia.

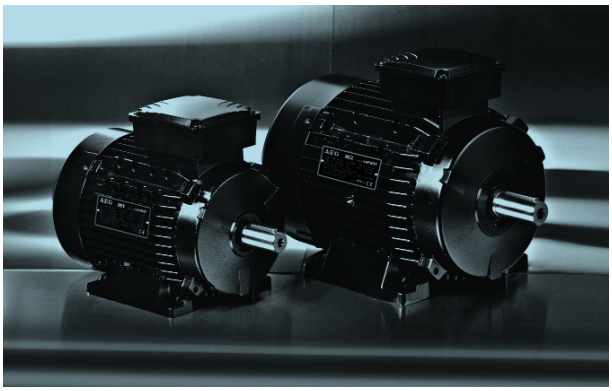
For Europe, Lafert offers its 'AMHE' range of AC induction motors, whose efficiency values are conforming to IE2 requirements.

IE2

Lafert's motor for the North American market comprise the 'AMH' range. These machines meet the higher efficiency demands of the USA's Department of Energy's Energy Policy Act (EPAct): it is illegal to import Motors into the USA and Canada that do not comply with this standard.

ENERGY

In addition to EPAct requirements, these motors are a recognised component verified by Underwriters Laboratories and carry the UL approved logo.



CUSTOMISED MOTORS

Brake Motors

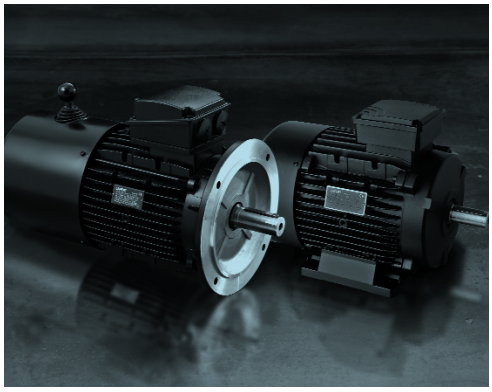
Lafert's brake motors (3 and single phase) are engineered to give safety, versatility and long service life. The motor's mechanical design is specific for brake motors in order to avoid any risk of failure.

The three brake options available with AC or DC brake coil can fit any application.

The AMBY and AMBZ ranges have a very strong design and may meet any heavy duty application. The AMBY range is also available with low noise brake, specific for theatres.

The compact AMS range is the ideal solution for woodworking equipment manufacturers, packaging machines manufacturers, as well as small crane manufacturers.

As well as meeting industry specific safety requirements, the motors are also failsafe machines: a combination that ensures maximum machine safety.



Dedicated and customised executions

Lafert specialises in customised solutions for non-standard motor applications. We are considered as a market leader in this field and have built a reputation for excellence for this core activity over the past 45 years.

The range of specials includes both electrical and mechanical variants:
- Extended stainless steel motor shafts for the fan industry
- Motors for pumping applications
- Complete Tailor made designs
- Customised flange and shaft for gear motors
- Electrical design to meet specific duty requests
- Specific wound motors for worldwide electrical supply
- Motor design to meet special environmental requests (Smoke and heat exhaust ventilation, Dust Ignition for Zone 22, Non Sparking Exn)

HIGH PERFORMANCE MOTORS

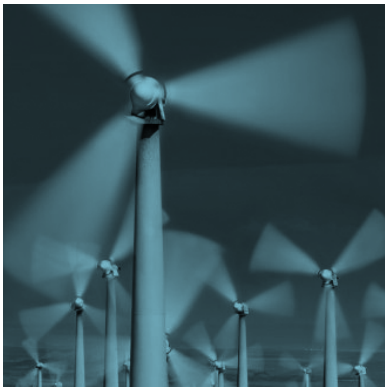
High Performance Motors with permanent magnet rotor

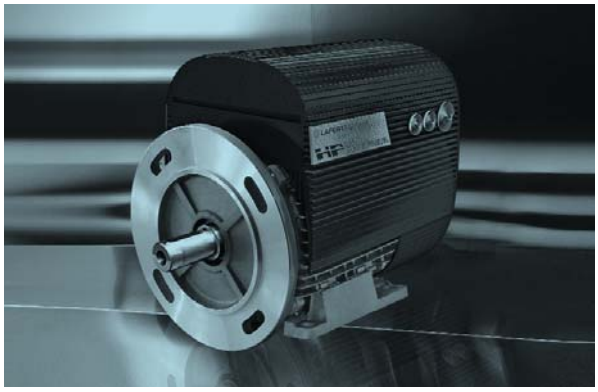
A differentiator with Sensorless Permanent Magnet Motors is the premium high efficiency level and the compact design. The efficiency level normally stands over 90% all along the motor's speed range.

This Product must be driven by a frequency converter, that can also be on-board as an integral drive.

Major applications are the Pump and Fan Industry, Textile Machinery Manufacturers, Gearbox Manufacturers, Traction Systems for microcars and scooters; this Product can be produced as a Generator for Wind Energy.

A separate catalogue is available.





SERVO MOTORS & DRIVES

Brushless Servo Motors

Among the few independent manufacturers of Servo Motors in the market, Lafert can supply a wide range of standard and tailor made products for Industrial Automation.
The whole manufacturing process is integrated within Lafert manufacturing facilities, giving an excellent flexibility to specific market demands, as well as a high level of cost-efficiency.

- Brushless Standard Motors
- Direct Drive Motors
- Low Inertia Motors
- Compact Motors

A separate catalogue is available.

Servo Drives

Our products are manufactured according to the criterion of adaptability and flexibility. This ensures an easy and fast set-up, by means of the most advanced hardware and software technologies.
Every device always ensures the highest reliability and safety, because it is subject to strict tests in different load and climatic conditions.

A separate catalogue is available.

LIFT MOTORS

Gearless Machines for Elevators

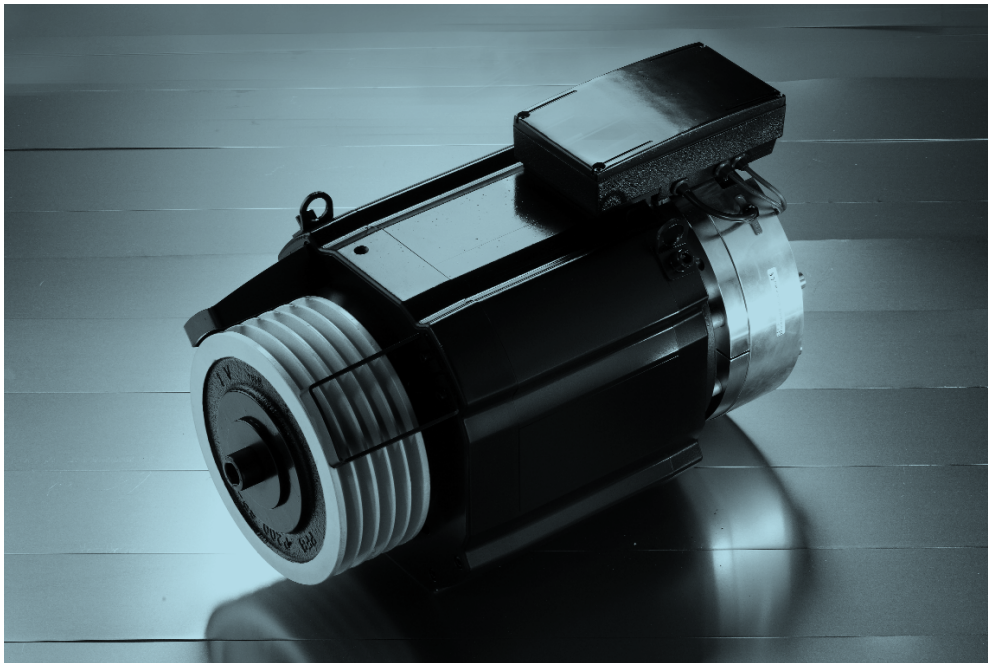
The SHIRE range allows the manufacturing of systems where the traction machine is inside the elevator shaft, so there is no need for a machine room, with obvious space and cost savings and a more rational layout of the all components.

SHIRE is permanent-magnet gearless synchronous machine with torque up to 660 Nm for systems up to 1,275 kg.

The compact and heavy-duty motor comes with the following features:

- Very small dimensions
- High Efficiency
- High comfort
- No maintenance
- Low noise level

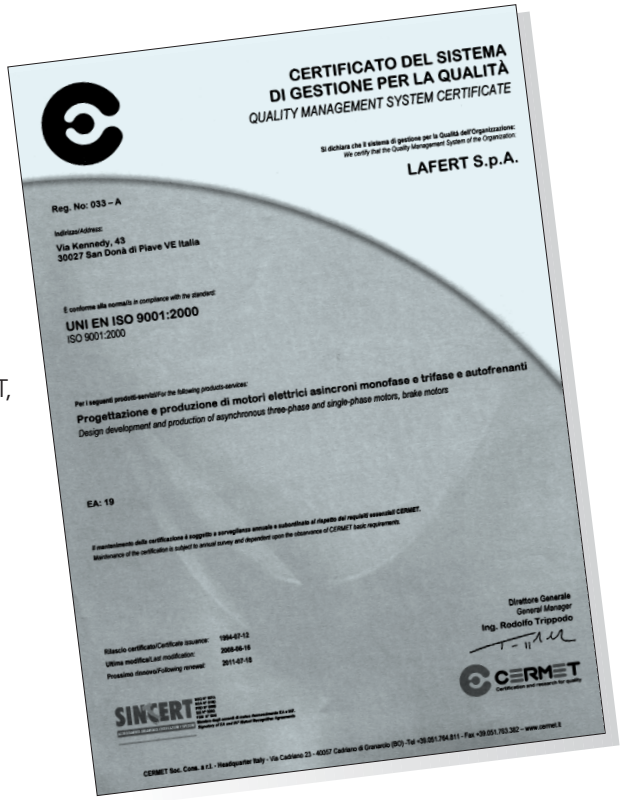
A separate catalogue is available.



Our Strengths:
Customer Designs
Exact Engineering

…In Partnership
with the Customer

The strictness of our quality control assures the flawless operation and reliability of our products.
That our quality scale fulfils your demands is confirmed by the certificate awarded by the CERMET, a Certification body authorized by SINCERT.


CERTIFICATO DEL SISTEMA
DI GESTIONE PER LA QUALITÀ
QUALITY MANAGEMENT SYSTEM CERTIFICATE

LAFERT S.p.A.

Reg. No: 033 – A

Via Kennedy, 43
30027 San Donà di Piave VE Italia

UNI EN ISO 9001:2000
ISO 9001:2000

Progettazione e produzione di motori elettrici asincroni monofase e trifase e autofrenanti
Design development and production of asynchronous three-phase and single-phase motors, brake motors

EA: 19

Direttore Generale
General Manager
Ing. Rodolfo Trippodo

CERMET

SINCERT

CE Marking
Our motors comply with the requirements of the following international standard:
IEC 60034

as well as with the following European Directives: Low Voltage Directive 2006/95/EC, the EMC-Directive 2004/108/EC and Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) 2002/95/EC.

The above named products comply with the requirements of the EC Directive Machines 2006/42/EC. In accordance with this Directive induction motors are components and intended solely for integration into other machines.
Commissioning is forbidden until conformity of the end product with this Directive is proved!

The CE symbol was applied for the first time in 1995.

The safety instructions in the Operation Manual of the manufacturer and EN 60204-1 have to be observed.

IE1 IE2

Harmonized efficiencies to IEC 60034-30;2008 - IE1 and IE2 code.
Efficiency testing method IEC 60034-2-1;2007

All standard three-phase motors with standard rating included in this catalogue comply with efficiency class IE1 and bear the corresponding label on the rating plate.
For efficiency at 50%, 75% and full load, please refer to the electrical data tables.

Efficiency classes of motors according to CEMEP - 1998

The voluntary agreement between the European committee of manufacturers of electric drive systems CEMEP and the European Commission defined three efficiency classes:

- **EFF3 = Motors with a low efficiency level**
- **EFF2 = Motors with improved efficiency level**
- **EFF1 = Motors with a high efficiency level**

The agreed minimum levels of the respective classes are based on efficiency measurements according to the old EN 60034-2:1996.

Method for determining the efficiency of motors

The method for measuring the efficiency of asynchronous AC motors was revised with the new IEC 60034-2-1:2007 standard. The new method significantly improves the accuracy under defined laboratory conditions. It replaces the EN 60034-2:1996.

As a direct comparison using the same motor, the efficiency levels measured according to the new method are below the efficiency levels determined using the old method.

New international efficiency classes of motors - IE Code

The new IEC 60034-30:2008 defines worldwide the efficiency classes of motors.

- **IE1 = Standard Efficiency (comparable to EFF2)**
- **IE2 = High Efficiency (comparable to EFF1)**
- **IE3 = Premium Efficiency**

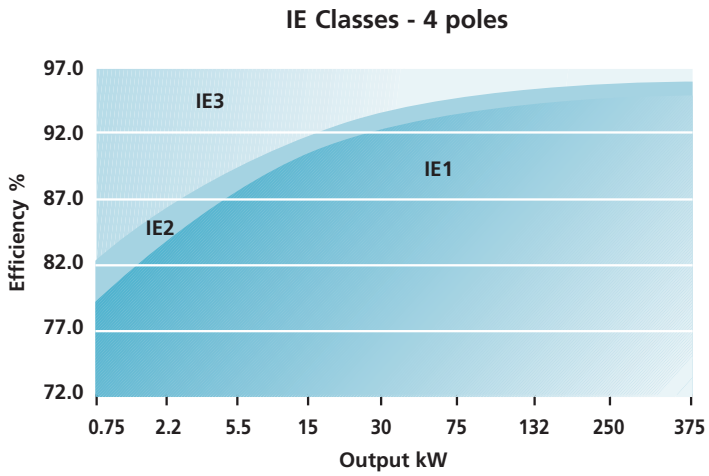
From February 2010 motors must be offered with the new classes IE1, IE2 and IE3. The old European designations (EFF3, EFF2 and EFF1) disappear from the market.

The efficiency levels according to IEC 60034-30 are measured based on the test methods defined in IEC 60034-2-1;2007.

The IEC 60034-30 only defines requirements of efficiency classes and aims to create provisions for International consistency. It does not define which motors must be supplied with which efficiency level. This is left to respective regional legislation.

Output	IE1 code Standard Efficiency			IE2 code High Efficiency			IE3 code Premium Efficiency		
kW	2 poles	4 poles	6 poles	2 poles	4 poles	6 poles	2 poles	4 poles	6 poles
0.75	72.1	72.1	70.0	77.4	79.6	75.9	80.7	82.5	78.9
1.1	75.0	75.0	72.9	79.6	81.4	78.1	82.7	84.1	81.0
1.5	77.2	77.2	75.2	81.3	82.8	79.8	84.2	85.3	82.5
2.2	79.7	79.7	77.7	83.2	84.3	81.8	85.9	86.7	84.3
3	81.5	81.5	79.7	84.6	85.5	83.3	87.1	87.7	85.6
4	83.1	83.1	81.4	85.8	86.6	84.6	88.1	88.6	86.8
5.5	84.7	84.7	83.1	87.0	87.7	86.0	89.2	89.6	88.0
7.5	86.0	86.0	84.7	88.1	88.7	87.2	90.1	90.4	89.1
11	87.6	87.6	86.4	89.4	89.8	88.7	91.2	91.4	90.3
15	88.7	88.7	87.7	90.3	90.6	89.7	91.9	92.1	91.2
18.5	89.3	89.3	88.6	90.9	91.2	90.4	92.4	92.6	91.7
22	89.9	89.9	89.2	91.3	91.6	90.9	92.7	93.0	92.2
30	90.7	90.7	90.2	92.0	92.3	91.7	93.3	93.6	92.9
37	91.2	91.2	90.8	92.5	92.7	92.2	93.7	93.9	93.3
45	91.7	91.7	91.4	92.9	93.1	92.7	94.0	94.2	93.7
55	92.1	92.1	91.9	93.2	93.5	93.1	94.3	94.6	94.1
75	92.7	92.7	92.6	93.8	94.0	93.7	94.7	95.0	94.6
90	93.0	93.0	92.9	94.1	94.2	94.0	95.0	95.2	94.9
110	93.3	93.3	93.3	94.3	94.5	94.3	95.2	95.4	95.1
132	93.5	93.5	93.5	94.6	94.7	94.6	95.4	95.6	95.4
160	93.7	93.8	93.8	94.8	94.9	94.8	95.6	95.8	95.6
200	94.0	94.0	94.0	95.0	95.1	95.0	95.8	96.0	95.8
250	94.0	94.0	94.0	95.0	95.1	95.0	95.8	96.0	95.8
315	94.0	94.0	94.0	95.0	95.1	95.0	95.8	96.0	95.8
355	94.0	94.0	94.0	95.0	95.1	95.0	95.8	96.0	95.8
375	94.0	94.0	94.0	95.0	95.1	95.0	95.8	96.0	95.8

Efficiency values according to IEC 60034-30;2008.
Efficiency standard calculation: IEC 60034-2-1;2007



The motors comply with the relevant standards and regulations, especially:

Title	IEC	EU CENELEC	D DIN/VDE	I CEI/UNEL	GB BS	F NFC	E UNE
Electrical							
General stipulations for electrical machines	60034-1	EN 60034-1	DIN EN 60034-1	CEI EN 60034-1	4999-1 4999-69	51-200 51-111	UNE EN 60034-1
Rotating electrical machines: methods for determining losses and efficiency using tests	60034-2	HD 53 2	DIN EN 60034-2	CEI EN 60034-2	4999-34	51-112	UNE EN 60034-2
Standard method for determing losses and efficiency from tests	60034-2-1						
Efficiency classes of single speed, three-phase, cage-induction motors (IE-code)	60034-30						
Terminal markings and direction of rotation of rotating electrical machines	60034-8	HD 53 8 S4	DIN VDE 0530-8	CEI EN 60034-8	4999-3	51-118	20113-8-96
Starting performance	60034-12	EN 60034-12	DIN EN 60034-12	CEI EN 60034-12	4999-112		UNE EN 60034-12
Standard voltages	60038	HD 472 S1	DIN IEC 60038	CEI 8-6			
Insulating materials	60085		DIN IEC 60085	CEI EN 60085			
Mechanical							
Dimensions and output ratings	60072		DIN EN 50347	UNEL 13113			
Mounting dimensions and relationship frame sizes-output ratings, IM B3	60072		DIN 42673-1	UNEL 13113	4999-10 51-110	51-105 51-104	UNE EN 50347 1980
Mounting dimensions and relationship frame sizes-output ratings, IM B5	60072		DIN 42677-1	UNEL 13117		20106-2-74	
Mounting dimensions and relationship frame sizes-output ratings, IM B14	60072		DIN 42677-1	UNEL 13118	4999-10 51-110	51-105 51-104	UNE EN 50347
Cylindrical shaft ends for electric motors	60072	HD 231	DIN 748-3	UNEL 13502	4999-10	51-111	
Degrees of protection	60034-5	EN 60034-5	DIN EN 60034-5	CEI EN 60034-5	4999-20	EN60034-5	20111-5
Methods of cooling	60034-6	EN 60034-6	DIN EN 60034-6	CEI EN 60034-6	4999-21		EN 60034-6
Mounting arrangements	60034-7	EN 60034-7	DIN EN 60034-7	CEI EN 60034-7	4999-22	51-117	EN 60034-7
Noise limits	60034-9	EN 60034-9	DIN EN 60034-9	CEI EN 60034-9	4999-51	51-119	EN 60034-9
Mechanical vibration	60034-14	EN60034-14	DIN EN 60034-14	CEI EN 60034-14	4999-50	51-111	EN 60034-14
Mounting flanges			DIN 42948	UNEL 13501			
Tolerances of mounting and shaft extensions			DIN 42955	UNEL 13501/ 13502			
Classification of environmental conditions	60721-2-1		DIN IEC 60721-2-1	CEI EN 60721-1			
Mechanical vibration; balancing	ISO 8821		DIN ISO 8821				

Motors to special regulations:
• Motors with UL, CSA and $_{c}UR_{us}$ approval (performance data on request)

CONDITIONS OF INSTALLATION

The motors are designed for operation at altitudes ≤ 1000 m above sea-level and at ambient temperatures of up to 40° C. Exceptions are indicated on the rating plate.

Permissible temperature rises to various standards

Standard/Regulation	Temperature of coolant	Permissible temperature rise in K (measured by resistance method) Temperature class		
	°C	B	F	H
VDE 0530 part 1	40	80	105	125
International IEC 34-1	40	80	105	125
Britain BS 2613	40	80	105	
Canada CSA	40	80	105	
USA NEMA and ANSI	40	80	105	
Italy CEI	40	80	105	
Sweden SEN	40	80	105	
Norway NEK	40	80	105	
Belgium NBN	40	80	105	
France NF	40	80	105	
Switzerland SEV	40	80	105	
India IS	40	80	-	

on request

The motors conform to degree of protection IP 55 to IEC 60034-5[1)]. Higher protection on request.

The standard design for horizontal mounting is suitable for indoor and protected outdoor installation, climate group MODERATE (see page 18) (temperature of coolant -20° to +40° C).

For unprotected outdoor installation or severe climatic conditions (moisture category wet, climate group WORLDWIDE, extremely dusty site conditions, aggressive industrial atmosphere, danger of storm rain and coastal climate, danger of attack by termites, etc.), as well as vertical mounting, special protective measures are recommended, such as:

- Protective cowl (for vertical shaft-down motors)
- For vertical shaft-up motors additional bearing seal and flange drainage
- Special paint finish
- Treatment of winding with protective moisture-proof varnish
- Anti-condensation heating (possibly winding heating)
- Condensation drain holes

The special measures to be applied have to be agreed with the factory once the conditions of installation have been settled.

1) IP54 for brake motors AMS and for AMBZ, AMBY from size 63 to 132

The corresponding conditions of installation have to be clearly indicated in the order.

Tolerances

For industrial motors to EN 60034-1, certain tolerances must be allowed on guaranteed values, taking into consideration the necessary tolerances for the manufacture of such motors and the materials used. The standard includes the following remarks:

1. It is not intended that guarantees necessarily have to be given for all or any of the items involved. Quotations including guaranteed values subject to tolerances should say so, and the tolerances should be in accordance with the table.
2. Attention is drawn to the different interpretation of the term guarantee. In some countries a distinction is made between guaranteed values and typical or declared values.
3. Where a tolerance is stated in only one direction, the value is not limited in the other direction.

Values for	Tolerance
Efficiency (η) (by indirect determination)	- 0.15 (1 - η) at $P_N \leq 150$ kW - 0.1 (1 - η) at $P_N > 150$ kW
Power factor ($\cos \varphi$)	$\frac{1 - \cos \varphi}{6}$, minimum 0.02, maximum 0.07
Slip (s) (at rated load and at working temperature)	± 20 % of the guaranteed slip at $P_N \geq 1$ kW ± 30 % of the guaranteed slip at $P_N < 1$ kW
Breakaway starting current (I_A) (in the starting circuit envisaged)	+ 20 % of the guaranteed starting current (no lower limit)
Breakaway torque (M_A)	- 15 % and + 25 % of the guaranteed breakaway torque (+ 25 % may be exceeded by agreement)
Pull-up torque (M_S)	- 15 % of the guaranteed value
Pull-out torque (M_K)	- 10 % of the guaranteed value (after allowing for this tolerance, M_K/M_N not less than 1.6)
Moment of inertia (J)	± 10 % of the guaranteed value

Mechanical tolerances

According to IEC 72-1, the following tolerances on mechanical dimensions of electric motors are permitted:

Parameter	Code	Tolerances	
Shaft height	H	- up to 250 - over 250	-0,5 mm -1 mm
Diameter of shaft end[1)]	D-DA	- from 11 to 28 mm - from 38 to 48 mm - from 55 to 100 mm	j6 k6 m6
Hub key width	F-FA		h9
Flange spigot	N	- up to 132 - over size 132	j6 h6

[1)] Centerings holes in shaft extension to DIN 332 part 2

Degrees of protection

Degrees of mechanical protection for machines are designated in accordance with IEC 60034-5 by the letters **IP** and two characteristic numerals.

First numeral: Protection against contact and ingress of foreign bodies

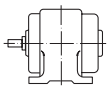
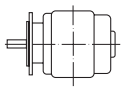
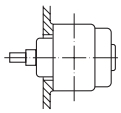
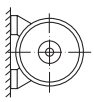
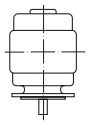
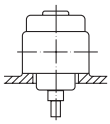
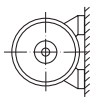
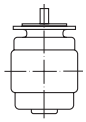
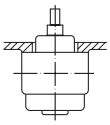
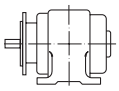
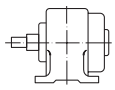
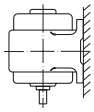
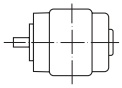
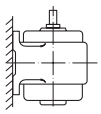
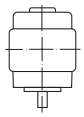
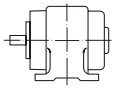
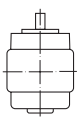
IP	Description
0	No special protection
1	Protection against solid foreign bodies larger than 50 mm (Example: inadvertent contact with the hand)
2	Protection against solid foreign bodies larger than 12 mm (Example: inadvertent contact with the fingers)
3	Protection against solid foreign bodies larger than 2.5 mm (Example: Wires, tools)
4	Protection against solid foreign bodies larger than 1 mm (Example: Wires, bands)
5	Protection against dust (harmful deposits of dust)
6	Complete protection against dust

Second numeral: Protection against ingress of water

IP	Description
0	No special protection
1	Protection against vertically falling water drops (condensation)
2	Protection against dropping water when inclined by up to 15°
3	Protection against waterspray at up to 60° from vertical
4	Protection against water splashed from any direction
5	Protection against water projected by a nozzle from any direction
6	Protection against heavy seas or water projected in powerful jets
7	Protection when submerged between 0.15 and 1 m.
8	Protection when continuously submerged in water at conditions agreed between the manufacturer and the user

Mounting arrangements

Mounting arrangements for rotating electrical machines are designated according to IEC 60034-7, *Code I* (in brackets Code II).
Our motors are available with the mounting arrangements listed below, depending on design and frame size. Motors with aluminium frame are equipped with removable feet that allow easy change of mounting arrangement.

Foot mounting	Flange mounting	Motors without endshield
IM B3 (IM 1001) 	IM B5 (IM 3001) Flange type A to DIN 42 948 at drive end 	IM B9 (IM 9101) without endshield and without ball bearings on drive end 
IM B6 (IM 1051) 	IM V1 (IM 3011) Flange type A to DIN 42 948 at drive end 	IM V8 (IM 9111) without endshield and without ball bearings on drive end 
IM B7 (IM 1061) 	IM V3 (IM 3031) Flange type A to DIN 42 948 at drive end 	IM V9 (IM 9131) without endshield and without ball bearings on drive end 
IM B8 (IM 1071) 	IM B35 (IM 2001) Flange type A to DIN 42 948 at drive end 	IM B15 (IM 1201) without endshield and without ball bearings on drive end 
IM V5 (IM 1011) 	IM B14 (IM 3601) Flange type C to DIN 42 948 at drive end 	
IM V6 (IM 1031) 	IM V18 (IM 3611) Flange type C to DIN 42 948 at drive end 	
IM B34 (IM 2101) Flange type C to DIN 42 948 at drive end 	IM V19 (IM 3631) Flange type C to DIN 42 948 at drive end 	

It is essential to state the desired mounting arrangement when ordering, as the constructive design depends partly on the mounting arrangement.

Materials

Motor parts	Frame size	Material
Motor housing	56 - 160 180 - 315	Aluminium alloy Cast iron
Endshield	56 - 160 132 - 315	Aluminium alloy* Cast iron
Flanged endshield	56 - 160 132 - 315	Aluminium alloy* Cast iron
Fan cover	56 - 112 56 - 112 132 - 315	Plastics Sheet steel (optional) [1)] Sheet steel
Fan	56 - 315 56 - 315	Plastics Aluminium alloy (optional)
Terminal box	56 - 112 56 - 112 132 - 160 180 - 280 315	Plastics Aluminium alloy (optional) [2)] Aluminium alloy Sheet steel Cast iron

[1)] Standard for brake motors type AMBY and AMBZ and for AMS 112
[2)] For three-phase motors only

* Cast iron option for 112

Paint finish

Normal finish
Suitable for climate group **Moderate** to IEC 60721-2-1, e.g. indoor and outdoor installation.
For short periods: up to 100 % rel. humidity at temperatures up to +30° C.
Continuously: up to 85 % rel. humidity at temperatures up to +25° C.
Standard paint color: RAL 9005.

Special finish K1
Suitable for climate group **Worldwide** to IEC 60721-2-1, e.g. outdoor installation in corrosive chemical and marine atmospheres.
For short periods: up to 100 % rel. humidity at temperatures up to +35° C.
Continuously: up to 98 % rel. humidity at temperatures up to +30° C.

Bearings

Classification of bearings (standard design) [1)]
Bearings for standard design have permanent lubrication
Ball bearings to ISO15 (DIN 625)

Frame size	No. of poles	Drive end	Non-drive end
56	2 + 4	6201-2Z	6201-2Z
63	2 + 4	6202-2Z	6202-2Z
71	2 - 8	6203-2Z	6203-2Z
80	2 - 8	6204-2Z C3	6204-2Z C3
90	2 - 8	6205-2Z C3	6205-2Z C3
100	2 - 8	6206-2Z C3	6206-2Z C3
112	2 - 8	6306-2Z C3	6306-2Z C3
132	2 - 8	6208-2Z C3	6208-2Z C3
160	2 - 8	6309-2Z C3	6309-2Z C3
180	2 - 8	6310-2Z C3	6310-2Z C3
200	2 - 8	6312 C3	6312 C3
225	2 - 8	6313 C3	6313 C3
250	2 - 8	6314 C3	6314 C3
280	2	6316 C3	6316 C3
280	4 - 8	6318 C3	6318 C3
315 S/M/L	2	6316 C3	6316 C3
315 S/M/L	4 - 8	6319 C3	6319 C3

[1)] With regard on bearings for special design, consult us

Lubrication note
Permanent lubrication up to 180 frame
200 frame up with regreasing facility lubrication nipple is a flat M10x1 to DIN 3404

Roller bearings
Roller bearings available as an option. Please consult us.

Bearing arrangement

Frame size	Bearing drive end	Bearing non-drive end	Spring-loaded
56 - 160 Standard motors	Non-locating bearing	Non-locating bearing	Non-drive end
63 - 160 Brake motors	Non-locating bearing	Locating bearing	Drive end
180 - 315 Standard motors	Locating bearing	Non-locating bearing	Non-drive end

Belt drive

The data apply only to the normal drive end shaft extension of IM B3 motors with one speed.
Calculation of belt drive:

$$F_R = \frac{19120 \cdot P \cdot k}{D_1 \cdot n}$$

F_R = Radial shaft load in N
P = Output in kW
n = Speed in min^{-1}
D_1 = Pulley diameter in m
k = Belt tension factor, varying with the type of belt, assumed to be approximately:
3-4 for normal flat belt without idler pulley
2-2.5 for normal flat belt with idler pulley
2.2-2.5 for V-belt
For exact data apply to the belt manufacturer.

Maximum permissible axial forces without additional radial forces *

Frame size	Horizontal shaft				Vertical shaft - force upwards				Vertical shaft - force downwards			
	3000 min -1 kN	1500 min -1 kN	1000 min -1 kN	750 min -1 kN	3000 min -1 kN	1500 min -1 kN	1000 min -1 kN	750 min -1 kN	3000 min -1 kN	1500 min -1 kN	1000 min -1 kN	750 min -1 kN
56	0.16	0.21	-	-	0.18	0.22	-	-	0.15	0.19	-	-
63	0.19	0.26	-	-	0.21	0.28	-	-	0.17	0.24	-	-
71	0.23	0.33	0.33	0.37	0.26	0.35	0.36	0.39	0.21	0.30	0.31	0.34
80	0.32	0.44	0.46	0.50	0.34	0.47	0.48	0.53	0.29	0.41	0.43	0.47
90	0.34	0.48	0.49	0.54	0.38	0.47	0.53	0.58	0.31	0.44	0.46	0.51
100	0.48	0.68	0.70	0.77	0.54	0.74	0.76	0.83	0.43	0.62	0.64	0.71
112	0.48	0.68	0.70	0.77	0.56	0.75	0.77	0.84	0.40	0.60	0.62	0.69
132 S	0.80	1.13	1.16	1.28	1.00	1.32	1.36	1.47	0.61	0.93	0.97	1.08
132 M	0.78	1.09	1.13	1.24	0.99	1.30	1.33	1.45	0.58	0.89	0.92	1.03
160 M	0.84	1.18	1.21	1.33	1.18	1.52	1.56	1.68	0.50	0.83	0.87	0.99
160 L	0.82	1.15	1.18	1.30	1.18	1.51	1.55	1.67	0.46	0.79	0.82	0.94
180	0.82	1.15	1.18	1.30	1.18	1.51	1.55	1.67	0.46	0.79	0.82	0.94
200	0.82	1.15	1.18	1.30	1.18	1.51	1.55	1.67	0.46	0.79	0.82	0.94
225	1.10	1.60	1.90	2.40	2.10	2.60	2.90	3.40	0.30	0.70	1.00	1.50
250	1.00	1.60	2.00	2.50	2.30	2.70	3.20	3.70	0.20	0.60	1.10	1.50
280	1.70	1.90	2.40	2.90	2.90	3.10	3.60	3.70	0.15	0.30	0.80	1.00
315	3.50	4.00	4.50	5.00	6.00	7.00	7.50	8.00	1.00	1.90	2.40	2.90

Values for 50 Hz. For service on 60 Hz, reduce values by 10%
* Consult according to direction of force

Permissible radial forces
without additional axial force (Ball bearings)

Nominal life = 20.000 h (Lh10)

F_R = permissible radial force in kN in load point corresponding to half shaft extension

Size	3000 min $^{-1}$ kN	1500 min $^{-1}$ kN	1000 min $^{-1}$ kN	750 min $^{-1}$ kN
56	0.34	0.42	-	-
63	0.38	0.48	-	-
71	0.46	0.58	0.67	0.73
80	0.59	0.83	0.86	0.94
90	0.67	0.94	0.97	1.07
100	0.92	1.29	1.33	1.47
112	0.93	1.30	1.34	1.48
132 S	1.35	1.90	1.96	2.15
132 M	1.40	1.97	2.03	2.23
160 M	1.55	2.17	2.23	2.46
160 L	1.58	2.22	2.29	2.52
180 M	3.00	4.44	4.55	4.76
180 L	3.02	4.47	4.58	4.79
200 L	5.24	6.85	8.01	8.94
225 M	6.11	7.80	9.09	10.12
250 M	6.79	8.82	10.31	11.45
280 S	7.76	11.90	13.87	15.44
280 M	7.79	11.99	13.97	15.55
315 S/M	7.02	11.35	13.40	15.13
315 L	7.03	11.37	13.35	15.09

Special endshields and flanges

Full range of smaller sized and over sized flanges

Frame size	Smaller sized Flange IM B5 [1]	Smaller sized Flange IM B14	Over sized Flange IM B5	Over sized Flange IM B14
56	NA	NA	NA	63
63	56	56	71 [3]	71-80
71	56-63	63	80-90	80-90
80	63-71	63-71	NA	90-100
90 S-L	63-71	71-80	100 [3]	100-112
100 L	71-80	90	NA	132
112 M	80 [2]-90 [2]	90	132 [7]	132
132 S	112 [2]	112	NA	160 [1] [4]
132 M	112	112	160 [4]	160
160 M	NA	132	NA	NA
160 L	NA	132	NA	NA

Possibility to fit over sized bearings:

Frame size	IM B3	IM B5	IM B14
56	NA	NA	NA
63	6203-6205	6203	6203-6205
71	6204-6205	6204-6205	6204-6205
80	6205-6206	6205-6206	6205-6206
90 S-L	6206	6206-6308	6206
100 L	6306	6306-6208	6306
112 M	6208	6208	6208
132 S	6308-6309	6308 [4]	6308 [4]
132 M	6308-6309	6308-6309	6309
160 M	NA	6310	6310
160 L	NA	6310	6310

Availability of aluminium endshields and flanges with steel insert

Frame size	Endshield DE	Endshield NDE	IM B5	IM B14
71	A	A	A	NA
80	A	A	A	A
90 S-L	A	A	NA	NA
100 L	A	A	A	NA
112 M	A	A	A	NA
132 S	NA	NA	NA	NA
132 M	NA	NA	A [5]	NA
160 M	NA	NA	NA	NA
160 L	NA	NA	NA	NA

Availability of cast iron endshields and flanges

Frame size	Endshield DE	Endshield NDE	IM B5	IM B14	Regreasing device DE	Regreasing device NDE	Regreasing device IM B5	Regreasing device IM B14
71	NA	NA	NA	NA	NA	NA	NA	NA
80	A [6]	A [6]	NA	NA	NA	NA	NA	NA
90 S-L	A [6]	A [6]	NA	NA	NA	NA	NA	NA
100 L	A [6]	A [6]	NA	NA	NA	NA	NA	NA
112 M	A [6]	A [6]	NA	NA	NA	NA	NA	NA
132 S	A	A	A	A	NA	NA	A	A
132 M	A	A	A	A	A	A	A	A
160 M	A	A	A	A	A	A	A	A
160 L	A	A	A	A	A	A	A	A

A Available NA Not available

1) Not available for all motor ratings; consult us
2) Cast iron endshield with radial slotted holes
3) Not interchangeable with standard execution
4) Cast iron endshield
5) Only with oversized bearing (6308)
6) Special mechanical design
7) Only with oversized bearing (6208)

Cooling

Surface cooling, independent of the direction of rotation.
Motors type AM available without internal fan as type AG, e.g. for installation in a directed air stream (outputs on request).

Vibration

The amplitude of vibration in electric motors is governed by EN 60034-14 *Mechanical vibration of rotating electrical machines with shaft heights 56 and larger - methods of measurement and limits.*
Standard motors are designed to vibration grade A (normal). Vibration grade B is available at extra cost.

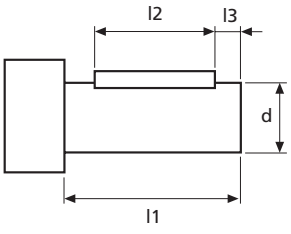
Pole-changing motors in Dahlander connection can only be supplied in vibration grade A.

