rotor nl®

NO MOTOR WITHOUT ROTOR

Part of RegalRexnord

Rotor B.V.

Mors 1 - 5
7151 MX Eibergen
Netherlands
Tel. +31 (0)545 - 46 46 40
info.nl@regalrexnord.com
sales.nl@regalrexnord.com
order.nl@regalrexnord.com

www.rotor.nl
www.regalrexnord.com

No motor without Rotor!

This slogan has been long established and with it Rotor BV have been serving the market.

The “rotor nl® electric motors” catalogue is to be used as a practical reference book by both original equipment manufacturers (OEMs) and end users of electric motors.

This catalogue has been structured into five sections:

Section 1. Rotor BV - Regal Rexnord

Section 2. Standards and Directives

Section 3. Motor Information

Section 4. Rotor Product Range

Section 5. Rotor BV Services

In addition to the standard electric motor information and our rotor nl® product range, there is also information about the EuP Directive provided and the related IE1, IE2, IE3 and IE4 standards. This information can be found in Section 2: “Standards and Directives”.

This catalogue has been prepared with great care. Should any errors, omissions or inaccuracies be found, please contact us in due course so corrections can be made in future editions.

We hope that this catalogue will provide an insight view in electric motors and the future development in the market and highlight diversity of our product range. Please feel free to contact us with any questions about our products or services you may have.

We will be happy to assist you!

Table of Contents

Section 1

Rotor BV - Regal Rexnord

An insight information about our company can be found in the following paragraphs. Its history, the present days and the future.

Rotor nl® Service Partners

Rotor has an extensive, branched network of service partners in the Netherlands. Thanks to our service partners, we are able to serve our customers quickly and efficiently. Our service partners include:

GRONINGEN
Facta Appingedam B.V.
Holepolder 1
9902 SM APPINGEDAM
Tel: +31(0)88 73 84 700
appingedam@facta.nl
www.facta.nl
24-hour service: +31(0)6 542 438 82

FRIESLAND
Facta Dronrijp
De Alde Mar 11
9035 VP DRONRIJP
Tel: +31 (0)517 23 12 32
friesland@facta.nl
www.facta.nl
24-hour service: +31 (0)517 23 12 32

OVERIJSSEL
Julo Wikkelbedrijf B.V.
Marssteden 47
7547 TE ENSCHEDE
Tel: +31(0)53 432 40 75
info@julobv.nl
www.julobv.nl
24-hour service: +31(0)53 432 40 75

DRENTHE
Elektromotoren Emmen B.V.
Willem Schoutenstraat 13
7825 VV EMMEN
Tel: +31(0)591 61 69 28
info@elektromotorenemmen.nl
www.elektromotorenemmen.nl
24-hour service: +31(0)6 270 953 97

GELDERLAND
Demri B.V.
Fabriekstraat 39-01
7005 AP DOETINCHEM
Tel: +31(0)314 32 37 53
info@demri.nl
www.demri.nl
24-hour service: +31(0)314 32 37 53

Vos & Julo B.V.
Koningslijn 4
7312 GG APELDOORN
Tel: +31(0)55 355 39 48
info@vosjulo.nl
www.vosjulo.nl
24-hour service: +31(0)55 355 39 48

Hondersloo Elektromotoren
Industrieweg 25
7102 DX WINTERSWIJK
Tel: +31(0)543 51 20 96
info@hondersloelektromotoren.nl
www.hondersloelektromotoren.nl
24-hour service: +31(0)543 51 20 96

NOORD-HOLLAND
Facta Uitgeest B.V.
Westerwerf 11
1911 JA UITGEEST
Tel: +31(0)88 600 02 00
uitgeest@facta.nl
www.facta.nl
24-hour service: +31(0)88 600 02 00

V.o.F. Elektromotorenbedrijf De Vier
Slijperweg 15
1032 KT AMSTERDAM
Tel: +31(0)20 636 04 07
info@elektromotorendevier.nl
www.elektromotorendevier.nl
24-hour service: +31(0)20 636 04 07

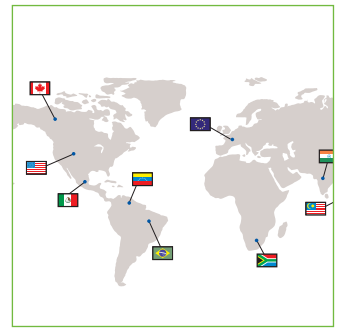
ZUID-HOLLAND
Facta Zevenhuizen B.V.
Nijverheidscentrum 36
2761 JP ZEVENHUIZEN ZH
Tel: +31(0)88 738 47 00
zevenhuizen@facta.nl
www.facta.nl
24-hour service: +31(0)6 537 139 33

Facta Spijkenisse
Röntgenweg 6
3208 KG SPIJKENISSE
Tel: +31 (0)88 60 00 300
spijkenisse@facta.nl
www.facta.nl
24-hour service: +31 (0)88 60 00 300

NOORD-BRABANT
De Bruyn B.V.
Van Konijnenburgweg 105
4612 PL BERGEN OP ZOOM
Tel: +31(0)164 23 43 02
sales@de-bruyn.nl
www.de-bruyn.nl
24-hour service: +31(0)6 482 700 74

LIMBURG
Facta Nederweert B.V.
Pannenweg 208
6031 RK NEDERWEERT
Tel: +31(0)495 63 41 41
nederweert@facta.nl
www.facta.nl
24-hour service: +31(0)6 109 585 64

Antes Aandrijftechniek B.V.
Reeweg 141
6374BW LANDGRAAF
Tel: +31(0)45 531 72 64
info@antes.nl
www.antes.nl
24-hour service: +31(0)6 502 436 70



Rotor BV history

1958 – Establishment
In 1958, Mr. Th. M. Kraakman founded Rotor BV in The Hague when he started importing MEZ electric motors from Czechoslovakia. With a growing market for standard electric motors and a strong increase in turnover and stock, Rotor outgrew The Hague facility. With few local expansion choices and a shortage of expert staff, Mr. Kraakman decided to relocate.

1974 - Relocation
Rotor moved to Eibergen in 1974, which gave the company the opportunity to produce special electric motors. This is where the Rotor NL® electric motor was born. The growing need for motors in fields such as shipping, offshore use, and the petrochemical industry also meant there was a larger demand for motors tailored to specific applications and operating conditions. At its new facility, Rotor BV could produce these customized motors in house which could not only fulfil the need for particular applications, but also meet industry standards for factors like efficiency, noise level and maintenance.

1983 - Expansion
By 1983, Rotor BV had become a company with 80 employees, a building complex the size of four football pitches and a stock of thousands of electric motors. That same year, the company drove the first pile for the construction of new production halls with an area of about 4,000 square meters.

1997 - Rotor Belgium
"Rotor expanded in April 1997, opening a branch in Gent-Drongen, Belgium, to strengthen its position abroad. The branch, under the name of Rotor Belgium, was in operation until January 2008. For the next ten years, the branch operated independently under the leadership of M. Dhoedt as Rotec Motors and Gears BVBA. Currently, all Rotor BV relations from Belgium, Luxembourg and France can contact our Eibergen office directly for technical and commercial information."

2004 - Rotor expands with Rotor UK
Rotor BV became an internationally visible player with the acquisition of the electric motors division of Exico Limited in May, 2004. Exico, based in Wellingborough, Great Britain, continued under the name Rotor UK Ltd. The acquisition significantly increased Rotor's market share in the UK and allowed the company to serve existing British customers more efficiently.

2005 - Introduction of the Rotor nl® Flameproof Electric Motor
For environments presenting a risk of explosion, electric motors became available in types 3RD and 4RD in accordance with CENELEC EN 50014, EN 50018 and EN 50019 standards (IEC 79-0, IEC 79-1). Rotor BV became an ATEX certified company and the first company in drive technology to comply with the provisions of the European directive ATmospheres EXplosives (ATEX directive 94/9 / EC).

2005 - Implementation of new ERP System
In October 2005, we switched to the Microsoft Dynamics ERP Business solution, contributing to a further increase in productivity. This would soon lead to new functionality that allows us to quickly configure our products.

2006 - Management buy-out at Rotor BV in Eibergen
In January 2006, a buyout agreement between existing Rotor BV management and shareholders ensured the continuity and growth of Rotor BV.

2007 - New layout of the production lines
Strong turnover growth (greater than 50 percent between 2004 and 2006) was reason enough to reorganize and optimize our production facility. New production lines gave Rotor BV the capability to continue to grow and meet the needs of our customers.

2010 - Acquisition by Regal Beloit Corporation
In September 2010, Regal Beloit, a United States-based manufacturer of motors and related components, bought the shares of Rotor BV. The acquisition expanded Regal's market share in Europe as well as provided Rotor BV with new opportunities for growth and development.

2012 - Test center equipped with new test stand
A new test facility was installed with a closed loop variable frequency drive (VFD) system including a data logger for type testing of large motors up to 1000kW. (1 MegaWatt) The workload energy is regenerated and fed back into a closed loop power supply again, which contributes to a green solution.

2014 - New paint booth
A highly modern paint booth has been installed in our facility capable of handling advanced painting standards. The area is now conditioned and constant measurement of temperatures, dewpoint and relative humidity ensure the best results. The large area expanded our capacity close to a tenfold.

2016 - Test stand upgrade
The success of the new test stand installed in 2012 led to another upgrade of that system. The extended test system enables us to perform tests up to 13.8kV for medium voltage motors.

2017 - Rotor BV and Regal Beloit BV now merged together
November 2017 we initiated the merge of Regal Beloit BV with Rotor BV. Continuing under the name Rotor BV, this allows us to serve our customers with just one process in place, combining the strength of both companies.

2018 - Rotor BV exists 60 years
Celebrating the existence of Rotor for of 60 years, many customers were invited for a tour on our premises, as well as a helicopter flight above Eibergen and our premises. Being together with the full Rotor team resulted in a fruitful and memorable day for all.

2021 - Regal merge with Rexnord
In the fall of this year, the merger of Regal Beloit Corporation and the Rexnord Process & Motion Control (PMC) business has taken place. With the new name Regal Rexnord, it will combine the strength of engineering and manufacturing of power transmission solutions and high-efficiency electric motors and systems.

Regal Rexnord Corporation

Rotor B.V. joined the American electrical group Regal Beloit Corporation in September 2010.
In the fall of 2021, the merger of Regal Beloit Corporation and the Rexnord Process & Motion Control (PMC) business has taken place. With the new name Regal Rexnord, it will combine the strength of engineering and manufacturing of power transmission solutions and high-efficiency electric motors and systems.

Regal Rexnord Corporation, with 2020 revenue of $4.1 Billion and 29,000 associates, is a global leader in the engineering and manufacturing of industrial powertrain solutions, power transmission components, electric motors and electronic controls, air moving products, and specialty electronics, serving customers throughout the world.

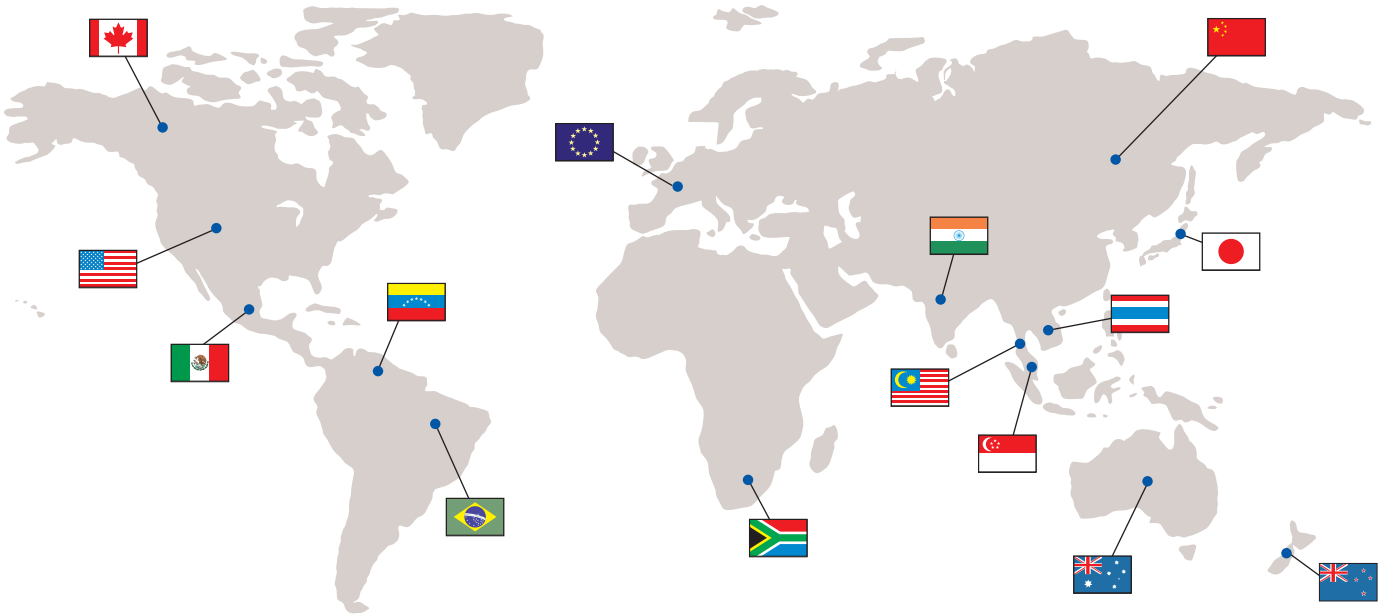
Regal Rexnord is comprised of four operating segments: Motion Control Solutions, Climate Solutions, Commercial Systems and Industrial Systems. Through longstanding technology leadership and an intentional focus on producing the most energy-efficient products and systems, Regal Rexnord helps create a better tomorrow – for its customers and for the planet. Regal is headquartered in Beloit, Wisconsin and has manufacturing, sales, and service facilities worldwide.

Rotor BV Today

Rotor BV, a subsidiary of Regal Rexnord Cooperation, is a leading supplier of electric motors for some of the most demanding applications in the Marine world. For over 60 years, we developed an unique expertise that enables us to engineer and deliver the best tailor-made solutions at a world-class service level. We take pride in our capability to provide customized, flexible solutions at a quick turnaround time. Rotor is headquartered in Eibergen - the Netherlands, with production, sales, engineering, and service facilities throughout Europe and Asia.

When you choose Rotor, you leverage a unique source of knowledge and global experience with local know-how to efficiently optimize and meet your drive requirements.

We create a better tomorrow
by efficiently converting power into motion



Our values

Our Mision

With the strength of a multinational corporation and the expertise and agility of a niche player, Rotor NL aims to be our clients' first choice in every market we serve. The core of our offering features our unique flexible service model, application knowledge and best-in-class customer service.
At the center of Rotor is our knowledge. By combining our knowledge with new technologies, we will continue to provide innovative solutions and meet the future needs of the industries we serve."

Our Vision

We strive to create a better tomorrow by providing our customers the best and most efficient motor solutions and services in a smart and sustainable way.

Our values

Integrity

A zero tolerance policy on unethical behavior. We value integrity most. We are honest, transparent, and trustworthy in all situations.

Responsibility

We have a responsibility to safety, sustainability, and our community.

Diversity, Engagement & Inclusion

We strongly believe that the more diverse minds focused on our purpose, the better the outcomes will be. We create an environment where all of associates can bring their best to Rotor, develop and grow professionally, and work as one team to drive success for our customers, associates, and shareholders.

Customer Success

Our customer is our main priority. We must understand their needs and develop products, solutions and services that solve their challenges.

Innovation with Purpose

Through innovation we develop products and solutions that solve our customer's problems. We innovate to develop products that are valued by our customer and bring profitable growth for Rotor.

Continuous Improvement

Our responsibility is to make tomorrow better than today. This means a focus on making the work easier, more productive, and more efficient.

Performance

We have a responsibility to all three of our primary stakeholders (customers, associates and shareholders) to drive profitable revenue growth.

Passion to win

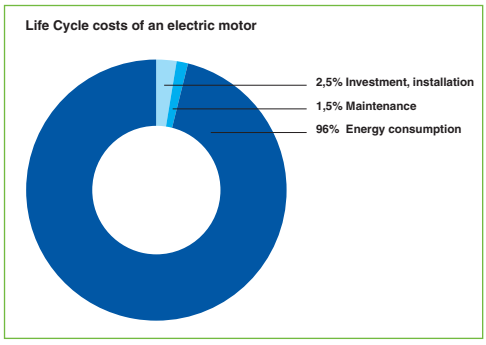
Passion is the fuel that inspires and drives our associates to achieve top performance. It helps us to overcome any obstacles in achieving our goals.

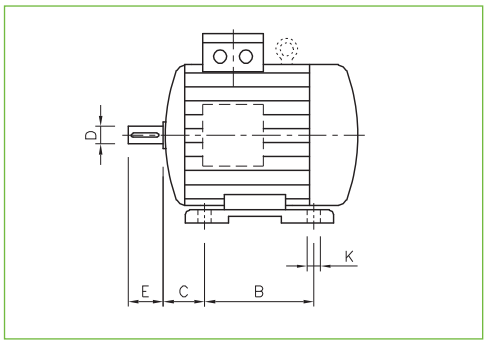
....with a Sense of Urgency

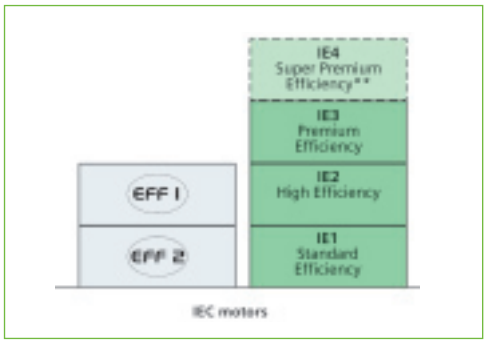
Everything we do at Rotor, we do with a sense of urgency.

Section 2

Standards and Directives



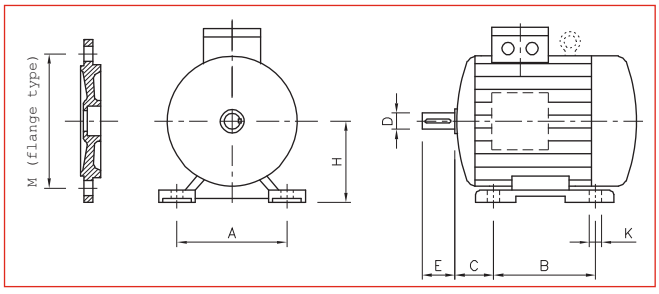




The following pages contain information about the new standards and guidelines of rotor nl® motors comply with and a comprehensive description of ATEX motors.

Standard Electric Motors

It may not be quite clear which standard(s) are applicable when a reference is being made to “standard electric motors”. The designer of a driven equipment always aims at the highest level of exchangeability for all components but often incorrectly assumes that any “standard electric motor” can always be replaced with another “standard electric motor” made by a different manufacturer without a problem.
The most important construction features are defined in the EN 50 347 standard, which specifies the frame size (distance from the floor to the shaft centre in mm) and the mounting dimensions of the feet and their position in relation to the shaft



as well as the shaft key sizes, flange sizes and flange fitting dimensions (see figure 1). The standard however does not specify the other motor dimensions such as the motor length, the the position and the size of the terminal box, or the motor frame sizes in relation to all power outputs.

The relation between the motor frame sizes and power outputs as well as the shaft and flange sizes are specified in the EN 50 347 standard for single speed electric motors. rotor nl® electric motors fully comply with this standard and all motor combinations can be supplied accordingly.
Additionally rotor nl® Increased Output Electric Motors can be supplied. These motors have higher power output when compared with Power Output/Frame Size combinations specified in the standard. The Increased Output Motors additional to the standard motors specified in the standard are clearly indicated in the Rotor standard documentation and/or applicable Price List.
Please be informed that the standard does not specify a specific position of the terminal box. The motor manufacturer can therefore decide on a position of the terminal box as “on top”, “on the right” or “on the left” side when viewed from the DE (drive end) of the electric motor. Most electric motor manufacturers prefer to position the terminal box “on top” with the option to rotate the cable entry 4 x 90°.

Standards and European Directives

Standards

All electric motors featured in this catalogue meet the relevant IEC, EN, ISO, DIN and NEN standards. The most important standards are listed in the table.

European Directives

Rotor nl® electric motors meet all European Directives and have CE mark displayed.

EC manufacturer declaration in accordance with European standards:

Rotor B.V., Mors 2, 7151 MX Eibergen, the Netherlands, declare under their sole responsibility that the product (electric motors) marked as rotor nl®, RN series and any derived executions to which this declaration applies are in conformity with the relevant harmonized standards:

In accordance with the provisions of the European Directives;

2014/35/EU Directive of the European Parliament and of the Council of 26th February 2014 on the harmonization of the laws of Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits, Official Journal of the EU L96, 29/03/2014, p. 357-374.

(EC) Nr. 640/2009 Commission Regulation of 22 July 2009 implementing Directive 2005/32/EC (2009/125/EC) of the European Parliament and of the Council with regard to ecodesign requirements for electric motors (as modified by Commission Regulation (EU) No. 4/2014 of 06 January 2014).

Eibergen - The Netherlands, 30th May 2018

This declaration certifies compliance with the directives named above, but does not guarantee any specific properties or durability. The safety information and instructions in the supplied product documentation must be carefully observed.

Description	EN-IEC	ISO	DIN
Nominal operation and properties	IEC 60034-1		
Protection degrees	IEC 60034-5		DIN 40050
Cooling method	IEC 60034-6		
Construction forms	IEC 60034-7		
Turning direction and marking on connection terminals	IEC 60034-8		
Maximum noise production	IEC 60034-9		
Connection voltage	IEC 60038		
Dimensions, tolerances	EN 50347		
Balancing		ISO 2373	DIN 45665
Energy Efficiency	IEC 60034-30		

IE Directives

Electric motors are clearly the largest consumers of electricity in the European Union. With approximately 680 TWh of electricity consumption per year, they account for up to 59% of the total power generation. Thanks to the directives stipulating ecological design and the implementation of energy labelling, electric motors can save up to 135 TWh/year* (a consumption reduction of nearly 20%).

Classification of Electric Motors

The former CEMEP voluntary EU agreement (CEMEP is the European Committee of Manufactures of Electrical Machines and Power Electronics) has been replaced by the EuP Directive, which must be implemented in the national legislation in all member states of the European Union. It classifies the following three levels of energy efficiency:

IE1—standard efficiency;
IE2—high efficiency;
IE3—premium efficiency.
IE4—super premium effiency.

IE stands for International Efficiency. The new IE coding replaces the former EFF1 and EFF2 classifications. The relationship between the different efficiency classifications is shown in Figure 1. The new EuP Directive applies to:

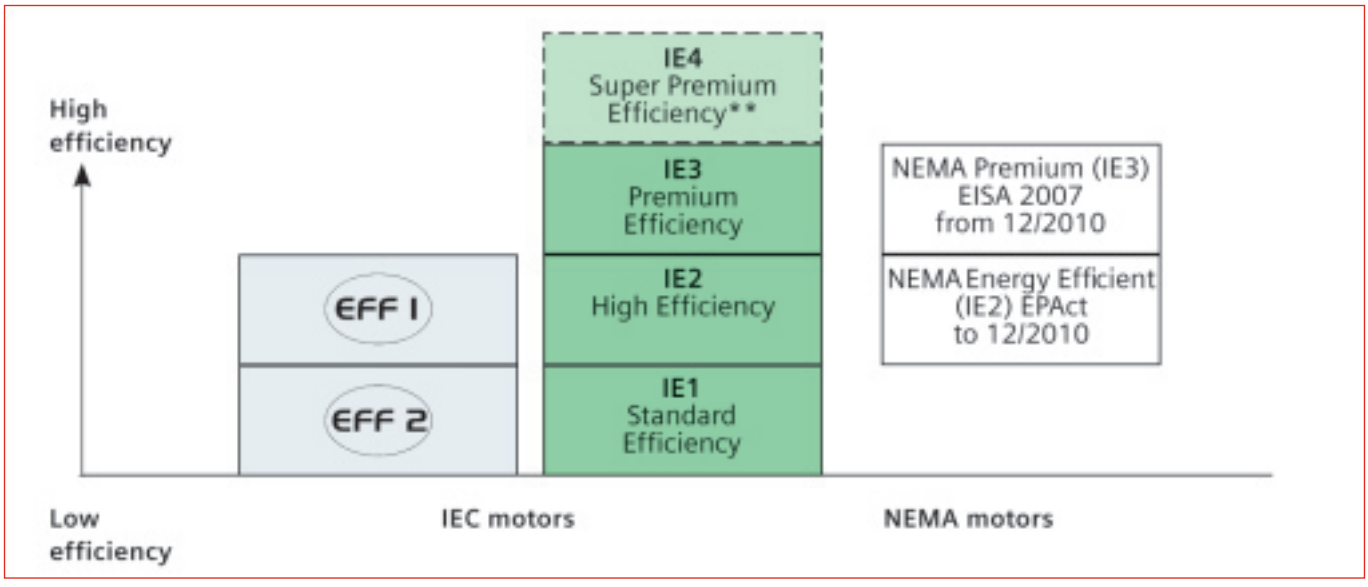
—2 to 6—pole electric motors

—with a nominal U_N voltage of up to 1,000 V

—a nominal P_N power between 0.75 kW and 375 kW

—classified on the basis of continuous operation (S1)

Figure 1: Comparison of standards



** TWh = TerraWatt Hour. One TWh is equal to one billion KiloWatt Hours.*

*** IE4: under development.*

Life Cycle Costs

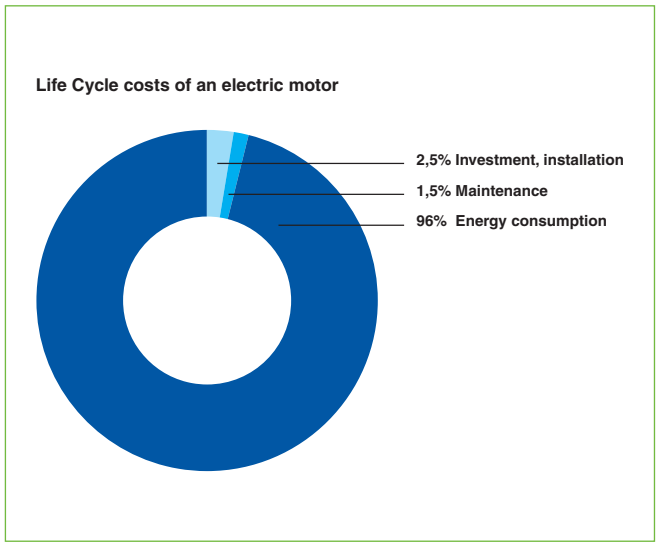
During the electric motor life-cycle, the operating costs are determined mainly by the energy costs. These are 95% to 99% of the total cost of the electric motor during its life-cycle.

Besides the better energy efficiency the IE2, IE3 and IE4 electric motors provide also other benefits:

— The higher efficiency results in less less heat needed to be dissipated so a smaller fans are used.

— The smaller fans result in less ventilation losses and a reduction of noise level.

— The other benefit is the lower motor temperature as it is a direct result of the improved electric motor design, making IE2, IE3 and IE4 electric motors suitable for applications with ambient temperatures exceeding 40°C.



The new Directive ensures that only improved design motors are placed on the market, which means that the IE1 motors (formerly EFF2) became the lowest efficiency limit, the old EFF3 efficiency class completely eliminated and the new more efficient “premium efficiency” IE3 motors will supersede the current standard of “high efficiency” IE2 motors (formerly EFF1).

The efficiency of IE3 electric motors is higher than that of lower class electric motors such as IE2 (EFF1) and IE1 (EFF2) electric motors.

Please note that the greater the power output of an electric motor the higher the efficiency and the smaller the differences in efficiency between the individual classes. See Figure 2.

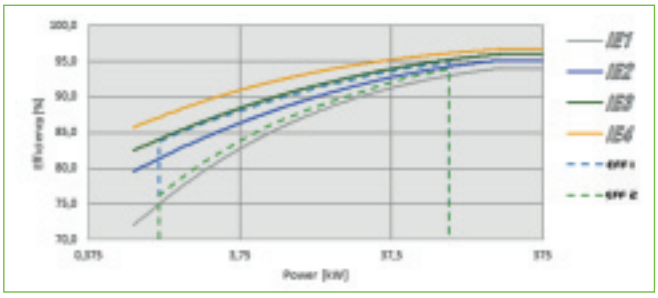


Figure 2: Classification of electric motors 0.75-375 kW according to IE labels.

The main changes between the former CEMEP agreement and the new EUP Directive standard are shown schematically in the figure below.

	CEMEP voluntary EU agreement	NEMA EPAct	EuP Directive based on standard IEC 60034-30 (EuP Directiuve still has to be passed; EuP = Energy Using Product)
Description	Voluntary agreement between the EU Commission and the European Committee of Manufactures of Electrical Machines and Power Electronics CEMEP	The current legislation in the US / CAN / MX also regulates efficiency	The EuP Directive must be implemented in national legislation in all European Countries. IEC 60034-2-1 is the basis for determining losses and therefore determining the efficiency.
Number of poles	2, 4	2, 4, 6	2, 4, 6
Power range	1.1 - 90 kW	0.75 - 150 kW	0.75 - 375 kW
Level	Standard - EFF3 Improved efficiency - EFF2 High efficiency - EFF1	High Efficiency NEMA Premium	Standard Efficiency - IE1 High Efficiency - IE2 Premium Efficiency - IE3 Super Premium Efficiency - IE4
Voltage	400 V, 50 Hz	230/460 V, 60 Hz	< 1000V, 50/60 Hz
Degree of protection	IP5X	Open + enclosed motors (IP23 + IP56)	All
Motors with brake	NO	YES	Being harmonized
Geared motors	NO	NO	YES
Explosion-proof motors	NO	YES	EuP Directive - being harmonized IEC 60034-30 - YES (however, explosoin protection always has the higher priority)
Validity	Voluntary agreement; this will be withdrawn when national implementation comes into effect	From 12/2010 NEMA Premium (IE3) minimum efficiency	Standard IEC 60034-30, valid since October 2008, EuP (measures still have to be finally passed), legal transition period is then 36 months.

What does the new standard mean for Rotor and for you?

As from 1st June 2011 Rotor is longer able to supply 5RN electric motors that do not meet the criteria set out in the new EuP standard. The new 6RN electric motors will replace the old range. The new 6RN electric motors contain more copper and other materials in order to reduce energy losses and improve electric motor efficiency. The 6RN electric motors meet the new IE2 standard.

The 6RN electric motors are being marketed at higher prices to reflect the additional material used.

Because of the higher efficiency of the 6RN electric motors, the capital cost payback period is shorter.

EuP Directive implementation dates

16th June 2011: All new manufactured electric motors must be of the IE2 efficiency standard or higher

1st January 2015: Electric motors with the nominal power output of 7.5kW to 375 kW must be of the IE3 efficiency standard (IE2 motors can be used for a frequency inverter duty)

1st January 2017: Electric motors with the nominal power output of 0.75kW to 375 kW must be of the IE3 efficiency standard (IE2 motors can be used for a frequency inverter duty)

If you have any question concerning the new standards and the consequences for your company, please contact our Contact Centre at +31 (0)545-464640.

ATEX Motors

ATEX is an abbreviation for the French “ATmosphère EXplosible” and is used as a synonym for the two European Directives related to explosion hazard in atmospheric conditions.

The ATEX legislation directives:

- ATEX 114 directive specifies **the construction** of equipment and protection systems intended for use in potentially explosive atmospheres
- ATEX 153 directive specifies to **the use** of equipment and protection systems intended for use in potentially explosive atmospheres.

The designations for both directives are:

Directive	Old number	New number	Application
2014/34/EU	ATEX 95	ATEX 114	for manufacturers
1999/92/EC	ATEX 137	ATEX 153	for equipment users

ATEX Directive 114

This directive sets out the essential health and safety requirements (EHSR) for equipment and protection systems intended for use in potentially explosive atmospheres.

Classification in Groups

The relevant equipment and protection systems are classified into two groups.

Group I: intended for underground use (mining industry).
Group II: intended for use in other locations with potentially explosive atmospheres.

Within these groups, different categories define the level of protection.
Group I: contains two protection categories, M1 and M2.
Group II: contains three protection categories, 1 to 3.

The categories definition: The lower the number, the higher is the protection level.

ATEX Directive 153

ATEX Directive 153 is actually an addendum to ATEX Directive 114. ATEX Directive 114 describes the construction of equipment intended for installation and use in potentially explosive atmospheres and ATEX Directive 153 describes how these areas should be classified into hazardous areas and how work can be performed safely in these areas.

Classification in hazardous areas

The environmental atmosphere and prevailing conditions at the workplace are a major determinant for the installation methods of equipment and the choice of materials to be used. It is therefore a prerequisite to classify the areas with potentially gas and dust explosive atmospheres into hazardous areas.

The potentially hazardous areas are classified into hazardous areas based on the frequency and duration of the occurrence of n explosive atmosphere:

Zone 0, 1 and 2: areas at risk of gas explosion (where a mixture of air with any combination of flammable gas, fumes or mist is present)
Zone 20, 21 and 22: areas at risk of dust explosion (where a cloud of flammable dust may occur).

The lowest number indicates the most hazardous area.

The higher is the classification of the hazardous area, the more stringent requirements are specified for the environment and the application and use of the equipment and the protection systems.

** Source: Euronorm.net*

Euro-Voltage

The IEC 38 “standard voltages” standard (Sixth edition) was published in 1983. This standard specifies the standard voltages for the electricity network, the equipment and the installations. The NEN 10 038 standard, “Electrical power systems and equipment—Nominal voltages” was published in the Netherlands in 1989 and includes the IEC 38 standard without changes. This standard makes provisions for a “standard voltage” of 3 x 230V/400V—50Hz. The implementation of this standard denominated the same voltage in a large area in order to ensure minimum variations of voltages in variety of products and equipment.

More about tolerances

The supply network voltage tolerances during the operation have been defined in national standards such as NEN 3173 where a distinction has been made between zone A and zone B.

A voltage tolerance of ± 5% applies in zone A and ±10% in zone B. An electrical rotating machine shall be capable of performing its primary function within zone A but need not to comply with its performance at the rated voltage and the rated frequency and may, therefore, exhibit some deviations. The motor temperature rise may be higher than at rated voltage and rated frequency.

An electrical rotating machine shall be capable of performing its primary function within zone B but need not to comply with its performance at the rated voltage and the rated frequency and may, therefore, exhibit some deviations. The deviations may be higher than in zone A. The motor temperature rise may be higher than at rated voltage and rated frequency. The temperature rise in zone B may be higher that in zone A. Extended operation at the perimeter of zone B is not recommended.

rotor nl® electric motors

The rotor nl® electric motors are supplied as 3 x 400V—50Hz (Y or D) as standard. Other voltages are available upon request. The voltage for which the electric motor has been designed is always specified on the rating plate of any electric motor.

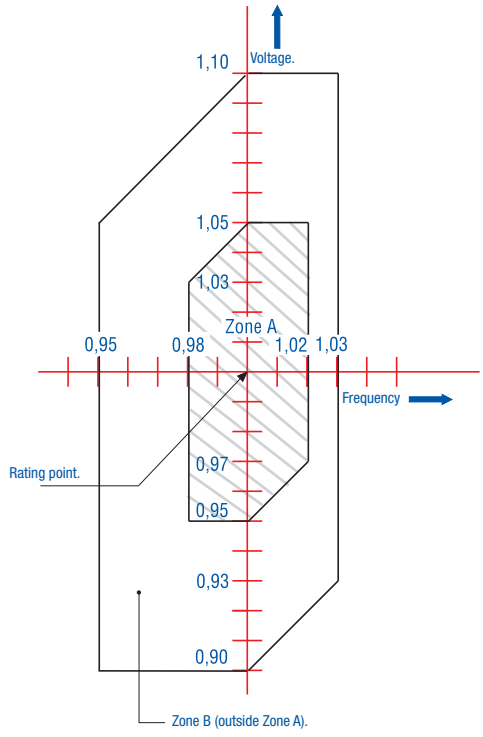
1 230V between a phase and neutral and 400V between any two phases in a three-phase system.

2 This means that the nominal torque (Nm) of the electric motor is maintained.

3 The temperature rise limits or temperature limits in accordance with this standard apply at the rating point and may be progressively exceeded as the operating point moves away from the rating point. For conditions t the extreme boundaries of zone A, the temperature rises and temperatures typically exceed the limits specified in this standard by approximately 10K.

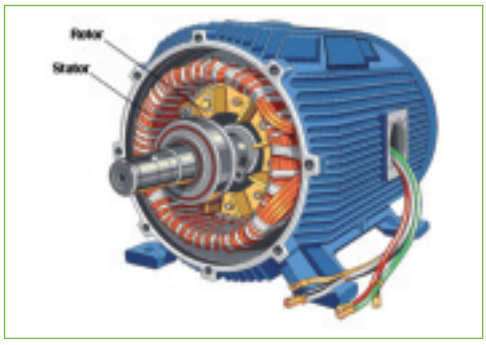
4 In practical applications and operating conditions, a machine will sometimes be required to operate outside the perimeter of zone A. Such excursions should be limited in value, duration and frequency of occurrence. Corrective measures should be taken, where practical, within a reasonable time, for example, a reduction in output. Such action may avoid a reduction in machine life from temperature effects.

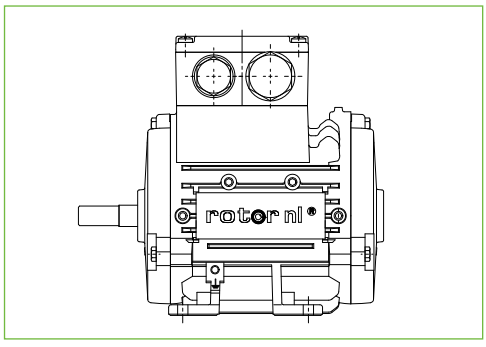
figure 1:
min./.max voltage & frequency of the motor.

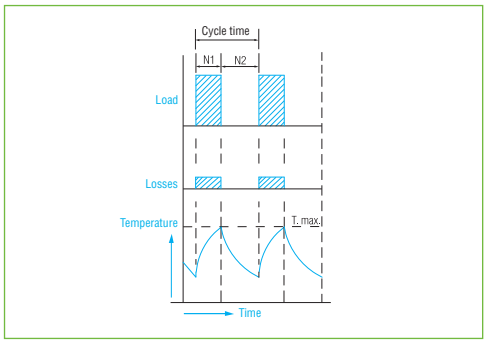


Section 3

Electric motor information

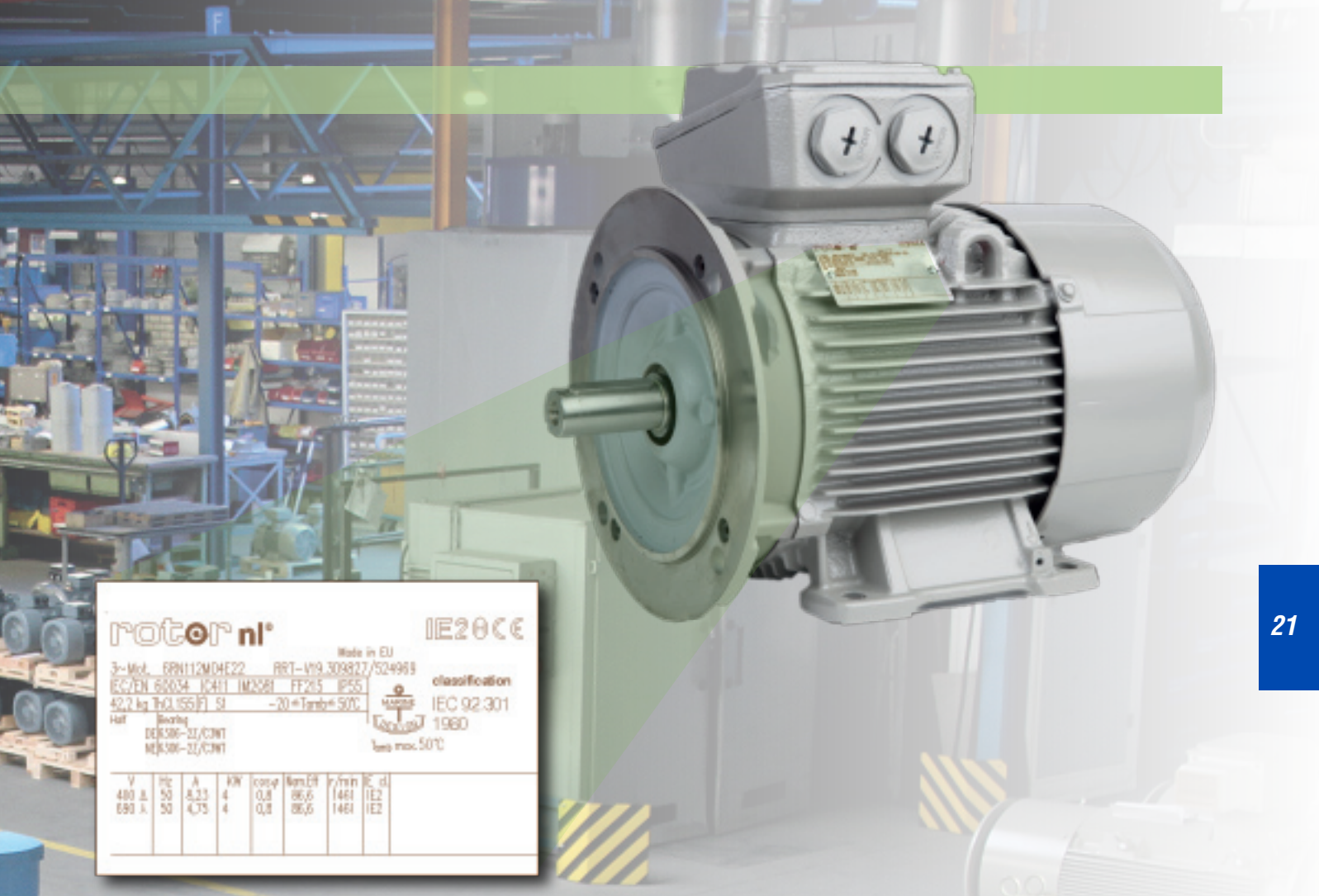






On the following pages you will find everything you need to know about rotor nl® electric motors, including the frame size, dimensions and outputs.

Rotor NL Name Plate



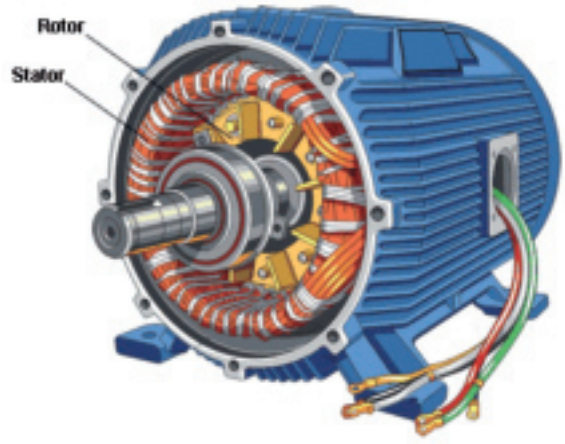
Description on rating plate	Description	Page
6RN112M04	Serial name: frame size; number of poles	15
IC411	Cooling type	32
IP55	Protection class	28
IM2081	Construction form / mounting	27
FT-215	Flange pitch circle diameter	41
50 Hz	Supply frequency	23
Δ/Y 400/690V	Connection + supply voltage	35 + 36
4 kW	Power	24
8,23/4,75 A	Current at 400/690 volt	33
1461 min^{-1}	Speed	23
S1	Operational type	24
Marine design	Special model	59

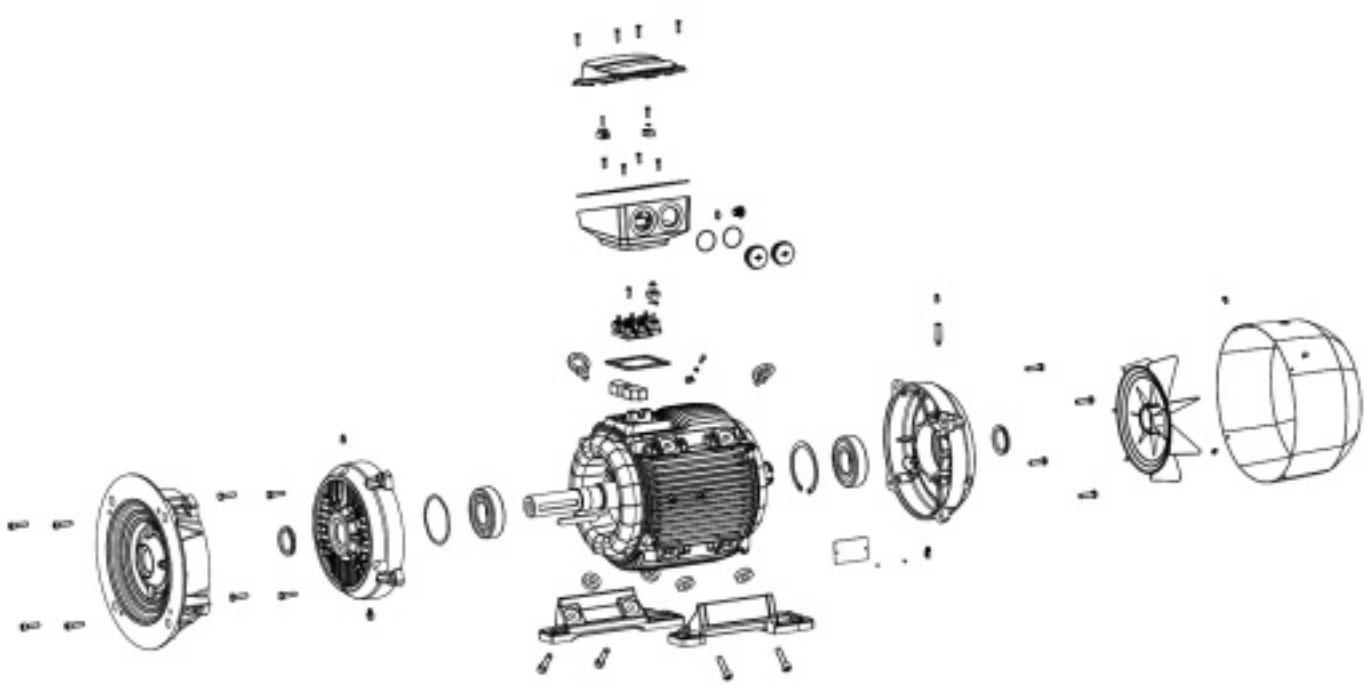
Basic Description of the Electric Motor

An electric motor is a commonly used device that transforms electrical energy into mechanical energy through the interaction of magnetic fields. The main two components of an electric motor are the stator and the rotor.

