EMERSON™
Industrial Automation





LS2


LEROY® SOMER

High-efficiency three-phase induction motors
ATEX GAS - Zones 1 & 2
ATEX DUST - Zones 21 & 22

Technical catalogue

4970 en - 2013.04/b

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Introduction

In this catalogue, Leroy-Somer describes high-efficiency induction motors for use in gas and dust explosive atmospheres.
These motors have been designed to incorporate the latest European standards, and can satisfy most of industry's demands.
They are par excellence the leading products in the Leroy-Somer range.

Other motors, ranging in power from **0.045 to 2200 kW** and special construction types are included in the Leroy-Somer motor programme.

Flameproof motors Ex d

II 2 G Ex d or d e II B or C T4 or T5 or T6 Gb — **FLSD series**

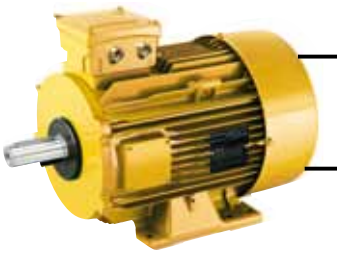
Increased safety motors Ex e

II 2 G Ex e II C T3 or T4 Gb — **LSE / FLSE series**

Non-sparking motors Ex nA

II 2 G Ex nA II C T3 Gb — **LSN / FLSN series**

Motors for combustible dust



II 2 D Ex tb III C T125°C Db — **LSPX / FLSPX series**

II 3 D Ex tc III B T125°C Dc — **LSES/LS / FLSES/FLS series**

For more information, see the “Directives and standards relating to motor efficiency” section.

Quality commitment

Leroy-Somer's quality management system is based on:
- Control of procedures right from the initial sales offering until delivery to the customer, including design, manufacturing start-up and production
- A total quality policy based on making continuous progress in improving operational procedures, involving all departments in the company in order to give customer satisfaction as regards delivery times, conformity and cost
- Indicators used to monitor procedural performance
- Corrective actions and advancements with tools such as FMECA, QFD, MAVP, MSP/MSQ and Hoshin type improvement workshops on flows, process re-engineering, plus Lean Manufacturing and Lean Office
- Annual surveys, opinion polls and regular visits to customers in order to ascertain and detect their expectations.

Personnel are trained and take part in the analyses and the actions for continuously improving the procedures.

Leroy-Somer has entrusted the certification of its expertise to various international organisations.
Certification is granted by independent professional auditors, and recognises the high standards of the **company's quality assurance procedures.** All activities resulting in the final version of the machine have therefore received official certification **ISO 9001: 2008 from the DNV**. Similarly, our environmental approach has enabled us to obtain certification ISO 14001: 2004.
Products for particular applications or those designed to operate in specific environments are also approved or certified by the following organisations: LCIE, DNV, INERIS, BSRIA, TUV, GOST, which check their technical performance against the various standards or recommendations.

CERTIFICATION

The ATEX motors presented in this catalogue comply with the national and/or international standards governing the construction of this type of equipment.
EC type-examination certificates are drawn up by notified bodies, **in accordance with ATEX Directive 94/9/EC.**
Certificates granted by the bodies listed opposite are recognized by all EC countries.
Approved equipment is authorized to carry the CE mark or the distinctive community mark

Definition of atmospheres and zones

ATMOSPHERES AT RISK OF EXPLOSION AND EUROPEAN DIRECTIVES

A zone with a risk of explosion is any place where an explosive or potentially explosive atmosphere may be present, the explosion risk being permanent, intermittent or accidental. An explosive atmosphere is an atmosphere containing a mixture of air and inflammable substances (in the form of gas, vapour, fog or combustible dust) which exists permanently. A potentially explosive atmosphere is one which may become explosive due to the particular local or accident-related conditions.

In zones at risk of explosion, electrical installations must be reduced to what is essential to the operating needs. Two European Directives govern equipment and protection of workers occupying its zones.

Directive 94/9/EC:
This Directive harmonises the essential safety requirements with which equipment and protection systems, intended for use in potentially explosive atmospheres, must comply in order to allow free movement of goods and equipment inside the European Community.

Directive 1999/92/EC:
This Directive concerning the protection of workers sets the minimum rules to be complied with in terms of health of safety and workers likely to be exposed to the risk of potentially explosive atmospheres.
It requires in particular that the worker in an establishment:
- Defines the zones where explosive atmospheres may appear and describes them.
- Selects electrical equipment suitable for the previously defined zones.
- Checks the installation, operating and maintenance conditions for this equipment.

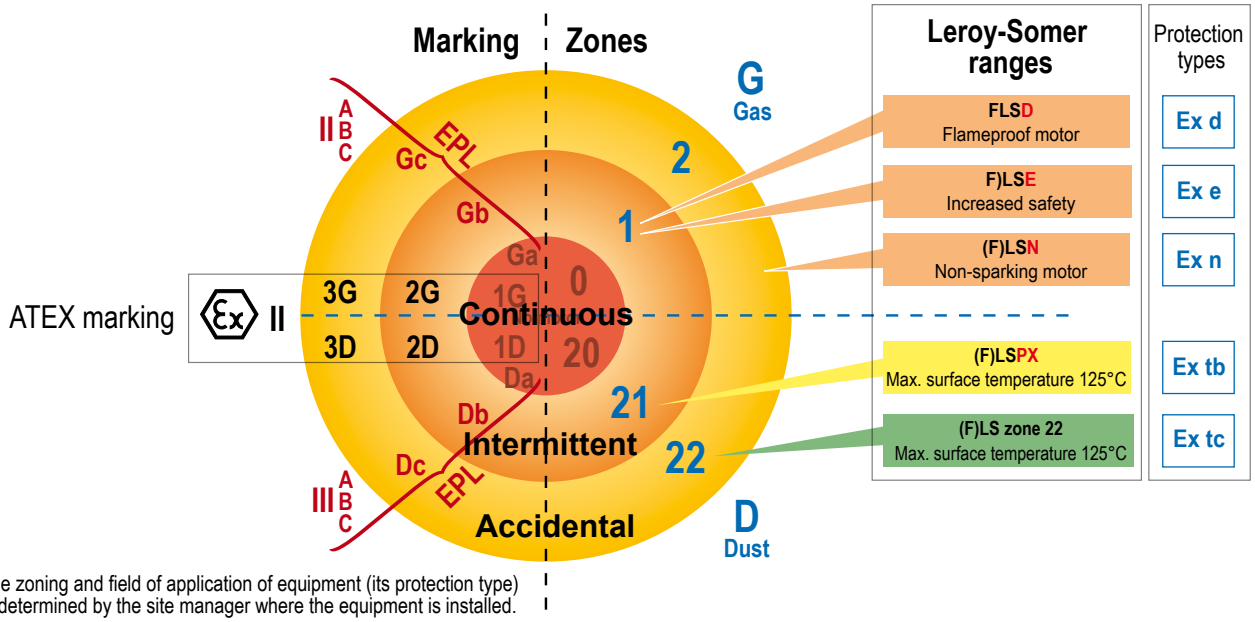
DEFINITION OF ZONES AT RISK OF EXPLOSION

Standards IEC 60079-10-1 and -2 define the danger zones according to the risk of encountering explosive atmospheres as shown in the diagram opposite:

Zone 0 (gas) and 20 (dust):
Location where an explosive atmosphere is present permanently or for very long periods. Only control or measurement equipment can be installed there, hence no electric motors.

Zone 1 (gas) and 21 (dust):
Location where an explosive atmosphere is present occasionally or intermittently.

Zone 2 (gas) and 22 (dust):
Location where an explosive atmosphere is present accidentally and only in abnormal operating situations.



The zoning and field of application of equipment (its protection type) is determined by the site manager where the equipment is installed.

Definition of atmospheres and zones

Electrical equipment installed in areas presenting explosion risks are divided, in accordance with standard 60079-0, into three equipment groups:
- Group I: Gas-prone mines – This group only applies to mine gas (methane) in mines.
- Group II: Explosive gas atmospheres – The gases present are divided into three subdivisions A, B or C according to the severity of risks.
- Group III: Explosive dust atmospheres – The dust is divided into three subdivisions A, B or C according to its properties.

Directive 94/9/EC Classification of equipment					IEC 60079-0 Classification of equipment (Equipment Protection Level (EPL))					Zones
Use	ATEX group	Category	Level of protection	If ATEX present	Use	Equipment group	EPL	Level of protection	If ATEX present	60079-10
Gas-prone mines	I	M1 Maximum mine gas content	Very high	Powered up	Gas-prone mines	I	Ma Maximum mine gas content	Very high	Powered up	
		M2 Outside a certain value	High	Powered down			Mb Outside a certain value	High	Powered down	
Surface industries	II	1G	Very high	Powered up	Explosive gas atmospheres	II A B C	Ga	Very high	Powered up	0
		2G	High				Gb	High		1
		3G	Normal				Gc	Reinforced		2
		1D	Very high		Explosive dust atmospheres	III A B C	Da	Very high		20 IP6X
		2D	High				Db	High		21 IP6X
		3D	Normal				Dc	Reinforced		22 IP5X

I: Methane
IIA: Propane
IIB: Ethylene
IIC: Hydrogen, Acetylene
IIIA: combustible particles in suspension
IIIB: non-conductive dust (electrical resistivity >10^3Ω.m)
IIIC: conductive dust

CLASSIFICATION OF GAS EQUIPMENT GROUPS

Gases are divided into three subdivisions according to the risks subsequent to an explosion. These risks increase from subdivision A to subdivision C. **Equipment certified for use when a type C gas is present can therefore be used when type A and B gases are present.**

TEMPERATURE CLASSES

The temperature class is based on the maximum temperature rise in the equipment and on the ambient operating temperature. The maximum surface temperature of an electrical appliance must always be lower than the ignition temperature of the mix of gases in which it will be used.

In order to select various appliances according to their surface temperature, **six temperature classes** have been created:

Temperature class	T1	T2	T3	T4	T5	T6
Ignition temperature	> 450°C	> 300°C	> 200°C	> 135°C	> 100°C	> 85°C
Max. permissible surface temperature for the equipment	450°C	300°C	200°C	135°C	100°C	85°C

Classification of common gases

Gas	Ignition temperature °C	Equipment temperature class	Explosion group
Amyl acetate	380	T2	IIA
Ethyl acetate	427	T2	IIA
Acetone	465	T1	IIA
Acetylene	305	T2	IIC
Acetic acid	464	T1	IIA
Oleic acid	360	T2	IIB
Hydrosulphuric acid	270	T3	IIB
Propylene alcohol	405	T2	IIB
Ethyl alcohol	425	T2	IIA - IIB
Ethanal	140	T4	IIA
Ammonia solution	630	T1	IIA
Acetic anhydride	316	T2	IIA
Benzene (pure)	498	T1	IIA
Butane n	365	T2	IIA
Butanol n	343	T2	IIA
Ethyl chloride	510	T1	IIA
Methylene chloride	625	T1	IIA
Cyclohexanon	420	T2	IIA
Dichlorethylene	460	T1	IIA
Oils for motors with boiling point < 135°C	220 to 300	T3	IIA
Special oils with boiling point > 135°C	220 to 300	T3	IIA
Ethane	472	T2 - T1	IIA
Ethylic ether	180	T4	IIB
Ethylene	425	T2	IIB
Ethylene glycol	235	T3	IIB
Fuel EL DIN 51 603 section 1/12.81	220 to 300	T3	IIA
Fuel L DIN 51 603 section 2/10.76	220 to 300	T3	IIA
Fuels M and S DIN 51 603 section 2/10.76	220 to 300	T3	IIA
Town gas	560	T1	IIB
Diesel oil DIN 51601/04.78	220 to 300	T3	IIA
Hexane n	225	T3	IIA
Hydrogen	560	T1	IIC
Kerosene (or fuel oil no. 1)	220 to 300	T3	IIA
Methane	537	T1	IIA
Methanol	385	T2	IIA
Naphthalene	520	T1	IIA
Ethylene oxide	440	T2	IIB
Carbon monoxide	605	T1	IIB
Phenol	595	T1	IIA
Propane	450	T2	IIA
Carbon disulphide	95	T6	IIC
Tetraline (tetrahydronaphthalene)	425	T2	IIB
Toluene	482	T1	IIA

Indicative values

Explosive dust atmospheres

CLASSIFICATION OF DUST EQUIPMENT GROUPS

Dust is divided into three groups according to its characteristics:

Group	Dust type	Size	Resistivity
IIIA	Combustible particles in suspension	> 500 µm	-
IIIB	Non-conductive dust	≤ 500 µm	> 10^3 Ω.m
IIIC	Conductive dust	≤ 500 µm	≤ 10^3 Ω.m

DUST IGNITION TEMPERATURE

Combustible dust is dangerous as it can generate an explosive atmosphere when dispersed into the air (cloud of dust). Moreover, a layer of combustible dust can ignite and act as an ignition source in an explosive atmosphere.

Material (granulometry)	Aluminium (10 µm)	Wheat (37 µm)	Wood (60 µm)	Sugar (30 µm)	Paint pigment (52 µm)	Maize (28 µm)	Polyethylene (72 µm)
Minimum ignition temperature of a dust cloud	560°C	510°C	500°C	490°C	470°C	440°C	440°C
Minimum ignition temperature of a 5 mm layer	430°C	300°C	310°C	480°C	450°C	280°C	(melting)

The maximum motor surface temperature must in all circumstances be:
- < Ignition temperature of a layer of dust -75°C
- < 2/3 ignition temperature of a dust cloud

All ATEX dust or ATEX gas-dust motors, proposed in this catalogue, are approved and marked for the temperature class T 125°C.

Definition of equipment

ELECTRICAL EQUIPMENT PROTECTION TYPE

Depending on the selected protection type, European standards define specific construction rules for electrical equipment which can be used in potentially explosive atmospheres.
These protection methods each form a specific standard in addition to the IEC 60079-0 standard (general rules) and are indicated by a lower case letter. These are:
- d: Flameproof enclosure
- e: Increased safety
- nA: Non-sparking
- p: Pressurized enclosure
- q: Powder filling
- o: Immersion in oil
- i: Fail safe
- m: Encapsulation
- t: Protected by a casing

PROTECTION TYPE FOR MOTORS IN EXPLOSIVE GAS ATMOSPHERES

Electric motors protected by type "d" flameproof casing (EN 60079-1)

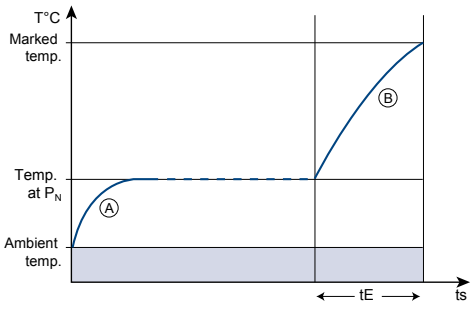
They must satisfy, among others, the following requirements:
- Resist an internal explosion of the air/gas mixture without damage to or permanent distortion of the casing.
- Ensure that the ignition inside the enclosure cannot be transmitted to the ambient explosive atmosphere.
- Present a surface temperature lower than the external ignition temperature of the gas.

These three conditions require:
- Very robust construction of the casing.
- Minimum joint lengths and reduced gaps so that explosion of the air/gas mixture that is present inside the casing is not transmitted to the ambient potentially explosive atmosphere (end shield/housing recesses, shaftways, etc).
- Limited temperature rise, taking into account unfavourable operating conditions (voltage limits) ensuring, depending on the ambient temperature, a surface temperature that is lower than the temperature class required by the type of gas present.

Electric motors protected by type "e" increased safety enclosure (EN 60079-7)

The type "e" protection method concerns equipment which does not produce arcs, sparks or hot spots during normal operation. This excludes in particular all rotating machines with a commutator.
This requires, amongst others, the following design features:
- Special precautions to avoid the production of arcs and sparks: air distances, and minimum creepage distances between items which are powered up and, with regard to earths, absence of mechanical friction, insulation, minimum distances in ventilation systems, special materials for fans, etc.
- a temperature at all points in the motor (including the stator and the rotor) lower than the ignition temperature of the gas. This temperature must include a period with the rotor locked as defined in standard EN 60079-7.

