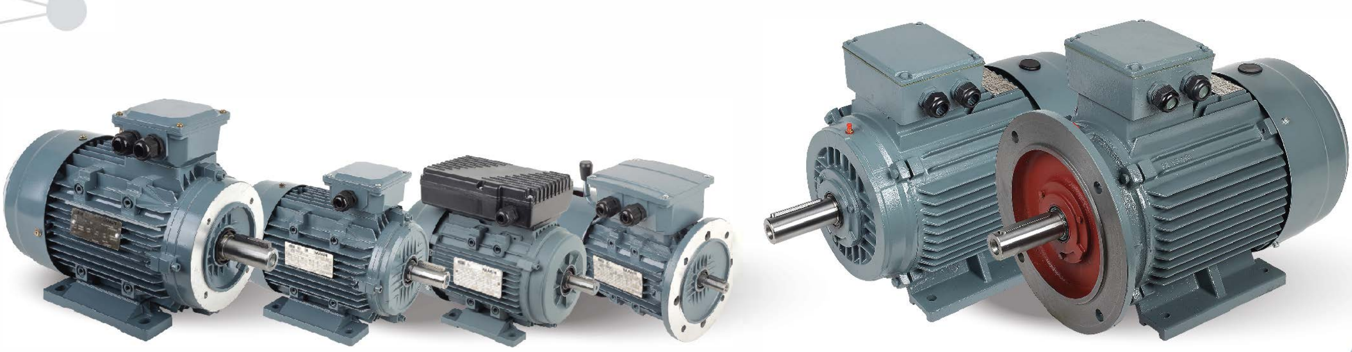
TECHNICAL CATALOG

EDITION 11/2021

VANICH GROUP
Industrial Product Company

FIMM®

LOW VOLTAGE
GENERAL PERFORMANCE **MOTORS**



IE2-IE3

Three phase asynchronous

FMA and FM Series Motors

SINGLE PHASE

Single phase asynchronous

FMS Series Motors

BRAKE MOTOR

Three phase asynchronous

FMB Series Motors

Table of CONTENTS

INTRODUCTION

FIMM motors are suitable for driving various kinds of machines or equipments. The output ratings are from 0.18 kW to 500 kW. The frame sizes are from 63 to 400.

The FM Series have cast iron stator frames, endshields and terminal boxes. The feet integrally cast into the stator frame.

The location of the terminal box in standard design is on the top, on the right or on the left are possible. The position of the entry opening can be adjusted to suit the existing connection facilities by turning through 90°.

All motors comply with the requirements of European CE marking.

All motors are designed for high efficiency and low temperature giving a long economical service life.

FMA Series motors from frame size 63 to 112 with aluminium stator frames, terminal boxes and cast iron endshields are also available.

ISET S.r.l. Unipersonale

Sede Legale e Uffici — Cap. soc. i.v. € 10.200,00
Via Donatori di sangue, 9 - 46024 Moglia (MN) — Cod. Fisc. e PIVA Reg. Imprese 02 332 750 369
Tel. e fax +39 (0)376 598963 — REA 02 332 750 369
www.iset-italia.eu iset@iset-italia.com — Cap. soc. i.v. MN 0221098

ISTITUTO SERVIZI EUROPEI TECNOLOGICI

CERTIFICATE

Certificat – Certificado– Сертификат – Zertifikat

1) APPLICANT: (who finally puts the product on the market)
VANICH RUNG RUENG INTERTRADE CO., LTD
No.32, Rama II Rd, Thakham, Bangkhuntien, Bangkok, Thailand

2) CERTIFICATE NO.: ISETC.002320200507
FILE REFERENCE: SCC(20)50011-10-23-EMC, SCC(20)50011-10-23-LVD

3) ISET MARK:

4) CAUTION ABOUT CE MARKING (Instruction for the Applicant who puts the product on the EU market):
The label of the CE Marking on the left side should be not less than 5mm height. CE Marking and EC Declaration of Conformity are duties for the manufacturer or its applicant who puts the product on the market. This one is responsible to start the CE marking and certification procedure as required by the legislation in force. Only for the products which are compulsorily included into specific Directives or Regulations will be necessary to appoint a Notified Body.

5) TYPE OF PRODUCT: Three-phase induction motor
MODEL(S): See the following annex I

6) LIST OF DIRECTIVES / REGULATIONS /STANDARDS (as declared by the manufacturer itself)
Low Voltage Directive 2014/35/EU, Electromagnetic Compatibility 2014/30/EU
EN 55014-1:2017, EN 55014- 2:2015, EN 61000-3-2:2019, EN 61000-3-3:2013+A1:2019,
EN 60034-1:2012+A11:2014+A12:2017+A13:2017+AC:2014

7) NOTE: The applicant is aware about the contents and information included in the ModCOM04.06 Regulation for this type of Certificate that is considered totally accepted. The latest revision of the Regulation is available and can be downloaded from the website www.iset-italia.eu. This document is not referred to any evaluation that could be considered as included in the scope of the activities covered by the standard BS EN ISO/IEC 17065:2012 or European Regulation 765/2008.

8) REMARK: Certificate is issued on voluntary application from the Client and it gives to the applicant the right to use and affix the ISET Mark (at point 3) on their products, even if it doesn't imply any assessment on the safety and compliance of the product. ISET declares that the only scope of the assessment is to verify the existence of the declaration issued by the manufacturer or an applicant under its own responsibilities.

9) DATE OF ISSUE: 07/05/2020 EXPIRY DATE: 06/05/2025

10) SIGNATURE: Xiao Ming
(On behalf of the Legal representative)

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General Specification

Cooling and ventilation

The standard cooling method is Totally Enclosed Fan-Cooled (TEFC) in accordance with code IC411 of I EC 60034-6. Standard motors in sizes 63-355 are equipped with radial-flow plastic fans.

Enclosure

The standard degree of protection is IP55. The IP55 enclosure means complete hoseproof and dustproof protection. A higher degree of protection is available.

Voltage and frequency

Standard voltage is 400V/50Hz but can be manufactured for any single voltage in the range 200-600V at a frequency 50 or 60 Hz. The motors will operate satisfactorily with voltage variations of ±10% from the rated voltage.

Connection

Direct on line starting can be used on all frame sizes. Motors up to and including 3kW are star connected and cannot be started with Star/Delt started. Motors 4kW and above can be started with Star/Delta started.

Noise

The permitted noise levels of electrical machines are fixed in IEC60034 - 9 (EN60034-9). The noise level of FIMM motors is well below these limit value. For details, please refer to the performance data tables.

Vibration

Standard motors are designed for vibration class N (normal). Vibration class R (reduced) and vibration class S (special) are available on request.

Quality assurance

Stringent quality procedures are observed from first design to finished products in accordance with IS09001 documented quality systems. Our factories have been assessed to meet these requirements, a further assurance that only the highest possible standards of quality are accepted.

Against solar radiation

High solar radiation will result in undue temperature rise. In these circumstances, motors should be screened from solar radiation by placement of adequate sunshades which do not inhibit air flow.

Degree of protection

Standard levels of enclosure protection for all frame sizes for both motor and the terminal box is IP55, with IP56, IP65 and IP66 available on request. Enclosure designations comply with IEC60529 or AS60529. The enclosure protection required will depend upon the environmental and operational conditions within which the motor is to operate.

IP standards explanation

IP	5	5
	1	2

International protection rating prefix (IEC 60034 - 5)

First numeral

First characteristic numeral
Degree of protection of persons against approach to live parts or contact with live or moving parts (other than smooth rotating shafts and the like) inside the enclosure, and degree of protection of equipment within the enclosure against the ingress of solid foreign bodies.

4. Protected against solid object greater than 1.0 mm: Wires or strips of thickness greater than 1.0 mm, solid objects exceeding 1.0 mm.
5. Dust protected: Ingress of dust is not totally prevented but it does not enter in sufficient quantity to interfere with satisfactory operation of the equipment.
6. Dust tight: No ingress of dust.

Second numeral

Second characteristic numeral

4. Protected against splashing water: Water splashed against the enclosure from any direction shall have no harmful effect.
5. Protected against water jets: Water projected by a nozzle against the enclosure from any direction shall have no harmful effect.
6. Protected against heavy seas: Water from heavy seas or water projected in powerful jets (larger nozzle and higher pressure than second numeral 5) shall not enter the enclosure in harmful quantities.

Shaft

FIMM motors have standard shaft extension lengths which provided with standard key, drilled and tapped hole. Non standard shaft extensions are available upon special order, with shaft design outlined on a detailed drawing. Shaft extension run out, concentricity and perpendicularity to face of standard flange mount motors, comply with normal grade tolerance as specified in IEC 60072-1 and AS1359. Precision grade tolerance is available upon special order.

Finish

Standard FIMM motor color is RAL 7031. Other colors are also available. All castings and steel parts are provided with a prime coat of rust-resistant paint. The finishing coat of enamel paint is sufficient for normal conditions, however special paint systems can be provided to accommodate stringent requirements for motors in corrosive environments. Special coatings are needed to resist such substances as acid, salt water and extreme climatic conditions.

Electrical design

As standard, FIMM motors have the following design and operating parameters. Performance data is based on this standard. Any deviation should be examined and performance values altered in accordance with the information provided in this section.

Three phase, 380-415V/50Hz, 440-480V/60Hz
Ambient cooling air temperature, 40°C
Altitude 1000m
Duty cycle S1 (continuous)
Rotation Clockwise / Counter Clockwise
Connection 230 volt Delta/400 volt Star (3kW and below)
400 volt Delta/690 volt Star (4kW and above)

GENERAL SPECIFICATION

Standards and regulations

FIMM motors are built to comply with the requirements of the following international standards and regulation:

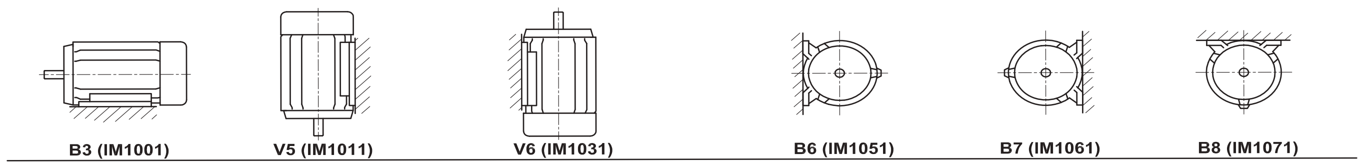
1. International Electrotechnical Commission - IEC 60034 and IEC 60072.
2. The requirements of European CE marking. Low voltage Directive 73/23 (1973), modified by Directive 93/68 (1993) and the EMC -Directive 89/336. These FIMM motors are designed to use with other machinery, and they should only be used if the complete machinery is in conformity with the provisions of the Directive of safety of machinery (89/93/EEC).
3. CEMEP agreement - All motors with standard rating include in this catalog comply with efficiency class IE2 & IE3 and bear the corresponding label on the rating plate.

Standards	IEC
General requirements for electrical machines	60034-1
Methods of determining losses and efficiency	60034-2
Degrees of protection	60034-5
Methods of cooling	60034-6
Mounting arrangements	60034-7
Terminal markings and direction of rotation	60034-8
Noise limits	60034-9
Starting performance	60034-12
Mechanical vibration	60034-14
Standard voltages	60038
Dimensions and output ratings	60072
Mounting dimensions and relationship framesizes-output ratings	60072
Shaft dimensions	60072
Classification of environmental conditions	600721-2-1
Insulation material	60085

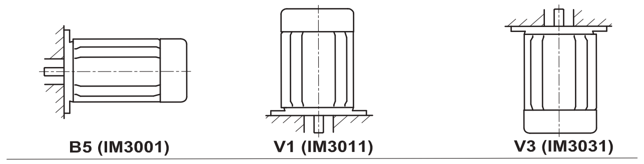
*The FIMM motor range corresponds to the new international standard IEC 60034-30

Standards mounting arrangements

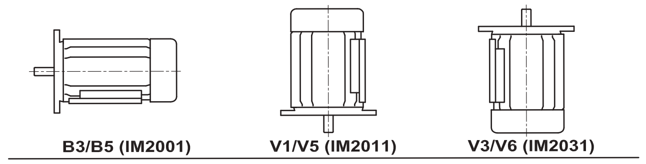
Foot mounting



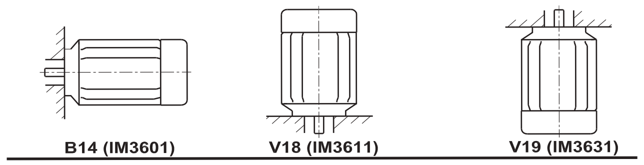
Large flange



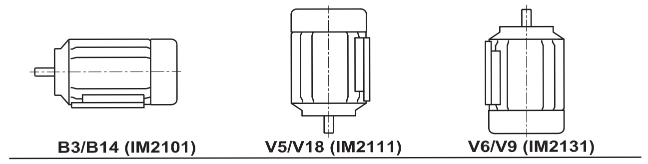
Large flange and feet



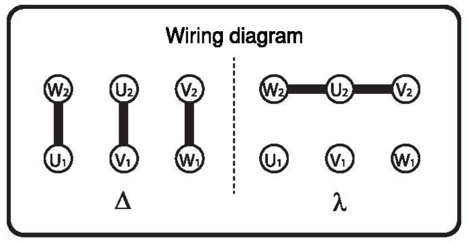
Small flange (face)

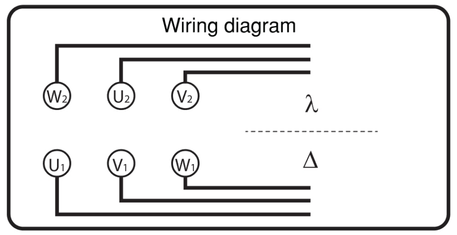


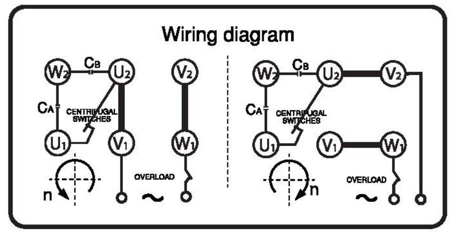
Small flange (face) and feet



Connection diagram three phase & single phase motor







DELTA CONNECTION

STAR CONNECTION

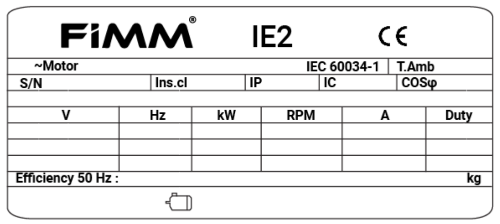
STAR-DELTA CONNECTION

COUNTER CLOCKWISE

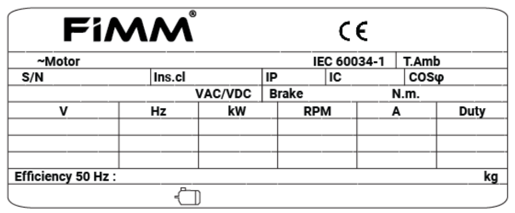
CLOCKWISE

Rating plates

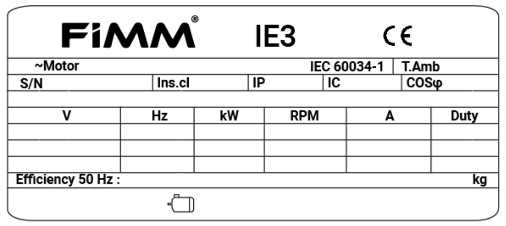
IE 2 Name Plate for 3 Phase



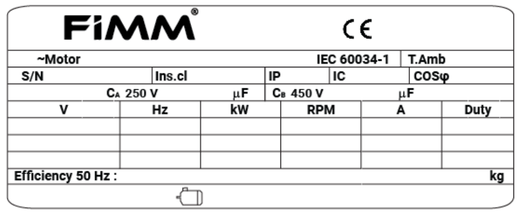
Brake Motor for 3 Phase



IE 3 Name Plate for 3 Phase



Single Phase



Description of Coding

FiMM®		(21)	CE		
(1) ~Motor	(2)		IEC 60034-1	T.Amb (15)	
S/N (3)	Ins.cl (6)	IP (4)	IC (17)	COSφ (5)	
(8)	VAC/VDC	Brake (9)	N.m.		
V	Hz	kW	RPM	A	Duty
(10)	(11)	(12)	(13)	(14)	(7)
Efficiency 50 Hz : (16)					(20) kg
(18)	(19)				

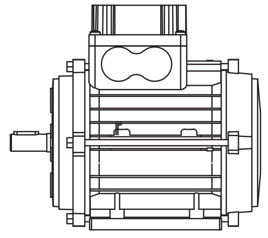
FiMM®			CE		
~Motor			IEC 60034-1	T.Amb	
S/N	Ins.cl	IP	IC	COSφ	
(22)	C_A 250 V µF	C_B 450 V µF	(23)		
V	Hz	kW	RPM	A	Duty
Efficiency 50 Hz :					kg

Electric Motor Identification

1. Phase
2. Motor Type Code
3. Serial No.
4. Degree of Protection
5. Power Factor
6. Insulation Class
7. Duty
8. Brake Power Supply
9. Braking Torque (N.m.)
10. Motor Voltage (Depending on Connection)
11. Power Frequency (Hz.)
12. Output Power (kW)
13. Output Speed (RPM)
14. Rated Current (Depending on Connection)
15. Maximum Ambient Operating Temp. (°C)
16. Efficiency
17. Cooling System
18. Bearing No. (DE)
19. Bearing No. (NDE)
20. Weight (Kg)
21. Efficiency Classification
22. Capacitor Start
23. Capacitor Run

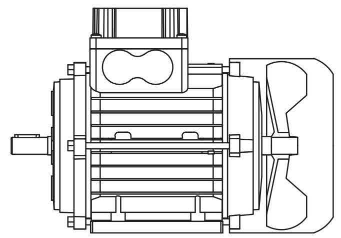
COOLING SYSTEMS

IC410



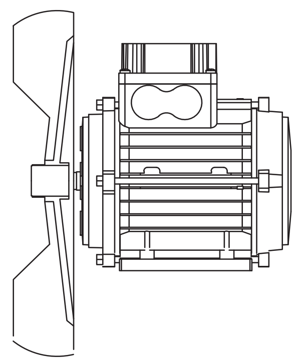
Standard construction electric motors are closed and self-ventilated with a fan mounted to the motor shaft which operates in both direction of rotation.

IC411



This cooling system, per IEC 60034-6, is designated IC411.
Standard construction electric motors are constructed so that with IC411 cooling, duty is S1, this duty is guaranteed if the fan cover intake grille is not blocked by dirt deposited during operation or due to the installation itself (for example, inside the frame of a machine) such situations of poor ventilation must be carefully analysed to avoid compromising the motor's performance.