There is a copper windings in the stator, which when energised creates a rotating magnetic field, which induces electric current in the rotor cage. This creates a magnetic field in the rotor and it is the interaction of the two magnetic fields, which makes the rotor to rotate.

The rotating magnetic field of the stator always rotates faster than the rotor. The rotor is not rotating synchronously with the rotating magnetic field in the stator (hence it is an asynchronous electric motor). The speed difference between the rotating magnetic field in the stator and the rotor speed is called 'slip'. It is the slip, which enables voltage to be generated in the rotor cage creating the rotor current. The interaction of the magnetic field in the stator and the magnetic field in the rotor produce the torque which is the mechanical output on the shaft.
Higher shaft load provides more slip, more slip generates more rotor current, more rotor current produces more torque.
This is the typical principle of asynchronous squirrel-cage electric motors.





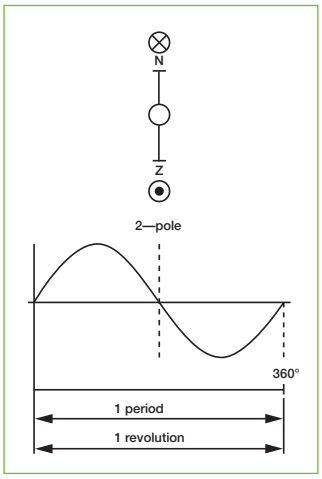
Exploded view of a RN electric motor

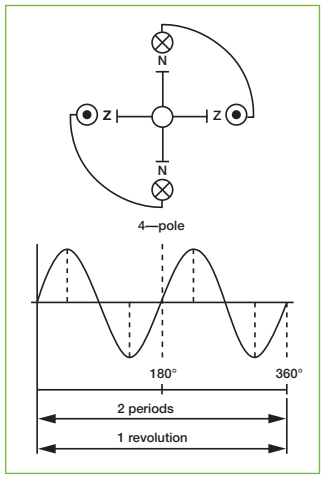
Fixed or Variable Speed

The rotating speed of an electric motor depends on the number of poles and the frequency of the supply. A single speed electric motor has 2, 4, 6, 8, etc. poles (1, 2, 3 or 4 pole-pairs respectively) and the mains supply frequency is 50Hz or 60 Hz as standard.

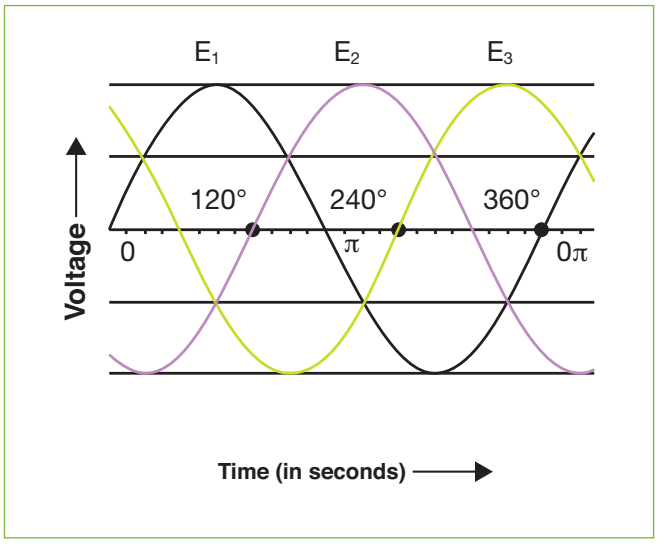
The more poles in an electric motor the lower the synchronous speed. The 2-pole electric motor makes 50 revolutions per second which is 3000 rpm and a 4-pole electric motor makes one half which is 1500 rpm at 50Hz.
At 60 Hz a 2-pole electric motor makes 3600 rpm and a 4-pole electric motor 1800 rpm. The following calculation is used to calculate the rotating speed of an electric motor.

The asynchronous motor rotational speed = $\frac{60 \times f \text{ (supply frequency)}}{2p \text{ (pole pairs)}}$ **– slip = ...min^{-1}**





Rotor nl® electric motors can also be supplied as multiple speed motors (pole-changing). These electric motors are provided with a special winding that enable rotating at different speeds.



Power and Duty cycle

Power Output

The unit of power output is kW (1HP = 0.75kW; 1 kW = 1.34 HP) (HP ≈ Horse Power). The power output values specified in this catalogue are based on maximum power at continuous load at what the thermal stability of the motor winding is attained. The continuous load is referred to as S1 Duty Cycle. Electric motors can be used at various Duty Cycles, short-term or intermittent (S2, S3, S4, etc.). A higher power output may be achieved whilst used at short-term or intermittent duty. They main factor for determination of the maximum power output at a short-term or intermittent Duty Cycle is the temperature rise, which when added to the (standard) ambient temperature of 40°C must not exceed the limit temperature of the insulation material used in the electric motor winding. In order to achieve the optimum efficiency a correct combination of the size of the motor should be used for the given application.

Duty Types (Duty Cycles)

The Duty Cycles (S1 to S10) have been defined in IEC 60034-1 standard indicating the run cycles of electric motors and in case of the intermittent duty also the frequency of the run periods. The power output limit up to which an electric motor can be utilised is determined by the maximum permissible temperature of the stator winding.

The electrical and mechanical parameters of electric motors are based on Duty Cycle S1 - continuous operation.

Duty Type S1: Continuous duty

Operation with a constant load during such a period of time that a thermal equilibrium is attained. The power that is specified on the rating plate may be taken up continuously. The rating plate specifies: S1.

Duty type S2 - Short-time duty

Operation at constant load for a given time, less than that required to reach thermal equilibrium, followed by a time de-energized and at rest of sufficient duration to re-establish machine temperatures within 2 K of the coolant temperature. The appropriate abbreviation is S2, followed by an indication of the duration of the duty.
Example: S2 60 min (alternative: 5, 10, 20 or 30 min).

Duty type S3 - intermittent periodic duty

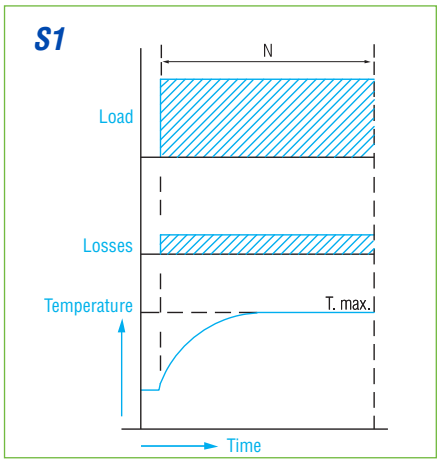
A sequence of identical duty cycles, each including a time of operation at constant load and a time de-energized and at rest. In this duty, the cycle is such that the starting current does not significantly affect the temperature rise. The appropriate abbreviation is S3, followed by the cyclic duration factor.
Example: S3 25% (alternative: 30, 40 or 60%).

Duty type S4 - Intermittent periodic duty with starting.

A sequence of identical duty cycles, each cycle including a significant starting time, a time of operation at constant load and a time de-energized and at rest. The appropriate abbreviation is S4, followed by the cyclic duration factor, the moment of inertia of the motor (J_M) and the moment of inertia of the load (J_{ext}), both referred to the motor shaft.
Example: S4 25% $J_M = 0.15$ kg x m^2 $J_{ext} = 0.7$ kg x m^2

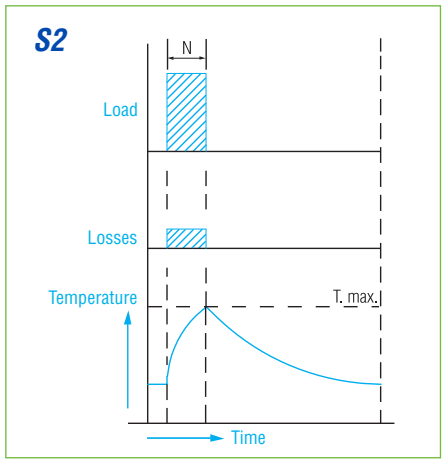
Duty type S5 - Intermittent periodic duty with electric braking

A sequence of identical duty cycles, each cycle consisting of a starting time, a time of operation at constant load, a time of electric braking and a time de-energized and at rest. The appropriate abbreviation is S5, followed by the cyclic duration factor, the moment of inertia of the motor (J_M) and the moment of inertia of the toad (J_{ext}), both referred to the motor shaft.
Example: S5 25 % $J_M = 0.15$ kg x m^2 $J_{ext} = 0.7$ kg x m^2
-



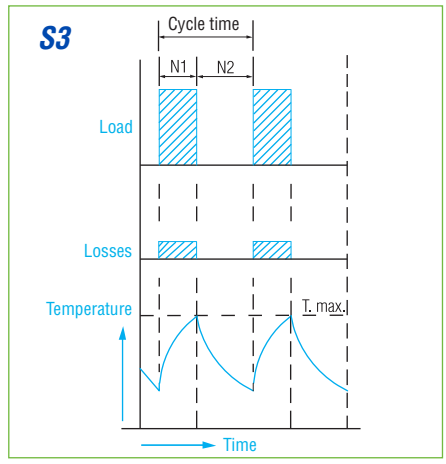
N = constant load
T max = highest reached temperature

S1: continuous operation
Operation with a constant load during such a period of time that a thermal equilibrium is attained.



N = constant load
T max = highest temperature range during the load

S2: brief operation
Operation with a constant load during a specific period of time that is shorter than the period of time in which the thermal equilibrium would be attained followed by a rest period that is sufficiently long to restore the thermal equilibrium with the coolant.



N1 = constant load
N2 = rest period
T max = highest temperature range during a cycle.

S3: intermittent regular operation
Operation composed of a series of equal cycles, each consisting of a period with constant load and a rest period.

Duty type S6 - Continuous duty with intermittent load

A sequence of identical duty cycles, each cycle consisting of a time of operation at constant load and a time of operation at no-load. There is no time de-energized and at rest. The appropriate abbreviation is S6, followed by the cyclic duration factor.
Example: S6 40%

Duty type S7 - Continuous-operation periodic duty with electric braking

A sequence of identical duty cycles, each cycle consisting of a starting time, a time of operation at constant load and a time of electric braking. There is no time de-energized and at rest. The appropriate abbreviation is S7, followed by the moment of inertia of the motor (J_M) and the moment of inertia of the toad (J_{ext}), both referred to the motor shaft.
Example: S7 J_M = 0.4 kg x m² J_{ext}-=7.5 kg x m²

Duty type S8 - Continuous duty with periodic changes in load and rotation

A sequence of identical duty cycles, each cycle consisting of a time of operation at constant load corresponding to a predetermined speed of rotation, followed by one or more times of operation at other constant loads corresponding to different speeds of rotation (carried out, 'for example, by means of a change in the number of poles in the case of induction motors). There is no time de-energized and at rest.
The appropriate abbreviation is S8, followed by the moment of inertia of the motor (J_M) and the moment of inertia of the load (J_{ext}), both referred to the motor shaft, together with the the load, speed and cyclic duration factor for each speed condition.
Example: S8 J_M = 0.5 kg x m² Jext= kg x m² 16kW 740rpm 30%; 40kW 1460rpm 30%; 25kW 980rpm 40%

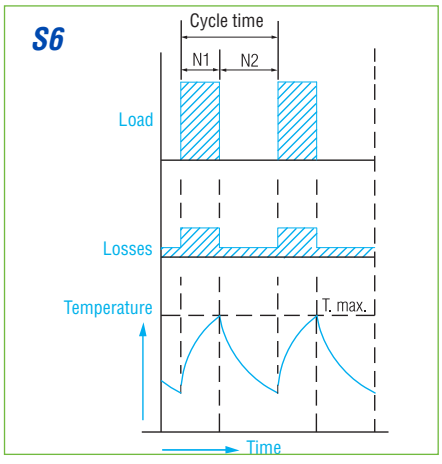
Duty type S9 - Duty with non-periodic load and speed variations

A duty in which generally load and speed vary non-periodically within the permissible operating range. This duty includes frequently applied overloads that may greatly exceed the reference load. The appropriate abbreviation is S9. For this duty type, a constant load appropriately selected and based on duty type S1 is taken as the reference value ("P_{ref}") for the overload concept.

Duty type S10 - Duty with discrete constant loads and speeds

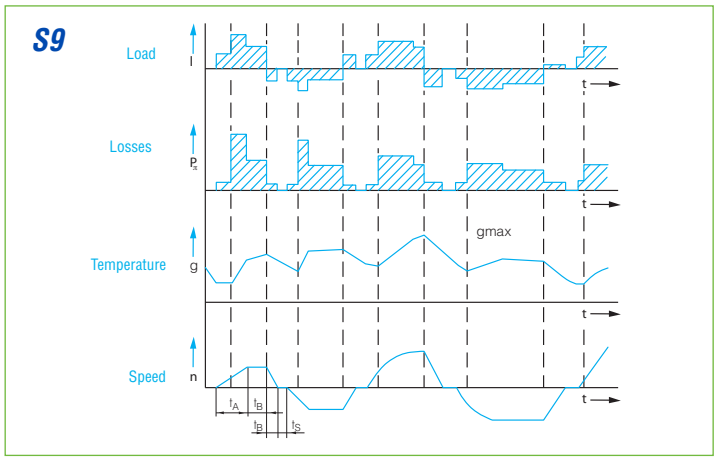
A duty consisting of a specific number of discrete values of load (or equivalent loading) and if applicable, speed, each load/speed combination being maintained for sufficient time to allow the machine to reach thermal equilibrium. The minimum load within a duty cycle may have the value zero (no-load or de-energized and at rest). The appropriate abbreviation is S10, followed by the per unit quantities p/Δt for the respective load and its duration and per unit quantity TL for the relative thermal life expectancy of the insulation system. The reference value for the thermal life expectancy is the thermal life expectancy at rating for continuous running duty and permissible limits of temperature rise based on duty type S1. For a time de-energized and-at rest, the load shall be indicated by the by the letter r.
Example: S10 p/Δt = 1.1/0.4; 1/0.3; 0.9/0.2; r/0.1 TL = 0.6
The value of TL should be rounded off to the nearest multiple of 0.05.
For this duty type a constant toad appropriately selected and based on duty type S1 shall be taken as the reference value ('P_{ref}') for the discrete loads.

Diagrams of operational types



N1 = constant load
N2 = no load
T max = highest temperature range during a cycle

S6: interrupted operation with intermittent load
A series of equal cycles each consisting of a period with a constant load and a period with zero load.

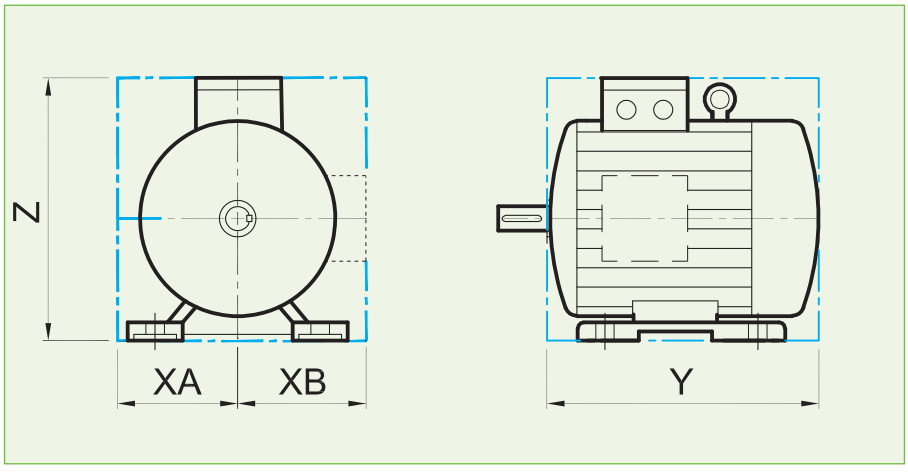


S9: operation with non-regular changing load and rotational speed
Operation where in general the load and the rotational speed do not regularly change within the allowed operational area.

Maximum Overall Dimensions

Standard three-phase electric motors must comply with the standard maximum overall dimensions as specified in the DIN 42 673 standard, page 4.
It is important to keep these maximum overall dimensions in mind when designing the driven equipment so the possibility to replace a standard electric motors with another make is guaranteed where possible. A sufficient space around the electric motor must be maintained to enable motor mounting and connection as well as to enable sufficient air cooling during the operation. The maximum overall dimensions are applicable on all standard three-phase squirrel cage TEFC electric motors. (TEFC ≈ Totally Enclosed Fan Cooled).

The rotor nl® single-phase squirrel cage electric motors are also supplied in accordance with the standard applicable for three-phase electric motors. The frame sizes are the same as the three-phase motors. The total length of single-phase motors may be longer at certain sizes. For more information please see the dimensional drawings contained in this brochure.



IEC/DIN housing size	Size in mm.			
	XA	XB	Y	Z
63	73	110	210	181
71	78	130	224	196
80	96	154	256	214
90S	104	176	286	244
90L	104	176	298	244
100L	122	194	342	266
112M	134	218	372	300
132S	158	232	406	356
132M	158	232	440	356
160M	186	274	542	480
160L	186	274	562	480
180M	206	312	602	554
180L	206	312	632	554
200L	240	382	680	600
225S	270	428	764	675
225M	270	428	764	675
250M	300	462	874	730
280S	332	522	984	792
280M	332	522	1,036	792
315S	372	576	1,050	865
315M	372	576	1,100	865

Mounting positions and Standardization

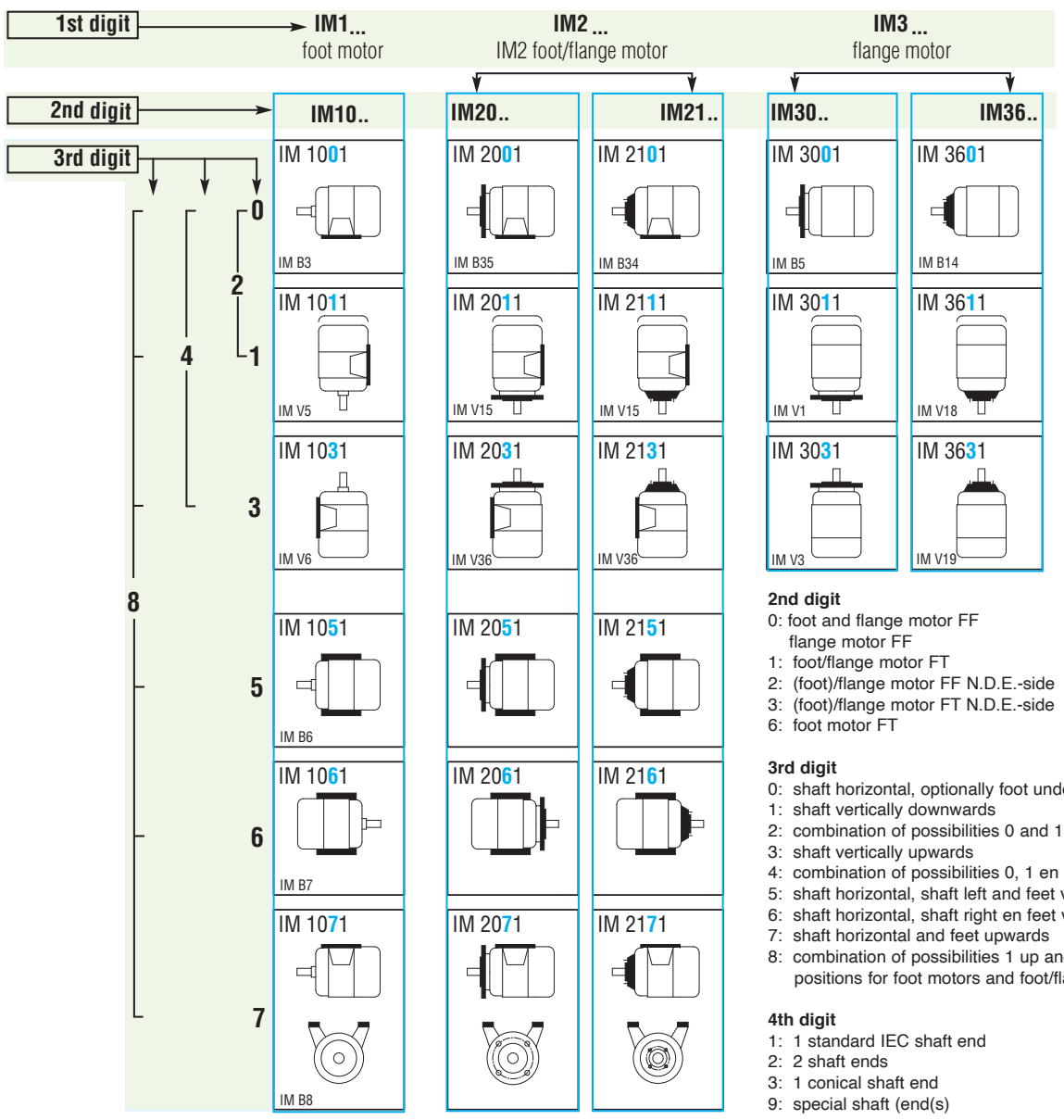
The mounting positions of electric motors are summarised in the table below.

Remarks:
The specified mounting must always be mentioned when ordering an electric motor. The actual motor mounting may influence the protection class and bearing design. Flange-mounted electric motors need further specification of the required pitch circle diameter of the fixing holes in the flange (FF or FT type of flange) (Dimension M).

FF (Flange Free Holes) = free holes are in B5 flanges, FT (Flange Tapped Holes) = tapped holes are in B14 flanges.

The pitch circle diameter (dimension M) is specified in the EN 50347 standard in relation to the frame size for the FF (B5) flange and the FT (B14A) flange (up to 160 frame). The pitch circle diameter (dimension M) is not specified for FT (B14B) flanges the EN 50347 standard, they however are specified in IEC 72-1 standard.

The motor mountings and the positions are summarised in the IM code as per the table below. For detailed information please consult the IEC 34-7 (NEN 10034-7) standard.



2nd digit
0: foot and flange motor FF
flange motor FF
1: foot/flange motor FT
2: (foot)/flange motor FF N.D.E.-side
3: (foot)/flange motor FT N.D.E.-side
6: foot motor FT

3rd digit
0: shaft horizontal, optionally foot under
1: shaft vertically downwards
2: combination of possibilities 0 and 1
3: shaft vertically upwards
4: combination of possibilities 0, 1 en 3 for flange motors
5: shaft horizontal, shaft left and feet vertical
6: shaft horizontal, shaft right en feet vertical
7: shaft horizontal and feet upwards
8: combination of possibilities 1 up and including 7 (all positions for foot motors and foot/flange motors.

4th digit
1: 1 standard IEC shaft end
2: 2 shaft ends
3: 1 conical shaft end
9: special shaft (end(s)

Degree of Protection IP

The Degree of Protection of rotating electric machines is defined as protection against the penetration of mechanical particles, dust and water. The Degree of Protection is defined in the following standard: IEC 34-5 (NEN-EN 60034-5).

Indicators

The Degree of Protection is indicated by the 'IP' followed by two numbers, the first indicating the protection against mechanical particles and the second indication the protection against water.

An example of the Degree of Protection definition:

IP-55;

The higher the digits, the greater the protection level against mechanical particles/ against water (see the tables below). All rotor nl® three-phase electric motors are supplied in IP55 as standard enabling an outdoor installation. The higher level of protection may however cause a few issues:

— 1. Tight shaft seals cause additional "sliding friction" which generates heat and contributes to the friction losses, which are more significant at fast running motors.

— 2. The condensation drain holes used for draining off the condensation water and the equalisation of the atmospheric pressure ("breathing option") must be partially enclosed at IP55 and completely enclosed at IP56 protection.

A suitable solution can implemented to overcome the first problem by fitting an alternative shaft seal in the endshield/flange or the bearing cap but not on the bearing as it would cause excessive heat development. The second problem is less easy to resolve. The probability of condensation water accumulating inside the motor is higher at higher protection levels. A moisture-proof insulation system (tropical insulation is standard in all rotor nl® motors) is usually sufficient for IP55 protection.

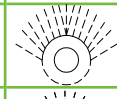
At the protection class IP56 the problem is more difficult to overcome, especially for frame size greater than 100 frame as the air volume in large electric motors is larger and this increases the potential for condensation when changes in temperature occur. To minimise condensation accumulation a stable internal temperature must be maintained (5°C above the ambient temperature). This applies for motors when stationary as the internal temperature always rises significantly during the operation. The solution is the installation of anti-condensation (or "standstill") heaters. See page 31 for more details.

The protection class selection is intended to reduce the probability of electric motor failures due to ingress of mechanical particles and water. This however is not a guarantee of trouble-free operation. Higher protection class should be implemented where necessary and for specific applications as it sometimes can achieve the opposite effect with regard to the reliability of operation. The IP rating displayed on the motor nameplate must be observed during the electric motor installation.

Protection degrees specified by the first indicator

1st	protection against solid particles and dust	
0		No protection
1		Protection against the penetration of solid particles with a diameter larger than 50 mm.
2		Protection against the penetration of solid particles with a diameter larger than 12 mm.
3		Protection against the penetration of solid particles with a diameter larger than 2.5 mm.
4		Protection against the penetration of solid particles with a diameter larger than 1 mm.
5		Limited dustproof. The quantity of dust must not compromise electric motor performance.
6		Protection against the penetration of dust (dustproof)

Protection degrees specified by the second indicator

2nd	protection against water	
0		No special protection
1		Protection against water that falls perpendicularly on to the electric motor
2		Protection against water that falls on the electric motor at an angle of no more than 15°
3		Protection against water that falls on the electric motor at an angle of no more than 60°
4		Protection against splashing water that falls on the electric motor from all sides
5		Protection against water jets (under a specific pressure) from a random direction
6		Protection against heavy seas or powerful water jets (for example, above deck set-up on vessels)
7		Protection against immersion
8		Protection against continuous submersion in water.

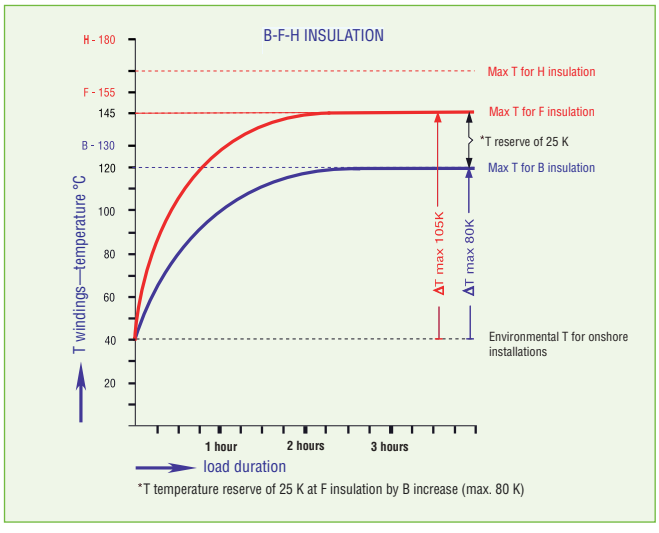
Insulation Class

Various insulation materials are used in electric motors and each has its own function:

The most important materials are:
- Wire insulation
- Slot and phase insulation materials (insulation between the winding and the stator lamination pack and phase insulation between the windings heads).
- Winding impregnation.
- Insulating sleeve used to cover wire/lead connections.
- Insulation of winding leads (between the winding and the terminal board).

All these insulation materials are specified in thermal classes that are referenced using a letter (Y—A—E—B—F—H—C). Every thermal class has its own temperature limit specified (see the table). An insulation material of a specific class need to retain its mechanical and electrical properties within the temperature limit and have a reasonably long service life.

The maximum permissible temperature rise (see the table) of the winding is determined based on the thermal class temperature limits. Continuous duty (S1) at the rated power output at an ambient temperature of 40˚C is specified for indoor/outdoor installations. The temperature of the winding increases as a result of the copper and iron losses in the electric motor during operation. The winding temperature rise is determined through measuring the resistance of the winding (winding resistance increases with increasing temperature). Host spots in windings cannot be determined using the winding resistance method. To allow for any Hot Spots in winding lower temperature limits are specified for the used insulation materials.
It is now a common practise to produce motors with insulation class F with winding temperature rise in accordance with the class B (max. 80 K). This means that the motors have a temperature reserve of 25 K. This reserve can be utilised for short-term overload, a higher ambient temperature (above 40°C), for supply voltage/frequency fluctuation etc. Should you know that the thermal reserve would be utilised it is advisable to discuss the application requirements with the motor manufacturer.



Remark:
The allowable shaft load also decreases when the set-up height increases.
The table below provides an overview of this.

Height (m)	1,000	1,500	2,000	2,500	3,000	3,500	4,000
Power (%) T_{max} 40 °C	100	98	95	91	87	83	78

Insulation class	A	E	B	F	H	F*
Temperature limit	105°C	120°C	130°C	155	180	155
Max. temperature of the winding	100°C	115°C	120°C	145°C	165°C	145°C
Environmental temperature for offshore installations	40°C	40°C	40°C	40°C	40°C	40°C
Maximum T (K) of the stator winding	60 K	75 K	80 K	105 K	125 K	80 K + 25 K
Additional thermal reserve						

Insulation class F (155°C) with a winding temperature increase in correspondence with class B (max. 80 K).
This creates an additional thermal reserve of 25 K.

Motor Thermal Protection

All electric motors should be protected against overloading. Electric motors will develop a fault when overloaded as the temperature rises above the thermal limit of the insulation materials during the overload, which results in the loss of the mechanical and electrical properties.

Service life

The standard service life of the motor insulation material is 20,000 to 25,000 hours depending on the maximum limit temperature of the individual material. In real life this theoretical service life is exceeded many times. The insulation class B determines the maximum permissible winding temperature of 120°C (limit temperature 130°C) and class F determines the maximum permissible winding temperature of 145°C (limit temperature 155°C). The service life of the winding insulation is reduced by half every time the winding temperature exceeds the maximum permissible temperature by 10 K. Rotor nl® electric motors have been wound in class F (155°C) as standard but the motors' temperature rise is within the class B, well below the class F thermal limit. The service life is therefore expected to exceed the standard service life many times.

Motor protection switch

The temperature of the winding is determined by the energy losses in the electric motor as well as other factors. The "copper losses" are the main contributor to the heat generation. The copper losses are in proportion to the square of the current ($P_{cu} = I^2 \times R$). It is often the case that the temperature does not rise immediately when a specific electric current starts to pass through the winding. The temperature will rise gradually. In order to prevent the damage of the motor winding a current Protection Switch is sometimes used. The electric motor current passes through bi-metal in the switch, which gets warmer.
Each metal has a different dilatation property, which results in opening of the circuit when hot. In this case the electric motor does not need to be protected by fuses as they cannot be precisely adjusted for the electric motor current. Unlike bi-metal Protection Switches the fuses do not heat up or cool down with the electric motor winding. It recommended to set the fuses for a slightly higher current value to prevent tripping of one phase and running on 2 phases. In this case the thermal Protection Switch would trip off too late or not at all. The fuses should only serve as protection against short-circuits.

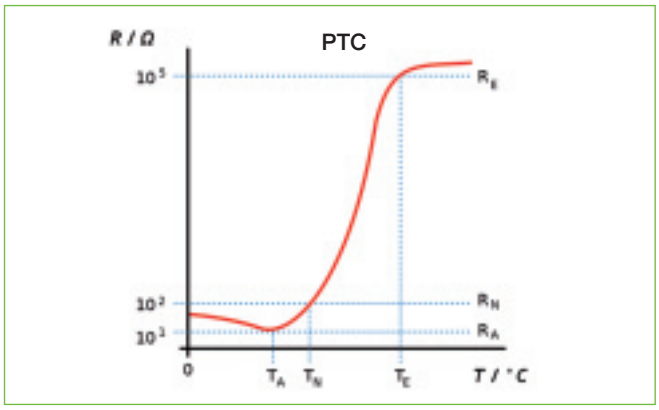
Protection tool for your driven equipment

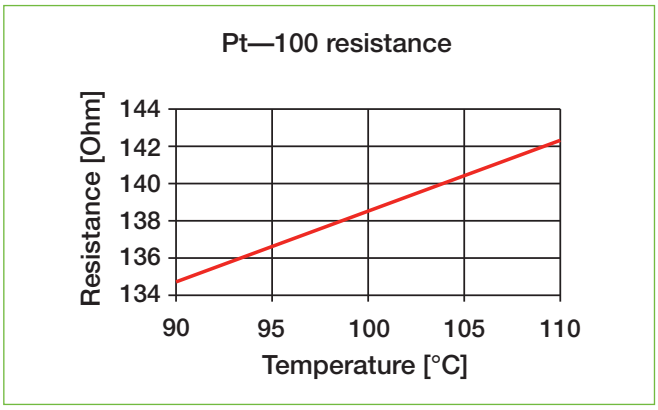
The thermal electric motor Protection Switch can also be used as a protection for the driven equipment. The current limit can be set lower than the electric motor rated current. The Protection Switch will trip the motor off even when the motor rated current has not been exceeded. It is not unusual that electric motors run at 30% to 80% of the rated load. It is therefore advisable to adjust the thermal Protection Switch based on the driven equipment requirements.

PT100

PT100 is a commonly used sensor for temperature measurement. It is a resistance thermometer. Another name is the RTD (Resistance Temperature Detector). Although this expression also includes other types of temperature sensors 70% of all temperature measurements in electric motors are carried out by PT100. The advantages are wide measurement range, the (almost) linear characteristics, long service life, its accuracy and ease of use and connectivity. The linear relation between temperature and resistance values is a significant difference when compared with PTCs and their characteristics.

The acronym PT refers to platinum being the material from which the very fine resistance wires in PT100 are produced. The number 100 refers to the electrical resistance of 100 Ohm (± 0.1 Ohm) that the sensors have at 0°C.

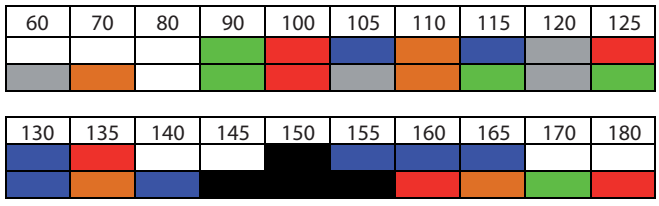




Difference in resistance between a PTC (left) and a PT—100 (right)

PTC thermistors

PTC are used to protect the motor winding and trip when the maximum permissible winding temperature is reached. The PTC (Positive Temperature Coefficient) is a resistance sensor that has a small resistance value when cold and high resistance value when hot. The PTC has a thermistor effect. This means that the temperature characteristics on the resistance is not linear. The special resistance/temperature curve can be seen on page 30. PTC are used in combination with a PTC thermistor relay in the auxiliary current circuit of the electric motor. The electric motor will be switched off when the limit temperature is reached. This method is independent of the motor current and responds only to the temperature of the winding.



Colour code of temperature values of PTCs

Klikson or Bi-metal switch

The operation of this protection is similar to PTC thermistors, only no additional relay is required.
The Bi-metal switch can operate upto 1.5A enabling direct operation, avoiding the need for an aditional relay.

Anti-condensation (Standstill) heaters

Electric motors that are not continuously running (S1 duty) are usually provided with a standstill or anti-condensation heaters coils (SHC). The heaters switch on when the electric motors are not running and ensure that a constant temperature inside the motor housing is maintained preventing water condensation during sudden differences in temperature inside the electric motors. Water condensation is harmful and can shorten the service life of electric motors. The heaters keep constant temperature in motors after they have been switched off and prevent forming condensation.

Anti-condensation heaters power

Construction size	Watt	Voltage
63	16 W	230 V
71	16 W	230 V
80	16 W	230 V
90	25 W	230 V—(110 V optional)
100	25 W	230 V—(110 V optional)
112	25 W	230 V—(110 V optional)
132	25 W	230 V—(110 V optional)
160	50 W	230 V—(110 V optional)
180	50 W	230 V—(110 V optional)
200	50 W	230 V—(110 V optional)
225	80 W	230 V—(110 V optional)
250	80 W	230 V—(110 V optional)
280	100 W	230 V—(110 V optional)
315	100 W	230 V—(110 V optional)
355	200 W	230 V—(110 V optional)
400	200 W	230 V—(110 V optional)
450	200 W	230 V—(110 V optional)

Motor Cooling

Totally Enclosed Fan Cooled electric motors (TEFC) are air cooled motors provided with an external fan that is fitted on the electric motor's own shaft. Totally Enclosed Force Ventilated motors (TEFV) are equipped with an independently driven fan. In some cases motors are installed in an air flow and are without a fan. These are Totally Enclosed Air Over motors (TEAO). The air necessary for cooling of the motor is usually provided by the driven equipment. The Totally Enclosed Non Ventilated electric motors (TENV) have no fan nor they are subject of forced cooling. Some TENV motors are used for short term duty cycle (i.e. S2-10min duty).

Electric motors with forced cooling (TEFC and TEAO) require approximately 25 to 30 cubic metres of cooling air per minute for 100 kW.

The following are the important features for effective electric motor cooling (this list is not exhaustive):

—Blade shape
—The drive mode
—Noise generation
—Energy consumption
—Electric motor installation and maintenance.

Blade shape

The simplest option is having the fan mounted directly on to the electric motor shaft. The rotating speed of the electric motor determines the speed of the fan. The required direction of rotation is usually not specified so the standard industrial electric motors are equipped with bi-directional fan with straight blades (radial fan) suitable for both directions of rotation (CW or CCW).

The drive mode

The fan can be directly driven by the electric motor (fitted on motor's own shaft). This is usually used for continuous use (S1 duty).
If an electric motor is frequently switched on and off (for example at S4 duty), additional heat will be generated be by the motor especially when there is a large moment of inertia attached to the motor's shaft resulting in heavy start-up. Totally Enclosed Force Ventilated motors (TEFV) are equipped with an independently driven fan, delivering cooling air necessary to cool the motor even when the motor is stationary. This cooling method is often used when motors' speed is controlled by frequency inverters when the motors' own fan becomes ineffective at low speeds.

The force ventilation is suitable for a broad range of voltages. This runs from 230V 50Hz to 575V 60Hz,
3 phase; as indicated on force ventilation unit nameplate. An additional advantage when using this unit is its high protection class: IP66.
Note: If an electric motor runs at a half of the rated speed, the own fan borne by the motor's shaft will deliver only 12.5% of the volume of the cooling air when compared with the air delivery at the motor's rated speed.

Noise generation and energy consumption

The sound pressure level as well as energy consumption can be reduced by using uni-directional axial fans instead of radial fans. The reduction depends on the power and speed. The reduction effect at 6- and 8-pole electric motors (1,000 rpm and 750 rpm) is less significant.

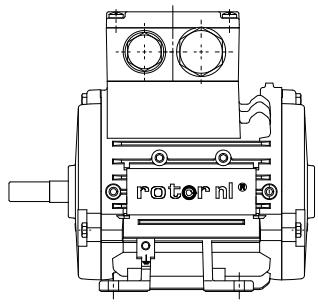
Set-up and maintenance

When installing an electric motor it is important to ensure that the motor will have sufficient supply of cooling air. It is necessary to ensure that the air supply is not blocked in any way and in a dusty environment regular maintenance must be performed and motor cooling ribs cleaned in regular intervals!

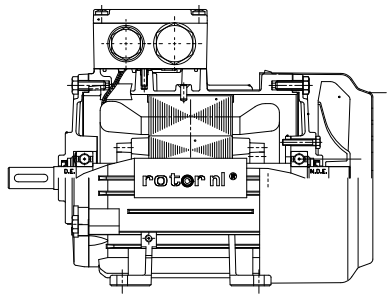
Definition of terms

— Direction of rotation **CW** = Clockwise
(to the right when viewed from the drive end)
— Direction of rotation **CCW** = Counter Clockwise
(to the left when viewed from the drive end)
—**TEFC** = Totally Enclosed Fan Cooled / IC 411
—**TEAO** = Totally Enclosed Air Over / IC 418
—**TENV** = Totally Enclosed Non Ventilated / IC 410
—**TEFV** = Totally Enclosed Force Ventilated / IC 416

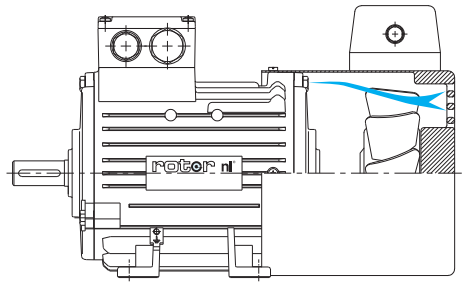
IC410



IC411



IC416



IC416 - force ventilation units - data

Construction size	Δ	Y	A max Δ	A max Y
63	220-290 V	380-500 V	0.1	0.06
71	220-290 V	380-500 V	0.1	0.06
80	220-290 V	380-500 V	0.1	0.06
90	220-290 V	380-500 V	0.33	0.19
100	220-290 V	380-500 V	0.31	0.17
112	220-290 V	380-500 V	0.31	0.17
132	220-290 V	380-500 V	0.45	0.25
160	220-290 V	380-500 V	0.91	0.54
180	220-290 V	380-500 V	0.91	0.54
200	220-290 V	380-500 V	0.91	0.54
225	220-290 V	380-500 V	0.45	0.25
250	220-290 V	380-500 V	0.45	0.25
280	220-290 V	380-500 V	0.91	0.54
315	220-400 V	380-500 V	1.62	0.56
355	230 V	400 V	5.9	3.4
400	230 V	400 V	11	6.4
450	400 V	690 V	8.2	2.9

Sound Pressure Level

Noise level criteria must also be met when installing electric motors depending on the environment and directives applicable on the specific industrial installations with respect to the maximum permissible sound pressure levels. The values included in the table are figures for guidance applicable for standard rotor nl® electric motors.

Measurements

The sound pressure levels shown in the table are average test values. The specified values apply at no load, 50 Hz speeds and rated voltage with a tolerance of + 3dB. The tests were carried out in accordance with the provisions of ISO1680 and were measured at a distance of 1 metre. 0.02 mPa (milli Pascal) applies as the reference pressure level. The last column provides the factor (Ls) that must be added to the sound pressure to obtain the acoustic power.

Reduced-noise electric motors

Electric motors can be supplied as a reduced-noise execution. They will be fitted with axial fans that is only suitable for one direction of rotation (CW or CCW). The temperature rise of the low-noise electric motors can sometimes be higher than the temperature rise of standard electric motors as the class F would be fully utilised to achieve the required noise reduction.

IEC/DIN	Motor speed				Factor
housing size	3.000 min-1	1.500 min-1	1.000 min-1	750 min-1	Ls
63	53	44	43	-	+ 8.9
71	55	44	43	46	+ 8.9
80	60	47	47	50	+ 9.1
90	64	48	56	54	+ 9.2
100	64	53	52	47	+ 9.4
112	64	55	47	49	+ 9.5
132	66	57	49	49	+ 10.2
160	71	60	50	51	+ 10.2
180	72	62	59	54	+ 10.5
200	73	65	63	58	+ 10.7
225	73	66	57	56	+ 11.0
250	74	67	58	57	+ 11.1
280	75	68	60	57	+ 11.3
315S	79	71	67	65	+ 11.8
315M	80	71	68	65	+ 11.8
355	77	75	71	67	+ 15
400	79	78	73	69	+ 15
450	81	81	75	71	+ 15

Pole-changing Electric Motors

Multi-speed Pole-changing electric motors can run at more than one rotating speed. The standard series of pole-changing electric motors supplied by Rotor come with two rotating speeds. However, electric motors with more than two rotating speeds can also be supplied on request. The rotating speeds are achieved by using multiple windings in the motor stator.

Rotor supply the following rotating speed combinations:
3,000rpm/1,500rpm at 50 Hz
1,500rpm/1,000rpm
1,500rpm/750rpm

There are two winding options available for pole-changing electric motors: Dahlander (tapped) winding and two separate windings.

The Dahlander winding is based on one winding which is tapped and can be switched in two ways. The electric motor can run at two speeds. This Dahlander winding is usually used in smaller stators. For larger motor sizes two separate windings are usually used. The disadvantage of the Dahlander winding is that rotating speed must always be in 1:2 ratio.

Electric motors can be provided with two (or in some cases three) separate windings. The advantage of separate winding is that the poles do not have to be in 1:2 ratio. The electric motor can be designed in such a way that the required speeds and power ratings are specifically tailored for the application. The disadvantage is that a larger frame size need to be often used when compared with Dahlander winding. The description of the connection is on page 36.