In the event of rotor failure and locking, an actuator must be able to disconnect the motor from the supply in a period $t < t_E$.



- T°C = Internal temperature at the hottest spot
- Marked temp = Limit temperature (slightly lower than the rated temperature class)
- Temp. at P_N = Rated temperature
- Ambient temperature = Highest permissible ambient temperature
- t_S = duration in seconds
- t_E = locked rotor time
- Ⓐ = temperature rise in normal duty
- Ⓑ = temperature rise during locked rotor test

"nA" non-sparking electric motors (EN 60079-15)

The type "nA" protection method concerns equipment which generates no sparks, arcs, or hot spots, which operates in an exceptionally explosive atmosphere

(only for use in zone 2).

This requires the following design features:

- Precautions to avoid the production of arcs and sparks: air distances, and minimum creepage distances between items which are powered up and with regard to earths

- A temperature at all points in the motor (including the stator and the rotor) lower than the ignition temperature of the gas. Conversely, it should not take account of rotor locking if applicable.

PROTECTION TYPE BY A CASING tb OU tc FOR MOTORS IN EXPLOSIVE DUST ATMOSPHERES

Protection type "t" by a casing prevents the risk of explosion by:
- non-penetration of dust in the motor thanks to its "IP" Index of Protection, which must be at minimum:
  • IP 65 for motors installed in zone 21 and/or exposed to conductive dust (Ex tb).
  • IP 55 for motors installed in zone 22 (Ex tc) (non-conductive dust).
- The maximum motor surface temperature, which never exceeds the temperature class indicated on the nameplate.
- No production of arcs and sparks outside the motor.

Certification of equipment used in hazardous areas

For equipment installed in the European Community, Directive ATEX 94/9/EC governs the ways of demonstrating compliance with the various reference documents for equipment intended for use in explosive zones. At minimum, electrical equipment for use in zones 0 or 20 and 1 or 21 must always be certificated by an approved notified body.

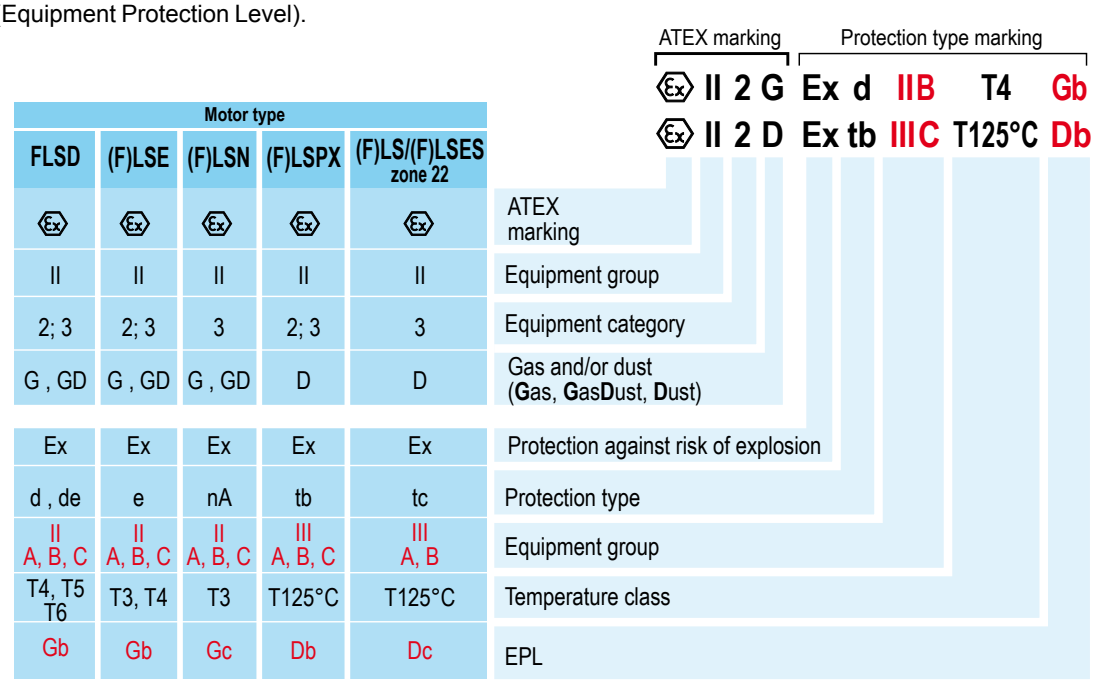
Outside Europe, some countries accept local use of components approved in accordance with the current rules.
In order to assist free movement of electrical equipment used in explosive atmospheres and simplify the granting of any local certificates, the International Electrotechnical Commission has for some years proposed a **voluntary IECEx certification** which is increasingly recognised in numerous countries outside Europe as well as by major international order placers. Some motor ranges featured in this catalogue are certified **IECEx.**

In North America, particularly the USA, the installation and certification regulations to be considered in the USA are those specified in the NEC (National Electrical Code). Unfortunately there is no mutual recognition between EN/IEC and NEC standards. For installations outside North America, American firms in Europe, Asia or Africa often refer to the NEC.

	NEC 500	Type of product	CENELEC
	Class I	Gas	Group I (mines) and II (surface)
	Class II	Dust	Group III
	Class III	Fibres and dust in suspension	
	Division (DIV) 1	Gas and dust	Zone 0, 1 or 21
	Division (DIV) 2		Zone 2 or 22
Gas	Group A	Acetylene	IIC
	Group B	Hydrogen	IIC
	Group C	Ethylene	IIB
	Group D	Propane	IIA
Dust	Group E	Conductive dust	IIIC
	Group F	Carbon dust	IIIB
	Group D	Non-conductive dust	IIIB

Equipment marking

Electrical equipment operating in explosive gas and/or dust atmospheres must be given dual marking:
- Marking in accordance with ATEX 94/9/EC directive incorporating the Ex logo, indication of the group and equipment category plus the symbol G, D or GD.
- IEC marking (in accordance with standard 60079-0) with indication of the protection type, equipment group, the temperature class and the EPL (Equipment Protection Level).



Directive and standards relating to motor efficiency

There have been a number of changes to the standards and new standards created in recent years. They mainly concern motor efficiency and their scope includes measurement methods and motor classification.

Regulations are gradually being implemented, both nationally and internationally, in many countries in order to promote the use of high-efficiency motors (Europe, USA, Canada, Brazil, Australia, New Zealand, Korea, China, Israel, etc).

The new generation of LS2 high-efficiency three-phase induction motors responds to changes in the standards as well as the latest demands of system integrators and users.

A - Standard IEC 60034-30
(September 2008) defines the principle to be adopted and brings global harmonisation to energy efficiency classes for electric motors throughout the world.

Motors concerned
Single-speed three-phase cage induction motors
- Un ≤ 1000 V
- Pn from 0.75 to 375 kW
- 2, 4 and 6 poles
- S1 or S3 duty with operating factor ≥ 80%
- 50 and 60 Hz frequency
- On the mains
- All types of fixing, shaft extension, accessories
- All protection indices IP 1x to 6x and cooling method IC 0x to 4x

Motors not concerned
- Magnet motors
- Motors specifically designed for variable speed in accordance with IEC 60034-25
- Motors which are fully integrated in a machine and cannot be tested separately (such as rotor/stator).

B - New standard for measuring the efficiency of electric motors: IEC 60034-2-1 (September 2007)
Standard IEC 60034-2-1 concerns asynchronous induction motors:
- Single-phase and three-phase with power ratings of 1 kW or less
  The preferred method is the Direct method.
- Three-phase motors with power ratings above 1 kW
  The preferred method is the summation of losses method with the total of additional losses measured.

Comments:
- The new standard for efficiency measurement is very similar to the IEEE 112-B method used in North America.
- Since the measurement method is different, this means that for the same motor, the rated value will be different (usually lower) with IEC 60034-2-1 than with IEC 60034-2.

Example of a 22 kW 4P LSES motor:
- according to IEC 60034-2, the efficiency is 92.6%
- according to IEC 60034-2-1, the efficiency is 92.3%

C - Directive 2009/125/EC (21 October 2009) from the European Parliament has established a framework for setting the eco-design requirements to be applied to “energy-using products”. These products are grouped in lots. Motors come under lot 11 of the eco-design programme, as do pumps, fans and circulating pumps.

D - Decree implementing European directive ErP (Energy related Product) - EC/640/2009 - lot 11 (July 2009)
This is based on standard IEC 60034-30 and will define the efficiency classes whose use will be mandatory in the future. It specifies the efficiency levels to be attained for machines sold in the European market and outlines the timetable for their implementation.

This standard only defines efficiency classes and their conditions. It is then up to each country to define the efficiency classes and the exact scope of application.

ERP EUROPEAN DIRECTIVE

Motors concerned: Motors defined under standard IEC 60034-30.
Obligation to place high-efficiency motors on the market:
- IE2 class from 16 June 2011
- Class IE3[1] from 1 January 2015 for power ratings from 7.5 to 375 kW
- Class IE3[1] from 1 January 2017 for power ratings from 0.75 to 375 kW

The European Commission is currently working to define minimum efficiency values for drives.

[1] or IE2 motor + drive

Motors not concerned:
- Motors designed to operate when fully submerged in liquid
- Motors which are fully integrated in another product (rotor/stator)
- Motors with duty other than S1
- Motors designed to operate in the following conditions:
- altitude > 1000 m
- ambient air temperature > 40°C
- maximum operating temperature > 400°C
- ambient air temperature < -15°C or < 0°C for air-cooled motors
- cooling water temperature at product entry < 5°C or > 25°C
- **Safety motors conforming to directive ATEX 94/9/EC**
- Brake motors
- Onboard motors

Efficiency classes	Efficiency level	Definition
IE1	Standard	Comparable to eff2
IE2	High	Comparable to eff1 and EPAct’92
IE3	Premium	Comparable to EISA Premium
IE4 *	Super Premium	

** Planned.*

Standards and approvals

LIST OF STANDARDS QUOTED IN THIS DOCUMENT

Our motors comply with the standards quoted in this catalogue

Reference		International standards
IEC 60034-1	**EN 60034-1**	Electrical rotating machines: ratings and operating characteristics.
IEC 60034-2		Electrical rotating machines: methods for determining losses and efficiency from tests (additional losses added as a fixed percentage)
IEC 60034-2-1		Electrical rotating machines: methods for determining losses and efficiency from tests (measured additional losses)
IEC 60034-5	**EN 60034-5**	Electrical rotating machines: classification of degrees of protection provided by casings of rotating machines.
IEC 60034-6	**EN 60034-6**	Electrical rotating machines (except traction): cooling methods.
IEC 60034-7	**EN 60034-7**	Electrical rotating machines (except traction): symbols for mounting positions and assembly layouts
IEC 60034-8		Electrical rotating machines: terminal markings and direction of rotation.
IEC 60034-9	**EN 60034-9**	Electrical rotating machines: noise limits.
IEC 60034-12	**EN 60034-12**	Starting characteristics for single-speed 3-phase cage induction motors for supply voltages less than or equal to 660 V.
IEC 60034-14	**EN 60034-14**	Electrical rotating machines: mechanical vibrations of certain machines with a frame size above or equal to 56 mm. Measurement, evaluation and limits of vibrational intensity.
IEC 60034-17		Cage induction motors supplied by inverters - Application guide.
IEC 60034-30		Electrical rotating machines: efficiency classes for single-speed three-phase cage induction motors (Code IE).
IEC 60038		IEC standard voltages.
IEC 60072-1		Dimensions and power series for electrical rotating machines: designation of casings between 56 and 400 and flanges between 55 and 1080.
IEC 60085		Evaluation and thermal classification of electrical insulation.
IEC 60721-2-1		Classification of natural environment conditions. Temperature and humidity.
IEC 60892		Effects of an imbalance in the voltage system on the characteristics of three-phase squirrel-cage induction motors.
IEC 61000-2-10/11 and 2-2		Electromagnetic compatibility (EMC): environment.
IEC guide 106		Guidelines on the specification of environmental conditions for the determination of operating characteristics of equipment.
ISO 281		Bearings - Dynamic load ratings and nominal bearing life.
ISO 1680	**EN 21680**	Acoustics - Test code for measuring airborne noise emitted by electrical rotating machines: a method for establishing an expert opinion for free field conditions over a reflective surface.
ISO 8821		Mechanical vibration - Balancing. Conventions on shaft keys and related parts.
	EN 50102	Degree of protection provided by electrical enclosures against extreme mechanical impacts.
ISO 12944-2		Corrosivity category.
IEC 60079-0	**EN 60079-0**	Electrical equipment for explosive atmospheres: general regulations.
IEC 60079-1	**EN 60079-1**	Electrical equipment for explosive atmospheres: "d" flameproof casings.
IEC 60079-7	**EN 60079-7**	Electrical equipment for explosive atmospheres: "e" increased safety.
IEC 60079-15	**EN 60079-15**	Electrical equipment for explosive atmospheres: "n" non-sparking.
IEC 60079-31	**EN 60079-31**	Electrical apparatus for use in the presence of combustible dust.

Standards and approvals

APPROVALS

Certain countries recommend or insist on approval from national organizations.
Approved products must carry the recognized mark on their nameplates.

Country	Initials	Organization
USA/CANADA	UL	Underwriters Laboratories
CANADA	CSA	Canadian Standards Association
RUSSIA	GOST	CCVE
etc		

International and national standard equivalents

International reference standards		National standards				
IEC	Title (summary)	FRANCE	GERMANY	U.K.	ITALY	SWITZERLAND
60034-1	Ratings and operating characteristics	NFEN 60034-1 NFC 51-120 NFC 51-200	DIN/VDE O530	BS 4999	CEI 2.3.VI.	SEV ASE 3009
60034-5	Classification of degrees of protection	NFEN 60034-5	DIN/EN 60034-5	BS EN 60034-5	UNEL B 1781	
60034-6	Cooling methods	NFEN 60034-6	DIN/EN 60034-6	BS EN 60034-6		
60034-7	Mounting arrangements and assembly layouts	NFEN 60034-7	DIN/EN 60034-7	BS EN 60034-7		
60034-8	Terminal markings and direction of rotation	NFC 51 118	DIN/VDE 0530 Teil 8	BS 4999-108		
60034-9	Noise limits	NFEN 60034-9	DIN/EN 60034-9	BS EN 60034-9		
60034-12	Starting characteristics for single-speed motors for supply voltages ≤ 660 V	NFEN 60034-12	DIN/EN 60034-12	BS EN 60034-12		SEV ASE 3009-12
60034-14	Mechanical vibrations of machines with frame size ≥ 56 mm	NFEN 60034-14	DIN/EN 60034-14	BS EN 60034-14		
60072-1	Dimensions and output powers for machines of between 56 and 400 frame and flanges of between 55 and 1080	NFC 51 104 NFC 51 105	DIN 748 (~) DIN 42672 DIN 42673 DIN 42631 DIN 42676 DIN 42677	BS 4999		
60085	Evaluation and thermal classification of electrical insulation	NFC 26206	DIN/EN 60085	BS 2757		SEV ASE 3584

NB: DIN 748 tolerances do not conform to IEC 60072-1.