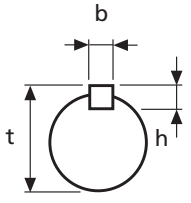
Rotors are at present dynamically balanced with **half** key fitted as per DIN ISO 8821. Other balancing only on request.
The motors are identified as follows:

"H" or "blank" means balanced with *half key*
"F" means balanced with *full key*
"N" means *no key*

Position and dimensions of key

Frame size	Poles	d x l1	b x h	l2	l3	t
56	9 x 20	3 x 3	15	2.5	10.2	
63		11 x 23	4 x 4	15	4	12.5
71		14 x 30	5 x 5	20	5	16
80		19 x 40	6 x 6	30	6	21.5
90		24 x 50	8 x 7	40	6	27
100		28 x 60	8 x 7	50	6	31
112		28 x 60	8 x 7	50	6	31
132		38 x 80	10 x 8	70	6	41
160		42 x 110	12 x 8	100	6	45
180		48 x 110	14 x 9	100	5	51.5
200		55 x 110	16 x 10	100	5	59
225	2	55 x 110	16 x 10	100	5	59
225	4	60 x 140	16 x 10	110	10	59
250	2	60 x 140	18 x 11	110	10	64
250	4	65 x 140	18 x 11	110	10	69
280	2	65 x 140	18 x 11	125	7.5	69
280	4	75 x 140	20 x 12	125	7.5	79.5
315	2	65 x 140	18 x 11	125	5	69
315	4	80 x 170	22 x 14	140	5	85





Dimensions in mm.
For larger shafts in special design the dimensions l2 and l3 are maintained.

Anti-condensation heater

On request, motors which due to strong temperature fluctuations are exposed to condensation during standstill, can be fitted against surcharge with an anti-condensation heater (space heater).
For supply voltage and heater rating please refer to the following table:

Frame size	Supply voltage (V)	Heater rating per motor (W)
112 - 160	110 or 230	25
180 - 225	110 or 230	50
250 - 280	110 or 230	50
315	110 or 230	75

During operation of the motor, the heating must be switched off.

Noise

The noise level of an electrical machine is determined by measuring the sound pressure level in accordance with curve A of the sound level meter to EN 60651 and is indicated in dB (A). The permitted noise levels of electrical machines are fixed in EN 60034-9 (IEC 34-9). The noise level of our motors is well below these limit values.
Air-borne sound measurements are carried out in an anechoic testing chamber to EN 21680-ISO 1680.
Speed corresponding to a mains frequency of 50 Hz and the number of poles.

Noise levels

The noise values listed below refer to 50 Hz at rated voltage with a tolerance of up to + 3 dB(A). Values for pole-changing motors on request. For 60 Hz supply values are 3-5 dB(A) higher.
Sound pressure level L_{pA} and sound power level L_{WA} for three-phase single-speed motors with dimensions and output ratings to IEC 60072

Frame size	2 pole		4 pole		6 pole		8 pole	
	L_{WA}	L_{pA}	L_{WA}	L_{pA}	L_{WA}	L_{pA}	L_{WA}	L_{pA}
56	57	48	47	38				
63	58	49	47	38				
71	61	52	51	42	49	40		
80	72	60	60	48	52	40	47	35
90	74	62	61	49	58	46	54	42
100	78	66	62	50	62	51	58	46
112	80	68	65	53	65	53	58	46
132	81	72	71	59	69	57	64	52
160	87	74	75	62	71	58	69	56
180	87	74	77	64	72	59	71	58
200	87	74	78	65	73	60	72	59
225	88	75	79	66	75	62	73	60
250	90	76	81	67	77	63	74	60
280	92	78	83	69	80	66	75	61
315	93	79	85	71	82	68	79	65

Rated voltage

For the rated voltage of the motors, EN 60034-1 allows a tolerance of ± 5 %. According to IEC 60038, the mains voltages may have a tolerance of ± 10 %.

Therefore the three-phase motors are designed for the following rated voltage ranges (exceptions are shown in the data tables):

Mains voltage to DIN IEC 38	Rated voltage range of motor
230 V ± 10%	218-242 V ± 5%
400 V ± 10%	380-420 V ± 5%
690 V ± 10%	655-725 V ± 5%

Within the rated motor voltage range, the permissible maximum temperature is not exceeded. When the motors are operated at the limits of the voltage tolerance, the permissible overtemperature of the stator winding may be exceeded by 10 K.

Nameplates are marked with the maximum rated currents within the stated voltage ranges.

For brake motors, for motors in 500 V, 50 Hz design, and all not standard voltages, no voltage range is marked. The voltage tolerances to EN 60034-1 apply.

Rated frequency

Three-phase 50 Hz motors can also be operated on 60 Hz mains, provided the mains voltage increases proportionally to the frequency. The relative values for starting and breakaway torque remain nearly unchanged and slightly increase for the starting current. The rated speed increases by the factor 1.2 and output by factor 1.15. Should a motor designed for 50 Hz be operated at 60 Hz without the voltage being increased, the rated output of the motor cannot be increased. Under these operating conditions, rated speed increases by factor 1.2. The relative values for starting and breakaway torque are reduced by factor 0.82 and for starting current by factor 0.9.

Additionally to the voltage range for 50 Hz operation, three-phase single-speed motors (not brake motors) are also marked with the voltage range for 60 Hz operation.

Nameplates examples:

Rated current

For three-phase motors the rated currents listed in the data tables apply to an operating voltage of 400 V. The conversion to other operating voltages, with output and frequency remaining unchanged, is to be made as follows:

Nominal voltage (V)	230	380	**400**	440	500	660	690
Conversion factor x I_N	1.74	1.05	**1.0**	0.91	0.80	0.61	0.58

Rated torque

$$\text{Rated torque in Nm} = 9550 \times \frac{\text{Rated power in kW}}{\text{Rated speed in min}^{-1}}$$

Output

The outputs stated in this catalogue are for constant load in continuous running duty S1 according to EN 60034-1, based on an ambient temperature of 40° C and installation at altitudes up to 1000 m above sea level.

For severe operating conditions, e.g. high switching rate, long run-up time or electric braking, a thermal reserve is necessary, which could call for higher thermal class or the use of a motor with a higher rating. In these cases we recommend to enquire with detailed information on the operating conditions.

Overload

At operating temperature three-phase motors are capable of withstanding an overload for 15 seconds at 1.5 times the rated torque at rated voltage. This overload is according to EN 60034-1 and will not result in excessive heating.
Utilizing thermal class F, motors can be operated continuously with an overload of 12 %. Nevertheless this is not valid for motors which to catalogue are utilized to thermal class F.

Connection

Motor output at 50 Hz	230 V Δ 400 V Y	400 V Δ 690 V Y	500 V Y	500 V Δ	690 V Δ
under 3 kW	standard	on request	on request	on request	-
4 to 5.5 kW	standard	standard	on request	on request	on request
≥ 7.5 kW	on request	standard	on request	on request	on request

Insulation and temperature rise

Class F insulation to EN 60034-1 is used throughout.
In standard design motors are intended for operation at 40° C ambient temperature with class B temperature rise only, with an overtemperature limit of 80 K. This also applies for the rated voltage range to IEC 60038. Exceptions are shown on the data tables.

Temperature rise (ΔT*) and maximum temperatures at the hottest points of the winding (T_{max}) according to the temperature classes of EN 60034-1.

	ΔT*	T_{max}
Class B	80 K	125° C
Class F	105 K	155° C
Class H	125 K	180° C

*Measurement by resistance method

Output reduction at ambient temperatures over 40° C

Ambient temperature	45° C	50° C	55° C	60° C
Class B Reduction of nominal output to approx.	95 %	90 %	85 %	80 %

When a winding is utilized to temperature class F (105K), no output reduction is required up to an ambient temperature of 55° C. *This does not apply to motors which in their standard design are already utilized to thermal class F.*

Installation at altitudes of more than 1000 m above sea level (see also EN 60034-1)

Altitude of installation	2000 m	3000 m	4000 m
At 40°C ambient temperature and thermal class B Rated output reduced to approx.	92 %	84 %	76 %
At 40°C ambient temperature and thermal class F Rated output reduced to approx.	89 %	79 %	68 %
Full nominal output to data tables with thermal class B and ambient temperature of	32° C	24° C	16° C
Full nominal output to data tables with thermal class F and ambient temperature of	30° C	19° C	9° C

Starting rate

The permissible number of starts per hour can be taken as given in the table below, provided the following conditions are met.
Additional moment of inertia ≤ moment of inertia of the rotor: load torque rising with the square of the speed up to nominal torque; starts at even intervals.

Shaft height	Permissible No. of starts per hour for 2p		
	= 2	= 4	≥ 6
56 - 71	100	250	350
80 - 100	60	140	160
112 - 132	30	60	80
160 - 180	15	30	50
200 - 225	8	15	30
250 - 315	4	8	12

For permissible number of starts for pole-changing motors and brake motors please consult us, indicating the complete operating conditions.

For the motors type AMME and AMDE, time between stop and restart of the motor must be higher than 15 s.

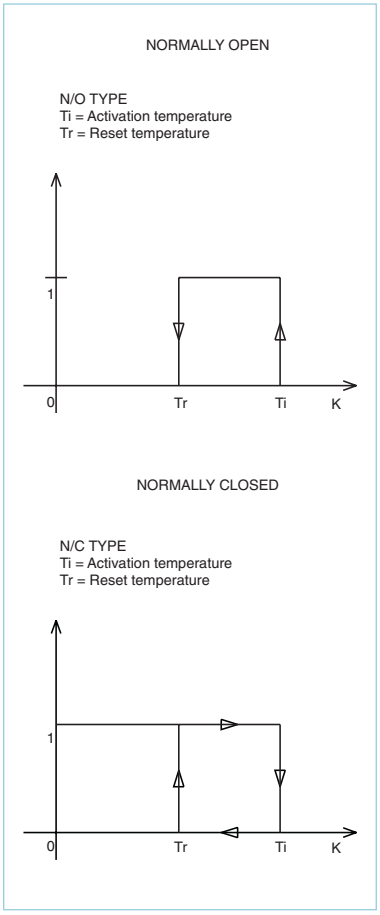
Thermal protection

The decision on a particular type of thermal protection should be taken according to the actual operating conditions. Motors may be protected by means of current-dependent thermal protection switches, overcurrent relays and temperature detectors.

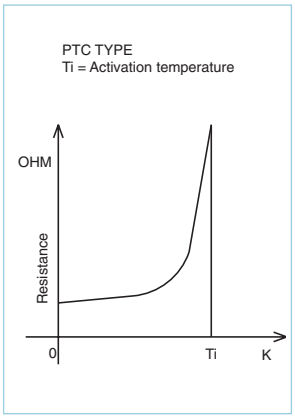
Thermal protection is possible as follows:
- Thermal protection switch with bimetal release
- Thermistor protection with semiconductor temperature detectors (PTC) in the stator winding in connection with release (if required, with additional motor protection switch).
- Bimetal temperature detector as N/C or N/O in the stator winding (if required, with additional motor protection switch).
- Resistance thermometer for monitoring winding and bearing temperature.

Should protection of the motor be required, we install protection switch with bimetal release (semiconductor temperature detectors on request).

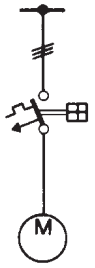
Operating specifications
Thermal cut-out



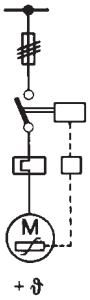
Operating specifications
of the thermistors



Examples of connection



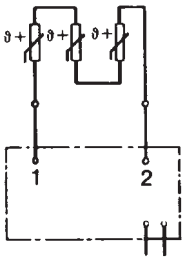
Protection method	Protection against:
Motor protection switch with thermal and electromagnetic overcurrent release	• Overload in continuous service • Locked rotor



Contactor with overcurrent relay
Thermistor protection and fuse

in service against:
- Overload in continous service
- Long starting and braking periods
- High switching rate

in case of fault against:
- Obstruction of cooling
- Increased ambient temperature
- Single-phase operation
- Frequency fluctuations
- Switching against locked rotor



Semiconductor temperature detector
with release

in service against:
- Overload in continous service
- Long starting and braking periods
- High switching rate

in case of fault against:
- Obstruction of cooling
- Increased ambient temperature
- Single-phase operation
- Frequency fluctuations
- Switching against locked rotor

Auxiliaries

Encoder (standard design)

Pulses per revolution	200-2048
Max outputs frequency	100 kHz
Power supply	$5V_{dc}$
Electronics	line driver
Current consumption without load	100 mA
Outputs	2 signals with rectangular pulses A, B 2 signals with inverted rectangular pulses $\overline{A}$, $\overline{B}$ zero pulse and inverted zero pulse
Pulse displacement between outputs	90°
Protection	IP 54
Max speed	3000 (6000) min^{-1}
Operating temperature	-10°C ÷ 85°C

Motors for normal continuous duty (S1) and normal operating conditions

Quotation (if submitted)	No./Date
Quantity	Units
Designation	Type
Output (for pole-changing motors, outputs referred to speeds)	kW
Speed (for pole-changing motors, outputs referred to speeds)	min^{-1}
Direction of rotation (viewed on drive end)	
Mounting arrangement (to IEC 60034-7)	
Degree of protection, motor/terminal box (to IEC 60034-5)	
Mains voltage	V
Mains frequency	Hz
Method of starting (direct-on-line or Y-Δ)	
Location of terminal box	
Machine to be driven	

Dimensions of cables, if these differ from those allocated by VDE 0100, referred to an ambient temperature of 40° C, or when aluminium conductors are used. It should be stated when parallel connected conductors are used.

Additional information for special designs

Second or non-standard shaft extension
Radial sealing ring
Paint coating
Corrosive protection
Vibration level
Anti-condensation heating
Temperature detectors
Noise requirements
Mechanical or electrical brake
Special stipulations

Additional information for special duties and difficult operating conditions

S 2: ... min (short-time duty)

S 3: ... % - ... min (intermittent duty)

S 4: ... % - J_M ... kgm² - J_{ext} ... kgm² (intermittent duty with starting)

S 5: ... % - J_M ... kgm² - J_{ext} ... kgm² (intermittent duty with electric braking)

S 6: ... % - min (continuous-operation periodic duty with intermittent load)

S 7: J_M ... kgm² - J_{ext} ... kgm² (continuous-operation periodic duty with electric braking)

S 8: J_M ... kgm² - J_{ext} ... kgm² (continuous-operation periodic duty with speed changes)

S 9: ... kW (continuous duty with non-periodic load and speed variations).
For this duty type suitable full load values should be taken as the overload concept.

S10: p/Δt .... r .... TL (Duty with discrete constant loads).

Starting conditions (no-load or loaded starting)

Shock loads

Load torque curve during run-up (characteristic)

Moment of inertia (J_{ext}) referred to the motor shaft kgm²

Description of the type of drive (direct coupling, flat or V-belt, straight or helical gears, sprocket, crank, eccentric cam, etc.)

Radial force (or diameter of drive element) N

Direction of force and point of application (distance from shaft shoulder or width of drive element) mm

Axial force and direction of application (pull/thrust) N

Ambient conditions (e.g. increased humidity, dust accumulation, corrosive gases or vapours, increased or extremely low ambient temperature, outdoor installation, installation at altitudes over 1000 m above sea level, external vibration, etc.)

THREE-PHASE MOTORS

Terminal boxes

The location of the terminal box in standard design is on top; on the right or on the left are possible.

Motors 71-160 frame size have removable feet for easy change of terminal box position

For motors with mountings IM B6, IM B7, IM B8, IM V5, IM V6 the location of the terminal box is related to an IM B3 mounting.

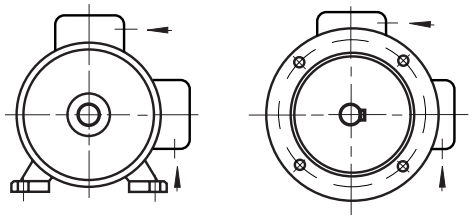
The position of the entry openings can be adjusted to suit the existing connection facilities by turning through 90°. Should special accessories be used (temperature detectors, anti-condensation heating, etc.) please enquire.

For motors in standard design, the cable gland does not belong to our scope of delivery.

For plastic terminal boxes, only plastic glands may be used (shock protection).

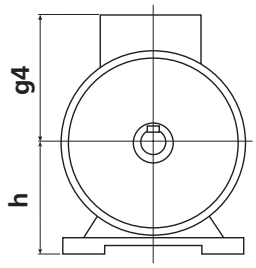
When using screened leads, a metal terminal box is required.

Direction of cable entries

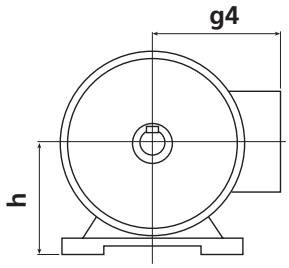


Frame size	Degree of protection	Thread for cable entry		Max. cable section	Terminal thread	Max. external cable diam.
		Metric [1]	Pg [2]	mm²		mm
56 - 71	IP 55	1 x M16/1 x M20	1 x Pg 11/1 x Pg 13.5	2.5	M4	12
80	IP 55	1 x M25/1 x M20	1 x Pg 13.5/1 x Pg 16	2.5	M4	16
90 - 112	IP 55	1 x M25/1 x M20	1 x Pg 13.5/1 x Pg 16	4	M5	16
132	IP 55	2 x M32	2 x Pg 21	4	M5	20
160	IP 55	2 x M40	2 x Pg 29	16	M6	28
180	IP 55	2 x M40/1 x M20		35	M8	28
200	IP 55	2 x M50/1 x M25		35	M8	34
225	IP 55	2 x M50/1 x M25		50	M10	34
250 - 280	IP 55	2 x M63/1 x M25		50	M10	40
315	IP 55	2 x M63/1 x M25 [3]		185	M12	48

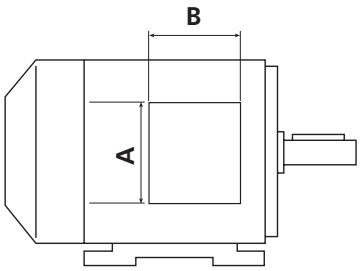
[1] Pitch 1.5
[2] Pg thread to DIN 40 430 (on request)
[3] Terminal box with unscrewable cable entry plate



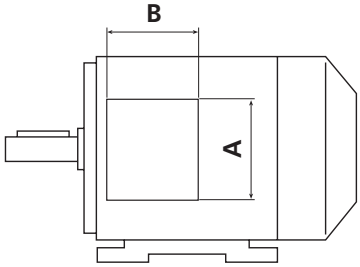
Terminal box on top



Terminal box at the side



left [1)]



right

[1)] On frame size 56-63 the terminal box is supplied displaced towards the non-drive end

Standard design

Frame size h	g4	A	B	Material
56	98	91	93	Plastic UL 94 V0
63	103	91	93	Plastic UL 94 V0
71	112	91	93	Plastic UL 94 V0
80	129	111	116	Plastic UL 94 V0
90	138	111	116	Plastic UL 94 V0
100	145	111	116	Plastic UL 94 V0
112	161	111	116	Plastic UL 94 V0
132	198	133	133	Aluminium
160	238	150	150	Aluminium
180	263	204	180	Sheet Steel
200	330	258	265	Sheet Steel
225	357	258	265	Sheet Steel
250	385	258	265	Sheet Steel
280	419	258	265	Sheet Steel
315	510	400	300	Cast Iron

Special design

Frame size h	g4	A	B	Material
56	100	94	94	Aluminium
63	105	94	94	Aluminium
71	114	94	94	Aluminium
80	139	110	110	Aluminium
90	148	110	110	Aluminium
100	155	110	110	Aluminium
112	171	110	110	Aluminium
180	285	209	220	Cast Iron
200	310	241	246	Cast Iron
225	334	272	254	Cast Iron
250	375	272	254	Cast Iron
280	409	272	254	Cast Iron

Connection diagrams

Windings of standard three-phase **single speed** motors can be connected either in star or delta connection.

Star connection

A star connection is obtained by connecting W2, U2, V2 terminals to eachother and the U1, V1, W1 terminals to the mains. The phase current and voltage are:

$I_{ph} = I_n$; $U_{ph} = U_n / \sqrt{3}$

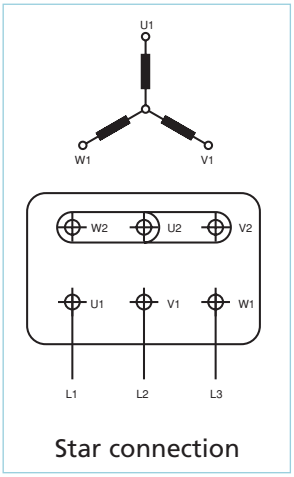
where I_n is the line current and U_n the line voltage referred to the star connection.

Delta connection

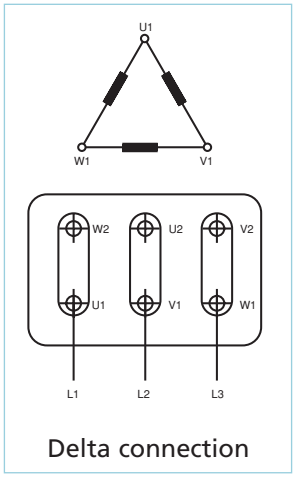
A delta connection is obtained by connecting the end of a phase to the beginning of the next phase.
The phase current I_{ph} and the phase voltage U_{ph} are:

$I_{ph} = I_n / \sqrt{3}$; $U_{ph} = U_n$

where I_n and U_n are referred to the delta connection.



Star connection



Delta connection

Star-delta starting

Star-delta starting allows a peak current reduction. It can be used only when the reduced starting torque obtained is higher than the resistant torque. Actually, it should be noted that the torque of an induction squirrel-cage motor is directly proportional to the square of the voltage. Motors whose rated voltage with delta connection corresponds to the mains voltage, can be started with the star-delta method.

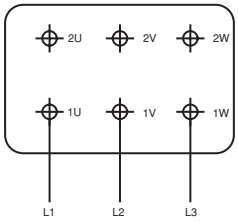
All motors can be supplied with windings designed for star-delta starting (for example: 400 V Δ / 690 V Y).

Pole-changing motors

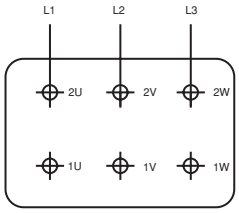
Standard pole-changing motors are designed for single voltage and direct-on-line starting.

When the ratio between the two speeds is from 1 to 2, the standard motors have one single winding (Dahlander connection). For the other speeds, the motors have two separate windings.

AM/AMV - two separate windings

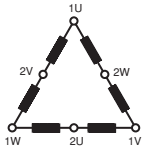


Low speed

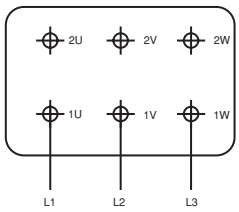


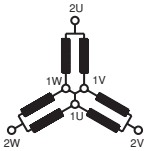
High speed

AM - Dahlander connection Δ / YY

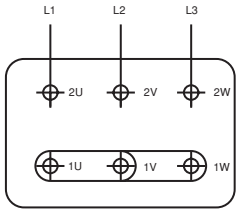


Low speed

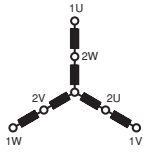




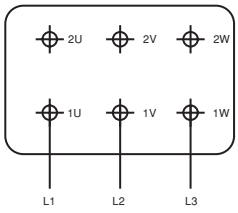
High speed

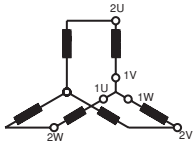


AMV - Dahlander connection Y / YY

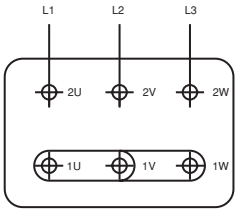


Low speed





High speed



Motors frame sizes 90 upwards in standard design are suitable for operation on static frequency converters, taking into account the following remarks:

• Maximum converter output voltage 500V at peak voltages $\hat{U} \leq 1460V$ and $du/dt \leq 13$ kV/us. For higher converter output voltages or stresses, a special insulation is required.

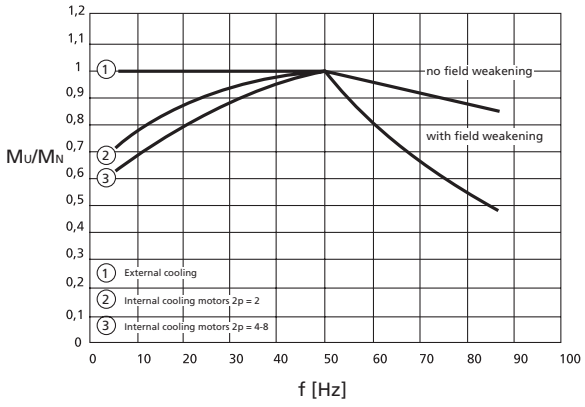
• With square characteristic of the load torque, motors can be driven with their rated torque.

• For constant torque, the rated torque of motors with internal cooling must be reduced due to reduced cooling air inlet. Depending on the control range, the use of an external fan would be advisable.

• The motors frame sizes 90 – 112 are suitable for a maximum output frequency of the converter of 60 Hz (e.g. applications with square torque, control range 1:10, such as pumps and fans). For higher frequencies, a special range with type designation AMI is available on request. From frame size 132 upwards, motors designed Δ/Y 230/400 V, 50 Hz can be operated in delta with a maximum frequency of 87 Hz (observe mechanical limit speed).

The motors frame size 56 – 80 can be operated on single-phase converters up to maximum 60 Hz. (Special range with type designation AMI for operation on three-phase converters with output voltage ≥ 400 V and output frequency > 60 Hz).

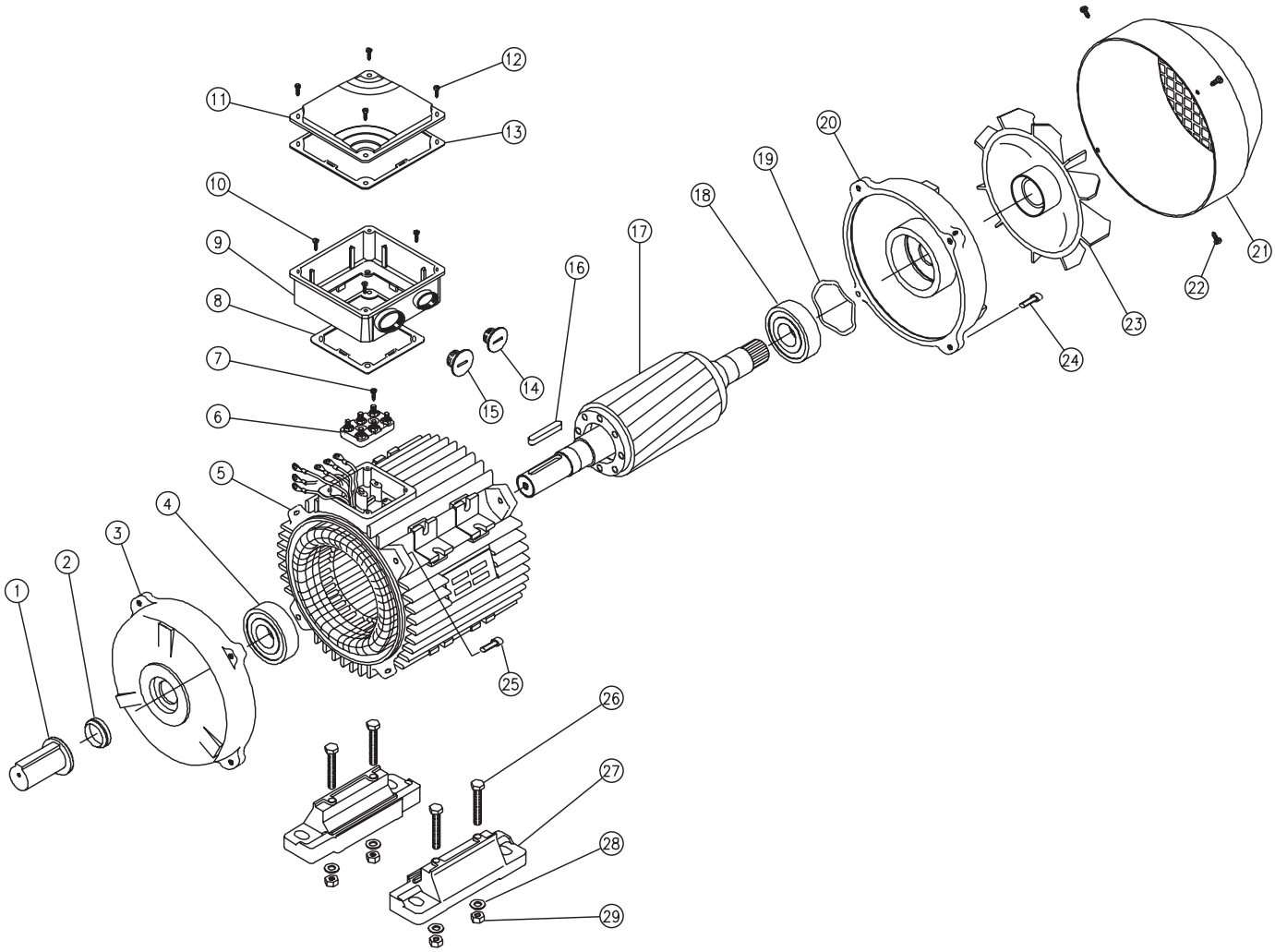
The electrical values and dimensions of the range AMI in frame size 56 to 112 are identical to AM motors (see data tables pages 41-44).



Torque caracteristics of three-phase motors driven by frequency converters.

Noise

Depending on the operating point and converter type, converter-fed motors produce between approx. 4 - 10 dB(A) higher noise values than when supplied from the mains. For motors driven with a frequency over 50 Hz, more fan noise is produced. We recommend the use of an external fan.



Part description

1	Shaft protection
2	Dust seal drive end
3	Endshield drive end
4	Bearing drive end
5	Stator frame
6	Terminal board
7	Fixing screw terminal board
8	Gasket terminal box
9	Terminal box
10	Fixing screw terminal box
11	Terminal box lid
12	Fixing screw terminal box lid
13	Gasket terminal box lid
14	Blank gland plug
15	Blank gland plug
16	Key
17	Rotor complete
18	Bearing non-drive end
19	Pre-load washer
20	Endshield non-drive end
21	Fan cover
22	Fixing screw fan cover
23	Fan
24	Fixing bolt endshield non-drive end
25	Fixing bolt endshield drive end
26	Fixing bolt motor feet
27	Motor feet
28	Fixing washer motor feet
29	Fixing nut motor feet

Only motors 71-160 frame size have removable feet for easy change of terminal box position

In enquires and orders for spare parts please state always:
Designation of spare part, motor type, mounting arrangement, motor serial number (Product No. when available)
Enquires and orders cannot be handled without these data.

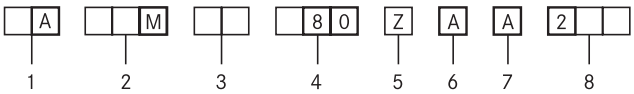
TYPE DESIGNATION

Apart from other information, it is necessary to specify the exact type designation in all enquiries, when ordering spare parts or replacement motors or when asking for documentary information.
The type designation of our motors comprises 8 points of reference, each of which may consist of several letters and/or numerals. The meaning of each symbol can be seen from the following table. For motors not included in our standard range, special symbols may be used which are not listed here.

Meaning of the symbols

Ref. point	Meaning	Description of symbols used for our motors	
1	Type of motor	A	Asynchronous motor
2	Cooling	M G MFV	Surface cooled with external fan, cooling fins Surface cooled without external fan, cooling fins Surface cooled with forced ventilation, cooling fins
3	Type of motor	blank V H HE I	Three-phase motor, standard efficiency IE1code Three-phase pole-changing motor for driving fans Three-phase motor, efficiency to EPACT regulations Three-phase motor, high efficiency IE2 code Special design for three-phase motor driven with frequency converter
4	Shaft centre height	56, 63, 71, 80, 90, 100, 112, 132,160, 180, 200, 225, 250, 280, 315	
5	Frame length	Z S M L	 Mechanical dimension (short) Mechanical dimension (medium) Mechanical dimension (long)
6	Mechanical design and output value	A B ... Z	
7	Frame material	A G	Aluminium frame Cast iron frame
8	Number of poles	2 - 4/2 4 - 8/4 6 - 4/6 8 - 6/8	

Example



1) Temperature rise to class F

* Higher output (progressive motor)

High efficiency motors - IE2 code/EFF1 from 280 to 315 frame size

Three-phase motors designed for range of rated voltage 380-420 V ± 5% - 50 Hz

IE1

For mains voltage to IEC 60038 400 V ± 10% - 50 Hz

Standard efficiency motors, IE1
Efficiency testing method IEC 60034-2-1;2007

Temperature rise to class B

Tipo		kW	HP	min^{-1}	M_N Nm	IE1 η 50%	IE1 η 75%	IE1 η 100%	cos φ	I_N 400V	I_N 380-420V	I_A/I_N	M_A/M_N	M_S/M_N	M_K/M_N	J 10^{-3} kgm^2	kg
3000 min^{-1} (2 poles)																	
AM 56Z AA	**2**	0.09	0.12	2810	0.3	49.0	53.0	59.0	0.67	0.35	0.40	3.9	3.8	3.8	3.9	0.09	3.4
AM 56Z BA	**2**	0.12	0.16	2800	0.4	51.0	56.0	62.0	0.68	0.40	0.45	3.5	3.4	3.4	3.5	0.1	3.5
AM 63Z AA	**2**	0.18	0.25	2790	0.6	54	58	63.0	0.73	0.60	0.65	3.7	3.0	3.0	3.1	0.14	3.6
AM 63Z BA	**2**	0.25	0.33	2790	0.9	57	62	66.0	0.70	0.80	0.75	4.5	3.2	3.2	3.3	0.17	4.1
AM 63Z CA	**2***	0.37 [1]	0.50 [1]	2800	1.3	54	58	65.0	0.70	1.20	1.25	4.6	3.4	3.3	3.4	0.20	4.4
AM 71Z AA	**2**	0.37	0.50	2820	1.3	58.0	64.0	70.0	0.78	1.0	1.2	4.7	3.6	3.4	3.6	0.36	5.8
AM 71Z BA	**2**	0.55	0.75	2830	1.9	57.0	64.0	71.0	0.77	1.5	1.6	4.8	3.2	3.1	3.3	0.42	6.2
AM 71Z CA	**2***	0.75 [1]	1.0 [1]	2800	2.6	58.9	65.7	72.6	0.76	2.0	2.1	5.2	3.1	3.2	3.1	0.61	7.2
AM 80Z AA	**2**	0.75	1.0	2840	2.5	66.3	71.5	73.0	0.78	1.9	2.0	5.0	2.8	2.8	2.9	0.75	8.4
AM 80Z BA	**2**	1.1	1.5	2810	3.7	72.1	75.0	75.3	0.82	2.5	2.6	4.6	2.4	2.8	2.9	0.89	9.5
AM 80Z CA	**2***	1.5 [1]	2.0 [1]	2825	5.1	74.7	77.5	77.8	0.83	3.3	3.4	5.0	2.9	3.0	3.3	1.05	11.1
AM 90S AA	**2**	1.5	2.0	2830	5.1	75.6	78.7	78.6	0.82	3.4	3.5	5.0	3.1	2.9	3.0	1.37	12.7
AM 90S BA	**2***	1.8	2.5	2805	6.1	74.9	78.0	78.2	0.80	4.2	4.3	4.5	2.6	2.4	2.5	1.37	12.7
AM 90L CA	**2**	2.2	3.0	2860	7.3	81.5	82.8	81.8	0.81	4.9	4.9	7.1	4.1	3.6	4.0	1.8	16.0
AM 90L DA	**2***	3 [1]	4.0 [1]	2860	10.0	78.7	81.8	82.2	0.80	6.6	6.8	7.2	3.9	3.4	3.8	2.09	18.7
AM 100L AA	**2**	3	4.0	2860	10.0	78.9	81.4	81.5	0.85	6.4	6.7	6.0	3.1	3.1	3.3	2.80	19.3
AM 100L BA	**2***	4 [1]	5.5 [1]	2835	13.5	81.1	82.5	81.7	0.88	8.0	8.1	6.2	2.9	2.5	2.9	3.35	19.7
AM 100L CA	**2***	5.5 [1]	7.5 [1]	2865	18.3	83.7	84.6	83.3	0.86	11.1	11.3	7.2	3.5	3.4	4.1	4.5	25.9
AM 112M AA	**2**	4	5.5	2880	13.3	81.9	84.0	83.5	0.82	8.4	8.7	8.0	3.4	3.5	3.6	5.20	24.3
AM 112M BA	**2***	5.5	7.5	2900	18.1	83.6	84.7	85.0	0.86	10.9	11.2	7.8	3.5	3.4	3.6	6.48	27.4
AM 112M CA	**2***	7.5	10	2900	24.7	86.7	87.8	87.1	0.87	14.3	14.8	8.7	4.0	3.9	4.0	8.58	33.6
AM 132S YA	**2**	5.5	7.5	2890	18.2	83.2	84.7	85.0	0.83	11.3	11.4	6.0	2.2	2.1	2.3	10.63	37.0
AM 132S ZA	**2**	7.5	10.0	2880	24.9	85.6	86.7	86.1	0.87	14.5	14.9	6.4	2.9	2.7	3.1	13.83	42.6
AM 132M ZA	**2***	9.2	12.5	2900	30.3	84.7	86.8	87.0	0.84	18.4	18.8	7.0	2.8	2.4	3.2	15.0	48.0
AM 132M RA	**2***	11	15.0	2880	36.5	87.1	88.1	88.0	0.85	21.3	21.7	6.9	3.2	2.8	3.8	17.13	52.5
AM 132M TA	**2***	15 [1]	20.0 [1]	2920	49.1	86.4	88.6	88.9	0.83	29.5	30.5	7.0	3.2	2.8	3.7	20.30	59.0
AM 160M VA	**2**	11	15	2940	35.7	83.4	86.4	87.7	0.83	21.9	22.7	7.4	2.5	2.3	3.1	40.00	77.0
AM 160M XA	**2**	15	20	2940	48.7	87.3	88.9	88.9	0.85	28.6	29.2	8.1	3.1	2.6	3.7	51.75	94.0
AM 160L XA	**2**	18.5	25	2950	59.9	88.2	89.7	89.6	0.87	34.3	34.8	8.5	3.6	3.0	4.2	64.00	107.8
AM 160L RA	**2***	22	30	2940	71.5	88.7	90.5	90.4	0.90	39.1	39.4	8.4	3.0	2.6	3.7	64.00	108.7
AM 180M XG	**2**	22	30	2925	71.8	88.2	89.8	89.9	0.86	41	42	7.4	2.5	2.3	3.2	65	130
AM 180M RG	**2***	30	40	2925	97.9	90.6	90.7	90.7	0.86	56	57.5	7.9	2.7	2.5	3.4	88	150
AM 200L LG	**2**	30	40	2945	97.3	88.3	90.2	90.7	0.85	56.2	57	7.8	2.2	2.0	3.0	120	212
AM 200L NG	**2**	37	50	2950	119.8	89.0	90.8	91.2	0.86	68.2	69	7.7	2.2	2.0	3.0	145	230
AM 225M NG	**2**	45	60	2945	145.9	90.0	91.5	91.7	0.89	80	82	7.8	2.4	1.9	2.8	270	310
AM 250M NG	**2**	55	75	2950	178.0	89.9	91.7	92.1	0.89	97	100	7.5	2.3	1.8	3.0	424	410
AMHE 280S G	**2**	75	100	2960	242.0	93.1	94.3	94.0	0.90	128	134	7.8	2.2	2.0	3.0	700	570
AMHE 280M G	**2**	90	125	2960	290.4	93.4	94.3	94.3	0.90	153	160	7.8	2.2	2.0	3.0	800	660
AMHE 315S G	**2**	110	150	2978	352.7	93.4	94.5	94.8	0.90	185	194	7.8	2.2	1.8	2.9	1400	800
AMHE 315M G	**2**	132	180	2978	423.3	93.2	94.8	95.1	0.90	223	233	7.8	2.2	1.8	2.9	1700	1000
AMHE 315M RG	**2**	160	220	2980	512.7	94.0	95.1	95.4	0.91	265	277	7.8	2.0	1.7	2.75	2600	1100
AMHE 315L G	**2**	200	270	2978	641.3	94.2	95.4	95.7	0.91	330	346	7.2	1.85	1.6	2.5	2800	1300

1) Temperature rise to class F

***** Higher output (progressive motor)

IE code not applicable to motors 2, 4, 6 poles with P_N < 0.75 kW. Efficiency testing method: IEC 60034-2;1996

High efficiency motors - IE2 code from 280 to 315 frame size

Efficiency values are not comparable without knowing the efficiency testing method.