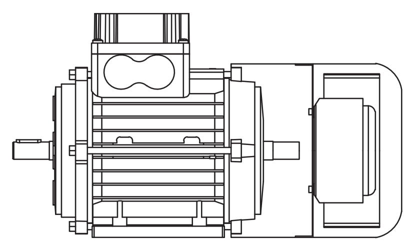
IC418



If the cooling system is IC418 (e.g. motor driving a fan and cooled by the resulting current of air), standard motors can be used in non-ventilated construction and S1 duty; naturally the speed and flow of air must be at least equivalent to that of the IC411 system.
In case of total lack of external surface ventilation (IC410) standard motors may be used only for limited duration or very periodic duty. In such conditions the standard duty is S2 10 min or S3 10%.

On request, motors can be provided without ventilation for S1 duty; the power, for a given motor size, is reduced to around 1/3 of the power available in S1 duty for IC411 motors. Contact our technical service for further information.

IC416



Forced ventilation

In the case of applications of the variable speed motor, it may be necessary to resort to forced ventilation (cooling method IC416), obtained by means of an axial flow servo-fan whose air flow rate is independent of the speed of rotation of the drive shaft.
The supply, independent from the electric motor, is given by means of a connector applied directly on fan cover (single-phase 230V 50-60Hz and three-phase 400V 50-60Hz.
On request, we can analyse different solution, or for special power voltages.

Electrical Design

Voltage and frequency

Standard FIMM motors are designed for a power supply of three phase 400V, 50Hz. Motors can be manufactured for any supply between 100V and 1100V and frequencies other than 50Hz. Standard FIMM motors wound for a certain voltage at 50Hz can also operate at other voltages at 50Hz and 60Hz without modification, subject to the changes in their data.

Motor wound for 50Hz at rated voltage	Connected to	Data in percentage of values at 50Hz and rated voltage						
		Output	r/min	I_N	I_L/I_N	T_N	T_L/T_N	T_B/T_N
380V	400V 50Hz	100	100	95	110	100	110	110
	380V 60Hz	100	120	98	83	83	70	85
	400V 60Hz	105	120	98	90	87	80	90
	415V 60Hz	110	120	98	95	91	85	93
	440V 60Hz	115	120	100	100	96	95	98
	460V 60Hz	120	120	100	105	100	100	103
400V	380V 50Hz	100	100	105	91	100	90	90
	415V 50Hz	100	100	96	108	100	108	108
	400V 60Hz	100	120	98	83	83	70	85
	415V 60Hz	104	120	98	89	86	75	88
	440V 60Hz	110	120	98	95	91	85	93
	460V 60Hz	115	120	100	100	96	93	98
	480V 60Hz	120	120	100	105	100	100	103
415V	380V 50Hz*	100	100	109	84	100	84	84
	400V 50Hz	100	100	104	93	100	93	93
	440V 50Hz	100	100	94	112	100	112	112
	415V 60Hz	100	120	98	83	83	70	85
	440V 60Hz	105	120	98	90	87	80	90
	460V 60Hz	110	120	98	95	91	85	94
	480V 60Hz	115	120	100	100	96	95	98
525V	550V 50Hz	100	100	95	110	100	110	110
	525V 60Hz	100	120	98	83	83	70	85
	550V 60Hz	105	120	98	90	87	80	90
	575V 60Hz	110	120	98	95	91	85	94
	600V 60Hz	115	120	100	100	96	95	98

* Not applicable for motors with F class temperature rise.

1) I_N = Full load current T_N = Full load torque
I_L/I_N = Locked rotor current/ full load current
T_L/T_N = Locked rotor torque/ full load torque
T_B/T_N = Breakdown torque/full load torque

Standard torque values for alternative supplies are obtainable only with special windings. For these purpose-built motors the performance data is the same as for 400V motors except for the currents which are calculated with the accompanying formula:

Where:

$$I_x = \frac{400 \times I_N}{U_x}$$

I_x = Current
I_N = Full load current at 400 volt
U_x = Design voltage

Temperature and altitude

Rated power specified in the performance data tables apply for standard ambient conditions of 40°C at 1000m above sea level. Where temperature or altitude differ from the standard, multiplication factors in the table below should be used.

Ambient temperature	Temperature factor
30°C	1.06
35°C	1.03
40°C	1.00
45°C	0.97
50°C	0.93
55°C	0.88
60°C	0.82

Altitude above sea level	Altitude factor
1000m	1.00
1500m	0.98
2000m	0.94
2500m	0.91
3000m	0.87
3500m	0.82
4000m	0.77

$$\text{Effective Power} = \text{Rated Power} \times \text{Temperature Factor} \times \text{Altitude Factor}$$

Example 1:

Effective Power required = 15 kW

Air temperature =50°C (factor 0.93)

Altitude = 2500 metres (factor 0.91)

$$\text{Rated power required} = \frac{15}{0.93 \times 0{,}91} = 17.7\text{kW}$$

The appropriate motor is one with a rated power above the required, being 18.5 kW.

Example 2:

Rated power = 11 kW

Air temperature = 50°C (factor 0.93) Altitude

= 1500 metres (factor 0.98) Effective Power

= 11 x 0.93 x 0.98 = 10.0 kW

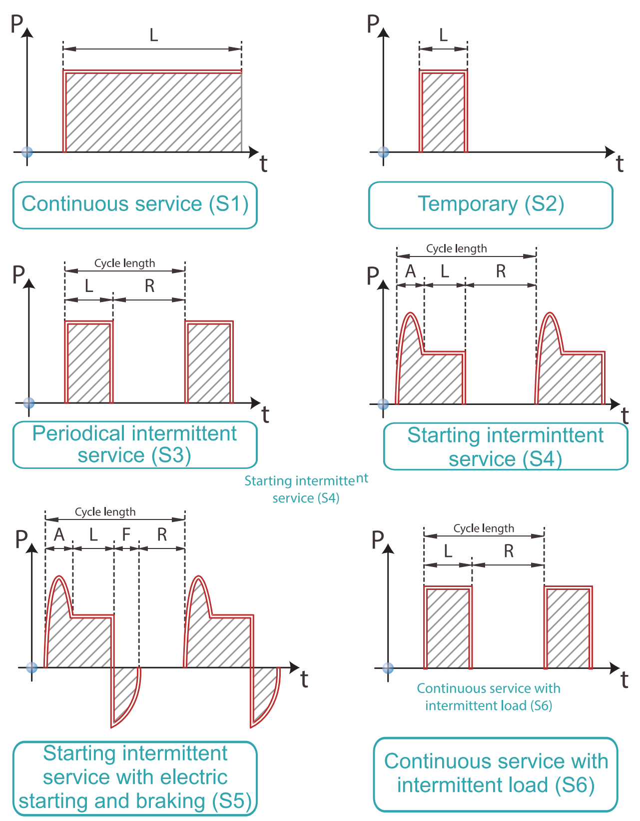
Rotation

For clockwise rotation, viewed from drive end, standard three phase FIMM motor terminal markings coincide with the sequence of the phase line conductors. For counter clockwise rotation, viewed from drive end, two of the line conductors have to be reversed. This is made clear in the table of connection diagrams three phase motors with cage rotor (page 9).

Duty

FIMM motors are supplied suitable for S1 operation (continuous operation under rated load). When the motor is operated under any other type of duty the following information should be supplied to determine the correct motor size:

- Type and frequency of switching cycles as per duty factors S3 to S7 and duty cycle factor.
- Load torque variation during motor acceleration and braking (in graphical form).
- Moment of inertia of the bad on the motor shaft.
- Type of braking (eg mechanical electrical through phase reversal or DC injection)



Explanation

D = Cycle length

L = Load time R= Resting time

A = Starting time F = Braking time

Intermittent ratio calculation in percentage

S3 = L/(D)*100 S4 = (A+L)/(D)*100

S5 = (A+L+F)/D*100 S6 = L/(D)*100

Permissible output

Apply the factors of the expanding table to the output rating for motors with duty cycles that are not continuous. For other duties (S4, S5, S8 and S7) contact us for appropriate duty cycle factors.

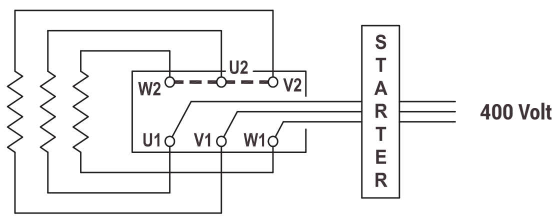
	Poles	Duty cycle factor		
		For frames 80 to 132	For frames 160 to 250	For frames 280 to 355
Short-time duty, S2				
30 min	2	1.05	1.20	1.20
	4 to 8	1.10	1.20	1.20
60 min	2 to 8	1.00	1.10	1.10
Intermittent duty, S3				
15%	2	1.15	1.45	1.40
	4 to 8	1.40	1.40	1.40
25%	2	1.10	1.30	1.30
	4 to 8	1.30	1.25	1.30
40%	2	1.10	1.10	1.20
	4 to 8	1.20	1.08	1.20
60%	2	1.05	1.07	1.10
	4 to 8	1.10	1.05	1.10

Connection

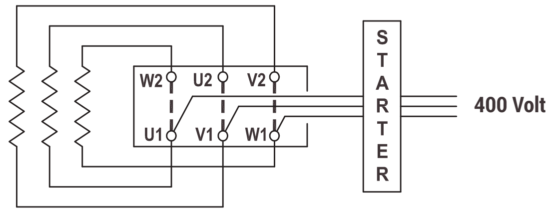
A motor's rated voltage must agree with the power supply line-to-line voltage. It is carefully to ensure the correct connection to the motor terminals.

Internal connections, voltages and VF drive selection

Standard terminal connections for motors 3kW and below is 230V delta / 400V star. These motors are designed for 400V Direct On Line (D.O.L.) starting, when connected in the star configur tion. They are also suitable for operation with 230V three phase variable frequency drives. when connected in the delta configur tion. Standard terminal connections for motors 4kW and above is 400V delta / 690V star. These motors are designed for 400V Direct On Line (D.O.L.) starting, when connected in the delta configur tion. They are also suitable for operation with 400V three phase variable frequency drives . Alternatively they can be operated D.O.L. in the star configur tion from a 690V supply or with a 690V variable frequency drive. In this case the drive must be supplied with an output reactor to protect the winding insulation. These size motors are also suitable for 400V star-delta starting as described below. Motor connected for D.O.L. starting with bridges in place for star connection (3kW and below).



Motor connected for D.O.L starting with bridges in place for delta connection (4kW and above).



Starting

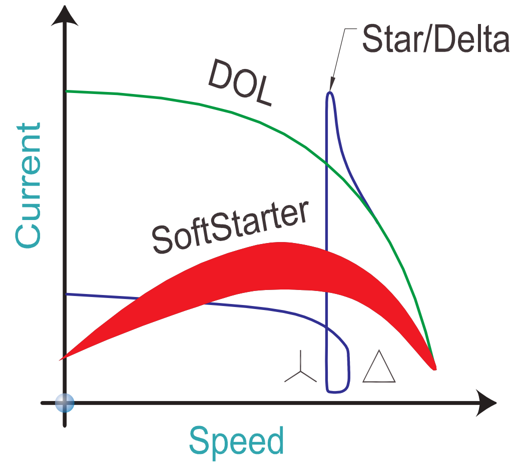
All of the following starter options are available and are the best supplied together with the motor.

D.O.L Starters

When an electric motor is started by direct connection to the power supply (D.O.L.), it draws a high current, called the starting current, which is approximately equal in magnitude to the locked rotor current I_L . As listed in the performance data, locked rotor current can be up to 8 times the rated current I_N of the motor. In circumstances where the motor starts under no load or where high starting torque is not required, it is preferable to reduce the starting current by one of the following means.

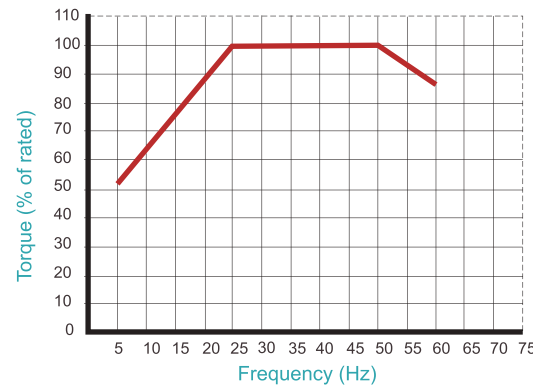
Star - Delta starting

The FIMM motors 4kW and above are suitable for the star-delta starting method. Through the use of a star-delta starter, the motor terminals are connected in the star configuration during starting, and reconnected to the delta configur tion when running. The benefits of this starting method are a significantly lower starting current, to a value about 1/3 of the D.O.L. starting current, and a corresponding starting torque also reduced to about 1/3 of its D.O.L. value. It should be noted that a second current surge occurs on change over to the delta connection. The level of this surge will depend on the speed the motor has reached at the moment of change over.



VVVF Drives

Variable Voltage Variable Frequency drives are primarily recognized for their ability to manipulate power from a constant 3 phase 50/60Hz supply converting it to variable voltage and variable frequency power. This enables the speed of the motor to be matched to its load in a flexible and energy efficient manner. The only way of producing starting torque equal to full load torque with kill load current is by using VVVF drives. The functionally flexible VVVF drive is also commonly used to reduce energy consumption on fans, pumps and compressors and offers a simple and repeatable method of changing speeds or flow rates.



EDM Concerns

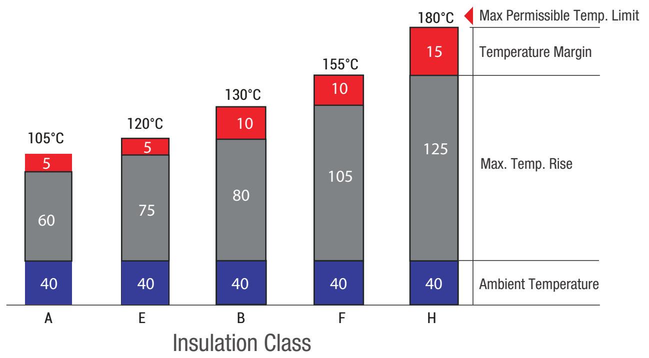
Capacitive voltages in the rotor can be generated due to an effect caused by harmonics in the waveform causing voltage discharge to earth through the beatings. This discharge results in etching of the bearing running surfaces. This effect is known as Electrical Discharge Machining (EDM). It can be control with the fitment of appropriate filters to the drive. To further reduce the of EDM, an insulated non drive bearing can be used. FIMM recommends the use of insulated bearings for all motors 315 frame and above.

Insulation

Our standard motors have insulation class F while the temperature rise is for Class B ensuring longer service life.

Upon the customer's request, H class insulation motors are manufactured.

Under specified measuring conditions in accordance with IEC 60034-1 standard, insulation class F for an electric motor means that at ambient temperature of 40°C the temperature rise of its windings may be max. 105°C with the additional temperature margin of 10°C.

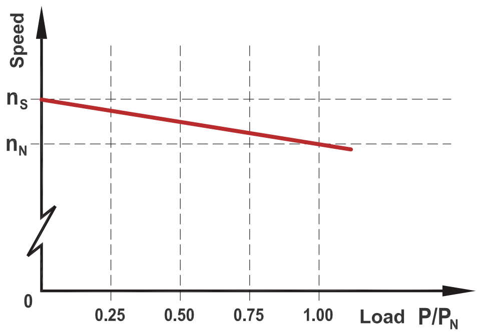


Thermal protection

Motors can be protected against excessive temperature rise by inserting, at various positions within the windings, thermal probes which can either give a warning signal or cut off the supply to the motor in the event of a temperature abnormality. The units fitted to FIMM motors, frame sizes 160 and above, are PTC thermistors. These thermovariable resistors, with positive temperature co-efficient are fitted one per phase, series connected and are terminated in a terminal strip located in the terminal box. Trip temperature is 155°C (180°C) for FIMM motor class H). Additional 130°C thermistors can be fitted as an option for alarm connection.

Speed at partial loads

The relationship between motor speed and degree of loading on an FIMM motor is approximately linear up to the rated load. This is expressed graphically in the accompanying drawing.



Where:

n_N = full load speed

n_S = asynchronous speed

P/P_N = partial load factor

Current at partial loads

Current at partial loads can be calculated using the following formula:

$$I_x = \frac{Pout_x}{\sqrt{3} \times U_N \times \cos\varphi_x \times \eta_x} \times 10^5$$

Where:

I_x = partial load current (amps)

$Pout_x$ = partial load (kW)

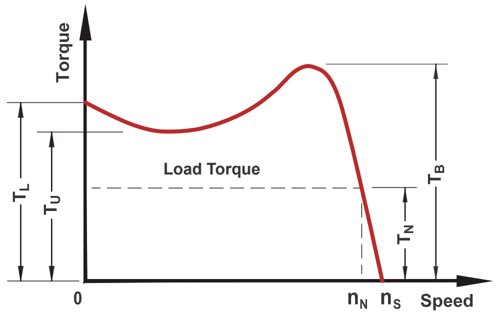
U_N = rated voltage

cos ˜ $_x$ = partial load power factor

° $_x$ = partial load efficiency (%

Torque characteristics

Typical characteristics of torque behaviour relative to speed are shown in the torque speed curve example below .



Where:

T_N = full load torque

T_L = locked rotor torque

T_U = pull-up torque

T_B = break down torque

n_N = full load speed

n_S = asynchronous speed

FIMM motors all exceed the minimum starting torque requirements for Design N (Normal torque) as specified in IEC60034-12, and in most cases meet the requirements of Design H (High torque). Rated torque can be calculated with the following formula:

$$T_N = \frac{9550 \times P_N}{n_N}$$

Where:

T_N = full load torque (Nm)

P_N = full load output power (kW)

n_N = full load speed (r/min)

Design features

Permissible radial loads on the shaft with standard bearings

The values of radial load calculated considering:
- Frequency: 50Hz.
- Temperature not exceeding 90ºC.

For operation at 60Hz, the values have to be reduced by 6% in order to achieve the same useful life.

- 30,000 hours of life for 2-pole motors;
- 60,000 hours of life for 4,6,8-pole motors.

*The distance fo the point of action of force F_R from the shoulder of ther shaft must not exceed the length of the shaft end.