Definition of “Index of Protection” (IP)

Ingress protection of electrical equipment enclosures
In accordance with IEC 60034-5 - EN 60034-5 (IP) - IEC 62262 (IK)

1st number: Protection against solid objects			2nd number: Protection against liquids			3rd number: Mechanical protection		
IP	Tests	Definition	IP	Tests	Definition	IK	Tests	Definition
0		No protection	0		No protection	00		No protection
1	Ø 50 mm	Protected against solid objects of over 50 mm (example: accidental contact with the hand)	1		Protected against water drops falling vertically (condensation)	01	150 g, 10 cm	Impact energy: 0.15 J
2	Ø 12 mm	Protected against solid objects of over 12 mm (example: a finger)	2	15°	Protected against water drops falling at up to 15° from the vertical	02	200 g, 10 cm	Impact energy: 0.20 J
3	Ø 2.5 mm	Protected against solid objects of over 2.5 mm (examples: tools, wires)	3	60°	Protected against rain falling at up to 60° from the vertical	03	250 g, 15 cm	Impact energy: 0.37 J
4	Ø 1 mm	Protected against solid objects of over 1 mm (examples: thin tools, small wires)	4		Protected against projected water from all directions	04	250 g, 20 cm	Impact energy: 0.50 J
5		Protected against dust (no deposits of harmful material)	5		Projected against jets of water from all directions from a hose	05	350 g, 20 cm	Impact energy: 0.70 J
6		Protected against any dust penetration	6		Protected against projected water comparable to big waves	06	250 g, 40 cm	Impact energy: 1 J
			7	0.15m, 1m	Protected against the effects of immersion between 0.15 and 1 m	07	0.5 kg, 40 cm	Impact energy: 2 J
			8 ..m	..m	Protected against prolonged effects of immersion under pressure	08	1.25 kg, 40 cm	Impact energy: 5 J
						09	2.5 kg, 40 cm	Impact energy: 10 J
						10	5 kg, 40 cm	Impact energy: 20 J

Example:

Example of an IP 55 machine

IP : Ingress protection

5. : Machine protected against dust and accidental contact.
Test result: no dust enters in harmful quantities, no risk of direct contact with rotating parts. The test will last for 2 hours.

.5 : Machine protected against jets of water from all directions from hoses at 3 m distance with a flow rate of 12.5 l/min at 0.3 bar.
The test will last for 3 minutes.
Test result: no damage from water projected onto the machine.

Conditions of use

NORMAL OPERATING CONDITIONS

a/ According to IEC 60034-1, motors can operate in the following normal conditions:
• ambient temperature within the range -16 to +40°C
• altitude less than 1000 m
• atmospheric pressure: 1050 hPa (mbar)

Standard EN 60079-0 concerning electrical equipment in a potentially explosive atmosphere extends the range of ambient temperatures T_a from -20 to +40°C as standard. In this case, no additional marking is necessary on the certified equipment.

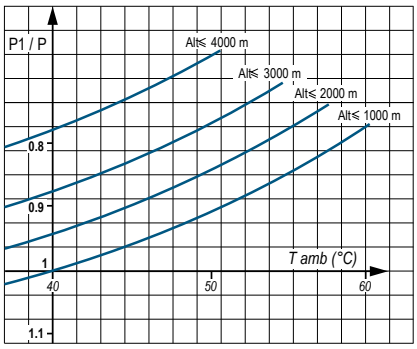
Temperatures outside this range may be considered when the equipment is certified. An additional mark must therefore be added. These extensions involve special consultation.

b/ FLSD motors are designed to operate in atmospheres where the relative humidity can reach 95% at 40°C.

POWER CORRECTION

The power ratings of our motors are given for continuous duty (S1) at rated voltage and frequency, at up to 1000 m altitude and at a maximum ambient temperature of 40°C as standard.
By derating their rated power, it is possible to use our ATEX motors in temperature conditions above 40°C (60°C) and at higher altitudes than 1000 m.

Table of correction coefficients*



***For FLSD Ex d(e) IIB or IIC T4, (F)LSN Ex nA II T3 and (F)LSE Ex e II T3 motors.**

Not applicable to (F)LSE Ex e IIC T4 Gb motors and FLSD T5 or T6 motors (please consult LEROY-SOMER).

HARSH ENVIRONMENT

Some operating conditions require special finishes appropriate for the environment: very dusty, humid, or harsh atmospheres.
The essential criteria for anti-corrosion protection apply to custom components meeting the requirements of the ATEX Directive (screws and bolts, plates, cover), metal cable glands, protection of working parts (stator and rotor), special finishes.

V.I.K. VERSION FOR THE GERMAN HEAVY INDUSTRY

ATEX Ex d e IIC T4 Gb, Ex e IIC T3 Gb and Ex nA IIC T3 motors can be built to comply with the V.I.K. recommendations issued by German heavy industry which apply to equipment for potentially explosive atmospheres. The main characteristics with which motors manufactured in accordance with this recommendation must comply are:
- Finish for corrosive environment (paint, screws and bolts, etc).
- Two stainless steel nameplates, one located inside the terminal box.
- For flameproof non-sparking motors, IE2 efficiency level is imposed.
- Drip cover if motor placed in vertical position, shaft end facing down.
- For increased safety motors, a permissible locked rotor time longer than stipulated in standard IEC 60079-7.

Enhanced impregnation and protection

NORMAL ATMOSPHERIC PRESSURE (750 MM HG)

The selection table below can be used to find the method of manufacture best suited to particular environments in which temperature and relative humidity show large degrees of variation (see relative and absolute humidity calculation method, on preceding page).
The symbols used refer to permutations of components, materials, impregnation methods and finishes (varnish or paint).

The protection of the winding is generally described by the term "tropicalization".

For high humidity environments, we recommend that the windings are pre-heated (see next page).

Ambient temperature \ Relative humidity	RH ≤ 95%	RH > 95%*	Influence on construction
θ < - 40°C	ask for estimate (quotation)	ask for estimate (quotation)	Increasing derating
- 16 to + 40°C	T Standard or T0	TC Standard or TC0	
- 40 to + 40°C	T1	TC1	
- 16 to + 65°C	T2	TC2	
+ 65 to + 90°C	ask for estimate (quotation)	ask for estimate (quotation)	
θ > + 90°C	ask for estimate (quotation)	ask for estimate (quotation)	
Plate mark	**T**	**TC**	
Influence on construction	Increased winding protection		

* *Atmosphere without high levels of condensation*

Standard construction

Heaters

SPACE HEATERS

Severe climatic conditions etc, may require the use of space heaters (fitted to one or two winding end coils) which serve to maintain the average temperature of the motor, provide trouble-free starting, and/or eliminate problems caused by condensation (loss of insulation).

The heater supply wires are brought out to a connection element in the motor terminal box.

The heaters must be switched off while the motor is running.

D.C. INJECTION HEATING

An alternative to the use of space heaters is to inject direct current into two of the phases wired in series from a D.C. voltage source which can give the total power indicated in the table above. This method can only be used on motors rated less than 10 kW.

This is easily calculated: if R is the resistance of the windings in series, the D.C. voltage will be given by the equation (Ohm's law):

$$U_{(V)} = \sqrt{P_{(W)} \cdot R_{(\Omega)}}$$

Resistance should be measured with a micro-ohmmeter.

A.C. INJECTION HEATING

A single-phase A.C. voltage (from 10 to 15% of rated voltage), can be used between 2 phases placed in series.
This method can be used on the whole motor range.

External finish

Leroy-Somer motors are protected with a range of surface finishes.
The surfaces receive appropriate special treatments, as shown below.

Preparation of surfaces

Surface	Parts	Surface treatment
Cast iron	End shields, frames, etc	Shot blasting + Primer
Steel	Accessories	Phosphatization + Primer
	Terminal boxes - Fan covers	Electrostatic painting or Epoxy powder
Aluminium alloy	Housings - Terminal boxes	Shot blasting
Polymer	Fan covers - Terminal boxes Ventilation grilles	None, but must be free from grease, casting-mould coatings, and dust which would affect paint adhesion

DEFINITION OF ATMOSPHERES

An atmosphere is said to be harsh when components are attacked by bases, acids or salts. It is said to be corrosive when components are attacked by oxygen.

Paint systems

Series	Environment	Paint system	Applications	Corrosivity category * acc. to ISO 12944
Aluminium frame	Non-harsh and not very harsh (indoors, rural, industrial)	**Ia** Standard LSN - LSE LSPX - LSES Zone 22	1 polyurethane top coat, 20/30 µm	C3L
	Substantial chemical attack: frequent contact with bases, acids, alkalis Surroundings - neutral environment (not in contact with chlorinated or sulphurous products)	**IIIb****	1 Epoxy base coat, 30/40 µm 1 Epoxy intermediate coat, 30/40 µm 1 Epoxy top coat, 25/35 µm	C4H
Aluminium frame Cast iron frame	Moderately corrosive: humid, and outdoors (temperate climate)	**IIa** Standard FLSN FLSE - FLSD FLSPX - FLSES Zone 22	1 Epoxy base coat, 30/40 µm 1 polyurethane top coat, 20/30 µm	C3M
	Corrosive: maritime, very humid (tropical climate)	**IIIa** Standard FLSES with Corrobloc finish	1 Epoxy base coat, 30/40 µm 1 Epoxy intermediate coat, 30/40 µm 1 polyurethane top coat, 20/30 µm	C4M
	Special conditions. Very harsh, polluted with chlorinated or sulphurous products	Ve**	1 Epoxy base coat, 20/30 µm 2 Epoxy intermediate coats, each 35/40 µm 1 polyurethane top coat, 35/40 µm	C5I-M
		161b**	1 base coat, 50 µm 2 Epoxy intermediate coats, each 80 µm 1 Epoxy top coat, 50 µm	C5M-M

** Values given for information only since the surfaces vary in nature whereas the standard only takes account of steel surfaces.*
*** Evaluation of the degree of rusting in accordance with ISO 4628 (rusted area between 1 and 0.5%).*

System **I**a is for moderate climates and System **II**a is for general climates as defined in standard IEC 60721.2.1.

Standard paint colour references:

RAL 2004 **ATEX GAS**

RAL 1007 **ATEX DUST ZONE 21**

RAL 6000 **ATEX DUST ZONE 22**

Interference suppression and protection of people

AIRBORNE INTERFERENCE

EMISSION
For standard motors, the housing acts as an electromagnetic screening, reducing electromagnetic emissions measured at 0.25 metres from the motor to approximately 5 gauss (5 x 10–4 T).
However, electromagnetic emissions may be noticeably reduced by a special construction of aluminium alloy end shields and a stainless steel shaft.

IMMUNITY
The construction of motor housings (especially finned aluminium alloy frames) isolates external electro-magnetic sources to the extent that any field penetrating the casing and magnetic circuit will be too weak to interfere with the operation of the motor.

POWER SUPPLY INTERFERENCE

The use of electronic systems for starting, speed control or power supply can create harmonics on the supply lines which may interfere with the operation of machines. These phenomena are taken into account in determining the machine dimensions, which act as quenching chokes in this respect.
The IEC 61000 standard, currently in preparation, will define permissible rejection and immunity rates: only then will machines for general distribution (especially single-phase motors and commutator motors) have to be fitted with suppression systems.
Three-phase squirrel cage machines do not in themselves produce interference of this type. Mains connection equipment (contactors) may, however, need interference protection.

APPLICATION OF DIRECTIVE 2004/108/EC CONCERNING ELECTROMAGNETIC COMPATIBILITY (EMC)

a - for motors only
According to amendment 1 of IEC 60034-1, induction motors are not transmitters and do not produce interference (via carried or airborne signals) and therefore conform inherently to the essential requirements of the EMC directives.

b - for motors supplied by inverters (at fixed or variable frequency)
In this case, the motor is only a sub-assembly of a device which the system builder must ensure conforms to the essential requirements of the EMC directives.

APPLICATION OF LOW VOLTAGE DIRECTIVE 2006/95/EC

All motors are subject to this directive. The main requirements concern the protection of people, animals and property against risks caused by operation of the motors (see the commissioning and maintenance manual for precautions to be taken).

APPLICATION OF MACHINERY DIRECTIVE 2006/42/EC

All motors are designed to be integrated in a device subject to the machinery directive.

CE product marking

The fact that motors comply with the essential requirements of the Directives is shown by the **CE** mark on their nameplates and/or packaging and documentation.

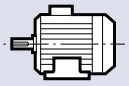
Mounting arrangements

MOUNTINGS AND POSITIONS (IEC standard 60034-7)

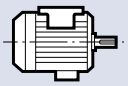
Foot mounted motors

• all frame sizes

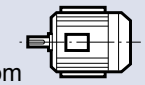
IM 1001 (IM B3)
- Horizontal shaft
- Feet on floor



IM 1071 (IM B8)
- Horizontal shaft
- Feet on top

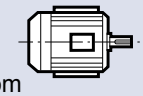


IM 1051 (IM B6)
- Horizontal shaft
- Wall mounted with feet on left when viewed from drive end

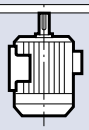


IM 1011 (IM V5)
- Vertical shaft facing down
- Feet on wall

IM 1061 (IM B7)
- Horizontal shaft
- Wall mounted with feet on right when viewed from drive end



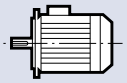
IM 1031 (IM V6)
- Vertical shaft facing up
- Feet on wall



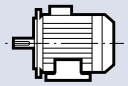
(FF) flange mounted motors

• all frame sizes (except IM 3001, which is limited to frame size 225 mm)

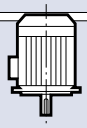
IM 3001 (IM B5)
- Horizontal shaft



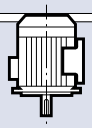
IM 2001 (IM B35)
- Horizontal shaft
- Feet on floor



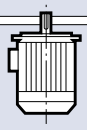
IM 3011 (IM V1)
- Vertical shaft facing down



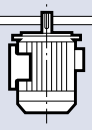
IM 2011 (IM V15)
- Vertical shaft facing down
- Feet on wall



IM 3031 (IM V3)
- Vertical shaft facing up



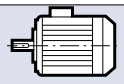
IM 2031 (IM V36)
- Vertical shaft facing up
- Feet on wall



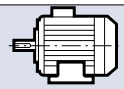
(FT) face mounted motors

• all frame sizes ≤ 132 mm

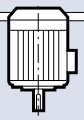
IM 3601 (IM B14)
- Horizontal shaft



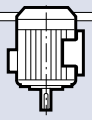
IM 2101 (IM B34)
- Horizontal shaft
- Feet on floor



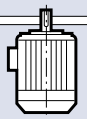
IM 3611 (IM V18)
- Vertical shaft facing down



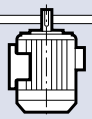
IM 2111 (IM V58)
- Vertical shaft facing down
- Feet on wall



IM 3631 (IM V19)
- Vertical shaft facing up



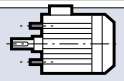
IM 2131 (IM V69)
- Vertical shaft facing up
- Feet on wall



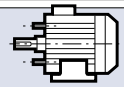
Motors without drive end shield

Caution: The protection (IP) specified on the IM B9 and IM B15 motor nameplates is provided by the customer when the motor is assembled.

IM 9101 (IM B9)
- Threaded tie rods
- Horizontal shaft



IM 1201 (IM B15)
- Foot mounted with threaded tie rods
- Horizontal shaft



Frame size (mm)	Mounting positions											
	IM 1001	IM 1051	IM 1061	IM 1071	IM 1011	IM 1031	IM 3001	IM 3011	IM 3031	IM 2001	IM 2011	IM 2031
≤ 200	●	●	●	●	●	●	●	●	●	●	●	●
225 and 250	●	●	●	●	●	●	■	●	●	●	●	●
≥ 280	●	■	■	■	■	■	■	●	●	●	●	■

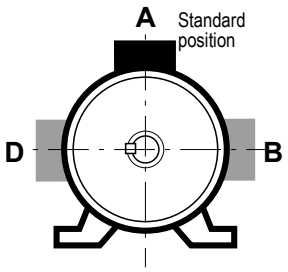
●: possible positions.
■: please consult Leroy-Somer specifying the coupling method and the axial and radial loads if applicable

Mains connection

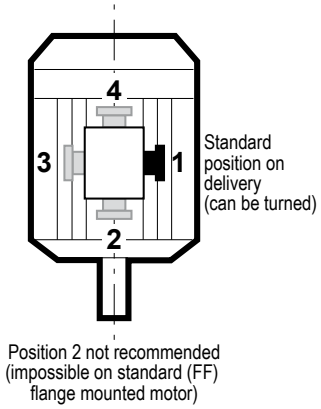
TERMINAL BOX

Placed as standard on top of the motor near the drive end, it is fitted with plugs or a removable undrilled support plate.
The standard position of the plug is on the right, seen from the drive end but, owing to the symmetrical construction of the box, it can usually be placed in any of the 4 directions, as shown in the table below:
If required, the terminal box may be fitted in a different position (on the left or right as seen from the drive end, and at the DE or NDE of the motor housing).