Three-phase motors designed for range of rated voltage 380-420 V ± 5% - 50 Hz

IE1

For mains voltage to IEC 60038 400 V ± 10% - 50 Hz

Standard efficiency motors, IE1
Efficiency testing method IEC 60034-2-1;2007

Temperature rise to class B

Tipo		kW	HP	min^{-1}	M_N Nm	IE1 η 50%	IE1 η 75%	IE1 η 100%	cos φ	I_N 400V	I_N 380-420V	I_A/I_N	M_A/M_N	M_S/M_N	M_K/M_N	J 10^{-3} kgm^2	kg
1500 min^{-1} (4 poles)																	
AM 56Z AA	**4**	0.06	0.08	1300	0.4	42.0	44.0	48.0	0.70	0.28	0.32	2.6	2.1	2.0	2.1	0.14	2.7
AM 56Z BA	**4**	0.09	0.12	1330	0.6	43.0	47.0	51.0	0.74	0.35	0.40	2.5	2.2	2.1	2.2	0.16	2.9
AM 63Z AA	**4**	0.12	0.16	1350	0.8	46.0	50.0	57.0	0.65	0.50	0.55	2.4	2.0	1.9	2.0	0.25	3.3
AM 63Z BA	**4**	0.18	0.25	1330	1.3	47.0	50.0	58.0	0.70	0.65	0.70	2.3	1.9	1.8	1.9	0.27	4.1
AM 63Z CA	**4***	0.25	0.33	1360	1.8	49.0	52.5	58.0	0.74	0.85	0.90	2.7	2.2	2.0	2.1	0.30	4.2
AM 71Z AA	**4**	0.25	0.33	1340	1.8	55.0	59.0	64.0	0.66	0.90	1.00	3.2	1.9	1.8	2.0	0.70	5.7
AM 71Z BA	**4**	0.37	0.50	1370	2.6	60.0	63.0	67.0	0.67	1.20	1.25	3.3	2.2	2.1	2.2	0.82	6.0
AM 71Z CA	**4***	0.55 [1]	0.75 [1]	1380	3.8	61.0	64.0	69.0	0.68	1.70	1.80	3.6	2.4	2.3	2.4	0.95	7.3
AM 80Z AA	**4**	0.55	0.75	1400	3.8	67.0	69.0	70.0	0.72	1.6	1.7	3.6	2.6	2.5	2.6	1.58	8.2
AM 80Z BA	**4**	0.75	1.0	1410	5.1	68.7	70.8	72.4	0.72	2.1	2.2	4.4	2.8	2.3	2.8	2.00	9.3
AM 80Z CA	**4***	1.1 [1]	1.5 [1]	1385	7.6	73.4	75.7	75.2	0.77	2.8	2.9	4.4	2.5	2.5	2.6	2.41	10.6
AM 90S AA	**4**	1.1	1.5	1400	7.5	75.8	76.0	75.4	0.78	2.7	2.9	5.2	2.5	2.4	2.8	2.5	12.5
AM 90L BA	**4**	1.5	2.0	1400	10.2	77.6	77.8	77.5	0.78	3.6	3.7	5.7	2.8	2.6	3.0	3.13	14.5
AM 90L CA	**4**	1.8 [1]	2.5 [1]	1380	12.5	76.3	76.5	75.9	0.81	4.2	4.3	5.5	2.7	2.5	2.9	3.13	14.5
AM 90L DA	**4***	2.2 [1]	3.0 [1]	1400	15.0	78.3	78.5	77.9	0.77	5.3	5.5	4.8	2.9	2.8	3.2	4.05	17.0
AM 100L AA	**4**	2.2	3.0	1435	14.6	76.5	79.1	79.9	0.74	5.4	5.6	5.3	2.5	2.4	2.7	4.6	19.5
AM 100L BA	**4**	3.0	4.0	1425	20.1	82.0	83.0	81.6	0.78	6.8	6.9	4.6	2.4	2.3	2.5	5.58	22.5
AM 100L CA	**4***	4.0 [1]	5.5 [1]	1400	27.3	80.8	81.8	80.4	0.78	9.2	9.3	6.0	2.6	2.4	2.9	6.05	25.0
AM 112M AA	**4**	4.0	5.5	1430	26.7	83.2	83.9	83.1	0.82	8.5	8.8	6.3	2.2	2.0	2.8	12.2	29.5
AM 112M BA	**4***	5.5 [1]	7.5 [1]	1430	36.7	84.1	84.8	84.0	0.83	11.4	11.7	6.5	2.2	2.0	2.9	15.2	34.0
AM 132S ZA	**4**	5.5	7.5	1430	36.7	87.2	87.1	86.1	0.82	11.3	11.7	5.8	3.0	2.7	3.0	22.40	41.9
AM 132M ZA	**4**	7.5	10.0	1440	49.7	87.3	87.2	86.2	0.83	15.3	15.5	6.8	3.1	2.7	3.1	29.25	51.0
AM 132M RA	**4**	9.2	12.5	1440	61.0	86.5	87.5	87.3	0.86	17.7	17.9	8.0	3.5	3.2	3.5	37.25	65.0
AM 132M TA	**4***	11.0 [1]	15.0 [1]	1440	72.9	83.5	83.9	84.5	0.87	21.5	22.0	8.3	3.1	3.0	3.3	37.25	65.0
AM 160M XA	**4**	11	15	1460	71.9	88.5	89.3	88.7	0.80	22.4	22.7	7.5	2.5	2.2	3.1	81.25	88.5
AM 160L XA	**4**	15	20	1460	98.1	89.4	90.2	89.6	0.84	28.8	29.6	7.0	2.5	2.2	3.3	105.7	106.5
AM 160L ZA	**4***	18.5	25	1460	121.8	89.9	90.7	90.1	0.84	35.4	36	7.6	2.5	2.2	3.3	120.4	117.3
AM 160L RA	**4***	22	30	1460	143.9	90.4	91.2	90.6	0.86	41.0	42	7.8	2.4	2.2	3.2	134.7	128.1
AM 180M XG	**4**	18.5	25	1460	121.0	89.0	89.8	89.3	0.84	35.5	36.5	7.2	2.7	2.2	3.0	105	125
AM 180L XG	**4**	22	30	1460	143.9	89.8	90.5	89.9	0.84	42	43.5	7.3	2.7	2.2	3.0	118	135
AM 180L RG	**4***	30	40	1455	196.9	89.0	90.0	90.0	0.82	58	60	7.8	3.0	2.4	3.2	150	150
AM 200L NG	**4**	30	40	1465	195.6	89.7	90.8	90.7	0.84	56.5	58.5	7.0	2.4	1.8	2.6	195	225
AM 200L FG	**4***	37	50	1465	241.2	90.3	91.0	91.0	0.83	69.5	71.5	7.4	2.6	2.0	2.8	248	255
AM 225S NG	**4**	37	50	1475	239.5	89.8	91.1	91.2	0.84	69.5	71.5	7.5	2.3	2.0	2.9	356	290
AM 225M NG	**4**	45	60	1475	291.3	90.8	91.8	91.7	0.86	81.5	85	7.6	2.3	2.0	2.9	461	330
AM 250M NG	**4**	55	75	1475	356.1	91.6	92.3	92.1	0.84	103	107	6.5	3.5	2.1	2.4	640	385
AM 250M KG	**4***	75	100	1470	487.2	90.7	91.8	92.0	0.82	142	146	7.3	3.9	2.3	2.7	812	440
AMHE 280S G	**4**	75	100	1475	485.6	93.5	94.5	94.3	0.88	131	138	7.4	2.4	1.9	2.7	1400	570
AMHE 280M G	**4**	90	125	1475	582.7	93.6	94.7	94.6	0.88	157	165	7.4	2.5	2.0	2.8	1600	660
AMHE 315S G	**4**	110	150	1480	709.8	93.8	95.0	95.0	0.88	191	201	7.7	2.4	2.0	2.6	3200	800
AMHE 315M G	**4**	132	180	1482	850.6	93.8	95.2	95.3	0.88	229	241	7.7	2.4	2.0	2.6	3700	1000
AMHE 315M RG	**4**	160	220	1487	1027.5	94.0	95.4	95.4	0.88	276	288	7.8	2.4	2.0	2.7	4700	1100
AMHE 315L G	**4**	200	270	1485	1286.1	94.0	95.4	95.5	0.88	345	360	7.6	2.3	1.9	2.6	5500	1300

1) Temperature rise to class F

***** Higher output (progressive motor)

IE code not applicable to motors 2, 4, 6 poles with P_N < 0.75 kW. Efficiency testing method: IEC 60034-2;1996

High efficiency motors - IE2 code from 280 to 315 frame size

Efficiency values are not comparable without knowing the efficiency testing method.

Three-phase motors designed for range of rated voltage 380-420 V ± 5% - 50 Hz

IE1

For mains voltage to IEC 60038 400 V ± 10% - 50 Hz

Standard efficiency motors, IE1
Efficiency testing method IEC 60034-2-1;2007

Temperature rise to class B

Tipo		kW	HP	min^{-1}	M_N Nm	IE1 η 50%	75%	100%	cos φ	I_N 400V	380-420V	I_A/I_N	M_A/M_N	M_S/M_N	M_K/M_N	J 10^{-3} kgm^2	kg
1000 min^{-1} (6 poles)																	
AM 71Z AA	**6**	0.18	0.25	880	2.0	46.0	48.0	53.0	0.60	0.85	0.9	2.2	1.6	1.5	1.6	0.60	6.1
AM 71Z BA	**6**	0.25 [1]	0.33 [1]	880	2.7	46.0	50.0	54.0	0.62	1.10	1.2	2.5	1.7	1.6	1.7	0.90	6.6
AM 80Z AA	**6**	0.37	0.5	920	3.8	47.0	58.0	60.0	0.70	1.25	1.3	2.7	1.6	1.6	2.1	1.97	8.0
AM 80Z BA	**6**	0.55	0.75	920	5.7	60.0	64.0	68.0	0.67	1.75	1.8	2.9	2.2	2.1	2.1	2.47	9.4
AM 90S AA	**6**	0.75	1.00	910	7.9	70.5	72.5	71.5	0.63	2.4	2.5	2.9	1.7	1.5	1.7	3.18	11.6
AM 90L BA	**6**	1.1	1.5	920	11.4	72.0	73.5	73.0	0.66	3.3	3.4	3.0	1.7	1.5	1.7	4.78	15.0
AM 100L AA	**6**	1.5	2.00	930	15.4	73.3	75.8	75.3	0.69	4.2	4.4	3.7	1.8	1.8	2.3	6.73	17.5
AM 100L BA	**6**	1.8	2.5	940	18.3	74.6	77.1	76.6	0.67	5.1	5.3	4.2	2.4	2.4	2.8	9.43	22.0
AM 112M AA	**6**	2.2	3.00	940	22.4	77.0	79.0	78.0	0.74	5.3	5.4	4.4	2.4	2.4	2.6	14.18	26.0
AM 112M CA	**6***	3	4.00	940	30.5	81.8	82.8	82.8	0.74	7.0	7.2	5.3	2.9	2.9	2.9	18.70	39.0
AM 132S ZA	**6**	3	4.00	950	30.2	79.5	81.5	81.3	0.72	7.4	7.5	4.9	2.0	1.8	2.4	23.53	36.7
AM 132M YA	**6**	4	5.5	950	40.2	81.4	83.1	82.7	0.71	9.9	10.5	4.5	2.2	2.0	2.5	29.50	42.5
AM 132M ZA	**6**	5.5	7.5	950	55.3	82.2	83.6	83.6	0.71	13.5	13.5	4.1	2.2	1.9	2.2	37.75	55.5
AM 132M TA	**6***	7.5 [1]	10 [1]	960	74.6	82.8	83.5	82.9	0.75	17.4	17.6	5.0	2.3	1.9	2.8	54.10	64.1
AM 160M ZA	**6**	7.5	10	970	73.8	84.4	86.5	86.3	0.78	16.0	16.3	6.2	2.8	2.7	3.2	103	96.6
AM 160L ZA	**6**	11	15	960	109.4	88.1	88.5	87.8	0.78	23.4	24.0	6.0	2.5	2.2	3.5	137	113.6
AM 180L ZG	**6**	15	20	970	147.7	88.2	88.5	87.7	0.83	29.5	30	6.7	2.2	1.8	2.8	169	130
AM 200L PG	**6**	18.5	25	970	182.1	87.7	88.8	88.6	0.82	37.0	37	5.3	2.2	1.8	2.3	260	210
AM 200L RG	**6**	22	30	975	215.5	88.3	89.4	89.2	0.82	43.5	44	5.7	2.2	1.8	2.3	285	220
AM 225M PG	**6**	30	40	975	293.8	89.4	90.4	90.2	0.84	57.3	58	5.7	2.3	1.6	2.3	536	290
AM 250M PG	**6**	37	50	975	362.4	89.8	90.9	90.8	0.84	70	71	7.1	3.2	2.5	2.6	880	380
AM 280S G	**6**	45	60	985	436.3	90.3	91.3	91.4	0.84	85	88	6.0	2.5	1.8	2.0	2550	570
AM 280M G	**6**	55	75	985	533.2	90.7	91.7	91.9	0.83	104	107	6.1	2.5	1.9	2.0	2900	660
AM 315S G	**6**	75	100	985	727.1	91.3	92.4	92.8	0.84	139	144	7.0	3.0	2.1	2.6	5000	800
AM 315M G	**6**	90	125	985	872.6	91.8	92.7	93.0	0.85	164	172	7.0	3.0	2.1	2.6	6000	1000
AM 315M RG	**6**	110	150	985	1066.5	92.3	93.4	93.7	0.85	198	207	6.7	2.8	1.9	2.0	6100	1100
AM 315L G	**6**	132 [1]	175 [1]	985	1279.7	92.6	93.4	93.7	0.85	236	248	6.7	2.8	1.9	2.0	7300	1300

1) Temperature rise to class F

***** Higher output (progressive motor)

IE code not applicable to motors 2, 4, 6 poles with P_N < 0.75 kW. Efficiency testing method: IEC 60034-2;1996

Efficiency values are not comparable without knowing the efficiency testing method.

Three-phase motors designed for range of rated voltage 380-420 V ± 5% - 50 Hz

For mains voltage to IEC 60038 400 V ± 10% - 50 Hz

Efficiency testing method IEC 60034-2;1996

Temperature rise to class B

Tipo		kW	HP	min^{-1}	M_N Nm	η 50%	η 75%	η 100%	cos φ	I_N 400V	I_N 380-420V	I_A/I_N	M_A/M_N	M_S/M_N	M_K/M_N	J 10^{-3} kgm^2	kg
750 min^{-1} (8 poles)																	
AM 71Z AA	**8**	0.12	0.16	670	1.7	40	44	50	0.55	0.65	0.7	2.4	2.5	2.4	2.5	0.82	6
AM 80Z AA	**8**	0.25	0.33	680	3.5	40	47	51	0.62	1.1	1.2	2.2	1.8	1.9	2.0	1.97	8
AM 90S AA	**8**	0.37	0.50	680	5.2	52	58	59	0.53	1.7	1.8	2.1	1.4	1.3	1.6	3.18	11.4
AM 90L BA	**8**	0.55	0.75	680	7.7	52	58	59	0.54	2.5	2.7	2.1	1.4	1.3	1.6	4.78	15
AM 100L AA	**8**	0.75	1.0	690	10.4	59	64	65	0.65	2.6	2.8	3.0	1.6	1.5	1.7	6.72	17.6
AM 100L BA	**8**	1.1	1.5	690	15.2	59	67	68	0.62	3.9	4.0	3.0	1.9	1.3	1.6	15.93	22.6
AM 112M AA	**8**	1.5	2.0	696	20.6	66	69	70	0.66	4.6	4.8	4.0	1.8	2.0	2.4	16.70	35
AM 132S ZA	**8**	2.2	3.0	710	29.6	79.3	80.5	78.8	0.64	6.4	6.6	3.4	1.7	1.6	1.7	29.50	45.5
AM 132M ZA	**8**	3.0	4.0	710	40.4	81.3	82.0	79.8	0.67	8.1	8.4	3.6	1.7	1.6	1.9	37.75	54.5
AM 160M YA	**8**	4.0	5.5	700	54.6	84.9	84.5	84.4	0.72	9.5	9.7	4.5	1.8	1.6	2.2	75	75
AM 160M ZA	**8**	5.5	7.5	720	72.9	85.6	85.2	85.0	0.73	12.8	13.3	4.0	1.8	1.6	2.3	103	92
AM 160L ZA	**8**	7.5	10.0	710	100.9	86.3	85.8	85.5	0.74	17.1	17.8	4.0	1.8	1.6	2.3	137	113
AM 180L ZG	**8**	11	15	725	144.9	86.7	87.8	86.9	0.74	25.0	25.5	4.6	2.1	1.4	1.9	215	150
AM 200L RG	**8**	15	20	730	196.2	87.2	88.8	88.5	0.76	32.0	33.5	5.3	2.3	1.9	2.5	285	220
AM 225S PG	**8**	18.5	25	730	242.0	88.6	89.9	89.5	0.77	39.0	41	5.2	2.3	1.9	2.2	438	255
AM 225M PG	**8**	22	30	730	287.8	88.7	89.9	89.5	0.77	46.6	48	5.6	2.5	2.0	2.3	538	285
AM 250M PG	**8**	30	40	730	392.4	88.7	90.2	90.2	0.78	61	65	6.5	3.2	2.5	2.6	1080	400
AM 280S G	**8**	37	50	735	480.7	91.5	92.5	92.5	0.75	77	81	6.0	1.7	1.6	2.4	2550	570
AM 280M G	**8**	45	60	735	584.7	91.6	92.8	93.0	0.75	93	98	6.0	1.7	1.4	2.4	2900	660
AM 315S G	**8**	55	75	740	709.8	92.0	93.3	93.5	0.75	113	119	6.0	2.5	1.5	2.0	5000	800
AM 315M G	**8**	75	100	740	967.9	92.2	93.9	94.1	0.76	151	159	6.0	2.5	1.5	2.0	6000	1000
AM 315M RG	**8**	90	125	740	1161.4	93.4	94.2	94.4	0.77	179	188	6.0	2.4	1.8	2.0	6100	1100
AM 315L G	**8**	110 [1]	150 [1]	740	1419.5	93.6	94.4	94.6	0.77	218	227	6.0	2.4	1.8	2.0	7300	1300

1) Temperature rise to class F

Efficiency values are not comparable without knowing the efficiency testing method.

High efficiency motors, IE2 code
Efficiency testing method IEC 60034-2-1;2007

Sovratemperatura in classe B

Tipo		kW	HP	min^{-1}	M_N Nm	IE2η 50%	75%	100%	cos φ	I_N 400V	I_A/I_N	M_A/M_N	M_S/M_N	M_K/M_N	J 10^{-3} kgm^2	kg
3000 min^{-1} (2 poles)																
AMHE 80Z AA	**2**	0.75	1.0	2900	2.5	77.3	78.5	80.5	0.78	1.7	7.0	3.6	3.4	3.6	0.7	9.5
AMHE 80Z BA	**2**	1.1	1.5	2880	3.6	79.5	81.2	81.5	0.78	2.5	6.8	3.6	3.4	3.6	0.89	11.1
AMHE 80Z CA	**2***	1.5	2.0	2880	5.0	80.5	82.1	82.4	0.78	3.4	7.0	3.5	3.4	3.6	1.1	13.5
AMHE 90S AA	**2**	1.5	2	2880	5.0	81.0	82.8	82.8	0.80	3.2	8.1	3.6	3.1	4.0	1.56	14.0
AMHE 90L CA	**2**	2.2	3	2860	7.3	82.5	84.0	84.0	0.85	4.4	8.5	3.5	3.2	3.7	1.8	16.0
AMHE 100L AA	**2**	3	4	2920	9.8	84.1	85.8	85.5	0.84	5.9	8.0	3.5	3.0	4.0	4.05	22.8
AMHE 100L BA	**2***	4	5.5	2920	13.1	85.2	86.4	86.1	0.86	7.8	8.2	3.3	3.0	3.8	4.1	22.8
AMHE 112M AA	**2**	4	5.5	2940	13.0	85.5	87.0	86.8	0.88	7.6	8.0	2.9	2.1	3.3	6.48	27.4
AMHE 112M BA	**2***	5.5	7.5	2920	18.0	85.8	87.4	87.3	0.88	10.4	8.0	3.0	2.1	3.2	8.58	34.0
AMHE 112M CA	**2***	7.5	10	2900	24.7	86.5	88.3	88.3	0.87	14.2	8.1	3.0	2.2	3.4	10.50	36.0
AMHE 132S YA	**2**	5.5	7.5	2900	18.1	86.0	88.0	87.9	0.89	10.2	7.3	2.7	2.3	3.2	14.0	46.0
AMHE 132S ZA	**2**	7.5	10	2900	24.7	86.3	88.6	88.4	0.89	13.8	7.5	2.8	2.5	3.3	16.0	53.0
AMHE 132M RA	**2***	11	15	2920	36.0	88.1	90.0	89.7	0.90	19.8	7.5	2.8	2.6	3.4	17.5	58.0
AMHE 132M TA	**2***	15	20	2920	49.1	88.9	90.6	90.3	0.89	27.0	7.5	3.0	2.8	3.5	21.0	61.0
AMHE 160M YA	**2**	11	15	2930	35.9	88.9	90.2	90.0	0.87	20.4	7.3	2.4	2.2	3.1	51.75	77.0
AMHE 160M ZA	**2**	15	20	2930	48.9	90.0	91.0	90.8	0.88	27.2	7.6	2.5	2.3	3.1	55.4	87.1
AMHE 160L ZA	**2**	18.5	25	2935	60.2	90.3	91.6	91.2	0.88	33.3	7.9	2.8	2.4	3.4	59.7	97.5
AMHE 160L TA	**2***	22	30	2935	71.6	91.0	91.7	91.5	0.90	38.6	8.3	3.0	2.6	3.7	64.0	108.7
AMHE 180M ZG	**2**	22	30	2930	71.7	91.1	91.8	91.5	0.88	39.5	7.7	2.5	2.3	3.2	70	135
AMHE 200L PG	**2**	30	40	2945	97.3	91.1	92.4	92.1	0.89	52.7	7.8	2.1	1.9	2.8	130	220
AMHE 200L RG	**2**	37	50	2950	119.8	91.5	92.9	92.6	0.89	65.0	7.6	2.2	2.0	2.8	156	240
AMHE 225M PG	**2**	45	60	2950	145.7	92.6	93.3	93.0	0.89	78.5	7.9	2.5	1.9	2.9	270	315
AMHE 250M PG	**2**	55	75	2955	177.7	92.8	93.9	93.6	0.9	94.5	7.7	2.4	1.8	3.0	424	410
AMHE 280S G	**2**	75	100	2960	242.0	93.1	94.3	94.0	0.9	128	7.8	2.2	2.0	3.0	700	570
AMHE 280M G	**2**	90	125	2960	290.4	93.4	94.3	94.3	0.9	153	7.8	2.2	2.0	3.0	800	660
AMHE 315S G	**2**	110	150	2978	352.7	93.4	94.5	94.8	0.9	185	7.8	2.2	1.8	2.9	1400	800
AMHE 315M G	**2**	132	180	2978	423.3	93.2	94.8	95.1	0.9	223	7.8	2.2	1.8	2.9	1700	1000
AMHE 315M RG	**2**	160	220	2980	512.7	94.0	95.1	95.4	0.91	265	7.8	2.0	1.7	2.75	2600	1100
AMHE 315L G	**2**	200	270	2978	641.3	94.2	95.4	95.7	0.91	330	7.2	1.85	1.6	2.5	2800	1300

***** Higher output (progressive motor)

High efficiency motors, IE2 code
Efficiency testing method IEC 60034-2-1;2007

Sovratemperatura in classe B

Tipo		kW	HP	min^{-1}	M_N Nm	IE2η 50%	IE2η 75%	IE2η 100%	cos φ	I_N 400V	I_A/I_N	M_A/M_N	M_S/M_N	M_K/M_N	J 10^{-3} kgm^2	kg
1500 min^{-1} (4 poles)																
AMHE 80Z AA	**4**	0.75	1	1430	5	79.2	80.3	80.2	0.76	1.8	5.5	2.8	2.7	3	2.5	11
AMHE 90S AA	**4**	1.1	1.5	1430	7.3	81.4	82.7	82.5	0.77	2.5	6.1	4.0	3.9	4.1	3.73	16.4
AMHE 90L BA	**4**	1.5	2	1430	10	82.0	83.5	83.0	0.77	3.4	6.4	3.9	3.8	4.0	3.73	16.4
AMHE 100L AA	**4**	2.2	3	1450	14.5	84.0	85.3	85.1	0.74	5.1	6.0	3.2	3.0	3.4	5.58	22.4
AMHE 100L BA	**4**	3	4	1440	19.9	85.3	86.6	86.4	0.77	6.5	6.3	3.4	3.1	3.6	7.3	26.5
AMHE 112M AA	**4**	4	5.5	1450	26.3	86.0	87.3	87.1	0.78	8.5	6.1	3.1	2.8	3.3	13.3	30.4
AMHE 132S RA	**4**	5.5	7.5	1450	36.2	87.5	88.3	88.1	0.84	10.8	7.4	3.0	2.4	3.3	30.0	55.0
AMHE 132M TA	**4**	7.5	10	1450	49.4	88.5	89.4	89.2	0.85	14.4	7.4	3.0	2.4	3.3	36.0	65.0
AMHE 160M ZA	**4**	11	15	1460	71.9	89.4	90.3	90.1	0.82	22.0	6.9	2.3	2.1	2.9	105.0	108.0
AMHE 160L ZA	**4**	15	20	1460	98.1	90.6	91.2	91.0	0.84	29.0	7.4	2.5	2.2	3.1	120.7	114.0
AMHE 180M ZG	**4**	18.5	25	1460	121	90.8	91.7	91.3	0.84	35	7.5	2.8	2.3	3.1	112	130
AMHE 180L ZG	**4**	22	30	1465	143.4	91.5	92.1	91.8	0.84	41	7.8	3.0	2.4	3.2	132	140
AMHE 200L RG	**4**	30	40	1465	195.6	90.0	92.7	92.4	0.83	56.5	7.0	2.4	1.8	2.6	206	230
AMHE 225S PG	**4**	37	50	1475	239.5	92.5	93.0	92.9	0.85	68	7.7	2.3	2.0	2.9	356	290
AMHE 225M PG	**4**	45	60	1475	291.3	92.7	93.3	93.2	0.87	80.5	7.7	2.3	2.0	2.9	461	330
AMHE 250M PG	**4**	55	75	1475	356.1	93.4	94.0	93.7	0.83	103	6.8	3.8	2.3	2.6	677	400
AMHE 280S G	**4**	75	100	1475	485.6	93.5	94.5	94.3	0.88	131	7.4	2.4	1.9	2.7	1400	570
AMHE 280M G	**4**	90	125	1475	582.7	93.6	94.7	94.6	0.88	157	7.4	2.5	2.0	2.8	1600	660
AMHE 315S G	**4**	110	150	1480	709.8	93.8	95.0	95.0	0.88	191	7.7	2.4	2.0	2.6	3200	800
AMHE 315M G	**4**	132	180	1482	850.6	93.8	95.2	95.3	0.88	229	7.7	2.4	2.0	2.6	3700	1000
AMHE 315M RG	**4**	160	220	1487	1027.5	94.0	95.4	95.4	0.88	276	7.8	2.4	2.0	2.7	4700	1100
AMHE 315L G	**4**	200	270	1485	1286.1	94.0	95.4	95.5	0.88	345	7.6	2.3	1.9	2.6	5500	1300

Three-phase motors high efficiency according to EPAct

IE2

ENERGY

c UL us

For mains voltage 460 V - 60 Hz

Insulation class F
Temperature rise to class B
S.F. 1.15

Verified by UL Underwriters Laboratories Inc.

Type		kW	HP	min^{-1}	M_N Nm	η 50%	η 75%	η 100%	cos φ	I_N 460V	I_A/I_N	M_A/M_N	M_S/M_N	M_K/M_N	J 10^{-3} kgm^2	kg
3600 min^{-1} (2 poles)																
AMH 90S AA	**2**	1.5	2	3470	4.1	83.8	84.9	84.3	0.88	2.7	7.7	3.1	3	3.6	1.6	14
AMH 90L BA	**2**	2.2	3	3500	6.0	85.4	86.6	86.3	0.84	3.9	7.5	4.4	4	4.4	1.8	16
AMH 100L AA	**2**	2.2	3	3530	6.0	86.5	87.9	87.8	0.84	3.9	11.5	4.7	4.1	5.5	3.3	19.7
AMH 100L BA	**2**	3	4	3525	8.1	86.4	87.8	87.7	0.82	5	10.5	5.6	5.3	5.8	4.0	22.8
AMH 112M AA	**2**	3.7	5	3530	10.0	86.1	88.4	88.1	0.84	6.3	14.3	5.7	2.1	5.8	8.6	33.6
AMH 112M AA	**2**	4	5.5	3540	10.8	86.1	88.3	88.0	0.87	6.6	13.7	5.3	1.9	5.4	8.6	33.6
AMH 112M BA	**2***	5.5	7.5	3500	15.0	85.0	88.6	88.5	0.85	9.3	10.9	4.5	2.48	4.3	8.6	34
AMH 132S ZA	**2**	5.5	7.5	3520	14.9	86.1	88.2	88.5	0.87	9.2	7.9	3.3	2.9	3.7	20.5	53
AMH 132S TA	**2**	7.5	10	3510	20.4	89.7	90.1	89.5	0.91	11	8.1	3.4	2.9	3.9	20.5	53
AMH 132M TA	**2**	9.2	12.4	3520	25.0	88.8	89.9	89.5	0.91	14	8.1	3.3	2.9	3.9	25	59
AMH 160M YA	**2**	11	15	3550	29.6	90.1	91	91.0	0.88	17.3	8.7	2.8	2.2	3.6	51.7	87.8
AMH 160M ZA	**2**	15	20	3545	40.4	91.2	89.9	91.0	0.88	23.5	8.7	2.8	2.2	3.6	64	104
AMH 160L ZA	**2**	18.5	25	3550	49.8	91.5	92	91.7	0.87	28.8	8.9	2.8	2.2	3.6	64	105
AMH 180M ZG	**2**	22	30	3550	59.2	92.1	92.6	92.4	0.88	33.5	8.6	2.9	2.3	3.7	88	145
AMH 200L PG	**2**	30	40	3555	80.6	90.6	91.7	91.7	0.87	47	8.1	2.4	1.8	2.9	130	220
AMH 200L RG	**2**	37	50	3555	99.4	91.7	92.5	92.4	0.88	57.5	7.9	2.3	1.7	2.7	156	240
AMH 225M PG	**2**	45	60	3555	120.9	91.8	93.0	93.0	0.88	70	8.1	2.4	1.8	3.0	270	315
AMH 250M PG	**2**	55	75	3560	147.5	91.2	92.7	93.0	0.90	81.5	7.5	2.9	1.7	2.5	424	410
AMH 280S G	**2**	75	100	3580	200.1	92.8	93.2	93.6	0.89	110	7.6	2.2	1.7	3.4	700	570
AMH 280M G	**2**	90	125	3580	240.1	93.0	94.1	94.5	0.89	134	7.7	2.2	1.7	3.4	800	660
AMH 315S G	**2**	110	150	3585	293.0	93.3	94.4	94.5	0.89	165	8.2	2.8	1.5	3.0	1400	800
AMH 315M RG	**2**	150	200	3585	399.6	94.5	94.8	95.0	0.90	220	8.7	3.0	1.6	3.2	2600	1100
1800 min^{-1} (4 poles)																
AMH 90L AA	**4**	1.1	1.5	1745	6.0	82.2	84.2	84.2	0.76	2.1	7.2	3.8	4	4.6	3.7	16.4
AMH 90L BA	**4**	1.5	2	1735	8.3	82.1	84.4	84.4	0.73	3.1	7.5	4	3.9	4.2	3.7	16.4
AMH 90L CA	**4**	1.8	2.4	1720	10.0	82.2	84.3	84.3	0.77	3.4	7.4	4.4	3.3	4	3.7	16.4
AMH 100L AA	**4**	2.2	3	1750	12.0	85.8	87.6	87.5	0.70	4.6	6.5	3.8	3.1	3.9	5.6	22.4
AMH 100L BA	**4**	3	4	1740	16.5	85.7	87.7	87.6	0.76	5.6	7.4	3	2.8	3.2	7.3	26.5
AMH 112M AA	**4**	3.7	5	1750	20.2	86.3	87.9	87.8	0.79	6.8	6.9	4.2	3.5	4.5	13.3	30.4
AMH 112M AA	**4**	4	5.5	1745	21.9	86.5	88.1	88.0	0.81	7	6.7	3.9	3.2	4.2	13.3	30.4
AMH 132S ZA	**4**	5.5	7.5	1755	29.9	88.8	89.8	89.5	0.84	9.4	7.9	3.4	2.8	3.7	30	56
AMH 132M ZA	**4**	7.5	10	1750	40.9	89.5	90.2	89.5	0.84	12.4	8.1	3.5	2.9	3.8	36	65
AMH 132M TA	**4**	9.2	12.4	1745	50.3	89.2	90	89.5	0.84	16	8.3	3.6	2.9	3.9	36	65
AMH 160M ZA	**4**	11	15	1770	59.3	90.8	91.4	91.0	0.84	18.5	8.6	3.2	2.3	3.4	105.7	108
AMH 160L ZA	**4**	15	20	1770	80.9	91.4	91.6	91.0	0.84	24	8.2	3.2	2.3	3.4	120.7	114
AMH 180M G	**4**	18.5	25	1770	99.8	92.3	92.8	92.4	0.83	29	8.8	3.2	2.3	3.4	132	140
AMH 180L G	**4**	22	30	1770	118.7	92.2	92.7	92.4	0.84	36.5	8.6	3.2	2.3	3.4	150	155
AMH 200L RG	**4**	30	40	1780	160.9	92.3	93.2	93.0	0.82	49	7.7	2.9	2.2	3.0	248	255
AMH 225S PG	**4**	37	50	1780	198.5	92.2	93.2	93.0	0.85	60	7.8	2.3	2.0	2.8	356	290
AMH 225M PG	**4**	45	60	1780	241.4	93.4	93.9	93.6	0.84	72	7.9	2.3	2.0	2.8	461	330
AMH 250M PG	**4**	55	75	1775	295.9	91.2	93.8	94.1	0.80	91	8.5	4.6	2.7	3.2	750	420
AMH 280S G	**4**	75	100	1785	401.2	93.8	94.5	94.5	0.84	119	7.8	2.9	2.1	3.1	1400	570
AMH 280M G	**4**	90	125	1785	481.5	94.1	94.6	94.5	0.84	143	7.7	2.9	2.1	3.1	1600	660
AMH 315S G	**4**	110	150	1785	588.5	93.6	94.7	95.0	0.87	170	7.8	2.2	1.6	2.8	3200	800
AMH 315M RG	**4**	150	200	1785	802.5	94.1	94.9	95.0	0.88	228	8.0	2.4	1.6	2.9	4700	1100

Three-phase pole-changing motors designed for range of rated voltage 380-420 V ± 5% - 50 Hz