Noise table in dB(A) for standard electric motors with a bi-directional fan

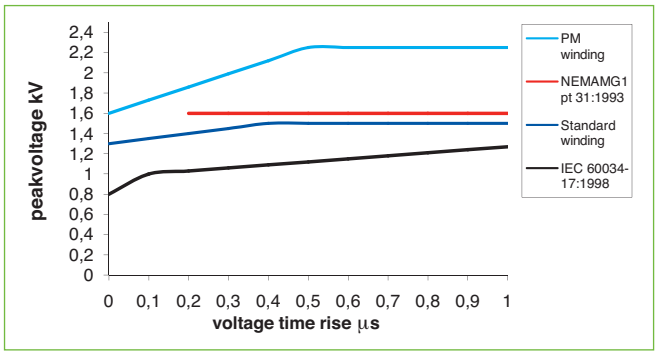
Voltage/Frequency Inverter

The rotating speed of an electric motor can be controlled by frequency inverter. This variable rotating speed control provides many advantages such as optimisation of production processes and energy saving. The speed and the power needed to drive the driven equipment can be tailored more accurately when a frequency inverter is utilised.

Frequency inverter driven motors consume less energy than fixed speed motors, driven equipment of which often require a different way of control. Pumps and fans are the best applications examples where energy can be saved. It is often the case that the airflow delivered by a fan is greater then actually needed at certain times and the airflow need to be throttled when a fan is driven by fixed speed motor. If the motor is frequency inverter driven, the airflow can be controlled much more economically by regulating the motor speed.

If an electric motor is connected to a frequency inverter, no restrictions apply when the speed control range is between 30% to 120% of the rated speed (at 50 Hz). This applies for variable speed applications (fans and centrifugal pumps)

If constant torque applications speed control is required it is recommended to use force ventilated motors. The motor's own fan becomes ineffective at low speeds and the motor torque need to be derated to as much as 1/3 of the rated torque, depending on the speed control range (IC411). To prevent derating an independently driven fan (force ventilation) is mounted on the back of the electric motor and delivering the required volume of cooling air even when the motor is running at low speed or is stationary (IC416). The rated torque is then available throughout the speed control range. Very low rpm depend on the inverter used. The power (torque) reduction of the driven equipment must correspond with the characteristic of the frequency inverter and electric motor combination. If in doubts please consult the electric motor manufacturer.



PM winding

The type of insulation that is applied when using a frequency inverter is called a Pulse Modulated winding, or the PM winding. Voltage peaks occur during frequency control, which affect the insulation material of the motor winding in the negative way. The standard rotor nl® electric motors are resistant to voltage peaks up to 1,500 V. The use of the PM winding is advisable for rated voltages higher than 500 V combined with inverter control. The PM winding can handle voltage peaks up to 2,250 V. The PM winding, however, affects the Power Output/ Motor Frame Size relation as the insulation material is thicker and less copper fits in the stator slots so the motors often must be produced in one size higher frame.

Pulse Generators and Tachometers

Tachometers and encoders (pulse generators) have become even more important since frequency inverters have been introduced to the industry. They act as a feedback for the frequency inverter as they establish the exact position of the motors shaft. The inverted then controls the speed of the motor much more accurately. The accuracy of the process is determined by the number of pulses the encoder can feed back to the inverter.

Tachometer; (analogue)

It can be compared to a dynamo on a bicycle; the harder you pedal, the higher is the voltage and brighter is the light. A tachometer outputs a voltage, which is related to the electric motor speed. The higher is the electric motor speed, the higher is the voltage.

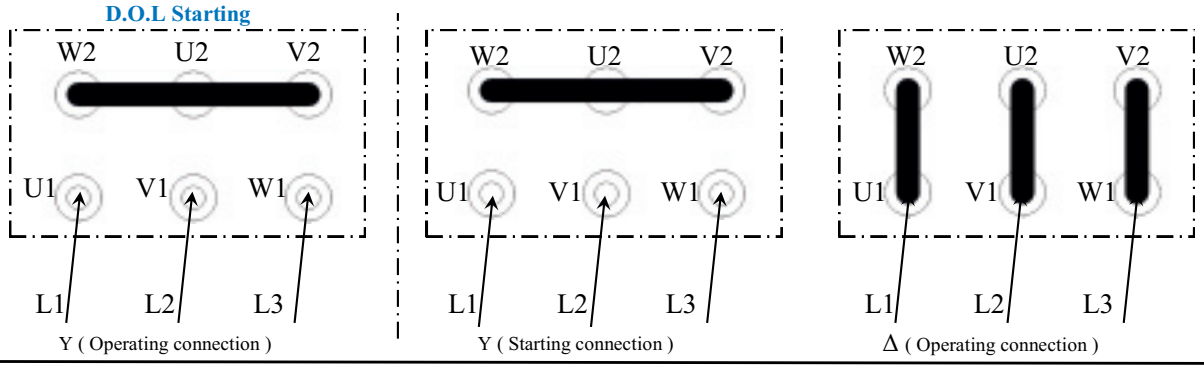
Encoder (pulse generator); (digital)

The encoder emits a number of pulses per revolution (512, 1024, 2048 pulses per rev.). The pulses are used as a feedback to the inverter to control the speed and determine the motor's shaft position. The signal is digital (0 or 1). The principle of the encoder is based on a rotating disc with a number of slots which enable the light to be emitted to an optical recorder. The number of slots are 512, 1024, 2048, etc. The light source (LED) can be found on one side of the disc and the optical recorder can be found on the other side of the disc. The rotating disc interrupts the light emittance so every interruption is an end of the pulse. The more pulses per revolution, the more accurately can the position of the rotor be determined.

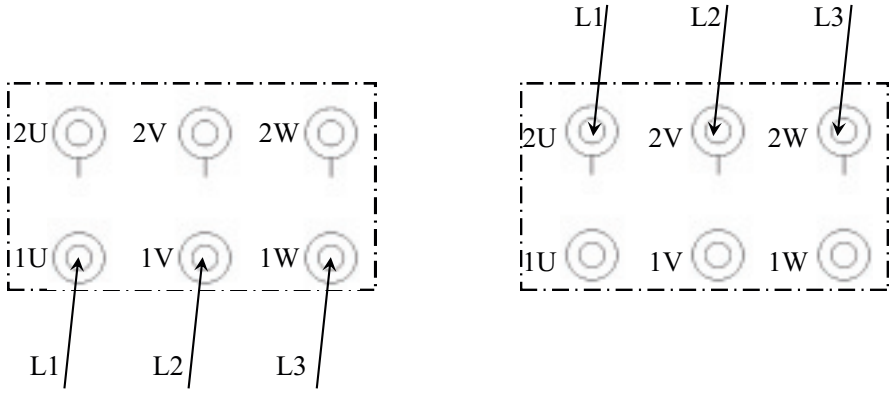
Connection Diagram acc. NEN-EN-IEC60034-8

SINGLE-SPEED MOTORS

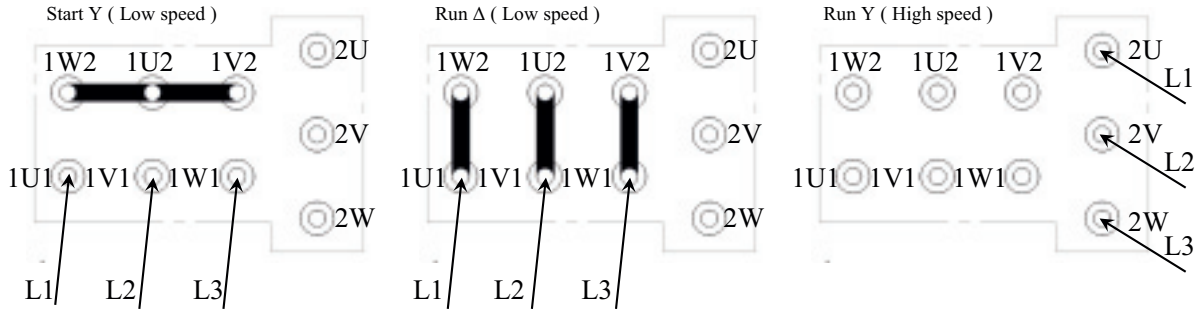
D.O.L Starting



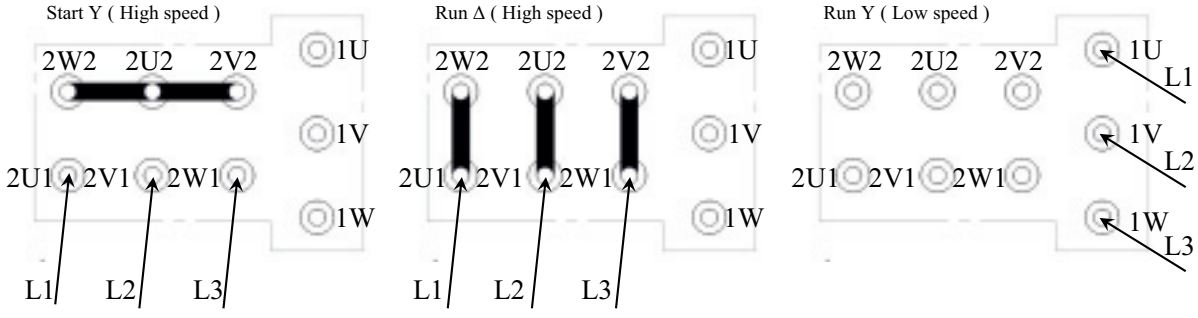
POLE-CHANGING WINDING (SEPERATE WINDINGS)



POLE-CHANGING WINDING (SEPERATE WINDINGS)
D.O.L HIGH Y D.O.L LOW Δ

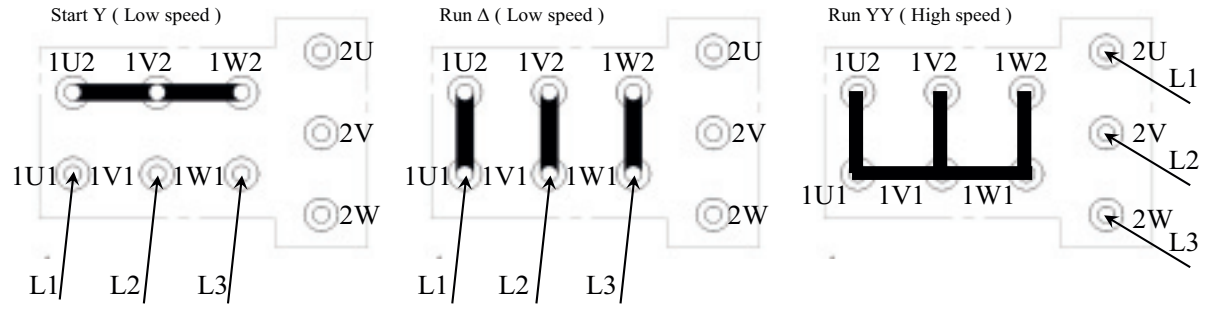


POLE-CHANGING WINDING (SEPERATE WINDINGS)
D.O.L LOW Y D.O.L HIGH Δ

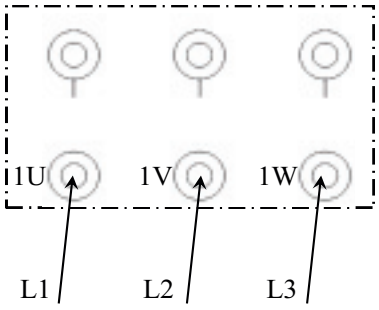


Connection Diagram acc. NEN-EN-IEC60034-8

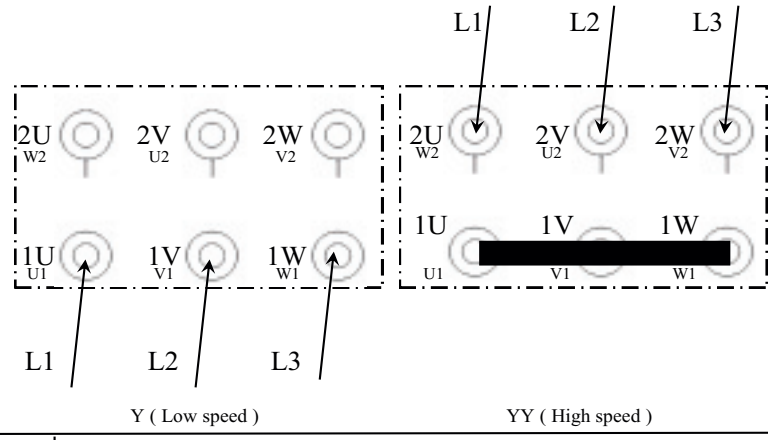
POLE-CHANGING WINDING (DAHLANDER Δ/YY)



PERMANENT MAGNET MOTOR

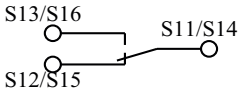


POLE-CHANGING WINDING (DAHLANDER Y/YY & Δ/YY)

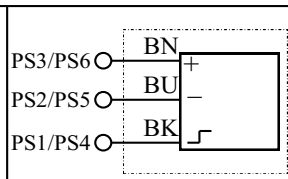


AUXILARY DEVICES

Components	Labeling	Significance
Anti Cond. Heaters (110V/230V)	1HE1 - 1HE2	
Anti Cond. Heaters Brake	2HE1 - 2HE2	
PTC = temperature sensor with	1TP1 - 1TP2	Alarm winding 1
Positive **T**emperature **C**oëfficient	2TP1 - 2TP2	Tripp winding 1
	3TP1 - 3TP2	Alarm winding 2
	4TP1 - 4TP2	Tripp winding 2
	10TP1 - 10TP2	Bearing DE
	11TP1 - 11TP2	Bearing NDE
NTC= temperature sensor with	1TN1 - 1TN2	Winding 1
Negative **T**emperature **C**oëfficient	2TN1 - 2TN2	Winding 2
NI100, PT100 = Resistance thermometers		
2-lead device :	1R1 - 1R2	Winding 1
	2R1 - 2R2	Winding 1
1R1 ○ ○ 1R2	3R1 - 3R2	Winding 1
	4R1 - 4R2	Winding 2
3-lead device :	5R1 - 5R2	Winding 2
1R1 ○ ○ 1R2	6R1 - 6R2	Winding 2
○ 1R2	10R1 - 10R2	Bearing DE
	11R1 - 11R2	Bearing NDE
Bi-metal temperature monitoring	1TB1 - 1TB2	Alarm winding 1
= switch opens when temperature	2TB1 - 2TB2	Tripp winding 1
increases	3TB1 - 3TB2	Alarm winding 2
	4TB1 - 4TB2	Tripp winding 2
KTY	+1R1 - -1R2	Winding 1
= silicon temperature sensor	+2R1 - -2R2	Winding 2
DC-Brake	BD1 - BD2	

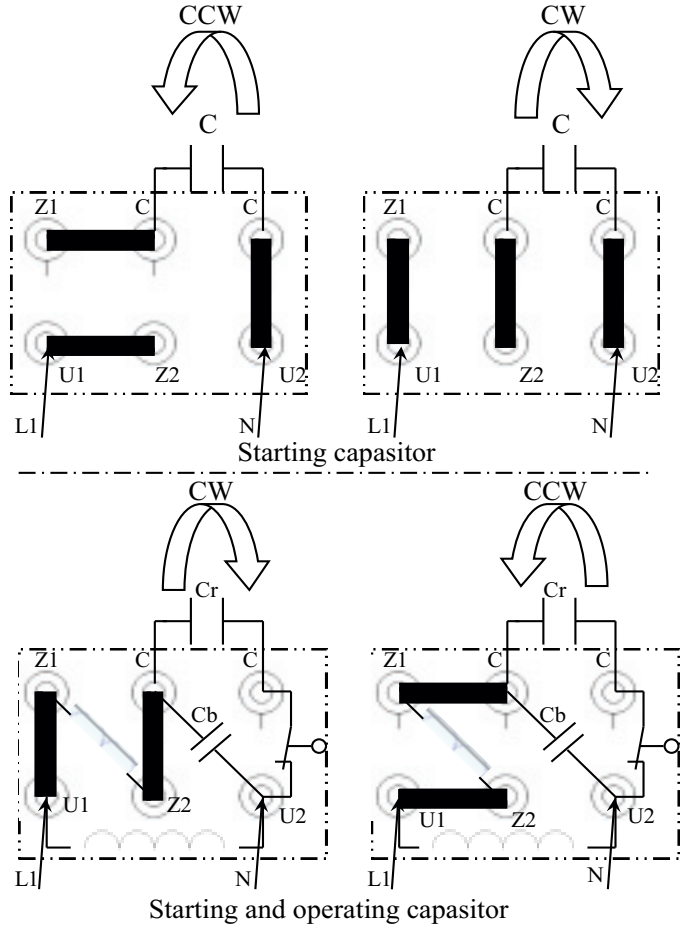


Microswitch :
ON/OFF : S11,S12 & S13
Wear detection : S14,S15 & S16



Proximity switch :
ON/OFF :PS1,PS2 & PS3
Wear detection :PS4,PS5 & PS6

ONE-PHASE MOTOR



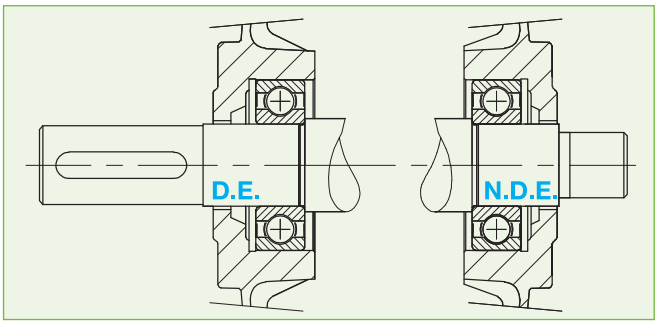
Bearing Designs and SPM Bearing Monitoring

Introduction

The bearings in an electric motor are used to support the rotor, to bear the forces that are created in the motor and to position the rotor in the stator. The accuracy of the bearing design must meet high criteria to guarantee trouble free electric motor operation. If an electric motor is connected directly to the driven equipment, the bearing of the electric motor often absorb forces created in by the driven equipment. Rotor nl® electric motors are equipped with axially pre loaded and located bearings as standard.

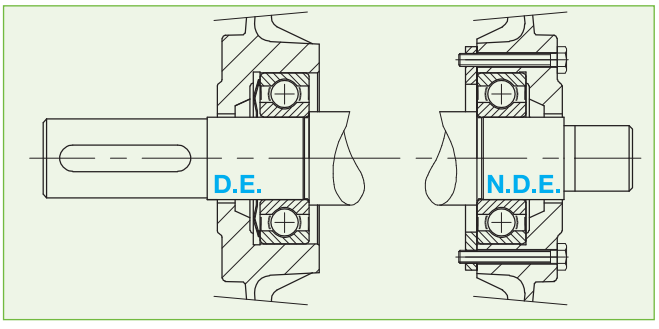
Floating bearings

This bearing type is used, for example, for electric motors with sleeve bearings. There is (nearly) no mechanical axial force limitation in the bearings, which means that the shaft has free axial movement. Often the rotor centralises in the stator finding its position through the electromagnetic forces. This position will be ideally determined when the motor is running at no load. A care must be taken when mounting a clutch as no axial forces must be applied on the shaft. Another example of floating bearing design is when the outer rings of both ball bearings slide in the bearing housings and are not axially located.



Located bearings

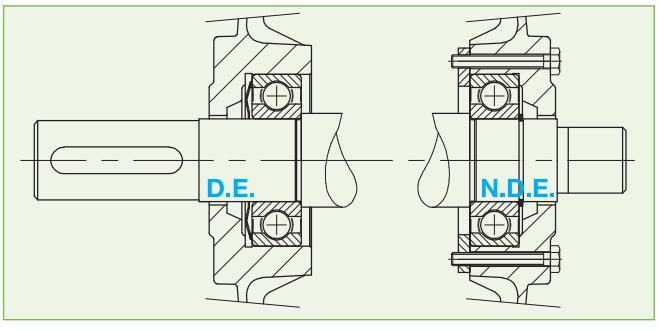
The outer ring of at least one ball bearing have been fixed in the bearing housing by use of a bearing cap or bearing retainer plate. The located (fixed) bearing cannot move in the axial direction. In comparison with the floating bearing design, the located bearing design prevents the rotor to move axially in relation to the stator. The only possible axial movement under normal circumstances is through the axial play in the ball bearings.



ROTOR STANDARD EXECUTION

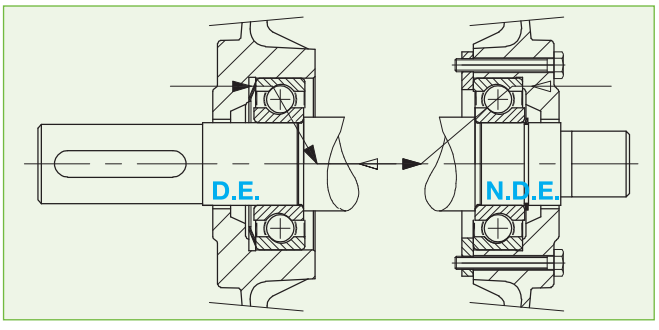
Enclosed + located bearings axially preloaded

The outer ring of NDE bearing is “located” in the bearing housing and on the shaft through the shaft circlip. The outer ring can not move axially in relation to the shaft. The located bearing is usually used in combination with an enclosed bearing design and when large axial loads are involved.



Enclosed + located bearings with increased axial pre-loading

Only one ball bearing can be located at a two ball bearing motor design. The other bearing should be able to slide axially in the bearing housing to compensate for any dilatation. Standard wavy washers are used for axial pre-loading or sometimes strengthened wavy washers and/or cup springs are used for increased axial pre-loading.

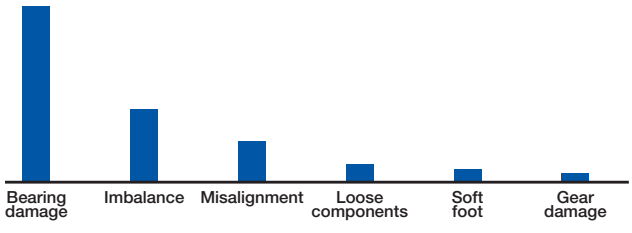


Bearing designs

Bearings are the only components in electric motors that are subject to wear. Standard bearing arrangement is usually sufficient to achieve the required service life where one bearing is located and the other bearing can axially slide in the bearing housing (loose fit). The service life of the bearings can, however, be shortened significantly by excessive load coming from the driven equipment or due to bearing damage resulting from operational conditions. The damage that occurs when pumps or fans are the application and the motors have “floating” bearing arrangement is referred to as “Brinell effect”. The use of “pre-loaded bearings” on both sides can sometimes eliminate the damage. The transferred force is effecting the outer ring of the motor’s bearing where the pump or fan have been mounted and the outer bearing ring of the axially “floating” bearing will start turning inside the bearing housing. This occurs at pumps or fans with a large moment of inertia (J fan ≥ 5 x J rotor) or when the fan is unbalanced or as a result of vibrations. The bearing housing will wear out and also frictional corrosion between the outer ring and the bearing housing will occur, which may lead to the jamming of the effected bearing. The rotation of the bearing in the housing will be reduced by applying an axial pre-loading.

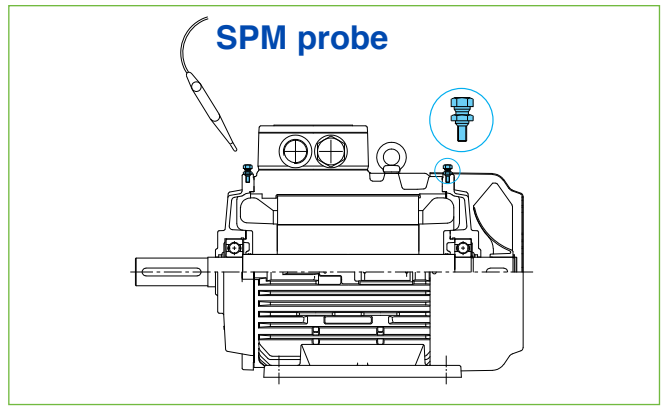
Frequent bearing damage occurs when motors are stationary and subject to vibrations. When stationary there is no lubrication film between the balls and the bearing races. The rotor moves as a result of external vibrations. This then leads to impact damage (a Brinell effect) of the balls in the races. The play can be reduced by applying axial pre-loading, which can limit the damage significantly.

Pre-loaded bearing design is a good solution for specific application cases. There are many more bearing designs available so a consultation with the electric motor manufacturer is recommended in order to establish the correct solution for specific applications or operating conditions.



Common mechanical failures

maximum vibrations of electric motors in V eff (mm/sec) and acceleration (m/s^2) in accordance with IEC 60034-14 2003-11 publication							
IEC housing size		56 ≤ H ≤ 132		132 < H ≤ 280		H > 280	
class	mm mounting	V eff mm/s	acceleration m/s^2	V eff mm/s	acceleration mm/s^2	V eff mm/s	acceleration m/s^2
A	free set-up	1.6	2.5	2.2	3.5	2.8	4.4
	fixed set-up	1.3	2	1.8	2.8	2.3	3.6
B	free set-up	0.7	1.1	1.1	1.7	1.8	2.8
	fixed set-up	-	-	0.9	1.4	1.5	2.4



SPM bearing monitoring

Increasing number of customers are starting to use the condition monitoring method. This means that the time of maintenance depends on the condition of the motor and not on the number of working hours.

In order to use this method the suitable testing equipment need to be available to determine the motor condition.

There are a number of different methods used to establish the condition of the bearings whilst in operation. The best known method is the SPM method (Shock Pulse Monitoring method). High-frequency shocks that occur in bearings when rolling elements and races come into contact are translated by a detection system into an instrument monitoring the bearing condition.

The place where an SPM nipple can be positioned is very important for correct measuring result. The fitting of the SPM nipples must also meet specific criteria. We recommend having the SPM nipples or detectors fitted on the new electric motors by qualified professionals to ensure that these criteria are met. **The rotor nl® electric motors can be supplied with SPM measuring nipples or detectors as an option at a surcharge.**

Mechanical Vibrations & Balancing

All rotor nl® electric motors are dynamically balanced with half key in accordance with the IEC 34-14 (2003) standard. The letter H (for Half key) is specified on the rating plate and on the shaft end. The letter F (for Full key) means that balancing has taken place with the full key. It is important that the parts or equipment that are mounted on the motor shaft are balanced accordingly before fitting.

The maximum permissible vibrations of electric motors are defined in the IEC 34-14 standard (see the table). **The rotor nl® electric motors meet the vibration class A as standard.** It may be a customer requirement to reduce motor vibrations for specific applications. Rotor nl® electric motors can be supplied in the reduced vibration execution of class B (special) upon request.

Bearing Load, Service Life and Lubrication

General

An assumption is usually made when designing electric motors that the motors will be coupled with the driven equipment through a flexible coupling or a V-belt transmission. Electric motors are, however, also often coupled with driven equipments, which transfer axial and/or radial forces originating from the driven equipment onto the motor shaft. Sometimes the load is significantly larger than the axial/radial load of the electric motor. The total axial and/or radial load is then a combination of all forces and the bearing design must always be taken into account when calculating the bearing service life.

The service life of grease-lubricated bearings depends on the following main factors:

- total axial and/or radial load applied on the bearings
- bearing type
- circumferential speed of the bearing (dependant on the electric motor speed)
- temperatures of the bearing and the bearing grease
- quality and lubricating properties of the bearing grease
- operation conditions (i.e. influence of moisture, pollution, external vibrations, etc.)

Ball bearings or cylindrical roller bearings?

Electric motors are by preference provided with ball bearings. Only when the radial load is know to be too high (for the ball bearings) cylindrical roller bearings must (NU bearings) be used on the drive end (DE). These bearings can absorb greater radial forces but the disadvantage is that their re-lubrication intervals are 50% shorter when compared with ball bearings.

A relatively high circumferential speed is involved when large bearings are used in combination with high rotating speeds. This results in grease being mechanically damaged. The service life of the grease also depends on the electric motor mounting. The theoretical service life is halved when the motor is vertically mounted compared to horizontal mounting. External vibrations also have a negative influence on the service life of the grease. “Bleeding” may occur where oil seeps out from the grease.

The bearing temperature is not only determined by the heat development in the bearing with regard to electric motors but also by the added heat from the electric motor or heat that is transferred from the driven equipment. It is important to know that 2-pole electric motors (3,000 rpm) have a rotor higher temperature when compared to multiple-pole electric motors (1,500 and 1,000 rpm). Similarly when electric motors are used for frequency inverter duty the heat losses in the rotor are greater. The heat is then transferred on the shaft and bearings.

Open bearings

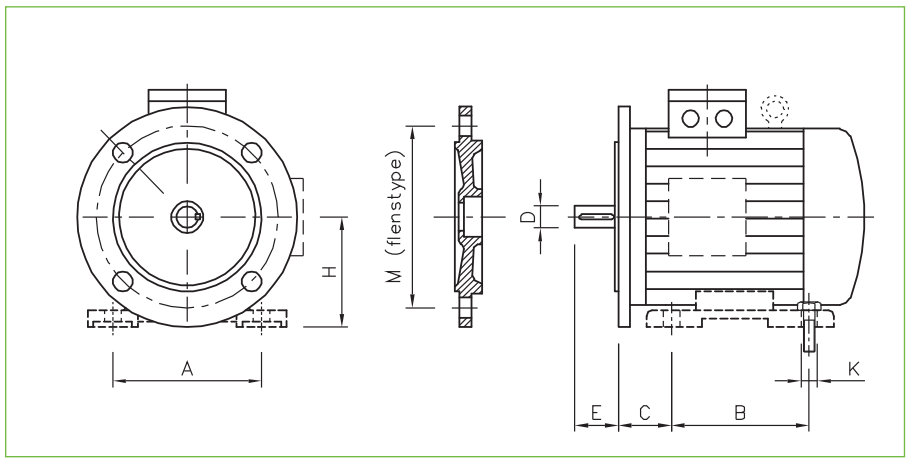
An optimum operation temperature of the bearings need to be established when open bearings are used, so the correct amount of grease is applied to guarantee a good lubrication. The grease in bearings loses its lubricating properties as due to mechanical load, ageing and increasing level of contamination. The grease in the open bearings must replaced on regular basis. The grease overloading increases the operation temperature of the bearing especially at high rotating speeds. As a general rule the grease filling should be between 30 and 50% of the bearing volume. (An overview is on page 72)

Service life calculation

If the axial and/or radial shaft load (applied on the motor shaft by the driven equipment) when advised to Rotor B.V. can be used for of the theoretical bearing service life calculation using the computer software. The calculation can only be used as indication indication as the real service life will depend on the factors mentioned above. Rotor nl® electric motors can also be supplied with a special bearing design that has been tailored for a specific application and/or operational conditions **(also see “Maintenance and Operating Instructions”).**

Combination of Frame Size, Dimension and Power

The table below is applicable for self cooled three-phase squirrel-cage electric motors for voltages up to 690V and frequency of 50Hz for continuous (S1) operation of a foot and/or flange mounting. This data are defined in the EN 50 347 standard as well as other standards.



IEC/DIN housing size	Construction sizes in mm				Flange type		Foot holes	Shaft end (D x E) in mm. At rotational speed		Power in kW at 50 Hz at rotational speed:			
	H	B	A	C	FF	FT	K	3,000 min^{-1}	≤ 1,500 min^{-1}	3,000 min^{-1}	1,500 min^{-1}	1,000 min^{-1}	750 min^{-1}
RN63	63	80	100	40	F115	F75	7 (M6)	11 x 23		0.18/0.25	0.12/0.18	-	-
RN71	71	90	112	45	F130	F85	7 (M6)	14 x 30		0.37/0.55	0.25/0.37	-	-
RN80	80	100	125	50	F165	F100	10 (M8)	19 x 40		0.75/1.1	0.55/0.75	0.37/0.55	-
RN90S	90	100	140	56	F165	F115	10 (M8)	24 x 50		1.5	1.1	0.75	0.37
RN90L		125								2.2	1.5	1.1	0.55
RN100L	100	140	160	63	F215	F130	12 (M10)	28 x 60		3	2.2/3	1.5	0.75/1.1
RN112M	112	140	190	70						4	4	2.2	1.5
RN132S	132	140	216	89	F265	F165	12 (M10)	38 x 80		5.5/7.5	5.5	3	2.2
RN132M		178								-	7.5	4/5.5	3
RN160M	160	210	254	108	F300	F215	14.5 (M12)	42 x 110		11/15	11	7.5	4/5.5
RN160L		254								18.5	15	11	7.5
RN180M	180	241	279	121	F300	-	14.5 (M12)	48 x 110		22	18.5	-	-
RN180L		279								-	22	15	11
RN200L	200	305	318	133	F350	-	18.5 (M16)	55 x 110		30/37	30	18.5/22	15
RN225S	225	286	356	149	F400	-	18.5 (M16)	55 x 110	60 x 140	-	37	-	18.5
RN225M		311								45	45	30	22
RN250M	250	349	406	168	F500	-	24 (M20)	60 x 140	65 x 140	55	55	37	30
RN280S	280	368	457	190	F500	-	24 (M20)	65 x 140	75 x 140	75	75	45	37
RN280M		419								90	90	55	45
RN315S	315	406	508	216	F600	-	28 (M24)	65 x 140	80 x 170	110	110	75	55
RN315M		457								132	132	90	75
RN315L	315	508	508	216	F600	-	28 (M24)	65 x 140	80 x 170	160	160	110	90
										200	200	132	110
RN315L-8/9					F740				85 x 170				
RNN315L	315	630	560	180	F740	-	26 (M24)	65 x 140	85 x 170	250/315	250/315	200/250	160/200
RNN315L				200*				-	95 x 170				
RNN355L	355	800	630	200	F840	-	33 (M30)	75 x 140	95 x 170	355/400/500	355/400/500	315/400	250/315
RNN355L				224*				-	100 x 120				
RNN400L	400	900	710	224	F940	-	33 (M30)	80 x170	100 x 210	560/630/710	650/630/710	450/500/560	355/400/450
RNN450	450	1,000	800	250	F1,080	-	39 (M36)	80 x 170	110 x 210	800/900/1,000	800/900/1,000	630/710/800	500/560/630

** NU bearing application.*

Flange and Shaft Dimensions

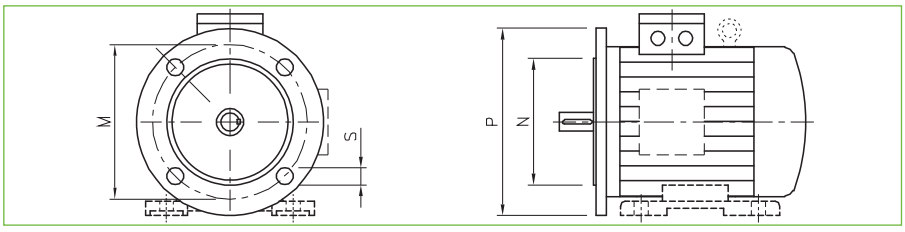
Flange dimensions

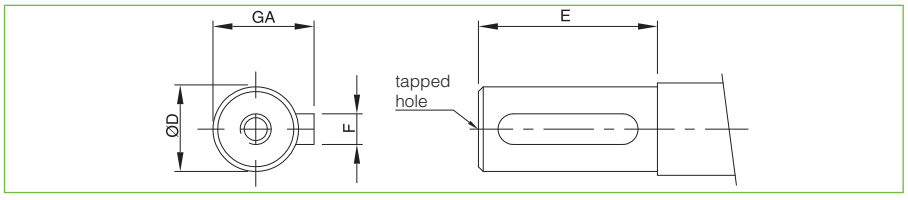
IEC/DIN	IM 3001/IM B5				IM 3601/IM B14A				IM 3601/IM B14B			
	M	P(max)	N	S	M	P(max)	N	S	M	P(max)	N	S
RN63	115	140	95j6	10	75	90	60j6	M5	100	120	80j6	M6
RN71	130	160	110j6	10	85	105	70j6	M6	115	140	95j6	M8
RN80	165	200	130j6	12	100	120	80j6	M6	130	160	110j6	M8
RN90					115	140	95j6	M8				
RN100	215	250	180j6	14.5	130	160	110j6	M8	165	200	130j6	M10
RN112												
RN132	265	300	230j6	14.5	165	200	130j6	M10				
RN160	300	350	250j6	18.5								
RN180												
RN200	350	400	300h6	18.5								
RN225	400	450	350h6	18.5								
RN250	500	550	450h6	18.5								
RN280												
RN315	600	660	550h6	24								
RN315-8/9	740	800	680h6	22								
RNN355	840	900	780h6	22								
RNN400	940	1,000	880h6	22								
RNN450	1,080	1,150	1,000h6	26								

By preference, the following information should be provided when ordering flange-mounted electric motors;

1e fixing hole type
FF = free holes
FT = tapped holes

2e M-size (fixing hole pitch)
Examples:
FF265: is IM 3001/B5—flange
Ø 300 x Ø 265 x Ø 230 mm.
with free holes.
FT115: is IM 3601/B14—flange
Ø 140 x Ø 115 x Ø 95 mm.
with M8 tapped holes.





Housing size type	Shaft		Flange FF		Flens FT (B14A)	
	Standard	Optional	Standard	Optional	Standard	Optional
RN63	Ø 11	Ø 9	115	-	75	-
RN71	Ø 14	Ø 11	130	115	85	75/100
RN80	Ø 19	Ø 14	165	130	100	85
RN90	Ø 24	Ø 19	165	130	115	100
RN100	Ø 28	Ø 24	215	165	130	-
RN112	Ø 28	Ø 24	215	-	130	-
RN132	Ø 38	Ø 28	265	215	165	130
RN160	Ø 42	Ø 38	300	265		215
RN180	Ø 48	Ø 42	300	265		
RN200	Ø 55	Ø 48	350	300		
RN225-2	Ø 55	Ø 48	400	300/350		
RN225-4/6/8	Ø 60	Ø 55	400	300/350		
RN250-2	Ø 60	Ø 55	500	400		
RN250-4/6/8	Ø 65	Ø 60	500	400		
RN280-2	Ø 65	Ø 60	500	400		
RN280-4/6/8	Ø 75	Ø 65	500	400		
RN315-2	Ø 65	Ø 60	600	-		
RN315-4/6/8	Ø 80	Ø 75	600	500/740		
RN315-4/6/8-8/9	Ø 85		740			
RNN315-2	Ø 65		740			
RNN315-4/6/8	Ø 85		740			
RNN315-4/6/8*	Ø 95		740			
RNN355-2	Ø 75		840			
RNN355-4/6/8	Ø 95		840			
RNN355-4/6/8*	Ø 100		840			
RNN355 E27-2/4	Ø 95		840			
RNN400-2	Ø 80		940			
RNN400-4/6/8	Ø 110		940			
RNN450-2	Ø 90		1,080			
RNN450-4/6/8	Ø 120		1,080			

** Fitted with NU bearings.*

Shaft dimensions

The shaft and flange dimensions specified in the dimensional drawings comply with the provisions of the relevant standard. The key and keyway comply with the NEN EN 50 347 standard. The electric motor shafts are equipped with an internal metric thread as indicated in the table below.