Positions of the terminal box in relation to the drive end (motor in IM 1001 position)



Positions of the plug in relation to the drive end



Terminal box position	A	B	D
LSN - LSE - LSES - LSPX	●	■	■
FLSN - FLSES - FLSPX 80 to 225 MT	●	-	-
FLSN - FLSES - FLSPX 225M to 355	●	■	■
FLSD 80 to 280	●	-	-
FLSD 315 to 355	●	■	■

● : standard
■ : please consult Leroy-Somer
- : not available

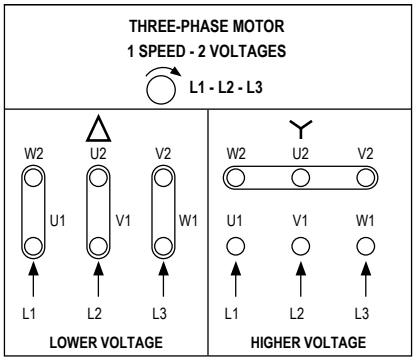
Cable gland position	1	2*	3	4
(F)LSN - (F)LSES - (F)LSPX	◆	✶	✶	✶
FLSD	◆	-	✶	-

** not recommended (impossible on (FF) flange mounted motors and on the FLSES/FLS 355LK/400/450)*

◆ : standard
✶ : possible by simply turning round the terminal box
- : not available

WIRING DIAGRAMS

All standard motors are supplied with a wiring diagram in the terminal box.
The diagrams normally used are shown opposite.
On the following pages are outline diagrams with internal and external connections.



EARTH TERMINAL

This is situated inside the terminal box. Consisting of a threaded stud with a hexagonal nut, it is used to connect cables with cross-sections at least as large as the cross-section of the phase conductors.
It is indicated by the sign: ⏚ in the terminal box moulding.
A second earth terminal is fitted on the motor.

Lubrication and maintenance of bearings

ROLE OF THE LUBRICANT

The principal role of the lubricant is to avoid direct contact between the metal parts in motion: balls or rollers, slip-rings, cages, etc. It also protects the bearing against wear and corrosion.

The quantity of lubricant needed by a bearing is normally quite small. There should be enough to provide good lubrication without undesirable overheating. As well as lubrication itself and the operating temperature, the amount of lubricant should be judged by considerations such as sealing and heat dissipation.

The lubricating power of a grease or an oil lessens with time owing to mechanical constraints and straightforward ageing. Used or contaminated lubricants should therefore be replaced or topped up with new lubricant at regular intervals.

Bearings can be lubricated with grease, oil or, in certain cases, with a solid lubricant.

GREASING

A lubricating grease can be defined as a product of semi-fluid consistency obtained by the dispersion of a thickening agent in a lubricating fluid and which may contain several additives to give it particular properties.

Composition of a grease
Base oil: 85 to 97%
Thickener: 3 to 15%
Additives: 0 to 12%

The base oil lubricates

The oil making up the grease **is of prime importance.** It is the oil that lubricates the moving parts by coating them with a protective film which prevents direct contact. The thickness of the lubricating film is directly linked to the viscosity of the oil, and the viscosity itself depends on temperature. The two main types used to make grease are mineral oils and synthetic oils. Mineral oils are suitable for normal applications in a range of temperatures from -30°C to +150°C.
Synthetic oils have the advantage of being effective in severe conditions (extreme variations of temperature, harsh chemical environments, etc).

The thickener gives the grease consistency

The more thickener a grease contains, the "harder" it will be. Grease consistency varies with the temperature. In falling temperatures, the grease hardens progressively, and the opposite happens when temperatures rise.

The consistency of a grease can be quantified using the NLGI (National Lubricating Grease Institute) classification. There are 9 NLGI grades, from 000 for the softest greases up to 6 for the hardest. Consistency is expressed by the depth to which a cone may be driven into a grease maintained at 25°C.

If we only consider the chemical nature of the thickener, lubricating greases fall into three major categories:

• **Conventional greases with a metallic soap base** (calcium, sodium, aluminium, lithium). Lithium soaps have several advantages over other metallic soaps: a high melting point (180° to 200°), good mechanical stability and good water resistant properties.

• **Greases with a complex soap base.** The main advantage of this type of soap is a very high melting point (over 250°C).

• **Soapless greases.** The thickener is an inorganic compound, such as clay. Their main property is the absence of a melting point, which makes them practically non-liquefying.

Additives improve some properties of greases

Additives fall into two types, depending on whether or not they are soluble in the base oil.

The most common insoluble additives - graphite, molybdenum disulphide, talc, mica, etc, improve the friction characteristics between metal surfaces. They are therefore used in applications where heavy pressure is required.

The soluble additives are the same as those used in lubricating oils: antioxidants, anti-rust agents, etc.

LUBRICATION TYPE

The bearings are lubricated with a polyurea soap-based grease.

Supply voltage

REGULATIONS AND STANDARDS

The IEC 60038 standard gives the European reference voltage as 230/400 V three-phase and 230 V single-phase, with a tolerance of ±10%.
The tolerances usually permitted for power supply sources are indicated below:

• Maximum line drop between customer delivery point and customer usage point: 4%.

• Variation in frequency around the rated frequency:
- continuous operation: ±1%
- transient state: ±2%

• Three-phase mains phase voltage imbalance:
- zero-sequence component and/or negative phase sequence component compared to positive phase sequence component: < 2%

The motors in this catalogue are designed for use on the European power supply of 230/400 V ±10% - 50 Hz.

All other voltages and frequencies are available on request.

EFFECTS ON MOTOR PERFORMANCE

VOLTAGE RANGE

The characteristics of motors vary when there is a corresponding variation in voltage of ±10% around the rated value.

An approximation of these variations is given in the table opposite.

	Voltage variation as a %				
	UN-10%	UN-5%	UN	UN+5%	UN+10%
Torque curve	0.81	0.90	1	1.10	1.21
Slip	1.23	1.11	1	0.91	0.83
Rated current	1.10	1.05	1	0.98	0.98
Rated efficiency	0.97	0.98	1	1.00	0.98
Rated power factor (Cos φ)	1.03	1.02	1	0.97	0.94
Starting current	0.90	0.95	1	1.05	1.10
Nominal temperature rise	1.18	1.05	1	1	1.10
P (Watt) no-load	0.85	0.92	1	1.12	1.25
Q (reactive V A) no-load	0.81	0.9	1	1.1	1.21

Motors used with variable speed control

The certification of our safety motors makes them suitable for use with frequency inverters, as long as all necessary precautions are taken to comply with the temperature class marked on the motor nameplate, in all circumstances.
Drive control by a frequency inverter results in an increase in the machine temperature rise, mainly due to the reduction in speed of the cooling fan and a significantly lower supply voltage than on the mains.
As a result, the motor rated power should usually be reduced. Derating tables have been drawn up by our design offices on the basis of on-load tests conducted on a test bed and the specifications of IEC 60034-17. Depending on the application, the desired speed range and the torque profile of the driven machine, Leroy-Somer will select the most suitable safety motor. Inverters of a type not designed for operation in a potentially explosive zone must be placed in a non-explosive zone.
(F)LSE increased safety and (F)LSN non-sparking motors must have been tested with the specified drive or a comparable drive in order to check the thermal behaviour. The approved drives appear in a table of compatibility available on request.
In some cases, it may prove necessary to use an ATEX-approved forced ventilation unit. For small motors (frame size below 160), the self-cooled standard cooling method (IC411) is nonetheless to be preferred.
A device to measure the actual motor speed, using an ATEX-certified incremental or absolute encoder, can also be installed at the non-drive end of most of our safety motors.
ATEX motors, supplied via a frequency inverter, are fitted with thermal protection devices in the winding. These must work independently of the measurement and control devices required for operation. Our derating tables are based on one power supply per drive with a switching frequency of 3 kHz minimum.

INSULATION SYSTEM FOR VARIABLE SPEED APPLICATIONS

The insulation system for the LSES, FLSES or PLSES motor means it is designed to be used on a drive without modification, regardless of the size of the machine or the application, at a supply voltage ≤ 480 V 50/60 Hz and can tolerate voltage peaks up to 1500 V and variations of 3500 V/µs.

These values are guaranteed without using a filter at the motor terminals.

For any voltage > 480 V, Leroy-Somer's reinforced insulation system must be used unless otherwise agreed by Leroy-Somer or a sine filter is used.

RECOMMENDATIONS CONCERNING THE MECHANISM OF ROTATION FOR VARIABLE SPEED APPLICATIONS

The voltage wave form at the drive output (PWM) can generate high-frequency leakage currents which can, in certain situations, damage the motor bearings.

This phenomenon is amplified with:
- High mains supply voltages
- Increased motor size
- Incorrectly earthed motor-drive system
- Long cable length between the drive and the motor
- Motor incorrectly aligned with the driven machine

Leroy-Somer machines, which have been earthed in accordance with good practice, need no special options except in the situations listed below:
- For voltage ≤ 480 V 50/60 Hz, and frame size ≥ 315 mm, we recommend using an insulated NDE bearing.
- For voltage > 480 V 50/60 Hz, and frame size ≥ 315 mm, we recommend using 2 insulated bearings.

Another solution could be to only use one insulated NDE bearing, accompanied by a filter at the drive output (dV/dt type or common mode filter).

GOOD WIRING PRACTICE

It is the responsibility of the user and/or the installer to connect the motor-drive system in accordance with the current legislation and regulations in whichever country it is used in. This is particularly important as concerns cable size and connection of earths and grounds.

The following information is given for guidance only, and should never be used as a substitute for the current standards, nor does it relieve the installer of his responsibility.

A motor-drive system, which has been earthed in accordance with good practice, will contribute significantly to reducing the voltage on the shaft and the motor casing, resulting in fewer high-frequency leakage currents. Premature breakage of bearings and auxiliary equipment such as encoders, should also be avoided wherever possible.

To ensure the safety of personnel, the size of the earthing cables should be determined individually in accordance with local regulations.

To ensure the safety of motors with frame size 315 mm or above, we recommend installing grounding strips between the terminal box and the feet and/or the motor and the driven machine.

For motors with a power rating of 30 kW or higher, the use of shielded single-core cables is strongly recommended. The motor-drive wiring must be symmetrical (U, V, W at the motor end must correspond to U, V, W at the drive end) with the cable shielding earthed both at the motor end and at the drive end.

For high-powered motors, unshielded single-core cables can be used, as long as they are installed together in a metal cable duct earthed on both sides with a grounding strip.

Cables must be kept as short as possible.

Weighted sound level [dB(A)]

Under IEC 60034-9, the guaranteed values are given for a machine operating at no-load under normal supply conditions (IEC 60034-1), in the actual operating position, or sometimes in the direction of rotation as specified in the design.

This being the case, standardized sound power level limits are shown for the values obtained for the machines described in this catalogue.
(Measurements were taken in conformity with standard ISO 1680).

Expressed as sound power level (Lw) according to the standard, the level of sound is also shown as sound pressure level (Lp) in the selection data.
The maximum standard tolerance for all these values is + 3 dB(A).

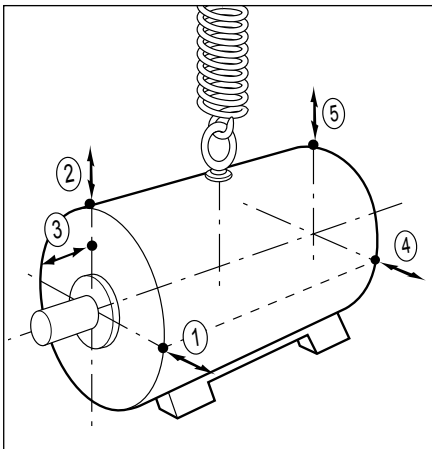
The noise levels of the motors in this catalogue are indicated in the selection tables.

Vibrations

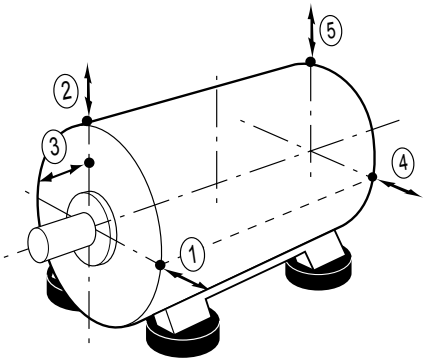
VIBRATION LEVELS - BALANCING

Inaccuracies due to construction (magnetic, mechanical and air-flow) lead to sinusoidal (or pseudo sinusoidal) vibrations over a wide range of frequencies. Other sources of vibration can also affect motor operation: such as poor mounting, incorrect drive coupling, end shield misalignment, etc.
We shall first of all look at the vibrations emitted at the operating frequency, corresponding to an unbalanced load, whose amplitude swamps all other frequencies and on which the dynamic balancing of the mass in rotation has a decisive effect.
Under standard ISO 8821, rotating machines can be balanced with or without a key or with a half-key on the shaft extension.
Standard ISO 8821 requires the balancing method to be marked on the shaft extension as follows:
- Half-key balancing: letter H (standard)
- Full key balancing: letter F
- No-key balancing: letter N

The machines in this catalogue are in vibration class level A - level B is available on request.



Measuring system for suspended machines

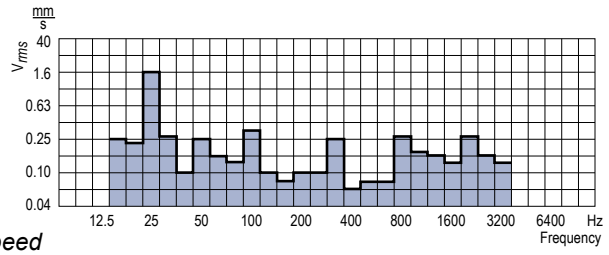


Measuring system for machines on flexible mountings

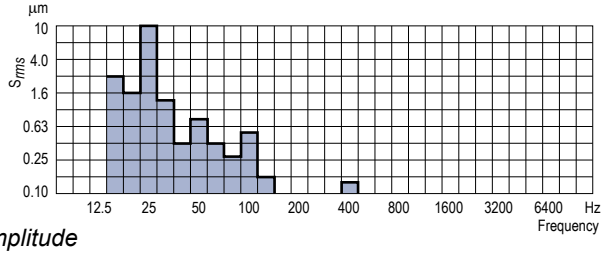
The measurement points quoted in the standards are indicated in the drawings above.
At each point, the results should be lower than those given in the tables below for each balancing class and only the highest value is to be taken as the "vibration level".

MEASURED PARAMETERS

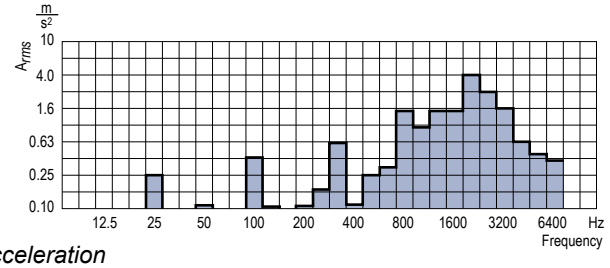
The vibration speed can be chosen as the variable to be measured. This is the speed at which the machine moves either side of its static position. It is measured in mm/s.
As the vibratory movements are complex and non-harmonic, it is the root mean square (rms) value of the speed of vibration which is used to express the vibration level.
Other variables that could also be measured are the vibratory displacement amplitude (in µm) or vibratory acceleration (in m/s^2).
If the vibratory displacement is measured against frequency, the measured value decreases with the frequency: high-frequency vibrations cannot be measured.
If the vibratory acceleration is measured, the measured value increases with the frequency: low-frequency vibrations (unbalanced loads) cannot be measured here.
However, if preferred, the table of vibration amplitudes may still be used (for measuring sinusoidal and similar vibrations).