For mains voltage to IEC 60038 400 V ± 10% - 50 Hz

Temperature rise to class B

Type		kW	HP	min^{-1}	M_N Nm	η 100%	cos φ	I_N 400V	I_N 380-420V	I_A/I_N	M_A/M_N	J 10^{-3} kgm^2	kg
1500/3000 min^{-1} (4/2 poles) - Dahlander connection Δ/YY													
AM 63Z AA	**4/2**	0.20/0.30	0.27/0.40	1345/2700	1.4/1.1	56/65	0.65/0.81	0.8/0.83	0.89/0.88	2.4/3.2	2.1/2.1	0.40	4.6
AM 71Z AA	**4/2**	0.30/0.45	0.40/0.65	1374/2830	2.1/1.5	61/66	0.78/0.73	1.0/1.35	1.2/1.5	3.3/3.0	2.3/2.1	0.76	6.3
AM 80Z AA	**4/2**	0.45/0.60	0.65/0.80	1390/2760	3.1/2.1	64/68.8	0.75/0.80	1.4/1.6	1.5/1.7	3.8/4.0	2.3/2.2	1.58	8.3
AM 80Z BA	**4/2**	0.55/0.75	0.75/1.0	1435/2850	3.7/2.5	70/71.2	0.67/0.77	1.7/2.0	1.8/2.1	4.5/5.0	2.6/2.8	2.00	11.5
AM 80Z CA	**4/2**	0.8/1.1	1.1/1.5	1425/2830	5.4/3.7	76.1/77.2	0.70/0.79	2.2/2.6	2.5/2.8	4.5/4.9	2.5/2.7	2.41	14.7
AM 90L AA	**4/2**	1.2/1.55	1.6/2.1	1435/2850	8/5.2	77.4/78.3	0.71/0.79	3.2/3.7	3.4/3.9	4.7/5.1	2.6/2.7	3.10	15.6
AM 90L BA	**4/2**	1.6/2.0 [1]	2.15/2.7 [1]	1390/2810	11/6.8	73.5/75.5	0.78/0.86	4.0/4.6	4.1/4.7	4.1/5.5	2.7/2.6	3.73	17.1
AM 100L AA	**4/2**	1.8/2.5	2.5/3.35	1420/2865	12.1/8.3	78.5/77.4	0.76/0.84	4.5/5.6	4.7/5.8	5.2/5.5	2.2/2.2	4.60	21.4
AM 100L BA	**4/2**	2.2/3.0	3.0/4.0	1410/2830	14.9/10.1	74.6/71.4	0.72/0.82	5.9/7.4	6.1/7.7	4.2/4.3	1.8/2.0	4.60	22.5
AM 100L CA	**4/2**	2.6/3.3	3.5/4.4	1430/2890	17.4/10.9	82.6/78.6	0.78/0.76	5.9/8.0	6.1/8.5	4.7/5.5	1.9/2.2	5.58	23.2
AM 112M AA	**4/2**	3.3/4.4	4.4/5.9	1410/2800	22.4/15	77.4/75.4	0.82/0.85	7.5/9.9	7.8/10.6	4.5/5.1	2.1/2.4	13.30	36.1
AM 132S ZA	**4/2**	4.4/5.5	6.0/7.5	1450/2925	29/18	83.0/84.6	0.70/0.87	11.0/10.8	12.0/11.8	4.4/7.2	2.2/2.7	13.83	42.6
AM 132M ZA	**4/2**	6.6/8.1	9.0/11.0	1460/2920	43.2/26.5	85.4/84.5	0.76/0.90	14.7/15.4	15.5/16.4	5.5/7.5	2.6/2.9	17.13	51.4
AM 160M ZA	**4/2**	8.8/11.0	12.0/15.0	1460/2940	57.6/35.7	87.1/87.5	0.79/0.91	18.5/20.0	19.0/21.0	5.5/7.5	2.0/1.9	51.75	94.0
AM 160L ZA	**4/2**	12.5/15.0	17.0/20.4	1470/2955	81.2/48.5	89.4/90.0	0.74/0.90	27.4/26.8	29.0/28.2	4.8/7.4	2.1/2.3	64.00	108.7
AM 180M ZG	**4/2**	15/19.5	20/26.5	1465/2955	97.8/63	89/87	0.80/0.88	30/36.5	31.5/38.5	5.8/7.2	2.0/1.8	112	130.0
AM 180L ZG	**4/2**	17.5/23	24/31	1465/2950	114.1/74.5	90/88	0.81/0.86	34.5/43	36.5/46	6.5/7.5	2.0/1.8	132	140.0
AM 200L PG	**4/2**	24/29	32.5/39	1470/2955	155.9/93.7	91/89.5	0.83/0.89	46/52	48/55	6.2/7.8	2.1/2.5	206	230.0
AM 200L RG	**4/2**	26/33	35/45	1470/2955	168.9/106.6	91.5/89.5	0.84/0.91	50/59	52/62	6.4/7.9	2.0/2.2	248	255.0
AM 225S P	**4/2**	30/38	40/52	1470/2965	194.9/122.4	92/91	0.85/0.91	55/66	58/70	5.8/7.8	1.7/1.8	356	325.0
AM 225M P	**4/2**	34/46 [1]	46/63 [1]	1475/2960	220.1/148.4	92/91	0.85/0.90	63/81	66/85	6.6/7.8	1.9/1.8	428	330.0
AM 250M P	**4/2**	50/58	68/79	1470/2965	324.8/186.8	93/92.5	0.85/0.90	92/100	96/104	5.8/8.6	3.0/3.5	750	465.0
AM 280S G	**4/2**	60/72 [1]	82/98 [1]	1480/2975	387.1/231.1	94/93	0.85/0.91	108/122	114/129	5.9/8.5	2.0/2.2	1200	580.0
AM 280M G	**4/2**	70/84 [1]	95/114 [1]	1480/2975	451.7/269.6	94/93	0.85/0.91	126/142	133/150	5.9/8.5	2.0/2.2	1400	620.0
AM 315S G	**4/2**	85/115	116/156	1485/2970	546.6/369.8	94.5/93	0.86/0.91	150/195	156/203	6.0/7.4	1.6/1.5	2200	860.0
AM 315M G	**4/2**	100/125	136/170	1485/2970	643.1/401.9	95/94	0.87/0.91	175/210	182/217	6.6/7.9	1.7/1.6	3100	940.0
AM 315L G	**4/2**	120/150	163/204	1485/2970	771.7/482.3	95/94	0.87/0.91	210/255	219/264	6.6/7.9	1.7/1.6	3100	1120.0

1) Temperature rise to class F

Three-phase pole-changing motors designed for range of rated voltage 380-420 V ± 5% - 50 Hz

For mains voltage to IEC 60038 400 V ± 10% - 50 Hz

Temperature rise to class B

Type		kW	HP	min^{-1}	M_N Nm	η 100%	cos φ	I_N 400V	I_N 380-420V	I_A/I_N	M_A/M_N	J 10^{-3} kgm^2	kg
750/1500 min^{-1} (8/4 poles) - Dahlander connection Δ/YY													
AM 71Z AA	**8/4**	0.09/0.15	0.12/0.20	610/1310	1.4/1.1	40/56	0.61/0.75	0.53/0.52	0.59/0.57	2.5/3.2	1.6/1.6	0.71	6.3
AM 80Z AA	**8/4**	0.18/0.37	0.25/0.50	700/1370	2.5/2.6	43.2/58.7	0.63/0.83	1.0/1.1	1.1/1.2	2.6/3.4	1.8/1.6	1.97	7.9
AM 80Z BA	**8/4**	0.26/0.51	0.35/0.68	700/1360	3.5/3.6	44.1/61.2	0.60/0.88	1.2/1.4	1.3/1.5	2.5/3.6	2.0/1.6	2.47	9.2
AM 90S AA	**8/4**	0.37/0.75	0.50/1.0	690/1385	5.1/5.2	52.2/67.1	0.58/0.82	1.8/2.0	1.9/2.1	2.8/3.9	1.9/1.8	3.18	13.5
AM 90L BA	**8/4**	0.5/1.0	0.67/1.34	690/1410	6.9/6.8	52.2/72.5	0.58/0.80	2.4/2.4	2.5/2.5	3.3/4.0	2.3/1.9	4.78	15.7
AM 100L AA	**8/4**	0.7/1.4	0.94/1.9	700/1440	9.5/9.3	57.2/78.5	0.50/0.78	3.5/3.3	3.7/3.4	2.8/4.3	2.1/1.9	5.58	21.9
AM 100L BA	**8/4**	0.9/1.8 [1]	1.2/2.5 [1]	690/1415	12.5/12.1	62/76	0.56/0.87	3.8/4.0	4.0/4.3	2.5/4.5	1.9/1.8	6.00	23.7
AM 112M AA	**8/4**	1/1.8	1.34/2.5	710/1445	13.5/11.9	66.1/78.5	0.61/0.82	4.1/4.1	4.4/4.2	3.9/6.3	2.2/2.1	14.18	31.7
AM 112M BA	**8/4**	1.3/2.6 [1]	1.75/3.0 [1]	705/1420	17.6/17.5	70.0/76.3	0.65/0.88	4.6/5.7	4.8/5.9	3.2/4.8	2.1/2.0	16.70	34.2
AM 132S ZA	**8/4**	2.1/3.7	2.9/5.0	710/1440	28.2/24.5	70.2/76.1	0.66/0.84	6.5/8.4	6.7/8.6	4.0/5.2	1.9/1.7	29.50	42.5
AM 132M ZA	**8/4**	2.6/4.8	3.5/6.5	715/1450	34.7/31.6	71.6/78.8	0.60/0.80	8.8/11.0	9.8/12.0	4.3/5.5	2.3/1.8	37.75	55.5
AM 160M YA	**8/4**	4.0/6.3	5.5/8.6	710/1410	53.8/42.7	80.0/81.0	0.64/0.88	11.3/12.8	12.3/13.5	4.6/6.5	1.8/ 1.7	81.25	88.5
AM 160L YA	**8/4**	4.8/7.5	6.5/10.0	730/1470	62.8/48.7	80.0/85.0	0.65/0.85	13.2/15.0	14.0/16.0	4.5/6.5	1.8/1.6	105.75	106.5
AM 160L ZA	**8/4**	5.9/10.3	8.0/14.0	725/1450	77.7/67.8	81.0/87.0	0.66/0.88	16.1/19.5	17.0/20.4	5.0/6.0	1.9/1.6	127.50	110.5
AM 180L ZG	**8/4**	11/18	15/24	730/1465	143.9/117.3	87/89	0.72/0.90	26/32	27/34	5.8/6.8	2.0/1.6	215.0	150.0
AM 200L PG	**8/4**	15/23	20/31	730/1465	196.2/149.9	88/88	0.77/0.92	33.5/41	34/43	5.3/7.0	2.0/2.3	285.0	220.0
AM 200L RG	**8/4**	18/29	24/39	735/1470	233.9/188.4	89/89	0.73/0.91	40/51	42/54	5.6/7.5	2.6/2.4	375.0	255
AM 225S PG	**8/4**	21/32	28/43	735/1475	272.8/207.2	89/90	0.79/0.92	44/55	45/59	5.8/7.4	2.2/2.0	576.0	310.0
AM 225M PG	**8/4**	26/37 [1]	35/50 [1]	735/1475	337.8/239.5	90/90	0.78/0.91	53/65	56/68	5.4/7.2	2.1/2.1	577.0	315.0
AM 250M PG	**8/4**	32/46 [1]	43/63 [1]	730/1470	418.6/298.8	90/90.5	0.77/0.91	67/81	70/85	6.0/8.8	2.8/2.8	1320.0	490.0
AM 280S G	**8/4**	44/60 [1]	60/82 [1]	740/1485	567.8/385.8	91/91	0.80/0.91	88/105	93/110	5.8/8.2	2.1/2.3	2000.0	580.0
AM 280M G	**8/4**	52/70 [1]	71/95 [1]	740/1485	671.1/450.1	91/91	0.80/0.91	105/122	110/128	5.8/8.2	2.1/2.3	2320.0	620.0
AM 315S ZG	**8/4**	60/100	82/136	735/1480	779.6/645.2	93/93	0.75/0.88	117/170	123/180	6.6/7.5	2.2/2.2	3100.1	790.0
AM 315M ZG	**8/4**	75/120	100/163	735/1480	974.4/774.3	93/93	0.76/0.89	152/205	160/215	6.6/7.7	2.3/2.3	3600.0	860.0
AM 315L ZG	**8/4**	90/150	120/200	735/1480	1169.3/967.9	94/94	0.76/0.89	180/253	190/266	6.9/7.9	2.3/2.5	4300.0	990.0

1) Temperature rise to class F

Three-phase pole-changing motors designed for range of rated voltage 380-420 V ± 5% - 50 Hz

For mains voltage to IEC 60038 400 V ± 10% - 50 Hz

Temperature rise to class B

Type		kW	HP	min^{-1}	M_N Nm	η 100%	cos φ	I_N 400V	I_N 380-420V	I_A/I_N	M_A/M_N	J 10^{-3} kgm^2	kg
1500/1000 min^{-1} (4/6 poles) - separate windings													
AM 71Z AA	**4/6**	0.22/0.15	0.30/0.20	1430/900	1.5/1.6	61/44	0.7/0.64	0.78/0.68	0.83/0.73	1.9/3.4	1.5/1.8	0.73	6.2
AM 80Z AA	**4/6**	0.37/0.26	0.50/0.35	1385/905	2.6/2.7	61.4/48.1	0.82/0.80	1.1/1.0	1.1/1.1	3.7/2.6	1.7/1.3	1.97	8.3
AM 80Z BA	**4/6**	0.55/0.37	0.75/0.50	1380/900	3.8/3.9	60.5/51.1	0.64/0.82	1.5/1.3	1.6/1.4	3.7/2.7	1.6/1.2	2.47	10.0
AM 90S AA	**4/6**	0.75/0.5	1.0/0.67	1400/930	5.1/5.1	63/64	0.81/0.61	2.2/1.9	2.3/2.1	3.0/3.5	1.4/1.8	4.10	13.4
AM 90L BA	**4/6**	1/0.65	1.34/0.87	1380/920	6.9/6.7	68.8/67.1	0.81/0.62	2.6/2.3	2.8/2.5	2.9/3.4	1.1/1.6	4.78	16.4
AM 100L AA	**4/6**	1.2/0.8	1.6/1.07	1460/940	7.8/8.1	76.0/67.9	0.66/0.70	3.5/2.5	3.8/2.6	4.7/3.0	2.1/1.5	4.60	24.4
AM 100L BA	**4/6**	1.6/1.0	2.15/1.34	1445/935	10.6/10.2	77.6/69.5	0.73/0.63	4.1/3.3	4.3/3.5	5.8/3.0	2.8/1.7	5.58	33.2
AM 112M AA	**4/6**	1.8/1.3	2.5/1.75	1445/950	11.9/13.1	74.6/69.5	0.85/0.78	4.2/3.6	4.4/3.7	5.9/3.8	1.9/1.3	14.18	33.3
AM 112M BA	**4/6**	2.6/1.85	3.5/2.5	1445/950	17.2/18.6	73.8/71.6	0.86/0.73	6.0/5.2	6.2/5.4	6.1/4.4	2.0/1.7	17.53	37.0
AM 132S ZA	**4/6**	3.1/2.2	4.2/3.0	1440/965	20.6/21.8	80/78	0.80/0.74	7/5.5	7.5/6	5.8/5.6	2.1/2.0	22.4	41.9
AM 132M ZA	**4/6**	4.0/2.6	5.5/3.5	1470/975	26/25.5	81.0/79.3	0.83/0.74	8.6/6.4	9.3/7.0	7.7/5.2	2.0/1.9	29.25	51.0
AM 160M YA	**4/6**	5.5/3.7	7.5/5.0	1480/970	35.5/36.4	84.0/81.4	0.79/0.73	12.0/9.0	12.9/9.6	7.5/4.5	2.5/1.6	81.25	88.5
AM 160M ZA	**4/6**	7.5/4.8	10.2/6.5	1465/960	48.9/47.7	85.0/82.6	0.83/0.75	15..4/11.2	15.8/11.5	7.4/4.6	2.4/1.6	81.25	88.5
AM 160L ZA	**4/6**	11.0/6.6	15.0/9.0	1470/960	71.5/65.7	86.0/83.8	0.86/0.75	21.6/15.2	22.5/16.0	7.2/5.0	2.3/1.8	105.75	106.5
AM 180L ZG	**4/6**	16.5/11	22.5/15	1475/985	106.8/106.6	89/86	0.87/0.76	31/24	32.5/25.5	7.6/7.8	2.0/2.4	215.0	150.0
AM 200L PG	**4/6**	21/14	28/19	1470/980	136.4/136.4	88/87	0.88/0.81	39/28.5	41/30	6.0/6.4	1.8/2.2	285.0	220.0
AM 200L RG	**4/6**	26/18	35/24	1475/985	168.3/174.5	89.5/88.5	0.88/0.81	48/36	50/38	7.2/7.4	2.0/2.5	375.0	255.0
AM 225S PG	**4/6**	30/21	40/28	1475/985	194.2/203.6	91/89	0.89/0.81	53/42	56/44	6.8/7.4	1.9/2.6	583.0	310.0
AM 225M PG	**4/6**	37/25 [1]	50/34 [1]	1475/985	239.5/242.4	90.5/89	0.90/0.83	66/49	69/51	6.2/6.8	1.8/2.2	583.0	315.0
AM 250M PG	**4/6**	45/30	60/40	1475/980	291.3/292.3	91/90.5	0.90/0.86	79/56	83/59	8.5/7.6	2.8/3.0	1320.0	490.0
AM 280S G	**4/6**	65/45 [1]	88/60 [1]	1485/988	418/435	91.5/92	0.88/0.83	117/86	123/90	7.0/6.8	1.7/2.3	1200.0	580.0
AM 280M G	**4/6**	80/54 [1]	109/73 [1]	1485/988	514.5/521.9	91.5/91	0.88/0.83	144/105	151/110	7.0/6.8	1.7/2.3	1400.0	620.0
AM 315S G	**4/6**	87/58	117/78	1480/985	561.4/562.3	93/93	0.90/0.85	150/105	157/110	7.8/7.8	1.9/2.2	3100.0	790.0
AM 315M G	**4/6**	95/65	129/88	1480/985	613/630.2	93/93	0.90/0.85	165/118	171/124	7.8/7.8	2.0/2.2	3600.0	860.0
AM 315L G	**4/6**	105/72	141/96	1480/985	677.5/698	94/94	0.93/0.87	175/127	183/135	7.8/8.0	2.0/2.3	4300.0	990.0

1) Temperature rise to class F

Three-phase pole-changing motors designed for range of rated voltage 380-420 V ± 5% - 50 Hz

For mains voltage to IEC 60038 400 V ± 10% - 50 Hz

Temperature rise to class B

Type		kW	HP	min^{-1}	M_N Nm	η 100%	cos φ	I_N 400V	I_N 380-420V	I_A/I_N	M_A/M_N	J 10^{-3} kgm^2	kg
1000/750 min^{-1} (6/8 poles) - separate windings													
AM 80Z AA	**6/8**	0.37/0.18	0.50/0.25	915/700	3.9/2.5	51.1/44.2	0.81/0.65	1.3/1.0	1.4/1.0	2.8/2.5	1.4/1.7	2.47	9.5
AM 90L AA	**6/8**	0.55/0.30	0.75/0.40	950/710	5.5/4	65.2/45.1	0.62/0.52	2.0/1.8	2.1/1.9	3.9/2.6	2.5/1.9	4.78	16.2
AM 100L AA	**6/8**	0.75/0.45	1.0/0.60	960/720	7.5/6	72.6/61.8	0.67/0.54	2.2/2.0	2.3/2.1	4.1/2.9	1.9/1.9	6.73	23.4
AM 112M AA	**6/8**	0.95/0.65	1.3/0.90	965/715	9.4/8.7	65.2/62.1	0.78/0.70	3.0/2.2	3.2/2.3	4.5/3.8	1.4/1.7	14.18	32.0
AM 112M BA	**6/8**	1.5/0.75	2.0/1.0	970/720	14.8/9.9	75.3/64.6	0.66/0.60	4.4/2.8	4.6/3.0	4.6/3.8	2.2/2.1	18.70	36.2
AM 132S ZA	**6/8**	2.2/1.2	3.0/1.6	970/730	21.7/15.7	73.5/66.0	0.69/0.60	6.3/4.4	6.6/4.8	4.5/3.7	1.6/1.7	29.5	42.5
AM 132M ZA	**6/8**	3.0/1.7	4.1/2.3	980/730	29.2/22.2	78.2/72.5	0.72/0.64	7.7/5.3	8.2/5.9	5.4/4.3	1.7/1.7	37.75	55.5
AM 160M YA	**6/8**	4.8/2.6	6.5/3.5	970/730	47.3/34	83.0/74.0	0.80/0.70	10.5/7.3	11.0/7.7	4.8/3.6	1.9/1.8	112.7	88.0
AM 160M ZA	**6/8**	5.9/3.3	8.0/4.5	970/730	58.1/43.2	83.2/73.0	0.76/0.60	13.5/10.9	14.5/11.4	6.5/5.0	2.2/2.1	150.25	97.5
AM 180L ZG	**6/8**	11/8.5	15/11.5	985/730	106.6/111.2	86/83	0.76/0.74	24/20	26/22	6.8/5.5	2.0/2.1	215.0	150.0
AM 200L PG	**6/8**	15/11.5	20/15.6	980/735	146.2/149.4	88/86.5	0.82/0.74	30.5/25.5	32/27	5.8/4.8	1.8/2.3	285.0	220.0
AM 200L RG	**6/8**	19/14.5	26/19.7	980/735	185.1/188.4	89/86.5	0.83/075	37/32	39/34	6.0/5.5	1.9/2.3	375.0	255.0
AM 225S PG	**6/8**	23/18	31/24	985/735	223/233.9	89/88	0.83/0.78	45/38	47/40	6.2/5.2	1.9/2.0	583.0	310.0
AM 225M PG	**6/8**	28/21 [1]	38/28 [1]	985/735	271.5/272.8	90/88.5	0.82/0.78	54/45	57/47	5.8/5.0	1.9/1.9	583.0	315.0
AM 250M PG	**6/8**	31/24	42/32.5	985/735	300.5/311.8	91/91	0.84/0.79	59/49	62/51	8.4/7.5	2.6/3.4	1320.0	490.0
AM 280S G	**6/8**	44/33 [1]	59.5/45 [1]	988/738	425.3/427	91/90	0.81/0.75	87/70	91/74	5.2/5.0	1.4/1.7	1200.0	580.0
AM 280M G	**6/8**	55/42 [1]	75/57 [1]	988/738	531.6/543.5	91/90	0.81/0.75	108/90	113/95	5.2/5.0	1.5/2.1	1400.0	620.0
AM 315S G	**6/8**	65/48	87/64	988/740	628.3/619.4	92.0/92.0	0.87/0.81	117/90	121/94	7.5/7.4	2.0/2.2	3100.0	790.0
AM 315M G	**6/8**	75/55	100/74	988/740	724.9/709.8	92.5/92.0	0.87/0.81	135/105	140/109	7.5/7.4	2.1/2.3	3600.0	860.0
AM 315L G	**6/8**	90/70	120/94	988/740	869.9/903.3	93.0/92.5	0.87/0.81	160/135	166/140	7.5/7.5	2.2	4300.0	990.0

1) Temperature rise to class F

Three-phase pole-changing motors for fan drives designed for range of rated voltage 380-420 V ± 5% - 50 Hz

For mains voltage to IEC 60038 400 V ± 10% - 50 Hz

Temperature rise to class B

Type		kW	HP	min^{-1}	M_N Nm	η 100%	cos φ	I_N 400V	I_N 380-420V	I_A/I_N	M_A/M_N	J 10^{-3} kgm^2	kg
1500/3000 min^{-1} (4/2 poles) - Dahlander connection Y/YY													
AMV 63Z AA	**4/2**	0.07/0.33	0.095/0.45	1350/2700	0.5/1.2	55/60	0.70/0.80	0.25/0.95	0.27/1.1	2.5/2.6	1.8/1.6	0.37	5.0
AMV 71Z AA	**4/2**	0.08/0.37	0.11/0.5	1350/2870	0.6/1.2	60/64	0.65/0.68	0.30/1.3	0.35/1.4	3.2/4.3	2.0/2.8	0.82	7.9
AMV 71Z BA	**4/2**	0.12/0.55	0.16/0.75	1430/2835	0.8/1.9	70/68	0.65/0.72	0.40/1.6	0.42/1.7	4.1/4.0	3/2.8	1.08	10.0
AMV 80Z AA	**4/2**	0.15/0.75	0.2/1.0	1400/2710	1/2.6	70/68	0.68/0.80	0.45/1.9	0.45/2.0	2.6/4.6	2.8/2.9	1.58	8.3
AMV 80Z BA	**4/2**	0.22/1.1	0.3/1.5	1420/2820	1.5/3.7	70/73	0.75/0.84	0.6/2.5	0.65/2.6	4.6/4.7	2.7/2.9	2.0	11.5
AMV 90L AA	**4/2**	0.30/1.5	0.4/2.0	1400/2830	2/5.1	69/70	0.70/0.84	0.9/3.5	1.0/3.7	4.7/5.0	2.7/3.0	3.13	15.6
AMV 90L BA	**4/2**	0.44/2.2	0.6/3.0	1430/2830	2.9/7.4	74/72	0.76/0.89	1.1/4.8	1.2/5.0	4.5/5.2	2.6/2.8	3.73	17.1
AMV 100L AA	**4/2**	0.50/2.5	0.67/3.3	1430/2840	3.3/8.4	72/73	0.77/0.88	1.3/5.3	1.4/5.6	4.6/5.0	2.2/2.3	4.6	21.4
AMV 100L BA	**4/2**	0.60/3.0	0.8/4.0	1440/2850	4/10.1	78/77	0.79/0.87	1.3/6.2	1.4/6.5	4.5/4.5	2.2/2.1	5.58	23.2
AMV 112M AA	**4/2**	0.75/3.70	1.0/5.0	1440/2850	5/12.4	74/72	0.80/0.90	1.7/7.9	1.9/2.2	4.5/5.1	2.0/2.4	13.3	36.1
AMV 112M BA	**4/2**	0.9/4.5	1.2/6.1	1440/2850	6/15.1	75/73	0.82/0.90	2.0/9.5	2.1/9.8	4.5/5.5	2.0/2.3	14.75	40.0
AMV 132S AA	**4/2**	1.1/5.5	1.5/7.5	1440/2880	7.3/18.2	81.5/84.8	0.78/0.90	2.5/10.4	2.6/11.0	5.0/6.0	2.1/2.8	13.83	42.6
AMV 132S BA	**4/2**	1.5/7 [1]	2/9.5 [1]	1440/2900	9.9/23.1	82.0/86.0	0.78/0.92	3.4/12.8	3.8/13.0	5.3/6.5	2.2/2.9	13.83	42.6
AMV 132M CA	**4/2**	1.9/8.0	2.6/10.9	1450/2930	12.5/26.1	83.7/88.0	0.82/0.87	4.0/15.1	4.0/16.0	5.5/7.0	2.2/3.0	17.13	51.4
AMV 160M AA	**4/2**	2.8/11	3.8/15.0	1440/2940	18.6/35.7	82.5/88.2	0.78/0.90	6.3/20.0	7.0/20.4	5.0/7.5	2.0/2.1	51.75	94
AMV 160M BA	**4/2**	3.3/13.5 [1]	4.5/18.3 [1]	1440/2920	21.9/44.2	83.0/88.5	0.80/0.92	7.2/24.0	7.5/24.0	5.5/7.5	2.0/2.2	51.75	94
AMV 160L CA	**4/2**	4.4/18.5 [1]	6.0/25.1 [1]	1450/2940	29/60.1	85.5/89.5	0.83/0.92	9.0/32.5	9.5/33.0	5.5/7.5	2.0/2.2	64.0	108.7
AMV 180M ZG	**4/2**	5/20	6.7/27	1470/2950	32.5/64.7	89/88	0.83/0.89	10/37.5	10.5/38.5	5.5/7.5	2.0/2.1	112.0	130.0
AMV 180L ZG	**4/2**	6/24	8/32	1470/2940	39/78	90/89	0.83/0.88	11.5/45	13/47	5.5/7.5	2.0/2.1	132.0	140.0
AMV 200L PG	**4/2**	6.5/30	8/40	1480/2950	41.9/97.1	91.5/90	0.81/0.89	12.2/53	12.6/55	7.1/7.7	2.6/2.3	206.0	230.0
AMV 200L RG	**4/2**	7/35	9.5/47	1480/2950	45.2/113.3	91.5/90	0.82/0.89	14/62	14.8/64	7.1/7.7	2.6/2.3	248.0	255.0
AMV 225M PG	**4/2**	8.0/40	10.7/54	1485/2970	51.4/128.6	92/91	0.81/0.89	15.5/70	16.1/73	7.5/8.5	2.3/2.1	428.0	330.0
AMV 250M PG	**4/2**	11.0/55	14.7/75	1485/2965	70.7/177.1	93/92.5	0.82/0.92	21/92	22/96	7.4/8.4	3.6/3.4	750.0	465.0
AMV 280S G	**4/2**	13/67	17/90	1485/2980	83.6/214.7	93.5/93	0.83/0.88	24.5/118	26/122	8.4/8.9	2.9/2.5	1200.0	580.0
AMV 280M G	**4/2**	16/80	21/107	1485/2980	102.9/256.4	93.5/93	0.83/0.88	29.5/140	32/144	8.4/8.9	2.9/2.5	1400.0	620.0
AMV 315S G	**4/2**	20/100	27/134	1492/2975	128/321	93.5/93	0.84/0.90	37/174	39/180	7.4/8.3	1.9/1.6	2200.0	860.0
AMV 315M G	**4/2**	23/120	31/160	1492/2975	147.2/385.2	94.5/94	0.84/0.90	42/207	45/213	7.8/8.6	2.0/1.8	2500.0	940.0
AMV 315L G	**4/2**	28/145	38/195	1492/2975	179.2/465.4	94.5/94	0.84/0.90	51/250	54/257	8.0/8.7	2.0/1.8	3100.0	1120.0

1) Temperature rise to class F

Three-phase pole-changing motors for fan drives designed for range of rated voltage 380-420 V ± 5% - 50 Hz

For mains voltage to IEC 60038 400 V ± 10% - 50 Hz

Temperature rise to class B

Type		kW	HP	min^{-1}	M_N Nm	η 100%	cos φ	I_N 400V	I_N 380-420V	I_A/I_N	M_A/M_N	J 10^{-3} kgm^2	kg
750/1500 min^{-1} (8/4 poles) - Dahlander connection Y/YY													
AMV 71Z AA	**8/4**	0.08/0.37	0.11/0.5	660/1370	1.2/2.6	26/57	0.63/0.72	0.60/1.25	0.65/1.35	2.8/3.4	1.9/1.7	1.24	6.8
AMV 80Z AA	**8/4**	0.12/0.55	0.16/0.75	685/1420	1.7/3.7	50/69	0.60/0.74	0.58/1.53	0.65/1.6	1.9/3.3	1.4/1.5	2.47	9.2
AMV 80Z BA	**8/4**	0.18/0.75	0.25/1.0	660/1380	2.6/5.2	53/67	0.73/0.81	0.65/1.9	0.7/2.0	2.0/3.5	1.6/1.7	2.41	10.6
AMV 90L AA	**8/4**	0.18/1.1	0.25/1.5	680/1400	2.5/7.5	60/70	0.65/0.82	0.9/2.7	1.0/2.8	2.8/4.0	1.5/2.0	2.98	15.7
AMV 90L CA	**8/4**	0.4/1.6	0.54/2.15	675/1400	5.7/10.9	61.5/75	0.64/0.79	1.8/4.0	1.8/4.1	3.1/5.0	1.6/2.2	3.70	19.6
AMV 100L AA	**8/4**	0.45/2.2	0.60/3.0	680/1420	6.3/14.8	63.1/75.3	0.60/0.80	1.7/5.0	1.9/5.3	2.7/4.7	1.7/2.0	5.58	21.9
AMV 100L BA	**8/4**	0.6/2.6	0.80/3.5	680/1435	8.4/17.3	64.0/76.2	0.63/0.75	2.2/6.5	2.3/6.7	2.7/4.8	1.7/2.2	6.00	23.7
AMV 112M AA	**8/4**	0.7/3.3	0.94/4.5	690/1420	9.7/22.2	62/78	0.70/0.80	2.2/7.4	2.3/7.6	3.4/6.5	1.8/2.4	16.70	34.2
AMV 112M CA	**8/4**	1.0/4.0	1.34/5.5	720/1420	13.3/26.9	60/77	0.70/0.82	3.1/8.6	3.3/9.0	3.5/5.0	2.3/1.9	19.50	40.0
AMV 132S AA	**8/4**	1.1/4.5	1.5/6.1	725/1450	14.5/29.6	77.0/85.5	0.58/0.82	3.6/9.3	4.0/9.7	3.5/5.4	2.2/2.7	22.4	41.9
AMV 132M BA	**8/4**	1.4/5.5	1.9/7.5	720/1440	18.6/36.5	78.0/86.0	0.62/0.82	4.2/11.3	4.5/12	3.6/5.5	2.0/2.5	29.25	51.0
AMV 132M CA	**8/4**	1.8/7.5	2.4/10.2	720/1450	23.9/49.4	78.2/86.5	0.64/0.86	5.2/14.6	5.5/15.0	4.6/6.0	2.0/2.5	37.25	65.0
AMV 160M ZA	**8/4**	2.2/10.0	3.0/13.0	720/1450	29.2/65.9	80.0/88.0	0.61/0.83	6.6/19.9	6.8/20.4	3.5/6.0	1.8/1.7	81.25	88.5
AMV 160L ZA	**8/4**	3.2/15.0 [1]	4.3/20.0 [1]	720/1450	42.4/98.8	81.0/90.0	0.61/0.88	9.4/27.3	9.8/28	3.5/6.5	1.7/1.8	105.75	106.5
AMV 180M ZG	**8/4**	4/17	5.5/23	730/1465	52.3/110.8	84/90	0.61/0.83	11.5/33	13/34.5	4.0/7.2	1.7/2.3	112.0	130.0
AMV 180L ZG	**8/4**	5/20	6.8/27	730/1470	65.4/129.9	84/90	0.61/0.83	14.5/39	15/41	4.2/7.6	1.7/2.3	132.0	140.0
AMV 200L PG	**8/4**	6/24	8/32.5	735/1480	78/154.9	87.5/90.5	0.62/0.82	15.5/50	16.5/52	3.6/7.6	1.6/2.4	206.0	230.0
AMV 200L RG	**8/4**	7/28	9.5/38	735/1480	90.9/180.7	88/91	0.60/0.85	19/55	20/58	3.5/7.7	1.7/2.6	248.0	255.0
AMV 225M PG	**8/4**	8.5/36	11.5/49	735/1480	110.4/232.3	89.5/92	0.62/0.82	22/72	23/75	4.0/8.7	1.8/2.5	430.0	330.0
AMV 250M PG	**8/4**	11/46	15/62	740/1475	142/297.8	91.5/92	0.79/0.88	22/81	23/85	5.3/8.4	2.4/2.9	1110.0	490.0
AMV 280S G	**8/4**	16/66	22/88	740/1485	206.5/424.4	90/93	0.62/0.85	42/121	44/127	3.3/7.0	1.5/2.4	1200.0	580.0
AMV 280M G	**8/4**	19/78	26/106	740/1485	245.2/501.6	91/93	0.62/0.85	49/143	51/150	3.3/7.0	1.5/2.4	1400.0	620.0
AMV 315S G	**8/4**	26/105	35/140	743/1480	334.2/677.5	92.5/94.0	0.60/0.87	68/185	75/193	4.1/5.5	1.1/1.6	1900.0	800.0
AMV 315M G	**8/4**	33/132	45/177	743/1480	424.1/851.7	93.0/95.0	0.60/0.87	85/230	92/243	4.3/5.7	1.0/1.5	2500.0	940.0
AMV 315L G	**8/4**	40/165	55/220	743/1480	514.1/1064.6	93.0/95.5	0.61/0.88	103/285	109/300	4.2/6.0	1.2/1.6	3100.0	1120.0

1) Temperature rise to class F

Three-phase pole-changing motors for fan drives designed for range of rated voltage 380-420 V ± 5% - 50 HZ