Shaft diameter	Sizes in mm			
D	E	F	GA	Tapped hole
Ø 9j6	20	3	10.2	M3
Ø 11j6	23	4	12.5	M4
Ø 14j6	30	5	16	M5
Ø 19j6	40	6	21.5	M6
Ø 24j6	50	8	27	M8
Ø 28j6	60	8	31	M10
Ø 38k6	80	10	41	M12
Ø 42k6	110	12	45	M16
Ø 48k6	110	14	51.5	M16
Ø 55m6	110	16	59	M20
Ø 60m6	140	18	64	M20
Ø 65m6	140	18	69	M20
Ø 70m6	140	20	74.5	M20
Ø 75m6	140	20	79.5	M20
Ø 80m6	170	22	85	M20
Ø 85m6	170	22	85	M20
Ø 90m6	170	25	95	M24
Ø 95m6	170	25	100	M24
Ø 100m6	210	28	106	M24
Ø 110m6	210	28	116	M24
Ø 120m6	210	32	127	M24

Housing size IEC	ELECTRIC MOTOR DIMENSIONS											SHAFT DIMENSIONS			
Motor type	H	A	AB	B	C	AD	HD = H + AD	K	L	W	Z	D	E	F	GA
2 pole synchronous speed 3000 min^-1															
5RN63M02E12	63	100	120	80	40	101	164	7	202,5	M16/M25x1.5	20	11j6	23	4h9	12,5
5RN63M02E13	63	100	120	80	40	101	164	7	202,5	M16/M25x1.5	20	11j6	23	4h9	12,5
5RN63M02E16	63	100	120	80	40	101	164	7	228,5	M16/M25x1.5	20	11j6	23	4h9	12,5
5RN71M02E12	71	112	132	90	45	111	182	7	240	M16/M25x1.5	20	11j6	30	5h9	16
5RN71M02E13	71	112	132	90	45	111	182	7	240	M16/M25x1.5	20	14j6	30	5h9	16
5RN71M02E16	71	112	132	90	45	111	182	7	240	M16/M25x1.5	20	14j6	30	5h9	16
6RN80M02E12	80	125	150	100	50	121	201	9,5	292	M25x1.5	20	19j6	40	6h9	21,5
6RN80M02E13	80	125	150	100	50	121	201	9,5	292	M25x1.5	20	19j6	40	6h9	21,5
6RN90S02E10	90	140	165	100	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN90L02E14	90	140	165	125	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN100L02E14	100	160	196	140	63	193	293	12	397,5	2xM32x1.5	20	28j6	60	8h9	31
6RN100L02E16	100	160	196	140	63	193	293	12	432,5	2xM32x1.5	20	28j6	60	8h9	31
6RN112M02E12	112	190	226	140	70	195	307	12	390,5	2xM32x1.5	25	28j6	60	8h9	31
6RN112M02E16	112	190	226	140	70	195	307	12	415,5	2xM32x1.5	25	28j6	60	8h9	31
6RN132S02E10	132	216	256	140	89	214,5	346,5	12	466,5	2xM32x1.5	30	38k6	80	10h9	41
6RN132S02E11	132	216	256	140	89	214,5	346,5	12	466,5	2xM32x1.5	30	38k6	80	10h9	41
6RN132M02E16	132	216	256	178	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	80	10h9	41
6RN160M02E12	160	254	300	210	108	261	421	15	606	2xM40x1.5	40	42k6	110	12h9	45
6RN160M02E13	160	254	300	210	108	261	421	15	606	2xM40x1.5	40	42k6	110	12h9	45
6RN160L02E14	160	254	300	254	108	261	421	15	606	2xM40x1.5	40	42k6	110	12h9	45
6RN160L02E16	160	254	300	254	108	261	421	15	666	2xM40x1.5	40	42k6	110	12h9	45
6RN180M02E12	180	279	339	241	121	286	466	15	668	2xM40x1.5	90	48k6	110	14h9	51,5
6RN180L02E16	180	279	339	279	121	286	466	15	698	2xM40x1.5	90	48k6	110	14h9	51,5
6RN200L02E14	200	318	378	305	133	315	515	19	721	2xM50x1.5	90	55m6	110	16h9	59
6RN200L02E15	200	318	378	305	133	315	515	19	721	2xM50x1.5	90	55m6	110	16h9	59
6RN200L02E16	200	318	378	305	133	315	515	19	746	2xM50x1.5	90	55m6	110	16h9	59
6RN225M02E12	225	356	436	311	149	338	563	19	758	2xM50x1.5	100	55m6	110	16h9	59
6RN225M02E16	225	356	436	311	149	338	563	19	818	2xM50x1.5	100	55m6	110	16h9	59
6RN250M02E12	250	406	490	349	168	410	660	24	887	2xM63x1.5	100	60m6	140	18h9	64
6RN250M02E16	250	406	490	349	168	410	660	24	887	2xM63x1.5	100	60m6	140	18h9	64
6RN280S02E10	280	457	540	368	190	433	713	24	960	2xM63x1.5	110	65m6	140	18h9	69
6RN280M02E12	280	457	540	419	190	433	713	24	960	2xM63x1.5	110	65m6	140	18h9	69
6RN280M02E16	280	457	540	419	190	433	713	24	1070	2xM63x1.5	110	65m6	140	18h9	69
6RN315S02E10	315	508	610	406	216	515	830	28	1052	2xM63x1.5	110	65m6	140	18h9	69
6RN315M02E12	315	508	610	457	216	515	830	28	1052	2xM63x1.5	110	65m6	140	18h9	69
6RN315L02E14	315	508	610	508	216	515	830	28	1082	2xM63x1.5	110	65m6	140	22h9	85
6RN315L02E15	315	508	610	508	216	515	830	28	1217	2xM63x1.5	110	65m6	140	18h9	69

Housing size IEC	ELECTRIC MOTOR DIMENSIONS											SHAFT DIMENSIONS			
Motor type	H	A	AB	B	C	AD	HD = H + AD	K	L	W	Z	D	E	F	GA
4 pole synchronous speed 1500 min^-1															
5RN63M04E12	63	100	120	80	40	101	164	7	202,5	M16/M25x1.5	20	11j6	23	4h9	12,5
5RN63M04E13	63	100	120	80	40	101	164	7	202,5	M16/M25x1.5	20	11j6	23	4h9	12,5
5RN63M04E16	63	100	120	80	40	101	164	7	228,5	M16/M25x1.5	20	11j6	23	4h9	12,5
5RN71M04E12	71	112	132	90	45	111	182	7	240	M16/M25x1.5	20	14j6	30	5h9	16
5RN71M04E13	71	112	132	90	45	111	182	7	240	M16/M25x1.5	20	14j6	30	5h9	16
5RN71M04E16	71	112	132	90	45	111	182	7	240	M16/M25x1.5	20	14j6	30	5h9	16
6RN80M04E12	80	125	150	100	50	121	201	9,5	292	M25x1.5	20	19j6	40	6h9	21,5
6RN80M04E13	80	125	150	100	50	121	201	9,5	292	M25x1.5	20	19j6	40	6h9	21,5
6RN80M04E16	80	125	150	100	50	121	201	9,5	327	M25x1.5	20	19j6	40	6h9	21,5
6RN90S04E10	90	140	165	100	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN90L04E14	90	140	165	125	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN100L04E14	100	160	196	140	63	193	293	12	397,5	2xM32x1.5	20	28j6	60	8h9	31
6RN100L04E15	100	160	196	140	63	193	293	12	397,5	2xM32x1.5	20	28j6	60	8h9	31
6RN100L04E16	100	160	196	140	63	193	293	12	432,5	2xM32x1.5	20	28j6	60	8h9	31
6RN112M04E12	112	190	226	140	70	195	307	12	390,5	2xM32x1.5	25	28j6	60	8h9	31
6RN112M04E16	112	190	226	140	70	195	307	12	415,5	2xM32x1.5	25	28j6	60	8h9	31
6RN132S04E10	132	216	256	140	89	214,5	346,5	12	466,5	2xM32x1.5	30	38k6	80	10h9	41
6RN132M04E12	132	216	256	178	89	214,5	346,5	12	466,5	2xM32x1.5	30	38k6	80	10h9	41
6RN132M04E16	132	216	256	178	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	80	10h9	41
6RN160M04E12	160	254	300	210	108	261	421	15	606	2xM40x1.5	40	42k6	110	12h9	45
6RN160L04E14	160	254	300	254	108	261	421	15	606	2xM40x1.5	40	42k6	110	12h9	45
6RN160L04E16	160	254	300	254	108	261	421	15	666	2xM40x1.5	40	42k6	110	12h9	45
6RN180M04E12	180	279	339	241	121	286	466	15	698	2xM40x1.5	90	48k6	110	14h9	51,5
6RN180L04E14	180	279	339	279	121	286	466	15	698	2xM40x1.5	90	48k6	110	14h9	51,5
6RN180L04E16	180	279	339	279	121	286	466	15	698	2xM40x1.5	90	48k6	110	14h9	51,5
6RN200L04E15	200	318	378	305	133	315	515	19	721	2xM50x1.5	90	55m6	110	16h9	59
6RN200L04E16	200	318	378	305	133	315	515	19	746	2xM50x1.5	90	55m6	110	16h9	59
6RN225S04E10	225	356	436	286	149	338	563	19	788	2xM50x1.5	100	60m6	140	18h9	64
6RN225M04E12	225	356	436	311	149	338	563	19	788	2xM50x1.5	100	60m6	140	18h9	64
6RN225M04E16	225	356	436	311	149	338	563	19	848	2xM50x1.5	100	60m6	140	18h9	64
6RN250M04E12	250	406	490	349	168	410	660	24	887	2xM63x1.5	100	65m6	140	18h9	64
6RN250M04E16	250	406	490	349	168	410	660	24	957	2xM63x1.5	100	65m6	140	18h9	69
6RN280S04E10	280	457	540	368	190	433	713	24	960	2xM63x1.5	110	75m6	140	20h9	79,5
6RN280M04E12	280	457	540	419	190	433	713	24	960	2xM63x1.5	110	75m6	140	20h9	79,5
6RN280M04E16	280	457	540	419	190	433	713	24	1070	2xM63x1.5	110	75m6	140	20h9	79,5
6RN315S04E10	315	508	610	406	216	515	830	28	1082	2xM63x1.5	110	80m6	170	22h9	85
6RN315M04E12	315	508	610	457	216	515	830	28	1052	2xM63x1.5	110	80m6	170	18h9	69
6RN315L04E14	315	508	610	508	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
6RN315L04E15	315	508	610	508	216	515	830	28	1402	2xM63x1.5	110	80m6	170	22h9	85

RN Series 3-phase Motor Data

Housing size IEC	ELECTRIC MOTOR DIMENSIONS											SHAFT DIMENSIONS			
Motor type	H	A	AB	B	C	AD	HD = H + AD	K	L	W	Z	D	E	F	GA
6 pole synchronous speed 1000 min^-1															
5RN63M06E12	63	100	120	80	40	101	164	7	202,5	M16/M25x1.5	20	11j6	23	4h9	12,5
5RN63M06E13	63	100	120	80	40	101	164	7	202,5	M16/M25x1.5	20	11j6	23	4h9	12,5
5RN71M06E12	71	112	132	90	45	111	182	7	240	M16/M25x1.5	20	14j6	30	5h9	16
5RN71M06E13	71	112	132	90	45	111	182	7	240	M16/M25x1.5	20	14j6	30	5h9	16
6RN80M06E12	80	125	150	100	50	121	201	9,5	292	M25x1.5	20	19j6	40	6h9	21,5
6RN80M06E13	80	125	150	100	50	121	201	9,5	292	M25x1.5	20	19j6	40	6h9	21,5
6RN90S06E10	90	140	165	100	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN90L06E14	90	140	165	125	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN100L06E14	100	160	196	140	63	193	293	12	397,5	2xM32x1.5	20	28j6	60	8h9	31
6RN112M06E12	112	190	226	140	70	195	307	12	390,5	2xM32x1.5	25	28j6	60	8h9	31
6RN112M06E16	112	190	226	140	70	195	307	12	415,5	2xM32x1.5	25	28j6	60	8h9	31
6RN132S06E10	132	216	256	140	89	214,5	346,5	12	466,5	2xM32x1.5	30	38k6	80	10h9	41
6RN132M06E12	132	216	256	178	89	214,5	346,5	12	466,5	2xM32x1.5	30	38k6	80	10h9	41
6RN132M06E13	132	216	256	178	89	214,5	346,5	12	466,5	2xM32x1.5	30	38k6	80	10h9	41
6RN132M06E16	132	216	256	178	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	80	10h9	41
6RN160M06E12	160	254	300	210	108	261	421	15	606	2xM40x1.5	40	42k6	110	12h9	45
6RN160L06E14	160	254	300	254	108	261	421	15	606	2xM40x1.5	40	42k6	110	12h9	45
6RN160L06E16	160	254	300	254	108	261	421	15	666	2xM40x1.5	40	42k6	110	12h9	45
6RN180L06E14	180	279	339	279	121	286	466	15	668	2xM40x1.5	90	48k6	110	14h9	51,5
6RN180L06E16	180	279	339	279	121	286	466	15	698	2xM40x1.5	90	48k6	110	14h9	51,5
6RN200L06E14	200	318	378	305	133	315	515	19	721	2xM50x1.5	90	55m6	110	16h9	59
6RN200L06E15	200	318	378	305	133	315	515	19	721	2xM50x1.5	90	55m6	110	16h9	59
6RN200L06E16	200	318	378	305	133	315	515	19	746	2xM50x1.5	90	55m6	110	16h9	59
6RN225M06E12	225	356	436	311	149	338	563	19	788	2xM50x1.5	100	60m6	140	18h9	64
6RN225M06E16	225	356	436	311	149	338	563	19	848	2xM50x1.5	100	60m6	140	18h9	64
6RN250M06E12	250	406	490	349	168	410	660	24	887	2xM63x1.5	100	65m6	140	18h9	69
6RN250M06E16	250	406	490	349	168	410	660	24	887	2xM63x1.5	100	65m6	140	18h9	69
6RN280S06E10	280	457	540	368	190	433	713	24	960	2xM63x1.5	110	75m6	140	20h9	79,5
6RN280M06E12	280	457	540	419	190	433	713	24	960	2xM63x1.5	110	75m6	140	20h9	79,5
6RN280M06E16	280	457	540	419	190	433	713	24	960	2xM63x1.5	110	75m6	140	20h9	79,5
6RN315S06E10	315	508	610	406	216	515	830	28	1082	2xM63x1.5	110	80m6	170	22h9	85
6RN315M06E12	315	508	610	457	216	515	830	28	1082	2xM63x1.5	110	80m6	170	22h9	85
6RN315L06E14	315	508	610	508	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
6RN315L06E15	315	508	610	508	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
6RN315L06E16	315	508	610	508	216	515	830	28	1402	2xM63x1.5	110	80m6	170	22h9	85

Housing size IEC	ELECTRIC MOTOR DIMENSIONS											SHAFT DIMENSIONS			
Motor type	H	A	AB	B	C	AD	HD = H + AD	K	L	W	Z	D	E	F	GA
8 pole synchronous speed 750 min^-1															
5RN63M08E13	63	100	120	80	40	101	164	7	202,5	M16/M25x1.5	20	11j6	23	4h9	12,5
5RN71M08E12	71	112	132	90	45	111	182	7	240	M16/M25x1.5	20	14j6	30	5h9	16
5RN71M08E13	71	112	132	90	45	111	182	7	240	M16/M25x1.5	20	14j6	30	5h9	16
6RN100L08E14	100	160	196	140	63	193	293	12	397,5	2xM32x1.5	20	28j6	60	8h9	31
6RN100L08E15	100	160	196	140	63	193	293	12	397,5	2xM32x1.5	20	28j6	60	8h9	31
6RN112M08E12	112	190	226	140	70	195	307	12	390,5	2xM32x1.5	25	28j6	60	8h9	31
6RN132S08E10	132	216	256	140	89	214,5	346,5	12	466,5	2xM32x1.5	30	38k6	80	10h9	41
6RN132M08E12	132	216	256	178	89	214,5	346,5	12	466,5	2xM32x1.5	30	38k6	80	10h9	41
6RN132M08E16	132	216	256	178	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	80	10h9	41
6RN160M08E12	160	254	300	210	108	261	421	15	606	2xM40x1.5	40	42k6	110	12h9	45
6RN160M08E13	160	254	300	210	108	261	421	15	606	2xM40x1.5	40	42k6	110	12h9	45
6RN160L08E14	160	254	300	254	108	261	421	15	606	2xM40x1.5	40	42k6	110	12h9	45
6RN180L08E14	180	279	339	279	121	286	466	15	668	2xM40x1.5	90	48k6	110	14h9	51,5
6RN180L08E16	180	279	339	279	121	286	466	15	668	2xM40x1.5	90	48k6	110	14h9	51,5
6RN200L08E15	200	318	378	305	133	315	515	19	721	2xM50x1.5	90	55m6	110	16h9	59
6RN200L08E16	200	318	378	305	133	315	515	19	746	2xM50x1.5	90	55m6	110	16h9	59
6RN225S08E10	225	356	436	286	149	338	563	19	788	2xM50x1.5	100	60m6	140	18h9	64
6RN225M08E12	225	356	436	311	149	338	563	19	788	2xM50x1.5	100	60m6	140	18h9	64
6RN225M08E16	225	356	436	311	149	338	563	19	818	2xM50x1.5	100	60m6	140	16h9	59
6RN250M08E12	250	406	490	349	168	410	660	24	887	2xM63x1.5	100	65m6	140	18h9	69
6RN250M08E16	250	406	490	349	168	410	660	24	887	2xM63x1.5	100	65m6	140	18h9	69
6RN280S08E10	280	457	540	368	190	433	713	24	960	2xM63x1.5	110	75m6	140	20h9	79,5
6RN280M08E12	280	457	540	419	190	433	713	24	960	2xM63x1.5	110	75m6	140	20h9	79,5
6RN280M08E16	280	457	540	419	190	433	713	24	960	2xM63x1.5	110	75m6	140	20h9	79,5
6RN315S08E10	315	508	610	406	216	515	830	28	1082	2xM63x1.5	110	80m6	170	22h9	85
6RN315M08E12	315	508	610	457	216	515	830	28	1082	2xM63x1.5	110	80m6	170	22h9	85
6RN315L08E14	315	508	610	508	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
6RN315L08E15	315	508	610	508	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
6RN315L08E16	315	508	610	508	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85

Drawings on page 49 "Dimensions 3-phase Electric Motors"

RN Series 3-phase Motor Data

IE2

Housing size IEC	ELECTRIC MOTOR DIMENSIONS											SHAFT DIMENSIONS			
Motor type	H	A	AB	B	C	AD	HD = H + AD	K	L	W	Z	D	E	F	GA
2 pole synchronous speed 3000 min^-1															
5RN63M02E22	63	100	120	80	40	101	164	7	202,5	M16/M25x1.5	20	11j6	23	4h9	12,5
5RN63M02E23	63	100	120	80	40	101	164	7	202,5	M16/M25x1.5	20	11j6	23	4h9	12,5
5RN71M02E22	71	112	132	90	45	111	182	7	240	M16/M25x1.5	20	14j6	30	5h9	16
5RN71M02E23	71	112	132	90	45	111	182	7	240	M16/M25x1.5	20	14j6	30	5h9	16
6RN80M02E22	80	125	150	100	50	121	201	9,5	292	M25x1.5	20	19j6	40	6h9	21,5
6RN80M02E23	80	125	150	100	50	121	201	9,5	292	M25x1.5	20	19j6	40	6h9	21,5
6RN80M02E26	80	125	150	100	50	121	201	9,5	327	M25x1.5	20	19j6	40	6h9	21,5
6RN90S02E20	90	140	165	100	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN90L02E24	90	140	165	125	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN90L02E26	90	140	165	125	56	126	216	10	387	M25x1.5	20	24j6	50	8h9	27
6RN100L02E24	100	160	196	140	63	193	293	12	397,5	2xM32x1.5	20	28j6	60	8h9	31
6RN100L02E26	100	160	196	140	63	193	293	12	432,5	2xM32x1.5	20	28j6	60	8h9	31
6RN112M02E22	112	190	226	140	70	195	307	12	389	2xM32x1.5	25	28j6	60	8h9	31
6RN112M02E26	112	190	226	140	70	195	307	12	415,5	2xM32x1.5	25	28j6	60	8h9	31
6RN132S02E20	132	216	256	140	89	214,5	346,5	12	466,5	2xM32x1.5	30	38k6	80	10h9	41
6RN132S02E21	132	216	256	140	89	214,5	346,5	12	465	2xM32x1.5	30	38k6	80	10h9	41
6RN132M02E26	132	216	256	178	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	80	10h9	41
6RN160M02E22	160	254	300	210	108	261	421	15	604	2xM40x1.5	40	42k6	110	12h9	45
6RN160M02E23	160	254	300	210	108	261	421	15	604	2xM40x1.5	40	42k6	110	12h9	45
6RN160L02E24	160	254	300	254	108	261	421	15	604	2xM40x1.5	40	42k6	110	12h9	45
6RN160L02E26	160	254	300	254	108	261	421	15	664	2xM40x1.5	40	42k6	110	12h9	45
6RN180M02E22	180	279	339	241	121	286	466	15	668	2xM40x1.5	90	48k6	110	14h9	52
6RN180L02E26	180	279	339	279	121	286	466	15	698	2xM40x1.5	90	48k6	110	14h9	51,5
6RN200L02E24	200	318	378	305	133	315	515	19	727,5	2xM50x1.5	90	55m6	110	16h9	59
6RN200L02E25	200	318	378	305	133	315	515	19	727,5	2xM50x1.5	90	55m6	110	16h9	59
6RN200L02E26	200	318	378	305	133	315	515	19	746	2xM50x1.5	90	55m6	110	16h9	59
6RN225M02E22	225	356	436	311	149	338	563	19	818	2xM50x1.5	100	55m6	110	16h9	59
6RN225M02E26	225	356	436	311	149	338	563	19	818	2xM50x1.5	100	55m6	110	16h9	59
6RN250M02E22	250	406	490	349	168	410	660	24	859	2xM63x1.5	100	60m6	140	18h9	64
6RN250M02E26	250	406	490	349	168	410	660	24	887	2xM63x1.5	100	60m6	140	18h9	64
6RN280S02E20	280	457	540	368	190	433	713	24	961	2xM63x1.5	110	65m6	140	18h9	69
6RN280M02E22	280	457	540	419	190	433	713	24	961	2xM63x1.5	110	65m6	140	18h9	69
6RN280M02E26	280	457	540	419	190	433	713	24	1071	2xM63x1.5	110	65m6	140	18h9	69
6RN315S02E20	315	508	610	406	216	515	830	28	1052	2xM63x1.5	110	65m6	140	18h9	69
6RN315M02E22	315	508	610	457	216	515	830	28	1217	2xM63x1.5	110	65m6	140	18h9	69
6RN315L02E24	315	508	610	508	216	515	830	28	1217	2xM63x1.5	110	65m6	140	18h9	69
6RN315L02E25	315	508	610	508	216	515	830	28	1372	2xM63x1.5	110	65m6	140	18h9	69

Housing size IEC	ELECTRIC MOTOR DIMENSIONS											SHAFT DIMENSIONS			
Motor type	H	A	AB	B	C	AD	HD = H + AD	K	L	W	Z	D	E	F	GA
4 pole synchronous speed 1500 min^-1															
5RN63M04E22	63	100	120	80	40	101	164	7	202,5	M16/M25x1.5	20	11j6	23	4h9	12,5
5RN63M04E23	63	100	120	80	40	101	164	7	202,5	M16/M25x1.5	20	11j6	23	4h9	12,5
5RN71M04E22	71	112	132	90	45	111	182	7	240	M16/M25x1.5	20	14j6	30	5h9	16
5RN71M04E23	71	112	132	90	45	111	182	7	240	M16/M25x1.5	20	14j6	30	5h9	16
6RN80M04E22	80	125	150	100	50	121	201	9,5	292	M25x1.5	20	19j6	40	6h9	21,5
6RN80M04E23	80	125	150	100	50	121	201	9,5	292	M25x1.5	20	19j6	40	6h9	21,5
6RN80M04E26	80	125	150	100	50	121	201	9,5	327	M25x1.5	20	19j6	40	6h9	21,5
6RN90S04E20	90	140	165	100	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN90L04E24	90	140	165	125	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN90L04E26	90	140	165	125	56	126	216	10	387	M25x1.5	20	24j6	50	8h9	27
6RN100L04E24	100	160	196	140	63	193	293	12	397,5	2xM32x1.5	20	28j6	60	8h9	31
6RN100L04E25	100	160	196	140	63	193	293	12	397,5	2xM32x1.5	20	28j6	60	8h9	31
6RN100L04E26	100	160	196	140	63	193	293	12	430,5	2xM32x1.5	20	28j6	60	8h9	31
6RN112M04E22	112	190	226	140	70	195	307	12	389	2xM32x1.5	25	28j6	60	8h9	31
6RN112M04E26	112	190	226	140	70	195	307	12	415,5	2xM32x1.5	25	28j6	60	8h9	31
6RN132S04E20	132	216	256	140	89	214,5	346,5	12	465	2xM32x1.5	30	38k6	80	10h9	41
6RN132M04E22	132	216	256	178	89	214,5	346,5	12	465	2xM32x1.5	30	38k6	80	10h9	41
6RN132M04E26	132	216	256	178	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	80	10h9	41
6RN160M04E22	160	254	300	210	108	261	421	15	604	2xM40x1.5	40	42k6	110	12h9	45
6RN160L04E24	160	254	300	254	108	261	421	15	604	2xM40x1.5	40	42k6	110	12h9	45
6RN160L04E26	160	254	300	254	108	261	421	15	666	2xM40x1.5	40	42k6	110	12h9	45
6RN160L04E27	160	254	300	254	108	261	421	15	666	2xM40x1.5	40	42k6	110	12h9	45
6RN180M04E22	180	279	339	241	121	286	466	15	668	2xM40x1.5	90	48k6	110	14h9	52
6RN180L04E24	180	279	339	279	121	286	466	15	698	2xM40x1.5	90	48k6	110	14h9	52
6RN180L04E26	180	279	339	279	121	286	466	15	698	2xM40x1.5	90	48k6	110	14h9	51,5
6RN200L04E25	200	318	378	305	133	315	515	19	727,5	2xM50x1.5	90	55m6	110	16h9	59
6RN200L04E26	200	318	378	305	133	315	515	19	746	2xM50x1.5	90	55m6	110	16h9	59
6RN225S04E20	225	356	436	286	149	338	563	19	763	2xM50x1.5	100	60m6	140	18h9	64
6RN225M04E22	225	356	436	311	149	338	563	19	848	2xM50x1.5	100	60m6	140	18h9	64
6RN225M04E26	225	356	436	311	149	338	563	19	848	2xM50x1.5	100	60m6	140	18h9	64
6RN250M04E22	250	406	490	349	168	410	660	24	859	2xM63x1.5	100	65m6	140	18h9	69
6RN250M04E26	250	406	490	349	168	410	660	24	957	2xM63x1.5	100	65m6	140	18h9	69
6RN280S04E20	280	457	540	368	190	433	713	24	961	2xM63x1.5	110	75m6	140	20h9	80
6RN280M04E22	280	457	540	419	190	433	713	24	960	2xM63x1.5	110	75m6	140	20h9	79,5
6RN280M04E26	280	457	540	419	190	433	713	24	1070	2xM63x1.5	110	75m6	140	20h9	79,5
6RN315S04E20	315	508	610	406	216	515	830	28	1082	2xM63x1.5	110	80m6	170	22h9	85
6RN315M04E22	315	508	610	457	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
6RN315L04E24	315	508	610	508	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
6RN315L04E25	315	508	610	508	216	515	830	28	1402	2xM63x1.5	110	80m6	170	22h9	85

Housing size IEC	ELECTRIC MOTOR DIMENSIONS											SHAFT DIMENSIONS			
Motor type	H	A	AB	B	C	AD	HD = H + AD	K	L	W	Z	D	E	F	GA
6 pole synchronous speed 1000 min^-1															
6RN80M06E23	80	125	150	100	50	121	201	9,5	292	M25x1.5	20	19j6	40	6h9	21,5
6RN90S06E20	90	140	165	100	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN90L06E24	90	140	165	125	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN90L06E26	90	140	165	125	56	126	216	10	387	M25x1.5	20	24j6	50	8h9	27
6RN100L06E24	100	160	196	140	63	193	293	12	397,5	2xM32x1.5	20	28j6	60	8h9	31
6RN100L06E26	100	160	196	140	63	193	293	12	432,5	2xM32x1.5	20	28j6	60	8h9	31
6RN112M06E22	112	190	226	140	70	195	307	12	389	2xM32x1.5	25	28j6	60	8h9	31
6RN112M06E26	112	190	226	140	70	195	307	12	415,5	2xM32x1.5	25	28j6	60	8h9	31
6RN132S06E20	132	216	256	140	89	214,5	346,5	12	465	2xM32x1.5	30	38k6	80	10h9	41
6RN132M06E22	132	216	256	178	89	214,5	346,5	12	465	2xM32x1.5	30	38k6	80	10h9	41
6RN132M06E23	132	216	256	178	89	214,5	346,5	12	465	2xM32x1.5	30	38k6	80	10h9	41
6RN132M06E26	132	216	256	178	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	80	10h9	41
6RN160M06E22	160	254	300	210	108	261	421	15	604	2xM40x1.5	40	42k6	110	12h9	45
6RN160L06E24	160	254	300	254	108	261	421	15	604	2xM40x1.5	40	42k6	110	12h9	45
6RN160L06E26	160	254	300	254	108	261	421	15	666	2xM40x1.5	40	42k6	110	12h9	45
6RN180L06E24	180	279	339	279	121	286	466	15	668	2xM40x1.5	90	48k6	110	14h9	52
6RN180L06E26	180	279	339	279	121	286	466	15	698	2xM40x1.5	90	48k6	110	14h9	51,5
6RN200L06E24	200	318	378	305	133	315	515	19	727,5	2xM50x1.5	90	55m6	110	16h9	59
6RN200L06E25	200	318	378	305	133	315	515	19	727,5	2xM50x1.5	90	55m6	110	16h9	59
6RN200L06E26	200	318	378	305	133	315	515	19	746	2xM50x1.5	90	55m6	110	16h9	59
6RN225M06E22	225	356	436	311	149	338	563	19	848	2xM50x1.5	100	60m6	140	18h9	64
6RN225M06E26	225	356	436	311	149	338	563	19	848	2xM50x1.5	100	60m6	140	18h9	64
6RN250M06E22	250	406	490	349	168	410	660	24	859	2xM63x1.5	100	65m6	140	18h9	69
6RN250M06E26	250	406	490	349	168	410	660	24	887	2xM63x1.5	100	65m6	140	18h9	69
6RN280S06E20	280	457	540	368	190	433	713	24	961	2xM63x1.5	110	75m6	140	20h9	80
6RN280M06E22	280	457	540	419	190	433	713	24	961	2xM63x1.5	110	75m6	140	20h9	80
6RN280M06E26	280	457	540	419	190	433	713	24	960	2xM63x1.5	110	75m6	140	20h9	79,5
6RN315S06E20	315	508	610	406	216	515	830	28	1082	2xM63x1.5	110	80m6	170	22h9	85
6RN315M06E22	315	508	610	457	216	515	830	28	1082	2xM63x1.5	110	80m6	170	22h9	85
6RN315L06E24	315	508	610	508	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
6RN315L06E25	315	508	610	508	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
6RN315L06E26	315	508	610	508	216	515	830	28	1402	2xM63x1.5	110	80m6	170	22h9	85

Housing size IEC	ELECTRIC MOTOR DIMENSIONS											SHAFT DIMENSIONS			
Motor type	H	A	AB	B	C	AD	HD = H + AD	K	L	W	Z	D	E	F	GA
8 pole synchronous speed 750 min^-1															
5RN71M08E22	71	112	132	90	45	111	182	7	240	M16/M25x1.5	20	14j6	30	5h9	16
5RN71M08E23	71	112	132	90	45	111	182	7	240	M16/M25x1.5	20	14j6	30	5h9	16
6RN80M08E22	80	125	150	100	50	121	201	9,5	292	M25x1.5	20	19j6	40	6h9	21,5
6RN80M08E23	80	125	150	100	50	121	201	9,5	292	M25x1.5	20	19j6	40	6h9	21,5
6RN90S08E20	90	140	165	100	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN100L08E24	100	160	196	140	63	193	293	12	397,5	2xM32x1.5	20	28j6	60	8h9	31
6RN100L08E25	100	160	196	140	63	193	293	12	397,5	2xM32x1.5	20	28j6	60	8h9	31
6RN112M08E22	112	190	226	140	70	195	307	12	415,5	2xM32x1.5	25	28j6	60	8h9	31
6RN132S08E20	132	216	256	140	89	214,5	346,5	12	466,5	2xM32x1.5	30	38k6	80	10h9	41
6RN132M08E22	132	216	256	178	89	214,5	346,5	12	466,5	2xM32x1.5	30	38k6	80	10h9	41
6RN160M08E22	160	254	300	210	108	261	421	15	606	2xM40x1.5	40	42k6	110	12h9	45
6RN160M08E23	160	254	300	210	108	261	421	15	606	2xM40x1.5	40	42k6	110	12h9	45
6RN160L08E24	160	254	300	254	108	261	421	15	606	2xM40x1.5	40	42k6	110	12h9	45
6RN180L08E24	180	279	339	279	121	286	466	15	668	2xM40x1.5	90	48k6	110	14h9	51,5
6RN180L08E26	180	279	339	279	121	286	466	15	698	2xM40x1.5	90	48k6	110	14h9	51,5
6RN200L08E25	200	318	378	305	133	315	515	19	721	2xM50x1.5	90	55m6	110	16h9	59
6RN200L08E26	200	318	378	305	133	315	515	19	746	2xM50x1.5	90	55m6	110	16h9	59
6RN225M08E22	225	356	436	311	149	338	563	19	788	2xM50x1.5	100	60m6	140	18h9	64
6RN225M08E26	225	356	436	311	149	338	563	19	848	2xM50x1.5	100	60m6	140	18h9	64
6RN250M08E26	250	406	490	349	168	410	660	24	887	2xM63x1.5	100	65m6	140	18h9	69
6RN280S08E20	280	457	540	368	190	433	713	24	960	2xM63x1.5	110	75m6	140	20h9	79,5
6RN280M08E22	280	457	540	419	190	433	713	24	960	2xM63x1.5	110	75m6	140	20h9	79,5
6RN280M08E26	280	457	540	419	190	433	713	24	960	2xM63x1.5	110	75m6	140	20h9	80
6RN315L08E24	315	508	610	508	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
6RN315L08E25	315	508	610	508	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85

Drawings on page 49 "Dimensions 3-phase Electric Motors"

Housing size IEC	ELECTRIC MOTOR DIMENSIONS											SHAFT DIMENSIONS			
Motor type	H	A	AB	B	C	AD	HD = H + AD	K	L	W	Z	D	E	F	GA
2 pole synchronous speed 3000 min^-1															
6RN80M02E32	80	125	150	100	50	121,5	201,5	9,5	292	M25x1.5	20	19j6	40	6h9	21,5
6RN80M02E33	80	125	150	100	50	121,5	201,5	9,5	327	M25x1.5	20	19j6	40	6h9	21,5
6RN90S02E30	90	140	165	100	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN90L02E34	90	140	165	125	56	126	216	10	387	M25x1.5	20	24j6	50	8h9	27
6RN100L02E34	100	160	196	140	63	193	293	12	432,5	2xM32x1.5	20	28j6	60	8h9	31
6RN100L02E36	100	160	196	140	63	193	293	12	432,5	2xM32x1.5	20	28j6	60	8h9	31
6RN112M02E32	112	190	226	140	70	195	307	12	415,5	2xM32x1.5	25	28j6	60	8h9	31
6RN112M02E36	112	190	226	140	70	195	307	12	415,5	2xM32x1.5	25	28j6	60	8h9	31
6RN132S02E30	132	216	256	140	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	70	10h9	41
6RN132S02E31	132	216	256	140	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	70	10h9	41
6RN132M02E36	132	216	256	178	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	70	10h9	41
6RN132M02E37	132	216	256	178	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	70	10h9	41
6RN160M02E32	160	254	300	210	108	261	421	14,5	606	2xM40x1.5	40	42k6	110	12h9	45
6RN160M02E33	160	254	300	210	108	261	421	14,5	606	2xM40x1.5	40	42k6	110	12h9	45
6RN160L02E34	160	254	300	254	108	261	421	14,5	664	2xM40x1.5	40	42k6	110	12h9	45
6RN160L02E36	160	254	300	254	108	261	421	14,5	666	2xM40x1.5	40	42k6	110	12h9	45
6RN180M02E32	180	279	339	241	121	286	466	15	668	2xM40x1.5	90	48k6	110	14h9	51,5
6RN180L02E36	180	279	339	279	121	286	466	15	698	2xM40x1.5	90	48k6	110	14h9	51,5
6RN200L02E34	200	318	378	305	133	315	515	19	721	2xM50x1.5	90	55m6	110	16h9	59
6RN200L02E35	200	318	378	305	133	315	515	19	746	2xM50x1.5	90	55m6	110	16h9	59
6RN200L02E36	200	318	378	305	133	315	515	19	746	2xM50x1.5	90	55m6	110	16h9	59
6RN225M02E32	225	356	436	311	149	338	563	19	818	2xM50x1.5	100	55m6	110	16h9	59
6RN225M02E36	225	356	436	311	149	338	563	19	898	2xM50x1.5	100	55m6	110	16h9	59
6RN250M02E32	250	406	490	349	168	410	660	24	887	2xM63x1.5	100	60m6	140	18h9	64
6RN250M02E36	250	406	490	349	168	410	660	24	957	2xM63x1.5	100	60m6	140	18h9	64
6RN280S02E30	280	457	540	368	190	433	713	24	964	2xM63x1.5	110	65m6	140	18h9	69
6RN280M02E32	280	457	540	419	190	433	713	24	1070	2xM63x1.5	110	65m6	140	18h9	69
6RN280M02E36	280	457	540	419	190	433	713	24	1070	2xM63x1.5	110	65m6	140	18h9	69
6RN315S02E30	315	508	610	406	216	515	830	28	1052	2xM63x1.5	110	65m6	140	18h9	69
6RN315M02E32	315	508	610	457	216	515	830	28	1217	2xM63x1.5	110	65m6	140	18h9	69
6RN315L02E34	315	508	610	630	216	515	830	28	1217	2xM63x1.5	110	65m6	140	18h9	69
6RN315L02E35	315	508	610	630	216	515	830	28	1372	2xM63x1.5	110	65m6	140	18h9	69
7RN315L02E36	315	508	610	508	216	565	880	28	1282	2xM63x1.5	110	65m6	140	18h9	69
7RN315L02E37	315	508	610	508	216	565	880	28	1362	2xM63x1.5	110	65m6	140	18h9	69
7RN355M02E33	355	610	780	560	254	657	1012	35	1577	2xM80x2	140	75m6	140	20h9	79,5
7RN355L02E34	355	610	780	630	254	657	1012	35	1577	2xM80x2	140	75m6	140	20h9	79,5
7RN355L02E35	355	610	780	630	254	657	1012	35	1577	2xM80x2	140	75m6	140	20h9	79,5

Housing size IEC	ELECTRIC MOTOR DIMENSIONS											SHAFT DIMENSIONS			
Motor type	H	A	AB	B	C	AD	HD = H + AD	K	L	W	Z	D	E	F	GA
4 pole synchronous speed 1500 min^-1															
6RN80M04E32	80	125	150	100	50	121,5	201,5	9,5	292	M25x1.5	20	19j6	40	6h9	21,5
6RN80M04E33	80	125	150	100	50	121,5	201,5	9,5	327	M25x1.5	20	19j6	40	6h9	21,5
6RN90S04E30	90	140	165	100	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN90L04E34	90	140	165	125	56	126	216	10	372	M25x1.5	20	24j6	50	8h9	27
6RN100L04E34	100	160	196	140	63	193	293	12	432,5	2xM32x1.5	20	28j6	60	8h9	31
6RN100L04E35	100	160	196	140	63	193	293	12	430,5	2xM32x1.5	20	28j6	60	8h9	31
6RN100L04E36	100	160	196	140	63	193	293	12	475,5	2xM32x1.5	20	28j6	60	8h9	31
6RN112M04E32	112	190	226	140	70	195	307	12	415,5	2xM32x1.5	25	28j6	60	8h9	31
6RN112M04E36V	112	190	226	140	70	195	307	12	465,5	2xM32x1.5	25	28j6	60	8h9	31
6RN132S04E30	132	216	256	140	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	70	10h9	41
6RN132M04E32	132	216	256	178	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	70	10h9	41
6RN132M04E36V	132	216	256	178	89	214,5	346,5	12	575	2xM32x1.5	30	38k6	70	10h9	41
6RN160M04E32	160	254	300	210	108	261	421	14,5	606	2xM40x1.5	40	42k6	110	12h9	45
6RN160L04E34	160	254	300	254	108	261	421	14,5	664	2xM40x1.5	40	42k6	110	12h9	45
6RN160L04E36	160	254	300	254	108	261	421	14,5	666	2xM40x1.5	40	42k6	110	12h9	45
6RN180M04E32	180	279	339	241	121	286	466	15	668	2xM40x1.5	90	48k6	110	14h9	51,5
6RN180L04E34	180	279	339	279	121	286	466	15	698	2xM40x1.5	90	48k6	110	14h9	51,5
6RN180L04E36	180	279	339	279	121	286	466	15	698	2xM40x1.5	90	48k6	110	14h9	51,5
6RN200L04E35	200	318	378	305	133	315	515	19	746	2xM50x1.5	90	55m6	110	16h9	59
6RN200L04E36	200	318	378	305	133	315	515	19	746	2xM50x1.5	90	55m6	110	16h9	59
6RN225S04E30	225	356	436	286	149	338	563	19	788	2xM50x1.5	100	60m6	140	18h9	64
6RN225M04E32	225	356	436	311	149	338	563	19	848	2xM50x1.5	100	60m6	140	18h9	64
6RN225M04E36	225	356	436	311	149	338	563	19	928	2xM50x1.5	100	60m6	140	18h9	64
6RN250M04E32	250	406	490	349	168	410	660	24	887	2xM63x1.5	100	65m6	140	18h9	69
6RN250M04E36	250	406	490	349	168	410	660	24	957	2xM63x1.5	100	65m6	140	18h9	69
6RN280S04E30	280	457	540	368	190	433	713	24	960	2xM63x1.5	110	75m6	140	20h9	79,5
6RN280M04E32	280	457	540	419	190	433	713	24	1074	2xM63x1.5	110	75m6	140	20h9	80
6RN280M04E36	280	457	540	419	190	433	713	24	1070	2xM63x1.5	110	75m6	140	20h9	79,5
6RN315S04E30	315	508	610	406	216	515	830	28	1082	2xM63x1.5	110	80m6	170	22h9	85
6RN315M04E32	315	508	610	457	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
6RN315L04E34	315	508	610	630	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
6RN315L04E35	315	508	610	630	216	515	830	28	1402	2xM63x1.5	110	80m6	170	22h9	85
7RN315L04E36	315	508	610	508	216	565	880	28	1312	2xM63x1.5	110	85m6	170	22h9	90
7RN315L04E37	315	508	610	508	216	565	880	28	1422	2xM63x1.5	110	85m6	170	22h9	90
7RN355M04E33	355	610	780	560	254	657	1012	35	1607	2xM80x2	140	95m6	170	25h9	100
7RN355L04E34	355	610	780	630	254	657	1012	35	1607	2xM80x2	140	95m6	170	25h9	100
7RN355L04E35	355	610	780	630	254	657	1012	35	1607	4xM80x2	140	95m6	170	25h9	100

RN Series 3-phase Motor Data

IE3

Housing size IEC	ELECTRIC MOTOR DIMENSIONS											SHAFT DIMENSIONS			
Motor type	H	A	AB	B	C	AD	HD = H + AD	K	L	W	Z	D	E	F	GA
6 pole synchronous speed 1000 min^-1															
6RN90S06E30	90	140	165	100	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN90L06E34	90	140	165	125	56	126	216	10	347	M25x1.5	20	24j6	50	8h9	27
6RN100L06E34	100	160	196	140	63	193	293	12	432,5	2xM32x1.5	20	28j6	60	8h9	31
6RN112M06E32	112	190	226	140	70	195	307	12	414	2xM32x1.5	25	28j6	60	8h9	31
6RN112M06E36	112	190	226	140	70	195	307	12	465,5	2xM32x1.5	25	28j6	60	8h9	31
6RN132S06E30	132	216	256	140	89	214,5	346,5	12	465	2xM32x1.5	30	38k6	70	10h9	41
6RN132M06E32	132	216	256	178	89	214,5	346,5	12	465	2xM32x1.5	30	38k6	70	10h9	41
6RN132M06E33	132	216	256	178	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	70	10h9	41
6RN160M06E32	160	254	300	210	108	261	421	14,5	604	2xM40x1.5	40	42k6	110	12h9	45
6RN160L06E34	160	254	300	254	108	261	421	14,5	664	2xM40x1.5	40	42k6	110	12h9	45
6RN180L06E34	180	279	339	279	121	286	466	15	668	2xM40x1.5	90	48k6	110	14h9	52
6RN180L06E36	180	279	339	279	121	286	466	15	698	2xM40x1.5	90	48k6	110	14h9	51,5
6RN200L06E34	200	318	378	305	133	315	515	19	721	2xM50x1.5	90	55m6	110	16h9	59
6RN200L06E35	200	318	378	305	133	315	515	19	746	2xM50x1.5	90	55m6	110	16h9	59
6RN200L06E36	200	318	378	305	133	315	515	19	746	2xM50x1.5	90	55m6	110	16h9	59
6RN225M06E32	225	356	436	311	149	338	563	19	848	2xM50x1.5	100	60m6	140	18h9	64
6RN225M06E36	225	356	436	311	149	338	563	19	928	2xM50x1.5	100	60m6	140	18h9	64
6RN250M06E32	250	406	490	349	168	410	660	24	887	2xM63x1.5	100	65m6	140	18h9	69
6RN250M06E36	250	406	490	349	168	410	660	24	957	2xM63x1.5	100	65m6	140	18h9	69
6RN280S06E30	280	457	540	368	190	433	713	24	964	2xM63x1.5	110	75m6	140	20h9	80
6RN280M06E32	280	457	540	419	190	433	713	24	964	2xM63x1.5	110	75m6	140	20h9	80
6RN280M06E36	280	457	540	419	190	433	713	24	1070	2xM63x1.5	110	75m6	140	20h9	79,5
6RN315S06E30	315	508	610	406	216	515	830	28	1082	2xM63x1.5	110	80m6	170	22h9	85
6RN315M06E32	315	508	610	457	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
6RN315L06E34	315	508	610	630	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
6RN315L06E35	315	508	610	630	216	515	830	28	1402	2xM63x1.5	110	80m6	170	22h9	85
6RN315L06E36	315	508	610	630	216	515	830	28	1402	2xM63x1.5	110	80m6	170	22h9	85
7RN315L06E37	315	508	610	508	216	565	880	28	1422	2xM63x1.5	110	85m6	170	22h9	90
7RN315L06E38	315	508	610	508	216	565	880	28	1512	2xM63x1.5	110	85m6	170	22h9	90
7RN355M06E32	355	610	780	560	254	657	1012	35	1607	2xM80x2	140	95m6	170	25h9	100
7RN355M06E33	355	610	780	560	254	657	1012	35	1607	2xM80x2	140	95m6	170	25h9	100
7RN355L06E34	355	610	780	630	254	657	1012	35	1607	2xM80x2	140	95m6	170	25h9	100

Housing size IEC	ELECTRIC MOTOR DIMENSIONS											SHAFT DIMENSIONS			
Motor type	H	A	AB	B	C	AD	HD = H + AD	K	L	W	Z	D	E	F	GA
8 pole synchronous speed 750 min^-1															
6RN160M08E33	160	254	300	210	108	261	421	14,5	596	2xM40x1.5	40	42k6	110	12h9	45
6RN200L08E35	200	318	378	305	133	315	515	19	721	2xM50x1.5	90	55m6	110	16h9	59
6RN315M08E32	315	508	610	457	216	515	830	28	1082	2xM63x1.5	110	80m6	170	22h9	85
6RN315L08E35	315	508	610	630	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
7RN315L08E37	315	508	610	508	216	565	880	28	1422	2xM63x1.5	110	85m6	170	22h9	90
7RN315L08E38	315	508	610	508	216	565	880	28	1512	2xM63x1.5	110	85m6	170	22h9	90

Drawings on page 49 "Dimensions 3-phase Electric Motors"

RN Series 3-phase Motor Data

IE4

Housing size IEC	ELECTRIC MOTOR DIMENSIONS											SHAFT DIMENSIONS			
Motor type	H	A	AB	B	C	AD	HD = H + AD	K	L	W	Z	D	E	F	GA
2 pole synchronous speed 3000 min^-1															
6RN100L02E44	100	160	196	140	63	193	293	12	432,5	2xM32x1.5	20	28j6	60	8h9	31
6RN112M02E42	112	190	226	140	70	195	307	12	415,5	2xM32x1.5	25	28j6	60	8h9	31
6RN132S02E40	132	216	256	140	89	214,5	346,5	12	465,5	2xM32x1.5	30	38k6	80	10h9	41
6RN132S02E41	132	216	256	140	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	80	10h9	41
6RN160L02E44	160	254	300	254	108	261	421	15	666	2xM40x1.5	40	42k6	110	12h9	45
6RN160M02E42	160	254	300	210	108	261	421	15	606	2xM40x1.5	40	42k6	110	12h9	45
6RN160M02E43	160	254	300	210	108	261	421	15	666	2xM40x1.5	40	42k6	110	12h9	45
6RN180M02E42	180	279	339	241	121	286	466	15	698	2xM40x1.5	90	48k6	110	14h9	51,5
6RN200L02E44	200	318	378	305	133	315	515	19	721	2xM50x1.5	90	55m6	110	16h9	59
6RN200L02E45	200	318	378	305	133	315	515	19	746	2xM50x1.5	90	55m6	110	16h9	59
6RN225M02E42	225	356	436	311	149	338	563	19	818	2xM50x1.5	100	55m6	110	16h9	59
6RN250M02E42	250	406	490	349	168	410	660	24	887	2xM63x1.5	100	60m6	140	18h9	64
6RN280M02E42	280	457	540	419	190	433	713	24	1070	2xM63x1.5	110	65m6	140	18h9	69
6RN280S02E40	280	457	540	368	190	433	713	24	1070	2xM63x1.5	110	65m6	140	18h9	69
6RN315L02E44	315	508	610	508	216	515	830	28	1217	2xM63x1.5	110	65m6	140	18h9	69
6RN315L02E45	315	508	610	508	216	515	830	28	1372	2xM63x1.5	110	65m6	140	18h9	69
6RN315M02E42	315	508	610	508	216	515	830	28	1217	2xM63x1.5	110	65m6	140	18h9	69
6RN315S02E40	315	508	610	508	216	515	830	28	1052	2xM63x1.5	110	65m6	140	18h9	69
7RN315L02E46	315	508	610	508	216	565	880	28	1282	2xM63x1.5	110	65m6	140	18h9	69
7RN315L02E47	315	508	610	508	216	565	880	28	1362	2xM63x1.5	110	65m6	140	18h9	69
7RN355M02E43	355	610	780	560	254	657	1012	35	1577	2xM80x2	140	75m6	140	20h9	79,5
7RN355L02E44	355	610	780	630	254	657	1012	35	1577	2xM80x2	140	75m6	140	20h9	79,5
7RN355L02E45	355	610	780	630	254	657	1012	35	1577	2xM80x2	140	75m6	140	20h9	79,5