Vibration speed



Vibration amplitude



Vibration acceleration

Vibrations

Maximum vibration magnitude limits (rms values) in terms of displacement, speed and acceleration for a frame size H (IEC 60034-14)

Vibration level	Frame size *H* (mm)								
	56 ≤ *H* ≤ 132			132 < *H* ≤ 280			*H* > 280		
	Displacement µm	Speed mm/s	Acceleration m/s²	Displacement µm	Speed mm/s	Acceleration m/s²	Displacement µm	Speed mm/s	Acceleration m/s²
A	25	1.6	2.5	35	2.2	3.5	45	2.8	4.4
B	11	0.7	1.1	18	1.1	1.7	29	1.8	2.8

For large machines and special requirements with regard to vibration, balancing can be carried out *in situ* (finished assembly). Prior consultation is essential, as the machine dimensions may be modified by the necessary addition of balancing disks mounted on the shaft extensions.

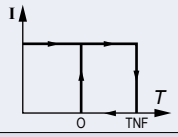
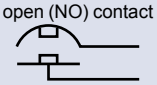
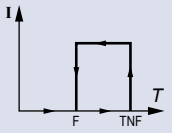
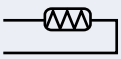
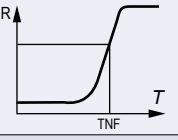
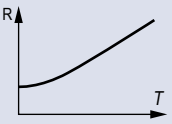
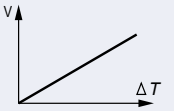
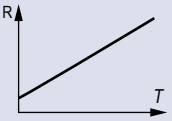
Performance

THERMAL PROTECTION

Motors are protected by a manual or automatic overcurrent relay, placed between the isolating switch and the motor. This relay may in turn be protected by fuses.

These protection devices provide total protection of the motor against non-transient overloads. If a shorter reaction time is required, if you want to detect transient overloads, or if you wish to monitor temperature rises at "hot spots" in the motor or at strategic points in the installation for maintenance purposes, it would be advisable to install heat sensors at sensitive points. The various types are shown in the table below, with a description of each. It must be emphasized that under no circumstances can these sensors be used to carry out direct regulation of the motor operating cycles.

Built-in indirect thermal protection

Type	Operating principle	Operating curve	Breaking capacity (A)	Protection provided	Mounting Number of devices
Normally closed thermal protection **PTO***	Bimetallic strip, indirectly heated, with normally closed (NC) contact 		1.6 A at 250 V with cos φ 0.6	General monitoring for non-transient overloads	Mounting in control circuit 2 or 3 in series
Normally open thermal protection **PTF***	Bimetallic strip, indirectly heated, with normally open (NO) contact 		1.6 A at 250 V with cos φ 0.6	General monitoring for non-transient overloads	Mounting in control circuit 2 or 3 in parallel
Positive temperature coefficient thermistor **PTC**	Variable non-linear resistance with indirect heating 		0	General monitoring for transient overloads	Mounted with associated relay in control circuit 3 in series
Temperature sensor **KT** Y	Resistance depends on the winding temperature		0	High accuracy continuous surveillance of key hot spots	Mounted in control boards with associated reading equipment (or recorder) 1 per hot spot
Thermocouples ***T*** (*T* < 150°C) Copper Constantan ***K*** (*T* < 1000°C) Copper-nickel	Peltier effect		0	Continuous surveillance of hot spots at regular intervals	Mounted in control boards with associated reading equipment (or recorder) 1 per hot spot
Platinum resistance thermometer **PT 100**	Variable linear resistor with indirect heating		0	High accuracy continuous surveillance of key hot spots	Mounted in control boards with associated reading equipment (or recorder) 1 per hot spot

- NRT: nominal running temperature.
- The NRTs are chosen according to the position of the sensor in the motor and the temperature rise class.
- **KT** Y 84/130 as standard.

* Only for Zone 21 & 22 motors

Fitting thermal protection

- PTO or PTF, in the control circuits
- PTC, with relay, in the control circuits
- PT 100 or thermocouples, with reading equipment or recorder, in the control panel of the installation for continuous surveillance

Alarm and early warning

All protective equipment can be backed up by another type of protection (with different NRTs): the first device will then act as an early warning (light or sound signals given without shutting down the power circuits), and the second device will be the alarm (shutting down the power circuits).

Starting methods for induction motors

The two essential parameters for starting cage induction motors are:
- starting torque
- starting current

These two parameters and the resistive torque determine the starting time.
These characteristics arise from the construction of cage induction motors. Depending on the driven load, it may be necessary to adjust these values to avoid torque surges on the load or current surges in the supply. There are essentially five different types of starting, which are:
- D.O.L. starting
- star/delta starting
- soft starting with auto-transformer
- soft starting with resistors
- electronic starting

The tables on the next few pages give the electrical outline diagrams, the effect on the characteristic curves, and a comparison of the respective advantages of each mode.

MOTORS WITH ASSOCIATED ELECTRONICS

Electronic starting modes control the voltage at the motor terminals throughout the entire starting phase, giving very gradual smooth starting.

DIGISTART D2 ELECTRONIC STARTER

This simple, compact electronic starter enables three-phase induction motors to be started smoothly by controlling their acceleration. It incorporates motor protection.

• 18 to 200 A range
• **Integrated by-pass**: ease of wiring
• Simplicity and speed of setup
All settings configured with just seven selector switches
• Flexibility
- Mains supply voltages 200-440 VAC & 200-575 VAC

• Starting and stopping modes:
- Current limit
- Current ramp
- Deceleration control
- Communication
- Modbus, DeviceNet, Profibus, USB, display console
- Management of pumping functions

DIGISTART D3 ELECTRONIC STARTER

Using the latest electronic control technologies to manage transient phases, the DIGISTART D3 range combines simplicity and user-friendliness while offering the user a high-performance, communicating electronic starter, and can achieve substantial energy savings.

• Range from 23 to 1600 A/400 V or 690 V
• Integrated bypass up to 1000 A:
- Compact design: up to 60% space saving
- Energy saving
- Reduced installation costs

• Advanced control
- Starting and stopping adapt to the load automatically
- Automatic parameter optimisation by gradually learning the types of start
- Special deceleration curve for pumping applications which derives from more than 15 years of Leroy-Somer's experience and expertise

• High availability
- Able to operate with only two power components operational
- Protection devices can be disabled to implement forced run mode (smoke extraction, fire pump, etc)

• Total protection
- Continuous thermal modelling for maximum motor protection (even in the event of a power cut)
- Trips on configurable power thresholds
- Control of phase current imbalance
- Monitoring of motor temperatures and the environment with PTC or PT 100

• As an option
- Installation trips in the event of an earth fault
- Protection against mains over- and undervoltages
- Connection to "Δ" motor (6-wire)
- Starter size at least one rating lower
- Automatic detection of motor connection
- Ideal for replacing Y/Δ starters

• Communication
Modbus RTU, DeviceNet, Profibus, USB

• Simplicity of setup
- 3 parameter-setting levels
- Preset configurations for pumps, fans, compressors, etc
- Standard: access to the main parameters
- Advanced menu: access to all data
- Storage
- Time-stamped log of trips
- Energy consumption and operating conditions
- Latest modifications
- Simulate operation by forcing control
- Display the state of the inputs/outputs
- Counters: running time, number of starts, etc

• Starting on variable speed drive
One of the advantages of variable speed drives is that loads can be started without a current surge on the mains supply, since starting is always performed with no voltage or frequency at the motor terminals.

Designation

Ⓔx	II 2 G Ex	d or de	II	B or C*	T4 or T5 or T6	Gb

* for frame size ≤ 280 mm

The complete motor **reference** described below will enable you to **order** the desired equipment.

The selection method consists of following the terms in the designation.

4P 1500 min-1	FLSD	180	M	18.5 kW	LS2/IE2	IM 1001 IM B3	230 / 400 V	50 Hz	IP 55
No. of poles Speed(s)	Series designation	Frame size IEC 60072	Housing designation and manufacturer code	Rated power	Range/Efficiency class	Mounting arrangement IEC 60034-7	Mains voltage	Mains frequency	Protection IEC 60034-5

Description

Description	Materials	Comments
Housing with cooling fins	Cast iron	- with integral feet or without feet • 4, 6 or 8 fixing holes for foot mounting • lifting rings for frame size ≥ 90 - external earth terminal
Stator	Insulated low-carbon magnetic steel laminations Insulated electroplated copper	- low carbon content guarantees long-term lamination pack stability - semi-enclosed slots - class F insulation - 1 set of PTC sensors in the winding for frame sizes ≥ 160
Rotor	Insulated low-carbon magnetic steel laminations Aluminium (A5L) or copper	- squirrel cage with inclined cage bars - rotor cage pressure die-cast in aluminium (or alloy for special applications) or soldered in copper - shrink-fitted to shaft or keyed - rotor balanced dynamically, class A - 1/2 key
Shaft	Steel	- for frame size ≤ 132: • tapped shaft end • closed keyway - for frame size ≥ 160: • tapped shaft end • open keyway
End shields	Cast iron	
Bearings and lubrication		- regreasable bearings from frame size 160 upwards - bearings preloaded at NDE from 80 to 280 and preloaded at DE from 315 ST upwards
Labyrinth seal **Lipseals**	Plastic or steel Synthetic rubber	- lipseal or labyrinth seal at drive end and at non drive end for frame sizes 80 to 132 and 315 - decompression grooves for frame sizes 160 to 280 and 355
Fan	Composite material up to frame size 280 inclusive, metal for larger models	- 2 directions of rotation: straight blades
Fan cover	Pressed steel	- fitted with a drip cover (optional)
Terminal box	Cast iron	- type "d" in standard version and type "e" as an option (see below) - pre-drilled with one or more ISO holes with plug or cable gland - can be turned: 4 positions - internal earth terminal - terminal plate

Other construction types

CORROBLOC FINISH

The CORROBLOC finish is a top coat for the basic cast iron motor described above. In addition to the basic construction, its special finishes resist corrosion in particularly harsh environments, and these qualities are enhanced with age.

Description	Materials	Comments
Stator - Rotor		- anti-corrosion protection for frame sizes 80 to 132
Nameplate	Stainless steel	- nameplate: indelible marking
Screws	Steel with anti-corrosion coating	- stainless steel fixing screws from FLSD 160 upwards
Terminal box	Cast iron body and cover	
Cable gland or plug	Brass	- Ex protection type same as the terminal box
External finish		- system IIIa (see External finish section)

INCREASED SAFETY TERMINAL BOX VERSION Ex d e IIB or IIC

These motors have a type "d" flameproof casing and a type "e" increased safety terminal box.

Terminal box	Cast iron	- type "e" increased safety - type "d" separation between motor casing and type "e" terminal box - safety terminal block

Flameproof motor - Type "d" terminal box

Flameproof motor - Type "e" terminal box

Bearings and lubrication

PERMANENTLY GREASED BEARINGS

Under normal operating conditions, the service life (L_{10h}) in hours of the lubricant is indicated in the table below for ambient temperatures less than 55°C.

Series	Type	Number of poles	Type of permanently greased bearing	
			N.D.E.	D.E.
FLSD	80 L	2; 4; 6	6204 C3	6204 C3
	90 S/L	2; 4; 6	6205 C3	6205 C3
	100 L/112 M	2; 4; 6	6206 C3	6206 C3
	132 S/M	2; 4; 6	6308 C3	6308 C3

BEARINGS WITH GREASE NIPPLES

The chart opposite shows the greasing intervals, depending on the type of motor, for standard bearing assemblies fitted with grease nipples, operating at an ambient temperature of 25°C, 40°C and 55°C on a horizontal shaft machine.

The chart below is valid for FLSD motors lubricated with Polyrex EM103 grease, which is used as standard.

Series	Type	Number of poles	Type of bearing for bearings with grease nipples		Quantity of grease	Regreasing intervals in hours								
						3000 rpm			1500 rpm			1000 rpm		
			N.D.E.	D.E.	g	25°C	40°C	55°C	25°C	40°C	55°C	25°C	40°C	55°C
FLSD	160 M/L	2; 4; 6	6210 C3	6309 C3	13	18500	18500	9250	25000	25000	21400	25000	25000	25000
	180M/L	2; 4; 6	6212 C3	6310 C3	15	14200	14200	7100	25000	25000	18900	25000	25000	23900
	200 L	2; 4; 6	6313 C3	6313	25	10600	10600	5300	25000	25000	15700	25000	25000	20700
	225 S/M													
	250 M	2; 4; 6	6314 C3	6316 C3	33	7400	7400	3700	21000	21000	13200	25000	25000	18200
	280 S/M													
	315	2	6317 C3	6317 C3	37	4000	4000	2000	-	-	-	-	-	-
	315	4; 6	6320 C3	6320 C3	50	-	-	-	7800	7800	4900	12500	12500	7800
	355	2	6317 C3	6317 C3	37	4000	4000	2000	-	-	-	-	-	-
	355	4; 6	6322 C3	6322 C3	60	-	-	-	6600	6600	4100	11000	11000	6900

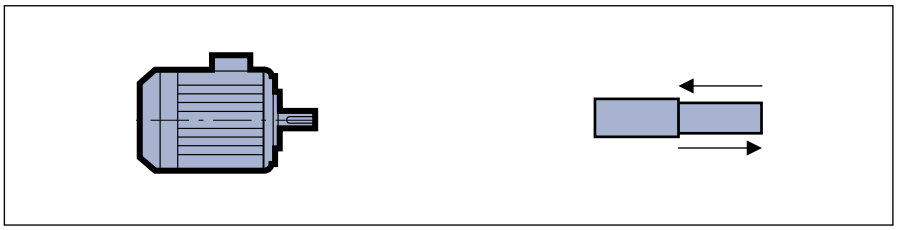
BEARING FITTING ARRANGEMENTS

FLSD series		Horizontal shaft	Vertical shaft	
			Shaft facing down	Shaft facing up
Foot mounted motors	Mounting arrangement	B3/B6/B7/B8	V5	V6
	standard mounting	The DE bearing is: - located at DE for frame ≤ 132 - locked for 160 ≤ frame ≤ 315 S The NDE bearing is locked on frames 315 M to 355.	The DE bearing is: - located at DE for frame ≤ 132 - locked for 160 ≤ frame ≤ 315 S The NDE bearing is locked on frames 315 M to 355.	The DE bearing is: - located at DE for frame ≤ 90 - locked for 100 ≤ frame ≤ 315 S The NDE bearing is locked on frames 315 M to 355.
	on request	DE bearing locked for frame ≤ 132	DE bearing locked for frame ≤ 132	DE bearing locked for frame ≤ 90
Flange mounted motors (or foot and flange)	Mounting arrangement	B5/B35/B14/B34	V1/V15/V18/V58	V3/V36/V19/V69
	standard mounting	The DE bearing is locked on frames 80 to 315 S. The NDE bearing is locked on frames 315 M to 355.	The DE bearing is locked on frames 80 to 315 S. The NDE bearing is locked on frames 315 M to 355.	The DE bearing is locked on frames 80 to 315 S. The NDE bearing is locked on frames 315 M to 355.