For mains voltage to IEC 60038 400 V ± 10% - 50 Hz

Temperature rise to class B

Type		kW	HP	min^{-1}	M_N Nm	η 100%	cos φ	I_N 400V	I_N 380-420V	I_A/I_N	M_A/M_N	J 10^{-3} kgm^2	kg
1500/1000 min^{-1} (4/6 poles) - separate windings													
AMV 71Z AA	**4/6**	0.25/0.08	0.33/0.11	1370/900	1.7/0.4	60/40	0.80/0.70	0.75/0.4	0.8/0.45	3.0/2.5	1.6/1.6	1.15	6.7
AMV 71Z BA	**4/6**	0.37/0.13	0.50/0.18	1360/880	2.6/1.4	62/44	0.80/0.70	1.0/0.6	1.1/0.7	3.2/2.6	1.6/1.6	1.24	7.2
AMV 80Z AA	**4/6**	0.55/0.18	0.75/0.25	1380/920	3.8/1.9	60/42	0.83/0.82	1.60/0.75	1.7/0.8	3.5/2.4	1.6/1.0	1.97	8.3
AMV 80Z BA	**4/6**	0.75/0.25	1.0/0.33	1400/940	5.1/2.5	70/60	0.82/0.72	1.8/0.8	1.9/0.9	4.2/2.6	1.6/1.3	4.05	14
AMV 90S AA	**4/6**	0.75/0.24	1.0/0.32	1400/950	5.1/2.4	70/60	0.82/0.72	1.9/0.8	2.0/0.9	4.2/2.6	1.6/1.3	4.05	14
AMV 90L BA	**4/6**	1.1/0.37	1.5/0.50	1400/930	7.5/3.8	70/60	0.81/0.74	2.8/1.2	3.0/1.3	4.3/2.7	1.6/1.2	4.78	16.4
AMV 90L CA	**4/6**	1.5/0.5	2.0/0.67	1420/950	10.1/5	73/64	0.80/0.70	3.52/1.52	3.7/1.6	4.8/2.6	1.5/1.3	5.98	20.5
AMV 100L AA	**4/6**	1.85/0.60	2.5/0.75	1400/920	12.6/6.2	74/64	0.80/0.73	4.6/1.9	4.8/2.1	4.8/3.1	1.8/1.5	6.73	23.4
AMV 100L BA	**4/6**	2.2/0.75	3.0/1.0	1420/950	14.8/7.5	76/66	0.79/0.75	5.1/2.1	5.3/2.2	5.0/3.5	1.7/1.3	9.25	22.6
AMV 112M AA	**4/6**	3/1.0	4.0/1.34	1440/970	19.9/9.8	80/73	0.81/0.65	6.6/3.0	6.8/3.2	5.8/4.6	2.5/2.1	13.3	30.4
AMV 132S AA	**4/6**	3.8/1.3	5.2/1.8	1460/970	24.9/12.8	85.0/75.0	0.8/0.72	8.1/3.5	8.5/4	6.5/4.0	2.2/1.7	22.4	41.9
AMV 132M BA	**4/6**	4.4/1.5	6.0/2.0	1460/970	28.8/14.8	86.0/78.2	0.85/0.73	8.7/3.8	9.2/4.3	6.5/4.4	2.2/1.7	29.25	51.0
AMV 132M CA	**4/6**	5.5/1.8	7.5/2.4	1460/970	36/17.7	86.8/80.0	0.84/0.74	10.9/4.4	12.0/4.	7.0/4.7	2.6/1.8	37.25	65.0
AMV 132M DA	**4/6**	6.3/2.2 [1]	8.6/3.0 [1]	1460/970	41.2/21.7	86.8/81.0	0.84/0.73	12.5/5.4	13.5/5.	7.2/4.8	2.6/1.9	37.25	66.0
AMV 160M AA	**4/6**	7.5/2.5	10.0/3.4	1470/975	48.7/24.5	87.5/83.0	0.83/0.75	14.9/5.8	15.6/6.0	8.3/4.5	2.5/1.9	81.25	88.5
AMV 160L BA	**4/6**	11.0/3.7	15.0/5.0	1470/970	71.5/36.4	88.0/84.2	0.81/0.73	22.5/8.7	23.4/9.0	8.0/4.8	2.4/1.8	105.75	106.5
AMV 160L CA	**4/6**	13.0/4.0 [1]	17.7/5.4 [1]	1460/970	85/39.4	88.0/84.5	0.81/0.72	26.3/9.5	27.5/10	8.0/4.8	2.4/1.9	105.75	106.5
AMV 180L ZG	**4/6**	17/5.5	23/7.5	1470/975	110.4/53.9	89.5/86	0.86/0.84	31/11	33/11.5	7.6/5.5	1.9/1.5	215.0	150.0
AMV 200L PG	**4/6**	21/7	28/9.5	1470/985	136.4/67.9	88/87	0.88/0.84	39/14	41/14.5	6.0/6.2	1.8/2.2	285.0	220.0
AMV 200L RG	**4/6**	26/9	35/12	1475/985	168.3/87.3	89.5/88	0.88/0.85	48/17	50/18	7.0/6.2	2.0/2.1	375.0	255.0
AMV 225M PG	**4/6**	33/11	45/15	1475/985	213.7/106.6	90/89	0.89/0.85	60/21	63/22	7.0/6.8	2.0/2.4	583.0	315.0
AMV 250M PG	**4/6**	50/18	68/24	1470/985	324.8/174.5	91/90	0.90/0.85	89/34.5	93/36	8.5/8.5	2.8/3.2	1110.0	490.0
AMV 280S G	**4/6**	63/22	84/29	1490/992	403.8/211.8	92.5/91	0.88/0.85	111/42	117/44	7.7/8.3	1.9/2.5	1200.0	580.0
AMV 280M G	**4/6**	73/27	98/36	1490/992	467.9/259.9	92.5/91	0.87/0.85	131/50	137/53	7.7/8.3	1.9/2.5	1400.0	620.0
AMV 315S G	**4/6**	90/31	121/42	1492/995	576/297.5	93/90.5	0.88/0.88	160/58	167/62	8.3/8.0	2.2/2.5	3100.0	790.0
AMV 315M G	**4/6**	115/36	154/48	1492/995	736.1/345.5	93/90.5	0.88/0.87	200/67	209/71	8.3/8.0	2.2/2.5	3600.0	860.0
AMV 315L G	**4/6**	135/43	180/58	1490/993	865.2/413.5	93.5/90	0.88/0.87	235/79	245/83	8.0/7.8	2.3/2.6	4300.0	990.0

1) Temperature rise to class F

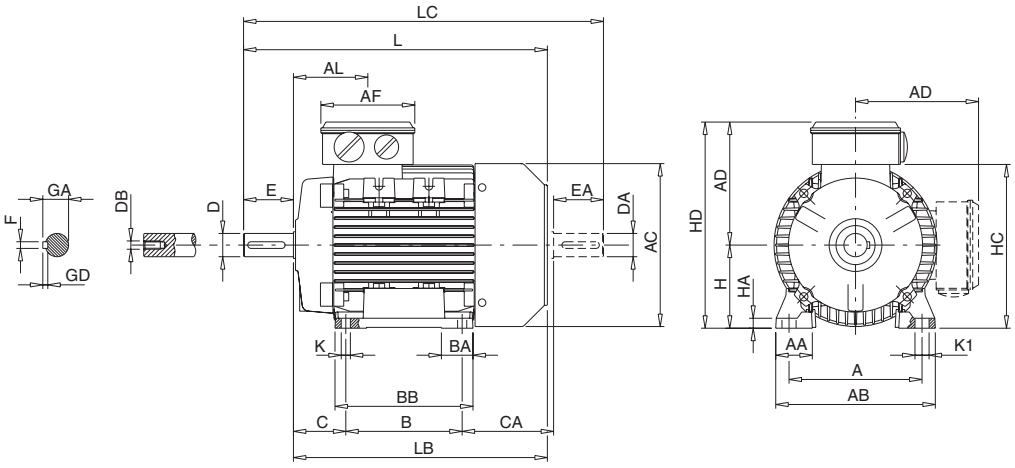
Three-phase pole-changing motors for fan drives designed for range of rated voltage 380-420 V ± 5% - 50 HZ

For mains voltage to IEC 60038 400 V ± 10% - 50 Hz

Temperature rise to class B

Type		kW	HP	min^{-1}	M_N Nm	η 100%	cos φ	I_N 400V	I_N 380-420V	I_A/I_N	M_A/M_N	J 10^{-3} kgm^2	kg
1000/750 min^{-1} (6/8 poles) - separate windings													
AMV 80Z AA	**6/8**	0.25/0.11	0.33/0.15	930/720	2.6/1.5	53/49	0.79/0.62	0.9/0.55	1.0/0.7	2.9/3.0	1.6/1.8	1.97	7.9
AMV 80Z BA	**6/8**	0.37/0.15	0.50/0.25	920/715	3.8/2	52/47	0.81/0.63	1.3/0.8	1.4/0.9	2.8/2.8	1.4/1.9	2.47	9.5
AMV 90L AA	**6/8**	0.55/0.22	0.75/0.30	960/740	5.5/2.8	65/47	0.62/0.51	2.0/1.4	2.1/1.5	3.9/2.9	2.5/2.1	4.78	16.2
AMV 90L BA	**6/8**	0.75/0.30	1.0/0.40	940/720	7.6/4	64/45.5	0.67/0.52	2.5/1.85	2.7/1.9	3.4/2.6	2.2/1.9	4.78	16.2
AMV 100L AA	**6/8**	1.1/0.45	1.5/0.60	950/710	11.1/6.1	70.6/58	0.71/0.67	3.1/1.7	3.3/1.8	4.3/2.8	2.0/1.3	9.43	22.0
AMV 112M AA	**6/8**	1.5/0.6	2.0/0.80	970/720	14.8/8	75.8/65	0.65/0.60	4.4/2.3	3.7/2.5	5.5/3.4	2.8/2.1	18.70	39.0
AMV 132S ZA	**6/8**	2.2/0.9	3.0/1.2	970/715	21.7/12	78.0/69.0	0.67/0.55	6.1/3.5	6.7/4.0	4.8/4.0	1.6/1.6	29.5	42.5
AMV 132M YA	**6/8**	3/1.2	4.0/1.6	960/715	29.8/16	80/72	0.7/0.55	7.8/4.4	8.2/4.8	4.8/4.1	1.6/1.6	37.75	55.5
AMV 132M ZA	**6/8**	4/1.6	5.5/2.2	960/715	39.8/21.4	81.0/74.0	0.78/0.6	9.2/5.2	9.8/5.6	5.3/4.4	1.7/1.7	44.5	64.1
AMV 160M YA	**6/8**	5.5/2.2	7.5/3.0	970/730	54.1/28.8	83/76	0.77/0.6	12.5/7	13.5/7.5	5.7/5.6	1.6/1.9	112.7	88.0
AMV 160M ZA	**6/8**	7/3	9.5/4.1	970/730	68.9/39.2	84/77	0.80/0.65	15/8.7	16/9.3	6.0/5.8	1.7/2.2	150.25	97.5
AMV 180L ZG	**6/8**	12/6	16/8	985/735	116.3/78	87/84	0.76/0.72	26/14.5	27.5/15	7.2/6.0	2.1/2.1	215.0	150.0
AMV 200L PG	**6/8**	17/8.5	23/11.5	980/735	165.7/110.4	89/85	0.80/0.74	35/19.5	36.5/20.5	5.6/5.6	1.9/2.3	285.0	220.0
AMV 200L RG	**6/8**	22/11	30/15	980/735	214.4/142.9	89.5/86	0.81/0.75	43/24.5	46/26	6.3/5.7	2.3/2.5	375.0	255.0
AMV 225M PG	**6/8**	26/13	35/17.5	985/740	252.1/167.8	90.5/87	0.80/0.74	52/28.5	55/30	6.6/6.2	2.2/2.3	583.0	315.0
AMV 250M PG	**6/8**	38/19	52/26	985/735	368.4/246.9	92/90	0.87/0.81	69/38	72/40	8.0/7.5	2.7/3.2	1110.0	490.0
AMV 280S G	**6/8**	43/22	58/29	990/475	414.8/442.3	92/90	0.80/0.77	84/46	88/48	5.8/6.0	1.5/2.2	1200.0	480.0
AMV 280M G	**6/8**	54/27	72/36	990/745	520.9/346.1	92/90	0.80/0.77	104/57	110/60	5.8/6.1	1.5/2.2	1400.0	620.0
AMV 315S G	**6/8**	73/35	98/47	988/745	705.6/448.6	92.5/91	0.87/0.81	130/68	137/71	7.3/7.3	2.0/2.2	3100.0	790.0
AMV 315M G	**6/8**	85/40	114/54	988/745	821.6/512.7	93/92	0.87/0.81	150/77	158/81	7.5/7.4	2.1/2.3	3600.0	860.0
AMV 315L G	**6/8**	105/50	140/167	988/745	1014.9/640.9	93.5/92	0.87/0.82	185/95	193/100	7.5/7.5	2.4/2.2	4300.0	990.0

THREE-PHASE FRAME SIZE 56 - 160 IM B3
ALUMINIUM ALLOY FRAME



IEC DIN	H h	A b	B a	C w_1	K[1] s	AB f	BB e	CA	AD[2] g_4	HD[2]	AC m_1	HC g	HA
56	56	90	71	36	6	109	90	65	98	154	112	110	8
63	63	100	80	40	7	126	105	72	103	166	125	125	8
71	71	112	90	45	7	144	109	83	112	183	142	142	9
80	80	125	100	50	10	153	125	89	129	209	160	162	9.5
90S	90	140	100	56	10	170	150	116	138	228	180	181	11
90L	90	140	125	56	10	170	150	91	138	228	180	181	11
100L	100	160	140	63	11	192	166	110	145	245	196	198	12
112M	112	190	140	70	12.5	220	175	126	161	273	225	226	15
132S	132	216	140	89	12	256	180	134	195	327	248	261	17
132M	132	216	178	89	12	256	218	136	195	327	248	261	17
132M [4]	132	216	178	89	12	256	218	166	195	327	248	261	17
160M	160	254	210	108	14	320	270	180	238	398	317	316	23
160L	160	254	254	108	14	320	310	180	238	398	317	316	23
160L [5]	160	254	254	108	14	320	310	210	238	398	317	316	23

IEC DIN	K1 c	L k	LB	LC k_1	AL	AF	BA m	AA n	D/DA d/d_1	E/EA l/l_1	F/FA u/u_1	GD	GA/GC t/t_1	DB[3] d_6/d_7
56	12	190	170	211	62	93	22	22	9	20	3	3	10.2	M3
63	12	213	190	238	63	93	26	26	11	23	4	4	12.5	M4
71	17	245	215	278	69	93	22	30	14	30	5	5	16	M5
80	14	272	232	319	79	116	28.5	34.5	19	40	6	6	21.5	M6
90S	15	317	267	372	85	116	28/53	37	24	50	8	7	27	M8
90L	15	317	267	372	85	116	28/53	37	24	50	8	7	27	M8
100L	17	366	306	433	91	116	38	44	28	60	8	7	31	M10
112M	19	388	328	456	91.5	116	46	48	28	60	8	7	31	M10
132S	20	442	362	523	100	133	45	59	38	80	10	8	41	M12
132M	20	482	402	563	120	133	45	59	38	80	10	8	41	M12
132M [4]	20	500	420	593	120	133	45	59	38	80	10	8	41	M12
160M	18	608	498	718	146	150	65	76	42	110	12	8	45	M16
160L	18	652	542	762	168	150	65	76	42	110	12	8	45	M16
160L [5]	18	678	568	678	168	150	65	76	42	110	12	8	45	M16

1) Clearance hole for screw
2) Maximum dimension
3) Centering holes in shaft extensions to DIN 332 part 2
4) Only for MT A2*
5) Only for LR A4

THREE-PHASE FRAME SIZE 180 - 315 IM B3
CAST IRON FRAME

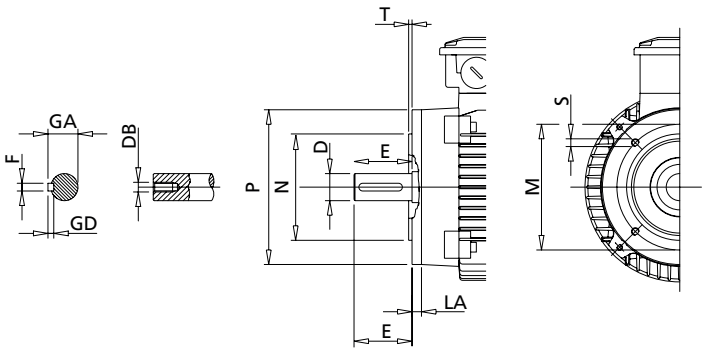
	IEC DIN	H h	A b	B a	C w_1	K[1] s	AB f	BB e	CA	AD[2] g_4	HD[2]	AC	HC m_1	HA g	K1 c
180M		180	279	241	121	14.5	330	316	256	263	443	355	360	15	18
180L		180	279	279	121	14.5	330	316	218	263	443	355	360	15	18
200L		200	318	305	133	18.5	380	360	237	330	530	379	398	18	18
225S	**2 - 4/2**	225	356	286	149	18.5	420	375	318	357	582	443	447	22	18.5
	≥4	225	356	286	149	18.5	420	375	318	357	582	443	447	22	18.5
225M	**2 - 4/2**	225	356	311	149	18.5	420	375	318	357	582	443	447	22	18.5
	≥4	225	356	311	149	18.5	420	375	318	357	582	443	447	22	18.5
250M	**2 - 4/2**	250	406	349	168	24	500	425	321	385	635	494	500	45	28
	≥4	250	406	349	168	24	500	425	321	385	635	494	500	45	28
280S	**2 - 4/2**	280	457	368	190	24	560	450	357	419	699	494	564	50	28
	≥4	280	457	368	190	24	560	450	357	419	699	494	564	50	28
280M	**2 - 4/2**	280	457	419	190	24	560	500	357	419	699	494	564	50	28
	≥4	280	457	419	190	24	560	500	357	419	699	494	564	50	28
315S YE	**2 - 4/2**	315	508	406	216	28	630	533	438	510	874	640	666	37	28
	≥4	315	508	406	216	28	630	533	438	510	874	640	666	37	28
315S ZE	**2 - 4/2**	315	508	406	216	28	630	533	438	510	874	640	666	37	28
	≥4	315	508	406	216	28	630	533	438	510	874	640	666	37	28
315M	**2 - 4/2**	315	508	457	216	28	630	533	387	510	874	640	666	37	28
	≥4	315	508	457	216	28	630	533	387	510	874	640	666	37	28
315L	**2 - 4/2**	315	508	508	216	28	630	583	386	510	874	640	666	37	28
	≥4	315	508	508	216	28	630	583	386	510	874	640	666	37	28

	IEC DIN	L k	LB	LC k_1	AL	AF	BA m	AA n	D/DA d/d_1	E/EA l/l_1	F/FA u/u_1	GD	GA/GC t/t_1	DB [3] d_6/d_7
180M		712	602	838	260.5	180	91	66	48	110	14	9	51.5	M16
180L		712	602	838	260.5	180	91	66	48	110	14	9	51.5	M16
200L		779	669	895	285.5	265	90	79	55	110	16	10	59	M20
225S	**2 - 4/2**	857.5	747.5	973	304.5	265	95	90	55	110	16	10	59	M20
	≥4	887.5	747.5	1033	304.5	265	95	90	60	140	18	11	64	M20
225M	**2 - 4/2**	857.5	747.5	973	304.5	265	95	90	55	110	16	10	59	M20
	≥4	887.5	747.5	1033	304.5	265	95	90	60	140	18	11	64	M20
250M	**2 - 4/2**	970	830	1118	342.5	265	120	135	60	140	18	11	64	M20
	≥4	970	830	1118	342.5	265	120	135	65	140	18	11	69	M20
280S	**2 - 4/2**	1036	896	1195	374	265	135	122	65	140	18	11	69	M20
	≥4	1036	896	1195	374	265	135	122	75	140	20	12	79.5	M20
280M	**2 - 4/2**	1087	947	1246	258	265	135	122	65	140	18	11	69	M20
	≥4	1087	947	1246	258	265	135	122	75	140	20	12	79.5	M20
315S YE	**2 - 4/2**	1190	1050	1340	439	300	123	110	65	140	18	11	69	M20
	≥4	1220	1050	1400	439	300	123	110	80	170	22	14	85	M20
315S ZE	**2 - 4/2**	1190	1050	1340	439	300	123	110	65	140	18	11	69	M20
	≥4	1220	1050	1400	439	300	123	110	80	170	22	14	85	M20
315M	**2 - 4/2**	1190	1050	1340	439	300	123	110	65	140	18	11	69	M20
	≥4	1220	1050	1400	439	300	123	110	80	170	22	14	85	M20
315L	**2 - 4/2**	1240	1100	1390	464	300	123	110	65	140	18	11	69	M20
	≥4	1270	1100	1450	464	300	123	110	80	170	22	14	85	M20

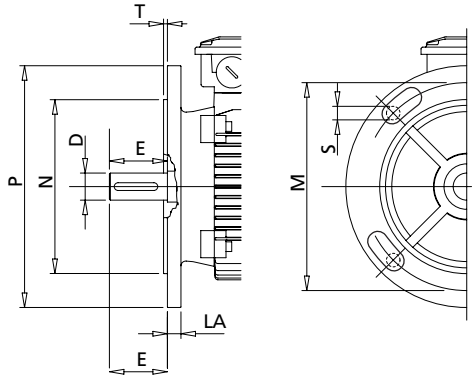
1) Clearance hole for screw
2) Maximum dimension
3) Centering holes in shaft extensions to DIN 332 part 2

THREE-PHASE FRAME SIZE 56 - 160 IM B14, IM B5
ALUMINIUM ALLOY FRAME

IM B14

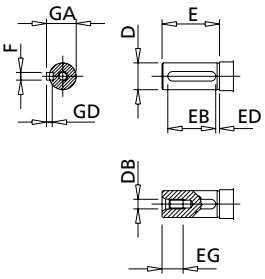


IM B5



	Small flange B14						Large flange B14						Flange B5					
IEC DIN	P a_1	N b_1	LA c_1	M e_1	T f_1	S s_1	P a_1	N b_1	LA c_1	M e_1	T f_1	S s_1	M e_1	N b_1	P a_1	T f_1	LA c_1	S[1] s_1
56	80	50		65	3	M5	105	70	8	85	2.5	M6	100	80	120	2.5	5.5	M6
63	90	60	9	75	2.5	M5	120	80	8	100	2.5	M6	115	95	140	3	9	M8
71	105	70	11	85	2.5	M6	140	95	8	115	2.5	M8	130	110	160	3.5	10	M8
80	120	80	8	100	3	M6	160	110	8.5	130	3.5	M8	165	130	200	3.5	10	M10
90S-L	140	95	10	115	3	M8	160	110	9	130	3.5	M8	165	130	200	3.5	12	M10
100L	160	110	10	130	3.5	M8	200	130	12	165	3.5	M10	215	180	250	4	14	M12
112M	160	110	10	130	3.5	M8	200	130	12	165	3.5	M10	215	180	250	4	14	M12
132S-M	200	130	30	165	3.5	M10	250	180	12	215	4	M12	265	230	300	4	14	M12
160M-L	250	180	12	215	4	M12	300	230	12	265	5	M16	300	250	350	5	15	M16

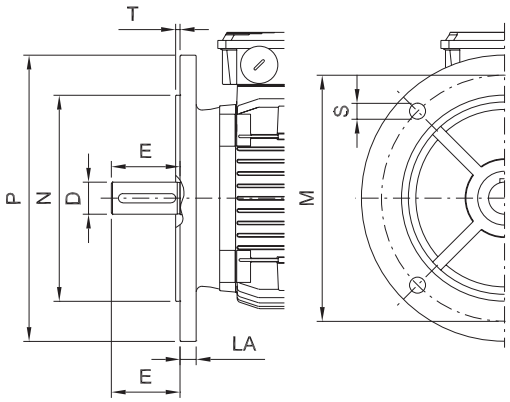
1) Clearence hole for screw. Hole as standard for 132 to 160 frame size



IEC DIN	D d	E l	F h9 u	GD	GA t	DB[1] d_6	EG	EB	ED
56	9 j6	20	3	3	10.2	M3	10	15	2.5
63	11 j6	23	4	4	12.5	M4	10	15	4
71	14 j6	30	5	5	16	M5	12.5	20	4
80	19 j6	40	6	6	21.5	M6	16	30	4
90S-L	24 j6	50	8	7	27	M8	19	40	4
100L	28 j6	60	8	7	31	M10	22	50	4
112M	28 j6	60	8	7	31	M10	22	50	4
132S-M	38 k6	80	10	8	41	M12	28	70	4
160M-L	42 k6	110	12	8	45	M16	36	100	4

1) Centering holes in shaft extension to DIN 332 part 2

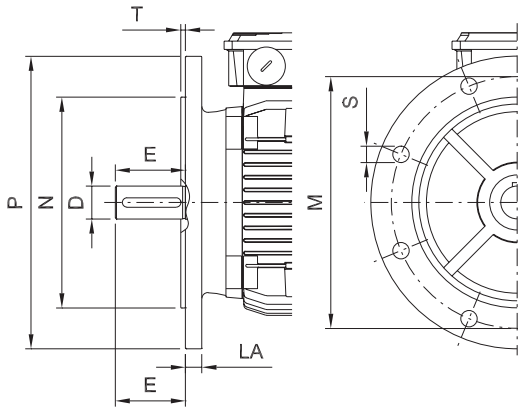
IM B5 - 180/200



IEC DIN	M e_1	N b_1	P a_1	T f_1	LA c_1	S[1] s_1
180M/L	300	250	350	5	13	M16
200L	350	300	400	5	15	M16

1) Clearance hole for screw

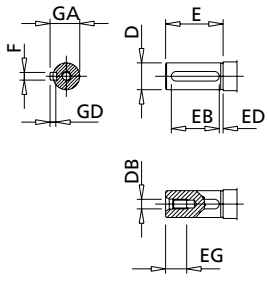
IM B5 - 225/315



IEC DIN	M e_1	N b_1	P a_1	T f_1	LA c_1	S[1] s_1
225S/M	400	350	450	5	16	M16
250M	500	450	550	5	18	M16
280S/M	500	450	550	5	18	M16
315S/M/L	600	550	660	6	22	M20

1) Clearance hole for screw

IEC DIN	Poli	D d	E l	F h9 u	GD	GA t	DB[2] d_6	EG	EB	ED
180M/L		48 k6	110	14	9	51.5	M16	36	100	5
200L		55 m6	110	16	10	59	M20	42	100	5
225S	**2 - 4/2**	55 m6	110	16	10	59	M20	42	100	5
	≥4	60 m6	140	18	11	64	M20	42	110	20
225M	**2 - 4/2**	55 m6	110	16	10	59	M20	42	100	5
	≥4	60 m6	140	18	11	64	M20	42	110	20
250M	**2 - 4/2**	60 m6	140	18	11	64	M20	42	110	20
	≥4	65 m6	140	18	11	69	M20	42	110	20
280S	**2 - 4/2**	65 m6	140	18	11	69	M20	42	125	7.5
	≥4	75 m6	140	20	12	79.5	M20	42	125	7.5
280M	**2 - 4/2**	65 m6	140	18	11	69	M20	42	125	7.5
	≥4	75 m6	140	20	12	79.5	M20	42	125	7.5
315S/M/L	**2 - 4/2**	65 m6	140	18	11	69	M20	42	125	10
	≥4	80 m6	170	22	14	85	M20	50	140	25



2) Centering holes in shaft extension to DIN 332 part 2

SINGLE-PHASE MOTORS

Terminal boxes

The location of the terminal box (viewed from drive end) in standard design is on top; on the right or on the left are possible.

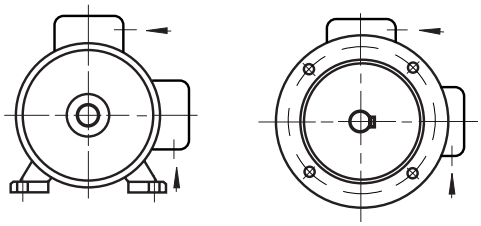
For motors with mountings IM B6, IM B7, IM B8, IM V5, IM V6 the location of the terminal box is related to an IM B3 mounting.

The position of the entry openings can be adjusted to suit the existing connection facilities by turning through 90°. Should special accessories be used (temperature detectors, anti-condensation heating, etc.) please enquire.

For motors in standard design, the cable gland does not belong to our scope of delivery.

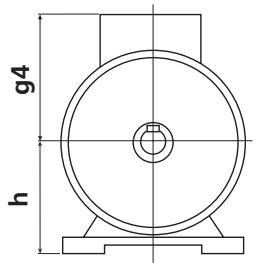
The dimension tables always show the maximum distance to the outermost edge of the available terminal boxes. This maximum value may, however, be smaller, depending on the design of the terminal box. If the space for mounting is very limited, please enquire.

Direction of cable entries

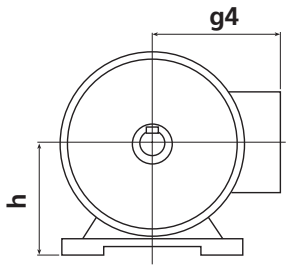


Frame size	Degree of protection	Thread for cable entry		Max. external cable diam.
		Metric [1]	Pg [2]	mm
56 - 71	IP 55	1 x M16	1 x Pg 11	12
80 -100	IP 55	1 x M20	1 x Pg 13.5	16

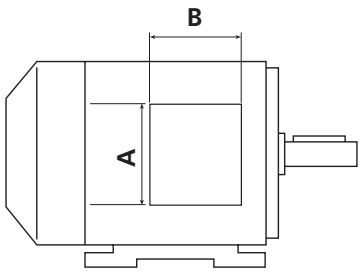
[1] Pitch 1.5
[2] Pg thread to DIN 40 430 (on request)



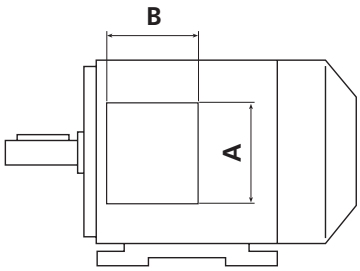
Terminal box on top



Terminal box at the side



left [1)]



right

[1)] Frame size 80-100 the position of the terminal box is close to drive end

Standard design

Frame size h	g4	A	B	Material
56	115	120	148	Plastic UL 94 V0
63	120	120	148	Plastic UL 94 V0
71	129	120	148	Plastic UL 94 V0
80	150	135	173	Plastic UL 94 V0
90	160	135	173	Plastic UL 94 V0
100	166	135	173	Plastic UL 94 V0

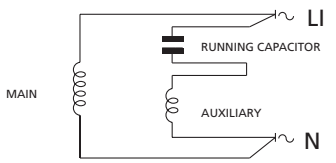
Connection diagrams

Single-phase motors type AMM and AMME are designed for single-rated voltage; motors type AMD and AMDE for dual voltage. The windings (main and auxiliary winding) are connected to the capacitor supplied with the motor.

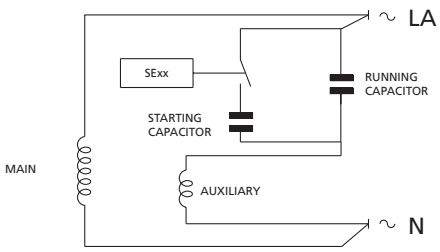
The direction of rotation can be reversed by inverting the winding ends as follows:

- main winding for motors with one supply voltage
- auxiliary winding for dual voltage motors

SERIES AMM

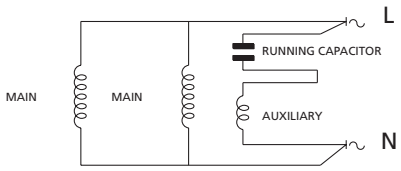


SERIES AMME

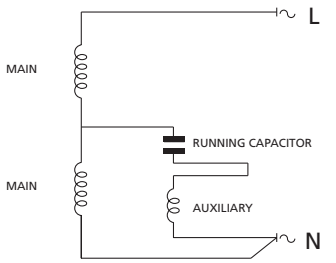


SExx - electronic device
for connection of starting capacitor

SERIES AMD

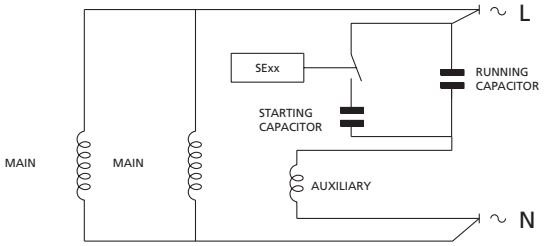


Connection at low voltage rate

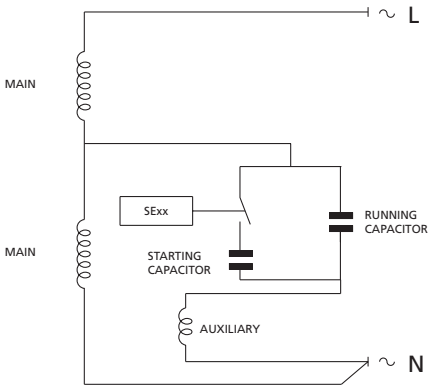


Connection at high voltage rate

SERIES AMDE



Connection at low voltage rate



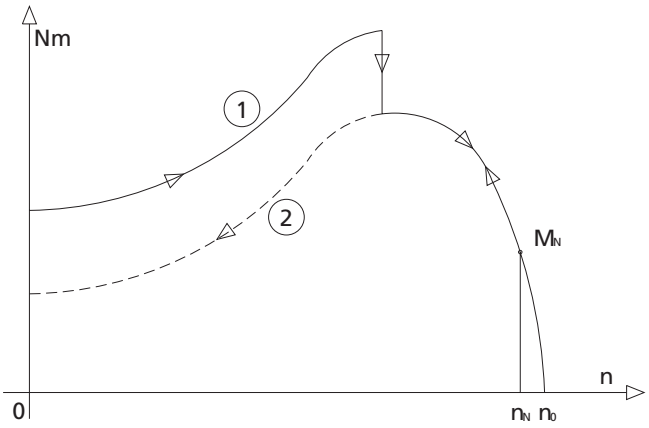
Connection at high voltage rate

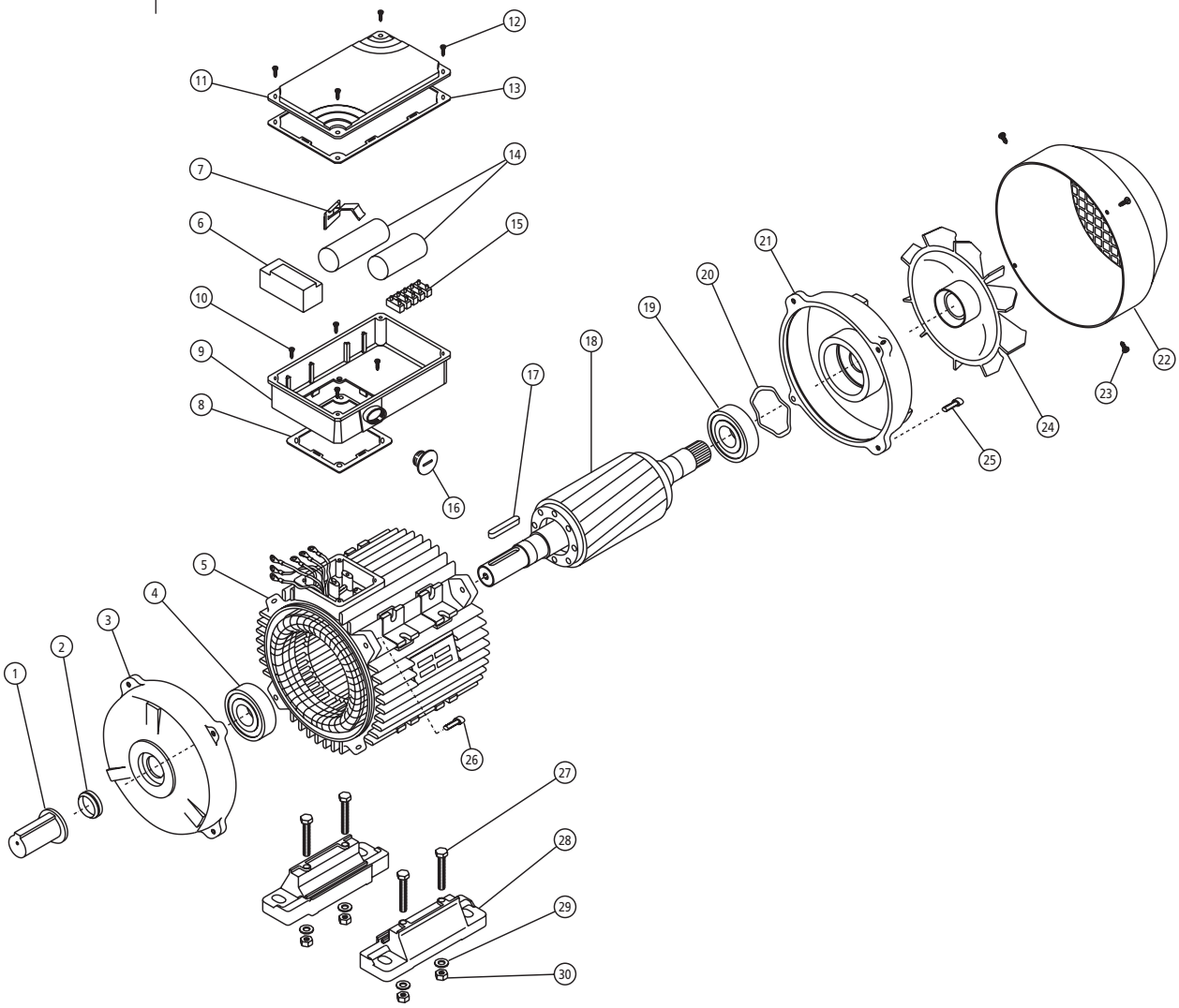
Electronic starting device (SE XX)

Single-phase motors with one single capacitor generally have lower starting torques than the full load torque. When higher starting torques are required, the motor is equipped with an additional starting capacitor. It is connected by the electronic starting device (SE XX) in the moment of starting and disconnected automatically proximate to the pull-out torque (see figure). At this point the torque characteristic for the running capacitor (characteristic 2) applies again.

Characteristic 1 is not reversible. The starting capacitor is reconnected only when restarting the motor. In case of overload, characteristic 2 has to be applied.

Time between stop and restart of the motor must be higher than 15 s.





Part description

1	Shaft protection
2	Dust seal drive end
3	Endshield drive end
4	Bearing drive end
5	Stator frame
6	Starter
7	Fixing device capacitor
8	Gasket terminal box
9	Terminal box
10	Fixing screw terminal box
11	Terminal box lid
12	Fixing screw terminal box lid
13	Gasket terminal box lid
14	Capacitor
15	Connecting block
16	Blank gland plug
17	Key
18	Rotor complete
19	Bearing non-drive end
20	Pre-load washer
21	Endshield non-drive end
22	Fan cover
23	Fixing screw fan cover
24	Fan
25	Fixing bolt endshield non-drive end
26	Fixing bolt endshield drive end
27	Fixing bolt motor feet
28	Motor feet
29	Fixing washer motor feet
30	Fixing nut motor feet

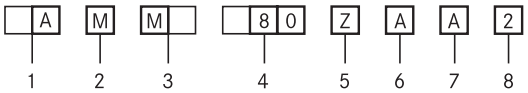
In enquires and orders for spare parts please state always:
Designation of spare part, motor type, mounting arrangement, motor serial number (Product No. (E-No.) when available)
Enquires and orders cannot be handled without these data.

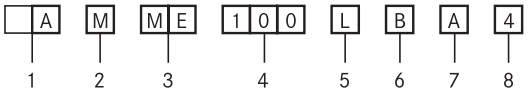
Apart from other information, it is necessary to specify the exact type designation in all enquiries, when ordering spare parts or replacement motors or when asking for documentary information.

The type designation of our motors comprises 8 points of reference, each of which may consist of several letters and/or numerals. The meaning of each symbol can be seen from the following table. For motors not included in our standard range, special symbols may be used which are not listed here.