Housing size IEC	ELECTRIC MOTOR DIMENSIONS											SHAFT DIMENSIONS			
Motor type	H	A	AB	B	C	AD	HD = H + AD	K	L	W	Z	D	E	F	GA
4 pole synchronous speed 1500 min^-1															
6RN100L04E44	100	160	196	140	63	193	293	12	432,5	2xM32x1.5	20	28j6	60	8h9	31
6RN100L04E45	100	160	196	140	63	193	293	12	482,5	2xM32x1.5	20	28j6	60	8h9	31
6RN112M04E42	112	190	226	140	70	195	307	12	465,5	2xM32x1.5	25	28j6	60	8h9	31
6RN132M04E42	132	216	256	178	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	80	10h9	41
6RN132S04E40	132	216	256	140	89	214,5	346,5	12	516,5	2xM32x1.5	30	38k6	80	10h9	41
6RN160L04E44	160	254	300	254	108	261	421	15	666	2xM40x1.5	40	42k6	110	12h9	45
6RN160M04E42	160	254	300	210	108	261	421	15	666	2xM40x1.5	40	42k6	110	12h9	45
6RN180L04E44	180	279	339	279	121	286	466	15	698	2xM40x1.5	90	48k6	110	14h9	51,5
6RN180M04E42	180	279	339	241	121	286	466	15	668	2xM40x1.5	90	48k6	110	14h9	51,5
6RN200L04E45	200	318	378	305	133	315	515	19	746	2xM50x1.5	90	55m6	110	16h9	59
6RN225M04E42	225	356	436	311	149	338	563	19	928	2xM50x1.5	100	60m6	140	16h9	59
6RN225S04E40	225	356	436	286	149	338	563	19	848	2xM50x1.5	100	60m6	140	18h9	64
6RN250M04E42	250	406	490	349	168	410	660	24	957	2xM63x1.5	100	65m6	140	18h9	69
6RN280M04E42	280	457	540	419	190	433	713	24	1070	2xM63x1.5	110	75m6	140	20h9	79,5
6RN280S04E40	280	457	540	368	190	433	713	24	1070	2xM63x1.5	110	75m6	140	20h9	79,5
6RN315L04E44	315	508	610	508	216	515	830	28	1402	2xM63x1.5	110	80m6	170	22h9	85
6RN315L04E45	315	508	610	508	216	515	830	28	1402	2xM63x1.5	110	80m6	170	22h9	85
6RN315L04E46	315	508	610	508	216	515	830	28	1402	2xM63x1.5	110	80m6	170	22h9	85
6RN315L04E47	315	508	610	508	216	515	830	28	1402	2xM63x1.5	110	80m6	170	22h9	85
6RN315M04E42	315	508	610	508	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
6RN315S04E40	315	508	610	508	216	515	830	28	1247	2xM63x1.5	110	80m6	170	22h9	85
7RN315L04E46	315	508	610	508	216	565	880	28	1422	2xM63x1.5	110	85m6	170	22h9	90
7RN315L04E47	315	508	610	508	216	565	880	28	1422	2xM63x1.5	110	85m6	170	22h9	90
7RN355M04E43	355	610	780	560	254	657	1012	35	1607	2xM80x2	140	95m6	170	25h9	100
7RN355L04E44	355	610	780	630	254	657	1012	35	1607	2xM80x2	140	95m6	170	25h9	100
7RN355L04E45	355	610	780	630	254	657	1012	35	1607	4xM80x2	140	95m6	170	25h9	100

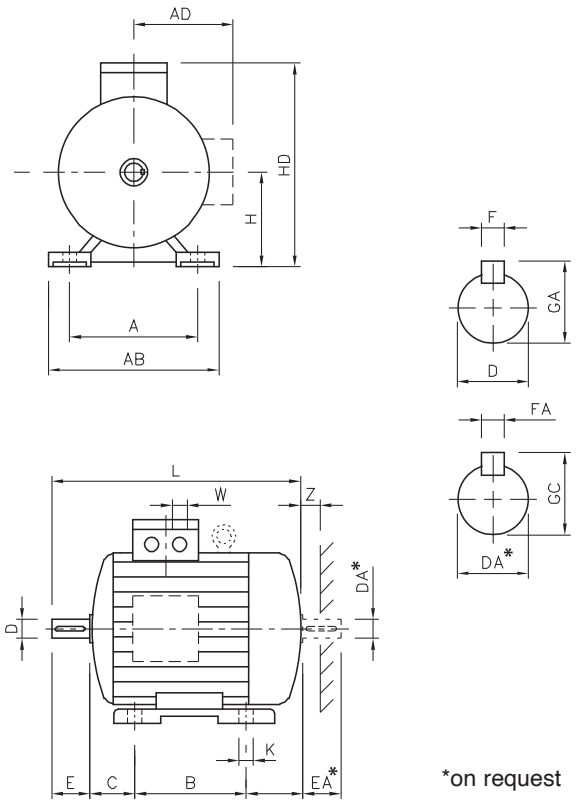
Housing size IEC	ELECTRIC MOTOR DIMENSIONS											SHAFT DIMENSIONS			
Motor type	H	A	AB	B	C	AD	HD = H + AD	K	L	W	Z	D	E	F	GA
6 pole synchronous speed 1000 min^-1															
7RN315L06E47	315	508	610	508	216	565	880	28	1422	2xM63x1.5	110	85m6	170	22h9	90
7RN315L06E48	315	508	610	508	216	565	880	28	1512	2xM63x1.5	110	85m6	170	22h9	90
7RN355M06E42	355	610	780	560	254	657	1012	35	1607	2xM80x2	140	95m6	170	25h9	100
7RN355M06E43	355	610	780	560	254	657	1012	35	1607	2xM80x2	140	95m6	170	25h9	100
7RN355L06E44	355	610	780	630	254	657	1012	35	1607	2xM80x2	140	95m6	170	25h9	100

Housing size IEC	ELECTRIC MOTOR DIMENSIONS											SHAFT DIMENSIONS			
Motor type	H	A	AB	B	C	AD	HD = H + AD	K	L	W	Z	D	E	F	GA
8 pole synchronous speed 750 min^-1															
7RN315L08E47	315	508	610	508	216	565	880	28	1422	2xM63x1.5	110	85m6	170	22h9	90
7RN315L08E48	315	508	610	508	216	565	880	28	1512	2xM63x1.5	110	85m6	170	22h9	90

Drawings on page 49 "Dimensions 3-phase Electric Motors""

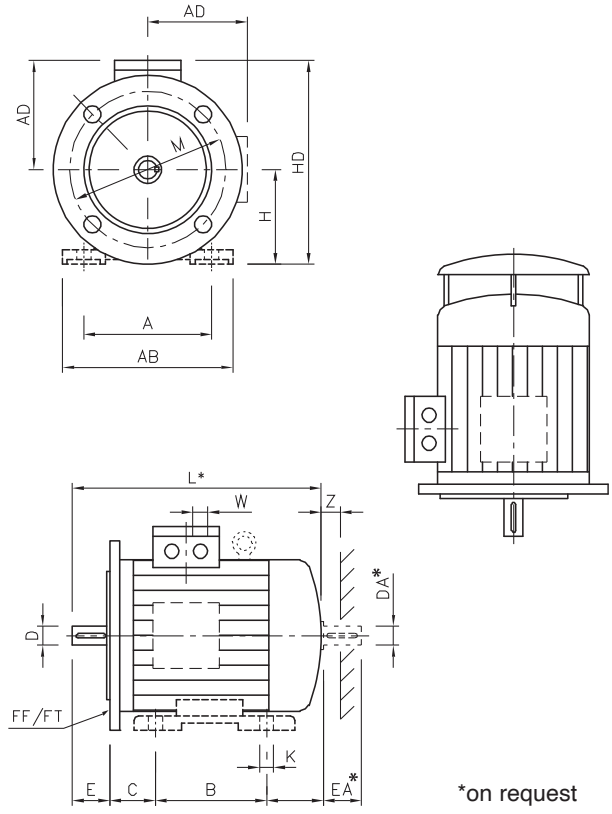
3-phase Electric Motors Dimensions

Electric motor for foot mounting



*on request

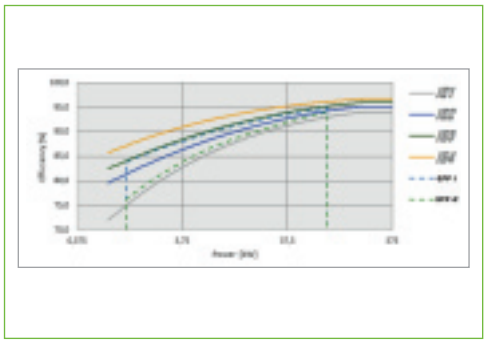
Electric motor for (foot)/flange mounting

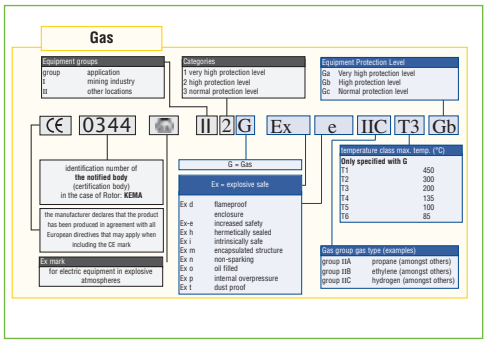


*on request

Section 4

Rotor Product Range





In the following pages you will find information about the standard range of rotor nl® electric motors and the details and modification options for an ATEX motor.

RN Series 3-phase Motor Data

IE1

Housing size IEC motor type	Power kW (50Hz)	Power kW (60Hz)	Speed min^-1	Nominal current at 400 V	Nominal current at 690 V	Power factor cos (phi)	Efficiency 4/4 Load %	Efficiency 3/4 Load %	Efficiency 2/4 Load %	Starting current Ia/In	Starting torque Ma/Mn	Stall torque Mk/Mn	Nominal torque Nm	Mass inertia J kgm2	Mass kg
2 pole synchronous speed 3000 min^-1															
5RN63M02E12	0,18	0,21	2805	1,08	-	0,79	52,8	50,1	44,2	2,9	1,7	2,2	0,61	0,00018	4,43
5RN63M02E13	0,25	0,29	2835	1,44	-	0,75	58,2	55,5	48,6	3,2	1,9	2,7	0,84	0,00022	4
5RN63M02E16	0,37	0,43	2795	2,05	-	0,71	63,9	60,3	51,9	3,3	2,4	2,5	1,26	0,00022	4
5RN71M02E12	0,37	0,43	2700	1,8	-	0,78	63,9	64,6	61,1	3,4	2,3	2,2	1,31	0,00022	6,54
5RN71M02E13	0,55	0,63	2700	2,59	-	0,8	69,0	69,8	66,5	3,5	2,2	2,2	1,95	0,00029	6,54
5RN71M02E16	0,75	0,86	2780	3,15	-	0,83	72,1	72,5	70,2	4,3	2,2	2,2	2,58	0,00051	6,54
6RN80M02E12	0,75	0,86	2835	2,98	-	0,86	72,1	72,6	69,9	5,2	2,1	2,3	2,53	0,00079	9
6RN80M02E13	1,1	1,27	2840	2,43	-	0,86	75,0	75,7	73,4	5,8	2,5	2,5	3,70	0,001	12
6RN90S02E10	1,5	1,75	2835	3,23	-	0,84	77,2	78,2	76,8	5,6	2,6	2,8	5,05	0,0014	13
6RN90L02E14	2,2	2,55	2855	4,55	-	0,85	79,7	80,9	81,3	6,5	2,8	3,2	7,36	0,0018	14
6RN100L02E14	3	3,45	2835	5,95	-	0,88	81,5	83,2	82,8	6,7	3,3	3,4	10,1	0,0034	31
6RN100L02E16	4	4,55	2850	8,2	-	0,85	83,1	83,9	83	7,1	4,4	4,0	13,4	0,0044	31,48
6RN112M02E12	4	4,55	2935	8,2	4,73	0,85	83,1	83	80,8	8,8	3,2	4,1	13,0	0,0067	39
6RN112M02E16	5,5	6,3	2935	10,8	6,24	0,86	84,7	84,7	82,7	8,8	2,8	3,7	17,9	0,0085	48
6RN132S02E10	5,5	6,3	2910	10,7	6,18	0,88	84,7	85,9	85,7	5,7	1,7	2,5	18,0	0,013	56
6RN132S02E11	7,5	8,6	2925	14,3	8,26	0,88	86,0	86,7	86,1	6,9	2,1	3,1	24,5	0,016	58,1
6RN132M02E16	11	12,6	2920	19,6	11,32	0,9	87,6	88,3	87,8	7,7	2,8	3,6	36,0	0,022	73
6RN160M02E12	11	12,6	2925	21	12,1	0,85	87,6	88	87,1	5,8	2,0	2,6	35,9	0,03	95
6RN160M02E13	15	17,3	2935	28,5	16,5	0,85	88,7	88,9	87,7	6,9	2,4	3,2	48,8	0,036	104
6RN160L02E14	18,5	21,3	2935	34,5	19,9	0,86	89,3	89,7	89,3	7,7	2,7	3,4	60,2	0,044	114
6RN160L02E16	22	24,5	2935	39,5	22,8	0,87	89,9	90,2	89,5	7,7	2,5	3,4	71,6	0,049	105
6RN180M02E12	22	24,5	2945	40,5	23,38	0,87	89,9	90,6	90,4	7,7	2,5	3,5	71,3	0,069	145
6RN180L02E16	30	33,5	2940	54	31,2	0,89	90,7	91,5	91,5	8,2	2,4	3,5	97,4	0,094	152
6RN200L02E14	30	33,5	2960	60	34,64	0,79	90,7	90,9	90,2	7,4	2,5	3,6	96,8	0,124	200
6RN200L02E15	37	41,5	2955	67	38,68	0,88	91,2	91,6	91,2	8,2	2,7	3,5	120	0,15	225
6RN200L02E16	45	51	2955	83	47,92	0,85	91,7	92,3	92,4	8,2	2,5	3,6	145	0,176	250
6RN225M02E12	45	51	2960	80,4	46,5	0,88	91,7	92	91,6	6,7	2,3	3,0	145	0,22	295
6RN225M02E16	55	62	2960	98	56,5	0,88	92,1	92,4	92	7,5	2,4	3,2	177	0,25	295
6RN250M02E12	55	62	2970	98	56,5	0,88	92,1	92,3	91,4	7,0	2,0	2,9	177	0,4	355
6RN250M02E16	75	84	2970	133	76,8	0,88	92,7	92,8	92,1	7,1	2,4	3,1	241	0,48	365
6RN280S02E10	75	84	2975	134	77	0,86	92,7	92,5	91,3	7,0	2,2	3,0	241	0,72	490
6RN280M02E12	90	101	2975	157	90,64	0,89	93,0	93,1	92,4	7,6	2,5	3,0	289	0,83	530
6RN280M02E16	110	123	2975	189	109,12	0,9	93,3	93,5	93,1	7,3	2,4	3,1	353	1	540
6RN315S02E10	110	123	2982	198	114,32	0,86	93,3	92,9	91,5	8,2	2,3	3,3	352	1,2	720
6RN315M02E12	132	148	2982	230	132,79	0,89	93,5	93,2	92,5	7,6	2,3	3,0	423	1,4	880
6RN315L02E14	160	180	2982	270	155,88	0,91	93,8	93,6	93,1	7,4	2,3	2,9	512	1,6	930
6RN315L02E15	200	224	2982	335	193,41	0,92	94,0	93,9	93,5	7,1	2,2	2,8	640	2,1	1130

Housing size IEC motor type	Power kW (50Hz)	Power kW (60Hz)	Speed min^-1	Nominal current at 400 V	Nominal current at 690 V	Power factor cos (phi)	Efficiency 4/4 Load %	Efficiency 3/4 Load %	Efficiency 2/4 Load %	Starting current Ia/In	Starting torque Ma/Mn	Stall torque Mk/Mn	Nominal torque Nm	Mass inertia J kgm2	Mass kg
4 pole synchronous speed 1500 min^-1															
5RN63M04E12	0,12	0,14	1360	0,48	-	0,71	50,0	47,3	39,1	2,4	1,6	1,8	0,84	0,00029	4
5RN63M04E13	0,18	0,21	1345	0,64	-	0,71	57,0	55,1	47,8	2,8	1,9	2,1	1,28	0,0004	4,43
5RN63M04E16	0,25	0,29	1340	0,76	-	0,74	61,5	59,6	53,5	2,9	1,7	1,9	1,78	0,00045	5
5RN71M04E12	0,25	0,29	1365	0,8	-	0,73	61,5	61,4	56,1	3,0	1,8	2,0	1,75	0,00052	6,54
5RN71M04E13	0,37	0,43	1350	1,1	-	0,76	66,0	67,7	65	3,4	1,9	2,0	2,62	0,00077	6,54
5RN71M04E16	0,55	0,63	1365	1,63	-	0,7	70,0	70,5	67,4	3,5	2,4	2,4	3,85	0,00095	6,54
6RN80M04E12	0,55	0,63	1385	1,44	-	0,79	70,0	70,7	67,7	3,8	2,1	2,2	3,79	0,0014	10
6RN80M04E13	0,75	0,86	1390	2,02	-	0,76	72,1	72	67	3,6	2,1	2,3	5,15	0,0017	11
6RN80M04E16	1,1	1,27	1420	2,65	-	0,77	75,0	76,85	75,83	6,0	2,1	2,8	7,40	0,0021	12
6RN90S04E10	1,1	1,27	1405	2,61	-	0,81	75,0	75,9	73,6	4,6	2,1	2,3	7,48	0,0024	12
6RN90L04E14	1,5	1,75	1415	3,5	-	0,8	77,2	77,8	75,1	4,7	2,4	2,6	10,1	0,0033	15
6RN100L04E14	2,2	2,55	1420	5	-	0,8	79,7	80,3	78,1	5,2	2,3	2,7	14,8	0,0059	31
6RN100L04E15	3	3,45	1425	6,45	-	0,84	81,5	82,6	81,5	5,6	2,4	2,6	20,1	0,0078	33
6RN100L04E16	4	4,55	1430	8,7	-	0,81	83,1	83,8	82,3	6,3	2,9	3,1	26,7	0,01	33
6RN112M04E12	4	4,55	1435	8,4	4,85	0,83	83,1	84,3	83,7	6,2	2,4	2,9	26,6	0,01	42
6RN112M04E16	5,5	6,3	1435	11	6,35	0,8	84,7	85,9	85,3	5,9	3,0	3,1	36,6	0,012	49
6RN132S04E10	5,5	6,3	1450	11,2	6,5	0,81	84,7	85,3	84,2	5,9	2,3	2,7	36,2	0,019	57
6RN132M04E12	7,5	8,6	1450	15	8,7	0,81	86,0	86,5	85,4	6,7	2,6	3,1	49,4	0,024	65
6RN132M04E16	11	12,6	1450	21,5	12,4	0,83	87,6	88,2	87,6	7,6	2,6	3,4	72,4	0,033	78
6RN160M04E12	11	12,6	1460	22,5	13	0,8	87,6	87,9	86,7	7,0	2,7	3,3	71,9	0,044	105
6RN160L04E14	15	17,3	1460	30	17,3	0,81	88,7	89,1	88	7,6	3,0	3,6	98,1	0,056	114
6RN160L04E16	18,5	21,3	1460	35	20,2	0,84	89,3	89,8	89,2	7,3	2,6	3,3	121	0,068	120
6RN180M04E12	18,5	21,3	1468	35	20,21	0,85	89,3	90,2	90,2	7,3	2,2	3,1	120	0,13	160
6RN180L04E14	22	25,3	1465	42,52	24,55	0,82	89,9	90,8	90,7	8,1	2,7	3,6	143	0,13	170
6RN180L04E16	30	34,5	1465	59,97	34,62	0,79	90,7	91,7	91,9	7,2	2,6	3,4	196	0,159	185,2
6RN200L04E15	30	34,5	1472	58	33,49	0,83	90,7	91,5	91,4	5,9	2,3	3,1	195	0,2	230
6RN200L04E16	37	42,5	1470	71	40,99	0,82	91,2	92	92,1	6,8	2,4	2,9	240	0,246	230
6RN225S04E10	37	42,5	1475	69	40	0,85	91,2	91,6	91,1	7,1	2,5	3,2	240	0,37	280
6RN225M04E12	45	52	1475	81	47	0,86	91,7	92,1	91,7	7,5	2,6	3,3	291	0,45	305
6RN225M04E16	55	63	1475	100	58	0,86	92,1	92,8	92,6	6,8	2,4	2,6	356	0,49	315
6RN250M04E12	55	62	1480	101	58	0,85	92,1	92,5	92,1	6,3	2,4	2,6	355	0,69	385
6RN250M04E16	75	86	1482	139	81	0,84	92,7	93,1	92,6	7,2	2,4	3,0	483	0,69	395
6RN280S04E10	75	86	1485	136	79,1	0,85	92,7	92,9	92,2	7,0	2,3	2,9	482	1,2	550
6RN280M04E12	90	104	1482	161	93	0,87	93,0	93,4	93,1	6,8	2,1	2,7	580	1,4	570
6RN280M04E16	110	127	1486	200	115	0,86	93,3	93,5	93	8,5	2,9	3,3	707	1,88	580
6RN315S04E10	110	127	1486	205	118,36	0,84	93,3	93,4	92,8	7,1	2,3	2,7	707	1,9	740
6RN315M04E12	132	152	1488	240	139	0,85	93,5	93,7	93,3	7,2	2,5	2,7	847	2,2	870
6RN315L04E14	160	184	1486	285	164,54	0,86	93,8	93,9	93,5	7,2	2,7	2,7	1028	2,9	940
6RN315L04E15	200	230	1486	355	204,96	0,87	94,0	94,2	94	6,9	2,5	2,7	1285	3,5	1140

RN Series 3-phase Motor Data

Housing size IEC motor type	Power kW (50Hz)	Power kW (60Hz)	Speed min^-1	Nominal current at 400 V	Nominal current at 690 V	Power factor cos (phi)	Efficiency 4/4 Load %	Efficiency 3/4 Load %	Efficiency 2/4 Load %	Starting current Ia/In	Starting torque Ma/Mn	Stall torque Mk/Mn	Nominal torque Nm	Mass inertia J kgm2	Mass kg
6 pole synchronous speed 1000 min^-1															
5RN63M06E12	0,09	0,11	895	0,48	-	0,63	42,7	38,5	30,4	2,0	1,8	1,9	0,96	0,00037	4,43
5RN63M06E13	0,12	0,14	890	0,69	-	0,61	45,0	44	36	2,1	2,2	2,1	1,29	0,0005	4,22
5RN71M06E12	0,18	0,21	875	0,85	-	0,67	45,5	44,4	38,3	2,0	1,9	2,0	1,96	0,00055	6
5RN71M06E13	0,25	0,29	860	0,99	-	0,71	52,1	52,8	48,4	2,2	2,0	2,0	2,78	0,0008	6
6RN80M06E12	0,37	0,43	920	1,24	-	0,7	59,7	56,9	51,1	2,7	1,6	1,8	3,84	0,0014	9
6RN80M06E13	0,55	0,63	900	1,71	-	0,72	65,8	66,6	62,6	2,8	1,7	1,9	5,84	0,0017	12
6RN90S06E10	0,75	0,86	940	2,25	-	0,67	70,0	70	66	3,7	1,8	2,3	7,62	0,0033	13
6RN90L06E14	1,1	1,27	925	3,1	-	0,68	72,9	73,8	71,2	4,0	2,0	2,4	11,4	0,004	15
6RN100L06E14	1,5	1,75	940	3,95	-	0,74	75,2	75,6	72,3	4,0	1,9	2,1	15,2	0,0065	31
6RN112M06E12	2,2	2,55	940	5,7	-	0,72	77,7	78,5	76,3	4,7	2,5	2,7	22,3	0,0092	37
6RN112M06E16	3	3,45	945	7,6	4,39	0,71	79,7	79,5	76,3	4,9	2,9	2,9	30,3	0,013	43
6RN132S06E10	3	3,45	955	7,3	4,2	0,73	79,7	79,9	77,1	4,6	1,9	2,6	30,0	0,017	54
6RN132M06E12	4	4,55	955	9,3	5,4	0,76	81,4	82,6	81,9	5,2	2,3	2,6	40,0	0,021	60
6RN132M06E13	5,5	6,3	955	12,7	7,3	0,75	83,1	84	83	5,8	2,7	2,9	55,0	0,027	68
6RN132M06E16	7,5	8,6	950	17,3	10	0,74	84,7	85,3	84,1	5,9	2,9	2,9	75,4	0,032	60
6RN160M06E12	7,5	8,6	970	17,2	9,9	0,73	84,7	85,4	85	5,9	2,3	3,1	73,8	0,056	103
6RN160L06E14	11	12,6	960	23	13,3	0,77	86,4	86,8	85,9	6,1	2,2	3,1	109	0,078	118
6RN160L06E16	15	17,3	965	33,42	19,3	0,75	87,7	87,9	86,5	6,5	3,0	3,4	148	0,094	125
6RN180L06E14	15	18	975	32	18,48	0,77	87,7	88,5	87,9	6,1	2,3	3,0	147	0,17	155
6RN180L06E16	18,5	22	970	39	22,52	0,76	88,6	89,4	89,1	5,9	2,2	2,9	182	0,206	165
6RN200L06E14	18,5	22	978	38	21,94	0,79	88,6	89,8	89,8	6,3	2,5	2,6	181	0,25	200
6RN200L06E15	22	26,5	980	45	25,98	0,79	89,2	90	89,6	6,8	2,8	2,9	214	0,3	220
6RN200L06E16	30	34,5	975	62	35,8	0,78	90,2	91,4	91,7	6,0	2,6	2,7	294	0,381	230
6RN225M06E12	30	36	978	58	33,5	0,81	90,2	91	90,7	6,0	2,7	2,5	293	0,49	285
6RN225M06E16	37	44,5	980	71	41	0,82	90,8	91,5	91,5	6,2	2,5	2,8	361	0,62	295
6RN250M06E12	37	44,5	978	72	41,6	0,82	90,8	91,5	91,3	6,4	2,6	2,3	361	0,76	370
6RN250M06E16	45	54	982	84,7	48,9	0,82	91,4	92,2	92,1	6,7	2,6	2,3	438	0,93	380
6RN280S06E10	45	54	985	83	48	0,84	91,4	92	91,6	6,3	2,5	2,3	436	1,1	460
6RN280M06E12	55	66	985	100	57	0,85	91,9	92,5	92,6	6,6	2,5	2,4	533	1,3	510
6RN280M06E16	75	90	985	139	81	0,84	92,6	93,3	93,2	7,0	2,9	2,7	727	1,7	520
6RN315S06E10	75	90	988	141	82	0,83	92,6	92,8	92,1	7,1	2,5	2,7	725	2,1	660
6RN315M06E12	90	108	988	164	94	0,83	92,9	93,2	92,8	7,4	2,6	2,9	870	2,5	730
6RN315L06E14	110	132	988	196	114	0,85	93,3	93,6	93,4	7,3	2,5	2,8	1063	3,2	920
6RN315L06E15	132	158	988	235	138	0,86	93,5	93,7	93,4	7,5	3,0	2,9	1276	4,15	990
6RN315L06E16	160	192	988	285	165	0,85	93,8	93,9	93,6	8,1	3,0	2,9	1546	4,7	1160

Housing size IEC motor type	Power kW (50Hz)	Power kW (60Hz)	Speed min^-1	Nominal current at 400 V	Nominal current at 690 V	Power factor cos (phi)	Efficiency 4/4 Load %	Efficiency 3/4 Load %	Efficiency 2/4 Load %	Starting current Ia/In	Starting torque Ma/Mn	Stall torque Mk/Mn	Nominal torque Nm	Mass inertia J kgm2	Mass kg
8 pole synchronous speed 750 min^-1															
5RN71M08E12	0,09	0,11	635	0,53	-	0,63	39,0	35,7	28,6	1,7	1,8	2,0	1,35	0,00055	7
5RN71M08E13	0,12	0,14	625	0,83	-	0,68	31,0	30,5	27,1	1,3	1,7	1,7	1,83	0,0008	7
6RN100L08E14	0,75	0,86	705	2,86	-	0,61	61,2	58,1	50,5	3,1	1,8	2,2	10,2	0,0056	36
6RN100L08E15	1,1	1,27	690	3,85	-	0,61	66,5	66	61,8	3,3	2,0	2,2	15,2	0,0078	36
6RN112M08E12	1,5	1,75	700	2,68	-	0,65	70,2	71,1	68,7	3,3	1,6	1,9	20,5	0,0094	51
6RN132S08E10	2,2	2,55	720	6,2	3,6	0,65	74,2	74,1	71,4	4,1	1,7	2,3	29,2	0,019	54
6RN132M08E12	3	3,45	715	8,5	4,9	0,67	77,0	77,4	75,2	4,0	1,7	2,2	40,1	0,024	67
6RN132M08E16	4	4,55	715	11	6,35	0,66	79,2	81,1	77	3,9	1,7	2,2	53,4	0,02	73
6RN160M08E12	4	4,55	720	10,9	6,3	0,67	79,2	79,3	76,3	4,2	1,6	2,2	53,1	0,044	111
6RN160M08E13	5,5	6,3	720	13,6	7,85	0,68	81,4	81,9	80,3	4,2	1,4	2,1	72,9	0,056	111
6RN160L08E14	7,5	8,6	715	18,9	10,9	0,69	83,1	83,7	82,4	3,8	1,7	2,2	100	0,077	91
6RN180L08E14	11	13,2	720	26,5	15,3	0,7	85,0	86,2	86	5,0	1,9	2,5	146	0,2	165
6RN180L08E16	15	18	718	34	19,7	0,74	86,2	87,5	87,2	4,7	2,1	2,3	199	0,263	190
6RN200L08E15	15	18	718	33	19,05	0,75	86,2	87,9	88,4	5,5	2,5	2,9	199	0,3	230
6RN200L08E16	18,5	22	720	40	23,09	0,76	86,9	88,2	88,4	6,1	2,7	3,2	245	0,416	230
6RN225S08E10	18,5	22	730	39,5	22,8	0,78	86,9	87,8	87,4	5,5	2,2	2,7	242	0,43	250
6RN225M08E12	22	26,5	730	45,5	26,5	0,78	87,4	88,3	88,1	5,7	2,3	2,7	288	0,5	270
6RN225M08E16	30	36	730	62	36	0,79	88,3	89,1	89,1	5,6	2,6	2,8	392	0,73	270
6RN250M08E12	30	36	731	59,5	34,4	0,8	88,3	89,2	89,2	5,8	2,3	2,5	392	0,84	370
6RN250M08E16	37	44,5	730	72	41,6	0,83	88,8	89,8	89,9	5,7	2,3	2,6	484	1	405
6RN280S08E10	37	44,5	735	74	42,7	0,8	88,8	89,7	89,7	5,3	2,0	2,1	481	1,22	460
6RN280M08E12	45	54	735	87	50	0,8	89,2	90,3	90,4	5,3	2,1	2,1	585	1,42	500
6RN280M08E16	55	66	736	111	64	0,81	89,7	90,4	90,5	5,7	2,5	2,5	714	1,6	550
6RN315S08E10	55	66	740	111	65	0,8	89,7	90,1	89,7	5,7	2,1	2,6	710	2	960
6RN315M08E12	75	90	738	148	85	0,81	90,3	90,7	90,5	5,9	2,3	2,7	970	2,5	1020
6RN315L08E14	90	108	738	171	99	0,84	90,7	91,2	91,2	5,9	2,2	2,6	1165	3,1	1080
6RN315L08E15	110	132	740	215	124	0,82	91,1	91,6	91,5	6,7	2,7	2,9	1419	3,9	1120
6RN315L08E16	132	158	740	255	150	0,81	91,5	91,9	91,6	7,2	2,9	3,3	1703	4,5	1160

RN Series 3-phase Motor Data

IE2

Housing size IEC motor type	Power kW (50Hz)	Power kW (60Hz)	Speed min^-1	Nominal current at 400 V	Nominal current at 690 V	Power factor cos (phi)	Efficiency 4/4 Load %	Efficiency 3/4 Load %	Efficiency 2/4 Load %	Starting current Ia/In	Starting torque Ma/Mn	Stall torque Mk/Mn	Nominal torque Nm	Mass inertia J kgm2	Mass kg
2 pole synchronous speed 3000 min^-1															
5RN63M02E22	0,18	0,21	2850	0,55	-	0,78	60,4	59,4	53,7	4,0	2,1	2,7	0,60	0,00022	5
5RN63M02E23	0,25	0,29	2835	0,69	-	0,81	64,8	63,5	57,3	4,0	1,9	2,5	0,84	0,00026	5
5RN71M02E22	0,37	0,43	2775	0,94	-	0,8	69,5	70,5	67,9	4,2	2,4	2,4	1,27	0,00035	7
5RN71M02E23	0,55	0,63	2870	1,34	-	0,8	74,1	75,2	72,9	4,6	2,6	2,6	1,83	0,00045	7
6RN80M02E22	0,75	0,86	2805	1,67	-	0,85	77,4	80	80,1	4,9	1,9	2,3	2,55	0,0001	9
6RN80M02E23	1,1	1,27	2840	2,4	-	0,83	79,6	81,3	80,9	6,0	2,7	3,1	3,70	0,0011	11
6RN80M02E26	1,5	1,75	2830	3,2	-	0,85	81,3	83,4	83,6	6,0	2,7	2,7	5,06	0,0013	11
6RN90S02E20	1,5	1,75	2900	3,15	-	0,84	81,3	81,7	79,8	7,0	3,5	3,5	4,94	0,0017	13
6RN90L02E24	2,2	2,2	2890	4,5	2,6	0,84	83,2	83,7	82	7,2	2,6	3,7	7,27	0,0021	15
6RN90L02E26	3	3,45	2895	6	3,5	0,86	84,6	85,5	84,5	7,9	3,4	3,6	9,90	0,0031	15
6RN100L02E24	3	3,45	2907	6,08	3,55	0,85	84,6	85,5	84,6	7,2	2,2	2,5	9,85	0,0044	31
6RN100L02E26	4	4,6	2906	7,88	4,55	0,86	85,8	86,9	86,5	7,6	2,5	3,5	13,1	0,0054	31,5
6RN112M02E22	4	4,55	2950	7,9	4,6	0,86	85,8	86,2	85,1	7,9	2,4	3,3	12,9	0,0092	39
6RN112M02E26	5,5	6,3	2950	10,3	6,47	0,89	87,0	87,8	87,4	8,5	2,3	3,8	17,8	0,012	48
6RN132S02E20	5,5	6,3	2952	10,2	5,91	0,87	87,0	88	87,6	6,7	1,8	2,9	17,8	0,02	56
6RN132S02E21	7,5	8,6	2953	13,9	8,05	0,87	88,1	88,5	87,6	7,5	2,2	3,1	24,3	0,024	58,1
6RN132M02E26	11	12,6	2957	19,7	11,4	0,89	89,4	90,1	89,9	7,9	2,5	3,2	35,5	0,031	73
6RN160M02E22	11	12,6	2954	20,5	11,8	0,86	89,4	89,3	88	7,4	2,1	3,2	35,6	0,045	95
6RN160M02E23	15	17,3	2952	27,7	16	0,88	90,3	90,7	90	7,6	2,4	3,4	48,5	0,053	104
6RN160L02E24	18,5	21,3	2958	33,5	19,3	0,87	90,9	91,3	90,6	7,9	2,9	3,6	59,7	0,061	114
6RN160L02E26	22	25,3	2957	38,3	22,1	0,89	91,3	91,8	91,4	8,4	3,1	3,7	71,0	0,068	105
6RN180M02E22	22	24,5	2940	39,78	23,1	0,87	91,3	91,8	91,3	7,9	2,7	3,7	71,5	0,069	145
6RN180L02E26	30	33,5	2940	52,69	30,4	0,89	92,0	92,6	92,3	7,8	2,3	3,4	97,4	0,094	152
6RN200L02E24	30	33,5	2955	54,31	31,36	0,86	92,0	92,3	91,8	7,2	2,5	3,4	96,9	0,13	200
6RN200L02E25	37	41,5	2960	65,3	37,7	0,87	92,5	93	92,7	7,9	2,7	3,5	119	0,15	225
6RN200L02E26	45	51	2950	79,31	45,8	0,87	92,9	93,2	92,9	7,1	2,4	3,3	146	0,176	250
6RN225M02E22	45	51	2965	79	46	0,87	92,9	93,1	92,5	8,2	2,7	3,6	145	0,23	295
6RN225M02E26	55	62	2960	97	56	0,88	93,2	93,6	93,2	7,5	2,5	3,3	177	0,26	295
6RN250M02E22	55	62	2970	96,5	55,7	0,88	93,2	93,3	92,4	7,1	2,0	3,1	177	0,4	355
6RN250M02E26	75	84	2960	137,2	237,64	0,84	93,8	93,6	92,6	7,3	2,1	3,2	242	0,46	365
6RN280S02E20	75	84	2978	134,8	77,9	0,85	93,8	93,6	92,4	7,5	2,3	3,2	240	0,71	490
6RN280M02E22	90	101	2975	156,6	90,4	0,88	94,1	94,2	93,5	7,4	2,4	3,1	289	0,83	530
6RN280M02E26	110	123	2975	187	322,33	0,9	94,3	94,5	94,1	7,8	2,3	3,1	353	1	540
6RN315S02E20	110	123	2982	187,1	108,1	0,9	94,3	94,2	93,3	7,8	2,2	3,0	352	1,3	720
6RN315M02E22	132	148	2982	218,9	126,7	0,91	94,6	94,7	94,1	7,7	2,2	3,0	423	1,6	880
6RN315L02E24	160	180	2982	264,3	152,6	0,92	94,8	94,9	94,3	7,4	2,2	2,9	512	1,8	930
6RN315L02E25	200	224	2982	330	191	0,92	95,0	95,2	94,8	7,9	2,5	3,0	640	2,2	1130

Housing size IEC motor type	Power kW (50Hz)	Power kW (60Hz)	Speed min^-1	Nominal current at 400 V	Nominal current at 690 V	Power factor cos (phi)	Efficiency 4/4 Load %	Efficiency 3/4 Load %	Efficiency 2/4 Load %	Starting current Ia/In	Starting torque Ma/Mn	Stall torque Mk/Mn	Nominal torque Nm	Mass inertia J kgm2	Mass kg
4 pole synchronous speed 1500 min^-1															
5RN63M04E22	0,12	0,14	1390	0,44	-	0,66	59,1	56,4	49	3,0	2,3	2,4	0,82	0,00037	5
5RN63M04E23	0,18	0,21	1375	0,56	-	0,69	64,7	62,4	55,7	3,3	2,1	2,3	1,25	0,00045	5
5RN71M04E22	0,25	0,29	1380	0,79	-	0,69	68,5	68,4	64,2	3,7	2,3	2,4	1,73	0,00076	7
5RN71M04E23	0,37	0,43	1385	1,04	-	0,73	72,7	73,2	69,9	3,8	2,2	2,3	2,55	0,00095	7
6RN80M04E22	0,55	0,63	1440	1,37	-	0,74	77,1	76,8	73,7	5,3	2,2	3,1	3,65	0,0017	10
6RN80M04E23	0,75	0,86	1440	1,8	-	0,76	79,6	79,9	77,5	5,5	1,9	3,1	4,97	0,0021	11
6RN80M04E26	1,1	1,27	1440	2,5	-	0,78	81,4	82,1	80,7	6,1	2,4	3,0	7,29	0,0029	11
6RN90S04E20	1,1	1,27	1425	2,5	-	0,78	81,4	81,8	80	5,8	2,3	2,9	7,37	0,0028	13
6RN90L04E24	1,5	1,75	1430	3,38	-	0,78	82,8	83,5	82,2	6,6	2,6	3,4	10,0	0,0036	16
6RN90L04E26	2,2	2,2	1430	4,75	2,74	0,81	84,3	85,6	85	6,1	2,7	3,0	14,7	0,0049	16
6RN100L04E24	2,2	2,55	1459	4,74	2,74	0,8	84,3	85,1	84,2	6,9	2,1	3,3	14,4	0,0086	29
6RN100L04E25	3	3,45	1458	6,23	3,6	0,81	85,5	86,4	85,6	6,9	2,0	3,1	19,6	0,011	33
6RN100L04E26	4	4,6	1461	8,34	4,82	0,8	86,6	88	87,5	7,5	2,2	3,5	26,1	0,014	33
6RN112M04E22	4	4	1461	8,23	4,75	0,8	86,6	87,3	86,4	7,1	2,5	3,2	26,1	0,014	40,5
6RN112M04E26	5,5	6,3	1458	11,2	6,48	0,81	87,7	88,2	87,2	7,1	2,5	3,1	36,0	0,017	49
6RN132S04E20	5,5	6,3	1466	11,5	6,63	0,79	87,7	88,4	87,6	6,9	2,3	2,9	35,8	0,027	57
6RN132M04E22	7,5	8,63	1463	14,9	8,6	0,82	88,7	89,8	89,8	6,7	2,1	2,7	49,0	0,034	65
6RN132M04E26	11	12,65	1466	21,6	12,5	0,83	89,8	90,9	90,9	7,4	2,4	3,2	71,7	0,046	80
6RN160M04E22	11	12,6	1471	21,4	12,3	0,84	89,8	91	90,9	6,7	2,2	2,8	71,4	0,065	97,8
6RN160L04E24	15	17,3	1474	28	16,2	0,85	90,6	91,2	90,8	7,3	2,5	3,0	97,2	0,083	114
6RN160L04E26	18,5	21,3	1474	34,93	20,17	0,85	91,2	91,8	91,3	7,7	2,5	3,3	120	0,099	120
6RN160L04E27	22	24,5	1474	41	23,7	0,85	91,6	91,2	91,1	8,0	2,1	3,0	143	1,2	120
6RN180M04E22	18,5	21,3	1465	35	20,3	0,84	91,2	92	91,9	7,6	2,5	3,3	121	0,12	160
6RN180L04E24	22	25,3	1465	41,62	24	0,84	91,6	92,2	91,9	7,7	2,7	3,6	143	0,13	160
6RN180L04E26	30	34,5	1465	57,62	33,27	0,81	92,3	93	92,9	8,2	2,5	3,4	196	0,16	180
6RN200L04E25	30	34,5	1472	56	33	0,84	92,3	92,9	92,6	7,0	2,4	3,3	195	0,2	230
6RN200L04E26	37	42,5	1465	68,59	-	0,84	92,7	93,5	93,6	7,0	2,4	3,0	241	0,246	230
6RN225S04E20	37	42,5	1470	65,9	38,1	0,88	92,7	93,5	93,5	6,8	2,2	2,8	240	0,42	280
6RN225M04E22	45	52	1475	79,9	46,2	0,87	93,1	93,8	93,7	7,2	2,4	3,1	291	0,46	305
6RN225M04E26	55	63	1480	101,3	58,5	0,84	93,5	94,2	94,1	6,2	2,4	2,6	355	0,47	315
6RN250M04E22	55	63	1480	100,2	57,9	0,84	93,5	93,9	93,7	7,0	2,6	2,9	355	0,75	385
6RN250M04E26	75	86	1480	134	77,4	0,86	94,0	94,5	94,3	6,6	2,2	2,7	484	0,85	395
6RN280S04E20	75	86	1485	132	76,2	0,87	94,0	94,2	93,8	7,2	2,3	2,8	482	1,3	550
6RN280M04E22	90	104	1486	160,6	92,8	0,86	94,2	94,3	93,6	7,7	2,4	3,1	578	1,4	570
6RN280M04E26	110	127	1485	193	111	0,86	94,5	94,9	94,8	7,5	2,5	3,0	707	1,7	580
6RN315S04E20	110	127	1490	196,1	113	0,85	94,5	94,6	94	7,5	2,6	2,9	705	2	740
6RN315M04E22	132	152	1490	231,2	133	0,86	94,7	94,9	94,6	7,2	2,5	2,9	846	2,3	870
6RN315L04E24	160	184	1490	279,8	162	0,87	94,9	95	94,5	7,6	2,7	3,0	1025	2,8	940
6RN315L04E25	200	230	1490	349,4	202	0,86	95,1	95,3	94,7	8,0	3,0	3,1	1282	3,5	1140