Axial loads

Horizontal motor

For a bearing life L_{10h} of 25,000 hours and 40,000 hours

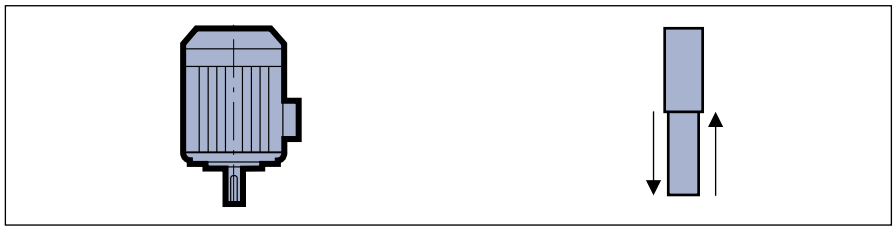


Series	Type	Number of poles	Permissible axial load (in daN) on main shaft extension for standard bearing assembly IM B3/B6 IM B7/B8 IM B5/B35 IM B14/B34											
			3000 rpm				1500 rpm				1000 rpm			
			→		←		→		←		→		←	
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours
FLSD	**80**	2; 4; 6	26.9	17.8	66.9	57.8	42.8	30.6	82.8	70.6	63.0	44.1	63.0	44.1
	90	2; 4; 6	24.7	14.9	74.7	64.9	40.2	27.0	90.2	77.0	82.0	57.4	110	77.0
	100	2; 4; 6	38.2	24.8	98.2	84.8	57.7	39.8	118	99.8	103	72.1	138	96.6
	112	2; 4; 6	36.9	23.5	96.9	83.5	58.0	40.0	118	100	101	70.7	140	98.0
	132	2; 4; 6	100	72.4	190	162	146	109	236	199	181	126.7	230	161
	160	2; 4; 6	201	161	201	161	262	209	262	209	296	235	296	235
	180	2; 4; 6	229	183	229	183	272	219	272	219	349	277	349	277
	200	2; 4; 6	348	280	348	280	466	372	466	372	530	423	530	423
	225	2; 4; 6	343	274	343	274	462	367	462	367	532	425	532	425
	250	2; 4; 6	425	332	425	332	531	412	531	412	657	513	657	513
	280	2; 4; 6	405	311	405	311	557	434	557	434	656	512	656	512
	315	2; 4; 6	486	411	326	276	728	546	528	396	847	635	647	485
	355	2; 4; 6	440	373	280	237	736	552	496	372	805	604	565	424

Axial loads

Vertical motor
Shaft facing down

For a bearing life L_{10h} of 25,000 hours and 40,000 hours

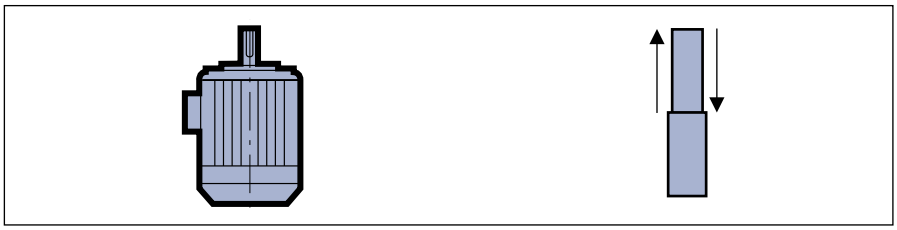


Series	Type	Number of poles	Permissible axial load (in daN) on main shaft extension for standard bearing assembly IM V5 IM V1/V15 IM V18/V58											
			3000 rpm				1500 rpm				1000 rpm			
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours
FLSD	**80**	2; 4; 6	25.3	16	69.5	60.4	40.8	28.5	86.3	74.0	59.0	41.3	68.0	47.6
	90	2; 4; 6	21.9	12	79.4	69.5	36.7	23.5	95.7	82.5	76.0	53.2	117	81.9
	100	2; 4; 6	35.0	22	104	90.2	52.9	34.8	126	108	95.0	66.5	146	102
	112	2; 4; 6	31.0	18	107	93.0	50.6	32.5	130	112	89.0	62.3	152	106
	132	2; 4; 6	89.3	61	208	180	133	95.3	259	221	156	109	255	179
	160	2; 4; 6	176	136	239	199	182	235	309	256	267	205	354	292
	180	2; 4; 6	195	148	282	235	264	201	367	304	304	231	432	359
	200	2; 4; 6	299	230	422	353	409	314	558	464	471	364	640	533
	225	2; 4; 6	289	220	426	357	402	308	559	465	473	365	641	534
	250	2; 4; 6	349	257	538	446	525	399	715	589	649	508	837	697
	280	2; 4; 6	557	464	308	215	760	633	435	308	897	753	518	374
	315	2; 4; 6	306	259	545	461	514	386	861	646	644	483	976	732
	355	2; 4; 6	175	148	648	548	391	293	1050	788	605	454	1175	881

Axial loads

Vertical motor
Shaft facing up

For a bearing life L_{10h} of 25,000 hours and 40,000 hours

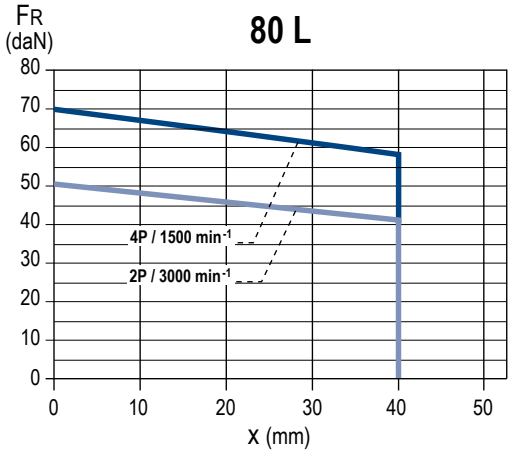


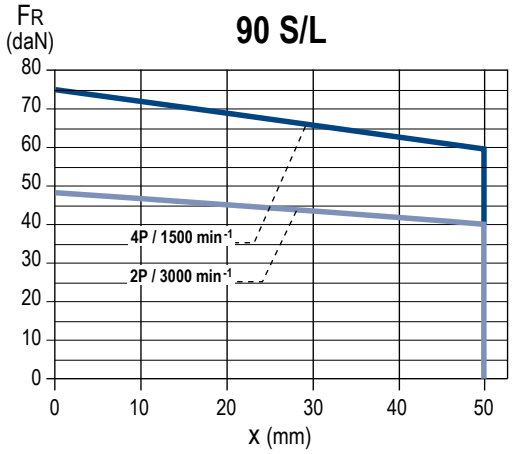
Series	Type	Number of poles	Permissible axial load (in daN) on main shaft extension for standard bearing assembly IM V6 IM V3/V36 IM V19/V69											
			3000 rpm				1500 rpm				1000 rpm			
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours
FLSD	80	2; 4; 6	65.3	20.4	29.5	56.2	80.8	34.0	46.3	65.5	59.0	41.3	68.0	47.6
	90	2; 4; 6	71.9	19.5	29.4	62.0	86.7	73.5	45.7	32.5	105	73.5	87	60.9
	100	2; 4; 6	95.0	43.8	81.5	30.2	113	94.9	66.1	48.0	130	91.0	110	77.0
	112	2; 4; 6	91.0	77.5	46.5	33.0	111	92.5	70.2	52.1	128	89.6	112	78.4
	132	2; 4; 6	179	151	116	87.8	223	185	168	131	205	144	206	144
	160	2; 4; 6	176	136	238	198	235	182	309	256	267	205	354	292
	180	2; 4; 6	194	148	282	235	264	201	367	304	304	231	432	359
	200	2; 4; 6	305	236	421	351	409	314	558	464	471	364	640	533
	225	2; 4; 6	289	220	426	357	402	308	559	465	473	365	641	534
	250	2; 4; 6	349	257	538	446	525	399	715	589	649	508	839	697
	280	2; 4; 6	308	215	557	464	435	308	760	633	518	374	897	753
	315	2; 4; 6	306	259	545	461	514	386	861	646	644	483	976	732
	355	2; 4; 6	Please consult Leroy-Somer											

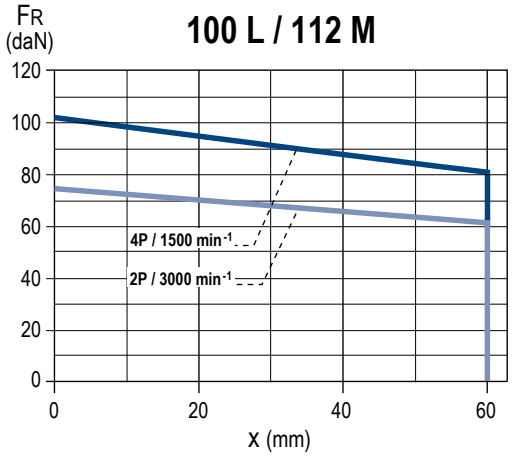
Radial loads

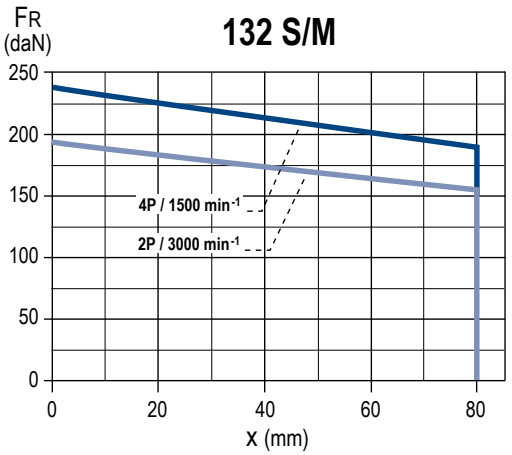
STANDARD FITTING ARRANGEMENT

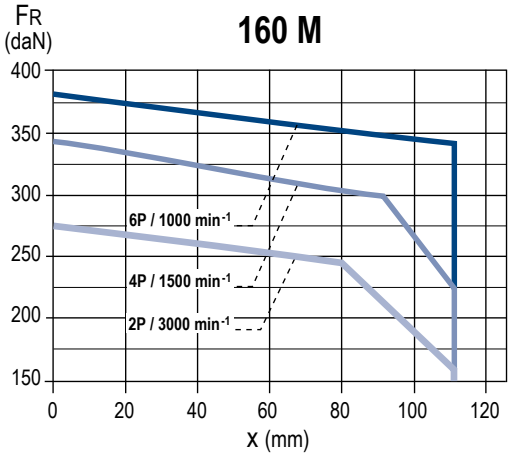
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: Distance with respect to the shaft shoulder

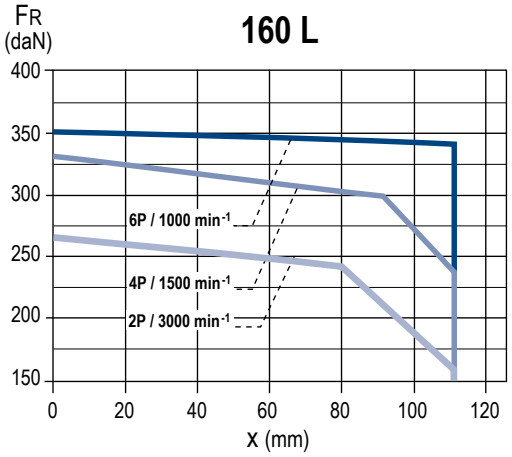








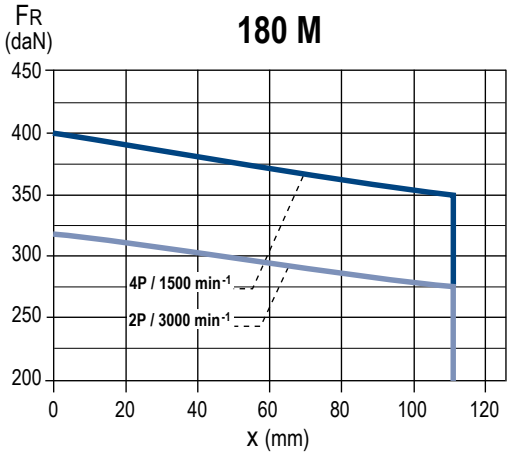


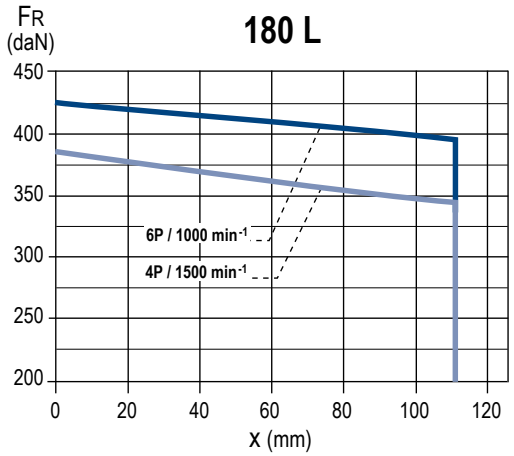


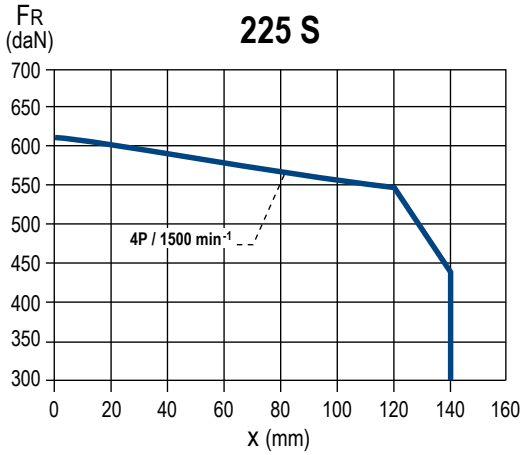
Radial loads

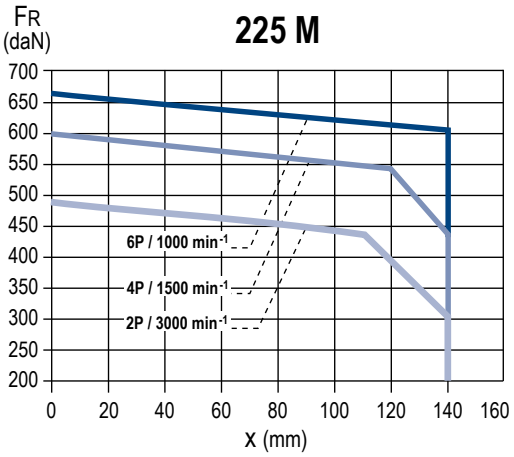
STANDARD FITTING ARRANGEMENT

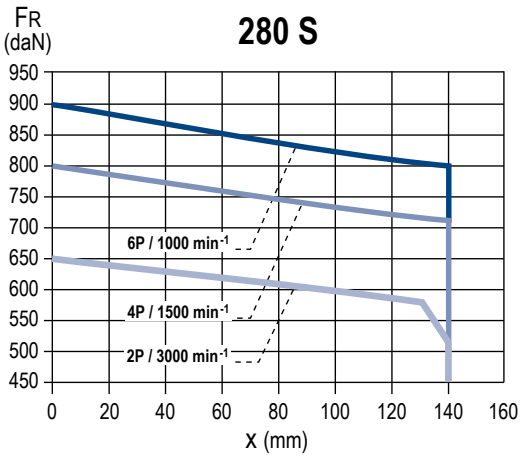
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: Distance with respect to the shaft shoulder