Ref. point	Meaning	Description of symbols used for our motors	
1	Type of motor	A	Asynchronous motor
2	Cooling	M	Surface cooled with external fan, cooling fins
3	Type of motor	M ME D DE	Single-phase motor Single-phase motor with starting capacitor Single-phase motor with double voltage Single-phase motor with double voltage and starting capacitor
4	Shaft centre height	56, 63, 71, 80, 90, 100	
5	Frame length	Z S M L	 Mechanical dimension (short) Mechanical dimension (medium) Mechanical dimension (long)
6	Mechanical design and output value	A B C D	
7	Frame material	A	Aluminium frame
8	Number of poles	2 4 6	

Examples





Single-phase motors designed for range of rated voltage 220-240 V ± 5% - 50 Hz

For mains voltage to IEC 60038 230 V ± 10% - 50 Hz

Type		kW	HP	min^{-1}	M_N Nm	η 100%	cos φ	I_N 230V	I_N 220-240V	I_A/I_N	M_A/M_N	M_K/M_N	J 10^{-3} kgm^2	kg
3000 min^{-1} (2 poles)														
AMM 56Z AA	**2**	0.12	0.16	2600	0.4	47	0.90	1.25	1.3	1.3	1.3	1.8	0.09	3
AMM 63Z AA	**2**	0.18	0.25	2710	0.6	58.5	0.98	1.2	1.3	3	1.2	1.8	0.14	5
AMM 63Z BA	**2**	0.25	0.33	2760	0.9	68.6	0.95	1.7	1.9	3.2	1	1.6	0.18	5.5
AMM 71Z AA	**2**	0.37	0.50	2780	1.3	57.6	0.89	3.1	3.3	3.1	0.8	1.9	0.41	7.1
AMM 71Z BA	**2**	0.55	0.75	2740	1.9	69	0.89	3.9	4.1	3.5	0.7	1.7	0.55	8.5
AMM 80Z AA	**2**	0.75	1	2800	2.6	65	0.95	5.3	5.5	4.1	0.6	2	1.05	11.4
AMM 80Z BA	**2**	1.1	1.5	2730	3.8	74	0.97	6.5	6.6	3.6	0.5	1.6	1.08	11.8
AMM 90S AA	**2**	1.1	1.5	2830	3.7	68	0.94	7.5	8	4	0.4	2	1.62	15.3
AMM 90L BA	**2**	1.5	2	2835	5.1	73	0.90	9.3	9.6	3.9	0.5	2.1	1.87	17.3
AMM 90L CA	**2**	1.8	2.5	2790	6.2	73	0.99	10.8	11.2	4	0.6	2	2.09	18.7
AMM 90L DA	**2**	2.2 [1]	3 [1]	2770	7.6	73	0.90	14.6	15.4	4.3	0.2	1.8	2.11	19.3
AMM 100L AA	**2**	2.2	3	2795	7.5	75	0.98	12.8	13.1	4.3	0.4	1.5	4.05	24.5
1500 min^{-1} (4 poles)														
AMM 56Z AA	**4**	0.09	0.12	1340	0.6	45	0.89	1	1.1	1.9	0.5	1.2	0.14	3.5
AMM 63Z AA	**4**	0.12	0.16	1385	0.8	50	0.97	1	1.1	2.8	0.7	1.5	0.27	4.5
AMM 63Z BA	**4**	0.18	0.25	1280	1.3	50	0.97	1.6	1.7	2	0.8	1.2	0.34	4.9
AMM 71Z AA	**4**	0.25	0.33	1270	1.9	52.1	0.89	2.5	2.7	2.4	0.7	1.5	0.82	7.2
AMM 71Z BA	**4**	0.37	0.50	1370	2.6	62	0.88	2.8	3.1	2.9	0.8	1.2	1.08	8.5
AMM 80Z AA	**4**	0.37	0.50	1390	2.5	60	0.96	2.8	2.9	3.2	0.5	1.9	2	9.8
AMM 80Z BA	**4**	0.55	0.75	1390	3.8	67	0.88	4	4.2	3.2	0.5	1.8	2.41	11.3
AMM 80Z CA	**4**	0.75	1	1445	5.0	73	0.90	4.9	5.1	4.4	0.3	1.9	2.7	12.8
AMM 90L AA	**4**	1.1	1.5	1415	7.4	70	0.93	7.4	7.8	3.6	0.5	1.5	3.13	15.4
AMM 90L BA	**4**	1.5 [1]	2 [1]	1430	10.0	79	0.94	9	9.3	4.3	0.5	1.7	3.73	17.6
AMM 100L AA	**4**	1.8	2.5	1380	12.5	70	0.96	12	12.4	3.6	0.3	1.5	5.83	22.8
AMM 100L BA	**4**	2.2 [1]	3 [1]	1450	14.5	81	0.97	12.5	12.7	4.6	0.4	1.7	6	23.8
1000 min^{-1} (6 poles)														
AMM 71Z AA	**6**	0.18	0.25	840	2.0	48.0	0.87	1.9	2	2.7	0.8	1.6	0.90	6.3
AMM 80Z AA	**6**	0.25	0.33	900	2.7	56	0.95	2.2	2.4	2.3	0.3	1.8	2	8.8
AMM 80Z BA	**6**	0.37	0.50	925	3.8	60	0.96	2.8	3	2.6	0.4	1.3	2.47	10
AMM 90L AA	**6**	0.55	0.75	950	5.5	72	0.95	3.4	3.5	3.4	0.4	1.2	5.2	16.5
AMM 90L BA	**6**	0.75	1	890	8.0	71	0.96	4.8	4.9	3.2	0.5	1.5	5.85	18
AMM 100L AA	**6**	1.1	1.5	950	11.1	69	0.96	7.1	7.7	2.9	0.2	1.3	6.73	19
AMM 100L BA	**6**	1.5 [1]	2 [1]	870	16.5	66	0.98	10	10.2	2.5	0.4	1.4	9.43	22.5

1) Temperature rise to class F

Single-phase motors with starting capacitor designed for range of rated voltage 220-240 V ± 5% - 50 Hz

For mains voltage to IEC 60038 230 V ± 10% - 50 Hz

Type		kW	HP	min^{-1}	M_N Nm	η 100%	cos φ	I_N 230V	I_N 220-240V	I_A/I_N	M_A/M_N	M_K/M_N	J 10^{-3} kgm^2	kg
3000 min^{-1} (2 poles)														
AMME 63Z AA	**2**	0.12	0.16	2810	0.4	67.1	0.90	0.90	1	2.5	1.9	1.5	0.11	4.5
AMME 63Z BA	**2**	0.18	0.25	2800	0.6	58.5	0.98	1.2	1.3	3	1.6	1.8	0.14	5
AMME 63Z CA	**2**	0.25	0.33	2760	0.9	68.6	0.95	1.7	1.9	3.2	1.7	1.6	0.18	5.5
AMME 71Z AA	**2**	0.37	0.50	2780	1.3	57.6	0.89	3.1	3.3	3.1	2.5	1.9	0.41	7.1
AMME 71Z BA	**2**	0.55	0.75	2740	1.9	69	0.89	3.9	4.1	3.5	1.9	1.7	0.55	8.5
AMME 80Z AA	**2**	0.75	1	2800	2.6	65	0.95	5.3	5.5	5.3	2.9	2	1.05	11.4
AMME 80Z BA	**2**	1.1	1.5	2730	3.8	74	0.97	6.5	6.6	4	2.9	1.6	1.08	11.8
AMME 90S AA	**2**	1.1	1.5	2830	3.7	68	0.94	7.5	8	5.2	2.4	2	1.62	15.3
AMME 90L BA	**2**	1.5	2	2835	5.1	73	0.90	9.3	9.6	5.1	2.5	2.1	1.87	17.3
AMME 90L CA	**2**	1.8	2.5	2790	6.2	73	0.99	10.8	11.2	3.7	1.6	2.0	2.09	18.7
AMME 90L DA	**2**	2.2 [1]	3 [1]	2770	7.6	73	0.90	14.6	15.4	4	1.8	1.8	2.11	19.3
AMME 100L AA	**2**	2.2	3	2795	7.5	75	0.98	12.8	13.1	4.3	1.8	1.8	4.05	24.5
1500 min^{-1} (4 poles)														
AMME 63Z AA	**4**	0.12	0.16	1385	0.8	50	0.97	1	1.1	2.8	1.2	1.5	0.27	4.5
AMME 63Z BA	**4**	0.18	0.25	1280	1.3	50	0.97	1.6	1.7	2	1.9	1.2	0.34	4.9
AMME 71Z AA	**4**	0.25	0.33	1270	1.9	52.1	0.89	2.5	2.7	2.4	3	1.5	0.82	7.2
AMME 71Z BA	**4**	0.29	0.39	1275	2.2	56.1	0.95	2.4	2.5	4	3	1.6	0.95	7.8
AMME 71Z CA	**4**	0.37	0.50	1370	2.6	62	0.88	2.8	3.1	2.9	2.5	1.2	1.08	8.5
AMME 80Z AA	**4**	0.37	0.50	1390	2.5	60	0.96	2.8	2.9	2.5	1.8	1.9	2	9.8
AMME 80Z BA	**4**	0.55	0.75	1390	3.8	67	0.88	4	4.2	3.3	2.3	1.8	2.41	11.3
AMME 80Z CA	**4**	0.75	1	1445	5.0	73	0.90	4.9	5.1	5.4	2.4	2	2.7	12.8
AMME 90L AA	**4**	1.1	1.5	1415	7.4	70	0.93	7.4	7.8	4.8	2	1.5	3.13	15.4
AMME 90L BA	**4**	1.5 [1]	2 [1]	1430	10.0	79	0.94	9	9.3	4.7	1.8	1.7	3.73	17.6
AMME 100L AA	**4**	1.8	2.5	1380	12.5	70	0.96	12	12.4	3.2	1.5	1.5	5.83	22.8
AMME 100L BA	**4**	2.2 [1]	3 [1]	1450	14.5	81	0.97	12.5	12.7	4.6	1	1.7	6	23.8
1000 min^{-1} (6 poles)														
AMME 71Z AA	**6**	0.15	0.20	865	1.7	43	0.83	1.8	1.9	1.8	1.9	1.2	1.24	8
AMME 80Z AA	**6**	0.25	0.33	900	2.7	56	0.95	2.2	2.4	2.3	1.3	1.8	2	8.8
AMME 80Z BA	**6**	0.37	0.50	925	3.8	60	0.96	2.8	3	2.7	2	1.3	2.47	10
AMME 90L AA	**6**	0.55	0.75	950	5.5	72	0.95	3.4	3.5	3.8	2.5	1.2	5.2	16.5
AMME 90L BA	**6**	0.75	1	890	8.0	71	0.96	4.8	4.9	3	3.4	1.5	5.85	18
AMME 100L AA	**6**	1.1	1.5	950	11.1	69	0.96	7.1	7.7	2.4	1.4	1.3	6.73	19
AMME 100L BA	**6**	1.5 [1]	2 [1]	870	16.5	66	0.98	10	10.2	2.5	2	1.4	9.43	22.5

1) Temperature rise to class F

Single-phase dual-voltage motors
115-230 V - 50 Hz

Type		kW	HP	min^{-1}	M_N Nm	η 100%	cos φ	I_N 115-230V	I_A/I_N	M_A/M_N	M_K/M_N	J 10^{-3} kgm^2	kg
3000 min^{-1} (2 poles)													
AMD 63Z AA	**2**	0.11	0.15	2760	0.4	52	0.93	2-1	2.8	0.6	1.5	0.11	4.5
AMD 63Z BA	**2**	0.18	0.25	2800	0.6	55	0.98	2.9-1.45	3	0.5	1.6	0.14	5
AMD 63Z CA	**2**	0.24	0.32	2815	0.8	56	0.98	3.8-1.9	3.1	0.6	1.8	0.18	5.5
AMD 71Z AA	**2**	0.37	0.50	2730	1.3	55	0.90	6.6-3.3	3.3	0.9	2	0.41	7.1
AMD 71Z BA	**2**	0.55	0.75	2840	1.8	64	0.94	8-4	4.2	0.5	1.9	0.55	8.5
AMD 80Z AA	**2**	0.75	1	2800	2.6	60	0.78	13.8-7	3.5	0.4	2.1	1.05	11.4
AMD 80Z BA	**2**	1.1	1.5	2770	3.8	72	0.93	14.2-7.2	3.5	0.5	1.6	1.08	11.8
AMD 90S AA	**2**	1.1	1.5	2815	3.7	70	0.78	17.5-8.8	3.8	0.4	1.9	1.62	15.3
AMD 90L BA	**2**	1.5	2	2800	5.1	69	0.87	22-11	3.6	0.4	1.8	1.87	17.3
AMD 90L CA	**2**	1.8	2.5	2810	6.1	70	0.89	25-12.5	3.7	0.3	1.9	2.09	18.7
AMD 90L DA	**2**	2.2 [1]	3 [1]	2880	7.3	76	0.93	27.2-13.6	5	0.3	1.9	2.10	19.3
AMD 100L AA	**2**	2.2	3	2810	7.5	75	0.92	28-14	4.6	0.2	1.8	4.05	24.5
1500 min^{-1} (4 poles)													
AMD 63Z AA	**4**	0.11	0.15	1370	0.8	53	0.89	2.2-1.1	2	0.8	1.6	0.27	4.5
AMD 63Z BA	**4**	0.18	0.25	1340	1.3	51	0.9	3.3-1.7	1.9	0.6	1.3	0.34	4.9
AMD 71Z AA	**4**	0.24	0.32	1300	1.8	51	0.81	5.1-2.55	2.5	0.7	1.4	0.82	7.2
AMD 71Z BA	**4**	0.29	0.39	1340	2.1	61	0.84	4.9-2.45	2.6	0.6	1.6	0.95	7.8
AMD 71Z CA	**4**	0.37	0.5	1370	2.6	58	0.85	6.5-3.25	3.4	0.5	1.5	1.08	8.5
AMD 80Z AA	**4**	0.37	0.5	1375	2.6	54	0.94	6.3-3.15	2.5	0.7	1.5	2	9.8
AMD 80Z BA	**4**	0.55	0.75	1360	3.9	66	0.84	8.6-4.3	3.4	0.6	1.7	2.41	11.3
AMD 80Z CA	**4**	0.75	1	1435	5.0	62	0.91	11.5-5.75	4.1	0.4	1.9	2.7	12.8
AMD 90L AA	**4**	1.1	1.5	1425	7.4	69	0.81	17-8.5	3.9	0.3	1.9	3.13	15.4
AMD 90L BA	**4**	1.5 [1]	2 [1]	1415	10.1	72	0.88	20.5-10.25	3.4	0.3	1.4	3.73	17.6
AMD 100L AA	**4**	1.8	2.5	1430	12.0	70	0.86	26-13	3.2	0.3	1.6	5.83	22.8
AMD 100L BA	**4**	2.2 [1]	3 [1]	1440	14.6	72	0.86	31-15.5	3.2	0.2	1.3	6	23.8
1000 min^{-1} (6 poles)													
AMD 71Z AA	**6**	0.15	0.20	910	1.6	58	0.80	2.8-1.4	2.2	0.5	1.4	1.24	8
AMD 80Z AA	**6**	0.25	0.33	930	2.6	61	0.85	4.2-2.1	2.3	0.4	1.2	2	8.8
AMD 80Z BA	**6**	0.37	0.50	940	3.8	61	0.82	6.4-3.2	2.9	0.4	1.6	2.47	10
AMD 90L AA	**6**	0.55	0.75	950	5.5	68	0.83	8.5-4.25	2.7	0.6	1.3	5.2	16.5
AMD 90L BA	**6**	0.75	1	950	7.5	58	0.79	14.2-7.1	3	0.4	1.6	5.85	18
AMD 100L AA	**6**	1.1	1.5	935	11.2	72	0.88	15-7.5	3.1	0.3	1.4	6.73	19
AMD 100L BA	**6**	1.5 [1]	2 [1]	890	16.1	74	0.98	18-9	2.9	0.5	1.4	9.43	22.5

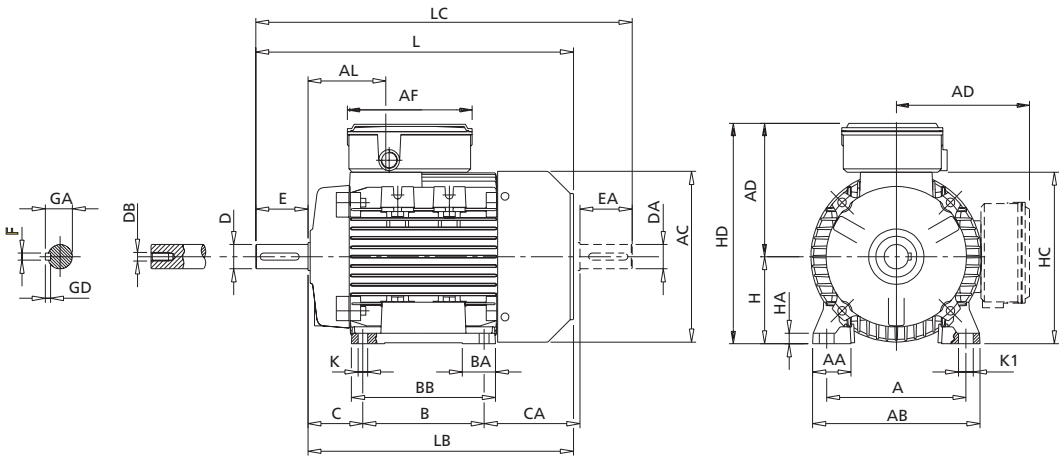
1) Temperature rise to class F

Single-phase dual-voltage motors with starting capacitor
115-230 V - 50 Hz

Type		kW	HP	min^{-1}	M_N Nm	η 100%	cos φ	I_N 115-230V	I_A/I_N	M_A/M_N	M_K/M_N	J 10^{-3} kgm^2	kg
3000 min^{-1} (2 poles)													
AMDE 63Z AA	**2**	0.11	0.15	2760	0.4	52	0.93	2-1	2.8	1.9	1.5	0.11	4.5
AMDE 63Z BA	**2**	0.18	0.25	2800	0.6	55	0.98	2.9-1.45	3	1.6	1.6	0.14	5
AMDE 63Z CA	**2**	0.24	0.32	2815	0.8	56	0.98	3.8-1.9	3.1	1.8	1.8	0.18	5.5
AMDE 71Z AA	**2**	0.37	0.50	2730	1.3	55	0.90	6.6-3.3	3.3	2.5	2	0.41	7.1
AMDE 71Z BA	**2**	0.55	0.75	2840	1.8	64	0.94	8-4	4.2	1.3	2	0.55	8.5
AMDE 80Z AA	**2**	0.75	1	2800	2.6	60	0.78	13.8-7	3.5	1.3	2.2	1.05	11.4
AMDE 80Z BA	**2**	1.1	1.5	2770	3.8	72	0.93	14.2-7.2	3.5	1.4	1.6	1.08	11.8
AMDE 90S AA	**2**	1.1	1.5	2815	3.7	70	0.78	17.5-8.75	3.8	2.6	1.9	1.62	15.3
AMDE 90L BA	**2**	1.5	2	2800	5.1	69	0.87	22-11	3.6	2.6	1.8	1.87	17.3
AMDE 90L CA	**2**	1.8	2.5	2810	6.1	70	0.89	25-12.5	3.7	1.6	1.9	2.09	18.7
AMDE 90L DA	**2**	2.2	3	2880	7.3	76	0.93	27.2-13.6	5	2.5	1.9	2.10	19.3
AMDE 100L AA	**2**	2.2 [1]	3 [1]	2810	7.5	75	0.92	28-14	4.6	1.8	1.8	4.05	24.5
1500 min^{-1} (4 poles)													
AMDE 63Z AA	**4**	0.11	0.15	1370	0.8	53	0.89	2.2-1.1	2	1.9	1.6	0.27	4.5
AMDE 63Z BA	**4**	0.18	0.25	1340	1.3	51	0.9	3.3-1.7	1.9	1	1.3	0.34	4.9
AMDE 71Z AA	**4**	0.24	0.32	1300	1.8	51	0.81	5.1-2.55	2.5	2.3	1.4	0.82	7.2
AMDE 71Z BA	**4**	0.29	0.39	1340	2.1	61	0.84	4.9-2.45	2.6	1.7	1.6	0.95	7.8
AMDE 71Z CA	**4**	0.37	0.5	1370	2.6	58	0.85	6.5-3.25	3.4	1.4	1.5	1.08	8.5
AMDE 80Z AA	**4**	0.37	0.5	1375	2.6	54	0.94	6.3-3.15	2.5	1.8	1.5	2	9.8
AMDE 80Z BA	**4**	0.55	0.75	1360	3.9	66	0.84	8.6-4.3	3.4	2.1	1.7	2.41	11.3
AMDE 80Z CA	**4**	0.75	1	1435	5.0	62	0.91	11.5-5.75	4.1	2	1.9	2.7	12.8
AMDE 90L AA	**4**	1.1	1.5	1425	7.4	69	0.81	17-8.5	3.9	2	1.9	3.13	15.4
AMDE 90L BA	**4**	1.5 [1]	2 [1]	1415	10.1	72	0.88	20.5-10.25	3.4	2	1.4	3.73	17.6
AMDE 100L AA	**4**	1.8	2.5	1430	12.0	70	0.86	26-13	3.2	2.1	1.6	5.83	22.8
AMDE 100L BA	**4**	2.2 [1]	3 [1]	1440	14.6	72	0.86	31-15.5	3.2	1.5	1.3	6	23.8
1000 min^{-1} (6 poles)													
AMDE 71Z AA	**6**	0.15	0.20	910	1.6	58	0.80	2.8-1.4	2.2	1.9	1.4	1.24	8
AMDE 80Z AA	**6**	0.25	0.33	930	2.6	61	0.85	4.2-2.1	2.3	1.3	1.2	2	8.8
AMDE 80Z BA	**6**	0.37	0.50	940	3.8	61	0.82	6.4-3.2	2.9	1.9	1.6	2.47	10
AMDE 90L AA	**6**	0.55	0.75	950	5.5	68	0.83	8.5-4.25	2.7	3	1.3	5.2	16.5
AMDE 90L BA	**6**	0.75	1	950	7.5	58	0.79	14.2-7.1	3	3.4	1.6	5.85	18
AMDE 100L AA	**6**	1.1	1.5	935	11.2	72	0.88	15-7.5	3.1	1.9	1.4	6.73	19
AMDE 100L BA	**6**	1.5 [1]	2 [1]	890	16.1	74	0.98	18-9	2.9	2	1.4	9.43	22.5

1) Temperature rise to class F

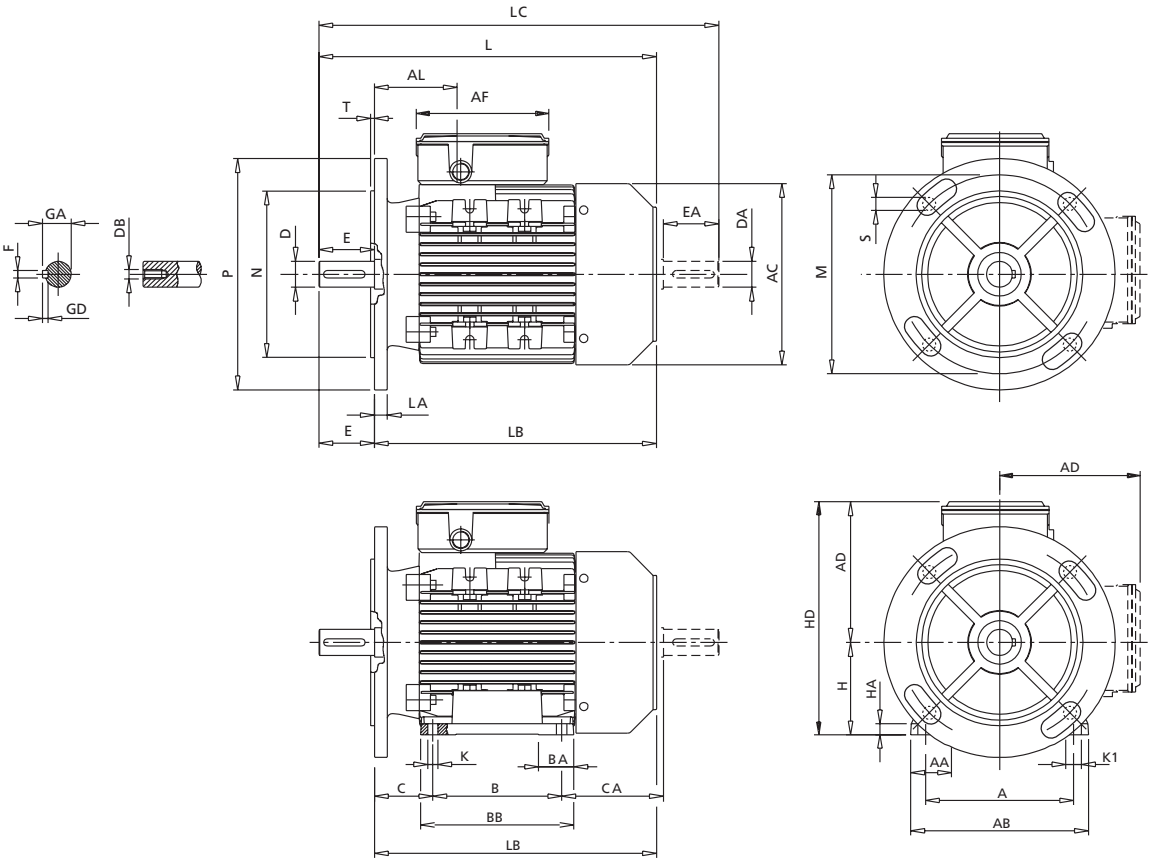
SINGLE-PHASE FRAME SIZE 56 - 100 IM B3



IEC DIN	H h	A b	B a	C w_1	K [1] s	AB f	BB e	CA	AD [2] g4	HD [2] p	AC g	HC	HA c	K1
56	56	90	71	36	6	109	90	65	115	171	104	110	8	9
63	63	100	80	40	7	126	104	72	120	183	122	121	8	11
71	71	112	90	45	7	144	109	86	129	200	142	142	9	11
80	80	125	100	50	10	153	125	89	150	230	160	162	9.5	14
90S	90	140	100	56	10	170	150	113	160	250	180	181	11	15
90L	90	140	125	56	10	170	150	88	160	250	180	181	11	15
100L	100	160	140	63	11	192	166	110	166	266	196	198	12	17

IEC DIN	L k	LB	LC k_1	AL	AF	BA m	AA n	D/DA d/d_1	E/EA l/l_1	F/FA u/u_1	GD	GA/GC t/t_1	DB [3] d_6/d_7
56	190	170	210	68	148	22	22	9 j6	20	3	3	10.2	M3
63	213	190	239	66	148	26	26	11 j6	23	4	4	12.5	M4
71	245	215	275	73	148	22	30	14 j6	30	5	5	16	M5
80	272	232	319	79	173	28.5	34.5	19 j6	40	6	6	21.5	M6
90S	317	267	372	85	173	28/53	37	24 j6	50	8	7	27	M8
90L	317	267	372	85	173	28/53	37	24 j6	50	8	7	27	M8
100L	366	306	433	89.5	173	38	44	28 j6	60	8	7	31	M10

1) Clearance hole for screw
2) Maximum dimension
3) Centering holes in shaft extensions to DIN 332 part 2

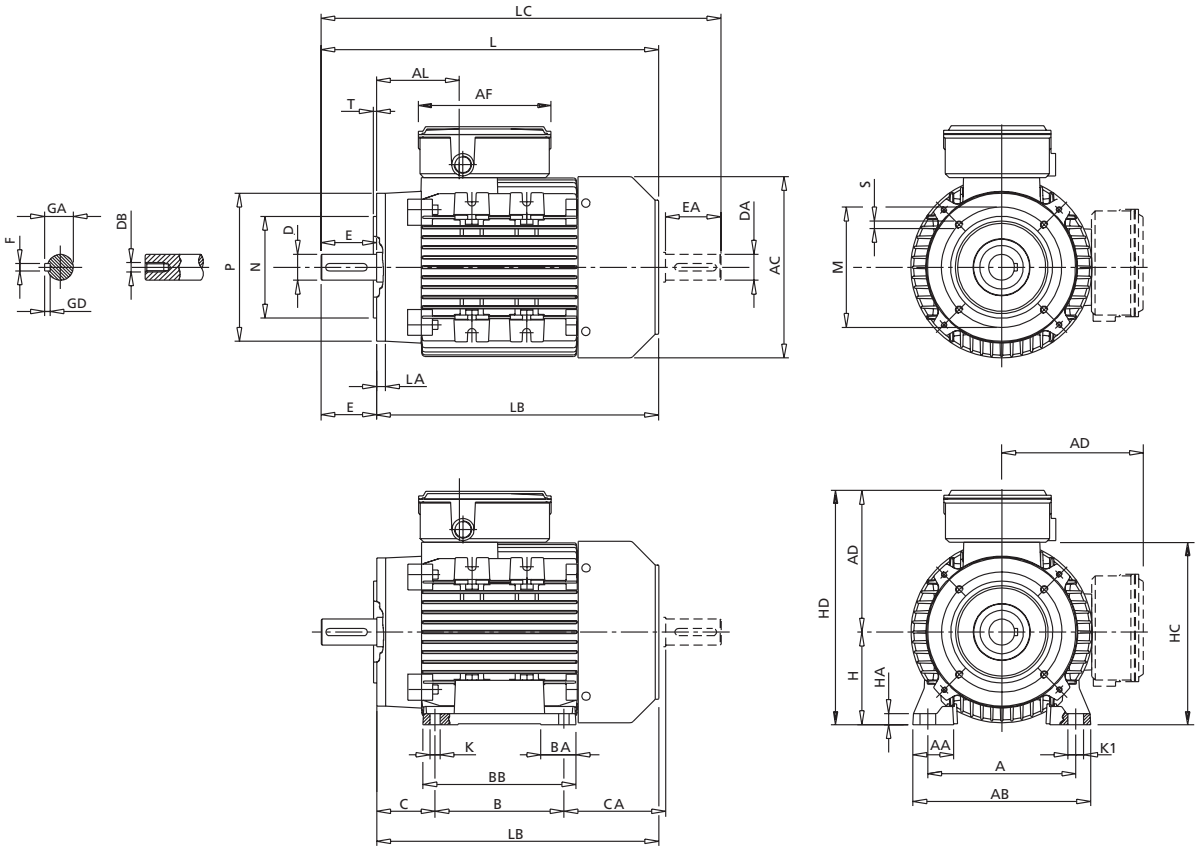


IEC DIN	M e_1	N b_1	P a_1	T f_1	LA c_1	S s1	H h	A b	B a	C w_1	K [1] s	CA	BB	AA	AB	BA
56	100	80	120	2.5	5.5	7	56	90	71	36	6	65	90	22	109	22
63	115	95	140	3	10	9.5	63	100	80	40	7	72	105	26	126	26
71	130	110	160	3.5	10	9.5	71	112	90	45	7	86	109	30	144	22
80	165	130	200	3.5	10	11.5	80	125	100	50	8	89	125	34.5	153	28.5
90S	165	130	200	3.5	12	11.5	90	140	100	56	10	113	150	37	170	28/53
90L	165	130	200	3.5	12	11.5	90	140	125	56	10	88	150	37	170	28/53
100L	215	180	250	4	14	14	100	160	140	63	11	110	166	44	192	44

IEC DIN	AD [2] g4	HD [2] p	AC g	HA c	K1	L k	LB	LC k_1	AL	AF	D/DA d/d_1	E/EA l/l_1	F/FA u/u_1	GD	GA/GC t/t_1	DB [3] d_6/d_7
56	115	171	104	8	9	190	170	210	68	148	9 j6	20	3	3	10.2	M3
63	120	183	122	8	11	213	190	239	66	148	11 j6	23	4	4	12.5	M4
71	129	200	142	9	11	245	215	275	73	148	14 j6	30	5	5	16	M5
80	150	230	160	9.5	14	272	232	319	79	170	19 j6	40	6	6	21.5	M6
90S	160	250	180	11	15	317	267	372	85	170	24 j6	50	8	7	27	M8
90L	160	250	180	11	15	317	267	372	85	170	24 j6	50	8	7	27	M8
100L	166	266	196	12	17	366	306	433	89.5	170	28 j6	60	8	7	31	M10

1) Clearance hole for screw
2) Maximum dimension
3) Centering holes in shaft extensions to DIN 332 part 2

SINGLE-PHASE FRAME SIZE 56 - 100 IM B14, IM B34



Small flange							Large flange												
IEC DIN	P a_1	N b_1	LA c_1	M e_1	T f_1	S s_1	P a_1	N b_1	LA c_1	M e_1	T f_1	S s_1	L k	LB	LC k_1	AL	AF	D/DA d/d1	E/EA l/l1	F/FA u/u1
56Z AA, BA	80	50		65	2.5	M5	105	70	8	85	2.5	M6	190	170	211	62	148	9j6	20	3
63Z AA, BA, CA	90	60		75	2.5	M5	120	80	8	100	2.5	M6	213	190	239	63	148	11j6	23	4
71Z AA, BA, CA	105	70		85	2.5	M6	140	95	8	115	2.5	M8	245	215	281	69	148	14j6	30	5
80Z AA, BA	120	80	8	100	3	M6	160	110	8.5	130	3.5	M8	272	232	319	79	173	19j6	40	6
90S AA, BA	140	95	10	115	3	M8	160	110	9	130	3.5	M8	317	267	372	85	173	24j6	50	8
90L BA, CA, DA	140	95	10	115	3	M8	160	110	9	130	3.5	M8	317	267	372	85	173	24j6	50	8
100L AA, BA, CA	160	110	10	130	3.5	M8	200	130	12	165	3.5	M10	366	306	433	89.5	173	28j6	60	8

IEC DIN	GD	GA/GC t/t_1	DB [3] d_6/d_7	H	A h	B b	C a	K [1] w_1	AB s	BB f	AA e	BA	CA	AD [2]	HD [2] g_4	AC m_1	HC g	HA	K1 c
56Z AA, BA	3	10.2	M3	56	90	71	36	6	109	90	22	22	65	115	171	110	114	8	12
63Z AA, BA, CA	4	12.5	M4	63	100	80	40	7	126	105	26	26	72	120	183	124	127	10	12
71Z AA, BA, CA	5	16	M5	71	112	90	45	7	144	109	30	22	86	129	200	137	143	12	17
80Z AA, BA	6	21.5	M6	80	125	100	50	8	153	125	34.5	28.5	89	150	230	160	162	9.5	14
90S AA, BA	7	27	M8	90	140	100	56	8	170	150	37	37/53	113	160	250	180	181	11	15
90L BA, CA, DA	7	27	M8	90	140	125	56	8	170	150	37	37/53	88	160	250	180	181	11	15
100L AA, BA, CA	7	31	M10	100	160	140	63	10	192	166	44	38	110	166	266	196	198	12	17

1) Clearance hole for screw
2) Maximum dimension
3) Centering holes in shaft extensions to DIN 332 part 2

BRAKE MOTORS

Series AMBY

Asynchronous three-phase brake motor with high-torque d.c. brake

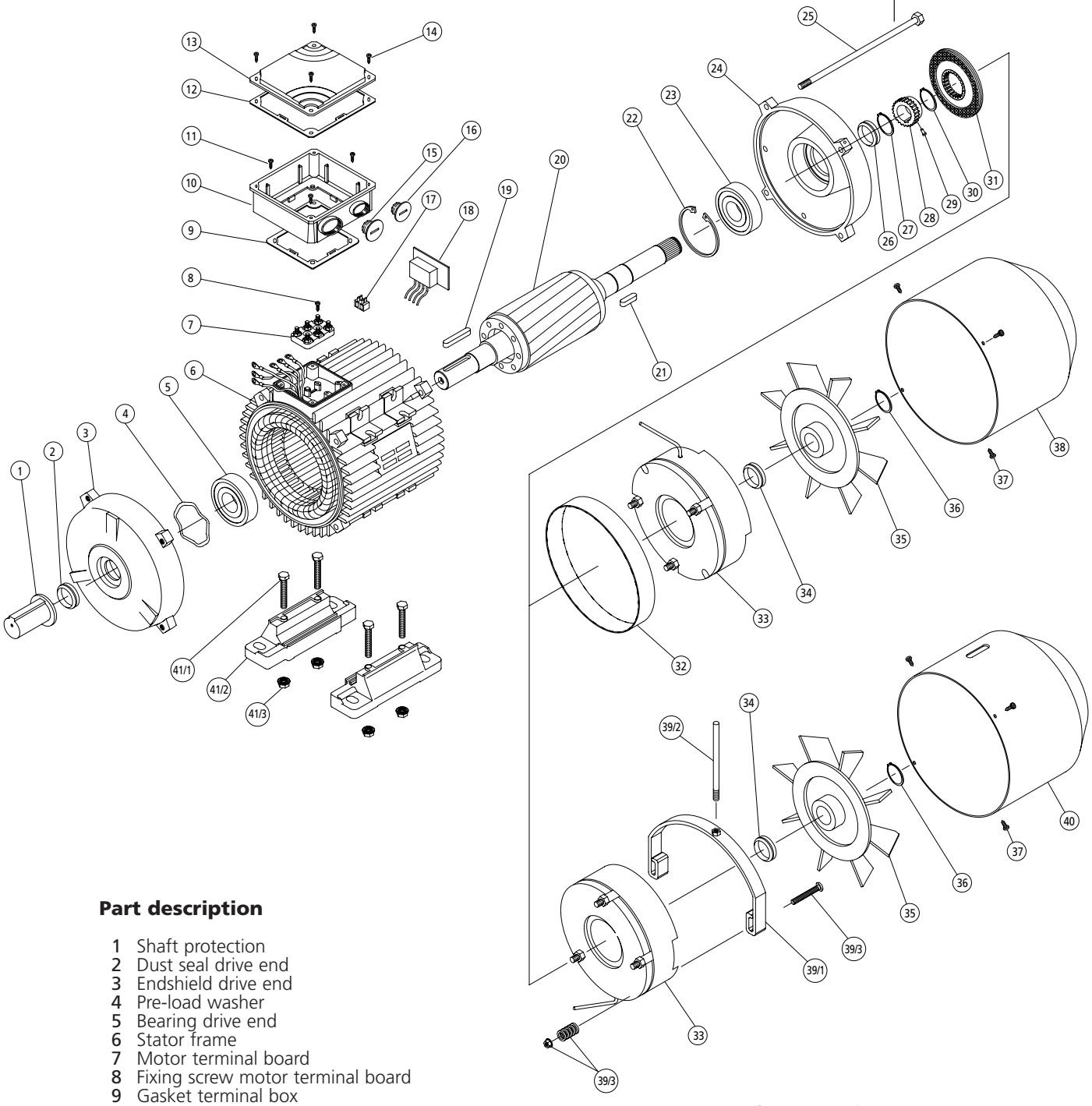
Frame sizes: 63 ... 160
Output range: 0.12 ... 22kW
Polarity: 2, 4, 6, 8 (pole-changing on request)
Insulation class F
Standard degree of protection: IP 54 (IP 55 on request) for frame size ≤ 132, IP 55 for frame size 160
Double braking surface
Asbestos-free friction surfaces
Electromagnetic spring-loaded brake with release in case of power supply interruption
Standard rectifier supply: 230 V - 50/60 Hz (others on request)
Progressive and noiseless braking
High braking torque (M_b >1,5 M_N)
Step adjustment braking torque (~ 33%; 67%;100% $M_{b\ max}$)
Fast acting rectifier available on request only for rectifier supply 230V 50/60Hz (sizes 63 ...112)
Special execution for wind generator available on request (continuous braking torque adjustment (in the range 30% $M_{b\ max}$ ... 100% $M_{b\ max}$), antisticking execution, corrosion resistance execution, reduced braking torque value, reduced range braking torque regulation, ...)
cURus approval on request
Efficiency class conform to Energy cURus on request
Available with a large number of options (i.e. encoder, axial independent cooling fan, hand release lever, special brake designs, flywheel, ...)
High number of starts/hour

Typical applications: Automation requiring a smooth intervention, transfer machinery, packaging machinery, gearmotors.