Forces of belt drive on the shaft tight side when the belt tensionners is calculated by the following formula:

$$F_R = 2\sigma_0 F \sin\frac{\alpha_1}{2} z \text{ (N)}$$

Where:

σ_0 : The initial tension. (N) (trapezoid belt, flatbelt

F : The cross-sectional area of the belt (cm^2)

α_1 : Arc of contact small (belt) pulley

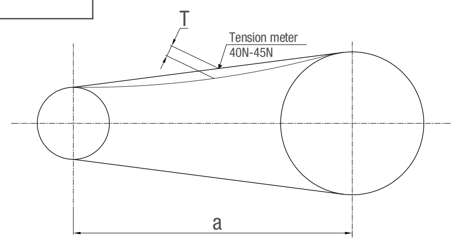
+ $\tilde{}_1 = 180^o - (d_2 - d_1)\frac{57^o}{a}$ ($\tilde{}_1 > 120^o$)
+ d_1 : Diameter of small (belt) pulley
+ d_2 : Diameter of large (belt) pulley
+ a : Center distance of 2(belt) pulley

z : Number of belt

Type of belt scales	The cross-sectional area F(cm^2)
A	0.81
B	1.38
C	2.3
D	4.76
E	6.92

Deflection Amount T (mm)

$$T = \frac{a}{64}$$



Example: there is 1 trapezoid belt drive

d_1 = 310mm
d_2 = 460mm
a = 1300mm
z = 8

The angle of the wheel hug small belt

$$\tilde{}_1 = 180^o - (d_2 - d_1)\frac{57}{a}$$

$$= 180^o - (460 - 310) \times 57/1300 = 173.4^o$$

Forces of belt drive on the shaft tight side when the belt tensioners accordance stretch panel

$$F_R = 2\circ_0 F \sin\frac{\tilde{}_1}{2} z \text{ (N)}$$

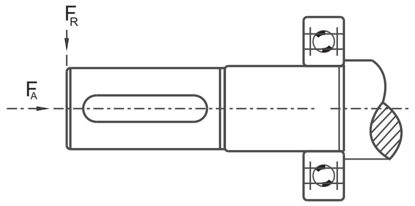
$$= 2 \times 150 \times 2.3 \times 0.998 \times 8 = 5\ 509 \text{ N}$$

Frame size	Pole number	Permissible radial load F_R [N]	
		Ball bearings	Roller bearings
63	2	365	---
	4	365	---
	6	410	---
	8	455	---
71	2	455	---
	4	450	---
	6	515	---
	8	565	---
80	2	590	---
	4	590	---
	6	670	---
	8	735	---
90	2	670	---
	4	660	---
	6	750	---
	8	830	---
100	2	1850	---
	4	915	---
	6	1045	---
	8	1150	---
112	2	1360	---
	4	1350	---
	6	1545	---
	8	1700	---
132	2	1955	---
	4	1930	---
	6	2210	---
	8	2240	---
160	2	2500	5460
	4	2480	5617
	6	2820	5722
	8	3115	5775
180	2	3275	6195
	4	3175	6720
	6	3600	7035
	8	4000	7140
200	2	4250	9240
	4	4325	9975
	6	5150	10290
	8	5275	10447
225	2	5075	11340
	4	4925	12180
	6	5575	12600
	8	6050	12810
250	2	5025	13230
	4	5475	15225
	6	5595	15750
	8	5970	15907
280	2	5000	14700
	4	5150	15225
	6	6300	15750
	8	7200	17325
315 S-M	2	5000	13650
	4	5700	26775
	6	6700	27825
	8	7600	28350
315 L	2	6200	13020
	4	6450	23625
	6	7300	26250
	8	8200	29400
355L	2	3250	---
	4	8400	---
	6	8900	---
	8	8900	---

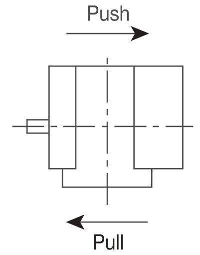
Permissible axial loads on the shaft with standard bearings

If the shaft end is loaded at X_{max} with the permissible radial load F_A, an additional axial load is allowed.

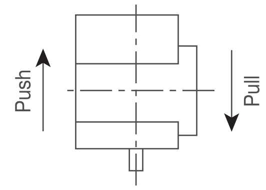
If the permissible radial load is not fully utilized, higher loads are possible in axial direction (Values on request).



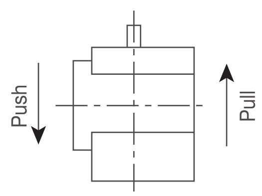
B3



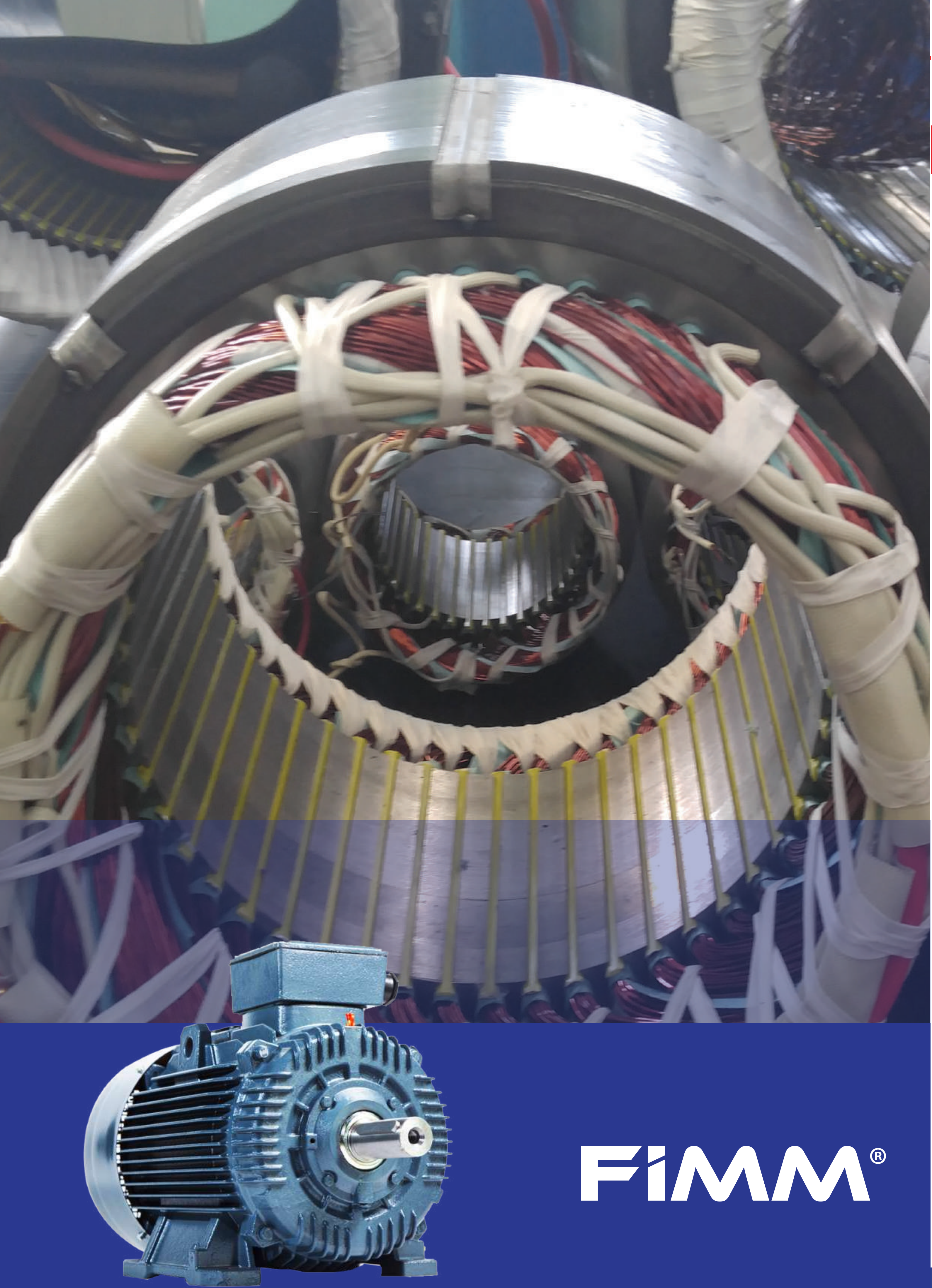
V5



V6



Frame size	Pole number	Limit axial load with F_R at X_{max} - F_A [N]			
		Ball bearings		Roller bearings	
		B3 push/pull	V5/V6 push/pull	B3 push/pull	V5/V6 push/pull
63	2	120	110	---	---
	4	120	110	---	---
	6	140	130	---	---
	8	160	150	---	---
71	2	140	130	---	---
	4	140	120	---	---
	6	170	150	---	---
	8	190	170	---	---
80	2	190	170	---	---
	4	190	160	---	---
	6	220	190	---	---
	8	250	220	---	---
90	2	200	170	---	---
	4	200	160	---	---
	6	240	190	---	---
	8	270	220	---	---
100	2	280	230	---	---
	4	280	220	---	---
	6	330	260	---	---
	8	370	300	---	---
112	2	410	330	---	---
	4	410	320	---	---
	6	480	370	---	---
	8	540	430	---	---
132	2	590	430	---	---
	4	590	380	---	---
	6	690	470	---	---
	8	780	560	---	---
160	2	750	490	1000	700
	4	750	450	1200	840
	6	880	520	1300	910
	8	1000	640	1400	980
180	2	880	950	1000	700
	4	880	1150	1250	875
	6	1030	1350	1350	945
	8	1160	1550	1550	1085
200	2	1160	1100	1100	770
	4	1160	1200	1200	840
	6	1360	1400	1400	980
	8	1520	1600	1600	1120
225	2	1300	1250	1250	875
	4	1300	1350	1350	945
	6	1520	1600	1600	1120
	8	1710	1850	1850	1295
250	2	1460	1300	1300	910
	4	1460	1400	1400	980
	6	1710	1600	1600	1120
	8	1920	1920	1900	1330
280	2	5500	3850	3700	2590
	4	5500	3850	3700	2590
	6	6500	4550	4000	2800
	8	7400	5180	4500	3150
315 S-M	2	5500	3850	3700	2590
	4	5800	4060	3500	2450
	6	6800	4760	4000	2800
	8	7650	5355	4500	3150
315 L	2	2200	1540	3850	2695
	4	2200	1540	3800	2660
	6	2500	1750	4600	3220
	8	3000	2100	5500	3850
355L	2	2000	3690	---	---
	4	6000	1880	---	---
	6	7000	300	---	---
	8	8000	300	---	---



Performance Data

Efficiency Classification (%)

Output (kW)	IE1				IE2				IE3			
	2P	4P	6P	8P	2P	4P	6P	8P	2P	4P	6P	8P
0.18	52.8	57.0	45.5	38.0	60.4	64.7	56.6	45.9	65.9	69.9	63.9	58.7
0.25	58.2	61.5	52.1	43.4	64.8	68.5	61.6	50.6	69.7	73.5	68.6	64.1
0.37	63.9	66.0	59.7	49.7	69.5	72.7	67.6	56.1	73.8	77.3	73.5	69.3
0.55	69.0	70.0	65.8	56.1	74.1	77.1	73.1	61.7	77.8	80.8	77.2	73.0
0.75	72.1	73.0	70.0	61.2	77.4	79.6	75.9	66.2	80.7	82.5	78.9	75.0
1.1	75.0	76.2	72.9	66.5	79.6	81.4	78.1	70.8	82.7	84.1	81.0	77.7
1.5	77.2	78.5	76.0	70.2	81.3	82.8	79.8	74.1	84.2	85.3	82.5	79.7
2.2	79.7	81.0	79.0	74.2	83.2	84.3	82.9	77.6	85.9	86.7	84.3	81.9
3	81.5	82.6	80.0	77.0	84.6	85.5	83.3	80.0	87.1	87.7	85.6	83.5
4	83.1	84.2	82.0	79.2	85.8	86.6	84.6	81.9	88.1	88.6	86.8	84.8
5.5	84.7	85.7	84.0	81.4	87.0	87.7	87.8	83.8	89.2	89.6	88.0	86.2
7.5	86.0	87.0	84.7	83.1	88.1	88.7	87.9	85.3	90.1	90.4	89.1	87.3
11	87.6	87.6	86.4	85.0	89.4	89.8	88.7	86.9	91.2	91.4	90.3	88.6
15	88.7	88.7	87.7	86.2	90.3	90.6	89.7	88.0	91.9	92.1	91.2	89.6
18.5	89.3	89.3	88.6	86.9	90.9	91.2	90.4	88.6	92.4	92.6	91.7	90.1
22	89.9	89.9	89.2	87.4	91.3	91.6	90.9	89.1	92.7	93.0	92.2	90.6
30	90.7	90.7	90.2	88.3	92.0	92.3	91.7	89.8	93.3	93.6	92.9	91.3
37	91.2	91.2	90.8	88.8	92.5	92.7	92.2	90.3	93.7	93.9	93.3	91.8
45	91.7	91.7	91.4	89.2	92.9	93.1	92.6	90.7	94.0	94.2	93.7	92.2
55	92.1	92.1	91.9	89.7	93.3	93.4	93.1	91.0	94.3	94.6	94.2	92.5
75	92.7	92.7	92.6	90.3	93.8	94.0	93.7	91.6	94.8	95.1	94.8	93.1
90	93.0	93.0	92.9	90.7	94.1	94.2	94.0	91.9	95.2	95.3	95.1	93.4
110	93.3	93.3	93.3	91.1	94.4	94.5	94.3	92.3	95.5	95.5	95.3	93.7
132	93.5	93.5	93.5	91.5	94.6	94.7	94.3	92.6	95.7	95.8	95.5	94.0
160	93.8	93.8	93.8	91.9	94.9	94.9	94.6	93.0	95.9	96.0	95.8	94.3
200	94.0	94.0	94.0	92.3	95.1	95.1	94.8	93.4	96.1	96.2	95.9	94.6
250	94.0	94.0	94.0	-	95.1	95.1	94.8	-	96.1	96.2	95.9	-
315	94.0	94.0	-	-	95.1	95.1	-	-	96.1	96.2	-	-

2FMA Series (Aluminium Casing)

2 Pole - 3000 rpm asynchronous speed 50Hz

IE2

Output (kW)	Frame Size	Full lock speed (rpm)	Current Full load I_N, 50Hz 380V (A)	400V (A)	415V (A)	Locked rotor I_L/I_N	Efficiency % at % full load 100	75	50	Power factor, cos φ at % full load 100	75	50	Full load T_N (Nm)	Torque Locked rotor T_L/T_N	Break down T_B/T_N	Moment of inertia J=¼GD² (kgxm²)	Noise level at 1 meter dB(A)	Net weight (kg)
0.37	71A	2745	1.0	0.95	0.91	6.1	69.5	69.5	68.1	0.81	0.78	0.71	1.3	2.2	2.3	0.0007	62	6
0.55	71B	2745	1.38	1.31	1.26	6.1	74.1	74.1	72.6	0.82	0.79	0.72	1.9	2.3	2.3	0.0008	62	6.5
0.75	80MA	2855	1.8	1.7	1.6	7.0	77.4	77.0	73.8	0.82	0.77	0.70	2.5	2.2	2.3	0.001	62	10
1.1	80MB	2870	2.5	2.4	2.3	7.3	79.6	79.5	75.1	0.83	0.78	0.71	3.7	2.2	2.3	0.002	62	11
1.5	90S	2865	3.3	3.2	3.0	7.6	81.3	81.2	77.1	0.84	0.81	0.73	5.0	2.2	2.3	0.002	67	13
2.2	90L	2870	4.7	4.5	4.3	7.6	83.2	83.1	79.9	0.85	0.81	0.74	7.4	2.2	2.3	0.003	67	14
3	100L	2875	6.2	6.0	5.6	7.8	84.6	84.5	81.0	0.87	0.82	0.76	10.0	2.2	2.3	0.005	74	24
4	112M	2910	8.0	7.6	7.3	8.3	85.8	85.6	82.2	0.88	0.82	0.78	13.1	2.2	2.3	0.008	77	28

4 Pole - 1500 rpm asynchronous speed 50Hz

IE2

Output (kW)	Frame Size	Full lock speed (rpm)	Current Full load I_N, 50Hz 380V (A)	400V (A)	415V (A)	Locked rotor I_L/I_N	Efficiency % at % full load 100	75	50	Power factor, cos φ at % full load 100	75	50	Full load T_N (Nm)	Torque Locked rotor T_L/T_N	Break down T_B/T_N	Moment of inertia J=¼GD² (kgxm²)	Noise level at 1 meter dB(A)	Net weight (kg)
0.18	63B	1315	0.58	0.55	0.53	4.4	64.7	64.7	63.4	0.73	0.71	0.64	1.3	2.1	2.2	0.0005	52	5
0.25	71A	1335	0.75	0.71	0.69	5.2	68.5	68.5	67.1	0.74	0.71	0.65	1.8	2.1	2.2	0.0007	55	6
0.37	71B	1335	1.03	0.98	0.94	5.2	72.7	72.7	71.2	0.75	0.72	0.66	2.7	2.1	2.2	0.0009	55	6.5
0.55	80MA	1400	1.45	1.37	1.32	5.2	77.1	77.1	75.6	0.75	0.72	0.66	3.8	2.3	2.3	0.0019	55	9.5
0.75	80MB	1425	1.9	1.8	1.7	6.6	79.6	79.5	76.3	0.76	0.69	0.56	5.0	2.3	2.3	0.003	56	11
1.1	90S	1420	2.7	2.6	2.5	6.8	81.4	81.4	78.6	0.77	0.70	0.60	7.4	2.3	2.3	0.004	59	12
1.5	90L	1420	3.5	3.4	3.2	7.0	82.8	82.8	79.6	0.78	0.71	0.61	10.1	2.3	2.3	0.006	59	14
2.2	100LA	1430	5.0	4.8	4.5	7.6	84.3	84.1	80.9	0.80	0.72	0.63	14.7	2.3	2.3	0.01	64	23
3	100LB	1430	6.6	6.3	6.0	7.6	85.5	85.4	82.0	0.81	0.72	0.63	20.0	2.3	2.3	0.013	64	25
4	112M	1450	8.7	8.3	7.9	7.8	86.6	86.1	83.2	0.81	0.73	0.64	26.3	2.2	2.3	0.019	65	29

6 Pole - 1000 rpm asynchronous speed 50Hz

IE2

Output (kW)	Frame Size	Full lock speed (rpm)	Current Full load I_N, 50Hz 380V (A)	400V (A)	415V (A)	Locked rotor I_L/I_N	Efficiency % at % full load 100	75	50	Power factor, cos φ at % full load 100	75	50	Full load T_N (Nm)	Torque Locked rotor T_L/T_N	Break down T_B/T_N	Moment of inertia J=¼GD² (kgxm²)	Noise level at 1 meter dB(A)	Net weight (kg)
0.37	80A	885	1.19	1.13	1.09	4.7	67.6	67.6	66.2	0.70	0.68	0.61	4	1.9	2.0	0.0017	54	9
0.55	80B	885	1.59	1.51	1.45	4.7	73.1	73.1	71.1	0.72	0.70	0.63	5.9	1.9	2.1	0.0021	54	10.5
0.75	90S	935	2.1	2.0	1.9	6.0	75.9	75.8	73.1	0.71	0.65	0.58	7.7	2.0	2.1	0.005	57	13
1.1	90L	935	3.0	2.9	2.7	6.0	78.1	77.8	75.1	0.72	0.65	0.58	11.2	2.0	2.1	0.008	57	14
1.5	100L	945	4.0	3.8	3.6	6.5	79.8	79.7	76.0	0.72	0.68	0.59	15.2	2.0	2.1	0.013	61	23
2.2	112M	965	5.7	5.4	5.2	6.6	82.9	81.8	78.3	0.72	0.68	0.60	22.8	2.0	2.1	0.02	65	28