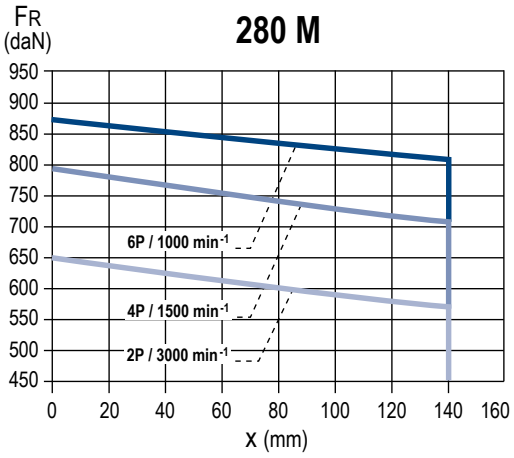








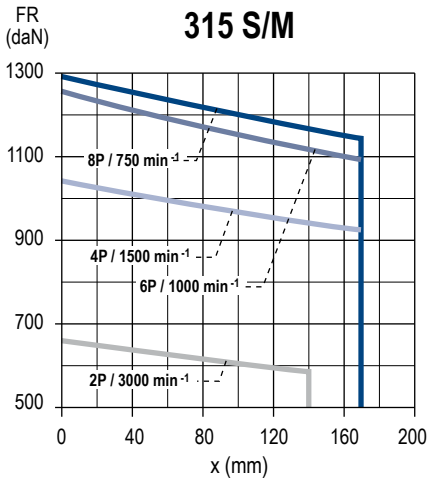


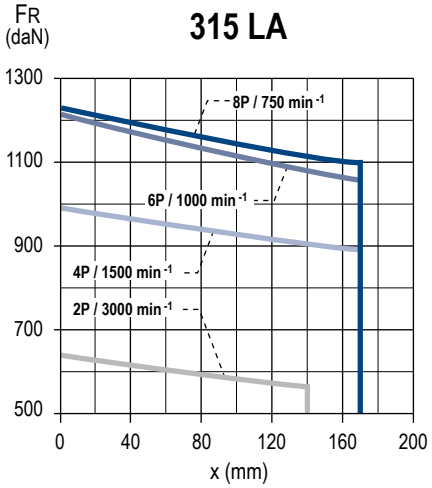


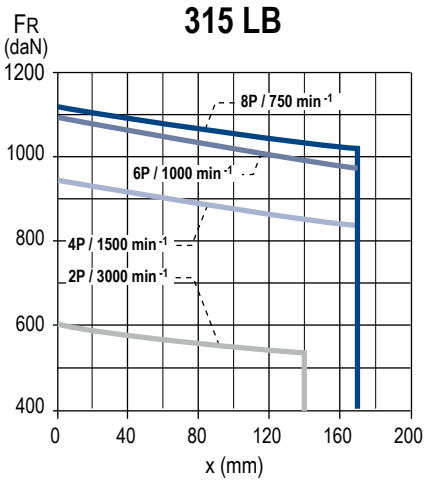
Radial loads

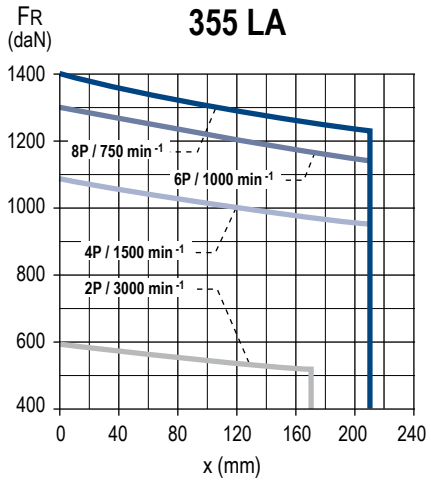
STANDARD FITTING ARRANGEMENT

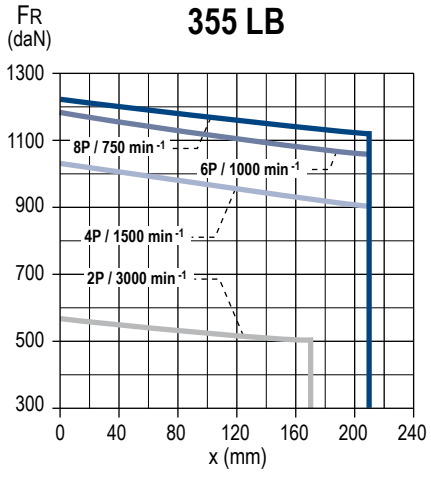
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: Distance with respect to the shaft shoulder

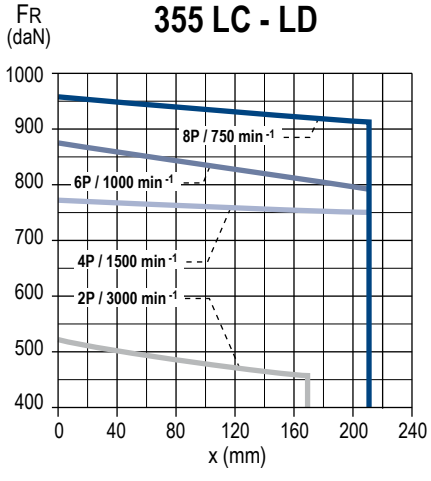












Radial loads

SPECIAL FITTING ARRANGEMENT

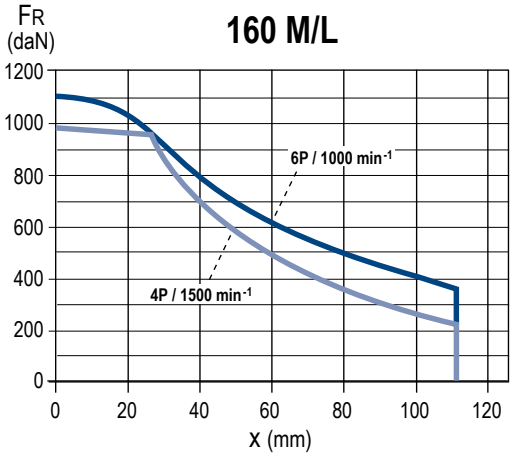
Type of drive end roller bearings

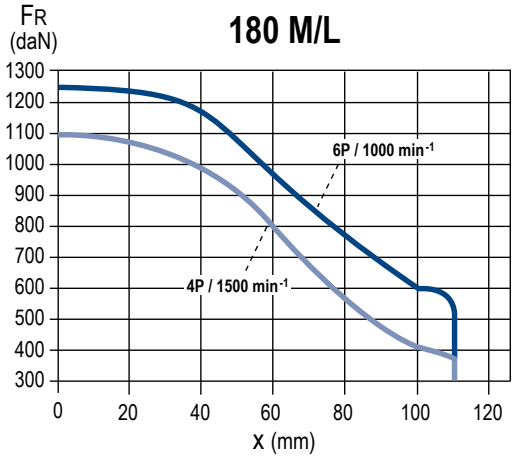
Series	Type	Number of poles	Non-drive end bearing (N.D.E.)	Drive end bearing (D.E.)
FLSD	160	4; 6; 8	6210 C3	NU309
	180	4; 6; 8	6212 C3	NU310
	200	4; 6; 8	6313 C3	NU313
	225	4; 6; 8	6313 C3	NU313
	250	4; 6; 8	6314 C3	NU316
	280	4; 6; 8	6314 C3	NU316
	315	4; 6; 8	6320 C3	NU320
	355	4; 6; 8	6322 C3	NU322

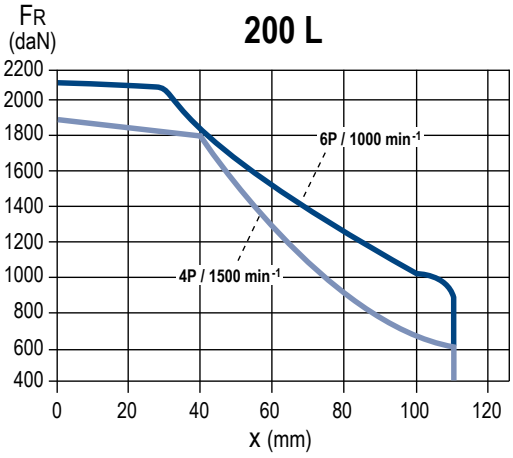
Radial loads

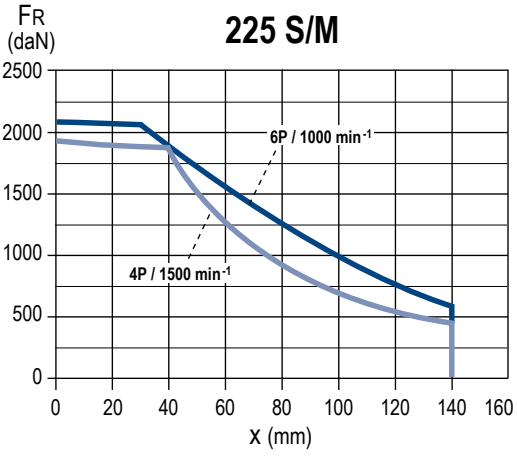
SPECIAL FITTING ARRANGEMENT

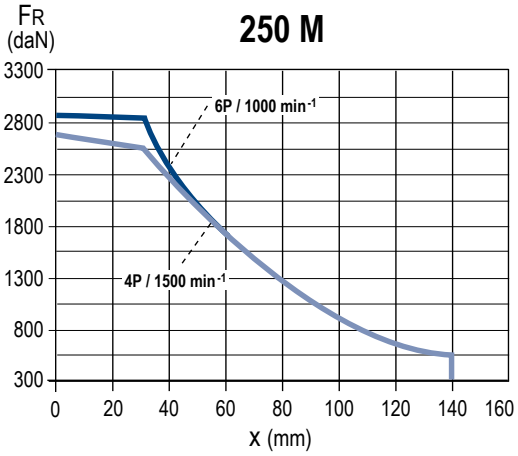
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: Distance with respect to the shaft shoulder

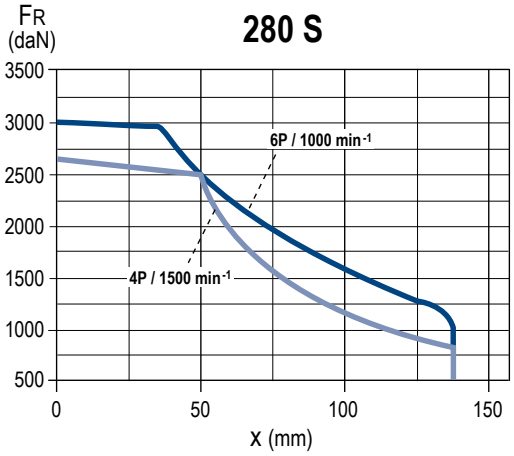








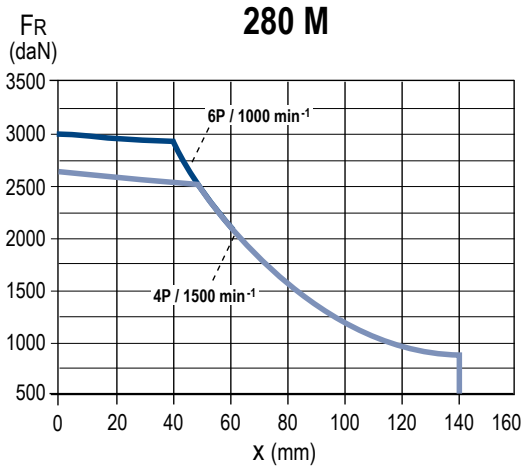


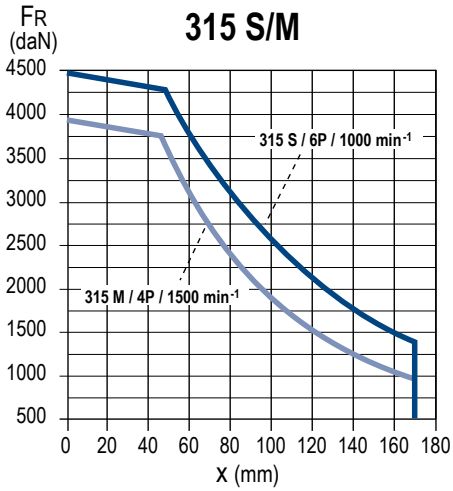


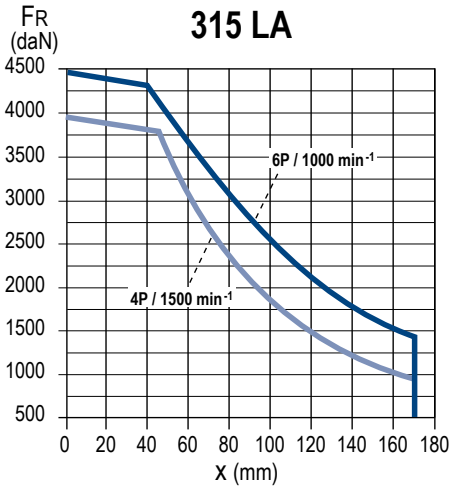
Radial loads

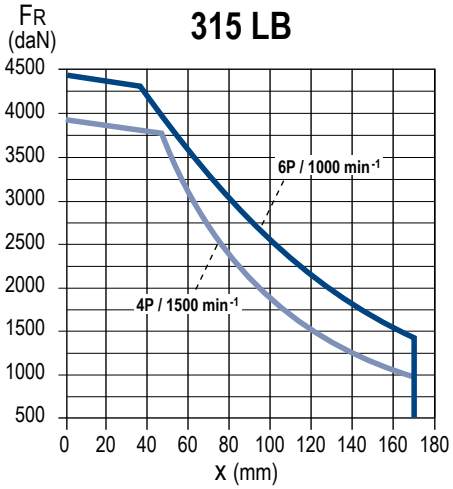
SPECIAL FITTING ARRANGEMENT

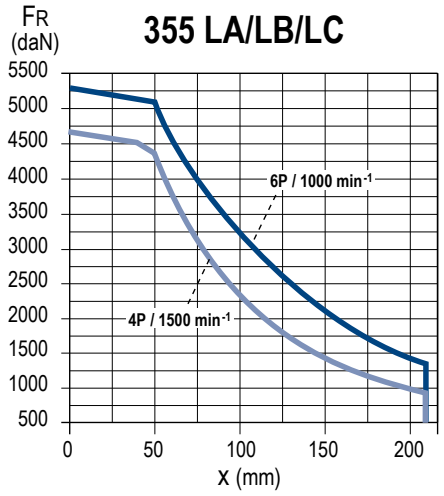
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: Distance with respect to the shaft shoulder











Mains connection

DESCRIPTIVE TABLE OF TERMINAL BOXES FOR RATED SUPPLY VOLTAGE OF 400 V (according to EN 50262)

Series	Type	Number and type of standard drill holes	Max. size of the power cable entry(ies)		
			1 main cable entry + 1 ISO M20 x 1.5 auxiliary drill hole	1 main cable entry + 2 ISO M20 x 1.5 auxiliary drill holes	2 main cable entries + 2 ISO M20 x 1.5 auxiliary drill holes
FLSD	80	1 ISO M20 x 1.5	1 ISO 32 x 1.5	1 ISO 25* x 1.5	NA
	90				
	100				
	112	1 ISO M25 x 1.5			
	132				
	160	1 ISO M40 x 1.5 + 1 ISO M20 x 1.5	1 ISO M50 x 1.5	1 ISO M50 x 1.5	2 ISO M40 x 1.5
	180				
	200	1 ISO M50 x 1.5 + 1 ISO M20 x 1.5			
	225				
	250				
	280	1 ISO M63 x 1.5 + 1 ISO M20 x 1.5	1 ISO M63 x 1.5	1 ISO M63 x 1.5	2 ISO M63 x 1.5
	315	1 ISO M75 x 1.5 + 1 ISO M20 x 1.5	1 ISO M80 x 1.5	1 ISO M80 x 1.5	2 ISO M75 x 1.5
	355	2 ISO M75 x 1.5 + 1 ISO M20 x 1.5			

** With terminal box "d", the 2nd auxiliary cable entry must always be in position 3.*

POWER SUPPLY CABLES

FLSD 80-132

The motors are supplied as standard with an ISO 20 or 25 cable gland for unshielded cable, except for versions Ex d IIC, which are supplied with cable glands with plugs.
On request, they can be fitted with:
- A larger size of cable gland
- A second cable gland for the power and/or an ISO M20 x 1.5 cable gland for the accessories
- Cable glands for shielded cables

Cable gland size	Ex d IIB T4 Gb	Ex d e IIB or IIC T4 Gb
	Permissible cable Ø (mm)	Permissible cable Ø (mm)
ISO M20 x 1.5	10 to 16	7.5 to 13
ISO M25 x 1.5	10 to 16	12.5 to 18

FLSD 160-355

Motors of size 160 or above are fitted as standard with one threaded hole with plug for the power and one ISO M20 x 1.5 auxiliary threaded hole with plug.
As an option, they can be fitted with:
- An extra large cable entry
- A second cable entry for the power and/or an additional cable entry for the auxiliaries
- Cable glands for unshielded cable(s) or shielded cable(s)

TERMINAL BLOCKS DIRECTION OF ROTATION

Standard motors have a block with 6 terminals whose marking complies with IEC 60034-8.
When the motor is running in U1, V1, W1 or 1U, 1V, 1W from a direct mains supply L1, L2, L3, it turns clockwise when seen from the drive end.