RN Series 3-phase Motor Data

IE2

Housing size IEC motor type	Power kW (50Hz)	Power kW (60Hz)	Speed min^-1	Nominal current at 400 V	Nominal current at 690 V	Power factor cos (phi)	Efficiency 4/4 Load %	Efficiency 3/4 Load %	Efficiency 2/4 Load %	Starting current Ia/In	Starting torque Ma/Mn	Stall torque Mk/Mn	Nominal torque Nm	Mass inertia J kgm2	Mass kg
6 pole synchronous speed 1000 min^-1															
6RN80M06E23	0,55	0,63	935	1,67	-	0,66	73,1	73,8	70,8	4,4	2,5	2,9	5,62	0,0025	12
6RN90S06E20	0,75	0,86	945	1,97	-	0,72	75,9	76,8	74,5	4,0	1,7	2,2	7,58	0,003	13
6RN90L06E24	1,1	1,3	935	2,94	-	0,7	78,1	79,3	77,7	4,3	2,1	2,5	11,2	0,004	16
6RN90L06E26	1,5	1,75	930	3,95	-	0,69	79,8	79,8	78,1	4,7	2,0	2,6	15,4	0,0048	19
6RN100L06E24	1,5	1,75	970	3,7	-	0,73	79,8	80,5	79	6,2	2,0	2,9	14,8	0,011	31
6RN100L06E26	2,2	2,55	968	5,06	2,92	0,75	81,8	83,3	82,7	5,7	1,9	2,9	21,7	0,14	31
6RN112M06E22	2,2	2,55	968	5	2,9	0,75	81,8	82,7	81,7	6,0	2,1	3,1	21,7	0,014	37
6RN112M06E26	3	3,45	962	6,83	3,94	0,78	83,3	84	82,7	6,0	2,1	3,1	29,8	0,017	43
6RN132S06E20	3	3,45	970	7	4,04	0,74	83,3	83,4	81	5,8	1,5	2,2	29,5	0,024	54
6RN132M06E22	4	4,6	971	8,84	5,1	0,77	84,6	85,5	84,3	5,6	1,6	2,5	39,3	0,029	60
6RN132M06E23	5,5	6,3	970	11,49	6,63	0,77	86,0	87,1	86,4	6,4	1,9	3,0	54,1	0,037	68
6RN132M06E26	7,5	8,6	970	16,5	9,5	0,75	87,2	88,1	87,1	6,5	2,1	3,0	73,8	0,046	60
6RN160M06E22	7,5	8,6	979	16,1	9,3	0,76	87,2	87,9	87,2	6,3	1,8	2,8	73,2	0,075	103
6RN160L06E24	11	12,6	976	22,6	13,1	0,8	88,7	89,7	89,3	6,2	1,7	2,7	108	0,098	118
6RN160L06E26	15	17,3	975	30,6	17,7	0,8	89,7	90,4	89,7	6,5	1,9	2,9	147	0,12	125
6RN180L06E24	15	18	970	31,01	17,98	0,77	89,7	90,1	89,5	6,3	2,4	3,1	148	0,17	155
6RN180L06E26	18,5	22	970	38,44	22,19	0,77	90,4	90,9	90,5	5,9	2,3	2,9	182	0,206	165
6RN200L06E24	18,5	22	978	36,3	21	0,82	90,4	91,4	91,3	6,0	2,3	2,5	181	0,25	200
6RN200L06E25	22	25,3	978	43,05	24,9	0,81	90,9	91,7	91,4	6,6	2,6	2,7	215	0,3	220
6RN200L06E26	30	34,5	975	61,1	20,37	0,77	91,7	92,5	92,4	6,3	2,6	2,7	294	0,381	230
6RN225M06E22	30	30	980	56,8	32,8	0,83	91,7	92,5	92,3	6,0	2,3	2,7	292	0,58	285
6RN225M06E26	37	44,5	978	70	122,11	0,82	92,2	93	92,9	6,7	2,5	2,8	361	0,67	295
6RN250M06E22	37	37	982	70	40,4	0,83	92,2	93,1	93,1	6,2	2,7	2,4	360	0,86	370
6RN250M06E26	45	54	980	83	48	0,85	92,7	93,4	93,4	6,4	2,4	2,5	438	1	380
6RN280S06E20	45	45	985	83,5	48,3	0,84	92,7	93,4	93,2	6,5	2,6	2,6	436	1,1	460
6RN280M06E22	55	55	985	99,8	57,7	0,86	93,1	93,9	94	6,7	2,8	2,5	533	1,4	510
6RN280M06E26	75	90	986	136	236,08	0,85	93,7	94,3	94,4	7,4	3,1	2,8	726	1,8	520
6RN315S06E20	75	75	988	140,5	80	0,82	93,7	94	93,6	6,6	2,4	2,7	725	2,1	660
6RN315M06E22	90	90	988	164,3	95,3	0,84	94,0	94,3	93,6	7,0	2,4	2,8	870	2,5	730
6RN315L06E24	110	110	988	194,7	113,2	0,86	94,3	94,6	94,5	7,2	2,5	2,8	1063	3,6	920
6RN315L06E25	132	158	988	235,9	136	0,85	94,6	94,9	94,7	7,9	2,9	2,8	1276	4	990
6RN315L06E26	160	192	988	284,5	165	0,86	94,8	94,7	94,4	8,2	3,0	3,2	1546	4,7	1160

Housing size IEC motor type	Power kW (50Hz)	Power kW (60Hz)	Speed min^-1	Nominal current at 400 V	Nominal current at 690 V	Power factor cos (phi)	Efficiency 4/4 Load %	Efficiency 3/4 Load %	Efficiency 2/4 Load %	Starting current Ia/In	Starting torque Ma/Mn	Stall torque Mk/Mn	Nominal torque Nm	Mass inertia J kgm2	Mass kg
8 pole synchronous speed 750 min^-1															
5RN71M08E22	0,09	0,11	635	0,49	-	0,67	35,2	40,6	35,8	1,6	1,6	1,6	1,35	0,00077	7
5RN71M08E23	0,12	0,14	640	0,64	-	0,64	39,8	39,6	34,7	1,7	1,9	1,9	1,79	0,001	7
6RN80M08E22	0,18	0,21	690	0,92	-	0,59	45,9	43,6	37,8	2,6	1,7	2,1	2,49	0,00175	9
6RN80M08E23	0,25	0,29	705	1,3	-	0,53	50,6	48,1	41,9	2,9	2,0	2,5	3,39	0,00246	10
6RN90S08E20	0,37	0,43	705	1,59	-	0,58	56,1	55,6	49,6	2,8	1,6	2,1	5,01	0,00225	14
6RN100L08E24	0,75	0,86	725	2,75	-	0,58	66,2	65,7	61,6	3,2	1,5	2,1	9,88	0,0086	32
6RN100L08E25	1,1	1,3	722	4,05	-	0,57	70,8	72,3	69,6	4,0	1,8	2,8	14,5	0,011	36
6RN112M08E22	1,5	1,75	718	4,33	-	0,66	74,1	73,9	71,2	4,2	1,4	2,4	19,9	0,014	51
6RN132S08E20	2,2	2,55	725	6,6	3,8	0,65	77,6	78,2	76,6	3,9	1,4	2,0	29,0	0,034	59
6RN132M08E22	3	3,45	729	7,99	4,61	0,65	80,0	80,7	79,2	5,0	1,4	2,4	39,3	0,035	67
6RN160M08E22	4	4,6	733	9,6	5,54	0,69	81,9	82,6	81,4	4,3	1,8	2,0	52,1	0,065	98
6RN160M08E23	5,5	6,3	733	13,4	7,7	0,68	83,8	84,2	83	4,4	2,1	2,1	71,7	0,083	111
6RN160L08E24	7,5	8,6	729	17,5	10,1	0,71	85,3	86,4	86	4,5	1,9	2,1	98,2	0,098	123
6RN180L08E24	11	13,2	720	26	15	0,7	86,9	88	87,6	4,9	2,3	2,6	146	0,2	155
6RN180L08E26	15	18	720	34,06	11,35	0,73	88,0	89,2	89	4,9	2,2	2,5	199	0,263	190
6RN200L08E25	15	18	718	32,5	18,8	0,79	88,0	89,5	89,9	5,4	2,4	2,8	199	0,344	220
6RN200L08E26	18,5	22	720	39,03	6,25	0,78	88,6	89,9	90,2	5,8	2,6	3,0	245	0,416	230
6RN225M08E22	22	26,5	730	44	25	0,8	89,1	91,3	91,1	5,5	2,3	2,7	288	0,5	270
6RN225M08E26	30	36	732	58	103,75	0,75	89,8	92	92,1	6,6	2,8	3,2	391	0,923	270
6RN250M08E26	37	44,5	730	70	123,32	0,82	90,3	92,6	92,7	6,0	2,2	2,6	484	0,735	405
6RN280S08E20	37	44,5	736	75	43	0,78	90,3	92,5	92,1	5,4	2,3	2,4	480	1,1	460
6RN280M08E22	45	54	738	89	51,5	0,79	90,7	92,8	92,4	5,7	2,5	2,5	582	1,4	510
6RN280M08E26	55	66	735	111,9	193,82	0,8	91,0	93,4	93	6,2	2,3	2,4	715	1,6	510
6RN315L08E24	90	108	740	167	96,41	0,83	91,9	94,3	94,4	5,8	2,2	2,5	1161	3,1	1160
6RN315L08E25	110	132	740	205	118,36	0,82	92,3	95	95,1	6,4	2,4	2,8	1419	3,9	980

RN Series 3-phase Motor Data

IE3

Huisgrootte IEC type	Vermogen kW(50Hz)	Vermogen kw(60Hz)	Toerental min^-1	Nominaal stroom bij 400 V	Nominaal stroom bij 690V	Vermogens factor cos(phi)	Rendement 4/4 Load %	Rendement 3/4 Load %	Rendement 2/4 Load %	Aanloop stroom Ia/In	Aanloop koppel Ma/Mn	Kip koppel Mk/Mn	Nominaal koppel Nm	Massa traagheid J kgm2	Massa kg
2 pole synchronous speed 3000 min^-1															
6RN80M02E32	0,75	0,86	2850	1,6	-	0,86	80,7	82,2	81,9	6,2	2,6	3,0	2,51	0,0011	9
6RN80M02E33	1,1	1,27	2885	2,25	-	0,84	82,7	83,9	83,1	7,4	2,8	3,8	3,64	0,0013	11
6RN90S02E30	1,5	1,75	2910	3	-	0,86	84,2	84,6	83,2	8,1	2,7	4,2	4,92	0,0021	15
6RN90L02E34	2,2	2,55	2920	4,2	2,4	0,88	85,9	86,8	86,1	8,2	2,6	4,0	7,19	0,0021	15
6RN100L02E34	3	3,45	2920	5,6	3,23	0,88	87,1	88	87,5	8,1	3,2	4,6	9,81	0,0054	31
6RN100L02E36	4	4,55	2895	7,5	4,3	0,88	88,1	88,5	88,1	9,8	2,9	4,1	13,2	0,0054	38
6RN112M02E32	4	4,55	2955	7,4	4,27	0,9	88,1	89,1	88,7	8,0	2,9	3,9	12,9	0,012	45
6RN112M02E36	5,5	6,3	2950	10,4	6	0,86	89,2	90,7	90	9,4	2,5	3,7	17,8	0,018	32
6RN132S02E30	5,5	6,3	2950	9,9	5,7	0,9	89,2	90	89,7	8,0	1,9	3,7	17,8	0,024	43
6RN132S02E31	7,5	8,6	2950	13,1	7,56	0,92	90,1	91	91	8,9	1,9	3,9	24,3	0,031	75
6RN132M02E36	11	12,6	2950	19,8	11,4	0,89	91,2	91,9	91,8	9,5	2,2	4,3	35,6	0,031	80
6RN132M02E37	15	17,3	2955	27	15,6	0,87	91,9	91,9	91,8	8,4	2,2	4,8	48,5	0,033	85
6RN160M02E32	11	12,6	2955	19,76	11,41	0,9	91,2	91	89,5	8,5	2,4	3,8	35,5	0,053	100
6RN160M02E33	15	17,3	2960	27	15,6	0,87	91,9	92,1	91,2	9,4	2,7	4,3	48,4	0,061	110
6RN160L02E34	18,5	21,3	2955	32,1	18,5	0,9	92,4	92,8	92,4	9,4	2,8	4,2	59,8	0,068	127
6RN160L02E36	22	25,3	2950	37,5	22	0,91	92,7	93,4	93,3	9,3	3,2	3,9	71,2	0,077	127
6RN180M02E32	22	24,5	2950	38,5	22,3	0,89	92,7	93,2	92,9	9,6	2,5	3,5	71,2	0,08	225
6RN180L02E36	30	33,5	2950	53	30,8	0,88	93,3	93,9	93,9	9,2	2,6	3,9	97,1	0,094	202
6RN200L02E34	30	33,5	2955	53,08	30,65	0,87	93,3	93,5	92,9	7,1	2,4	3,3	96,9	0,13	225
6RN200L02E35	37	41,5	2955	64,97	37,5	0,88	93,7	94,2	94	7,0	2,4	3,2	120	0,16	250
6RN200L02E36	45	51	2950	79,4	45,9	0,87	94,0	94,3	94	7,1	2,4	3,2	146	0,16	245
6RN225M02E32	45	51	2960	78,1	45,1	0,88	94,0	94,5	94,4	7,3	2,3	3,2	145	0,26	315
6RN225M02E36	55	62	2965	94	55	0,9	94,3	94,6	94,4	8,2	3,1	3,7	177	0,31	405
6RN250M02E32	55	62	2975	94,5	54,6	0,89	94,3	94,5	93,9	7,0	2,1	3,0	177	0,46	355
6RN250M02E36	75	84	2970	127	74	0,9	94,7	94,9	94,5	6,8	2,2	2,9	241	0,56	455
6RN280S02E30	75	75	2975	129,7	74,9	0,88	94,7	94,8	94,1	7,1	2,2	2,9	241	0,77	510
6RN280M02E32	90	90	2975	152,6	88,1	0,9	95,0	95,1	94,6	7,6	2,2	3,1	289	0,94	590
6RN280M02E36	110	123	2975	183	106	0,91	95,2	95,4	95,1	8,2	2,4	3,1	353	1,1	660
6RN315S02E30	110	123	2982	183	105,7	0,91	95,2	95,4	94,9	7,5	2,2	3,0	352	1,4	750
6RN315M02E32	132	148	2982	219,5	126,8	0,91	95,4	95,5	95,2	7,8	2,3	3,0	423	1,6	880
6RN315L02E34	160	150	2982	263,4	152,1	0,92	95,6	95,7	95,2	8,6	2,6	3,3	512	1,9	980
6RN315L02E35	200	224	2982	326,4	188,5	0,92	95,8	95,9	95,5	7,7	2,5	3,0	640	2,3	1150
7RN315L02E36	250	280	2986	430	248,26	0,88	95,8	95,6	94,8	9,3	3,0	4,2	800	2,82	1340
7RN315L02E37	315	315	2986	550	317,54	0,87	95,8	95,6	94,8	9,9	3,5	4,2	1007	3,27	1520
7RN355M02E33	355	355	2988	600	346,41	0,89	95,8	95,6	94,8	8,9	2,6	4,0	1135	4,74	2100
7RN355L02E34	400	450	2986	660	381,05	0,92	95,8	95,7	95,2	8,5	2,6	3,4	1279	5,36	2240
7RN355L02E35	500	560	2988	850	490,75	0,89	95,8	95,7	95,1	8,9	3,0	3,8	1598	5,76	2340

Housing size IEC motor type	Power kW (50Hz)	Power kW (60Hz)	Speed min^-1	Nominal current at 400 V	Nominal current at 690 V	Power factor cos (phi)	Efficiency 4/4 Load %	Efficiency 3/4 Load %	Efficiency 2/4 Load %	Starting current Ia/In	Starting torque Ma/Mn	Stall torque Mk/Mn	Nominal torque Nm	Mass inertia J kgm2	Mass kg
4 pole synchronous speed 1500 min^-1															
6RN80M04E32	0,55	0,63	1440	1,25	-	0,77	80,8	81,1	79,3	3,5	2,1	3,1	3,65	0,0021	11
6RN80M04E33	0,75	0,86	1450	1,75	-	0,75	82,5	82,3	79,9	7,1	2,7	3,9	4,94	0,0029	11
6RN90S04E30	1,1	1,27	1445	2,4	-	0,78	84,1	84,7	83,4	6,8	2,3	3,6	7,27	0,0028	16
6RN90L04E34	1,5	1,75	1445	3,25	-	0,79	85,3	85,9	84,9	7,1	2,8	3,6	9,91	0,0036	19
6RN100L04E34	2,2	2,55	1465	4,41	2,55	0,83	86,7	87,3	86,4	8,4	2,0	3,6	14,3	0,014	40
6RN100L04E35	3	3	1460	5,9	3,4	0,83	87,7	88,4	88,2	8,3	2,5	3,4	19,6	0,014	33
6RN100L04E36	4	4,55	1455	8	4,65	0,81	88,6	87,42	86,13	7,4	2,3	3,4	26,3	0,016	42
6RN112M04E32	4	4,55	1460	7,9	4,56	0,83	88,6	89,2	88,6	7,9	2,3	3,7	26,2	0,017	46
6RN112M04E36V	5,5	6,3	1460	11,1	6,4	0,8	89,6	90	90,5	8,5	2,8	3,9	36,0	0,019	48
6RN132S04E30	5,5	6,3	1475	10,5	6,1	0,84	89,6	90,1	89,5	8,2	2,8	3,9	35,6	0,046	57
6RN132M04E32	7,5	8,6	1465	14,21	8,3	0,84	90,4	91,1	90,8	8,2	2,4	3,5	48,9	0,046	80
6RN132M04E36V	11	12,6	1470	21,5	12,6	0,8	91,4	91,9	91,5	7,7	2,6	3,6	71,5	0,05	81
6RN160M04E32	11	12,6	1475	20,7	11,95	0,82	91,4	91,9	91,4	7,4	2,2	3,2	71,2	0,083	109
6RN160L04E34	15	17,3	1475	28,9	16,5	0,81	92,1	92,3	91,5	8,5	2,5	3,8	97,1	0,099	114
6RN160L04E36	18,5	21,3	1475	35,5	21	0,81	92,6	92,4	91,1	7,9	2,9	3,9	120	0,101	110
6RN180M04E32	18,5	21,3	1470	34,95	20,17	0,82	92,6	93,1	92,9	7,2	2,4	3,4	120	0,13	165
6RN180L04E34	22	25,3	1470	41,48	23,95	0,82	93,0	93,7	93,6	7,1	2,4	3,3	143	0,14	185,1
6RN180L04E36	30	34,5	1470	58,5	33,8	0,79	93,6	94,2	94,1	8,0	2,8	3,6	195	0,173	193
6RN200L04E35	30	33,5	1475	55,27	31,9	0,83	93,6	94	93,7	7,4	2,7	3,1	194	0,22	210
6RN200L04E36	37	41,5	1475	69,7	40,3	0,81	93,9	94,3	94,2	8,1	3,0	3,5	240	0,275	260
6RN225S04E30	37	51	1478	67,3	38	0,85	93,9	94,5	94,4	6,6	2,4	2,6	239	0,42	285
6RN225M04E32	45	51	1478	81,2	46,9	0,85	94,2	94,9	95,1	6,6	2,6	2,6	291	0,47	320
6RN225M04E36	55	62	1480	99,3	57,3	0,84	94,6	95,3	95,5	7,6	2,8	2,7	355	0,65	415
6RN250M04E32	55	62	1482	96	55	0,87	94,6	95,1	95	7,1	2,4	2,8	354	0,85	420
6RN250M04E36	75	84	1476	134,4	77,6	0,84	95,0	95,2	94,8	8,2	2,9	3,4	485	1,1	510
6RN280S04E30	75	75	1485	132,8	77	0,86	95,0	95,3	95	7,2	2,3	2,9	482	1,4	570
6RN280M04E32	90	90	1485	157,5	91	0,86	95,2	95,5	95,3	7,5	2,5	3,0	579	1,7	670
6RN280M04E36	110	123	1485	194	114	0,86	95,4	95,5	95	7,2	2,7	3,0	707	1,9	710
6RN315S04E30	110	123	1488	192,1	111	0,86	95,4	95,8	95,5	7,2	2,4	2,8	706	2,2	730
6RN315M04E32	132	148	1490	227,5	131,4	0,87	95,6	95,9	95,9	7,9	2,6	2,9	846	2,9	960
6RN315L04E34	160	150	1490	275,8	159,3	0,87	95,8	96,1	96,1	7,8	2,8	3,0	1025	3,1	960
6RN315L04E35	200	224	1488	343,5	198,4	0,88	96,0	96,3	96,1	7,7	3,1	2,9	1283	3,7	1190
7RN315L04E36	250	290	1490	440	254,03	0,85	96,0	96,1	95,7	7,9	2,8	3,2	1602	4,27	1290
7RN315L04E37	315	360	1490	570	329,09	0,83	96,0	96	95,6	8,5	3,2	3,5	2019	5,39	1560
7RN355M04E33	355	410	1492	620	357,96	0,86	96,0	96	95,4	7,9	2,9	2,8	2272	6,76	2290
7RN355L04E34	400	460	1492	720	415,69	0,84	96,0	96	95,5	8,4	3,4	3,0	2560	7,16	2110
7RN355L04E35	500	500	1491	870	502,29	0,86	96,0	96,1	95,9	8,1	3,0	3,3	3202	8,36	2290

RN Series 3-phase Motor Data

IE3

Housing size IEC motor type	Power kW (50Hz)	Power kW (60Hz)	Speed min^-1	Nominal current at 400 V	Nominal current at 690 V	Power factor cos (phi)	Efficiency 4/4 Load %	Efficiency 3/4 Load %	Efficiency 2/4 Load %	Starting current Ia/In	Starting torque Ma/Mn	Stall torque Mk/Mn	Nominal torque Nm	Mass inertia J kgm2	Mass kg
6 pole synchronous speed 1000 min^-1															
6RN90S06E30	0,75	0,86	945	1,96	-	0,7	78,9	80	78,8	4,5	2,1	2,6	7,6	0,004	13
6RN90L06E34	1,1	1,27	945	2,86	-	0,69	81,0	82	80,5	4,7	2,3	2,7	11,1	0,0048	19
6RN100L06E34	1,5	1,75	970	3,6	-	0,73	82,5	83,1	81,5	5,2	1,9	2,8	14,8	0,014	31
6RN112M06E32	2,2	2,55	970	5	-	0,75	84,3	85	83,9	5,5	2,0	2,6	21,7	0,017	47
6RN112M06E36	3	3,45	965	6,8	3,93	0,74	85,6	86	85,8	5,6	1,7	2,5	29,7	0,019	34
6RN132S06E30	3	3,45	970	6,5	3,75	0,77	85,6	86,9	86,6	5,6	1,7	2,6	29,5	0,037	54
6RN132M06E32	4	4,55	970	8,4	4,84	0,79	86,8	88	87,8	6,6	1,9	3,0	39,4	0,037	60
6RN132M06E33	5,5	6,3	970	11,5	6,64	0,78	88,0	89,1	88,8	6,3	1,9	2,9	54,1	0,046	68
6RN160M06E32	7,5	8,6	975	15,65	9,04	0,78	89,1	90,1	89,7	6,8	1,7	3,1	73,5	0,098	103
6RN160L06E34	11	12,6	975	22,3	12,9	0,8	90,3	91,2	90,8	6,6	1,8	3,0	108	0,12	118
6RN180L06E34	15	18	970	29,76	17,18	0,79	91,2	92	91,9	6,1	2,2	2,8	148	0,19	180
6RN180L06E36	18,5	22	975	38	22	0,77	91,7	92,3	91,9	6,9	2,6	3,3	181	0,247	185
6RN200L06E34	18,5	22	978	36,9	21,3	0,79	91,7	92,5	92,4	5,7	2,5	2,6	181	0,28	215
6RN200L06E35	22	22,4	978	44,15	25,6	0,78	92,2	93,1	93,2	5,6	2,3	2,6	215	0,32	230
6RN200L06E36	30	36	978	59	34,1	0,79	92,9	93,7	93,7	6,5	2,8	2,8	293	0,434	264
6RN225M06E32	30	30	982	56,5	32,7	0,83	92,9	93,6	93,5	7,1	2,6	2,9	292	0,67	285
6RN225M06E36	37	44,5	985	70	40,5	0,82	93,3	93,9	93,7	7,6	3,0	3,3	359	0,84	325
6RN250M06E32	37	37	985	68,2	39,4	0,84	93,3	94	94	7,4	2,6	2,8	359	1	370
6RN250M06E36	45	54	986	83	48	0,84	93,7	94,3	94,2	7,0	2,8	2,9	436	1,3	480
6RN280S06E30	45	45	988	81,7	47,2	0,85	93,7	94,3	94,2	7,0	2,7	2,7	435	1,4	510
6RN280M06E32	55	55	988	99,8	57,7	0,85	94,1	94,6	94,4	7,6	2,9	2,9	532	1,6	560
6RN280M06E36	75	90	988	138	79,67	0,83	94,6	95	94,8	8,6	3,7	3,3	725	1,9	630
6RN315S06E30	75	90	992	136,3	78,7	0,84	94,6	94,9	94,4	7,9	3,0	3,1	722	2,6	660
6RN315M06E32	90	90	990	160,2	92,6	0,86	94,9	95,2	94,9	7,1	2,4	2,9	868	3,1	890
6RN315L06E34	110	110	991	198,1	114,4	0,84	95,1	95,5	95,3	7,6	2,7	3,0	1060	3,9	990
6RN315L06E35	132	132	991	237,5	137,2	0,84	95,4	95,9	95,8	7,6	2,4	2,9	1272	4,4	990
6RN315L06E36	160	150	991	294	167,8	0,82	95,6	95,8	95,4	8,1	3,0	3,3	1542	4,6	1160
7RN315L06E37	200	240	992	365	210,73	0,82	95,8	95,9	95,6	7,5	3,0	3,2	1925	6,28	1410
7RN315L06E38	250	250	992	465	268,47	0,81	95,8	95,9	95,6	8,2	3,2	3,3	2407	8	1700
7RN355M06E32	315	380	993	580	334,86	0,82	95,8	95,8	95,3	7,8	2,9	3,2	3029	11,6	2040
7RN355M06E33	355	355	993	640	369,50	0,83	95,8	95,9	95,5	8,4	2,9	3,3	3414	13,7	2250
7RN355L06E34	400	400	994	720	415,69	0,84	95,8	96	95,8	8,1	2,8	3,0	3843	13,4	2240

Housing size IEC motor type	Power kW (50Hz)	Power kW (60Hz)	Speed min^-1	Nominal current at 400 V	Nominal current at 690 V	Power factor cos (phi)	Efficiency 4/4 Load %	Efficiency 3/4 Load %	Efficiency 2/4 Load %	Starting current Ia/In	Starting torque Ma/Mn	Stall torque Mk/Mn	Nominal torque Nm	Mass inertia J kgm2	Mass kg
8 pole synchronous speed 750 min^-1															
6RN160M08E33	5,5	6,3	730	14	-	0,66	86,2	86,9	85,7	3,8	1,6	1,9	72	0,083	111
6RN200L08E35	15	18	730	33,5	19,2	0,73	89,6	90,1	89,4	6,8	3,0	3,7	196	0,42	220
6RN315M08E32	75	90	738	144	83	0,81	93,1	93,5	93,3	5,9	2,3	2,7	970	2,5	890
6RN315L08E35	110	132	740	205	118	0,82	93,7	94,2	94,1	6,7	2,7	2,9	1419	3,9	980
7RN315L08E37	160	192	741	310	178,98	0,79	94,3	94,7	94,7	6,3	2,5	2,5	2062	6,78	1420
7RN315L08E38	200	240	742	390	225,17	0,78	94,6	94,8	94,5	6,7	2,7	2,9	2574	8,6	1660

RN Series 3-phase Motor Data

IE4

Housing size IEC motor type	Power kW (50Hz)	Power kW (60Hz)	Speed min^-1	Nominal current at 400 V	Nominal current at 690 V	Power factor cos (phi)	Efficiency 4/4 Load %	Efficiency 3/4 Load %	Efficiency 2/4 Load %	Starting current Ia/In	Starting torque Ma/Mn	Stall torque Mk/Mn	Nominal torque Nm	Mass inertia J kgm2	Mass kg
2 pole synchronous speed 3000 min^-1															
6RN100L02E44	3	3,45	2920	5,7	3,29	0,86	89,1	89,8	89,4	10,0	3,7	5,0	9,8	0,0054	38
6RN112M02E42	4	4,55	2950	7,21	4,16	0,89	90,0	90,4	89,7	9,8	2,6	4,1	12,9	0,012	45
6RN132S02E40	5,5	6,3	2960	10,4	6	0,84	90,9	90,9	89,8	9,9	2,1	4,6	17,7	0,024	62
6RN132S02E41	7,5	8,6	2955	12,95	7,56	0,91	91,7	92,4	92,3	10,1	2,2	4,3	24,2	0,039	74
6RN160L02E44	18,5	21,3	2960	31,4	18,19	0,91	93,7	94,1	93,8	10,3	3,1	4,3	59,7	0,074	147
6RN160M02E42	11	12,6	2960	19,22	11,03	0,9	92,6	92,8	92	9,6	2,8	4,2	35,5	0,061	100
6RN160M02E43	15	17,3	2960	26	15,01	0,9	93,3	93,5	92,9	10,3	3,1	4,5	48,4	0,068	130
6RN180M02E42	22	24,5	2955	38,3	22,23	0,89	94,0	94,4	94,1	9,4	2,8	4,3	71,1	0,091	175
6RN200L02E44	30	33,5	2955	53,94	31,18	0,85	94,5	94,8	94,4	8,3	2,8	4,0	96,9	0,13	222
6RN200L02E45	37	42,6	2960	65,5	37,8	0,89	94,8	95,1	94,9	8,5	2,9	4,0	119	0,2	263
6RN225M02E42	45	51	2970	80	46,19	0,84	95,0	95	94,4	9,1	3,1	4,1	145	0,26	330
6RN250M02E42	55	62	2975	95	54,85	0,88	95,3	95,2	94,5	7,9	2,5	3,3	177	0,48	430
6RN280M02E42	90	101	2978	152	87,76	0,89	95,8	95,9	95,4	8,9	2,8	3,4	289	1	620
6RN280S02E40	75	84	2980	127	73,32	0,89	95,6	95,6	95	8,9	2,7	3,5	240	0,94	610
6RN315L02E44	160	180	2988	260	152	0,92	96,3	96,3	96,3	10,3	3,2	3,9	511	2,1	1060
6RN315L02E45	200	224	2985	325	187,64	0,92	96,5	96,5	96,1	10,3	3,5	3,9	640	2,4	1180
6RN315M02E42	132	148	2988	220	128	0,9	96,2	96,2	95,6	10,7	2,9	3,9	422	1,9	980
6RN315S02E40	110	123	2985	184	106,23	0,89	96,0	96	95,3	8,7	2,5	3,5	352	1,4	750
7RN315L02E46	250	250	2986	425	245,37	0,88	96,5	96,4	95,7	9,3	3,0	4,2	800	2,82	1340
7RN315L02E47	315	355	2986	540	311,77	0,87	96,5	96,3	95,5	9,9	3,5	4,2	1007	3,27	1520
7RN355M02E43	355	355	2988	600	346,41	0,89	96,5	96,3	95,5	8,9	2,6	4,0	1135	4,74	2100
7RN355L02E44	400	400	2986	650	375,28	0,92	96,5	96,4	95,9	8,5	2,6	3,4	1279	5,36	2240
7RN355L02E45	500	500	2988	840	484,97	0,89	96,5	96,4	95,8	8,9	3,0	3,8	1598	5,76	2340
7RN355M02E43	355	355	2988	600	346,41	0,89	96,5	96,3	95,5	8,9	2,6	4,0	1135	4,74	2100

Housing size IEC motor type	Power kW (50Hz)	Power kW (60Hz)	Speed min^-1	Nominal current at 400 V	Nominal current at 690 V	Power factor cos (phi)	Efficiency 4/4 Load %	Efficiency 3/4 Load %	Efficiency 2/4 Load %	Starting current Ia/In	Starting torque Ma/Mn	Stall torque Mk/Mn	Nominal torque Nm	Mass inertia J kgm2	Mass kg
4 pole synchronous speed 1500 min^-1															
6RN100L04E44	2,2	2,55	1465	4,5	2,6	0,79	89,5	89,6	88,3	9,7	3,3	4,7	14,3	0,014	41
6RN100L04E45	3	3,45	1460	5,8	3,35	0,8	90,4	91	90,5	9,3	3,5	4,2	19,6	0,016	50
6RN112M04E42	4	4,55	1465	7,88	4,39	0,81	91,1	91,6	91	9,5	3,1	4,3	26,1	0,02	58
6RN132M04E42	7,5	8,6	1470	14,4	8,4	0,8	92,6	93,1	92,7	8,8	3,0	4,0	48,7	0,046	80
6RN132S04E40	5,5	6,3	1470	10,55	6	0,82	91,9	92,5	92,3	8,3	2,6	3,6	35,7	0,046	77
6RN160L04E44	15	17,3	1480	29,15	16,74	0,79	93,9	94	93,3	9,3	3,7	4,3	96,8	0,11	138
6RN160M04E42	11	12,6	1480	20,83	12,12	0,82	93,3	93,5	92,9	9,0	2,9	4,1	71,0	0,099	127
6RN180L04E44	22	25,3	1475	42	24,25	0,81	94,5	95	94,8	8,6	2,9	3,8	142	0,18	192
6RN180M04E42	18,5	21,3	1470	35,09	19,92	0,81	94,2	94,7	94,5	8,2	2,7	3,6	120	0,17	187
6RN200L04E45	30	34,5	1478	56,3	32,62	0,81	94,9	95,2	94,9	8,5	3,2	3,6	194	0,27	258
6RN225M04E42	45	52	1485	81	46,77	0,84	95,4	95,7	95,4	8,4	3,4	3,3	289	0,66	415
6RN225S04E40	37	42,5	1485	68	39,26	0,84	95,2	95,5	95,2	8,6	3,2	3,2	238	0,52	345
6RN250M04E42	55	63	1486	96	55,43	0,86	95,7	95,8	95,4	8,4	3,0	3,4	353	1,1	490
6RN280M04E42	90	90	1488	157	90,64	0,86	96,1	96,3	96,1	9,0	3,1	3,4	578	2	730
6RN280S04E40	75	86	1490	133	76,79	0,84	96,0	96,1	95,6	9,7	3,3	3,7	481	1,5	670
6RN315L04E44	160	184	1490	280	161,66	0,87	96,6	96,7	96,5	9,2	3,6	3,3	1025	3,7	1180
6RN315L04E45	200	230	1491	345	200	0,86	96,7	96,9	96,6	8,9	3,6	3,4	1281	4,4	1300
6RN315L04E46	250	288	1488	434,8	251	0,86	96,7	96,97	96,58	6,6	2,3	2,6	1604	4,6	1450
6RN315L04E47	315	362	1488	560	323,32	0,83	96,7	96,68	96,33	8,5	3,4	3,4	2021	4,4	1550
6RN315M04E42	132	152	1491	225	129,9	0,86	96,4	96,6	96,2	8,6	3,3	3,3	845	3,1	960
6RN315S04E40	110	127	1491	192	110,85	0,85	96,3	96,4	95,9	9,0	3,3	3,3	704	2,7	910
7RN315L04E46	250	250	1490	435	251,15	0,86	96,7	96,8	96,5	7,9	2,8	3,2	1602	4,98	1500
7RN315L04E47	315	315	1490	570	329,09	0,83	96,7	96,7	96,3	8,5	3,2	3,5	2019	5,39	1560
7RN355M04E43	355	355	1492	640	369,50	0,83	96,7	96,7	96,2	7,9	2,8	2,8	2272	6,76	2050
7RN355L04E44	400	400	1492	730	421,47	0,82	96,7	96,7	96,2	7,9	3,2	2,9	2560	7,16	2080
7RN355L04E45	500	500	1491	870	502,29	0,86	96,7	96,9	96,6	8,1	3,1	3,3	3202	8,36	2290
7RN355M04E43	355	355	1492	640	369,50	0,83	96,7	96,7	96,2	7,9	2,8	2,8	2272	6,76	2050

Housing size IEC motor type	Power kW (50Hz)	Power kW (60Hz)	Speed min^-1	Nominal current at 400 V	Nominal current at 690 V	Power factor cos (phi)	Efficiency 4/4 Load %	Efficiency 3/4 Load %	Efficiency 2/4 Load %	Starting current Ia/In	Starting torque Ma/Mn	Stall torque Mk/Mn	Nominal torque Nm	Mass inertia J kgm2	Mass kg
6 pole synchronous speed 1000 min^-1															
7RN315L06E47	200	200	992	365	210,73	0,82	96,6	96,4	96,1	7,5	3,0	3,2	1925	6,28	1410
7RN315L06E48	250	250	992	460	265,58	0,81	96,6	96,6	96,3	8,2	3,2	3,3	2407	8	1700
7RN355M06E42	315	315	993	570	329,09	0,82	96,6	96,6	96,1	7,8	2,9	3,2	3029	11,6	2040
7RN355M06E43	355	355	993	640	369,50	0,83	96,6	96,7	96,3	8,4	2,9	3,3	3414	13,7	2250
7RN355L06E44	400	400	993	710	409,92	0,84	96,6	96,7	96,5	8,1	2,8	3,0	3847	13,4	2240

Housing size IEC motor type	Power kW (50Hz)	Power kW (60Hz)	Speed min^-1	Nominal current at 400 V	Nominal current at 690 V	Power factor cos (phi)	Efficiency 4/4 Load %	Efficiency 3/4 Load %	Efficiency 2/4 Load %	Starting current Ia/In	Starting torque Ma/Mn	Stall torque Mk/Mn	Nominal torque Nm	Mass inertia J kgm2	Mass kg
8 pole synchronous speed 750 min^-1															
7RN315L08E47	160	160	741	305	176,09	0,79	95,1	95,5	95,5	6,3	2,5	2,5	2062	6,78	1420
7RN315L08E48	200	200	742	390	225,17	0,78	95,4	95,6	95,3	6,7	2,7	2,9	2574	8,6	1660

Marine & Offshore

The mechanical and electrical performance of the basic rotor nl® electric motors is adapted for marine and offshore application. Due to often aggressive “salty” environment, almost all sizes of RN series can be supplied in cast iron motor housing and endshields (except of very small sizes, which are in aluminium housing with cast iron endshields). Rotor produces electric motors for below deck as well as above deck applications and they can be equipped with disc brakes, encoders, force ventilation units etc. The electric motor windings are based on ambient temperatures of up to 50°C and are moisture and mould resistant suitable for relative air humidity up to 96%. These electric motors meet various criteria set out by a number of Marine Classification Societies and are suitable for “essential service” when supplied with a marine certificate.

How can a rotor nl® electric motor be identified as a marine motor?

All rotor nl® marine electric motors are equipped with stainless steel rating plate that specifies the following:

- the nominal electric motor data and the “rotor nl® marine classification” marking
- any additional rating plates with supplementary/customer data

The rating plate specifies the Marine Classification Society and the ambient temperature specified by the society’s regulations (usually IEC92.301 C). The date of purchase as well as the Marine Certificate number (issued by the Marine Classification Society) are also marked on the rating plate. The rating plate and a fixed component of the electric motor would have been certified and stamped by the Marine Classification Society surveyor when marine approval testing is required. Should no marine approval testing be required only the “Marine Classification Society” logo and the date of production would be specified on the rating plate. No additional rating plate would be fitted. Electric motors with a rating plate that is not marked as ‘rotor nl® marine classification’ are not marine motors and even though it is very likely that they would operate satisfactorily in the marine environment (on-board of a vessel or offshore), a factory marine motor declaration cannot be issued afterwards. A 2.1 or 2.2 class certificate can, in most cases, be issued for marine motors that are not older than 1 year upon request and the necessary data submission. The temperature rise of the winding must be determined by the resistance method. There are certain specific regulations applicable on marine motors related to the mechanical execution.

Certificates

All rotor nl® electric motors are tested after assembly to guarantee their correct operation and are subject to a high-voltage insulation test and a no-load run test. Additional tests can be performed in the factory test laboratory. Multiple electric motors can be tested there under continuous or intermittent load at the same time and their electrical and mechanical properties measured and identified. This is the same procedure as when new motor designs are tested and Type Test Reports issued. Rotor nl® electric motors can also be supplied with a factory Declaration of Compliance or with a Test Certificate that confirms that the test data measured on a specific electric motor are in compliance with the customer’s specification. Rotor nl® electric motors are tested to the EN 10204 standard and 4 different certificates can be selected.

EN 10204-2.1

The Declaration of Compliance 2.1 (factory declaration) is issued based on the electric motor serial number, invoice number and the customer order number. No testing is involved when issuing this document.

EN 10204-2.2

Test Certificate 2.2 (factory issued certificate) is issued based on the electric motor data set out in the Type Test Report (when the motor prototype have been tested) amended with certain other data (historical test data). The invoice number and the customer order number are also marked in the Test Certificate. A number of motor serial numbers of the same type can be included in one Test Certificate.

EN 10204-3.1

The relevant no-load and full-load tests are carried out on specific electric motor when the Inspection Certificate 3.1 (inspection report) is issued. A request for Inspection Certificate 3.1 must be made at the point of the order placement. This test is also referred to as the “routine test” and provides a reasonable guarantee of the correct performance of the electric motor when the tested data comply with the Type Test data. The invoice number and the customer order number are also marked in the Inspection Certificate. One Inspection Certificate is issued for each electric motor.

EN 10204-3.2

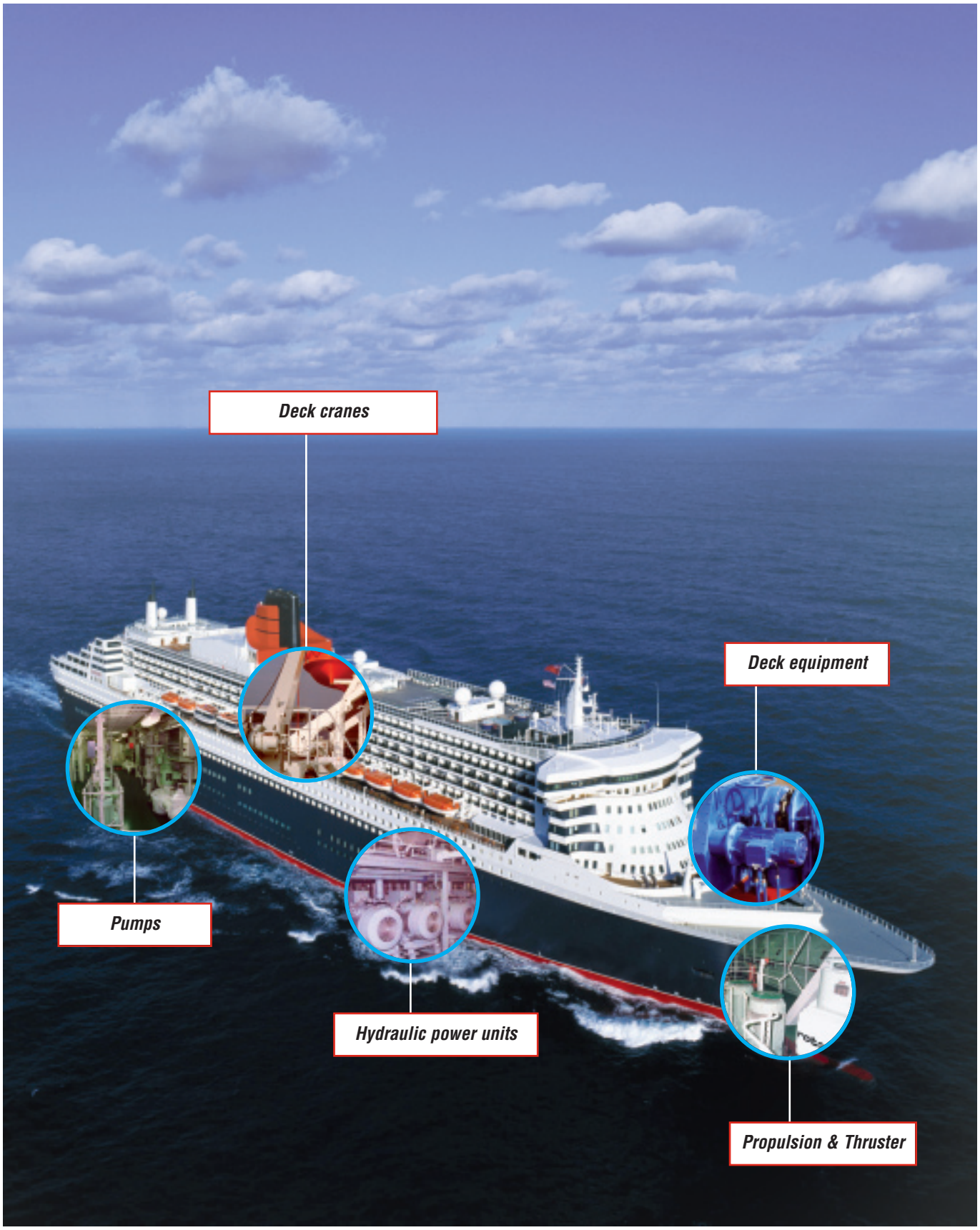
Inspection Certificate 3.2 is issued based on the test witnessed by an independent inspector (classified inspection report). The inspector (surveyor) can be appointed by the customer or by ourselves. In majority of the cases the surveyor would attend the testing in our approved test laboratory. External testing by certified laboratories have to be carried out in certain cases.