8 Pole - 750 rpm asynchronous speed 50Hz

IE2

Output (kW)	Frame Size	Full lock speed (rpm)	Current Full load I_N, 50Hz 380V (A)	400V (A)	415V (A)	Locked rotor I_L/I_N	Efficiency % at % full load 100	75	50	Power factor, cos φ at % full load 100	75	50	Full load T_N (Nm)	Torque Locked rotor T_L/T_N	Break down T_B/T_N	Moment of inertia J=¼GD² (kgxm²)	Noise level at 1 meter dB(A)	Net weight (kg)
0.75	100LA	685	2.6	2.4	2.4	5.8	66.2	66.2	64.9	0.67	0.65	0.59	10.5	1.8	2.0	0.0093	59	20
1.1	100LB	685	3.4	3.3	3.1	5.0	70.8	70.8	69.4	0.69	0.67	0.60	15.3	1.8	2.0	0.012	59	22
1.5	112M	695	4.3	4.1	4.0	5.0	74.1	74.1	72.6	0.70	0.68	0.61	20.6	1.8	2.0	0.025	61	29

2FM Series (Cast Iron Casing)

2 Pole - 3000 rpm asynchronous speed 50Hz

IE2

Output (kW)	Frame Size	Full lock speed (rpm)	Current Full load I_N, 50Hz 380V (A)	400V (A)	415V (A)	Locked rotor I_L/I_N	Efficiency % at % full load 100	75	50	Power factor, cos φ at % full load 100	75	50	Full load T_N (Nm)	Torque Locked rotor T_L/T_N	Break down T_B/T_N	Moment of inertia J=¼GD² (kgxm²)	Noise level at 1 meter dB(A)	Net weight (kg)
0.75	80MA	2855	1.8	1.7	1.6	6.8	77.4	77.0	73.8	0.82	0.77	0.70	2.5	2.3	2.3	0.001	62	15
1.1	80MB	2855	2.5	2.4	2.3	7.1	79.6	79.5	75.1	0.83	0.78	0.71	3.7	2.3	2.3	0.002	62	18
1.5	90S	2875	3.3	3.2	3.1	7.3	81.3	81.2	77.1	0.84	0.81	0.73	5.0	2.3	2.3	0.002	67	24
2.2	90L	2875	4.7	4.5	4.3	7.6	83.2	83.1	79.9	0.85	0.81	0.74	7.3	2.3	2.3	0.003	67	28
3	100L	2880	6.2	5.9	5.7	7.8	84.6	84.5	81.0	0.87	0.82	0.76	9.9	2.2	2.3	0.005	74	38
4	112M	2900	8.0	7.6	7.4	8.1	85.8	85.6	82.2	0.88	0.82	0.78	13.2	2.2	2.3	0.008	77	42
5.5	132SA	2900	10.9	10.4	10.0	8.2	87.0	86.9	84.3	0.88	0.83	0.79	18.1	2.2	2.3	0.014	79	68
7.5	132SB	2900	14.5	13.8	13.3	7.8	88.1	88.0	85.2	0.89	0.83	0.80	24.7	2.2	2.3	0.018	79	70
11	160MA	2940	21.0	20.0	19.2	7.9	89.4	88.8	86.8	0.89	0.84	0.80	35.7	2.2	2.3	0.051	81	108
15	160MB	2940	28.4	26.9	26.0	7.9	90.3	90.0	87.5	0.89	0.85	0.81	48.7	2.2	2.3	0.064	81	122
18.5	160L	2940	34.7	33.0	31.8	8.0	90.9	90.8	88.3	0.89	0.85	0.82	60.1	2.2	2.3	0.076	81	136
22	180M	2955	41.1	39.1	37.7	8.1	91.3	90.9	88.9	0.89	0.85	0.82	71.1	2.2	2.3	0.105	83	172
30	200LA	2965	55.7	52.9	51.0	7.5	92.0	91.7	89.6	0.89	0.85	0.82	96.6	2.0	2.3	0.179	84	234
37	200LB	2965	68.3	64.9	62.5	7.5	92.5	92.3	90.7	0.89	0.85	0.82	119.2	2.0	2.3	0.201	84	242
45	225M	2970	82.7	78.6	75.7	7.5	92.9	92.6	91.4	0.89	0.85	0.83	144.7	2.2	2.3	0.305	86	315
55	250M	2975	100.7	95.7	92.2	7.6	93.3	92.8	91.5	0.89	0.85	0.83	176.6	2.2	2.3	0.414	89	394
75	280S	2975	136.5	129.7	125.0	6.9	93.8	93.3	92.3	0.89	0.85	0.83	240.8	1.8	2.3	0.695	91	520
90	280M	2975	163.3	155.1	149.5	6.9	94.1	93.7	92.5	0.89	0.86	0.83	288.9	1.8	2.3	0.852	91	596
110	315S	2980	196.9	187.1	180.3	7.0	94.4	93.8	92.7	0.90	0.86	0.83	352.5	1.8	2.2	1.753	92	890
132	315M	2980	235.6	223.8	215.7	7.0	94.6	94.2	93.1	0.90	0.87	0.83	423.0	1.8	2.2	1.874	92	970
160	315LA	2980	281.8	267.7	258.0	7.1	94.9	94.3	93.2	0.91	0.87	0.83	512.8	1.8	2.2	2.296	92	1040
200	315LB	2980	351.5	333.9	321.9	7.1	95.1	94.6	93.5	0.91	0.87	0.83	640.9	1.8	2.2	2.478	92	1070
250	355M	2980	439.4	417.4	402.3	7.1	95.1	94.7	93.6	0.91	0.87	0.84	801.2	1.6	2.2	3.8	100	1638
315	355L	2980	553.6	525.9	506.9	7.2	95.1	94.7	93.7	0.91	0.88	0.85	1009.5	1.6	2.2	4.8	100	1834

4 Pole - 1500 rpm asynchronous speed 50Hz

IE2

Output (kW)	Frame Size	Full lock speed (rpm)	Current Full load I_N, 50Hz 380V (A)	400V (A)	415V (A)	Locked rotor I_L/I_N	Efficiency % at % full load 100	75	50	Power factor, cos φ at % full load 100	75	50	Full load T_N (Nm)	Torque Locked rotor T_L/T_N	Break down T_B/T_N	Moment of inertia J=¼GD² (kgxm²)	Noise level at 1 meter dB(A)	Net weight (kg)
0.75	80MB	1400	1.9	1.8	1.7	6.4	79.6	79.5	76.3	0.76	0.69	0.56	5.1	2.3	2.3	0.003	56	16
1.1	90S	1425	2.7	2.5	2.4	6.6	81.4	81.4	78.6	0.77	0.70	0.60	7.4	2.3	2.3	0.004	59	21
1.5	90L	1425	3.5	3.4	3.2	6.7	82.8	82.8	79.6	0.78	0.71	0.61	10.1	2.3	2.3	0.006	59	26
2.2	100LA	1440	5.0	4.7	4.5	7.3	84.3	84.1	80.9	0.80	0.72	0.63	14.6	2.3	2.3	0.01	64	32
3	100LB	1440	6.6	6.3	6.0	7.5	85.5	85.4	82.0	0.81	0.72	0.63	19.9	2.3	2.3	0.013	64	34
4	112M	1450	8.7	8.2	7.9	7.5	86.6	86.1	83.2	0.81	0.73	0.64	26.3	2.3	2.3	0.019	65	46
5.5	132S	1455	11.6	11.0	10.6	7.5	87.7	87.3	84.5	0.82	0.74	0.64	36.1	2.0	2.3	0.036	71	68
7.5	132M	1455	15.5	14.7	14.2	7.3	88.7	88.2	85.0	0.83	0.77	0.65	49.2	2.0	2.3	0.047	71	77
11	160M	1465	22.4	21.3	20.5	7.4	89.8	89.6	86.3	0.83	0.78	0.70	71.7	2.0	2.3	0.103	73	118
15	160L	1465	29.9	28.4	27.4	7.5	90.6	90.4	87.0	0.84	0.79	0.73	97.8	2.0	2.3	0.131	73	134
18.5	180M	1470	36.3	34.4	33.2	7.6	91.2	90.9	88.2	0.85	0.80	0.74	120.2	2.0	2.3	0.183	76	183
22	180L	1475	42.9	40.8	39.3	7.7	91.6	91.5	88.6	0.85	0.82	0.74	142.4	2.1	2.3	0.219	76	215
30	200L	1475	58.1	55.2	53.2	7.1	92.3	92.2	89.7	0.85	0.82	0.75	194.2	2.1	2.3	0.297	76	265
37	225S	1480	70.5	67.0	64.6	7.3	92.7	92.6	90.2	0.86	0.83	0.75	238.8	2.1	2.3	0.578	78	296
45	225M	1480	85.4	81.1	78.2	7.3	93.1	92.9	91.0	0.86	0.83	0.75	290.4	2.2	2.3	0.659	78	328
55	250M	1480	103.9	98.7	95.2	7.3	93.5	93.3	91.6	0.86	0.83	0.76	354.9	2.2	2.3	0.818	79	420
75	280S	1485	139.3	132.4	127.6	6.8	94.0	93.8	92.4	0.87	0.85	0.77	482.3	2.2	2.3	1.571	80	540
90	280M	1485	165.0	156.7	151.0	6.9	94.2	94.0	93.1	0.88	0.85	0.77	578.8	2.2	2.3	1.964	80	622
110	315S	1485	198.7	188.8	182.0	6.9	94.5	94.2	93.2	0.89	0.85	0.78	707.4	2.1	2.2	3.247	88	860
132	315M	1485	238.0	226.1	217.9	6.9	94.7	94.6	93.8	0.89	0.85	0.80	848.9	2.1	2.2	3.527	88	942
160	315LA	1485	284.6	270.4	260.6	6.9	94.9	94.8	94.2	0.90	0.87	0.81	1029.0	2.1	2.2	4.087	88	1018
200	315LB	1485	355.0	337.3	325.1	6.9	95.1	94.9	94.2	0.90	0.87	0.81	1286.2	2.1	2.2	5.374	88	1158
250	355M	1490	443.8	421.6	406.4	6.9	95.1	95.0	94.3	0.90	0.87	0.82	1602.3	2.0	2.2	8.4	95	1660
315	355L	1490	559.2	531.2	512.0	6.9	95.1	95.0	94.3	0.90	0.87	0.82	2019.0	2.0	2.2	9.9	95	1804

2FM Series (Cast Iron Casing)

6 Pole - 1000 rpm asynchronous speed 50Hz

IE2

Output (kW)	Frame Size	Full lock speed (rpm)	Current Full load I_N, 50Hz 380V (A)	400V (A)	415V (A)	Locked rotor I_L/I_N	Efficiency % at % full load 100	75	50	Power factor, cos φ at % full load 100	75	50	Full load T_N (Nm)	Torque Locked rotor T_L/T_N	Break down T_B/T_N	Moment of inertia J=¼GD² (kgxm²)	Noise level at 1 meter dB(A)	Net weight (kg)
0.75	90S	935	2.1	2.0	1.9	5.8	75.9	75.8	73.1	0.71	0.65	0.58	7.7	2.0	2.1	0.005	57	24
1.1	90L	940	3.0	2.8	2.7	5.9	78.1	77.8	75.1	0.72	0.65	0.58	11.2	2.0	2.1	0.008	57	26
1.5	100L	945	4.0	3.8	3.6	5.9	79.8	79.7	76.0	0.72	0.68	0.59	15.2	2.0	2.1	0.013	61	31
2.2	112M	950	5.7	5.4	5.2	6.2	82.9	81.8	78.3	0.72	0.68	0.60	22.1	2.0	2.1	0.02	65	40
3	132S	960	7.6	7.2	7.0	6.4	83.3	82.4	79.5	0.72	0.69	0.60	29.8	2.0	2.1	0.038	69	62
4	132MA	960	9.7	9.2	8.9	6.6	84.6	84.1	81.2	0.74	0.71	0.62	39.8	2.0	2.1	0.05	69	66
5.5	132MB	960	13.0	12.3	11.9	6.8	87.8	86.0	82.6	0.75	0.71	0.63	54.7	2.0	2.1	0.066	69	76
7.5	160M	970	16.8	15.9	15.3	6.8	87.9	87.1	84.7	0.78	0.71	0.64	73.8	2.0	2.1	0.121	73	112
11	160L	970	23.9	22.7	21.8	6.9	88.7	88.6	86.0	0.79	0.72	0.65	108.3	2.0	2.1	0.161	73	134
15	180L	975	31.0	29.4	28.4	7.3	89.7	89.6	87.5	0.82	0.74	0.67	146.9	2.0	2.1	0.264	73	182
18.5	200LA	975	38.9	36.9	35.6	7.2	90.4	90.3	88.5	0.80	0.75	0.69	181.2	2.0	2.1	0.407	73	230
22	200LB	975	45.4	43.1	41.6	7.3	90.9	90.8	89.5	0.81	0.75	0.70	215.5	2.0	2.1	0.459	73	240
30	225M	985	60.6	57.6	55.5	6.8	91.7	91.6	90.7	0.82	0.75	0.71	290.9	2.0	2.1	0.648	74	292
37	250M	985	73.5	69.8	67.3	7.0	92.2	92.1	91.2	0.83	0.76	0.73	358.7	2.0	2.1	0.979	76	388
45	280S	985	86.8	82.4	79.5	7.2	92.7	92.5	91.8	0.85	0.80	0.74	436.3	2.0	2.0	1.79	78	490
55	280M	985	104.4	99.2	95.6	7.2	93.1	93.0	92.6	0.86	0.80	0.75	533.2	2.0	2.0	2.164	78	560
75	315S	990	144.8	137.5	132.6	6.5	93.7	93.6	92.8	0.84	0.81	0.75	723.5	2.0	2.0	4.279	83	800
90	315M	990	171.1	162.6	156.7	6.6	94.0	93.9	93.2	0.85	0.82	0.76	868.2	2.0	2.0	5.017	83	920
110	315LA	990	208.5	198.1	190.9	6.6	94.3	94.0	93.5	0.85	0.82	0.76	1061.1	2.0	2.0	5.607	83	1020
132	315LB	990	246.5	234.2	225.7	6.6	94.6	94.2	93.6	0.86	0.82	0.77	1273.3	2.0	2.0	6.64	83	1110
160	355MA	990	298.2	283.3	273.0	6.7	94.8	94.5	94.2	0.86	0.82	0.78	1543.4	2.0	2.2	9.6	85	1554
200	355MB	990	371.9	353.3	340.6	6.8	95.0	94.7	94.2	0.86	0.83	0.80	1929.3	2.0	2.2	11.9	85	1768
250	355L	990	464.9	441.7	425.7	6.8	95.0	94.7	94.2	0.86	0.83	0.80	2411.6	2.0	2.2	13.4	85	1810

8 Pole - 750 rpm asynchronous speed 50Hz

IE2

Output (kW)	Frame Size	Full lock speed (rpm)	Current Full load I_N, 50Hz 380V (A)	400V (A)	415V (A)	Locked rotor I_L/I_N	Efficiency % at % full load 100	75	50	Power factor, cos φ at % full load 100	75	50	Full load T_N (Nm)	Torque Locked rotor T_L/T_N	Break down T_B/T_N	Moment of inertia J=¼GD² (kgxm²)	Noise level at 1 meter dB(A)	Net weight (kg)
0.75	100LA	690	2.6	2.4	2.4	6.1	66.2	65.9	61.6	0.67	0.55	0.46	10.4	1.8	2.0	0.008	59	30
1.1	100LB	690	3.4	3.3	3.1	6.1	70.8	70.5	65.7	0.69	0.58	0.47	15.2	1.8	2.0	0.01	59	35
1.5	112M	690	4.4	4.2	4.0	6.4	74.1	74.0	69.8	0.70	0.61	0.51	20.8	1.8	2.0	0.017	61	40
2.2	132S	710	6.1	5.8	5.6	6.4	77.6	77.5	72.4	0.71	0.61	0.52	29.6	1.8	2.0	0.031	64	55
3	132M	710	7.8	7.4	7.1	6.8	80.0	79.8	74.8	0.73	0.63	0.54	40.4	1.8	2.0	0.04	64	65
4	160MA	720	10.2	9.7	9.3	6.8	81.9	81.8	76.3	0.73	0.65	0.54	53.1	1.9	2.0	0.075	68	95
5.5	160MB	720	13.5	12.8	12.3	6.7	83.8	83.6	78.6	0.74	0.65	0.55	73.0	1.9	2.0	0.093	68	115
7.5	160L	720	17.8	16.9	16.3	6.4	85.3	85.1	80.6	0.75	0.67	0.55	99.5	1.9	2.0	0.126	68	125
11	180L	730	25.6	24.4	23.5	6.5	86.9	86.8	83.3	0.75	0.67	0.56	143.9	2.0	2.0	0.203	70	180
15	200L	730	34.1	32.4	31.2	6.6	88.0	87.9	84.2	0.76	0.72	0.58	196.2	2.0	2.0	0.339	73	220
18.5	225S	730	41.7	39.7	38.2	6.6	88.6	88.4	84.7	0.76	0.72	0.61	242.0	1.9	2.0	0.491	73	260
22	225M	740	48.1	45.7	44.0	6.6	89.1	89.0	85.3	0.78	0.73	0.62	283.9	1.9	2.0	0.547	73	290
30	250M	740	64.3	61.0	58.8	6.5	89.8	89.7	86.9	0.79	0.74	0.63	387.2	1.9	2.0	0.83	75	380
37	280S	740	78.8	74.9	72.2	6.5	90.3	90.1	87.2	0.79	0.75	0.65	477.5	1.9	2.0	1.39	76	490
45	280M	740	95.4	90.7	87.4	6.5	90.7	90.6	87.6	0.79	0.75	0.65	580.7	1.9	2.0	1.65	76	530
55	315S	740	113.4	107.7	103.8	6.6	91.0	90.8	88.2	0.81	0.76	0.68	709.8	1.8	2.0	4.79	82	770
75	315M	740	153.6	145.9	140.6	6.1	91.6	91.2	89.0	0.81	0.78	0.70	967.9	1.8	2.0	5.58	82	900
90	315LA	740	181.5	172.4	166.2	6.2	91.9	91.5	89.6	0.82	0.78	0.70	1161.5	1.8	2.0	6.37	82	960
110	315LB	740	220.8	209.8	202.2	6.3	92.3	92.2	90.1	0.82	0.79	0.71	1419.6	1.8	2.0	7.23	82	1060
132	355M1	740	264.1	251.0	241.9	6.3	92.6	92.3	90.7	0.82	0.80	0.72	1704.0	1.8	2.0	7.6	89	1556
160	355MB	740	318.8	302.8	291.9	6.3	93.0	92.7	91.5	0.82	0.82	0.74	2066.0	1.8	2.0	11.7	89	1680
200	355L	740	396.4	376.5	363.0	6.4	93.5	93.2	92.2	0.82	0.82	0.74	2582.0	1.8	2.0	12.9	89	1850