Table of the main brake features

Brake size	Motor size	M_b[1] [Nm] braking spring number 2	3	4	6	9	Air gap [mm]	Brake absorption [A] on dc side @ rectifier input 230V 50/60Hz
12 MV	63	1.8		3.5			0.25 ...0.5	0.1 A
12 MV	71	1.8		3.5			0.25 ...0.5	0.1 A
53 MV		2.5		5	7.5		0.25 ...0.5	0.14 A
13 MV	80	2.5		5	7.5		0.25 ...0.5	0.14 A
04 MV		5		10	15		0.3 ...0.55	0.17 A
14 MV	90	5		10	15		0.3 ...0.55	0.17 A
05 MV		13		26	40		0.3 ...0.55	0.23 A
15 MV	100	13		26	40		0.3 ...0.55	0.23 A
56S MV		25		50	75		0.35 ...0.6	0.34 A
15 MV	112	13		26	40		0.3 ...0.55	0.23 A
56S MV		25		50	75		0.35 ...0.6	0.34 A
16S MV	132	25		50	75		0.35 ...0.6	0.54 A
07 MV		50		100	150		0.4 ...0.8	0.7 A
17 MV	160	50		100	150		0.4 ...0.8	0.7 A
08 MV			85		170	250	0.5 ...0.9	1.2 A

[1] Rated values ± 20%
For delays of release/braking consult us
For max friction work for each braking consult us



Part description

1 Shaft protection
2 Dust seal drive end
3 Endshield drive end
4 Pre-load washer
5 Bearing drive end
6 Stator frame
7 Motor terminal board
8 Fixing screw motor terminal board
9 Gasket terminal box
10 Terminal box
11 Fixing screw terminal box
12 Gasket terminal box lid
13 Terminal box lid
14 Fixing screw terminal box lid
15 Blank gland plug
16 Blank gland plug
17 Brake terminal board (for sizes 63 … 112[a])
18 Rectifier
19 Motor key
20 Rotor complete
21 Brake key
22 Circlip
23 Bearing non-drive end
24 Endshield non-drive end[b]
25 Tie rod
26 Dust seal (for IP55 only)
27 Circlip
28 Brake hub
29 Anti-vibration spring/O-ring
30 Circlip
31 Brake disk
32 Brake gasket (for IP55 only)
33 Preassembled part of the brake (electromagnet, brake anchor, braking springs, fixing screws, guiding pipes, fastening nuts)
34 Dust seal (for IP55 only)
35 Fan
36 Circlip (only for sizes 100 and 112)
37 Fixing screw fan cover
38 Fan cover
39 Hand release:
39/1 hand lever
39/2 releasing lever
39/3 regulation/fixing kit
40 Fan cover for hand release
41 Foot kit (1 foot):
41/1 fixing screw
41/2 foot
41/3 fixing nut[c]

a) for sizes >112 brake terminal board is on the rectifier
b) for sizes 63 and 71 with braking flange
c) for sizes 132-160 washer and nut

Series AMBZ

Asynchronous three-phase brake motor with high-torque a.c. brake

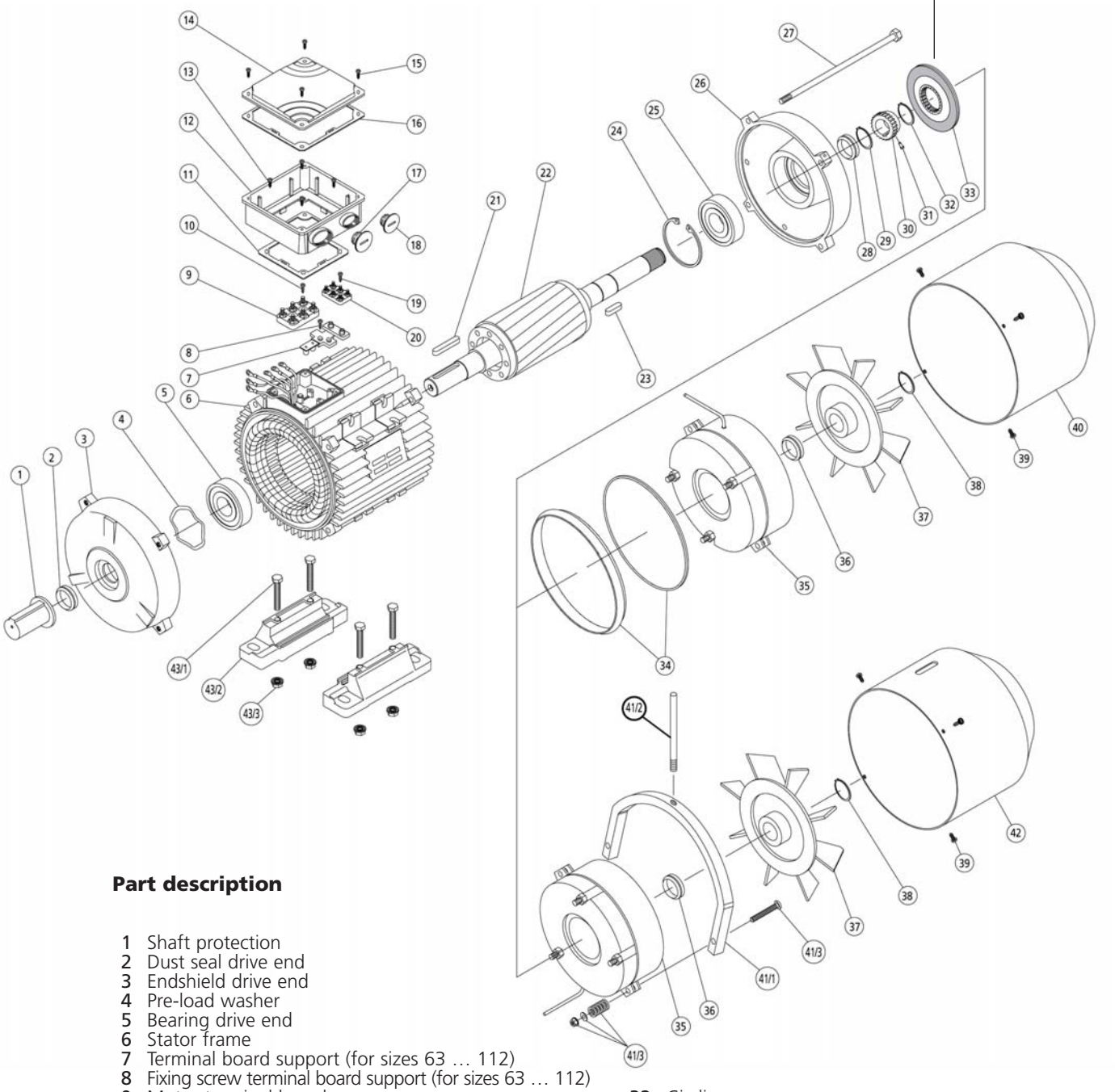
Frame sizes: 63 ... 160
Output range: 0.12 ... 22kW
Polarity: 2, 4, 6, 8 (pole-changing on request)
Insulation class F
Standard degree of protection: IP 54 (IP 55 on request) for frame size d 132, IP 55 for frame size 160
Double braking surface
Asbestos-free friction surfaces
Electromagnetic spring-loaded brake with release in case of power supply interruption
Standard brake supply: 230/400V - 50Hz (others on request) with separate terminal block
High braking torque ($M_b > 1.5\ M_N$)
Step adjustment braking torque as standard according to table below (< 33%; 67%;100% $M_{b\ max}$)
Special execution for wind generator available on request (continuous braking torque adjustment (in the range 30% $M_{b\ max}$ … 100% $M_{b\ max}$), antisticking execution, corrosion resistance execution, reduced braking torque value, reduced range braking torque regulation, …)
cURus approval on request
Efficiency class conform to Energy cURus on request
Available with a large number of options (i.e. encoder, axial independent cooling fan, hand release lever, special brake designs, flywheel, …)
Very high number of starts/hour

Typical applications: Automation with high intervention frequency, gearmotors, lifting, handling machinery.

Table of the main brake features

Brake size	Motor size	M_b[1] [Nm] min	M_b[1] [Nm] average	M_b[1] [Nm] max (std)	Air gap [mm]	Brake absorption [A] @ 230/400V 50Hz
12 MS/MV	63	1.8		3.5	0.25 … 0.5	0.18/0.1
12 MS/MV	71	1.8		3.5	0.25 … 0.5	0.18/0.1
53 MS/MV		2.5	5	7.5	0.25 … 0.5	0.2/0.12
13 MS/MV	80	2.5	5	7.5	0.25 … 0.5	0.2/0.12
04 MS/MV		5	10	15	0.3 … 0.55	0.28/0.16
14 MS/MV	90	5	10	15	0.3 … 0.55	0.28/0.16
05 MS/MV		13	26	40	0.3 … 0.55	0.63/0.36
15 MS/MV	100	13	26	40	0.3 … 0.55	0.63/0.36
56S MS/MV		25	50	75	0.35 … 0.6	1.2/0.68
15 MS/MV	112	13	26	40	0.3 … 0.55	0.63/0.36
56S MS/MV		25	50	75	0.35 … 0.6	1.2/0.68
16S MS/MV	132	25	50	75	0.35 … 0.6	1.2/0.68
07 MS/MV		50	100	150	0.4 … 0.8	1.5/0.87
17 MS/MV	160	50	100	150	0.4 … 0.8	1.5/0.87
08 MS/MV		85	170	250	0.5 … 0.8	1.9/1.1

[1] Rated values ± 20%
For delays of release/braking consult us
For max friction work for each braking consult us



Part description

1 Shaft protection
2 Dust seal drive end
3 Endshield drive end
4 Pre-load washer
5 Bearing drive end
6 Stator frame
7 Terminal board support (for sizes 63 … 112)
8 Fixing screw terminal board support (for sizes 63 … 112)
9 Motor terminal board
10 Fixing screw motor terminal board
11 Gasket terminal box
12 Terminal box
13 Fixing screw terminal box
14 Gasket terminal box lid
15 Terminal box lid
16 Fixing screw terminal box lid
17 Blank gland plug
18 Blank gland plug
19 Fixing screw brake terminal board (for sizes 63 … 112)
20 Brake terminal board (for sizes 63 … 112)
21 Motor key
22 Rotor complete
23 Brake key
24 Circlip
25 Bearing non-drive end
26 Endshield non-drive end[a)]
27 Tie rod
28 Dust seal (for IP55 only)
29 Circlip
30 Brake hub
31 Anti-vibration spring/O-ring
32 Circlip
33 Brake disk
34 Brake gasket (for IP55 only)
35 Preassembled part of the brake (electromagnet,brake anchor,braking springs, fixing screws, guiding pipes, fastening nuts, spacers)
36 Dust seal (for IP55 only)
37 Fan
38 Circlip (only for sizes 100 and 112)
39 Fixing screw fan cover
40 Fan cover
41 Hand release:
41/1 hand lever
41/2 releasing lever
41/3 regulation/fixing kit
42 fan cover for hand release
43 foot kit (1 foot):
43/1 fixing screw
43/2 foot
43/3 fixing nut[b)]

a) for sizes 63 and 71 with braking flange
b) for size ≥132 washer and nut

Series AMS

Asynchronous three-phase brake motor with low-torque d.c. brake with reduced overall dimensions

Frame sizes: 63 … 160
Output range: 0.12 … 22 kW
Polarity: 2, 4, 6, 8 (pole changing on request)
Insulation class F
IP 54 as standard degree of protection (IP 55 on request)
Electromagnetic spring-loaded brake with release in case of power supply interruption
Standard rectifier supply: 230 V - 50/60 Hz (others on request)
Standard version for easy air gap adjustment (version for manual rotation of the shaft front N-end available on request for size 63 ... 132)
Single braking surface
Asbestos-free friction surfaces
Non adjustable braking torque ($M_b \leq M_N$)
Soft, progressive and noiseless braking
Very reduced overall dimensions (similar to standard motors series AM)
Increased braking torque (+50% of the catalogue value) available on request
Fast acting rectifier available on request only for rectifier supply 230V 50/60Hz
cURus Approval on request
Efficiency class conform to Energy cURus on request
Available with a large range of options (i.e. encoder, axial independent cooling fan, hand release lever, …)

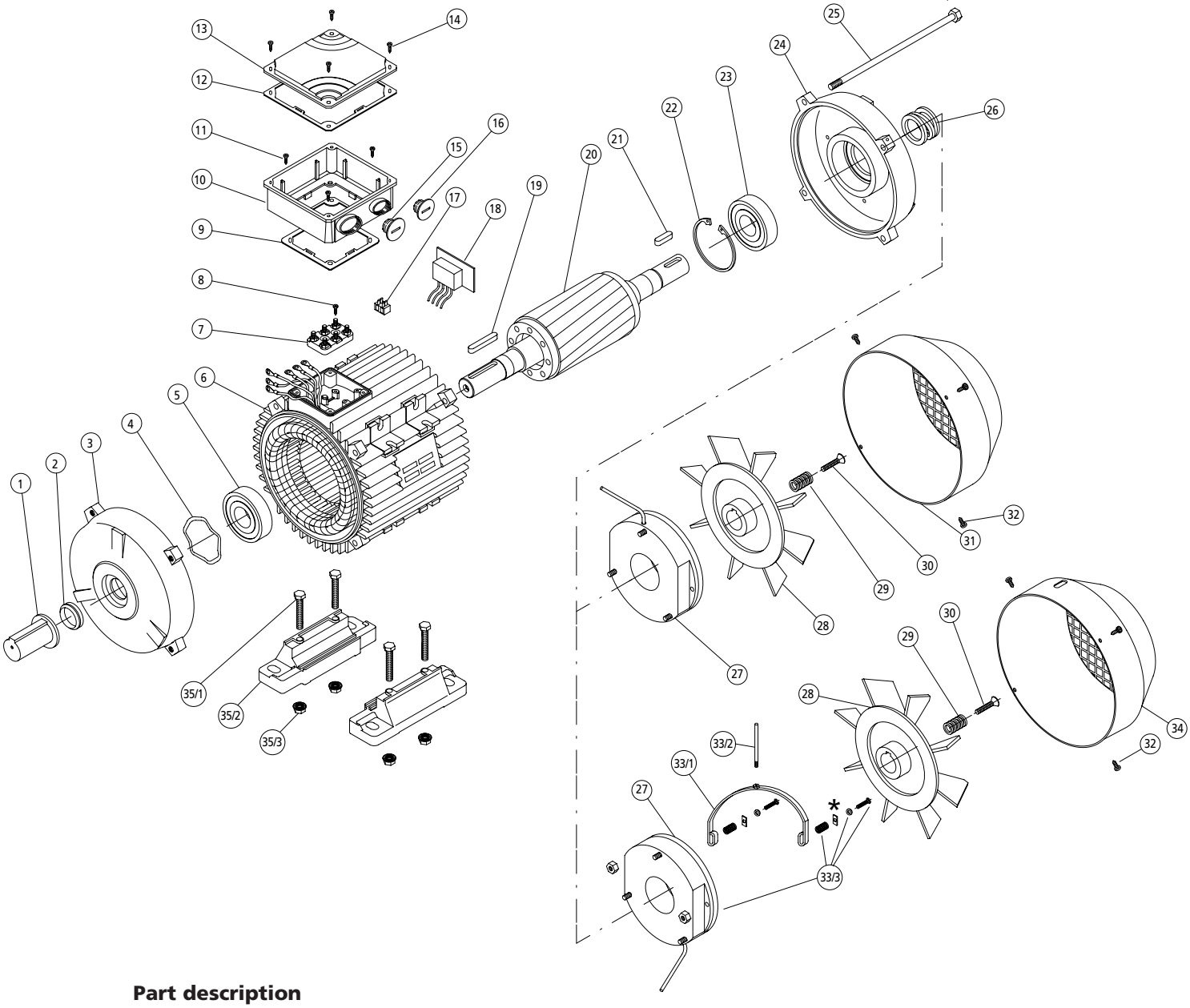
Typical applications: Woodworking/cutting machinery, machinery requiring long braking periods and high braking duties.

Table of the main brake features

Brake size	Motor size	M_b [1] [Nm]	Air gap [mm]	Brake absorption [A] on dc side @ rectifier input 230V 50/60Hz
63	63	3	0.25 …0.5	0.1 A
71	71	4	0.25 …0.5	0.1 A
80	80	7	0.25 …0.5	0.16 A
90	90	7	0.25 …0.5	0.16 A
100	100	13	0.3 …0.55	0.2 A
	112	13	0.3 …0.55	0.2 A
132 L	132	30	0.35 … 0.6	0.27 A
	160	30	0.35 …0.6	0.27 A

[1] Rated values ± 20%
For delays of release/braking consult us
For max friction work for each braking consult us

SPARE PARTS FOR AMS MOTORS FOR EASY AIR GAP ADJUSTMENT[1)]



Part description

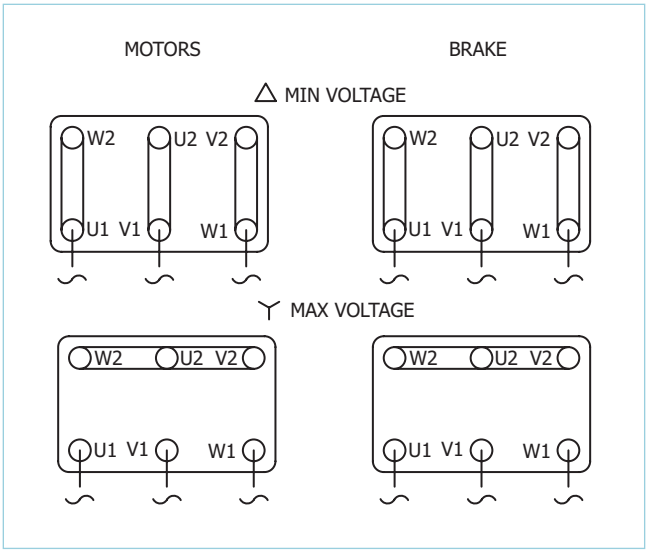
1 Shaft protection
2 Dust seal drive end
3 Endshield drive end
4 Pre-load washer
5 Bearing drive end
6 Stator frame
7 Motor terminal board
8 Fixing screw motor terminal board
9 Gasket terminal box
10 Terminal box
11 Fixing screw terminal box
12 Gasket terminal box lid
13 Terminal box lid
14 Fixing screw terminal box lid
15 Blank gland plug
16 Blank gland plug
17 Brake terminal board
18 Rectifier
19 Motor key
20 Rotor complete
21 Brake key
22 Circlip
23 Bearing non-drive end
24 Endshield non-drive end
25 Tie rod
26 Main contrast spring
27 Preassembled part of the brake (electromagnet, brake anchor with friction surface, braking springs, fixing screws)
28 Brake fan (with fixed washer)
29 Auxiliary contrast spring
30 Air gap adjustment/fixing screw
31 Fan cover
32 Fixing screw fan cover
33 Hand release:
33/1 hand lever
33/2 releasing lever
33/3 regulation/fixing kit
34 Fan cover for hand release
35 Foot kit (1 foot) (for sizes 71 … 132[a)])
35/1 fixing screw
35/2 foot
35/3 fixing nut[b)]

a) for size 63 feet integral with the case
b) for size 132 washer and nut

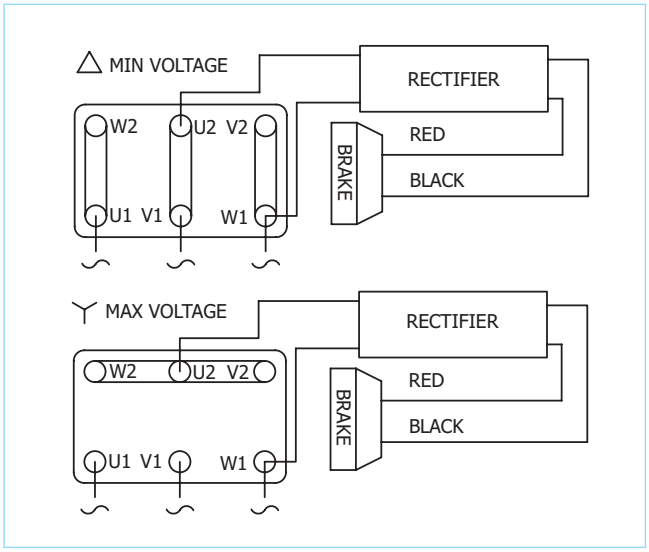
*spacer only for sizes 100, 112 and 132
1) AMS for manual rotation of the shaft from NDE available on request

Connection diagrams

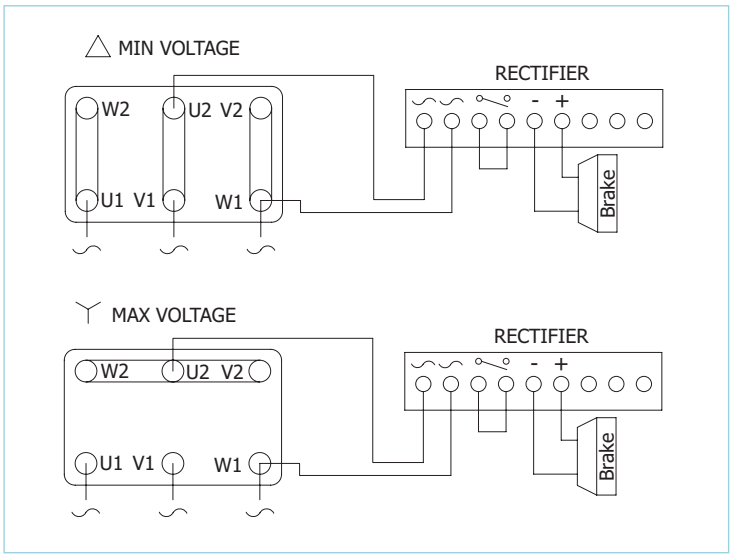
Every brake motors has got, inside the terminal box, the connection diagram both for the motor and for the brake/rectifier.
For brake motors with ac brakes (AMBZ type) the connection diagram is



For brake motors with dc brake (AMS and AMBY type) required at 230/400V 50Hz, the rectifier is directly connected to the motor terminal block as follows

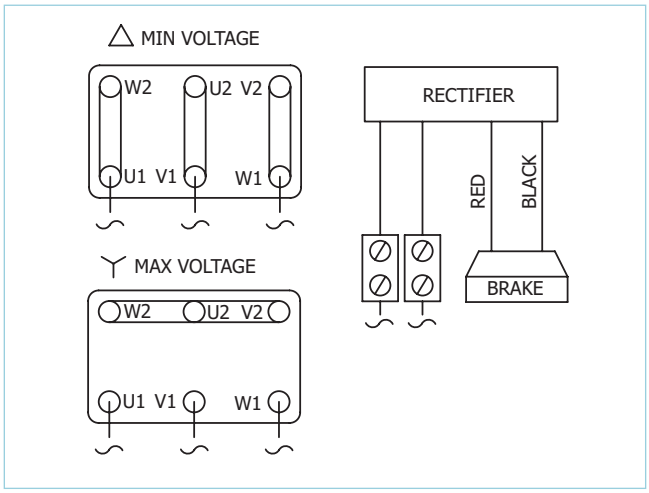


For AMS (63 ... 160) and AMBY (63 ...112)

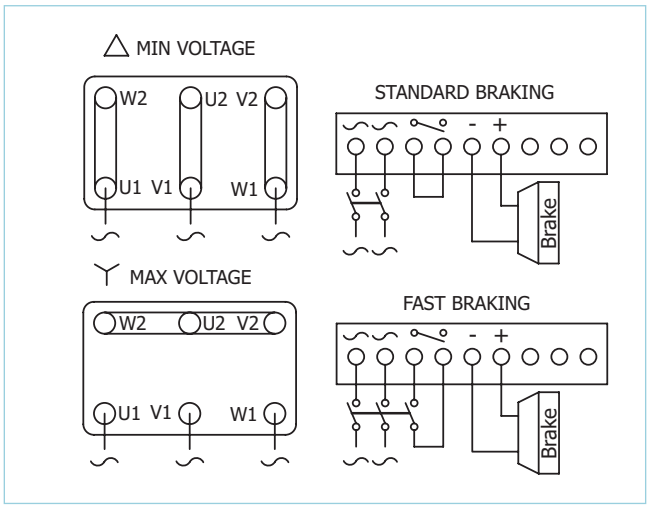


For AMBY 132-160

For all other supply value, different from 230/400V 50Hz, since the standard rectifier supply is 230V 50/60Hz, and when an inverter supply is used the rectifier has to be separately supplied according to the diagrams:



For AMS (63 ... 160) and AMBY (63 ...112)



For AMBY 132-160

Supplying the rectifier separately from the motor terminal block allows to reduce the delay of braking; to achieve the fast braking on AMBY132-160 it is necessary to open even the dc side of the brake coil (according to previous figure).
In case of pole-changing brake motors: for motor connection see three phase motors section , the brake/rectifier has to be supplied separately.
Warning: for the correct supply of both motor and brake refer to the values written on nameplate.

Apart from other information, it is necessary to specify the exact type designation in all enquiries, when ordering spare parts or replacement motors or when asking for documentary information.

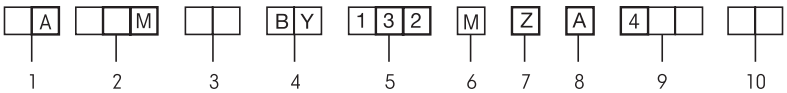
The type designation of our brake motors comprises 10 points of reference, each of which may consist of several letters and/or numerals. The meaning of each symbol can be seen from the following table. For motors not inlcuded in oru standard range, special symbols may be used which are not listed here

Meaning of the symbols

Ref. point	Meaning	Description of symbols used for our motors	
1	Type of motor	A	Asynchronous motor
2	Cooling	M G[1)] MFV	Surface cooled with external fan, cooling fins Surface cooled without external fan, cooling fins Surface cooled with forced ventilation, cooling fins
3	Type of motor	blank HE	Three-phase motors, standard efficiency IE1 code Three-phase motors, high efficiency IE2 code
4	Type of brake	BY BZ S	High-torque dc brake High-torque ac brake Low-torque dc brake
5	Shaft centre height	63, 71, 80, 90, 100, 112, 132,160	
6	Frame length	Z S M L	 Mechanical dimension (short) Mechanical dimension (medium) Mechanical dimension (long)
7	Mechanical design and output power	A ... ... Z	
8	Frame material	A	Aluminium frame
9	Number of poles	2 4 6 8	(pole-changing on request)
10	Special features	R3	High resistance rotor

[1)] For AMBY and AMBZ type only

Example



Brake motors designed for range of rated voltage 380-420 V ± 5% - 50 Hz

AMBY - high - torque d.c. brake
AMBZ - high - torque a.c. brake
AMS - low - torque d.c. brake

Standard efficiency motors, IE1
Efficiency testing method IEC 60034-2-1;2007

Tipo		P_N kW	HP	n_N min^{-1}	M_N Nm	IE1 η 50%	75%	100%	cos φ	I_N 400V	380-420V	I_A/I_N	M_A/M_N	M_K/M_N
3000 min^{-1} (2 poles)														
AM... 63Z AA	**2**	0.18	0.25	2790	0.6	54.0	58.0	63.0	0.73	0.60	0.65	3.7	3.0	3.1
AM... 63Z BA	**2**	0.25	0.33	2790	0.9	57.0	62.0	66.0	0.70	0.80	0.75	4.5	3.2	3.3
AM... 63Z CA	**2***	0.37	0.5	2800	1.3	54.0	58.0	65.0	0.70	1.20	1.25	4.6	3.4	3.4
AM... 71Z AA	**2**	0.37	0.5	2820	1.3	58.0	64.0	70.0	0.78	1.0	1.2	4.7	3.6	3.6
AM... 71Z BA	**2**	0.55	0.75	2830	1.9	57.0	64.0	71.0	0.77	1.5	1.6	4.8	3.2	3.3
AM... 71Z CA	**2***	0.75	1.0	2800	2.6	58.9	65.7	72.6	0.76	2.0	2.1	5.2	3.1	3.1
AM... 80Z AA	**2**	0.75	1.0	2840	2.5	66.3	71.5	73.0	0.78	1.9	2.0	5.0	2.8	2.9
AM... 80Z BA	**2**	1.1	1.5	2810	3.7	72.1	75.0	75.3	0.82	2.5	2.6	4.6	2.4	2.9
AM... 80Z CA	**2***	1.5	2.0	2825	5.1	74.7	77.5	77.8	0.83	3.3	3.4	5.0	2.9	3.3
AM... 90S AA	**2**	1.5	2.0	2830	5.1	75.6	78.7	78.6	0.82	3.4	3.5	5.0	3.1	3.0
AM... 90S BA	**2***	1.8	2.5	2805	6.1	74.9	78.0	78.2	0.80	4.2	4.3	4.5	2.6	2.5
AM... 90L CA	**2**	2.2	3.0	2860	7.3	81.5	82.8	81.8	0.81	4.9	4.9	7.1	4.1	4.0
AM... 90L DA	**2***	3	4.0	2860	10.0	78.7	81.8	82.2	0.80	6.6	6.8	7.2	3.9	3.8
AM... 100L AA	**2**	3	4.0	2860	10.0	78.9	81.4	81.5	0.85	6.4	6.7	6.0	3.1	3.3
AM... 100L BA	**2***	4	5.5	2835	13.5	81.1	82.5	81.7	0.88	8.0	8.1	6.2	2.9	2.9
AM... 100L CA	**2***	5.5	7.5	2865	18.3	83.7	84.6	83.3	0.86	11.1	11.3	7.2	3.5	4.1
AM... 112M AA	**2**	4	5.5	2880	13.3	81.9	84.0	83.5	0.82	8.4	8.7	8.0	3.4	3.6
AM... 112M BA	**2***	5.5	7.5	2900	18.1	83.6	84.7	85.0	0.86	10.9	11.2	7.8	3.5	3.6
AM... 112M CA	**2***	7.5	10	2900	24.7	86.7	87.8	87.1	0.87	14.3	14.8	8.7	4.0	4.0
AM... 132S YA	**2**	5.5	7.5	2890	18.2	83.2	84.7	85.0	0.83	11.3	11.4	6.0	2.2	2.3
AM... 132S ZA	**2**	7.5	10	2880	24.9	85.6	86.7	86.1	0.87	14.5	14.9	6.4	2.9	3.1
AM... 132M ZA	**2***	9.2	12.5	2900	30.3	84.7	86.8	87.0	0.84	18.4	18.8	7.0	2.8	3.2
AM... 132M RA	**2***	11	15	2880	36.5	87.1	88.1	88.0	0.85	21.3	21.7	6.9	3.2	3.8
AM... 132M TA	**2***	15	20	2920	49.1	86.4	88.6	88.9	0.83	29.5	30.5	7.0	3.2	3.7
AM... 160M VA	**2**	11	15	2940	35.7	83.4	86.4	87.7	0.83	21.9	22.7	7.4	2.5	3.1
AM... 160M XA	**2**	15	20	2940	48.7	87.3	88.9	88.9	0.85	28.6	29.2	8.1	3.1	3.7
AM... 160L XA	**2**	18.5	25	2950	59.9	88.2	89.7	89.6	0.87	34.3	34.8	8.5	3.6	4.2
AM... 160L RA	**2***	22	30	2940	71.5	88.7	90.5	90.4	0.90	39.1	39.4	8.4	3.0	3.7

* Higher output (progressive motor)

IE code not applicable to motors 2, 4, 6 poles with P_N < 0.75 kW. Efficiency testing method: IEC 60034-2;1996

Efficiency values are not comparable without knowing the efficiency testing method.

For maximum friction work per stop consult us

		AMBY				AMBZ				AMS			
Tipo		J 10^{-3} kgm²	$M_{b\,max}$ Nm	z_L [1] c/h	kg	J 10^{-3} kgm²	$M_{b\,max}$ Nm	z_L [1] c/h	kg	J 10^{-3} kgm²	M_b Nm	z_L [1] c/h	kg
3000 min^{-1} (2 poles)													
AM... 63Z AA	**2**	0.19	3.5	6300	5.7	0.19	3.5	7100	5.5	0.43	3	3550	5.1
AM... 63Z BA	**2**	0.21	3.5	6300	6.2	0.21	3.5	7100	6.0	0.45	3	3150	5.6
AM... 63Z CA	**2***	0.24	3.5	6000	6.5	0.24	3.5	6700	6.3	0.48	3	3150	5.9
AM... 71Z AA	**2**	0.38	3.5(7.5)[2]	5000	8.2	0.38	3.5(7.5)[2]	5600	8.0	0.81	4	2650	7.6
AM... 71Z BA	**2**	0.48	7.5	4750	9.3	0.48	7.5	5300	9.0	0.87	4	2650	8.0
AM... 71Z CA	**2***	0.57	7.5	4500	10.3	0.57	7.5	5000	10.0	0.96	4	2360	9.0
AM... 80Z AA	**2**	0.70	7.5(15)[2]	3350	12.6	0.70	7.5(15)[2]	3750	12.3	1.59	7	1700	11.2
AM... 80Z BA	**2**	0.91	15	3150	14.6	0.91	15	3550	14.5	1.75	7	1700	12.3
AM... 80Z CA	**2***	1.07	15	2650	16.2	1.07	15	3000	16.1	1.91	7	1400	13.9
AM... 90S AA	**2**	1.39	15(40)[2]	3150	18.7	1.39	15(40)[2]	3550	18.6	2.31	7	1400	15.7
AM... 90S BA	**2***	1.39	15(40)[2]	3150	18.7	1.39	15(40)[2]	3550	18.6	2.31	7	1400	15.7
AM... 90L CA	**2**	1.84	15(40)[2]	2500	22.0	1.84	15(40)[2]	2800	21.9	2.76	7	1200	19.0
AM... 90L DA	**2***	2.32	40	2360	26.5	2.32	40	2650	27.2	3.06	7	1120	21.7
AM... 100L AA	**2**	2.71	40(75)[2]	2360	27.9	2.71	40(75)[2]	2650	28.6	5.3	13	1120	23.6
AM... 100L BA	**2***	3.23	40(75)[2]	2120	28.3	3.23	40(75)[2]	2360	29.0	5.8	13	1000	24
AM... 100L CA	**2***	4.26	40(75)[2]	2000	34.5	4.26	40(75)[2]	2230	35.2	6.9	13	900	30.2
AM... 112M AA	**2**	5.0	40(75)[2]	1120	33.8	5.0	40(75)[2]	1250	34.5	7.6	13	750	29.0
AM... 112M BA	**2***	6.1	40(75)[2]	1000	36.9	6.1	40(75)[2]	1120	37.6	8.7	13	670	32.1
AM... 112M CA	**2***	8.8	75	900	46.5	8.8	75	1000	47.9	10.9	13	600	38.3
AM... 132S YA	**2**	10.4	75(150)[2]	710	55	10.4	75(150)[2]	800	56	14.2	30	560	46.5
AM... 132S ZA	**2**	13.1	75(150)[2]	670	61	13.1	75(150)[2]	750	62	17.0	30	480	52
AM... 132M ZA	**2***	14.1	75(150)[2]	600	66	14.1	75(150)[2]	670	67	18.0	30	430	57
AM... 132M RA	**2***	16.9	75(150)[2]	550	70	16.9	75(150)[2]	610	72	20.8	30	380	62
AM... 132M TA	**2***	22.0	150	500	81	22	150	555	83	- [3]	- [3]	- [3]	- [3]
AM... 160M VA	**2**	35.3	150(250)[2]	400	104	35.3	150(250)[2]	445	106	37.2	30	315	87
AM... 160M XA	**2**	46.1	150(250)[2]	350	121	46.1	150(250)[2]	385	123	48.1	30	300	104
AM... 160L XA	**2**	59	150(250)[2]	335	135	59	150(250)[2]	370	137	62	30	280	118
AM... 160L RA	**2***	59	150(250)[2]	335	135	59	150(250)[2]	370	137	62	30	280	118

* Higher output (progressive motor)

1) Max. Number of no-load starts/hour with cyclic duration factor 50%

2) On request

3) Motor not available

For maximum friction work per stop consult us

Standard efficiency motors, IE1
Efficiency testing method IEC 60034-2-1;2007

Tipo		P_N kW	HP	n_N min^{-1}	M_N Nm	IE1 η 50%	75%	100%	cos φ	I_N 400V	380-420V	I_A/I_N	M_A/M_N	M_K/M_N
1500 min^{-1} (4 poles)														
AM... 63Z AA	**4**	0.12	0.16	1350	0.8	46.0	50.0	57.0	0.65	0.50	0.55	2.4	2.0	2.0
AM... 63Z BA	**4**	0.18	0.25	1330	1.3	47.0	50.0	58.0	0.70	0.65	0.70	2.3	1.9	1.9
AM... 63Z CA	**4***	0.25	0.33	1360	1.8	49.0	52.5	58.0	0.74	0.85	0.90	2.7	2.2	2.1
AM... 71Z AA	**4**	0.25	0.33	1340	1.8	55.0	59.0	64.0	0.66	0.90	1.00	3.2	1.9	2.0
AM... 71Z BA	**4**	0.37	0.50	1370	2.6	60.0	63.0	67.0	0.67	1.20	1.25	3.3	2.2	2.2
AM... 71Z CA	**4***	0.55	0.75	1380	3.8	61.0	64.0	69.0	0.68	1.70	1.80	3.6	2.4	2.4
AM... 80Z AA	**4**	0.55	0.75	1400	3.8	67.0	69.0	70.0	0.72	1.6	1.7	3.6	2.6	2.6
AM... 80Z BA	**4**	0.75	1.0	1410	5.1	68.7	70.8	72.4	0.72	2.1	2.2	4.4	2.8	2.8
AM... 80Z CA	**4***	1.1	1.5	1385	7.6	73.4	75.7	75.2	0.77	2.8	2.9	4.4	2.5	2.6
AM... 90S AA	**4**	1.1	1.5	1400	7.5	75.8	76.0	75.4	0.78	2.7	2.9	5.2	2.5	2.8
AM... 90L BA	**4**	1.5	2.0	1400	10.2	77.6	77.8	77.5	0.78	3.6	3.7	5.7	2.8	3.0
AM... 90L CA	**4***	1.8	2.5	1380	12.5	76.3	76.5	75.9	0.81	4.2	4.3	5.5	2.7	2.9
AM... 90L DA	**4***	2.2	3.0	1400	15.0	78.3	78.5	77.9	0.77	5.3	5.5	4.8	2.9	3.2
AM... 100L AA	**4**	2.2	3.0	1435	14.6	76.5	79.1	79.9	0.74	5.4	5.6	5.3	2.5	2.7
AM... 100L BA	**4**	3.0	4.0	1425	20.1	82.0	83.0	81.6	0.78	6.8	6.9	4.6	2.4	2.5
AM... 100L CA	**4***	4.0	5.5	1400	27.3	80.8	81.8	80.4	0.78	9.2	9.3	6.0	2.6	2.9
AM... 112M AA	**4**	4.0	5.5	1430	26.7	83.2	83.9	83.1	0.82	8.5	8.8	6.3	2.2	2.8
AM... 112M BA	**4***	5.5	7.5	1430	36.7	84.1	84.8	84.0	0.83	11.4	11.7	6.5	2.2	2.9
AM... 132S ZA	**4**	5.5	7.5	1430	36.7	87.2	87.1	86.1	0.82	11.3	11.7	5.8	3.0	3.0
AM... 132M ZA	**4**	7.5	10	1440	49.7	87.3	87.2	86.2	0.83	15.3	15.5	6.8	3.1	3.1
AM... 132M RA	**4***	9.2	12.5	1440	61.0	86.5	87.5	87.3	0.86	17.7	17.9	8.0	3.5	3.5
AM... 132M TA	**4***	11.0	15	1440	72.9	83.5	83.9	84.5	0.87	21.5	22.0	8.3	3.1	3.3
AM... 160M XA	**4**	11	15	1460	71.9	88.5	89.3	88.7	0.80	22.4	22.7	7.5	2.5	3.1
AM... 160L XA	**4**	15	20	1460	98.1	89.4	90.2	89.6	0.84	28.8	29.6	7.0	2.5	3.3
AM ... 160L ZA	**4***	18.5	25	1460	121.8	89.9	90.7	90.1	0.84	35.4	36.0	7.6	2.5	3.3
AM ... 160L RA	**4***	22	30	1460	143.9	90.4	91.2	90.6	0.86	41.0	42.0	7.8	2.4	3.2

* Higher output (progressive motor)

IE code not applicable to motors 2, 4, 6 poles with P_N < 0.75 kW. Efficiency testing method: IEC 60034-2;1996

Efficiency values are not comparable without knowing the efficiency testing method.