Type Approval Certificate

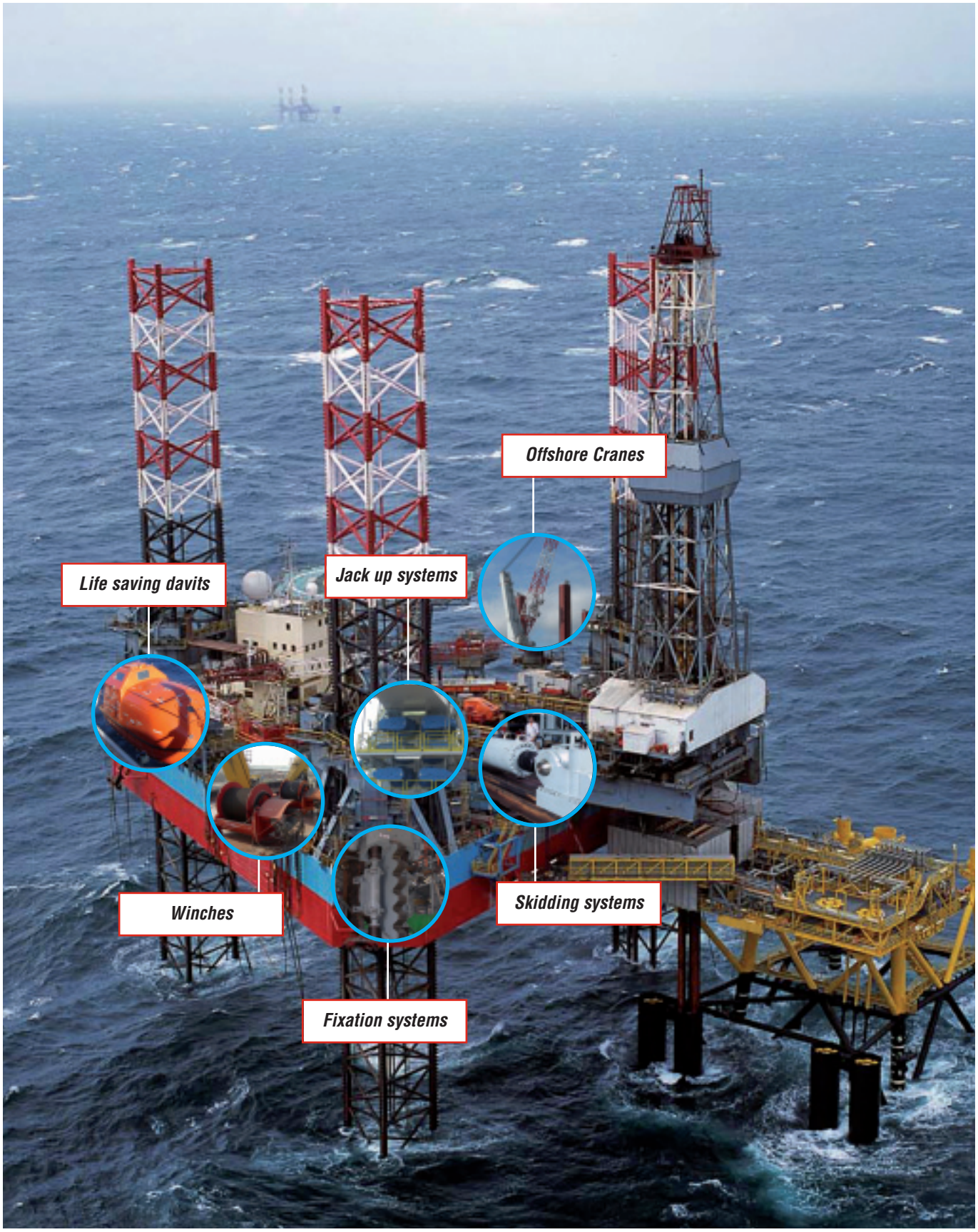
Rotor is authorised and approved to independently test and certify electric motors up to 300 kW (without the actual presence of a surveyor). The tests are carried out in our approved test laboratory. This enables Rotor to supply electric motors for essential service quickly and with the relevant certificate. The independent testing has been arranged with a number of Classification Societies. Rotor B.V. can currently issue Type Approval Certificate for DNV, BV, CCS, Lloyd's, ABS, RINA and KRS.

For other questions regarding survey, please contact testfield.nl@regalrexnord.com

Marine Applications



Offshore Applications



Shipping Classification Bureaus

Environmental temperatures for marine motors and maximum temperature increase of the winding

marine classification	environmental temperature °C	Maximum DT winding °K at insulation class F	H
IEC 34-1	40	105	135
IEC 92.301	50	90	115
American Bureau of Shipping	45	100	120
Bureau Veritas	45	100	120
China Classification Society	45	100	120
China Corperation Register	45	95	110
DNV	45	100	120
Indian Register of Shipping	45	90	110
Korean Register of Shipping	45	100	120
Lloyd's Register of Shipping	45	95	110
Nippon Kaji Kyokai	45	100	120
Registro Italiano Navale	45	100	120

The temperature increase of the winding is determined by the resistance method.
Specific regulations apply to marine motors with regard to the mechanical model.

For other questions regarding survey, please contact testfield.nl@regalrexnord.com

Standard	Dutch	English
EN 10204-2.1	Factory declaration	Declaration of compliance with the order 2.1
EN 10204-2.2	Factory inspection certificate	Test report 2.2.
EN 10204-3.1	Inspection report	Inspection certificate 3.1
EN 10204-3.2	Classified inspection report	Inspection certificate 3.2

Electric motors for Explosive Atmosphere

Main ATEX standards for electric motors

EN 60079-1–Ex-d (flameproof enclosure)

The flameproof enclosure must contain all components which can cause sparks, arcs or high temperatures and which in turn can cause an explosion during normal working conditions within the enclosure. The explosive gas mixture may also be present in the pressure tight enclosure, but any explosion inside the enclosure must not propagate to the outside atmosphere.

EN 60079-7–Ex-e (increased safety)

Electrical equipment designed in accordance with the protection type Ex-e must not contain any components that may cause sparks or arcs under normal working conditions and potentially act as an ignition source for an explosive gas mixture inside or in the surrounding of the equipment. The explosive gas mixture is expected to penetrate inside the electrical equipment. Ex-e is a type of protection where non-sparking/arcing material must be used.

EN 60079-15–Ex-n (non-sparking)

This type of protection is only suitable for Zone 2 hazardous area, but can apply to a large range of equipment. Generally any electrical device that does not have potentially sparking contacts, such as potentiometers, relays or switches or hot surfaces and where a water/dust tight enclosure is present, can be accommodated whilst certain guidelines are maintained.

It is compulsory to classify the work place in Zones and select ATEX 100a compliant equipment according to the identified Zones. Rotor trained staff is available to help with the selection of the suitable ATEX electric motors.

The ATEX directives do not apply to:

- Sea vessels and mobile offshore installations or for the equipment intended to be installed on board of sea vessels or offshore installations. They all must comply with the IMO (International Maritime Organization) convention.

GAS and DUST group

Two groups are referred to in the ATEX directive:
Group I and II. Both groups are subdivided into Categories. These Categories indicate whether a device or protection system can be deployed in a possibly explosive atmosphere with gas, mist or fumes (G) or with dust (D).

For all Zones (Gas and Dust) please specify:

- Whether the motor is to be frequency inverter controlled.
- Any specific model/execution is required

Category and Area Classification for GAS Atmosphere

ATEX Gas explosion-proof electric motors:
- The ATEX Category (or Zone) and the protection method
- Temperature class
- For flameproof electric motors Ex II 2G Ex-d and Ex II 2G Ex-d(e):
- The Gas Group: A, B or C.

Group I: = mining industry
Group II: = other locations

Category 1G	Zone 0
Category 2G	Zone 1
Category 3G	Zone 2

Zone	ATEX cat.	Description	Type of protection permitted.
0	1	An explosive gas mixture is present continuously or for long periods of time (>1000hr per year)	Ex-ia
1	2	An explosive gas mixture is likely to occur in normal operation occasionally (10 tot 1000hr per year)	Ex-d, Ex-e, Ex-i, Ex-m, Ex-o, Ex-p, Ex-q
2	3	An explosive gas mixture is not likely to occur in normal operations but, if it does occur, will persist for a short period only (<10hr per year)	Ex-d, Ex-e, Ex-i, Ex-m, EX-n, Ex-o, Ex-p, Ex-q

The standard range of Rotor ATEX motors consists of compressure-resistant electric motors, electric motors with increased safety, and electric motors with non-sparking equipment.

GAS

Electric motors cannot be positioned in zone 0

ZONE 2
gas not expected to be present

ZONE1
gas probably present occasionally

ZONE 0
gas continuously present

CE...Ex II 2 G Ex d … Gb, Ex d(e) … Gb
CE...Ex II 2 G Ex e … Gb
CE...Ex II 2 G Ex d … Gb, Ex d(e) … Gb
CE...Ex II 2 G Ex e … Gb
CE...Ex II 3 G Ex nA … Gc

Coding for Electric Motors in Gas Explosive Area

Gas

Equipment groups

group	application
I	mining industry
II	other locations

Categories
1 very high protection level
2 high protection level
3 normal protection level

Equipment Protection Level

Ga	very high protection level
Gb	high protection level
Gc	normal protection level

CE 0344 Ex II 2 G Ex e IIC T3 Gb

identification number of **the notified body** (certification body) in the case of Rotor: **KEMA**

the manufacturer declares that the product has been produced in agreement with all European directives that may apply when including the CE mark

Ex mark
for electric equipment in explosive atmospheres

G = Gas

Ex = explosive safe

Ex d	flameproof enclosure
Ex-e	increased safety
Ex h	hermetically sealed
Ex i	intrinsically safe
Ex m	encapsulated structure
Ex n	non-sparking
Ex o	filled with oil
Ex p	internal overpressure
Ex q	filled with sand

temperature class max. temp. (°C)
Only specified with G

T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

Gas group gas type (examples)

group IIA	propane (amongst others)
group IIB	ethylene (amongst others)
group IIC	hydrogen (amongst others)

ATEX Ex-d(e) Flameproof Electric Motors

Outputs when in continuous use (S1) and at a maximum environmental temperature of 40°C.

Outputs on demand with regard to deviating environmental temperatures, intermittent operation S2, S3, etc., and deviating frequencies.

Ex-II-2G Ex-d(e)-IIC-T4-Gb in accordance with EN 60079-0 and EN 60079-1

	Type		Power kW	Speed min-1	In (A) 400 Volt	Efficiency %	Power factor cos ϕ	Torque Nm	Starting torque (MA/MN)	Starting current (IA/IN)	Max. torque (MM/MN)	KR	Torque of inertia (kgmx10-4)	Weight kg
RD	71	B-2	0.55	2,805	1.32	70	0.86	1.87	2.9	5.5	3.1	16	4.2	16
RD	80	A-2	0.75	2,790	1.7	72	0.89	2.57	2.25	5.4	2.6	16	6.3	24
RD	80	B-2	1.1	2,790	2.35	77	0.87	3.77	2.6	6.1	2.9	16	7.9	26
RD	90	S-2	1.5	2,830	3.25	77	0.87	5.1	2.5	6.3	2.8	16	12.4	32
RD	90	L-2	2.2	2,845	4.4	82	0.88	7.4	2.8	6.9	2.65	16	15.5	34
RD	100	L-2	3	2,865	6	83.5	0.87	10	2.5	7.1	2.9	16	25.1	42.5
RD	112	M-2	4	2,890	7.8	84.5	0.88	13.2	2.5	7.6	2.95	16	45.1	58
RD	132	SA-2	5.5	2,910	10.8	84.5	0.88	18.1	2.7	6.6	2.8	16	96.7	77
RD	132	SB-2	7.5	2,925	14.5	85.5	0.89	24.5	2.7	7.9	3.1	16	122.5	84
RD	160	MA-2	11	2,840	22.3	80.6	0.88	35.8	2.8	6.9	3	16	294.3	148
RD	160	MB-2	15	2,940	28.5	83	0.92	48.9	3	7.7	3.2	16	391.2	166
RD	160	L-2	18.5	2,945	32.4	98.1	0.91	60.1	3.3	8	3	16	459	178
RD	180	M-2	22	2,930	39	92	0.89	71.7	2.4	7.2	2.9	16	615.1	205
RD	200	LA-2	30	2,930	53	93	0.88	97.8	2.1	7.3	2.8	16	1,044.2	240
RD	200	LB-2	37	2,930	64	93.5	0.89	120.6	2.2	7.3	2.9	16	1,273.9	250
RD	225	M-2	45	2,945	79	93.5	0.88	146	2	7.2	2.6	16	2,215.5	375
RD	250	M-2	55	2,970	95	94.4	0.89	177	2.8	7.5	3.2	16	6,750	485
RD	280	S-2	75	2,980	131	94.5	0.88	241	3.1	8	3	16	9,500	650
RD	280	M-2	90	2,980	152	95	0.9	289	3	8	2.9	16	11,000	700
RD	315	S-2	110	2,970	194	95.5	0.86	354	2.3	6	2.4	13	15,500	820
RD	315	M-2	132	2,970	228	95.5	0.88	425	2.5	6.5	2.8	13	18,000	930

	Type		Power kW	Speed min-1	In (A) 400 Volt	Efficiency %	Power factor cos ϕ	Torque Nm	Starting torque (MA/MN)	Starting current (IA/IN)	Max. torque (MM/MN)	KR	Torque of inertia (kgmx10-4)	Weight kg
RD	71	A-4	0.25	1,355	0.75	59.5	0.8	1.76	2.15	3.8	2.5	16	5.1	15
RD	71	B-4	0.37	1,350	1.05	63	0.81	2.61	2.25	3.8	2.9	16	6.3	16
RD	80	A-4	0.55	1,410	1.38	72	0.81	3.73	2.3	4.6	2.7	16	9.8	24
RD	80	B-4	0.75	1,400	1.8	76	0.8	5.1	2.4	5	2.6	16	12.5	26
RD	90	S-4	1.1	1,410	2.4	79	0.84	7.5	2.3	5.4	2.4	16	20.4	32
RD	90	L-4	1.5	1,405	3.25	79	0.84	10.2	2.5	5.8	2.6	16	26	35
RD	100	LA-4	2.2	1,405	4.8	79	0.84	15	2.1	5.1	2.2	16	38.8	42.5
RD	100	LB-4	3	1,400	6.4	81	0.84	20.5	2.1	5.3	2.3	16	49.9	46
RD	112	M-4	4	1,430	8.2	85	0.84	26.8	2.2	6.6	2.8	16	101.4	60
RD	132	S-4	5.5	1,435	10.9	84.5	0.86	36.7	2.3	5.5	2.7	16	211.3	84
RD	132	M-4	7.5	1,445	14.8	87	0.85	49.6	2.8	6.5	2.9	16	279.3	93.5
RD	160	M-4	11	1,470	22	87	0.83	71.5	2.7	6.7	2.8	16	541.7	159
RD	160	L-4	15	1,460	29	87.5	0.85	98	2.6	6.3	2.7	16	711.6	178
RD	180	M-4	18.5	1,460	35	92	0.84	121	2.5	6.5	2.3	16	1,129	215
RD	180	L-4	22	1,460	40	92.5	0.86	143.9	2.5	6.4	2.3	16	1,339	236
RD	200	L-4	30	1,460	56	93	0.83	196	2.2	6.2	3	16	2,129.8	250
RD	225	S-4	37	1,465	68	93.5	0.84	241.6	2.2	6.3	2.8	16	3,622.5	310
RD	225	M-4	45	1,465	83	94	0.83	293	2.3	6.2	2.8	16	4,284.5	390
RD	250	M-4	55	1,480	98	94.5	0.86	355	3.1	6.1	2.5	16	8,750	480
RD	280	S-4	75	1,480	135	95	0.86	485	2.4	6.1	2.8	16	18,750	610
RD	280	M-4	90	1,480	158	95	0.87	582	2.8	6.5	2.9	16	22,500	685
RD	315	S-4	110	1,485	193	95.5	0.87	708	2.7	6	2.4	16	35,000	820
RD	315	MA-4	132	1,485	232	95.8	0.87	850	2.5	6.5	2.6	16	38,750	930
RD	315	MB-4	160	1,485	282	96	0.86	1,030	2.7	7	2.6	16	50,000	1,240

ATEX Ex-d(e) Flameproof Electric Motors

Outputs when in continuous use (S1) and at a maximum environmental temperature of 40°C.

Outputs on demand with regard to deviating environmental temperatures, intermittent operation S2, S3, etc., and deviating frequencies.

Ex-II-2G Ex-d(e)-IIC-T4-Gb in accordance with EN 60079-0 and EN 60079-1

	Type		Power kW	Speed min-1	In (A) 400 Volt	Efficiency %	Power factor cos ϕ	Torque Nm	Starting torque (MA/MN)	Starting current (IA/IN)	Max. torque (MM/MN)	KR	Torque of inertia (kgmx10-4)	Weight kg
RD	71	A-6	0.18	930	0.67	60	0.65	1.86	2.1	3.1	2.3	16	8.1	15
RD	71	B-6	0.25	940	0.85	64	0.67	2.56	2.2	3.7	2.5	16	10.1	16
RD	80	A-6	0.37	925	1.1	67	0.72	3.83	2.3	3.6	2.5	16	19.1	25
RD	80	B-6	0.55	915	1.5	72	0.74	5.7	2.35	4.1	2.5	16	23.9	26.5
RD	90	S-6	0.75	915	2.1	70	0.74	7.8	1.8	3.7	2.1	16	32.3	32
RD	90	L-6	1.1	915	3	73	0.73	11.5	2.1	4.1	2.3	16	41.9	35
RD	100	L-6	1.5	930	3.7	76	0.77	15.4	2.2	4.7	2.3	16	65.7	46
RD	112	M-6	2.2	960	5	82	0.78	21.9	2.6	6.1	2.7	16	158	60
RD	132	S-6	3	975	6.6	83.5	0.79	29.4	2.3	6.3	2.5	16	272.2	84
RD	132	MA-6	4	960	8.8	83	0.8	39.9	2.4	6.3	2.9	16	322.9	88
RD	132	MB-6	5.5	955	11.8	83.5	0.81	55.1	2.3	6.1	2.9	16	383.8	95
RD	160	M-6	7.5	970	15.8	86	0.8	74.2	2.7	6.7	2.4	16	812.1	161
RD	160	L-6	11	965	23.5	88.5	0.77	109	2.2	6	2.3	16	1,091.6	182
RD	180	L-6	15	965	31	89.5	0.78	148	1.9	5.2	2.3	16	2,270	236
RD	200	LA-6	18.5	965	36	91	0.81	183	1.9	6	2.4	16	2,436.9	240
RD	200	LB-6	22	965	43	91.5	0.81	218.6	1.9	6	2.4	16	2,788.8	250
RD	225	M-6	30	975	56	92.5	0.83	293	1.8	5.8	2.5	16	6,611.7	390
RD	250	M-6	37	985	69	93.5	0.83	359	2.8	6	2.6	16	11,250	480
RD	280	S-6	45	985	82	94.5	0.84	437	2.5	6.3	2.7	16	23,000	610
RD	280	M-6	55	985	101	94.5	0.84	534	2.4	6	2.8	16	26,250	685
RD	315	S-6	75	980	140	95	0.82	732	2.5	5.9	2.8	16	46,250	820
RD	315	MA-6	90	985	163	95.5	0.84	874	2.1	5.1	2.9	16	52,500	930

	Type		Power kW	Speed min-1	In (A) 400 Volt	Efficiency %	Power factor cos ϕ	Torque Nm	Starting torque (MA/MN)	Starting current (IA/IN)	Max. torque (MM/MN)	KR	Torque of inertia (kgmx10-4)	Weight kg
RD	71	A-8	0.09	680	0.67	38	0.51	1.26	2	2	2.1	16	8.1	15
RD	71	B-8	0.12	655	0.54	45	0.71	1.75	1.8	2.4	2.1	16	10.1	16
RD	80	A-8	0.18	680	0.66	61	0.65	2.53	2.1	2.9	2.2	16	19.1	25
RD	80	B-8	0.25	680	0.92	58	0.68	3.52	2.1	3.1	2.3	16	23.9	26.5
RD	90	S-8	0.37	685	1.25	66	0.65	5.2	1.7	3	2	16	32.3	32
RD	90	L-8	0.55	685	1.75	69	0.66	7.7	1.75	3.1	2.1	16	41.9	35
RD	100	LA-8	0.75	690	2.3	69	0.69	10.4	1.8	3.5	2.1	16	65.7	42.5
RD	100	LB-8	1.1	695	3.25	70	0.7	15	1.9	3.8	2.2	16	85.7	46
RD	112	M-8	1.5	710	4.15	78	0.67	20.2	2	4.3	2.5	16	158	60
RD	132	S-8	2.2	710	5.5	79	0.74	29.6	1.9	4.3	2.2	16	260.6	79
RD	132	M-8	3	710	7.2	80	0.76	40.4	2.1	4.8	2.3	16	344.6	85
RD	160	MA-8	4	720	10	82.6	0.71	53.1	1.8	4.8	2.3	16	688	146
RD	160	MB-8	5.5	715	13.4	84	0.71	73.6	1.8	4.8	2.1	16	893.9	160
RD	160	L-8	7.5	725	16.7	86.5	0.75	98.8	2.3	5.8	2.1	16	1,202.7	182
RD	180	L-8	11	715	25	86.7	0.74	147	1.8	4.2	2.5	16	2,270	236
RD	200	L-8	15	720	29	91	0.82	196	2.1	4.5	2.5	16	3,782.7	250
RD	225	S-8	18.5	710	37	91	0.79	249	2.1	4.6	2.6	16	5,700.8	310
RD	225	M-8	22	715	45	91.5	0.77	294	2.1	4.6	2.6	16	6,780.6	390
RD	250	M-8	30	730	59	92.8	0.79	398	1.7	5.4	2.4	16	11,750	480
RD	280	S-8	37	730	74	93	0.78	485	1.9	6	2.3	16	23,000	610
RD	280	M-8	45	735	90	93.5	0.78	586	1.9	6.4	2.7	16	26,250	685
RD	315	S-8	55	735	104	94.5	0.81	716	2.2	6.2	2.3	16	46,250	820
RD	315	M-8	75	740	140	94.5	0.82	969	1.8	6.3	2.1	16	52,500	930

ATEX Ex-e Increased Safety Electric Motors

Outputs when in continuous use (S1) and at a maximum environmental temperature of 40ºC.

Outputs on demand with regard to deviating environmental temperatures, intermittent operation S2, S3, etc., and deviating frequencies.

Ex-II-2G Ex-e-IIC-T3-Gb in accordance with EN 60079-0 and EN 60079-7

Housing size IEC type	Power kW	Rotational speed min-1	Nominal current at 400 V A	tE time sec	Power factor cos ϕ -	Efficiency %	Starting current Ia/In -	Starting torque Ma/Mn -	Kip torque Mk/Mn -	Nominal torque Nm	Mass inertia J kgmx10^{-4}	Mass kg	Certificaat no. goedgekeurd door KEMA
2-pole synchronous rotational speed 3,000 min^{-1}													
RE63M02K	0.18	2,810	0.55	27	0.74	70	4.4	2.3	2.5	0.6	1.8	4	00ATEX2081
RE63M02	0.25	2,800	0.71	16	0.82	68	4.4	2.0	3.0	0.8	2.3	5	00ATEX2081
RE71M02K	0.37	2,825	0.93	25	0.80	72.5	5.6	3.0	3.0	1.3	3.5	6	00ATEX2082
RE71M02K	0.55	2,785	1.40	13	0.79	73	5.2	3.2	2.8	1.9	4.5	7	00ATEX2082
RE80M02K	0.75	2,845	1.81	11	0.85	74	6.2	2.5	2.7	2.5	8.5	9	00ATEX2083
RE80M02K	1.1	2,855	2.50	10	0.85	76	6.4	2.7	3.0	3.7	11	11	00ATEX2083
RE90S02	1.3	2,850	2.90	11	0.88	81	6.2	2.6	2.8	4.4	20	14	00ATEX2084
RE90L02	1.85	2,860	3.95	8	0.88	83	7.2	2.8	2.8	6.2	15	16	00ATEX2084
RE100L02	2.5	2,865	5.30	8	0.86	82.5	7.4	2.6	2.8	8.3	38	30	00ATEX2085
RE112M02	3.3	2,875	6.7	9	0.90	84	6.6	2.1	2.6	11	55	40	00ATEX2086
RE132S02	4.6	2,895	9.2	13	0.90	83.5	6.8	1.9	2.5	15	160	55	00ATEX2087
RE132S02	5.5	2,920	10.6	13	0.92	86	7.7	2.2	3.5	18	210	58	00ATEX2087
RE132S02	6.5	2,900	12.5	7	0.93	85.5	6.6	1.9	3.2	22	210	62	00ATEX2087
RE160M02	7.5	2,945	14.3	18	0.90	86	7.6	2.2	3.1	24	340	96	00ATEX2088
RE160M02	10	2,940	18.6	12	0.92	88.5	7.6	2.1	2.9	32	400	110	00ATEX2088
RE160L02	12.5	2,940	23.0	9	0.93	90.5	7.6	2.2	3.0	41	520	117	00ATEX2088
4-pole synchronous rotational speed 1,500 min^{-1}													
RE63M04K	0.12	1,375	0.52	30	0.66	55	2.6	2.1	2.3	0.8	3	4	00ATEX2081
RE63M04	0.18	1,330	0.62	25	0.75	56	2.7	1.8	1.8	1.3	4	5	00ATEX2081
RE71M04K	0.25	1,310	0.80	40	0.77	59	3.1	1.8	1.7	1.8	6	6	00ATEX2082
RE71M04	0.37	1,355	1.11	29	0.79	66.5	3.7	1.8	1.8	2.6	8	7	00ATEX2082
RE80M04K	0.55	1,390	1.57	21	0.73	69	4.6	3.0	2.5	3.8	15	9	00ATEX2083
RE80M04K	0.75	1,395	2.05	16	0.75	71	4.8	2.5	2.9	5.1	18	10	00ATEX2083
RE90S04	1	1,420	2.50	14	0.79	76.5	5.4	2.8	3.1	6.7	28	13	00ATEX2084
RE90L04	1.35	1,415	3.10	13	0.82	78.5	5.9	2.6	3.1	9.1	35	16	00ATEX2084
RE100L04K	2	1,420	4.64	11	0.79	79.5	6.4	2.5	2.7	13	48	31	00ATEX2085
RE100L04	2.5	1,415	5.50	10	0.84	81.5	6.4	2.6	2.7	16	58	33	00ATEX2085
RE112M04	3.6	1,435	7.50	9	0.83	85.5	7.2	2.6	2.9	24	110	42	00ATEX2086
RE132S04	5	1,455	10.4	9	0.83	87	6.6	2.5	3.3	33	210	57	00ATEX2087
RE132M04	6.8	1,460	14.1	9	0.82	87	7.7	2.7	3.8	45	270	78	00ATEX2087
RE160M04	10	1,455	19.7	10	0.87	89.5	6.5	2.1	2.7	66	520	115	00ATEX2088
RE160L04	13.5	1,465	27.0	9	0.84	90.5	6.9	2.8	3.1	89	570	134	00ATEX2088
6-pole synchronous rotational speed 1,000 min^{-1}													
RE71M06	0.25	851	0.81	70	0.72	64	3.0	1.9	1.9	2.1	9	7	00ATEX2082
RE80M06K	0.37	920	1.14	55	0.70	68	3.6	2.3	2.4	3.8	15	9	00ATEX2083
RE80M06	0.55	930	1.75	27	0.67	61.5	4.0	2.4	2.4	5.6	25	10	00ATEX2083
RE90S06	0.65	915	1.80	30	0.75	70	3.9	2.0	2.3	6.8	28	13	00ATEX2084
RE90L06	0.95	910	2.60	19	0.75	71	4.1	2.3	2.4	10	38	16	00ATEX2084
RE100L06	1.3	935	3.40	26	0.73	75.3	4.8	2.4	2.5	13	63	31	00ATEX2085
RE112M06	1.9	940	4.70	16	0.76	76.5	5	2.3	2.3	19	110	40	00ATEX2086
RE132S06	2.6	945	6.50	18	0.76	78.5	4.4	2	2.2	26	150	58	00ATEX2087
RE132M06	3.5	955	9.00	13	0.72	81	5.1	2.3	2.8	35	190	60	00ATEX2087
RE132M06	4.8	950	11.4	11	0.76	83	5.6	2.5	2.9	48	250	68	00ATEX2087
RE160M06	6.6	960	14.9	9	0.75	86.5	6.4	2	2.5	65	410	103	00ATEX2088
RE160L06	9.7	965	21.0	8	0.76	88.5	7.7	2.8	3.5	26	550	118	00ATEX2088

ATEX Ex-nA Non-sparking Electric Motors

Outputs when in continuous use (S1) and at a maximum environmental temperature of 40°C.

Outputs on demand with regard to deviating environmental temperatures, intermittent operation S2, S3, etc., and deviating frequencies.

Ex-II-3G Ex-nA-IIC-T3-Gc in accordance with EN 60079-0 and EN 60079-15

Housing size IEC type	Power kW	Rotational speed min^{-1}	Nominal current at 400 V A	Power factor cos ϕ -	Efficiency %	Starting current Ia/In -	Starting torque Ma/Mn -	Saddle torque Mz/Mn -	Nominal torque Nm	Mass inertia J $kgmx10^{-4}$	Mass kg
2-pole synchronous rotational speed 3,000 min^{-1}											
RN63-2K	0.18	2,820	0.51	0.72	62	3.8	2.2	2.1	0.6	1.8	4
RN63-2	0.25	2,830	0.69	0.80	65	4.1	1.9	1.9	0.8	2.3	5
RN63M02V	0.45	2,720	1.09	0.88	67	4.2	2.0	1.8	0.2	2.8	5
RN71-2K	0.37	2,740	1.05	0.82	62	3.7	2.2	2.1	1.3	3.5	6
RN71-2	0.55	2,800	1.45	0.81	67	4.7	2.6	2.6	1.9	4.3	7
RN80M02V	1.75	2,835	4.10	0.78	78.5	7.0	4.2	4.1	5.9	14	11
RN80-2K	0.75	2,855	1.80	0.85	71	5.8	2.3	1.6	2.5	8.5	8
RN80-2	1.1	2,850	2.40	0.86	77.5	6.3	2.4	1.8	3.7	11	10
RN80M02V	1.75	2,835	4.10	0.78	78.5	7.0	4.2	4.1	5.9	14	11
RN90S-2	1.5	2,855	3.35	0.86	76.5	5.7	2.3	2.3	5.0	18	11
RN90L-2	2.2	2,880	4.60	0.85	81	7.0	2.8	2.5	7.3	22	14
RN90L02V	3.8	2,780	8.0	0.84	81	6.0	3.1	3.0	13	25	14
RN100L-2	3	2,880	6.3	0.79	82	7.2	2.9	2.8	10	38	29
RN100L02V	4.6	2,880	9.8	0.81	84.5	8.0	3.7	3.4	15	44	34
RN112M-2	4	2,890	8.0	0.86	83	7.2	2.7	2.1	13	70	45
RN112L02V	5.5	2,905	10.7	0.86	86.5	6.1	2.7	2.2	18	77	48
RN132S-2K	5.5	2,895	10.8	0.90	81.5	6.1	1.8	1.8	18	120	52
RN132S-2	7.5	2,905	14.2	0.92	82.5	7.3	2.5	2.0	25	140	58
RN132L02V	11	2,900	20.8	0.90	84.5	7.6	2.7	2.2	36	210	70
RN160M-2K	11	2,910	22.2	0.88	84	5.6	1.8	1.5	36	340	96
RN160M-2	15	2,930	26.9	0.91	89	6.7	1.9	1.6	49	430	100
RN160L-2	18.5	2,935	32.8	0.90	90	7.5	2.1	1.8	60	520	111
RN160L02V	24.5	2,920	44.1	0.90	89	7.5	2.6	1.9	80	650	90
RN180M-2	22	2,945	40.8	0.86	91.5	6.4	2.5	2.3	71	680	145
RN200Lk-2	30	2,950	54	0.88	92	6.5	2.6	1.8	97	1,290	205
RN200L-2	37	2,950	66	0.89	93	7.2	2.5	2.2	120	1,530	225
RN225M-2	45	2,960	79	0.87	93.5	6.7	2.4	2.0	145	2,170	285
RN250M-2	55	2,960	95	0.88	94	6.7	2.1	1.8	177	4,030	375
RN280S-2	75	2,975	130	0.88	95	7.5	2.5	2.0	241	7,150	500
RN280M-2	90	2,975	154	0.89	95	7.2	2.6	2.0	289	8,320	540
RN315S-2	110	2,982	190	0.88	94.5	7.2	2.4	1.9	352	12,000	720
RN315M-2	132	2,982	225	0.90	95	6.9	2.4	1.8	423	13,900	775
RN315L-2	160	2,982	267	0.91	95.5	7.0	2.4	1.9	512	16,200	900
RN315L-2	200	2,982	329	0.92	96	6.7	2.3	1.8	641	21,000	1,015
2-pole synchronous rotational speed 1,500 min^{-1}											
RN63-4K	0.12	1,380	0.45	0.70	56	2.8	2.1	2.0	0.8	3	5
RN63-4	0.18	1,345	0.60	0.77	57	2.8	1.8	1.7	1.3	4	5
RN63M04V	0.29	1,320	0.95	0.75	58	2.9	2.1	2.1	2.1	5	5
RN71-4K	0.25	1,315	0.83	0.76	57	2.8	1.7	1.7	1.8	6	5
RN71-4	0.37	1,350	1.10	0.78	62.5	3.3	1.9	1.7	2.6	7	6
RN71M04V	0.6	1,350	1.60	0.78	70	4.0	2.4	2.1	4.2	9	7
RN80-4K	0.55	1,380	1.50	0.82	65.5	3.8	2.0	2.0	3.8	10	7
RN80-4	0.75	1,380	2.03	0.79	73	4.0	2.2	2.0	5.2	18	9
RN80M04V	1.25	1,382	3.00	0.81	75	4.7	2.8	2.5	8.6	25	12
RN90S-4	1.1	1,415	2.60	0.79	77.5	5.2	2.5	2.2	7.4	28	11
RN90L-4	1.5	1,415	3.55	0.78	78.5	5.4	2.6	2.1	10	44	14
RN90L04V	2.5	1,360	5.90	0.80	76	4.5	2.8	2.8	18	43	17.5
RN100L-4K	2.2	1,420	4.90	0.83	78	5.5	2.4	2.2	15	48	32
RN100L-4	3	1,405	6.8	0.79	80.5	5.4	2.8	2.6	20	58	34
RN100L04V	3.8	1,395	8.4	0.81	80	5.4	2.9	2.8	26	70	39
RN112M-4	4	1,430	8.7	0.80	83	6.3	2.7	2.4	27	134	42
RN112L04V	5.5	14,354	12.6	0.78	51.5	6.5	3.3	2.8	37	140	48
RN132S-4	5.5	1,450	12.1	0.78	84	6.3	2.5	2.3	36	273	54
RN132M-4	7.5	1,450	15.8	0.81	84.5	7.1	2.8	2.6	49	300	61
RN132L04V	10	1,440	21.0	0.80	86	7.0	3.3	2.7	66	300	74
RN160M-4	11	1,455	22.0	0.83	87	6.4	2.5	2.0	72	400	100
RN160L-4	15	1,455	29.8	0.82	88.5	6.9	2.6	2.1	98	550	120
RN160L04V	22	1,452	44.0	0.82	88	7.1	2.3	1.7	145	570	132
RN180M04A3	18.5	1,465	35.0	0.84	90.5	6.7	2.4	1.9	121	990	140
RN180L04A6	22	1,465	41.5	0.84	91	6.9	2.5	2.2	143	1,170	155
RN200L04A7	30	1,465	56	0.85	91.5	6.7	2.5	2.3	196	1,910	205
RN225S04A0	37	1,475	68	0.85	92.5	6.7	2.5	2.1	240	3,740	265
RN225M04A3	45	1,475	82	0.86	93	7.2	2.7	2.4	292	4,470	300
RN250M04A3	55	1,480	100	0.85	93.5	6.1	2.4	2.0	355	6,880	387
RN280S04A0	75	1,485	136	0.85	94.5	7.1	2.5	1.9	483	11,900	535
RN280M04A3	90	1,485	160	0.86	94.5	7.4	2.5	2.2	579	13,900	580
RN315S04A0	110	1,488	198	0.85	94.5	6.4	2.5	2.0	706	19,400	730
RN315M04A3	132	1,488	235	0.85	95.2	6.8	2.7	2.2	847	23,100	810
RN315L04A6	160	1,486	280	0.86	96	6.8	2.7	2.2	1,028	28,800	955
RN315L04A7	200	1,486	340	0.88	96	6.5	2.6	1.9	1,285	34,600	1,060

ATEX Ex-nA Non-sparking Electric Motors

Outputs when in continuous use (S1) and at a maximum environmental temperature of 40°C.

Outputs on demand with regard to deviating environmental temperatures, intermittent operation S2, S3, etc., and deviating frequencies.

Ex-II-3G Ex-nA-IIC-T3-Gc in accordance with EN 60079-0 and EN 60079-15

Housing size IEC type	Power kW	Rotational speed min-1	Nominal current at 400 V A	Power factor cos ϕ -	Efficiency %	Starting current Ia/In -	Starting torque Ma/Mn -	Saddle torque Mz/Mn -	Nominal torque Nm	Mass inertia J kgmx10^{-4}	Mass kg
6-pole synchronous rotational speed 1,000 min $^{-1}$											
5RN63M06V	0.12	890	0.6	0.61	45	2.1	2.2	1.8	1.29	5	5
RN71-6K	0.18	850	0.65	0.75	54.5	2.5	1.9	1.9	2.1	5	7
RN71-6	0.25	860	0.81	0.76	59	2.7	2.0	2.0	2.9	9	7
RN80-6K	0.37	920	1.25	0.74	59.5	3.1	1.8	1.7	3.9	15	7
RN80-6	0.55	910	1.76	0.74	61	3.0	1.8	1.8	5.9	18	9
RN90S-6	0.75	915	2.26	0.73	67.5	3.1	1.9	1.8	7.9	28	11
RN90L-6	1.1	915	3.09	0.74	69.5	3.5	2.2	2.0	12	35	15
RN90L06V	1.5	850	4.10	0.79	67	3.6	2.4	2.0	17	44	19
RN100L-6	1.5	920	4.00	0.75	73.5	3.8	2.2	2.1	16	63	32
RN112M-6	2.2	939	5.6	0.73	77.5	4.8	2.2	2.2	22	150	49
RN112L06V	3	930	7.40	0.76	77	4.6	2.3	1.9	31	150	42
RN112L06V	3	930	7.40	0.76	77	4.6	2.3	1.9	31	150	42
RN132S-6	3	949	7.2	0.77	78	4.4	1.8	1.5	30	150	49
RN132M-6K	4	950	9.9	0.73	79	5.0	2.4	2.2	40	190	56
RN132M-6	5.5	950	13.6	0.71	82	5.3	2.4	2.2	55	256	64
RN160M-6	7.5	955	17.5	0.73	84	4.4	1.8	1.6	75	410	100
RN160L-6	11	955	24.5	0.74	87.5	4.7	1.9	1.7	110	490	121
RN200Lk-6	18.5	975	36.5	0.81	90	5.6	2.5	2.0	181	2,380	195
RN200L-6	22	975	43.5	0.81	90.5	5.7	2.6	2.1	216	2,870	205
RN225M-6	30	978	58	0.83	92	5.6	2.7	2.4	293	4,920	280
RN250M-6	37	980	71	0.83	92.5	6.0	2.7	2.2	360	7,620	370
RN280S-6	45	985	83	0.85	92.5	6.1	2.4	2.1	436	11,200	475
RN280M-6	55	985	100	0.86	93	6.3	2.5	2.2	533	13,700	510
RN315S-6	75	988	138	0.84	93.5	6.5	2.5	2.2	725	21,000	685
RN315M-6	90	988	164	0.84	94	6.8	2.6	2.4	870	25,000	750
RN315L-6A6	110	988	196	0.86	94.5	6.8	2.5	2.3	1,063	32,000	890
RN315L-6A7	132	988	235	0.86	95	7.3	3.1	2.5	1,276	40,200	980
8-pole synchronous rotational speed 750 min $^{-1}$											
RN63-8	0.04	640	0.29	0.65	31	1.6	1.77	1.75	0.6	7	5
RN71-8K	0.09	630	0.38	0.72	50	2.1	1.7	1.8	1.4	8	7
RN71-8	0.12	645	0.54	0.64	51.5	2.3	2.2	2.2	1.8	8	7
RN80-8K	0.18	675	0.78	0.66	51	2.3	1.6	1.6	2.6	14	8
RN80-8	0.25	680	1.14	0.61	53.5	2.3	1.9	1.7	3.5	18	10
RN90S-8	0.37	675	1.13	0.75	63	2.7	1.5	1.5	5.2	25	10
RN90L-8	0.55	675	1.60	0.74	66.5	2.9	1.6	1.5	8	35	11
RN90L08V	0.75	670	2.20	0.72	70	3.0	2.0	2.0	11	48	11
RN100L-8	0.75	675	2.10	0.77	67.5	3.0	1.6	1.5	11	53	28
RN100L-8	1.1	670	2.90	0.75	72.5	3.1	1.7	1.7	16	70	30
RN112M-8	1.5	695	4.20	0.73	71.5	3.8	1.8	1.6	21	130	33
RN112M08V	2.2	695	6.2	0.71	72.5	4.0	2.2	1.9	30	190	42
RN132S-8	2.2	695	6.3	0.70	72	3.7	2.0	1.8	30	140	52
RN132M-8	3	690	8.5	0.69	74	3.7	2.1	2.0	42	190	57
RN132M08V	4	690	11.3	0.68	74.2	4.0	2.2	2.0	55	250	67
RN160M-8K	4	710	10.5	0.70	77.5	4.3	1.9	1.7	54	350	87
RN160M-8	5.5	705	13.8	0.72	79.5	4.4	1.9	1.5	75	430	97
RN160L-8	7.5	711	18.5	0.71	82.5	4.9	2.4	1.6	101	1,370	125
RN180L08B6	11	725	25.0	0.73	87.5	4.2	1.7	1.5	145	1,690	150
RN200Lk08	15	725	32.5	0.76	88	4.9	2.2	1.9	198	2,900	205
RN225S08	18.5	730	38.5	0.78	89.5	5.5	2.3	2.0	242	4,820	270
RN225M08	22	730	45.0	0.79	90	5.5	2.3	2.1	288	5,510	290
RN250M08	30	730	58	0.81	91.5	5.5	2.3	2.1	392	8,370	385
RN280S08	37	735	72	0.81	92	5.0	2.2	1.8	481	11,100	475
RN280M08	45	735	87	0.81	92.5	5.1	2.2	2.0	585	13,500	515
RN315S08	55	740	106	0.81	93	5.8	2.2	1.9	710	20,800	680
RN315M08	75	738	140	0.83	93.5	5.7	2.2	1.9	971	24,800	745
RN315L08B6	90	738	168	0.83	93.5	5.8	2.2	1.9	1,165	31,400	865
RN315L08B7	110	738	205	0.83	94	6.1	2.4	2.0	1,423	39,500	1,020

ATEX Ex-nA Non-sparking Electric motors - high output

Outputs when in continuous use (S1) and at a maximum environmental temperature of 40ºC.

Outputs on demand with regard to deviating environmental temperatures, intermittent operation S2, S3, etc., and deviating frequencies.

Ex-II-3G Ex-nA-IIC-T3-Gc in accordance with EN 60079-0 and EN 60079-15

Housing size IEC type	Power kW	Rotational speed min^{-1}	Nominal current at 400 V A	Power factor cos ϕ -	Efficiency %	Starting current Ia/In -	Starting torque Ma/Mn -	Saddle torque Mz/Mn -	Nominal torque Nm	Mass inertia J $kgmx10^{-4}$	Mass kg
2-polig synchroon toerental 3000 min^{-1}											
RN63M02V	0.45	2720	1.15	0.84	68	4.2	2.2	1.8	1.6	2.6	5
RN71M02V	0.94	2690	2.21	0.84	73.5	4.8	3.1	2.5	3.3	4.5	7
RN80M02V	1.75	2840	4.10	0.82	77	7.0	4.2	4.1	5.9	13	14
RN90L02V	3.8	2810	8.0	0.85	82	6.0	3.1	3.0	13	22	20
RN100L02V	4.6	2880	9.8	0.81	84	8.0	3.7	3.4	15	44	34
RN112M02V	5.5	2905	10.7	0.87	86.5	7.5	2.7	2.2	18	77	48
RN132M02V	11	2900	20.8	0.91	84.5	7.6	2.7	2.2	36	240	73
RN160L02V	24.5	2920	44.1	0.90	89	7.5	2.6	1.9	80	650	134
RN180L02A8	30	2950	54	0.86	93	7.5	2.4	2.2	97	860	175
RN200L02A8	45	2955	78	0.89	93.5	6.9	2.5	2.1	145	1,820	255
RN225M02A8	55	2960	94	0.89	95	7.3	2.6	2.3	177	2,660	335
RN250M02A8	75	2970	130	0.88	94.5	7.1	2.4	2.0	241	4,800	420
RN280M02B8	110	2975	184	0.90	95.5	7.0	2.5	2.0	353	10,000	630
RN315L02B8	250	2982	410	0.92	96	6.7	2.4	1.9	801	24,600	1,230
RN315L02A9	315	2980	530	0.89	96.5	9.2	3.4	3.0	1,007	28,800	1,350
4-polig synchroon toerental 1500 min^{-1}											
RN63M04V	0.29	1330	0.80	0.71	60	2.9	2.3	2.1	2.1	4.5	5
RN71M04V	0.6	1350	1.60	0.79	70	4.0	2.4	2.1	4.2	9.5	7
RN80M04V	1.25	1380	3.00	0.81	76	4.7	2.8	2.5	8.6	24	14
RN90L04V	2.5	1380	5.90	0.80	76	4.5	2.8	2.7	18	40	17.5
RN100L04V	3.8	1395	8.4	0.81	80	5.8	2.9	2.4	26	62	34
RN112L04V	5.5	1440	12.7	0.78	81	6.5	3.3	2.8	37	140	48
RN132L04V	10	1440	21.0	0.81	85	7.0	3.3	2.7	66	300	74
RN160L04V	22	1450	44.0	0.82	88	7.1	2.3	1.7	145	720	132
RN180L04A8	30	1465	59	0.80	92	6.3	2.6	2.2	196	1,440	180
RN200L04A8	37	1465	70	0.83	92.5	6.9	2.6	2.1	241	2,340	230
RN225M04A8	55	1475	99	0.86	93.5	6.8	2.5	2.1	356	4,860	330
RN250M04A8	75	1485	136	0.85	94.5	7.7	2.5	2.2	483	8,560	460
RN280M04B8	110	1490	198	0.84	95.5	7.9	2.8	2.7	707	17,100	680
RN315L04B8	250	1488	430	0.87	96	7.7	3.1	2.4	1,604	42,200	1,290
RN315L04A9	315	1490	550	0.86	96	7.7	3.4	2.4	2,020	52,000	1,520
6-polig synchroon toerental 1000 min^{-1}											
5RN63M06V	0.12	890	0.64	0.61	45	2.1	2.2	1.8	1.29	4.5	5
RN90L06V	1.5	850	4.11	0.81	67	3.6	2.4	2.0	17	44	19
RN112M06V	3	930	7.41	0.76	78	4.6	2.3	1.9	31	150	42
RN180L06A8	18.5	970	37.5	0.80	90	4.9	2.2	2.0	182	2,030	175
RN200L06A8	30	975	60	0.80	91	5.8	2.6	2.3	294	3,620	245
RN225M06A8	37	980	71	0.83	92.5	5.9	2.5	2.3	361	6,240	325
RN250M06A8	45	982	85	0.83	93.5	6.3	2.7	2.2	438	9,340	405
RN280M06A8	75	984	136	0.86	94	6.8	3.0	2.5	728	20,000	660
RN315L-6A8	160	988	285	0.86	95	7.5	3	2.51	1,547	47,100	1,180
RN315L-6A9	200	990	360	0.84	95.5	7.5	2.9	2.33	1,929	57,200	1,400
8-polig synchroon toerental 750 min^{-1}											
RN90L08V	0.75	670	2.21	0.72	70	3.0	2.0	2.0	11	51	16
RN112M08V	2.2	695	6.2	0.71	73	3.9	2.2	1.9	30	190	42
RN132M08V	4	690	11.5	0.68	74	3.9	2.2	2.0	55	250	74
RN180L08B8	15	720	34.0	0.73	88	4.5	2.0	1.8	199	2,060	165
RN200L08B8	18.5	725	39.5	0.78	88.5	5.5	2.5	2.0	244	3,670	230
RN225M08B8	30	730	61	0.79	90.5	6.0	2.5	2.3	392	7,300	345
RN250M08B8	37	731	72	0.82	92	5.9	2.3	2.2	483	10,610	130
RN280M08B8	55	736	106	0.81	93	5.9	2.4	2.1	714	16,300	560
RN315L08B8	132	738	245	0.83	94.5	6.5	2.5	2.1	1,708	45,200	1,100
RN315L08B9	160	738	290	0.84	94.5	6.5	2.6	2.2	2,070	48,000	1,380

Category and Area Classification for DUST Atmosphere

ATEX Dust explosion-proof electric motors:
- The ATEX Category (or Zone). For Zone 22 conductive or non-conductive dust must be specified.
- Maximum permissible surface temperature.