PERFORMANCE DATA IE2

3FM Series (Cast Iron Casing)

PERFORMANCE DATA IE3

2 Pole - 3000 rpm asynchronous speed 50Hz

IE3

Output (kW)	Frame Size	Full lock speed (rpm)	Current Full load I_N, 50Hz 380V (A)	400V (A)	415V (A)	Locked rotor I_L/I_N	Efficiency % at % full load 100	75	50	Power factor, cos φ at % full load 100	75	50	Full load T_N (Nm)	Torque Locked rotor T_L/T_N	Break down T_B/T_N	Moment of inertia J=¼GD² (kgxm²)	Noise level at 1 meter dB(A)	Net weight (kg)
0.75	80MA	2855	1.7	1.6	1.6	7.0	80.7	80.5	76.8	0.82	0.76	0.70	2.5	2.3	2.3	0.001	62	17
1.1	80MB	2855	2.4	2.3	2.2	7.3	82.7	82.6	79.3	0.83	0.77	0.70	3.7	2.2	2.3	0.002	62	20
1.5	90S	2875	3.2	3.1	3.0	7.6	84.2	84.1	81.2	0.84	0.80	0.72	5.0	2.2	2.3	0.002	67	24
2.2	90L	2875	4.6	4.3	4.2	7.6	85.9	85.7	82.6	0.85	0.80	0.73	7.3	2.2	2.3	0.003	67	29
3	100L	2880	6.0	5.7	5.5	7.8	87.1	87.0	83.5	0.87	0.81	0.75	9.9	2.2	2.3	0.006	74	42
4	112M	2900	7.8	7.4	7.2	8.3	88.1	87.9	84.7	0.88	0.81	0.77	13.2	2.2	2.3	0.009	77	48
5.5	132SA	2900	10.6	10.1	9.7	8.3	89.2	89.0	86.3	0.88	0.82	0.78	18.1	2.0	2.3	0.024	79	70
7.5	132SB	2900	14.4	13.7	13.2	7.9	90.1	89.8	87.9	0.88	0.82	0.79	24.7	2.0	2.3	0.029	79	74
11	160MA	2940	20.6	19.6	18.9	8.1	91.2	90.7	88.4	0.89	0.83	0.79	35.7	2.0	2.3	0.067	81	120
15	160MB	2940	27.9	26.5	25.5	8.1	91.9	91.8	88.5	0.89	0.84	0.80	48.7	2.0	2.3	0.08	81	130
18.5	160L	2940	34.2	32.5	31.3	8.2	92.4	92.2	89.8	0.89	0.84	0.84	60.1	2.0	2.3	0.097	81	148
22	180M	2955	40.5	38.5	37.1	8.2	92.7	92.4	90.2	0.89	0.84	0.81	71.1	2.0	2.3	0.137	83	192
30	200LA	2965	54.9	52.1	50.3	7.6	93.3	93.1	90.4	0.89	0.84	0.81	96.6	2.0	2.3	0.227	84	248
37	200LB	2965	67.4	64.0	61.7	7.6	93.7	93.6	91.2	0.89	0.84	0.81	119.2	2.0	2.3	0.269	84	270
45	225M	2970	80.8	76.8	74.0	7.7	94.0	93.8	91.8	0.90	0.84	0.82	144.7	2.0	2.3	0.36	86	324
55	250M	2975	98.5	93.5	90.2	7.7	94.3	94.2	92.5	0.90	0.84	0.82	176.6	2.0	2.3	0.791	89	438
75	280S	2975	133.7	127.0	122.4	7.1	94.8	94.6	92.9	0.90	0.84	0.82	240.8	1.8	2.3	0.96	91	565
90	280M	2975	159.9	151.9	146.4	7.1	95.2	94.9	93.2	0.90	0.85	0.82	288.9	1.8	2.3	1.157	91	595
110	315S	2980	195.1	185.3	178.6	7.1	95.5	95.1	93.5	0.90	0.85	0.82	352.5	1.8	2.3	1.662	92	956
132	315M	2980	220.4	221.9	213.9	7.1	95.7	95.2	93.9	0.90	0.86	0.82	423.0	1.8	2.3	1.874	92	960
160	315LA	2980	279.4	265.5	255.9	7.2	95.9	95.5	94.2	0.91	0.86	0.82	512.8	1.8	2.3	2.146	92	1060
200	315LB	2980	348.6	331.1	319.2	7.2	96.1	95.6	94.5	0.91	0.86	0.82	640.9	1.8	2.2	2.448	92	1080
250	355M	2980	435.7	413.9	399.0	7.2	96.1	95.7	94.7	0.91	0.86	0.83	801.2	1.6	2.2	3.8	100	1620
315	355L	2980	549.0	521.5	502.7	7.2	96.1	95.7	94.7	0.91	0.87	0.83	1009.5	1.6	2.2	4.82	100	2017

4 Pole - 1500 rpm asynchronous speed 50Hz

IE3

Output (kW)	Frame Size	Full lock speed (rpm)	Current Full load I_N, 50Hz 380V (A)	400V (A)	415V (A)	Locked rotor I_L/I_N	Efficiency % at % full load 100	75	50	Power factor, cos φ at % full load 100	75	50	Full load T_N (Nm)	Torque Locked rotor T_L/T_N	Break down T_B/T_N	Moment of inertia J=¼GD² (kgxm²)	Noise level at 1 meter dB(A)	Net weight (kg)
0.75	80MB	1400	1.8	1.7	1.7	6.6	82.5	82.2	78.6	0.75	0.68	0.55	5.1	2.3	2.3	0.003	56	16
1.1	90S	1425	2.6	2.5	2.4	6.8	84.1	83.9	80.9	0.76	0.69	0.60	7.4	2.3	2.3	0.004	59	25
1.5	90L	1425	3.5	3.3	3.2	7.0	85.3	85.1	81.8	0.77	0.71	0.61	10.1	2.3	2.3	0.005	59	31
2.2	100LA	1440	4.8	4.5	4.4	7.6	86.7	86.5	83.5	0.81	0.72	0.62	14.6	2.3	2.3	0.012	64	43
3	100LB	1440	6.3	6.0	5.8	7.6	87.7	87.6	84.4	0.82	0.72	0.63	19.9	2.3	2.3	0.016	64	52
4	112M	1450	8.4	7.9	7.7	7.8	88.6	88.4	85.8	0.82	0.73	0.64	26.3	2.2	2.3	0.022	65	54
5.5	132S	1455	11.2	10.7	10.3	7.9	89.6	89.3	86.9	0.83	0.74	0.64	36.1	2.0	2.3	0.060	71	70
7.5	132M	1455	15.0	14.3	13.7	7.5	90.4	90.1	88.0	0.84	0.76	0.65	49.2	2.0	2.3	0.071	71	84
11	160M	1465	21.5	20.4	19.7	7.7	91.4	91.3	88.5	0.85	0.77	0.69	71.7	2.2	2.3	0.137	73	128
15	160L	1465	28.8	27.3	26.3	7.8	92.1	92.0	89.3	0.86	0.78	0.72	97.8	2.2	2.3	0.171	73	150
18.5	180M	1470	35.3	33.5	32.3	7.8	92.6	92.5	90.5	0.86	0.79	0.73	120.2	2.0	2.3	0.239	76	182
22	180L	1475	41.8	39.7	38.3	7.8	93.0	92.7	91.0	0.86	0.79	0.74	142.4	2.0	2.3	0.259	76	223
30	200L	1475	56.6	53.8	51.9	7.3	93.6	93.5	91.5	0.86	0.81	0.74	194.2	2.0	2.3	0.459	76	300
37	225S	1480	69.6	66.1	63.7	7.4	93.9	93.6	91.8	0.86	0.82	0.75	238.8	2.0	2.3	0.656	78	354
45	225M	1480	84.4	80.2	77.3	7.4	94.2	94.0	92.0	0.86	0.82	0.75	290.4	2.0	2.3	0.758	78	442
55	250M	1480	102.7	97.6	94.1	7.4	94.6	94.5	92.8	0.86	0.82	0.75	354.9	2.2	2.3	1.078	79	460
75	280S	1485	136.3	129.5	124.8	6.9	95.1	94.8	93.0	0.88	0.83	0.76	482.3	2.0	2.3	1.8	80	581
90	280M	1485	163.2	155.1	149.5	6.9	95.3	95.0	93.4	0.88	0.84	0.77	578.8	2.0	2.3	2.13	80	658
110	315S	1485	196.8	187.0	180.2	7.0	95.5	95.1	93.8	0.89	0.84	0.77	707.4	2.0	2.2	3.415	88	914
132	315M	1485	235.7	223.9	215.8	7.0	95.8	95.4	94.0	0.89	0.84	0.79	848.9	2.0	2.2	3.807	88	1034
160	315LA	1485	285.1	270.9	261.1	7.1	96.0	95.7	94.2	0.89	0.85	0.80	1029.0	2.0	2.2	4.423	88	1078
200	315LB	1485	351.7	334.1	322.0	7.1	96.2	95.9	94.5	0.90	0.85	0.81	1286.2	2.0	2.2	5.262	88	1200
250	355M	1490	439.6	417.7	402.6	7.1	96.2	95.9	94.7	0.90	0.85	0.81	1602.3	2.0	2.2	9.2	95	1750
315	355L	1490	553.9	526.2	507.2	7.1	96.2	96.0	94.7	0.90	0.86	0.81	2019.0	2.0	2.2	10.2	95	1984

PERFORMANCE DATA IE3

3FM Series (Cast Iron Casing)

PERFORMANCE DATA IE3

6 Pole - 1000 rpm asynchronous speed 50Hz

IE3

Output (kW)	Frame Size	Full lock speed (rpm)	Current, Full load I_N, 50Hz, 380V (A)	400V (A)	415V (A)	Locked rotor I_L/I_N	Efficiency % at % full load, 100	75	50	Power factor, cos φ at % full load, 100	75	50	Torque, Full load T_N (Nm)	Locked rotor T_L/T_N	Break down T_B/T_N	Moment of inertia $J=¼GD^2$ (kgxm²)	Noise level at 1 meter dB(A)	Net weight (kg)
0.75	90S	935	2.0	1.9	1.9	6.0	78.9	78.8	75.6	0.71	0.64	0.57	7.7	2.0	2.1	0.004	57	25
1.1	90L	940	2.8	2.7	2.6	6.0	81.0	80.9	77.2	0.73	0.64	0.58	11.2	2.0	2.1	0.006	57	30
1.5	100L	945	3.8	3.6	3.5	6.5	82.5	82.3	78.9	0.73	0.67	0.58	15.2	2.0	2.1	0.016	61	40
2.2	112M	950	5.4	5.1	4.9	6.6	84.3	84.2	81.3	0.74	0.70	0.61	22.1	2.0	2.1	0.039	65	49
3	132S	960	7.2	6.8	6.6	6.8	85.6	85.2	82.5	0.74	0.70	0.61	29.8	2.0	2.1	0.045	69	61
4	132MA	960	9.5	9.0	8.7	6.8	86.8	86.7	83.2	0.74	0.70	0.61	39.8	2.0	2.1	0.053	69	70
5.5	132MB	960	12.7	12.0	11.6	7.0	88.0	87.9	84.6	0.75	0.71	0.64	54.7	2.0	2.1	0.056	69	78
7.5	160M	970	16.2	15.4	14.8	7.0	89.1	89.0	85.7	0.79	0.71	0.64	73.8	2.0	2.1	0.14	73	116
11	160L	970	23.1	22.0	21.2	7.2	90.3	90.2	87.2	0.80	0.71	0.64	108.3	2.0	2.1	0.192	73	142
15	180L	975	30.9	29.3	28.2	7.3	91.2	91.1	88.5	0.81	0.73	0.66	146.9	2.0	2.1	0.319	73	188
18.5	200LA	975	37.8	36.0	34.7	7.3	91.7	91.6	89.6	0.81	0.74	0.68	181.2	2.0	2.1	0.446	73	234
22	200LB	975	44.8	42.5	41.0	7.4	92.2	92.1	90.7	0.81	0.74	0.69	215.5	2.0	2.1	0.557	73	275
30	225M	985	59.1	56.2	54.1	6.9	92.9	92.8	91.3	0.83	0.74	0.70	290.9	2.0	2.1	0.832	74	332
37	250M	985	71.7	68.1	65.7	7.1	93.3	93.2	91.8	0.84	0.75	0.71	358.7	2.0	2.1	1.45	76	422
45	280S	985	85.8	81.6	78.6	7.3	93.7	93.6	92.1	0.85	0.79	0.72	436.3	2.0	2.0	2.25	78	536
55	280M	985	103.3	98.1	94.6	7.3	94.2	94.0	92.6	0.86	0.79	0.73	533.2	2.0	2.0	2.73	78	590
75	315S	990	143.4	136.2	131.3	6.6	94.8	94.5	93.2	0.84	0.80	0.73	723.5	2.0	2.0	3.98	83	848
90	315M	990	169.5	161.0	155.2	6.7	95.1	94.8	93.7	0.85	0.80	0.75	868.2	2.0	2.0	4.5	83	942
110	315LA	990	206.8	196.4	189.3	6.7	95.3	95.0	94.0	0.85	0.81	0.75	1061.1	2.0	2.0	5.61	83	980
132	315LB	990	244.5	232.2	223.8	6.8	95.5	95.3	94.2	0.86	0.81	0.76	1273.3	2.0	2.0	6.93	83	1140
160	355MA	990	295.7	281.0	270.7	6.7	95.8	95.5	94.7	0.86	0.81	0.76	1543.4	1.8	2.0	10.5	85	1790
200	355MB	990	364.6	346.4	333.8	6.8	95.9	95.7	94.8	0.87	0.81	0.78	1929.3	1.8	2.0	12.9	85	1945
250	355L	990	455.7	433.0	417.3	6.8	95.9	95.8	95.0	0.87	0.81	0.78	2411.6	1.8	2.0	12.9	85	1960

8 Pole - 750 rpm asynchronous speed 50Hz

IE3

Output (kW)	Frame Size	Full lock speed (rpm)	Current, Full load I_N, 50Hz, 380V (A)	400V (A)	415V (A)	Locked rotor I_L/I_N	Efficiency % at % full load, 100	75	50	Power factor, cos φ at % full load, 100	75	50	Torque, Full load T_N (Nm)	Locked rotor T_L/T_N	Break down T_B/T_N	Moment of inertia $J=¼GD^2$ (kgxm²)	Noise level at 1 meter dB(A)	Net weight (kg)
0.75	100LA	695	2.3	2.2	2.1	6.2	75.0	74.6	69.8	0.67	0.55	0.45	10.3	1.8	2.0	0.008	59	40
1.1	100LB	695	3.1	3.0	2.9	6.2	77.7	77.5	72.5	0.69	0.57	0.46	15.1	1.8	2.0	0.01	59	42
1.5	112M	695	4.1	3.9	3.7	6.7	79.7	79.5	75.2	0.70	0.60	0.50	20.6	1.8	2.0	0.017	61	45
2.2	132S	715	5.7	5.1	5.3	6.7	81.9	81.8	77.6	0.71	0.60	0.52	29.4	1.8	2.0	0.031	64	60
3	132M	715	7.5	7.1	6.8	6.9	83.5	83.3	79.5	0.73	0.62	0.54	40.1	1.8	2.0	0.04	64	70
4	160MA	725	9.8	9.3	9.0	6.9	84.8	84.6	80.9	0.73	0.63	0.54	52.7	1.9	2.0	0.075	68	100
5.5	160MA	725	13.1	12.4	12.0	6.9	86.2	86.1	82.5	0.74	0.64	0.54	72.4	1.9	2.0	0.093	68	120
7.5	160L	725	17.4	16.5	15.9	6.6	87.3	87.2	83.8	0.75	0.66	0.55	98.8	1.9	2.0	0.126	68	130
11	180L	735	25.2	23.9	23.0	6.6	88.6	88.5	84.9	0.75	0.66	0.56	142.9	2.0	2.0	0.203	70	190
15	200L	735	33.5	31.8	30.6	6.8	89.6	89.5	86.0	0.76	0.71	0.57	194.9	2.0	2.0	0.339	73	230
18.5	225S	735	41.0	39.0	37.6	6.8	90.1	90.0	86.7	0.76	0.71	0.61	240.4	1.9	2.0	0.491	73	270
22	225M	745	47.3	44.9	43.3	7.0	90.6	90.5	87.8	0.78	0.72	0.62	282.0	1.9	2.0	0.547	73	300
30	250M	745	63.2	60.0	58.9	6.7	91.3	91.2	88.3	0.79	0.73	0.63	384.6	1.9	2.0	0.83	75	390
37	280S	745	77.5	73.6	71.0	6.7	91.8	91.6	88.9	0.79	0.74	0.64	474.3	1.9	2.0	1.39	76	510
45	280M	745	93.9	89.2	86.0	6.7	92.2	92.0	89.5	0.79	0.74	0.65	576.8	1.9	2.0	1.65	76	560
55	315S	745	111.5	106.0	102.1	6.8	92.5	92.4	90.6	0.81	0.75	0.67	705.0	1.8	2.0	4.79	82	770
75	315M	745	151.1	143.6	138.4	6.3	93.1	93.0	91.5	0.81	0.77	0.69	961.4	1.8	2.0	5.58	82	1000
90	315LA	745	178.5	169.6	163.5	6.4	93.4	93.3	92.0	0.82	0.77	0.69	1153.7	1.8	2.0	6.37	82	1060
110	315LB	745	217.5	206.6	199.2	6.4	93.7	93.5	92.5	0.82	0.78	0.70	1410.1	1.8	2.0	7.23	82	1160
132	355MA	745	263.4	250.2	241.2	6.5	94.0	93.9	92.8	0.82	0.79	0.72	1692.1	1.8	2.0	11.73	89	1680
160	355MB	745	318.3	302.4	291.4	7.4	94.3	94.1	93.0	0.82	0.81	0.73	2051.0	1.8	2.0	12.48	89	1760
200	355L	745	396.6	376.7	363.1	8.4	94.6	94.5	93.5	0.82	0.81	0.74	2563.8	1.8	2.0	13.85	89	1990

FMB Series (Aluminium and Cast Iron Casing)