For maximum friction work per stop consult us

		AMBY				AMBZ				AMS			
Tipo		J 10^{-3} kgm²	$M_{b\ max}$ Nm	z_L [1] c/h	kg	J 10^{-3} kgm²	$M_{b\ max}$ Nm	z_L [1] c/h	kg	J 10^{-3} kgm²	M_b Nm	z_L [1] c/h	kg
1500 min^{-1} (4 poles)													
AM... 63Z AA	**4**	0.31	3.5	13200	5.4	0.31	3.5	15000	5.2	0.54	3	7500	4.8
AM... 63Z BA	**4**	0.35	3.5	12500	6.2	0.35	3.5	14000	6.0	0.59	3	7500	5.6
AM... 63Z CA	**4***	0.38	3.5	11800	6.3	0.38	3.5	13200	6.1	0.61	3	6700	5.7
AM... 71Z AA	**4**	0.70	3.5(7.5) [2]	7500	8.1	0.70	3.5(7.5) [2]	8500	7.9	1.13	4	5000	7.5
AM... 71Z BA	**4**	0.87	7.5	7250	9.1	0.87	7.5	8150	8.8	1.26	4	4850	7.8
AM... 71Z CA	**4***	1.11	7.5	6900	10.4	1.11	7.5	7800	10.1	1.50	4	4500	9.1
AM... 80Z AA	**4**	1.49	7.5(15) [2]	6700	12.4	1.49	7.5(15) [2]	6700	12.1	2.37	7	4250	11.0
AM... 80Z BA	**4**	1.93	15	6300	14.4	1.93	15	6300	14.3	2.77	7	4000	12.1
AM... 80Z CA	**4***	2.33	15	6000	15.7	2.33	15	6000	15.6	3.16	7	3750	13.4
AM... 90S AA	**4**	2.36	15(40) [2]	5000	18.0	2.36	15(40) [2]	5650	17.9	3.28	7	3550	15.5
AM... 90L BA	**4**	3.12	40	4750	21.1	3.12	40	5350	21.8	3.85	7	3350	16.3
AM... 90L CA	**4***	3.69	40	4550	22.3	3.69	40	5150	23.0	4.43	7	3250	17.5
AM... 90L DA	**4***	3.98	40	4300	24.8	3.98	40	4850	25.5	4.71	7	3150	20.0
AM... 100L AA	**4**	4.83	40(75) [2]	4500	28.1	4.83	40(75) [2]	5050	28.8	7.4	13	2500	23.8
AM... 100L BA	**4**	6.08	40(75) [2]	4250	31.1	6.08	40(75) [2]	4800	31.8	8.7	13	2350	26.8
AM... 100L CA	**4***	7.24	75	4000	37.0	7.24	75	4500	38.4	9.3	13	2200	29.3
AM... 112M AA	**4**	11.60	75	2500	42.4	11.60	75	2800	43.8	13.7	13	1500	34.2
AM... 112M BA	**4***	14.42	75	2240	46.9	14.42	75	2500	48.3	16.5	13	1320	38.7
AM... 132S ZA	**4**	22.02	75(150) [2]	2000	60	22.02	75(150) [2]	2250	61	25.9	30	1180	51
AM... 132M ZA	**4**	28.70	75(150) [2]	1800	69	28.70	75(150) [2]	2000	70	32.6	30	1000	60
AM... 132M RA	**4***	33.41	150	1500	87	33.41	150	1690	89	35.9	30	800	74
AM... 132M TA	**4***	33.41	150	1500	87	33.41	150	1690	89	35.9	30	800	74
AM... 160M XA	**4**	69	150(250) [2]	670	115	69	150(250) [2]	750	118	71	30	560	98
AM... 160L XA	**4**	90	150(250) [2]	600	133	90	150(250) [2]	675	136	92	30	500	117
AM... 160L ZA	**4***	108	250	580	157	108	250	650	156	105	30	480	126
AM... 160L RA	**4***	120	250	550	168	120	250	600	168	- [3]	- [3]	- [3]	- [3]

* Higher output (progressive motor)

1) Max. Number of no-load starts/hour with cyclic duration factor 50%

2) On request

3) Motor not available

For maximum friction work per stop consult us

Standard efficiency motors, IE1
Efficiency testing method IEC 60034-2-1;2007

Tipo		P_N kW	HP	n_N min^{-1}	M_N Nm	IE1 η 50%	75%	100%	cos φ	I_N 400V	380-420V	I_A/I_N	M_A/M_N	M_K/M_N
1000 min^{-1} (6 poles)														
AM... 71Z AA	**6**	0.18	0.25	880	2.00	46.0	48.0	53.0	0.60	0.85	0.90	2.2	1.6	1.6
AM... 71Z BA	**6**	0.25	0.33	880	2.70	46.0	50.0	54.0	0.62	1.10	1.20	2.5	1.7	1.7
AM... 80Z AA	**6**	0.37	0.5	920	3.80	47.0	58.0	60.0	0.70	1.25	1.30	2.7	1.6	2.1
AM... 80Z BA	**6**	0.55	0.75	920	5.70	60.0	64.0	68.0	0.67	1.75	1.8	2.9	2.2	2.1
AM... 90S AA	**6**	0.75	1.0	910	7.90	70.5	72.5	71.5	0.63	2.4	2.5	2.9	1.7	1.7
AM... 90L BA	**6**	1.1	1.5	920	11.40	72.0	73.5	73.0	0.66	3.3	3.4	3.0	1.7	1.7
AM... 100L AA	**6**	1.5	2.0	930	15.40	73.3	75.8	75.3	0.69	4.2	4.4	3.7	1.8	2.3
AM... 100L BA	**6***	1.8	2.5	940	18.30	74.6	77.1	76.6	0.67	5.1	5.3	4.2	2.4	2.8
AM... 112M AA	**6**	2.2	3.0	940	22.40	77.0	79.0	78.0	0.74	5.3	5.4	4.4	2.4	2.6
AM... 112M CA	**6***	3	4.0	940	30.50	81.8	82.8	82.8	0.74	7.0	7.2	5.3	2.9	2.9
AM... 132S ZA	**6**	3	4.0	950	30.20	79.5	81.5	81.3	0.72	7.4	7.5	4.9	2.0	2.4
AM... 132M YA	**6**	4	5.5	950	40.20	81.4	83.1	82.7	0.71	9.9	10.5	4.5	2.2	2.5
AM... 132M ZA	**6**	5.5	7.5	950	55.30	82.2	83.6	83.6	0.71	13.5	13.5	4.1	2.2	2.2
AM... 160M ZA	**6**	7.5	10	970	73.80	84.4	86.5	86.3	0.78	16.0	16.3	6.2	2.8	3.2
AM... 160L ZA	**6**	11	15	960	109.40	88.1	88.5	87.8	0.78	23.4	24.0	6.0	2.5	3.5

* Higher output (progressive motor)

IE code not applicable to motors 2, 4, 6 poles with P_N < 0.75 kW. Efficiency testing method: IEC 60034-2;1996
Efficiency values are not comparable without knowing the efficiency testing method.

For maximum friction work per stop consult us

		AMBY				AMBZ				AMS			
Tipo		J 10^{-3} kgm²	$M_{b\ max}$ Nm	z_L [1] c/h	kg	J 10^{-3} kgm²	$M_{b\ max}$ Nm	z_L [1] c/h	kg	J 10^{-3} kgm²	M_b Nm	z_L [1] c/h	kg
1000 min^{-1} (6 poles)													
AM... 71Z AA	**6**	1.14	7.5	16000	9.2	1.14	7.5	18000	8.9	1.53	4	10000	7.9
AM... 71Z BA	**6**	1.30	7.5	15000	9.7	1.30	7.5	16800	9.4	1.68	4	9500	8.4
AM... 80Z AA	**6**	1.94	7.5(15) [2]	9000	12.2	1.94	7.5(15) [2]	10100	11.9	2.82	7	6300	10.8
AM... 80Z BA	**6**	2.52	15	8500	14.5	2.52	15	9550	14.4	3.35	7	6000	12.2
AM... 90S AA	**6**	3.07	15(40) [2]	6700	17.6	3.07	15(40) [2]	7500	17.5	4.00	7	5300	14.6
AM... 90L BA	**6**	4.73	40	6300	22.8	4.73	40	7050	23.5	5	7	5000	18.0
AM... 100L AA	**6**	6.7	40(75) [2]	5600	26.1	6.7	40(75) [2]	6300	26.8	9	13	4500	21.8
AM... 100L BA	**6***	9.3	40(75) [2]	4750	30.6	9.3	40(75) [2]	5300	31.3	12	13	3750	26.3
AM... 112M AA	**6**	13.2	40(75) [2]	3150	35.5	13.2	40(75) [2]	3500	36.2	16	13	2650	30.7
AM... 112M CA	**6***	18.8	75	3000	52	18.8	75	3350	53	21	13	2500	43.7
AM... 132S ZA	**6**	22.3	75(150) [2]	2000	55	22.3	75(150) [2]	2250	56	26	30	1600	46.2
AM... 132M YA	**6**	29.8	75(150) [2]	1800	60	29.8	75(150) [2]	2000	62	34	30	1500	52
AM... 132M ZA	**6**	39.7	150	1700	77	39.7	150	1900	80	42	30	1400	65
AM... 160M ZA	**6**	106	150(250) [2]	1120	119	106	150(250) [2]	1260	122	108	30	900	103
AM... 160L ZA	**6**	139	150(250) [2]	1000	140	139	150(250) [2]	1120	143	141	30	850	124

* Higher output (progressive motor)

1) Max. Number of no-load starts/hour with cyclic duration factor 50%

2) On request

For maximum friction work per stop consult us

Brake motors designed for range of rated voltage 380-420 V ± 5% - 50 Hz

AMBY - high - torque d.c. brake
AMBZ - high - torque a.c. brake
AMS - low - torque d.c. brake

Efficiency testing method: IEC 60034-2;1996

Tipo		P_N kW	HP	n_N min^{-1}	M_N Nm	η 50%	η 75%	η 100%	cos φ	I_N 400V	I_N 380-420V	I_A/I_N	M_A/M_N	M_K/M_N
750 min^{-1} (8 poles)														
AM... 71Z AA	**8**	0.12	0.16	670	1.7	40	44	50	0.55	0.65	0.70	2.4	2.5	2.5
AM... 80Z AA	**8**	0.25	0.33	680	3.5	40	47	51	0.62	1.1	1.2	2.2	1.8	2.0
AM... 90S AA	**8**	0.37	0.5	680	5.2	52	58	59	0.53	1.7	1.8	2.1	1.4	1.6
AM... 90L BA	**8**	0.55	0.75	680	7.7	52	58	59	0.54	2.5	2.7	2.1	1.4	1.6
AM... 100L AA	**8**	0.75	1.0	690	10.4	59	64	65	0.65	2.6	2.8	3.0	1.6	1.7
AM... 100L BA	**8**	1.1	1.5	690	15.2	59	67	68	0.62	3.9	4.0	3.0	1.9	1.6
AM... 112M AA	**8**	1.5	2.0	696	20.6	66	69	70	0.66	4.6	4.8	4.0	1.8	2.4
AM... 132S ZA	**8**	2.2	3.0	710	29.6	79.3	80.5	78.8	0.64	6.40	6.6	3.4	1.7	1.7
AM... 132M ZA	**8**	3.0	4.0	710	40.4	81.3	82.0	79.8	0.67	8.10	8.4	3.6	1.7	1.9
AM... 160M YA	**8**	4.0	5.5	700	54.6	84.9	84.5	84.4	0.72	9.50	9.7	4.5	1.8	2.2
AM... 160M ZA	**8**	5.5	7.5	720	72.9	85.6	85.2	85.0	0.73	12.80	13.3	4.0	1.8	2.3
AM... 160L ZA	**8**	7.5	10	710	100.9	86.3	85.8	85.5	0.74	17.10	17.8	4.0	1.8	2.3

For maximum friction work per stop consult us

For mains voltage
to IEC 60038
400 V ± 10% - 50 Hz

		AMBY				AMBZ				AMS			
Tipo		J 10^{-3} kgm²	$M_{b\ max}$ Nm	z_L [1] c/h	kg	J 10^{-3} kgm²	$M_{b\ max}$ Nm	z_L [1] c/h	kg	J 10^{-3} kgm²	M_b Nm	z_L [1] c/h	kg
750 min^{-1} (8 poles)													
AM... 71Z AA	**8**	0.87	7.5	18000	9.1	0.87	7.5	20250	8.8	1.26	4	15000	7.8
AM... 80Z AA	**8**	1.94	7.5(15) [2]	15000	12.2	1.94	7.5(15) [2]	16750	11.9	2.82	7	11200	10.8
AM... 90S AA	**8**	3.07	15(40) [2]	8000	17.4	3.07	15(40) [2]	9000	17.3	4.00	7	6300	14.4
AM... 90L BA	**8**	4.54	15(40) [2]	7500	21.0	4.54	15(40) [2]	8400	20.9	5.5	7	6000	18.0
AM... 100L AA	**8**	6.7	40(75) [2]	6700	26.2	6.7	40(75) [2]	7550	26.9	9.3	13	5000	21.9
AM... 100L BA	**8**	9.3	40(75) [2]	6000	31.2	9.3	40(75) [2]	6750	31.9	11.9	13	4500	26.9
AM... 112M AA	**8**	15.7	40(75) [2]	3550	44.5	15.7	40(75) [2]	4000	45.2	18.3	13	3150	39.7
AM... 132S ZA	**8**	29.8	75(150) [2]	2500	63	29.8	75(150) [2]	2800	65	33.7	30	2000	55
AM... 132M ZA	**8**	39.7	150	2240	76	39.7	150	2500	74	42.2	30	1800	64
AM... 160M YA	**8**	79	150(250) [2]	1320	102	79	150(250) [2]	1475	104	80	30	1000	85
AM... 160M ZA	**8**	106	150(250) [2]	1120	119	106	150(250) [2]	1250	121	108	30	900	102
AM... 160L ZA	**8**	139	150(250) [2]	1000	140	139	150(250) [2]	1120	142	141	30	850	123

1) Max. Number of no-load starts/hour with cyclic duration factor 50%

2) On request

For maximum friction work per stop consult us

High efficiency brake motors, IE2 code
Efficiency testing method IEC 60034-2-1;2007

Tipo		P_N kW	HP	n_N min^{-1}	M_N Nm	IE2 η 50%	75%	100%	cos φ	I_N 400V	I_A/I_N	M_A/M_N	M_K/M_N
3000 min^{-1} (2 poles)													
AMHE ... 80Z AA	**2**	0.75	1	2900	2.5	77.3	78.5	80.5	0.78	1.7	7.0	3.6	3.6
AMHE ... 80Z BA	**2**	1.1	1.5	2880	3.6	79.5	81.2	81.5	0.78	2.5	6.8	3.6	3.6
AMHE ... 90S AA	**2**	1.5	2	2880	5.0	81.0	82.8	82.8	0.80	3.2	8.1	3.6	4.0
AMHE ... 90L CA	**2**	2.2	3	2860	7.3	82.5	84.0	84.0	0.85	4.4	8.5	3.5	3.7
AMHE ... 100L AA	**2**	3	4	2920	9.8	84.1	85.8	85.5	0.84	5.9	8.0	3.5	4.0
AMHE ... 100L BA	**2***	4	5.5	2920	13.1	85.2	86.4	86.1	0.86	7.8	8.2	3.3	3.8
AMHE ... 112M AA	**2**	4	5.5	2940	13.0	85.5	87.0	86.8	0.88	7.6	8.0	2.9	3.3
AMHE ... 112M BA	**2***	5.5	7.5	2920	18.0	85.8	87.4	87.3	0.88	10.4	8.0	3.0	3.2
AMHE ... 132S YA	**2**	5.5	7.5	2900	18.1	86.0	88.0	87.90	0.89	10.2	7.3	2.7	3.2
AMHE ... 132S ZA	**2**	7.5	10	2900	24.7	86.3	88.6	88.40	0.89	13.8	7.5	2.8	3.3
AMHE ... 132M RA	**2***	11	15	2920	36.0	88.1	90.0	89.70	0.90	19.8	7.5	2.8	3.4
AMHE ... 160M YA	**2**	11	15	2930	35.9	88.9	90.2	90.00	0.87	20.4	7.3	2.4	3.1
AMHE ... 160M ZA	**2**	15	20	2930	48.9	90.0	91.0	90.80	0.88	27.2	7.6	2.5	3.1
AMHE ... 160L ZA	**2**	18.5	25	2935	60.2	90.3	91.6	91.20	0.88	33.3	7.9	2.8	3.4

Tipo		P_N kW	HP	n_N min^{-1}	M_N Nm	IE2 η 50%	75%	100%	cos φ	I_N 400V	I_A/I_N	M_A/M_N	M_K/M_N
1500 min^{-1} (4 poles)													
AMHE ... 80Z AA	**4**	0.75	1	1430	5.0	79.2	80.3	80.2	0.76	1.8	5.5	2.8	3.0
AMHE ... 90S AA	**4**	1.1	1.5	1430	7.3	81.4	82.7	82.5	0.77	2.5	6.1	4.0	4.1
AMHE ... 90L BA	**4**	1.5	2	1430	10.0	82.0	83.5	83.0	0.77	3.4	6.4	3.9	4.0
AMHE ... 100L AA	**4**	2.2	3	1450	14.5	84.0	85.3	85.1	0.74	5.1	6.0	3.2	3.4
AMHE ... 100L BA	**4**	3	4	1440	19.9	85.3	86.6	86.4	0.77	6.5	6.3	3.4	3.6
AMHE ... 112M AA	**4**	4	5.5	1450	26.3	86.0	87.3	87.1	0.78	8.5	6.1	3.1	3.3
AMHE ... 132S RA	**4**	5.5	7.5	1450	36.2	87.5	88.3	88.1	0.84	10.8	7.4	3.0	3.3
AMHE ... 132M TA	**4**	7.5	10	1450	49.4	88.5	89.4	89.2	0.85	14.4	7.4	3.0	3.3
AMHE ... 160M ZA	**4**	11	15	1460	71.9	89.4	90.3	90.1	0.82	22.0	6.9	2.3	2.9
AMHE ... 160L ZA	**4**	15	20	1460	98.1	90.6	91.2	91.0	0.84	29.0	7.4	2.5	3.1

* Higher output (progressive motor)

For maximum friction work per stop consult us

		AMHEBY				AMHEBZ				AMHES			
Tipo		J 10^{-3} kgm²	$M_{b\,max}$ Nm	z_L [1] c/h	kg	J 10^{-3} kgm²	$M_{b\,max}$ Nm	z_L [1] c/h	kg	J 10^{-3} kgm²	M_b Nm	z_L [1] c/h	kg
3000 min^{-1} (2 poles)													
AMHE ... 80Z AA	**2**	1.02	7.5(15)[3]	2650	15.3	1.02	7.5(15)[3]	3000	15	1.91	7	1400	13.9
AMHE ... 80Z BA	**2**	1.28	15	2500	17.5	1.28	15	2800	17.2	2.12	7	1300	16.0
AMHE ... 90S AA	**2**	1.84	15(40)[2]	2500	22.0	1.84	15(40)[2]	2800	21.9	2.76	7	1250	19.0
AMHE ... 90L CA	**2**	2.13	15(40)[2]	2400	25.6	2.13	15(40)[2]	2700	26.1	3.06	7	1120	21.7
AMHE ... 100L AA	**2**	3.87	40(75)[2]	2060	32.2	3.87	40(75)[2]	2290	32.9	6.5	13	950	27.9
AMHE ... 100L BA	**2***	4.26	40(75)[2]	2000	34.5	4.26	40(75)[2]	2230	35.2	6.9	13	900	30.2
AMHE ... 112M AA	**2**	7.2	40(75)[2]	950	42.9	7.2	40(75)[2]	1065	44.0	9.8	13	630	36.0
AMHE ... 112M BA	**2***	8.3	40(75)[2]	900	45.8	8.3	40(75)[2]	1000	46.5	10.9	13	600	38.3
AMHE ... 132S ZA	**2**	13.1	75(150)[2]	670	61	13.1	75(150)[2]	750	62	17.0	30	480	52
AMHE ... 132S TA	**2**	16.9	75(150)[2]	550	70	16.9	75(150)[2]	610	72	20.7	30	380	62
AMHE ... 132M RA	**2***	20.6	75(150)[2]	500	77	20.6	75(150)[2]	555	78	- [3]	- [3]	- [3]	- [3]
AMHE ... 160M YA	**2**	46.1	150(250)[2]	350	121	46.1	150(250)[2]	385	123	48.1	30	315	87
AMHE ... 160M ZA	**2**	59	150(250)[2]	335	135	59	150(250)[2]	370	137	62	30	280	118
AMHE ... 160L ZA	**2**	59	150(250)[2]	335	135	59	150(250)[2]	370	137	62	30	280	118

		AMHEBY				AMHEBZ				AMHES			
Type		J 10^{-3} kgm²	$M_{b\,max}$ Nm	z_L [1] c/h	kg	J 10^{-3} kgm²	$M_{b\,max}$ Nm	z_L [1] c/h	kg	J 10^{-3} kgm²	M_b Nm	z_L [1] c/h	kg
1500 min^{-1} (4 poles)													
AMHE ... 80Z AA	**4**	2.63	7.5(15)[2]	5800	15.7	2.63	7.5(15)[2]	5800	15.7	3.50	7	3500	14.3
AMHE ... 90S AA	**4**	3.50	15(40)[2]	4650	20.5	3.50	15(40)[2]	5250	20.4	4.43	7	3250	17.5
AMHE ... 90L BA	**4**	3.98	40	4150	24.8	3.98	40	4700	25.5	4.71	7	3000	20.0
AMHE ... 100L AA	**4**	6.08	40(75)[2]	4250	31.1	6.08	40(75)[2]	4800	31.8	8.7	13	2350	26.8
AMHE ... 100L BA	**4**	7.24	40(75)[2]	4050	33.6	7.24	40(75)[2]	4550	34.3	9.3	13	2000	29.3
AMHE ... 112M AA	**4**	13.0	75	2370	44.7	13.0	75	2650	46.1	15.1	13	1410	36.5
AMHE ... 132S RA	**4**	28.7	75(150)[2]	1800	69	28.7	75(150)[2]	2000	70	32.6	30	1000	60
AMHE ... 132M TA	**4**	33.4	75(150)[2]	1500	87	33.4	75(150)[2]	1690	89	35.9	30	800	74
AMHE ... 160M ZA	**4**	90	150(250)[2]	600	133	90	150(250)[2]	675	136	92	30	500	117
AMHE ... 160L ZA	**4**	102	150(250)[2]	585	143	102	150(250)[2]	655	145	105	30	480	126

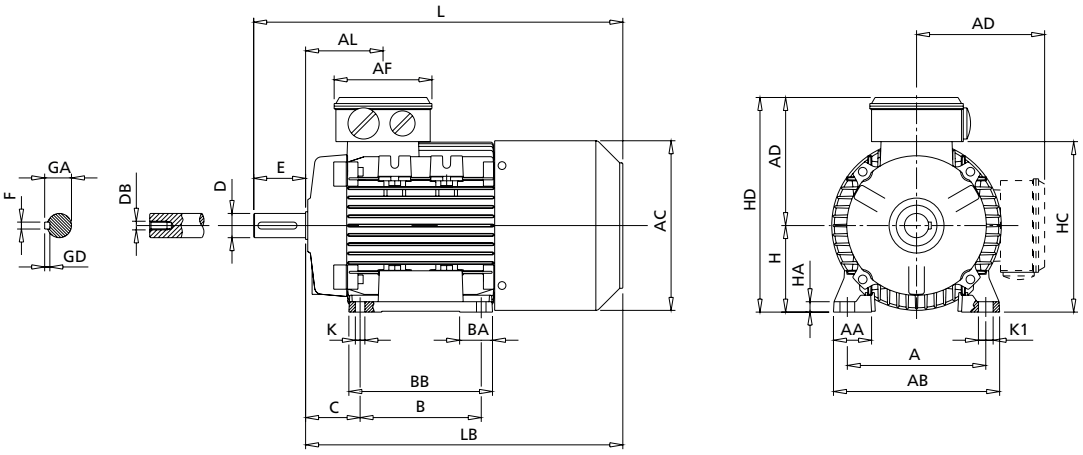
* Higher output (progressive motor)

1) Max. Number of no-load starts/hour with cyclic duration factor 50%

2) On request

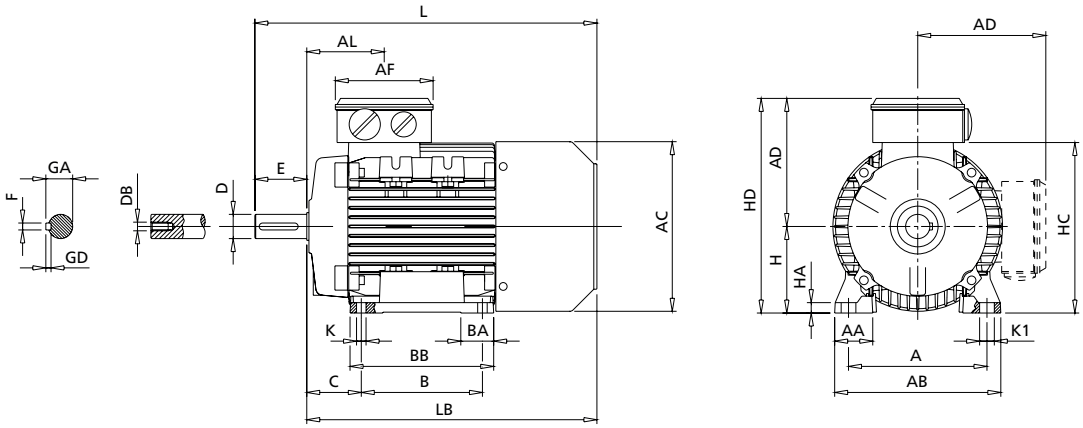
For maximum friction work per stop consult us

BRAKE MOTORS AMBY-AMBZ - FRAME SIZE 63-160 IM B3



IEC DIN	H h	A b	B a	C w_1	K[1] s	AB f	BB e	AD[2] g^4	HD[2] m_1	AC g	HC	HA c	K1	L k	LB	AL	AF	BA m	AA n	D d	E l	F u	GD	GA t	DB[3] d^6
63	63	100	80	40	7	120	100	97	160	124	120	8	11	267	244	63.5	93	28	30	11	23	4	4	12.5	M4
71	71	112	90	45	7	135	109	110	181	138	142	8	11	300	270	69	93	28	31	14	30	5	5	16	M5
80	80	125	100	50	10	153	125	129	209	157	162	9.5	14	350	310	79	116	28.5	34.5	19	40	6	6	21.5	M6
90S	90	140	100	56	10	170	150	138	228	177	181	11	15	403	353	85	116	28/53	37	24	50	8	7	27	M8
90L	90	140	125	56	10	170	150	138	228	177	181	11	15	403	353	85	116	28/53	37	24	50	8	7	27	M8
100L	100	160	140	63	11	192	166	145	245	192	198	12	17	465	405	91	116	38	44	28	60	8	7	31	M10
112M	112	190	140	70	12.5	220	175	161	273	222	226	15	19	487	427	91.5	116	46	48	28	60	8	7	31	M10
132S	132	216	140	89	12	256	180	195	327	257	261	17	20	591	511	100	133	45	59	38	80	10	8	41	M12
132M	132	216	178	89	12	256	218	195	327	257	261	17	20	611	531	120	133	45	59	38	80	10	8	41	M12
160M	160	254	210	108	14	320	270	238	398	317	316	23	18	721	611	146	150	65	76	42	110	12	8	45	M16
160L	160	254	254	108	14	320	310	238	398	317	316	23	18	763	653	168	150	65	76	42	110	12	8	45	M16
160L[4]	160	254	254	108	14	320	310	238	398	317	316	23	18	790	680	168	150	65	76	42	110	12	8	45	M16

1) Clearance hole for screw
2) Maximum dimension
3) Centering holes in shaft extensions to DIN 332 part 2
4) Only for LR A4

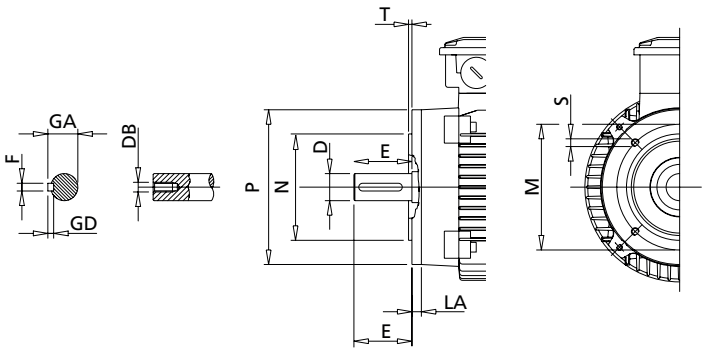


IEC DIN	H h	A b	B a	C w_1	K[1] s	AB f	BB e	AD[2] g^4	HD[2] m_1	AC g	HC	HA c	K1	L k	LB	AL	AF	BA m	AA n	D d	E l	F u	GD	GA t	DB[3] d^6
63	63	100	80	40	7	119	100	98	161	124	121	8	11	226	203	63	93	29	30	11	23	4	4	12.5	M4
71	71	112	90	45	8	135	109	111	182	138	142	8.5	11	255	225	69	93	28	31	14	30	5	5	16	M5
80	80	125	100	50	10	153	125	129	209	157	162	9.5	14	294	254	79	116	28.5	34.5	19	40	6	6	21.5	M6
90S	90	140	100	56	10	170	150	138	228	177	181	11	15	340	290	85	116	28/53	37	24	50	8	7	27	M8
90L	90	140	125	56	10	170	150	138	228	177	181	11	15	340	290	85	116	28/53	37	24	50	8	7	27	M8
100L	100	160	140	63	11	192	166	145	245	192	198	12	17	379	319	91	116	38	44	28	60	8	7	31	M10
112M	112	190	140	70	12.5	220	175	161	273	222	226	15	19	396	336	91.5	116	46	48	28	60	8	7	31	M10
132S	132	216	140	89	12	256	180	195	327	248	261	17	20	480	400	100	133	45	59	38	80	10	8	41	M12
132M	132	216	178	89	12	256	218	195	327	248	261	17	20	500	420	120	133	45	59	38	80	10	8	41	M12
160M	160	254	210	108	14	320	270	238	398	317	316	23	18	617	507	146	150	65	76	42	110	12	8	45	M16
160L	160	254	254	108	14	320	310	238	398	317	316	23	18	661	551	168	150	65	76	42	110	12	8	45	M16

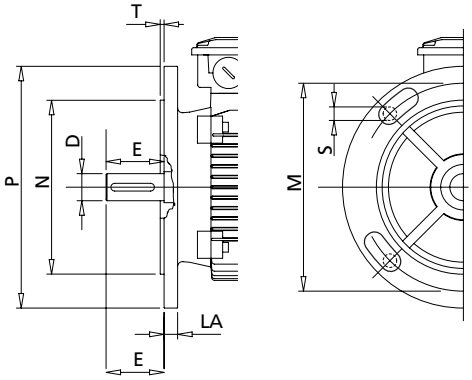
1) Clearance hole for screw
2) Maximum dimension
3) Centering holes in shaft extensions to DIN 332 part 2

BRAKE MOTORS AMBY-AMBZ-AMS - FRAME SIZE 63-160 IM B5-IM B14

IM B14

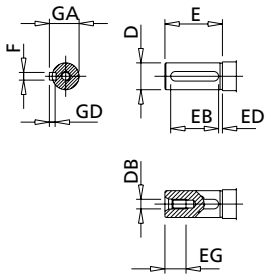


IM B5



	Small flange B14						Large flange B14						Flange B5					
IEC DIN	P a_1	N b_1	LA c_1	M e_1	T f_1	S s_1	P a_1	N b_1	LA c_1	M e_1	T f_1	S s_1	M e_1	N b_1	P a_1	T f_1	LA c_1	S[1] s_1
63	90	60	9	75	2.5	M5	120	80	8	100	2.5	M6	115	95	140	3	9	M8
71	105	70	11	85	2.5	M6	140	95	8	115	2.5	M8	130	110	160	3.5	10	M8
80	120	80	8	100	3	M6	160	110	8.5	130	3.5	M8	165	130	200	3.5	10	M10
90S-L	140	95	10	115	3	M8	160	110	9	130	3.5	M8	165	130	200	3.5	12	M10
100L	160	110	10	130	3.5	M8	200	130	12	165	3.5	M10	215	180	250	4	14	M12
112M	160	110	10	130	3.5	M8	200	130	12	165	3.5	M10	215	180	250	4	14	M12
132S-M	200	130	30	165	3.5	M10	250	180	12	215	4	M12	265	230	300	4	14	M12
160M-L	250	180	12	215	4	M12	300	230	12	265	5	M16	300	250	350	5	15	M16

1) Clearence hole for screw. Hole as standard for 132 to 160 frame size



IEC DIN	D d	E l	F h9 u	GD	GA t	DB[1] d_6	EG	EB	ED
63	11 j6	23	4	4	12.5	M4	10	15	4
71	14 j6	30	5	5	16	M5	12.5	20	4
80	19 j6	40	6	6	21.5	M6	16	30	4
90S-L	24 j6	50	8	7	27	M8	19	40	4
100L	28 j6	60	8	7	31	M10	22	50	4
112M	28 j6	60	8	7	31	M10	22	50	4
132S-M	38 k6	80	10	8	41	M12	28	70	4
160M-L	42 k6	110	12	8	45	M16	36	100	4

1) Centering holes in shaft extension to DIN 332 part 2

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Branches & Partners

Lafert GmbH
Bahnhofstraße 31
D - 73728 Esslingen - Germany
Phone +49 / (0) 711 540 3095 + 7
Fax +49 / (0) 711 540 3098
lafert.germany@lafert.com

Lafert Moteurs S.A.S.
L'Isle d'Abeau Parc de Chesnes
75, rue de Malacombe
F - 38070 St. Quentin-Fallavier
France
Phone +33 / 474 95 41 01
Fax +33 / 474 94 52 28
info.lafertmoteurs@lafert.com

Lafert N.A. (North America)
5620 Kennedy Road - Mississauga
Ontario L4Z 2A9 - Canada
Phone +1 / 800/661 6413 - 905/629 1939
Fax +1 / 905/629 2852
sales@lafertna.com

Lafert Singapore Pte Ltd
48 Hillview Terrace #03-08
Hillview Building - Singapore 669269
Phone +65 / 67630400 - 67620400
Fax +65 / 67630600
info@lafert.com.sg

Lafert Electric Motors Ltd.
Electra House - Electra Way
Crewe, Cheshire CW1 6GL
United Kingdom
Phone +44 / (0) 1270 270 022
Fax +44 / (0) 1270 270 023
lafertuk@lafert.com

Lafert Motores Eléctricos, S.L.
Polígono Pignatelli, Nave 27
E - 50410 Cuarte de Huerva
(Zaragoza) - Spain
Phone +34 / 976 503 822
Fax +34 / 976 504 199
info@lafertmotoreselectricos.com

Lafert Electric Motors (Australia)
Unit 3 - 891 Princes Highway
AUS - Springvale VIC 3171 - Australia
Phone +61 / (03) 9546 7515
Fax +61 / (03) 9547 9396
lafert@bigpond.com

Lafert S.p.A.
Via J.F. Kennedy, 43
I - 30027 San Donà di Piave
Venezia - Italy
Phone +39 / 0421 229 611
Fax +39 / 0421 222 908
info.lafert@lafert.com

www.lafert.com

LAFERTGROUP