- Our 3D range of motors can be derived from our standard range (certain modifications must be performed)
- Our 2D range of motors in flameproof enclosure are also available at short lead times (Ex d).

Group I: = mining industry
Group II: = other locations

Category 1D	Zone 20
Category 2D	Zone 21
Category 3D	Zone 22

Zone	ATEX cat.	Description	Type of protection permitted.
20	1	An explosive cloud of combustible dust in air is present continuously or for long periods of time (>1000hr per year)	Ex-ia
21	2	An explosive cloud of combustible dust in air is likely to occur in normal operation occasionally (10 tot 1000hr per year)	Ex-d, Ex-e, Ex-i, Ex-m, Ex-o, Ex-p, Ex-q
22	3	An explosive cloud of combustible dust in air is not likely to occur in normal operation but, if it does occur, will persist for a short period (<10hr per year)	Ex-d, Ex-e, Ex-i, Ex-m, EX-n, Ex-o, Ex-p, Ex-q

The standard range of Rotor ATEX motors consists of compressure-resistant electric motors, electric motors with increased safety, and electric motors with non-sparking equipment.

DUST

Electric motors cannot be installed in zone 20

ZONE 22
dust not expected to be present

ZONE 21
dust probably present occasionally

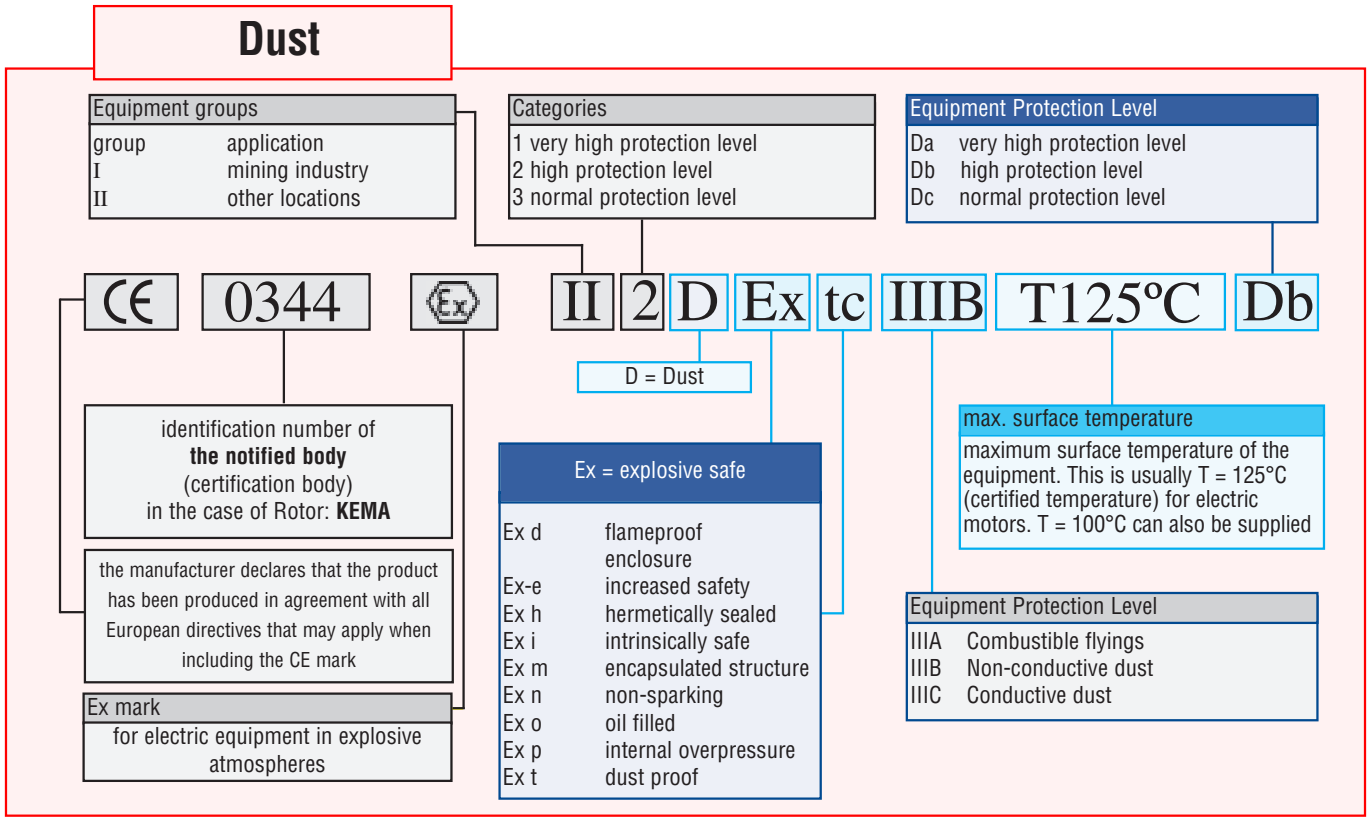
ZONE 20
dust continuously present

CE... Ex II 2 D Ex tb IIIC T... Db

CE... Ex II 3 D Ex tc IIIB T... Dc (non-conductive dust)

CE... Ex II 2 D Ex tb IIIC T... Db (conductive dust)

Coding for Electric Motors in Dust Explosive Area



Electric data of these electric motors are the same as the standard line of the RN series. Electric motors can be ordered with contract variations. Ex II 3D up to Frame Size 315. Ex II 2D on request.

Other constructions sizes on request.

Motor Execution Options

Rotor nl® electric motors: IP55. are standard equipped with pre-loaded, enclosed bearings fixed at NDE, RAL 7030. tropical insulation 96% RH and low noise performance.

Rotor electric motors are also available as special models. Provided below is a list of motor execution options. Customer-specific modifications are also possible. If required, please get in touch with your contact person.

Contract variation options	Page
Extra tropical insulation 98% RH	page 28
IPW55 additional shaft seal DE	page 28
IPW55 additional shaft seal DE & NDE 98% RH	page 28
IP56 98% RH	page 28
Oil-tight flange	
Standstill heating 230 V	page 31
Terminal box—on right hand side	
Terminal box—on left hand side	
Force ventilation unit, IC416	page 32
TEAO, IC418	page 32
TENV, IC410 (short-term operation)	page 32
Hydraulic model H.V.O., IC08	
PT100 temp. measuring element (1 pc.)	page 30
PTC tripping temp. monitoring elements	page 31
PTC alarm temp. monitoring elements	page 31
Bi-metal tripping temp. monitoring elements	page 31
Bi-metal alarm temp. monitoring elements	page 31
Strengthened pre-loaded bearing	page 38
SPM vibration monitoring nipples	page 38
PT100 bearing temp. measuring element	page 30
Balancing of class “B”, no key	page 38
Insulated bearing	page 34
C3 paint finish (stock colour) in accordance with ISO 12944	page 81
C5 paint finish (stock colour)	page 81
CSA inspection LR 39731/206768 metric swivel sockets	
Marine execution	page 59
Factory inspection certificate EN 10204—2.2	page 59
Inspection report (no load test) EN 10204—3.1	page 59
Inpection report (load test) EN 10204—3.1	page 59
Classified inpection report EN 10204—3.2	page 59

Pole-changing Motor Data

On this and the following pages, you will find an overview of the range of Pole-changing electric motors we provide. Information about these electric motors can be found on page 34. To make an informed decision about your order, please contact one of our staff members to learn more about the options available.

Outputs when in continuous use (S1) and at a maximum environmental temperature of 40ºC.

Outputs on demand with regard to deviating environmental temperatures, intermittent operation S2, S3, etc., and deviating frequencies.

Housing size IEC	Power	Rotational speed	Nominal current at 400V.	Power factor	Efficiency	Starting current	Starting torque	Stall torque	Nominal torque	Mass inertia	Mass
type	kW	min^-1	A	cos	%	Ia/In	Ma/Mn	Mk/Mn	Nm	J kgmx10^-4	kg
4/2-polig synchronous rotational 1500/3000 min^-1 /YY for constant torque appplication											
6RN80M42E02	0,48	1390	1,25	0,81	68,2	3,5	1,7	2	3,3	0,0014	9
	0,6	2830	1,51	0,83	69,3	4	1,8	2,2	2		
6RN90S42E00	1,1	1400	2,59	0,83	73,8	4,4	1,8	2,1	7,5	0,0028	14
	1,4	2830	3,41	0,83	71,3	4,4	1,8	2,2	4,7		
6RN90L42E04	1,5	1400	3,44	0,84	74,9	4,6	2	2,1	10	0,0033	16
	1,9	2860	4,42	0,84	73,9	5,1	2,1	2,3	6,3		
6RN100L42E04	1,9	1390	4,40	0,87	72	4,1	1,7	1,8	13,1	0,0059	18
	2,4	2800	5,60	0,88	70	4,2	1,8	1,8	8,2		
6RN100L42E05	2,5	1440	5,40	0,87	76,3	5,2	1,9	2,8	16,6	0,0078	22
	3,1	2840	6,40	0,9	77,3	5,2	2,1	2,9	10,4		
6RN112M42E02	3,7	1420	7,80	0,86	79,9	4,9	1,8	2,3	24,9	0,01	27
	4,4	2885	8,50	0,92	80,8	6,4	2,1	2,6	14,6		
6RN132S42E00	4,7	1440	9,80	0,84	82	5,6	1,6	2,7	31,2	0,019	38
	5,9	2875	12,00	0,89	80	5,6	1,8	2,8	19,6		
6RN132M42E02	6,5	1435	13,30	0,86	82	5,4	1,7	2,6	43,3	0,024	44
	8	2880	15,30	0,92	82	6,3	1,8	2,8	26,5		
6RN160M42E02	9,3	1440	18,30	0,87	84,5	5,7	1,7	2,8	61,7	0,044	62
	11,5	2870	22,00	0,92	82	6	1,8	2,9	38,3		
6RN160L42E06	13	1450	25,50	0,85	85,6	6	1,6	2,3	85,6	0,068	85
	16	2920	35,50	0,94	86	7,1	1,9	2,8	52,3		
8/4-polig synchronous rotational 750/1500 min^-1 /YY for constant torque appplication											
6RN90S84E00	0,35	680	1,2	0,71	57,2	2,5	1,4	1,7	4,9	0,0023	14
	0,5	1375	1,4	0,79	64	3	1,5	1,8	3,5		
6RN90L84E04	0,5	685	1,8	0,69	59,2	2,8	1,6	1,9	7	0,0031	16
	0,7	1400	2,1	0,75	64,7	3,4	1,8	2	4,8		
6RN100L84E04	0,55	715	2,7	0,53	57	3	2	2,7	7,3	0,0059	18
	1,1	1425	2,4	0,87	77,7	4,6	1,7	2,1	7,4		
6RN100L84E05	0,9	700	3,2	0,64	64,2	2,9	1,5	2	12,3	0,0078	22
	1,5	1415	3,2	0,89	77,7	4,5	1,5	1,9	10,1		
6RN112M84E02	1,1	715	4,0	0,6	66,5	3,2	1,6	2,3	14,7	0,01	27
	1,9	1440	3,9	0,87	80,9	5,4	1,6	2,3	12,6		
6RN132S84E00	1,6	730	7,1	0,53	61,5	3,3	1,6	2,6	20,9	0,019	38
	3,2	1450	6,5	0,87	82,3	5	1,4	2,1	21,1		
6RN132M84E02	2,2	730	9,0	0,52	68	3,8	2	3	28,8	0,024	44
	4,4	1450	8,5	0,88	84,5	5,5	1,5	2,3	29		
6RN160M84E02	3,5	730	11,4	0,57	77,5	4,2	2	2,8	45,8	0,044	62
	7	1450	13,4	0,9	84	5,2	1,6	2,2	46,1		
6RN160L84E04	5,6	725	16,8	0,6	80,2	4	1,9	2,7	73,8	0,056	73
	11	1445	21,0	0,9	84,4	5,1	1,5	2,2	72,7		

Pole-changing Motor Data

Outputs when in continuous use (S1) and at a maximum environmental temperature of 40°C.

Outputs on demand with regard to deviating environmental temperatures, intermittent operation S2, S3, etc., and deviating frequencies.

Housing size IEC	Power	Rotational speed	Nominal current at 400V.	Power factor	Efficiency	Starting current	Starting torque	Stall torque	Nominal torque	Mass inertia	Mass
type	kW	min^-1	A	cos	%	Ia/In	Ma/Mn	Mk/Mn	Nm	J kgmx10^-4	kg
4/2-pole synchronous rotational speed 1500/3000 min^-1 Y/YY for quadratic torque application											
6RN80M42E02-V	0,15	1445	0,37	0,78	75,5	4,7	1,5	2,3	1	0,0014	9
	0,7	2825	1,57	0,88	73,3	4,4	1,5	1,9	2,4		
6RN80M42E03-V	0,25	1435	1,11	0,85	66,2	4,9	1,7	2,3	1,7	0,0017	10
	0,95	2855	4,15	0,83	69,0	5,1	2	2,4	3,2		
6RN90S42E00-V	0,33	1435	0,75	0,82	77,7	5,3	2,2	2,6	2,2	0,0024	14
	1,4	2845	3,55	0,8	71,2	4,1	1,9	2,1	4,7		
6RN90L42E04-V	0,5	1420	1,10	0,85	77,3	5	2	2,3	3,4	0,0033	16
	2	2840	4,52	0,86	74,2	4,7	1,9	2,1	6,7		
6RN100L42E04-V	0,65	1415	1,45	0,86	75	4,1	1,6	1,8	4,4	0,0059	18
	2,4	2800	5,60	0,88	70	4,2	1,8	1,8	8,2		
6RN100L42E05-V	0,8	1435	1,72	0,85	79	5,2	1,9	2,8	5,3	0,0078	22
	3,1	2840	6,40	0,9	77,3	5,2	2,1	2,8	10,4		
6RN112M42E02-V	1,1	1455	2,25	0,85	83,4	6,1	2,2	2,5	7,2	0,01	27
	4,4	2885	8,50	0,92	80,8	6,4	2,1	2,5	14,6		
6RN132S42E00-V	1,45	1460	2,95	0,84	84	5,8	1,6	2,8	9,5	0,019	38
	5,9	2875	12,00	0,89	80	5,6	1,8	2,8	19,6		
6RN132M42E02-V	2	1455	4,00	0,85	85	5,6	1,8	2,8	13,1	0,024	44
	8	2880	15,30	0,92	82	6,3	1,8	2,8	26,5		
6RN160M42E02-V	2,9	1465	5,60	0,86	86,5	5,9	1,8	2,9	18,9	0,044	62
	11,5	2870	22,00	0,92	82	6	1,8	2,9	38,3		
6RN160L42E06-V	4,3	1455	8,40	0,85	87	6	1,6	2,3	28,2	0,068	85
	16	2920	28,50	0,94	86	7,1	1,9	2,3	52,3		
6/4-pole synchronous rotational speed 1000/1500 min^-1 Y/YY for quadratic torque application											
6RN80M64E02-V	0,12	940	0,49	0,68	51,6	2,6	1,5	2,1	1,2	0,0014	9
	0,4	1425	1,31	0,71	62,1	3,4	1,6	2,3	2,7		
6RN80M64E03-V	0,18	915	0,68	0,74	51,6	2,4	1,4	1,7	1,9	0,0017	10
	0,55	1405	1,58	0,75	67,1	3,7	2	2,2	3,7		
6RN90S64E00-V	0,29	955	1,07	0,66	59,1	3,4	1,8	2,3	2,9	0,0024	14
	0,8	1420	2,16	0,82	65,3	4,1	1,4	2	5,4		
6RN90L64E04-V	0,38	945	1,32	0,71	58,4	3,1	1,5	1,9	3,8	0,0033	16
	1,1	1415	2,70	0,8	73,5	4,4	1,8	2,2	7,4		
6RN100L64E04-V	0,6	970	2,50	0,62	55,5	3,4	1,7	2,7	5,9	0,0059	18
	1,7	1435	3,90	0,83	76,2	4,6	1,8	2,7	11,3		
6RN100L64E05-V	0,75	955	2,20	0,77	64,2	3,4	1,2	2	8	0,0078	22
	2,1	1435	4,60	0,84	78,4	5,4	2	2	14		
6RN112M64E02-V	0,9	975	3,05	0,66	64,7	3,9	1,6	2,5	8,8	0,01	27
	3	1455	6,80	0,78	81,4	6,4	2,1	2,5	19,7		
6RN132S64E00-V	1,2	980	3,40	0,7	72,3	4,6	1,4	2,5	11,7	0,019	38
	3,9	1455	8,20	0,83	83,1	5,7	1,5	2,5	25,6		
6RN132M64E02-V	1,7	980	4,65	0,71	74,1	5	1,7	2,5	16,6	0,024	44
	5,4	1465	11,10	0,82	85,9	6,9	2	2,5	35,2		
6RN160M64E02-V	2,5	985	6,50	0,71	77,7	4,7	1,5	2,6	24,2	0,044	62
	7,2	1470	14,10	0,85	86,9	6,3	1,8	2,6	46,8		
6RN160L64E04-V	3,7	985	9,40	0,69	82,4	6,2	2,3	3,5	35,9	0,059	73
	12	1475	24,50	0,8	87,9	7,5	2,1	3,5	77,7		
6RN180L64E04-V	6,5	985	16,50	0,7	81	5,5	1,8	2,7	63	0,13	132
	19	1475	38,00	0,8	90	8,1	2,5	3,7	123		
6RN200L64E05-V	9,5	985	23,00	0,7	84,5	6,5	2,3	2,8	92	0,2	173
	26	1475	52,00	0,8	91	7,5	2,3	3,4	168		

Pole-changing Motor Data

Outputs when in continuous use (S1) and at a maximum environmental temperature of 40°C.

Outputs on demand with regard to deviating environmental temperatures, intermittent operation S2, S3, etc., and deviating frequencies.

8/4-pole synchronous rotational speed 750/1500 min^-1 Y/YY for quadratic torque application											
6RN80M84E02-V	0,1	690	0,56	0,58	44,1	2,1	1,9	2,1	1,4	0,0014	9
	0,5	1390	1,31	0,8	69,1	3,6	1,7	2	3,4		
6RN80M84E03-V	0,15	680	0,73	0,58	50,8	2,2	2	2,1	2,1	0,0017	10
	0,7	1380	1,76	0,81	71	3,8	2	2,1	4,8		
6RN90S84E00-V	0,22	695	1,26	0,64	39,4	2,1	1,1	1,8	3	0,0024	14
	1	1370	2,35	0,87	70,6	3,5	1,5	1,8	7		
6RN90L84E04-V	0,33	690	1,63	0,62	47	2,3	1,1	1,7	4,6	0,0033	16
	1,5	1345	3,45	0,89	70,5	3,9	1,8	1,8	10,7		
6RN100L84E04-V	0,5	720	2,80	0,5	52	3,3	1,3	3,4	6,6	0,0078	22
	2	1440	4,45	0,79	82	7,5	3	3,4	13,3		
6RN100L84E05-V	0,65	715	2,90	0,58	56	3,2	1	2,6	8,7	0,0078	22
	2,5	1425	5,30	0,84	81	6,3	2,3	2,6	16,8		
6RN112M84E02-V	0,9	715	4,05	0,57	56	2,8	1	2,1	12	0,01	27
	3,6	1430	7,50	0,84	82	5,6	1,9	2,1	24		
6RN132S84E00-V	1,1	730	4,75	0,54	62	3,2	1	2,2	14,4	0,019	38
	4,7	1430	9,60	0,86	82	5,2	1,7	2,2	31,4		
6RN132M84E02-V	1,4	730	5,80	0,52	67,5	3,5	1,1	2,3	18,3	0,024	44
	6,4	1440	12,60	0,87	84,5	5,7	1,9	2,3	42,4		
6RN160M84E02-V	2,2	730	6,30	0,63	80,6	4	1,5	2,5	28,8	0,044	62
	9,5	1465	19,00	0,84	86,1	6,3	2	2,5	61,9		
6RN160L84E04-V	3,3	735	10,40	0,56	81,4	4,8	2,5	3,3	42,9	0,056	73
	14	1475	32,50	0,73	85,8	7,2	2,5	3,3	90,6		
6RN180M84E02-V	4,5	730	13,90	0,59	79,3	3,8	1,4	2,3	59	0,12	128
	16	1470	33,00	0,83	84,6	7	1,4	2,9	104		
6RN180L84E04-V	5	730	15,40	0,6	78,3	3,8	1,5	2,1	65	0,13	132
	18,5	1470	37,00	0,83	86,6	7	2,3	2,7	120		
6RN200L84E05-V	7,5	735	21,00	0,6	85	4	1,7	2,1	97	0,2	173
	28	1475	53,00	0,85	90,5	7,4	2,7	3,1	181		

Brake Motors and Backstop

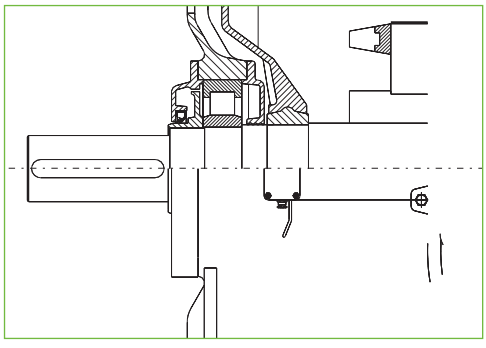
The brake selection depends greatly on the application. The applications can be very different. A 'holding brake' might be required for certain applications. This brake is not used for dynamic braking (full speed braking) but is engaged after the motor coasted down and whilst stationary. This is often required for electric motors with large moment of inertia attached on the shaft. In these situations the rotating energy would be converted into a lot of heat during dynamic (full speed) braking.

The correct brake selection can be made after consultation with the motor/brake supplier or manufacturer.
The following diagram provides an overview of the different types of brakes that can be mounted on rotor nl® electric motors.
The overview shows brake options that are available. Please contact our trained staff for the correct brake selection.

Housing size	Flange dimensions	Brake options in Nm		
		IP55/56/65/Ex-nA	IP 67 marine brake	Ex-d brakes
63	A140	4		
71	A140	8		8
	A160			
80	A160	16		22
	A200	10/25		
90	A160	16		22
	A200	25		
100	A200	32/60		40
	A250	50		
112	A250	32/50/60		60
132	A250	100		150
	A300	100, 160		
160	A300	150/160/250		180
	A350	160		
180	A300	250	250/300/400	355
	A350		250/400	
200	A300		250/300/400	460
	A400		250/300/400/630	
225	A350	500	400/630	460
	A400		400/630/1000	
	A450		400/630/1000	
250	A450		630/1000	1000
	A550		630/1000	
280	A450		1000/1600	1200
	A550		1000/1600	
315	A550			
	A660		2500/4000	
	A800		2500/4000/6300/10000	
355	A800		2500/4000/6300/10000	
400				
450				
IP 65 and Ex-d brakes are independent of the flange dimensions and apply only to each housing size				

Section 5

Rotor B.V. Services



The following pages contain information about the services provided by Rotor B.V., including the warranty conditions and the delivery schedule.

Maintenance and Operating Instructions

Safety
All electric motors must be installed by qualified engineers. The electrical connection and the commissioning may only be performed by a qualified installer in accordance with the applicable criteria, regulations and directives. The manufacturer will not be held responsible for damages resulting from ill installation and/or use.

Storage

Warehousing
Electric motors must be stored in a dry, vibration-free place. Cable entries and deep fixing holes in FT (B14) flanges must be sealed. Electric motors that have been out of operational for prolonged period of time must have their insulation resistance checked before commissioning. Motor winding should be dried should the insulation resistance be lower than 30 MOhm (measured for at 1,000 V).

Installation and fitting
The fitting and installation of an electric motor must correspond to the motor mounting as specified on the motor's rating plate. The motor should be dry before installation. During the installation the motor must be positioned in such a way that an uninterrupted supply of sufficient volume of cooling air is available for the motor at all times. The maximum length of the flange mounting bolts is limited to 2.5 x the bolt diameter for flange mounted motors with FT (B14) flanges (to prevent damage of the winding).

Power transmission
The mechanical power of the electric motor can usually be transmitted to the driven equipment through flexible coupling, a V-belt or a belt transmission. An accurate shaft alignment will increase the service life of the bearings as well as other motor parts. In case of electric motor integration in the driven equipment the installer/manufacturer of the driven equipment must satisfy himself that the type of the electric motor is suitable for the specific application. The transmission components must be securely fastened on the motor's shaft. The electric motors are balanced with a half key and marked with a letter H on the rating plate and/or the shaft end.

Tightening torques
The tightening bolts and nuts torque requires a special attention. During the motor installation the bolts and nuts must be tightened manually using standard manual tools until the spring washer is depressed and is flat. The maximum permissible torque related to the bolts and nuts used is not relevant for motor installation. Over-tightening can damage the electric motor construction and compromise its integrity. The use of (large) torque wrenches is not recommended. The same principle applies for the bolts and nuts on the terminal board. Correct star/delta (where applicable) configuration must be established. All nuts must be properly tightened but not overtightened. After approximately 300 operational hours all installation fasteners and electrical connections must be checked.

Electrical connection
The electrical connection of an electric motor must meet all applicable local regulations. Thermal protection (if fitted) must limit the risk of overloading of the motor. The use of a thermistor relay is recommended for PTC thermistors (if fitted). Standard electric motors can be used for both directions of rotation. The direction of rotation at standard three-phase motors can be changed by swapping any two incoming phase leads. A low-noise execution is available for one direction of rotation (these motors have an arrow marked on the endshield).

Frequency inverter
No restrictions usually apply for inverter duty motors for variable torque applications when the speed control range is between 30% and 120% of the nominal speed (at 50 Hz). The torque reduction applies for constant torque applications if the motor is not equipped with force ventilation. For more information and for speed control outside the above control range please contact the electric motor manufacturer.

General maintenance
Standard rotor nl® electric motors are practically maintenance-free. Any maintenance is limited to the following:
- Cleaning the motor surface and the cooling air openings to ensure sufficient cooling
- Re-lubrication and/or replacement of 2Z bearings.

Bearings in general
The bearings used in standard rotor nl® motors are listed in Table 1.
The motors have been equipped with C3 type of bearings as standard. Special grease must be used for extremely low or extremely high temperatures.

Bearing lubrication - Closed bearings
Smaller electric motors sizes are fitted with closed bearings (2Z) lubricated for life. These bearings must, be replaced at the end of the service life (see Table 2). High temperature grease (i.e. 85°C) bearings are recommended for the replacement. The service life of these bearings is considerably longer than standard ball bearings with standard grease (70°C). Smaller sizes of rotor nl® electric motors are supplied with 2Z bearings with a WT (85°C) grease as standard. These are special bearings supplied by with a temperature range of -40°C to +160°C and a service life higher than the average lithium complex greases. It is recommended replacing 2Z bearings every 4 years to prevent contamination as a result of ambient humidity and air pollution.

Open bearings with grease in bearing housing

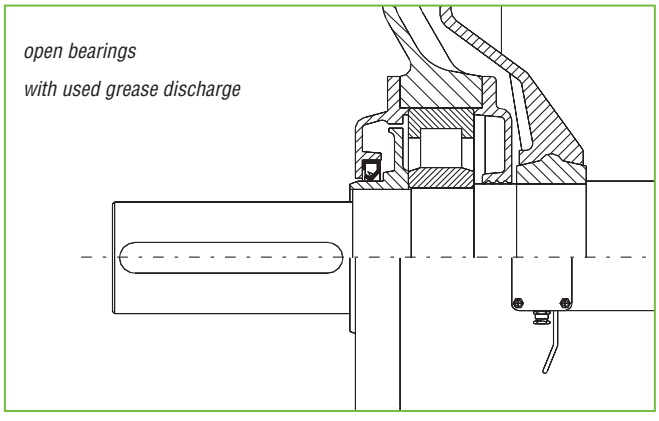
Open bearings are used for larger electric motors sizes that have been fitted with ball bearings. The grease is based on lithium with mineral oil. These bearings can be re-lubricated many times. The old grease is collected in the used grease chamber of the bearing cap. Re-lubrication must take place whilst the electric motor is operating. The fact that the grease nipple and the grease canal may be both completely empty before the first re-lubrication must be taken into consideration. Certain degree of counter-pressure is felt through the grease gun during the re-lubrication indicating the amount of grease that have been applied during re-lubrication The used grease chamber need removing after a number of re-lubrications The used grease removing is often performed when bearings are replaced. If bearings are subject to light load and have a long residual life left, they probably only need cleaning, used grease needs removing, bearings and bearing caps need refilling with grease (grease filling: bearings 50% and bearing caps 30% of the free space). Ex-e and Ex-n electric motors with open bearings and a used grease chamber are supplied without a lubrication nipple.

Open bearings with used grease discharge

If the electric motors are equipped with an automatic used grease discharge, unlimited re-lubrication is possible. The automatic used grease discharge works on an oscillating wheel principle that discharges the surplus grease to the used grease chamber. Closed used grease chamber must be open for one hour after the re-lubrication whilst the motor is operating to ensure that the surplus grease can be discharged.

Re-lubrication period

The re-lubrication period depends on the rotating speed, the shaft load, ambient factors electric motor installation. Re-lubrication must be carried out in accordance with the recommendations of the bearing and grease supplier. General guidelines can be found in the re-lubrication table. The values specified in Table 3 are for general guidance only and apply for horizontal motors with bearings temperature 70°C (for normal load and ambient temperature). The re-lubrication period must be halved for vertical electric motors. The re-lubrication period must be halved for every run when the temperature was 15°C above the bearing nominal temperature. Longer re-lubrication period is sometimes recommended if motors run at low temperatures - any re-lubrication period must not be longer than two times the recommended re-lubrication period. The re-lubrication period must be shortened when heavy shaft loads are applied.



Grease type

The rotor nl® electric motors that have been fitted with open bearings are supplied with a lithium based grease as standard. Grease types based on lithium with mineral base oil can be used for re-lubrication Good quality high temperature grease should be the preferred choice. If an electric motor is fitted with a special bearing and/or special grease (upon request), the bearing/grease information would be specified on the rating plate as well as the re-lubrication period.

Warranty

Warranty procedures and processes are in accordance with the general Terms and Conditions of Rotor B.V. currently in force at the time of the delivery.

IEC housing size	Pole number	Bearing types	
		THE	NDE
RN56	alle 5R../ 6R..	6201-2Z/C3	6201-2Z/C3
RN63	alle 5R../ 6R..	6201-2Z/C3	6201-2Z/C3
RN71	alle 5R../ 6R..	6202-2Z/C3	6202-2Z/C3
RN80	alle 5R..	6204-2Z/C3	6204-2Z/C3
RN80	alle 6R..	6204-2Z/C3	6004-2Z/C3
RN90	alle 5R..	6205-2Z/C3	6205-2Z/C3
RN90	alle 6R..	6205-2Z/C3	6004-2Z/C3
RN100	alle 5R..	6206-2Z/C3	6206-2Z/C3
RN100	alle 6R..	6306-2Z/C3	6306-2Z/C3
RN112	alle 5R.. / 6R..	6306-2Z/C3	6306-2Z/C3
RN132	alle 5R.. / 6R..	6308-2Z/C3	6308-2Z/C3
RN160	alle 5R.. / 6R..	6309-2Z/C3	6309-2Z/C3
RN180	alle 5R.. / 6R..	6310-2Z/C3	6310-2Z/C3
RN200	5R.. 2, 2/4-polig	6312/C3	6312/C3
RN200	alle 6R.. / 5R.. 4, 6, 8-polig	6312-2Z/C3	6312-2Z/C3
RN225	5R.. 2-polig	6213/C3	6213/C3
RN225	alle 6R.. / 5R.. 4, 6, 8-polig	6313/C3	6313/C3
RN250	5R.. 2-polig	6215/C3	6215/C3
RN250	alle 6R.. / 5R.. 4, 6, 8-polig	6315/C3	6315/C3
RN280	5R.. 2-polig	6216/C3	6216/C3
RN280	5R.. 2-polig	6217/C3	6217/C3
RN280	6R.. 2-polig	6315/C3	6315/C3
RN280	6R.. / 5R.. 4, 6, 8-polig	6317/C3	6317/C3
RN315	5R.. 2-polig	6217/C3	6217/C3
RN315	6R.. / 5R.. 2-polig	6316/C3	6316/C3
RN315	5R.. 2 polig	6219/C3	6219/C3
RN315	6R.. / 5R.. 4, 6, 8-polig	6319/C3	6319/C3
RN315	7R..2-polig	6316/C4	6316/C4
RN315	7R.. 4, 6-polig	6319/C4	6319/C4
RN355	7R.. 2-polig	6317/C4	6317/C4
RN355	7R.. 4, 6-polig	6320/C4	6320/C4
RNN315	2-polig	6218/C3	6218/C3
RNN315	4, 6, 8-polig	6218/C3	6218/C3
RNN355	2-polig	6218/C3	6218/C3
RNN355	4, 6, 8-polig	6220/C3	6220/C3
RNN400	2-polig	6218/C3	6218/C3
RNN400	4, 6, 8-polig	6224/C3	6264/C3
RNN450	2-polig	6220/C3	6220/C3
RNN450	4, 6, 8-polig	6228/C3	6228/C3

Bearing	Grease service life in hours of closed bearings provided with WT grease (T_{ref} 85ºC) at a bearing temperature of 70°C, at rotational speed in min^{-1}							
	3,600	3,000	1,800	1,500	1,200	1,000	900	750
6201 2Z/C3	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
6202 2Z/C3	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
6204 2Z/C3	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
6205 2Z/C3	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
6206 2Z/C3	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
6306 2Z/C3	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
6308 2Z/C3	32,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
6309 2Z/C3	26,000	36,000	40,000	40,000	40,000	40,000	40,000	40,000
6310 2Z/C3	22,000	32,000	40,000	40,000	40,000	40,000	40,000	40,000
6312 2Z/C3	18,000	24,000	36,000	40,000	40,000	40,000	40,000	40,000

The grease service life is the time where still 99% of the bearings are sufficiently lubricated. This time is twice as long at 90%.
The grease service life must be halved with regard to standard (MT) grease filling with a reference temperature of 70°C.
The grease service life must be halved for electric motor set-ups on a vertical shaft.

Bearing	Grease (grams)	Relubrication in hours at open bearings and rotational speed in $^{-1}$							
		3.600	3.000	1.800	1.500	1.200	1.000	900	750
6312/C3	20	4390	6050	11500	13500	15800	17600	18600	20100
6213/C3	14	4620	6310	11800	13800	16100	17800	18800	20300
6313/C3	23	3770	5330	10600	12600	15000	16900	17900	19500
6215/C3	16	3770	5330	10600	12600	15000	16900	17900	19500
6315/C3	30	2780	4140	9140	11100	13600	15500	16600	18300
6216/C3	18	3240	4700	9860	11900	14300	16200	17200	18900
6316/C3	33	2390	3650	8470	10500	12900	14900	15900	17700
7217	10	6250	8120	13700	15600	17800	19400	20300	21600
6217/C3	21	2780	4140	9140	11100	13600	15500	16600	18300
6317/C3	37	2060	3210	7850	9820	12300	14200	15300	17200
6218/C3	24	2390	3650	8470	10500	12900	14900	15900	17700
6319/C3	45	1520	2500	6750	8650	11100	13100	14200	16100
6220/C3	31	1770	2830	7280	9220	11700	13700	14800	16600
6320/C3	51	1240	2110	6100	7950	10400	12400	13500	15400
6322/C3	60	870	1570	5110	6860	9220	11200	12400	14300
6224/C3	43	1010	1780	5510	7310	9690	11700	12900	14800
6226/C3	46	786	1440	4860	6580	8910	10900	12100	14000
NU213/C3	14	1810	2590	7370	9310	11800	13800	14900	16700
NU215/C3	16	1340	2250	6330	8210	10600	12600	13800	15700
NU310/C3	15	2650	3970	8910	10900	13400	15300	16400	18100
NU312/C3	20	1680	2710	7100	9020	11500	13500	14600	16500
NU315/C3	30	850	1540	5040	6790	9140	11100	12300	14300
NU216/C3	18	1060	1860	5650	7470	9860	11900	13000	15000
NU316/C3	33	675	1270	4500	6180	8470	10500	11600	13600
NU217/C3	21	850	1540	5040	6790	9140	11100	12300	14300
NU317/C3	37	540	1050	4020	5620	7850	9820	11000	13000
NU319/C3	45	340	720	3200	4650	6750	8650	9800	11800
NU322/C3	60	-	360	2110	3280	5110	6860	7950	9920

Relubrication times are based on bearing and grease manufacturer data determined in accordance with the last known method.
The relubrication times must be halved for electric motors that are set up on a vertical shaft.
The relubrication times must be halved for each 15°C increase with regard to grease temperatures higher than the grease reference temperature.

Note:
The combinations of ICE/DIN housing sizes and bearings are in part dependent on the electric motor type and application. Also consult the binding data as stated in the documentation of the specific motor type. Special bearing designs can also be supplied on request.

***D.E.** = drive end*
***N.D.E.** = non-drive end*
***2Z:** (SKF) coding, two-sided (metal) closed bearing. (Protection plates on both sides of the bearing).*
***C3:** coding for the (radial) bearing clearance class.*

Stock Colours and Coating

SO 12944	specific conditions	application examples
C1		urban areas, low pollution, heated buildings and neutral atmospheres
C2	light condensing	unheated buildings where condensation may occur, warehouses and sports halls
	low humidity	atmospheres with low pollution, rural, dry area with little air pollution
C3	high humidity	offices with high humidity and some air pollution, laundromats, breweries and dairy companies
	high humidity, moderate pollution	urban and industrial atmospheres with moderate CO_2 pollution. coastal areas with low salinity
C4		Industrial/coastal areas and chemical companies
C5	high humidity, moderate pollution	Chemical plants, swimming pools and ports.
	high humidity (SO2 = 30 mg/m^3)	Industrial areas with high humidity and aggressive atmosphere.
	Salty environment	marine, offshore and coastal areas and areas with high salinity, such as; offshore windmills and wells.

Stock colours

The following paint colours are standard stock colours. Upon request any electric motor can be sprayed/painted in any of these colours. Rotor operate its own spray shop where special anti-corrosion coatings can be applied. These coatings consist of several layers of paint with different characteristics, which, in the correct combination, are resistant to a number of corrosive agents such as seawater, chemical fumes etc.

RAL 1007	Daffidol yellow
RAL 1015	Light ivory
RAL 2000	Yellowish orange
RAL 2002	Blood orange
RAL 2004	Pure orange
RAL 2008	Bright red orange
RAL 2009	Traffic orange
RAL 3001	Signal red
RAL 5001	Green blue
RAL 5002	Ultramarine blue
RAL 5005	Signal blue
RAL 5007	Brilliant blue
RAL 5009	Azure blue
RAL 5010	Gentian blue
RAL 5012	Light blue
RAL 5015	Sky blue
RAL 5017	Traffic blue
RAL 6028	Pine green
RAL 7012	Basalt grey
RAL 7016	Anthracite grey
RAL 7021	Black grey
RAL 7030	Stone grey
RAL 9003	Signal white
RAL 9005	Jet black
RAL 9010	Pure white
RAL 9016	Traffic white

The colours shown here are an approximation of the actual colours.

— Three-phase squirrel-cage electric motors 0.04—1000 kW

— Special electric motors for:
Offshore and Marine industry
Oil & Gas industry

—Special executions:
High IP ratings: IP 55/56/67/68
ATEX motors derived from the standard range
ATEX pressure-tight electric motors Ex-d(e)-IIC-T4 to 250 kW
Brake motors up to frame size IEC450

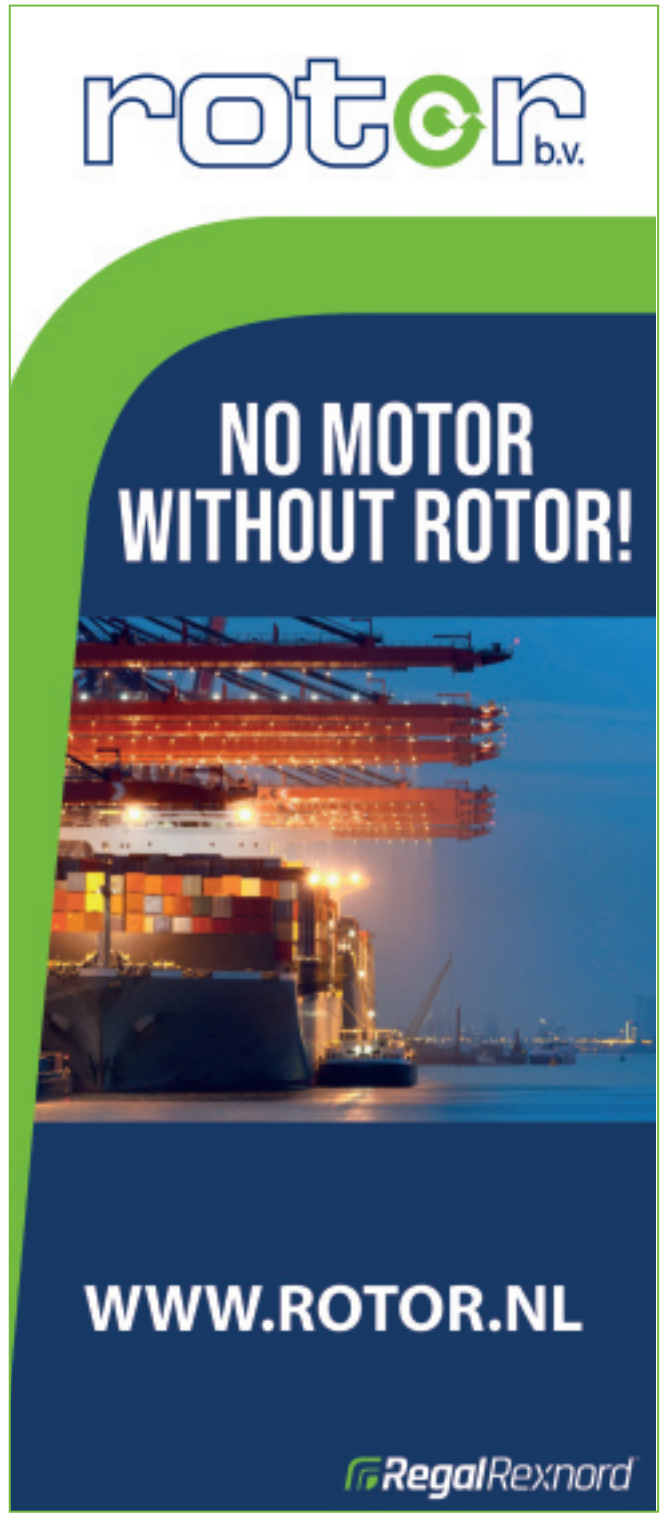
Advice and Training

—Application consultancy
electric motor drive technology
project and/or location orientated

Technical Training Courses

— Electric motor drive technology
courses for OEMs and End Users

Strong together!



ROTOR B.V.
Mors 1-5
7151 MX Eibergen, the Netherlands
+31 (0)545 – 46 46 40

info.nl@regalrexnord.com
sales.nl@regalrexnord.com
order.nl@regalrexnord.com

www.rotor.nl

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