4 Pole - 1500 rpm asynchronous speed 50Hz

BRAKE MOTOR

Output (kW)	Frame Size	Full lock speed (rpm)	Current Full load I_N, 50Hz 380V (A)	400V (A)	415V (A)	Locked rotor I_L/I_N	Efficiency % at % full load 100	Power factor, cos φ at % full load 100	Torque Full load T_N (Nm)	Locked rotor T_L/T_N	Break down T_B/T_N	Moment of inertia $J=¼GD^2$ (kg x m²)	Break Torque (Nm)	Noise level at 1 meter dB(A)	Net weight (kg)
0.37	71B	1330	1.12	1.07	1.02	5.2	67.0	0.75	2.7	2.1	2.3	0.0013	4	55	16
0.55	80MA	1390	1.57	1.5	1.43	5.2	71.0	0.75	3.8	2.4	2.3	0.0018	7.5	58	17
0.75	80MB	1380	2.03	1.93	1.85	6.0	73.0	0.76	5.2	2.3	2.3	0.0021	7.5	58	18
1.1	90S	1390	2.89	2.75	2.63	6.0	75.0	0.77	7.6	2.3	2.3	0.0021	15	61	22
1.5	90L	1390	3.70	3.52	3.36	6.0	78.0	0.79	10.3	2.3	2.3	0.0027	15	61	27
2.2	100LA	1410	5.16	4.91	4.69	7.0	80.0	0.81	14.9	2.3	2.3	0.0054	30	64	34
3	100LB	1410	6.78	6.46	6.16	7.0	82.0	0.82	20.3	2.3	2.3	0.0067	30	64	38
4	112M	1435	8.8	8.38	8.00	7.0	84.0	0.82	26.5	2.3	2.3	0.0095	40	65	48
5.5	132S	1440	11.7	11.14	10.64	7.0	85.0	0.83	36.5	2.3	2.3	0.0214	75	71	71
7.5	132M	1440	15.6	14.86	14.18	7.0	87.0	0.84	49.7	2.3	2.3	0.0296	75	71	83
11	160M	1460	22.3	21.24	20.27	7.0	88.0	0.84	72.0	2.2	2.3	0.0747	150	75	128
15	160L	1460	30.1	28.67	27.36	7.5	89.0	0.85	98.1	2.2	2.3	0.0918	150	75	142

Note : For Brake Motor

Frame 71-112 (Aluminium Casing)

Frame 132-160 (Cast Iron Casing)

FMS Series (Aluminium Casing)

2 Pole - 3000 rpm asynchronous speed 50Hz

SINGLE PHASE

Frame size	Output (kW)	Full load speed (RPM)	Current Full load I_N (A)	Efficiency at 100% full load	Power factor cos φ at 100% full load	Locked rotor I_L/I_N (A)	Torque Full load torque T_N (Nm)	Locked rotor torque T_L/T_N	Break down torque T_B/T_N	Start µF / Run µF	Weight of foot mount motor (kg)
71A	0.37	2800	2.6	67	0.92	6.0	1.3	1.8	1.8	50 / 12	7
80A	0.75	2800	4.7	73	0.95	6.0	2.6	1.8	1.8	100 / 20	9
90S	1.5	2800	9.0	76	0.95	6.0	5.1	1.8	1.8	150 / 35	14
90L	2.2	2800	13.1	77	0.95	6.0	7.5	1.8	1.8	200 / 45	18

4 Pole - 1500 rpm asynchronous speed 50Hz

SINGLE PHASE

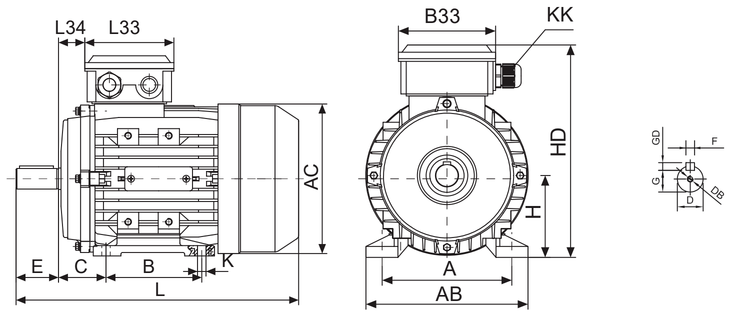
Frame size	Output (kW)	Full load speed (RPM)	Current Full load I_N (A)	Efficiency at 100% full load	Power factor cos φ at 100% full load	Locked rotor I_L/I_N (A)	Torque Full load torque T_N (Nm)	Locked rotor torque T_L/T_N	Break down torque T_B/T_N	Start µF / Run µF	Weight of foot mount motor (kg)
71B	0.37	1400	2.7	65	0.92	6.0	2.52	1.8	1.8	75 / 12	7
80MB	0.75	1400	4.85	71	0.95	6.0	5.08	1.8	1.8	100 / 25	13
90L	1.5	1400	9.3	74	0.95	6.0	10.02	1.8	1.8	200 / 35	18
100LA	2.2	1400	13.25	76	0.95	6.0	14.59	1.8	1.8	300 / 50	22
112M	4	1400	22.65	80	0.96	6.0	26.34	1.8	1.8	450 / 70	32

FIMM®

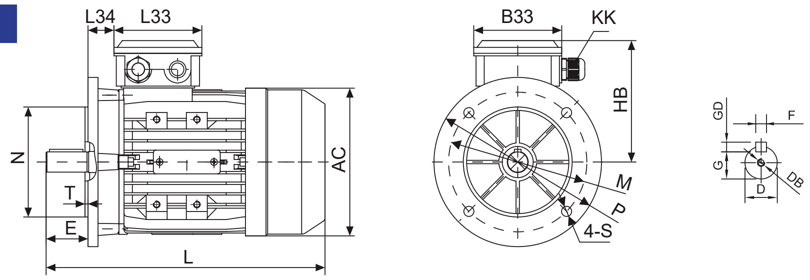
Dimensions
IE2-IE3

Aluminium Casing Dimension

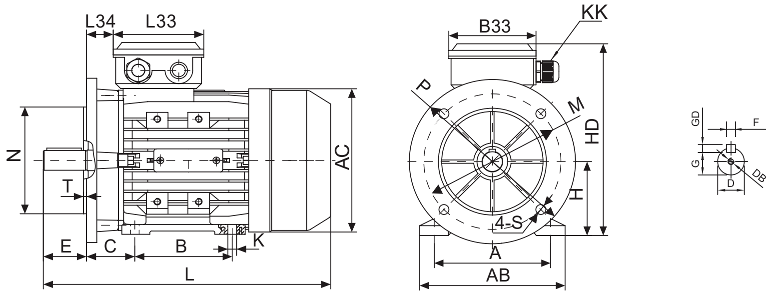
IMB3



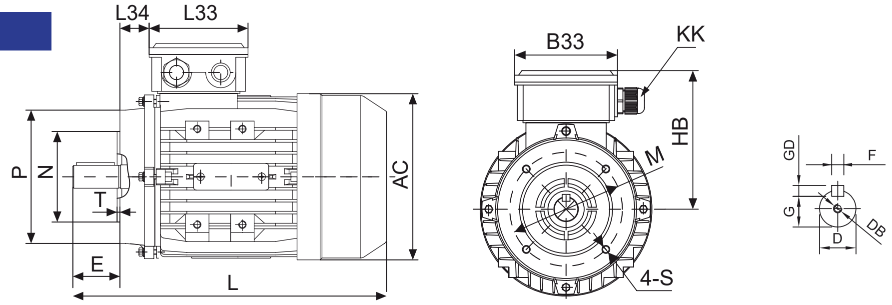
IMB5



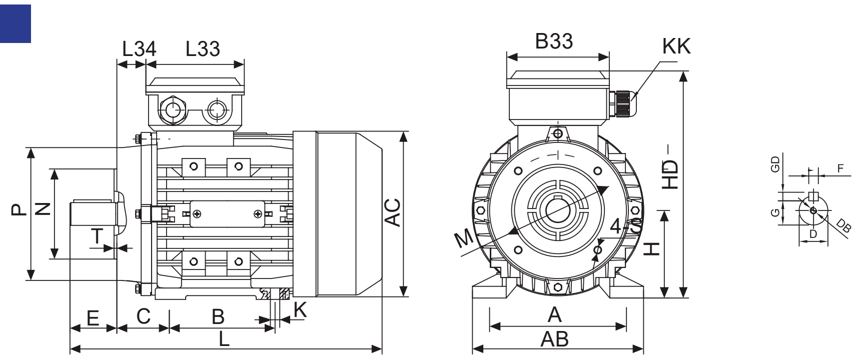
IMB35



IMB14



IMB34



Frame size	General								Feet					
	B3, B5, B34, B35, B14								B3, B34, B35					
	AC	B33	HB	HD	KK	L	L33	L34	A	AB	B	C	H	K
63	130	94	108	180	M18	230	94	14	100	135	80	40	63	7
71	145	94	115	195	M18	255	94	20	112	150	90	45	71	7
80MA/MB	175	105	133	220	M20	295	105	27	125	165	100	50	80	10
90S	195	105	139	250	M20	320	105	30	140	180	100	56	90	10
90L	195	105	139	250	M20	345	105	30	140	180	125	56	90	10
100L	215	105	152	270	M25	385	105	26	160	205	140	63	100	12
112M	240	112	167	300	M27	400	112	32	190	230	140	70	112	12
132S	275	112	186	345	M27	470	112	38	216	270	140	89	132	12
132M	275	112	186	345	M27	510	112	38	216	270	178	89	132	12
160M	330	143	224	420	M32	615	143	64	254	320	210	108	160	15
160L	330	143	224	420	M32	670	143	64	254	320	254	108	160	15

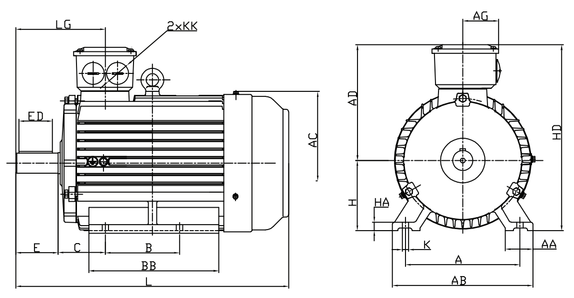
Note : B14C/2

Frame size	Shaft						Flange									
	B3, B5, B34, B35, B14						B5, B35					B14, B34				
	D	DB	E	F	G	GD	M	N	P	S	T	M	N	P	S	T
63	11	M4	23	4	8.5	4	115	95	140	10	3.0	75	60	90	M5	2.5
71	14	M5	30	5	11	5	130	110	160	10	3.5	85	70	105	M6	2.5
80MA/MB	19	M6	40	6	15.5	6	165	130	200	12	3.5	100	80	120	M6	3.0
90S	24	M8	50	8	20	7	165	130	200	12	3.5	115	95	140	M8	3.0
90L	24	M8	50	8	20	7	165	130	200	12	3.5	115	95	140	M8	3.0
100L	28	M10	60	8	24	7	215	180	250	15	4.0	130	110	160	M8	3.5
112M	28	M10	60	8	24	7	215	180	250	15	4.0	130	110	160	M8	3.5
132S	38	M12	80	10	33	8	265	230	300	15	4.0	165	130	200	M10	3.5
132M	38	M12	80	10	33	8	265	230	300	15	4.0	165	130	200	M10	3.5
160M/L	42	M16	110	12	37	8	300	250	350	19	5.0	215	180	250	M12	4.0

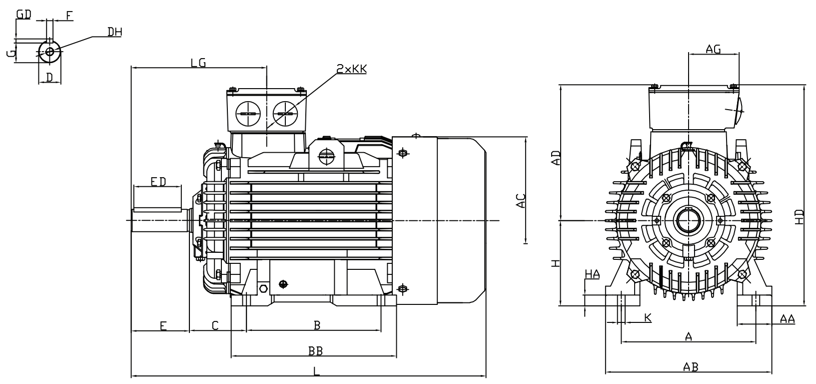
Note : B14C/2

Cast Iron Casing Dimension

IMB3

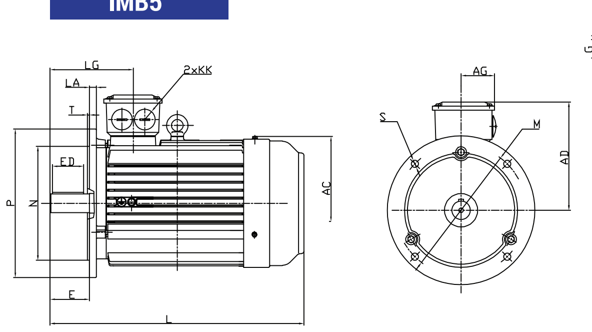


Frame size from 80 to 132

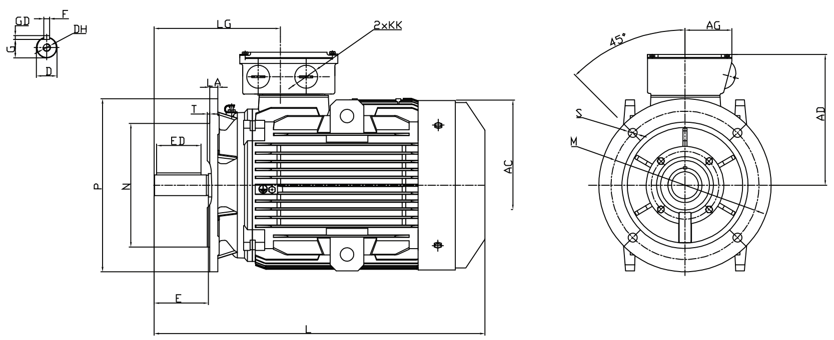


Frame size from 160 to 355

IMB5

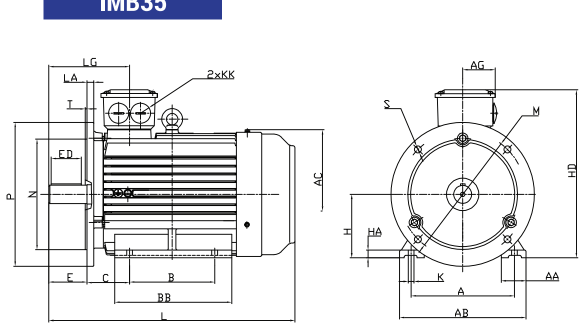


Frame size from 80 to 132

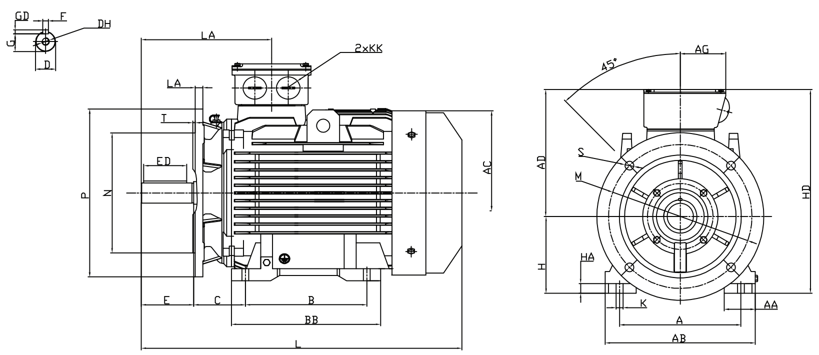


Frame size from 160 to 355

IMB35

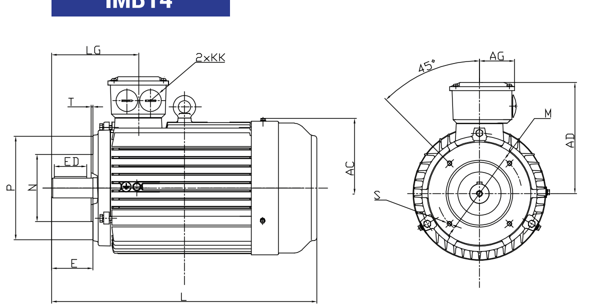


Frame size from 80 to 132

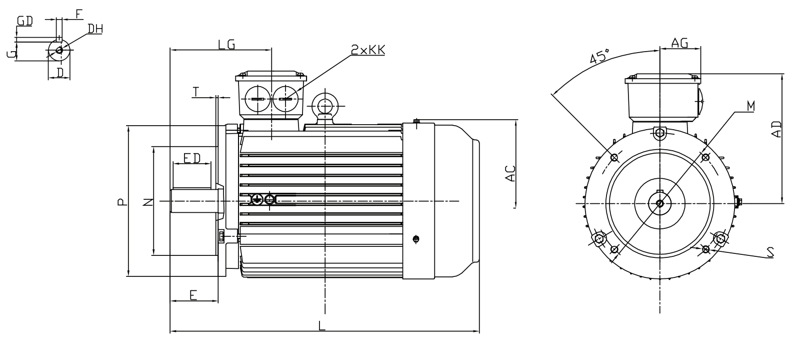


Frame size from 160 to 355

IMB14



Frame size from 80 to 160 B14/C2



Frame size from 80 to 160 B14/C1

Frame size	General B3 B5 B35 B14								Feet B3 B35									
	AC (2)	L (2)	AC	L	AD	AG	KK	LG	A	AB	AA	B	BB	C	H	HA	HD	K
80MB	175	301	175	295	145	51	M24X1.5	115	125	165	34	100	142	50	80	10	235	10
90S	205	360	190	318	155	60	M24X1.5	129	140	180	36	100	180	56	90	12.5	260	10
90L	205	390	190	343	155	60	M24X1.5	129	140	180	36	125	210	56	90	12.5	260	10
100L	215	434	215	381	165	60	M24X1.5	147	160	205	40	140	233	63	100	14	275	12
112M	236	461	236	399	185	75	M30X2	144	190	230	45	140	252	70	112	14	307	12
132S	275	492	275	474	205	75	M30X2	169	216	270	52	140	220	89	132	16	347	12
132M	275	530	275	512	205	75	M30X2	169	216	270	52	178	258	89	132	16	347	12
160M	330	658	330	614	250	95	M36X2	270	254	320	67	210	305	108	160	19	425	14.5
160L	330	680	330	658	250	95	M36X2	270	254	320	67	254	325	108	160	19	425	14.5
180M	380	721	380	683	270	95	M36X2	277	279	350	74	241	330	121	180	22	460	14.5
180L	380	769	380	721	270	95	M36X2	277	279	350	74	279	370	121	180	22	460	14.5
200L	420	781	420	781	325	120	M48X2	298	318	396	75	305	370	133	200	25	515	18.5
225S	465	831	465	831	335	120	M48X2	340	356	436	80	286	355	149	225	28	560	18.5
225M (1)	465	821	465	821	335	120	M48X2	310	356	436	80	311	380	149	225	28	560	18.5
225M	465	856	465	856	335	120	M48X2	340	356	436	80	311	380	149	225	28	560	18.5
250M (1)	520	935	520	935	370	160	M64X2	360	406	495	88	349	440	168	250	33	620	24
250M	520	941	520	941	370	160	M64X2	360	406	495	88	349	440	168	250	33	620	24
280S (1)	570	965	570	965	395	160	M64X2	350	457	550	100	368	495	190	280	35	685	24
280S	570	969	570	969	395	160	M64X2	350	457	550	100	368	495	190	280	35	685	24
280M (1)	570	1005	570	1005	395	160	M64X2	350	457	550	100	419	535	190	280	35	685	24
280M	570	1009	570	1009	395	160	M64X2	350	457	550	100	419	535	190	280	35	685	24
315S (1)	650	1145	650	1145	495	195	M64X2	387	508	635	120	406	515	216	315	45	820	28
315M (1)	650	1255	650	1255	495	195	M64X2	387	508	635	120	457	625	216	315	45	820	28
315L (1)	650	1255	650	1255	495	195	M64X2	387	508	635	120	508	625	216	315	45	820	28
315S	650	1196	650	1196	495	195	M64X2	417	508	635	120	406	515	216	315	45	820	28
315M	650	1306	650	1306	495	195	M64X2	417	508	635	120	457	625	216	315	45	820	28
315L	650	1306	650	1306	495	195	M64X2	417	508	635	120	508	625	216	315	45	820	28
355M (1)	735	1490	735	1490	640	260	M72X2	415	610	735	125	560	775	254	355	49	1000	28
355L (1)	735	1490	735	1490	640	260	M72X2	415	610	735	125	630	775	254	355	49	1000	28
355M	735	1520	735	1520	640	260	M72X2	445	610	735	125	560	775	254	355	49	1000	28
355L	735	1520	735	1520	640	260	M72X2	445	610	735	125	630	775	254	355	49	1000	28

(1) 2 Pole motors only

(2) IE3 motors

DIMENSIONS

DIMENSIONS

Frame size	Shaft							Flange dimension															
	B3 B5 B35 B14							B5 B35						B14C/2					B14C/1				
	D	DH	E	ED	F	G	GD	M	N	P	S	T	LA	M	N	P	S	T	M	N	P	S	T
80MB	19	M6X16	40	22	6	15.5	6	165	130	200	12	3.5	14	100	80	120	M6	3	130	110	160	M8	3.5
90S	24	M8X19	50	32	8	20	7	165	130	200	12	3.5	12	115	95	140	M8	3	130	110	160	M8	3.5
90L	24	M8X19	50	32	8	20	7	165	130	200	12	3.5	12	115	95	140	M8	3	130	110	160	M8	3.5
100L	28	M10X22	60	40	8	24	7	215	180	250	14.5	4	14	130	110	160	M8	3.5	165	130	200	M10	3.5
112M	28	M10X22	60	40	8	24	7	215	180	250	14.5	4	12	130	110	160	M8	3.5	165	130	200	M10	3.5
132S	38	M12X28	80	56	10	33	8	265	230	300	14.5	4	14	165	130	200	M10	3.5	215	180	250	M12	4
132M	38	M12X28	80	56	10	33	8	265	230	300	14.5	4	14	165	130	200	M10	3.5	215	180	250	M12	4
160M	42	M16X36	110	80	12	37	8	300	250	350	18.5	5	15	215	180	250	M12	4	265	230	300	M12	4
160L	42	M16X36	110	80	12	37	8	300	250	350	18.5	5	15	215	180	250	M12	4	265	230	300	M12	4
180M	48	M16X36	110	80	14	42.5	9	300	250	350	18.5	5	15	-	-	-	-	-	-	-	-	-	-
180L	48	M16X36	110	80	14	42.5	9	300	250	350	18.5	5	15	-	-	-	-	-	-	-	-	-	-
200L	55	M20X42	110	80	16	49	10	350	300	400	18.5	5	17	-	-	-	-	-	-	-	-	-	-
225S	60	M20X42	140	100	18	53	11	400	350	450	18.5	5	19	-	-	-	-	-	-	-	-	-	-
225M (1)	55	M20X42	110	80	16	49	10	400	350	450	18.5	5	19	-	-	-	-	-	-	-	-	-	-
225M	60	M20X42	140	100	18	53	11	400	350	450	18.5	5	19	-	-	-	-	-	-	-	-	-	-
250M (1)	60	M20X42	140	100	18	53	11	500	450	550	18.5	5	20	-	-	-	-	-	-	-	-	-	-
250M	65	M20X42	140	100	18	58	11	500	450	550	18.5	5	20	-	-	-	-	-	-	-	-	-	-
280S (1)	65	M20X42	140	100	18	58	11	500	450	550	18.5	5	22	-	-	-	-	-	-	-	-	-	-
280S	75	M20X42	140	100	20	67.5	12	500	450	550	18.5	5	22	-	-	-	-	-	-	-	-	-	-
280M (1)	65	M20X42	140	100	18	58	11	500	450	550	18.5	5	22	-	-	-	-	-	-	-	-	-	-
280M	75	M20X42	140	100	20	67.5	12	500	450	550	18.5	5	22	-	-	-	-	-	-	-	-	-	-
315S (1)	65	M20X42	140	100	18	58	11	600	550	660	24	6	24	-	-	-	-	-	-	-	-	-	-
315M (1)	65	M20X42	140	100	18	58	11	600	550	660	24	6	24	-	-	-	-	-	-	-	-	-	-
315L (1)	65	M20X42	140	100	18	58	11	600	550	660	24	6	24	-	-	-	-	-	-	-	-	-	-
315S	80	M20X42	170	130	22	71	14	600	550	660	24	6	24	-	-	-	-	-	-	-	-	-	-
315M	80	M20X42	170	130	22	71	14	600	550	660	24	6	24	-	-	-	-	-	-	-	-	-	-
315L	80	M20X42	170	130	22	71	14	600	550	660	24	6	24	-	-	-	-	-	-	-	-	-	-
355M (1)	75	M24X50	140	110	20	67.5	12	740	680	800	24	6	25	-	-	-	-	-	-	-	-	-	-
355L (1)	75	M24X50	140	110	20	67.5	12	740	680	800	24	6	25	-	-	-	-	-	-	-	-	-	-
355M	95	M24X50	170	140	25	86	14	740	680	800	24	6	25	-	-	-	-	-	-	-	-	-	-
355L	95	M24X50	170	140	25	86	14	740	680	800	24	6	25	-	-	-	-	-	-	-	-	-	-

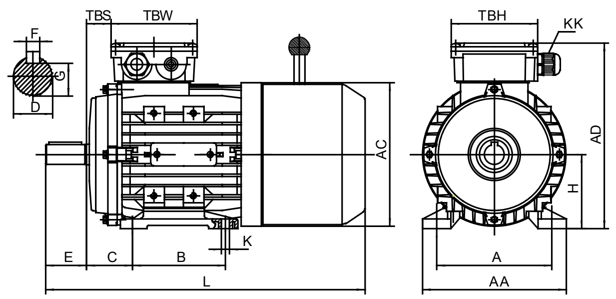
(1) 2 Pole motors only

FIMM®

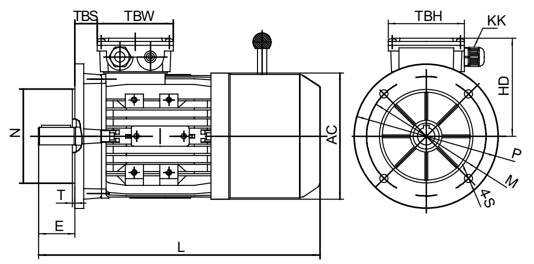
FIMM®

Dimensions BRAKE MOTOR

Brake Motor Dimension

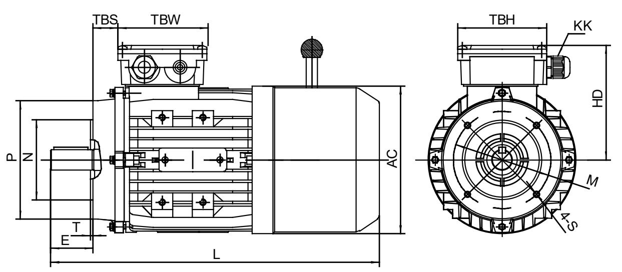


IMB3

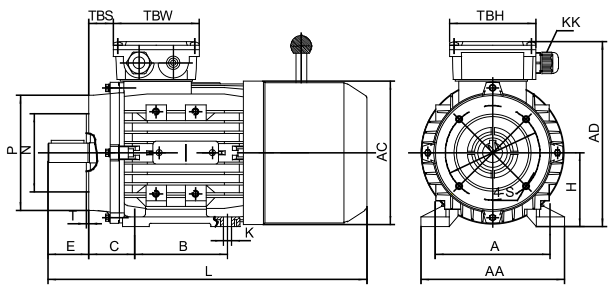


IMB5

FRAME	Foot Mounting				Shaft								General							
	H	A	B	C	D	E	F	G	K	SS	XX	ZZ	AA	AD	HD	AC	L	TBS	TBW	TBH
71	71	112	90	45	Φ14	30	5	11	7*10	M5	12	17	150	195	115	Φ145	301	20	94	94
80M	80	125	100	50	Φ19	40	6	15.5	10*13	M6	16	21	165	220	133	Φ175	300	27	105	105
90S	90	140	100	56	Φ24	50	8	20	10*13	M8	19	25	180	250	139	Φ195	420	30	105	105
90L	90	140	125	56	Φ24	50	8	20	10*13	M8	19	25	180	250	139	Φ195	445	30	105	105
100	100	160	140	63	Φ28	60	8	24	12*15	M10	22	30	205	270	152	Φ215	480	26	105	105
112M	112	190	140	70	Φ28	60	8	24	12*15	M10	22	30	230	300	167	Φ240	510	32	112	112
132S	132	216	140	89	Φ38	80	10	33	12*15	M12	28	37	270	345	186	Φ275	585	38	112	112
132M	132	216	178	89	Φ38	80	10	33	12*15	M12	28	37	270	345	186	Φ275	625	38	112	112
160M/L	160	254	210/254	108	Φ42	110	12	37	15*19	M16	36	45	320	420	224	Φ330	720/765	64	143	143

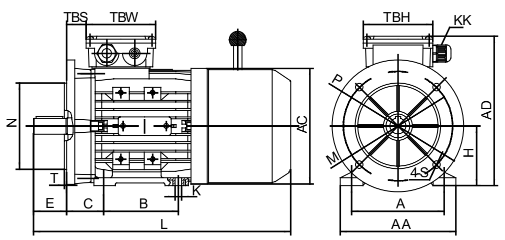


IM B14

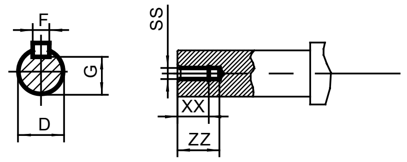


IM B34

FRAME	KK	B5					B14C/2					B14C/1				
		N	M	P	S	T	N	M	P	S	T	N	M	P	S	T
71	M18	Φ110	Φ130	Φ160	Φ10	3.5	Φ70	Φ85	Φ105	M6	2.5	Φ95	Φ115	Φ140	3	M8
80	M20	Φ130	Φ165	Φ200	Φ12	3.5	Φ80	Φ100	Φ120	M6	3	Φ110	Φ130	Φ160	3.5	M8
90	M20	Φ130	Φ165	Φ200	Φ12	3.5	Φ95	Φ115	Φ140	M8	3	Φ110	Φ130	Φ160	3.5	M8
100	M25	Φ180	Φ215	Φ250	Φ15	4	Φ110	Φ130	Φ160	M8	3.5	Φ130	Φ165	Φ200	3.5	M10
112	M27	Φ180	Φ215	Φ250	Φ15	4	Φ110	Φ130	Φ160	M8	3.5	Φ130	Φ165	Φ200	3.5	M10
132	M27	Φ230	Φ265	Φ300	Φ15	4	Φ130	Φ165	Φ200	M10	3.5	Φ180	Φ215	Φ250	4	M12
160	M32	Φ250	Φ300	Φ350	Φ19	5	Φ180	Φ215	Φ250	M12	4	Φ230	Φ265	Φ300	4	M12



IM B35



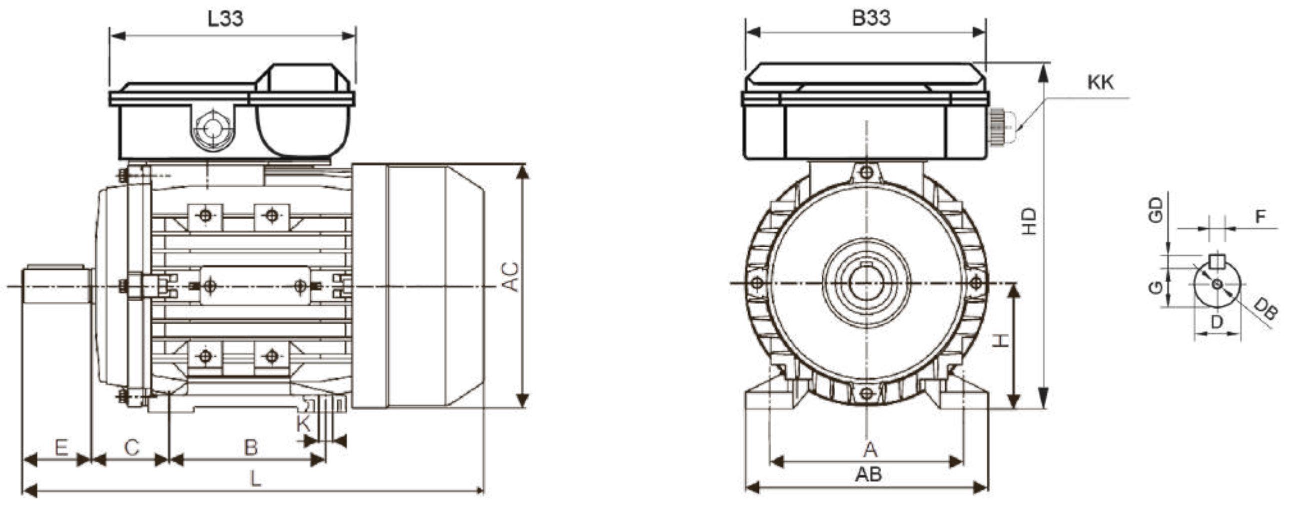
DIMENSIONS

FIMM®

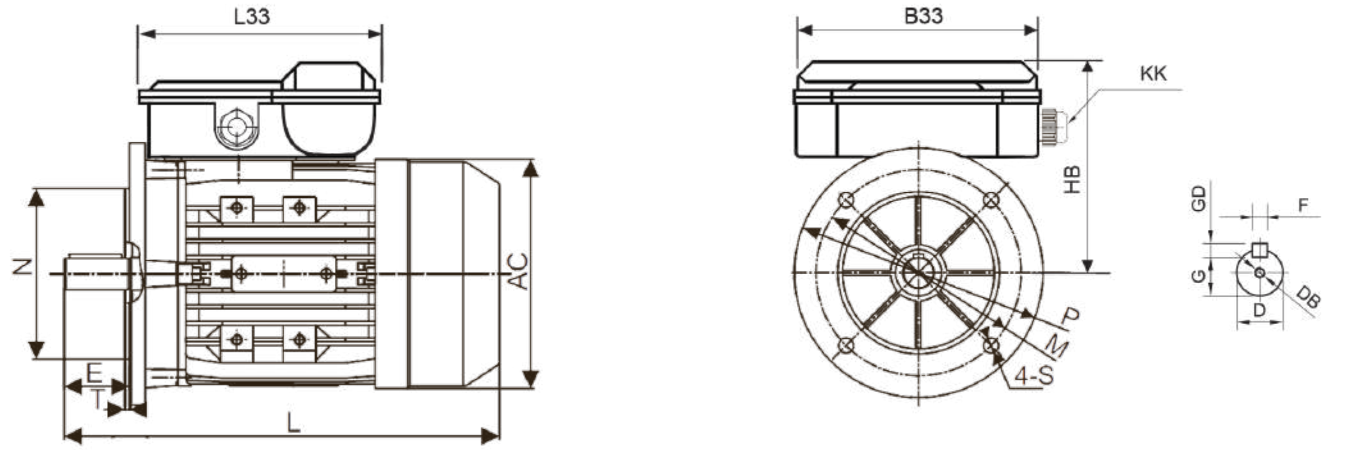
Dimensions SINGLE PHASE

Single Phase Dimension

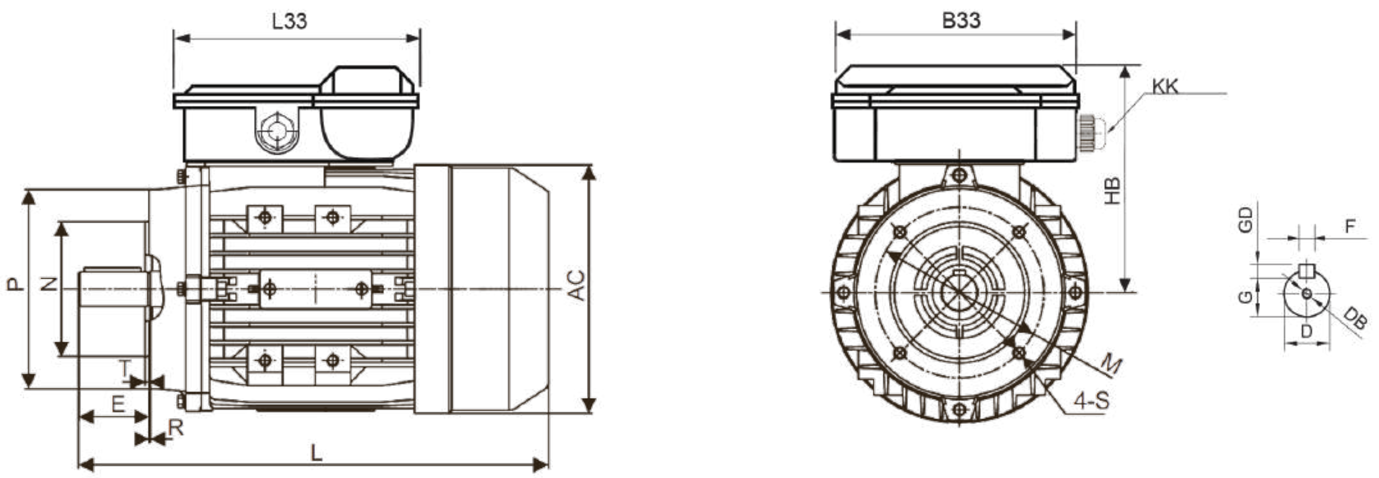
IMB3



IMB5



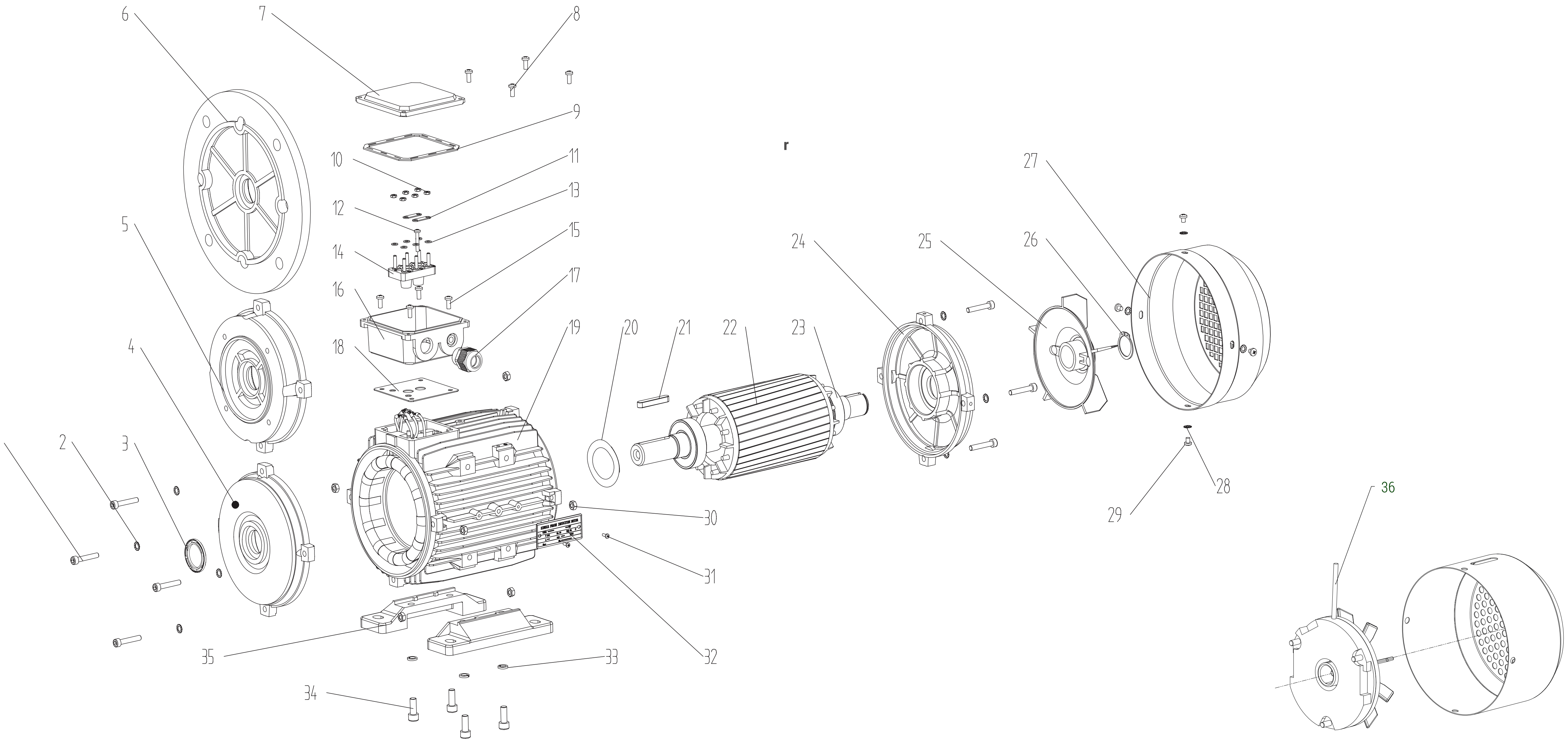
IMB14



Frame size	General							Feet				
	B3, B5, B14							B3				
	AC	B33	HB	HD	KK	L	L33	A	AB	B	C	H
71	132	109	114	182	M15	255	152	112	140	90	45	71
80	148	126	132	211	M18	302	180	125	157	100	50	80
90S	168	137	150	240	M18	341	201	140	174	100	56	90
90L	168	137	150	240	M18	361	201	140	174	125	56	90
100L	190	144	160	264	M18	401	208	160	196	140	63	100
112M	211	144	170	282	M18	401	208	190	218	140	70	112

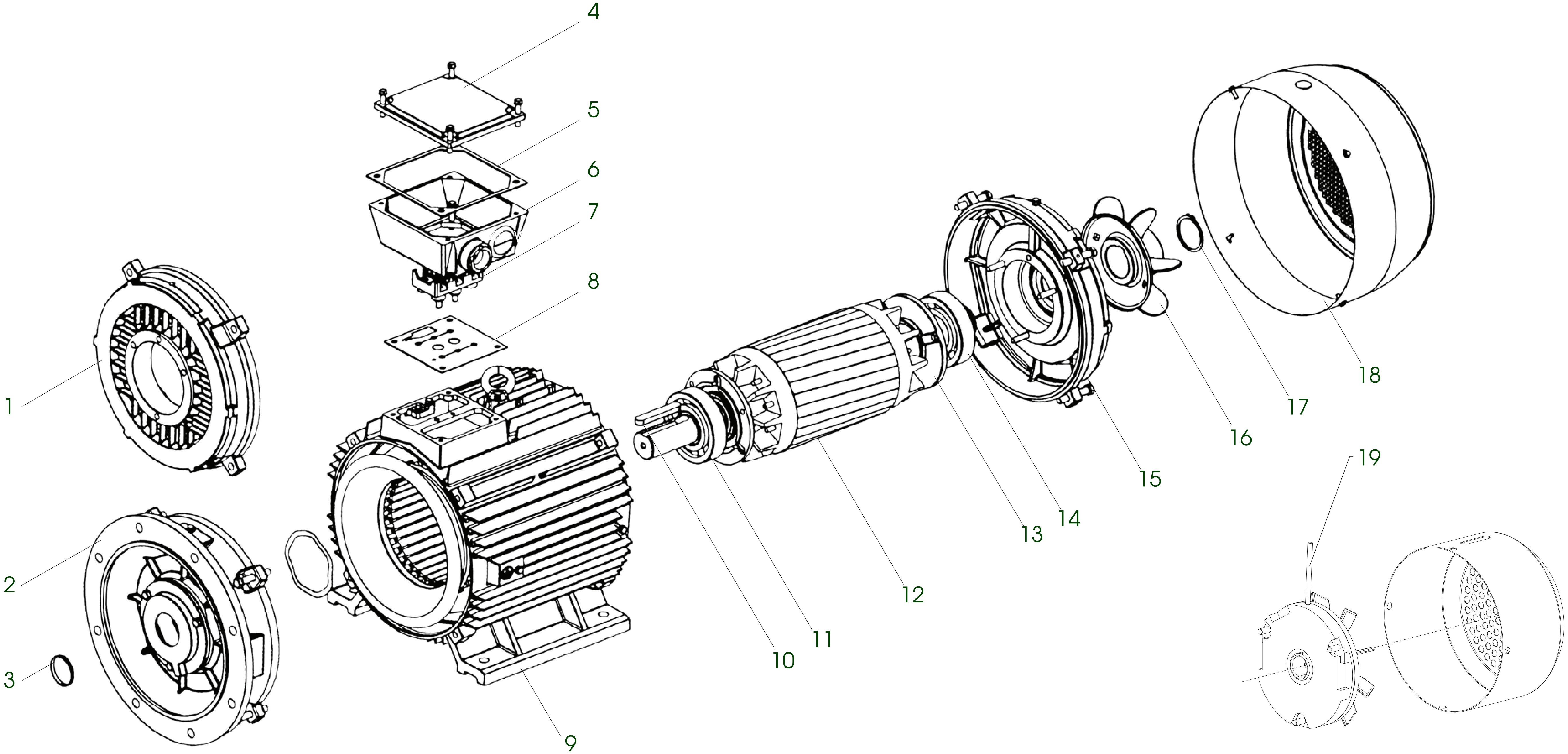
Frame size	Shaft						Flange									
	B3, B5, B14						B5					B14				
	D	DB	E	F	G	GD	M	N	P	S	T	M	N	P	S	T
71	14	M5	30	5	11.0	5	130	110	160	10	3.5	85	70	105	M6	2.5
80	19	M6	40	6	15.5	6	165	130	200	12	3.5	100	80	120	M6	3.0
90S	24	M8	50	8	20.0	7	165	130	200	12	3.5	115	95	140	M8	3.0
90L	24	M8	50	8	20.0	7	165	130	200	12	3.5	115	95	140	M8	3.0
100L	28	M10	60	8	24.0	7	215	180	250	15	4.0	130	110	160	M8	3.5
112M	28	M10	60	8	24.0	7	215	180	250	15	4.0	130	110	160	M8	3.5

Exploded view (Aluminium), Brake Motor



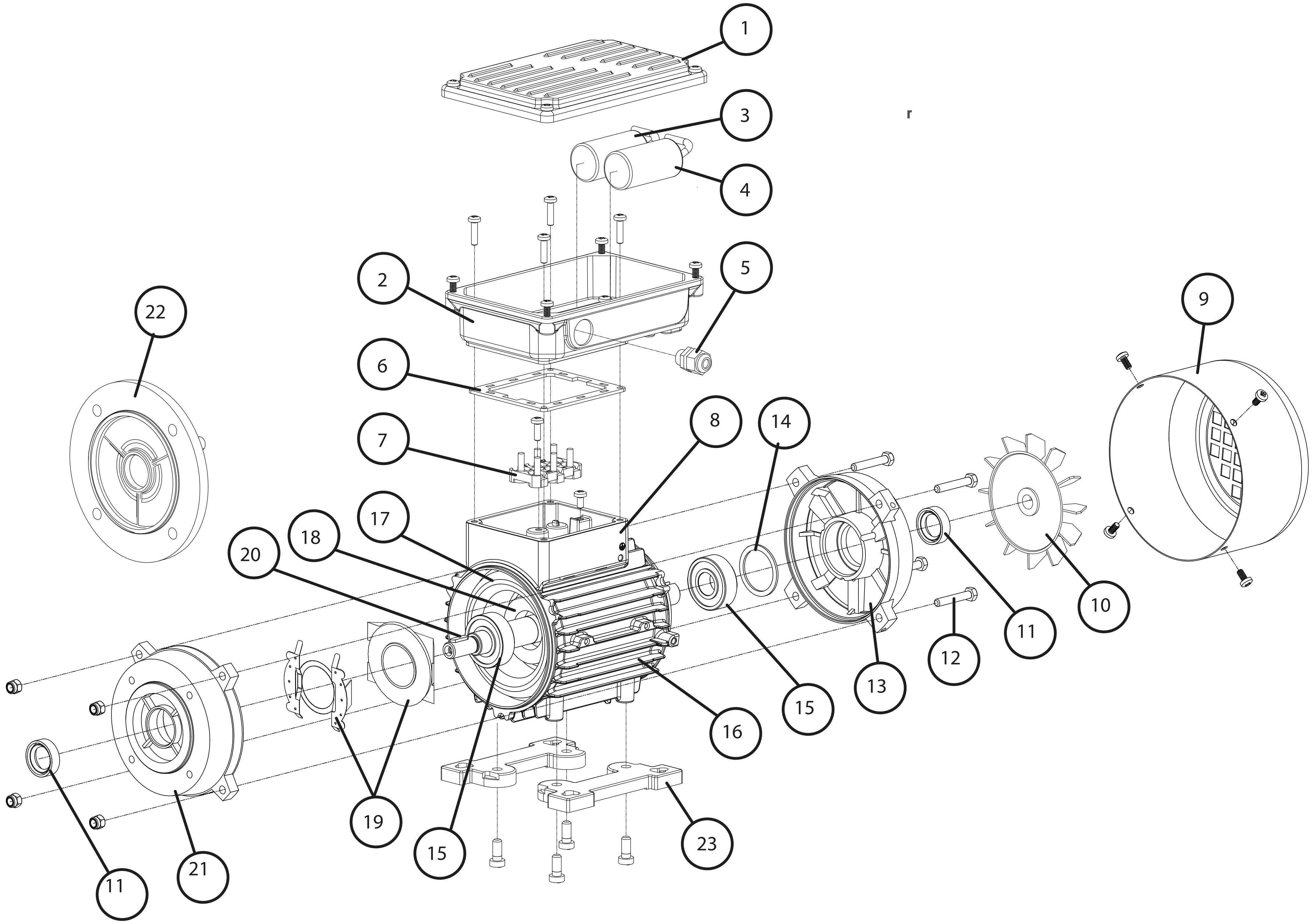
1. Screw
2. Gasket
3. Oil seal
4. Front endshield
5. B14 flange
6. B5 flange
7. TB cover
8. TB fixing screws
9. TB upper gasket
10. Terminal board fixing nut
11. Terminal bridge
12. Terminal pin
13. Terminal shim
14. Terminal board
15. TB fixing screws
16. TB base
17. Cable gland
18. TB bottom gasket
19. Frame
20. Preload washer
21. Key
22. Rotor
23. Bearing
24. NDE endshield
25. Cooling fan
26. Fan circlip
27. Fan cover
28. Fan cover fixing shim
29. Fan cover fixing screws
30. Endshield fixing nut
30. Endshield fixing nut
31. Rivet
32. Nameplate
33. Foot fixing nut
34. Foot fixing screws
35. Foot
36. Brake

Exploded view (Cast Iron), Brake Motor



1. Endshield D.E
2. Flange
3. Oil seal
4. Terminal Box Lid
5. Seal Gasket
6. Terminal Box Base
7. Terminal Board
8. Terminal Gasket
9. Stator
10. Key
11. Bearing D.E
12. Rotor
13. Inner Bearing Cap
14. Bearing N.D.E
15. Endshield N.D.E
16. Fan
17. Snap Ring
18. Fan Cowl
19. Brake

Exploded view (Single Phase)



Item	Description
1.	Terminal Box Cover
2.	Terminal Box Base
3.	Capacitor Start
4.	Capacitor Run
5.	Gland
6.	Rubber gasket
7.	Terminal Board
8.	Terminal Box
9.	Fan Cover
10.	Fan
11.	Shaft Seal
12.	Tie Rod
13.	NDE Shild
14.	Spring Washer
15.	Bearing
16.	Housing
17.	Stator
18.	Rotor
19.	Centrifugal Switch
20.	Key
21.	DE Shield
22.	Flange End Shield
23.	Feet

Bearing

Frame size	DE	NDE
63	6201 2RZC3	6201 2RZC3
71	6202 2RZC3	6202 2RZC3
80	6204 2RZC3	6204 2RZC3
90	6205 2RZC3	6205 2RZC3
100	6206 2RZC3	6206 2RZC3
112	6306 2RZC3	6306 2RZC3
132	6308 2RZC3	6308 2RZC3
160	6309 ZZC3	6309 ZZC3
180	6311 C3	6311 C3
200	6312 C3	6312 C3
225	6313 C3	6313 C3
250	6314 C3	6314 C3
280 (2 Poles)	6314 C3	6314 C3
280	6317 C3	6317 C3
315 (2 Poles)	6316 C3	6316 C3
315	6319 C3 / NU319	6319 C3
355 (2 Poles)	6319 C3	6319 C3
355	6322 C3 / NU322	6322 C3

Bearing lubrication

It should be noted that for motor fitted with Ball and Roller bearing, the lubrication intervals for both bearings should be based on the roller bearing data. The lubrication intervals recommend are calculated on the basis of normal working conditions (operating temperatures up to 70°C). FIMM motors are equipped with bearings from excellent manufactures. We recommend using SKF, FAG or NSK Brand. In general the bearings have C3 clearances. The motor of frame size 80-132 are fitted with life-lubricated bearings. The motor of frame size 160-355 are fitted with open bearings and regreasing device. Depending on the useful life of grease, open bearings must be regreased in good time so that the scheduled bearing service life is reached. We recommend using Shell Gadus S3 V220C-2 and BP Energrease LS2. Angular contact thrust ball bearings should be used for vertical mounting motor.

Frame size	Drive end bearing	Non-drive end bearing	Maximum regreasing period hours for operating temperatures up to 70°C			Quantity of grease in bearing chamber grams
			rpm<3600	rpm<1800	rpm<1200	
160	6309 ZZC3	6309 ZZC3	6000	12000	18000	13
180	6311 C3	6311 C3	4000	11000	16000	15
200	6312 C3	6312 C3	3500	8500	13000	20
225	6313 C3	6313 C3	3000	6000	9000	22
250	6314 C3	6314 C3	2000	5000	8000	23
280*	6314 C3	6314 C3	1200	-	-	30
280	6317 C3	6317 C3	-	4000	6000	30
315*	6316 C3	6316 C3	1200	-	-	30
315	NU319 C3/6319C3	6319 C3	-	2000	3000	45
355*	6319 C3	6319 C3	1200	-	-	45
355	NU322 C3/6322 C3	6322 C3	-	1400	2200	60

Notes:

* 2 Pole motors only

1. Vertical motors should be greased twice as often as horizontal motors.

2. Regreasing time should be reduced if bearing operating temperature is in excess of 70 C

Operation and Maintenance

OPERATION

- Before running the motor make sure that the terminal box lid is closed and secured with appropriate clearance to live parts.
- Make sure that appropriate earthing is done.
- Make sure that the coupling and/or transmission is adequately guarded for safety.
- Check the mounting bolts and/or flanges are firmly secured.
- Make sure of no loose objects around that may be sucked by the cooling fan on the motor.
- Make sure that the load applied is within the nameplate specification.
- Make sure that the ambient temperature is inside 40°C or nameplate specification, record the figures in the log book for future reference. Note that the current imbalance can be higher, typically 10 times the voltage imbalance if there is an imbalance in supply voltage.

MAINTENANCE SCHEDULE FOR MOTORS

Description	Comments	Maintenance frequency
Motor use/sequencing	Turn off or sequence unnecessary motors.	Weekly
Overall visual inspection	Verify equipment is operating and safety systems are in place.	Weekly
Check bearings and drive belts	Inspect for wear, and adjust, repair, or replace as necessary.	Weekly
Motor alignment	Look for rubber or steel savings under couplings, or listen for odd noises, as these may indicate a problem).	Weekly
Motor condition	Check condition by analyzing temperature or vibration, and compare to baseline values.	Quarterly (or as needed on weekly inspections)
Cleaning	Remove dust and dirt to facilitate cooling.	Quarterly
Check lubrication	Ensure bearings are lubricated as recommended by manufacturer.	Annually (or based on run hours)
Check mountings	Secure any loose mountings.	Annually
Check terminal tightness	Tighten any loose connections.	Annually
Check for balanced three-phase power	Troubleshoot unbalanced motor circuit and fi problems if the voltage imbalance exceeds 1%.	Annually
Check for over- or undervoltage conditions	Troubleshoot motor circuit and fix problems if th supply voltage differs significantly from rated voltages	Annually

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FIMM®

บริษัท วานิชรุ่งเรืองเอ็นจิเนียริ่ง จำกัด
สำนักงานใหญ่ : 32 ถนนพระรามที่ 2 แขวงท่าข้าม เขตบางขุนเทียน กรุงเทพฯ 10150
สาขาหาดใหญ่ : 84/42 หมู่.3 ตำบลคลองแห อำเภอหาดใหญ่ สงขลา 90110

sales_bangkok@vanichgroup.com
https://vanich-eng.com
https://vanichgroup.com

Tel : 0-2898-3000 (สำนักงานใหญ่)
0-7458-0962-4 (สาขาหาดใหญ่)

Fax : 0-2898-3336
0-2898-5051