If any two of the phases are changed over, the motor will run in an anti-clockwise direction (make sure that the motor has been designed to run in both directions).
If the motor is fitted with accessories (thermal protection or space heater), these must be connected on screw dominos with labelled wires.

Frame size	Terminals	Material	Tightening torque (Nm)
80 L to 112 M	M5	steel	3.5
132 S & 132 M	M6	steel	5
160 M & 225 M	M8	steel	10
250 M & 280 M	M10	steel	20
315 S & 355 L	M12	steel	35

2 poles - 3000 min^{-1}

Ex d / d e II B / C T4 Gb - IP55 - CLASS F - ΔT80K - S1 - CLASS IE2*

Type	400 V MAINS SUPPLY 50 Hz															
	Rated power	Rated speed	Rated torque	Rated current	Power factor			Efficiency IEC 60034-2-1 2007			Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Moment of inertia	Weight	Noise
	P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ			η			Is/In	Ms/Mn	M_M/Mn	J	IM B3	LP
	kW	min^{-1}	N.m	A	4/4	3/4	2/4	4/4	3/4	2/4				kg.m^2	kg	db(A)
FLSD 80L	0.75	2860	2.5	1.6	0.89	0.84	0.75	76.4	76.5	73.4	5.4	2.9	2.6	0.00087	23	61
FLSD 80L	1.1	2850	3.7	2.4	0.84	0.77	0.64	75.8	75.9	73.5	6.1	3.4	3.1	0.00087	23	61
FLSD 90S	1.5	2867	5.0	3	0.88	0.84	0.74	79	79.2	75.4	7.4	3.5	3.3	0.00171	31	64
FLSD 90L	2.2	2849	7.4	4.4	0.88	0.84	0.74	79.6	79.8	77.4	7.8	3.9	2.9	0.00199	32	64
FLSD 100L	3	2865	10.0	6.2	0.85	0.81	0.67	79.6	78.8	76.1	7.6	4.3	4.8	0.00227	38	66
FLSD 112M	4	2897	13.2	8	0.86	0.8	0.70	81.2	80.9	78	7.0	2.3	3.9	0.00652	47	69
FLSD 132S	5.5	2898	18.1	10.9	0.86	0.8	0.70	81.3	81.0	78.1	8.1	2.3	3.4	0.01191	76	72
FLSD 132S	7.5	2920	24.5	14.8	0.84	0.81	0.73	84.7	85.0	83.4	7.5	2.1	3.5	0.01443	76	72
FLSD 132M	9	2938	29.3	16.8	0.89	0.82	0.73	85.7	85.3	82.6	8.3	2.9	3.5	0.01847	88	72
FLSD 132M	11	2934	35.8	21	0.85	0.79	0.69	85.6	85.0	82.5	8.2	3.5	3.4	0.01847	88	72
FLSD 160MA*	11	2930	36.0	20	0.87	0.84	0.74	90.4	91.2	91.0	7.0	2.6	2.8	0.0450	180	70
FLSD 160MB*	15	2937	49	27	0.87	0.83	0.74	90.9	91.7	91.4	7.1	2.7	3.2	0.0490	186	70
FLSD 160L*	18.5	2937	60	34	0.87	0.83	0.74	91.2	91.9	91.8	7.5	2.7	3.1	0.0560	197	70
FLSD 180M*	22	2931	72	38	0.91	0.89	0.84	91.6	92.3	92.2	7.5	2.4	3.2	0.0950	259	70
FLSD 200LA*	30	2945	97	52	0.90	0.88	0.84	92.5	92.9	92.6	7.4	2.7	2.6	0.140	340	78
FLSD 200LB*	37	2950	120	64	0.90	0.88	0.84	92.5	92.8	92.6	8.0	2.9	2.7	0.160	359	78
FLSD 225M*	45	2950	146	76	0.91	0.89	0.85	93.4	93.8	93.7	7.3	2.7	2.6	0.270	413	78
FLSD 250M*	55	2960	177	96	0.88	0.86	0.79	94.1	94.4	93.8	7.3	2.5	3.0	0.364	555	79
FLSD 280S*	75	2954	242	127	0.90	0.89	0.84	94.6	94.9	94.6	6.8	2.4	2.7	0.460	678	78
FLSD 280M*	90	2954	291	150	0.91	0.89	0.85	94.9	95.3	95.2	7.3	2.4	2.3	0.540	724	78
FLSD 315S**	110	2970	354	191	0.90	0.87	0.81	94.5	94.2	93.3	8.0	2.1	2.6	1.50	1070	84
FLSD 315M**	132	2955	427	226	0.89	0.86	0.81	93.8	93	92.2	7.8	1.8	2.5	1.50	1070	84
FLSD 315LA**	160	2955	517	281	0.87	0.85	0.81	93.8	93.2	91.9	7.5	1.9	2.5	1.80	1120	84
FLSD 315LB**	200	2960	645	345	0.88	0.85	0.79	94.1	93.4	92.2	8.0	2.0	2.5	2.10	1220	84
FLSD 355LA**	250	2957	807	421	0.90	0.86	0.81	94.3	93.6	92.4	7.8	1.7	2.5	3.30	1470	84
FLSD 355LB**	315	2960	1016	530	0.90	0.86	0.80	94.3	93.7	93	7.2	1.6	2.5	3.85	1570	84
FLSD 355LC**	355	2982	1137	605	0.88	0.86	0.80	95.4	95.1	94.1	7.9	1.9	2.6	4.20	1985	84
FLSD 355LD**	400	2980	1282	676	0.89	0.85	0.80	95.1	94.7	93.6	7.8	2.0	2.7	4.20	1995	84

Motor with IE2 efficiency level
****Not applicable to IIC motors***

For T5 and T6 temperature classes, please consult Leroy-Somer.

4 poles - 1500 min^{-1}

Ex d / d e II B / C T4 Gb - IP55 - CLASS F - ΔT80K - S1 - CLASS IE2*

Type	400 V MAINS SUPPLY 50 Hz															
	Rated power	Rated speed	Rated torque	Rated current	Power factor			Efficiency IEC 60034-2-1 2007			Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Moment of inertia	Weight	Noise
	P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ			η			Is/In	Ms/Mn	M_M/Mn	J	IM B3	LP
	kW	min^{-1}	N.m	A	4/4	3/4	2/4	4/4	3/4	2/4				kg.m^2	kg	db(A)
FLSD 80L	0.55	1430	3.7	1.5	0.70	0.61	0.5	72	70.8	66.3	5.0	2.9	3.3	0.00167	22	44
FLSD 80L	0.75	1420	5.0	2.0	0.74	0.66	0.54	73.1	72.1	67.7	5.4	3.1	3.6	0.00212	24	44
FLSD 90S	1.1	1427	7.4	2.4	0.86	0.79	0.67	74.1	74.4	71.4	5.0	1.8	2.3	0.00264	28	50
FLSD 90L	1.5	1432	10.0	3.2	0.86	0.79	0.65	75.9	76	73.1	5.4	2.0	2.7	0.00321	30	50
FLSD 100L	2.2	1435	14.6	4.6	0.85	0.78	0.65	78.7	78.6	75.8	6.1	2.5	3.1	0.00432	38	52
FLSD 100L	3	1439	20.0	6.8	0.81	0.74	0.61	79.5	79.5	77	6.6	2.7	3.1	0.00557	38	52
FLSD 112M	4	1458	26.2	8.5	0.81	0.74	0.61	79.5	79.5	77	5.3	2.3	3.2	0.01226	51	52
FLSD 132S	5.5	1450	36.2	10.0	0.89	0.87	0.81	85.2	85.7	84.6	7.0	2.3	2.4	0.02507	89	59
FLSD 132M	7.5	1490	49.1	14.7	0.85	0.84	0.80	86.2	86.6	85.6	7.7	2.3	3.1	0.028	96	64
FLSD 160M*	11	1465	72	22	0.81	0.75	0.63	89.9	90.5	90	7.7	2.8	3.7	0.086	188	69
FLSD 160L*	15	1461	98	29	0.83	0.77	0.65	90.7	91.4	91.1	7.7	2.9	2.7	0.108	203	69
FLSD 180M*	18.5	1475	120	36	0.81	0.75	0.64	91.7	92.1	91.3	7.2	2.7	3.2	0.139	262	65
FLSD 180L*	22	1471	143	42	0.83	0.77	0.65	91.6	91.9	91.1	7.0	3.1	3.1	0.147	250	66
FLSD 200L*	30	1477	194	57	0.82	0.77	0.67	92.6	93.4	93	6.9	3.0	2.7	0.235	350	70
FLSD 225S*	37	1475	239	69	0.83	0.78	0.69	92.9	93.4	93	7.1	3.0	2.8	0.26	366	70
FLSD 225M*	45	1470	292	79	0.88	0.81	0.73	93.1	93.2	93	6.8	2.9	2.7	0.28	398	70
FLSD 250M*	55	1474	356	100	0.85	0.81	0.73	93.6	93.9	93.4	7.2	2.6	2.6	0.64	562	70
FLSD 280S*	75	1481	484	140	0.82	0.77	0.66	94.1	94.1	93.5	7.2	2.8	2.8	1.45	675	75
FLSD 280M*	90	1480	581	166	0.83	0.79	0.69	94.3	94.5	94.1	7.4	2.2	2.7	1.75	720	75
FLSD 315S**	110	1482	710	199	0.84	0.81	0.73	94.0	93.5	92.0	7.7	2.7	2.6	2.7	1070	73
FLSD 315M**	132	1483	850	238	0.84	0.80	0.72	94.5	94.1	93.0	7.4	2.6	2.5	2.7	1070	73
FLSD 315LA**	160	1483	1032	286	0.85	0.82	0.72	94.1	93.5	92.1	8.0	2.0	2.4	3.2	1120	73
FLSD 315LB**	200	1485	1291	357	0.85	0.80	0.69	94.3	93.9	93.1	8.0	2.0	2.5	4.1	1220	73
FLSD 355LA**	250	1483	1611	420	0.90	0.86	0.78	94.6	94.3	93.3	7.8	2.0	2.4	6.9	1580	80
FLSD 355LB**	300	1489	1930	520	0.87	0.84	0.77	94.8	94.5	94.2	6.7	1.6	2.4	8	1630	80
FLSD 355LC**	355	1489	2279	610	0.87	0.84	0.78	95.6	95.4	94.1	6.8	1.8	2.4	8.4	1870	80
FLSD 355LD**	400	1489	2564	688	0.87	0.83	0.77	95.6	95.4	95.6	7.4	2.1	2.4	8.7	1990	80

**** Motor with IE2 efficiency level***
***** Not applicable to IIC motors***

For T5 and T6 temperature classes, please consult Leroy-Somer.

6 poles - 1000 min^{-1}

Ex d / d e II B / C T4 Gb - IP55 - CLASS F - ΔT80K - S1 - CLASS IE2*

Type	400 V MAINS SUPPLY 50 Hz															
	Rated power	Rated speed	Rated torque	Rated current	Power factor			Efficiency IEC 60034-2-1 2007			Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Moment of inertia	Weight	Noise
	P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ			η			Is/In	Ms/Mn	M_M/Mn	J	IM B3	LP
	kW	min^{-1}	N.m	A	4/4	3/4	2/4	4/4	3/4	2/4				kg.m^2	kg	db(A)
FLSD 80L	0.25	950	2.5	0.8	0.74	0.68	0.60	60.3	58.2	54.0	3.6	2.0	1.9	0.0022	22	40
FLSD 80L	0.37	940	3.8	1.2	0.74	0.68	0.60	61.0	59.9	55.2	3.8	1.9	2.1	0.0028	24	40
FLSD 80L	0.55	955	5.5	1.8	0.67	0.59	0.50	65.1	64.0	59.0	4.4	2.5	2.6	0.0036	24	40
FLSD 90S	0.75	940	7.6	2.1	0.8	0.75	0.70	68.4	67.0	61.0	3.5	2.0	2.2	0.0031	28	45
FLSD 90L	1.1	940	11.2	2.7	0.81	0.76	0.70	68.2	68.0	63.0	4.8	1.8	2.2	0.0037	30	45
FLSD 100L	1.5	955	15.0	3.5	0.78	0.72	0.60	76.0	76.1	74.1	6.3	2.2	2.8	0.0056	38	48
FLSD 112M	2.2	960	21.9	5.2	0.77	0.71	0.60	77.9	78.2	75.2	5.5	2.3	2.4	0.012	51	48
FLSD 132S	3	953	30.1	6.9	0.76	0.74	0.60	80.2	80.3	78.3	5.3	2.2	2.4	0.0199	89	55
FLSD 132M	4	970	39.4	9	0.78	0.72	0.60	82.3	82.3	80.3	6.7	2.8	2.7	0.0275	93	55
FLSD 132M	5.5	970	54.1	12.2	0.79	0.74	0.60	81.9	82.4	79.4	7.1	3.2	2.7	0.0275	93	55
FLSD 160M*	7.5	977	73	16	0.78	0.71	0.59	87.6	87.7	85.8	6.4	1.9	2.7	0.127	187	56
FLSD 160L*	11	974	108	23	0.77	0.71	0.59	88.7	89.0	87.8	5.8	1.8	2.7	0.157	203	56
FLSD 180L*	15	978	146	33	0.74	0.67	0.55	89.7	89.9	89.3	6.8	2.3	2.8	0.247	265	58
FLSD 200LA*	18.5	978	181	37	0.79	0.74	0.62	90.6	90.7	89.9	7.2	2.5	3.2	0.3	340	66
FLSD 200LB*	22	975	215	44	0.79	0.74	0.62	91.0	91.1	90.3	7.0	2.5	3.2	0.33	370	66
FLSD 225M	30	974	294	62	0.77	0.72	0.60	90.2	90.9	90.7	6.8	2.5	3.2	0.38	395	66
FLSD 250M*	30	985	291	54	0.86	0.83	0.72	92.8	93.5	92.6	6.3	2.1	2.4	0.93	568	65
FLSD 280S*	45	985	436	81	0.86	0.83	0.74	93.6	94.1	94.0	6.6	2.3	2.4	1.14	678	65
FLSD 280M*	55	982	535	99	0.86	0.83	0.76	93.5	94.2	94.4	6.3	2.4	2.3	1.35	723	65
FLSD 315S**	75	987	726	130	0.87	0.83	0.77	93.9	93.9	93.0	7.2	1.7	2.3	3.1	1080	76
FLSD 315M**	90	983	874	161	0.86	0.83	0.75	93.0	92.9	91.5	7.1	1.5	2.5	3.1	1080	76
FLSD 315LA**	110	985	1066	197	0.86	0.82	0.74	93.3	92.0	85.0	6.8	1.6	2.5	4	1130	76
FLSD 315LB**	132	986	1278	234	0.86	0.83	0.74	94.0	93.8	92.4	7.5	1.7	2.5	4.4	1195	76
FLSD 315LB**	150	985	1454	265	0.86	0.82	0.72	93.8	93.5	92.1	6.8	1.5	2.4	4.4	1215	76
FLSD 355LA**	185	991	1783	329	0.86	0.83	0.74	93.3	93.3	92.2	7.5	1.7	2.7	5	1485	78
FLSD 355LB**	220	987	2129	384	0.87	0.84	0.75	94.1	94.0	92.7	7.5	1.8	2.7	6	1610	78
FLSD 355LD**	300	993	2885	553	0.82	0.79	0.71	94.6	94.4	93.1	7.6	1.6	2.6	8	1995	78

**** Motor with IE2 efficiency level***
***** Not applicable to IIC motors***

For T5 and T6 temperature classes, please consult Leroy-Somer.

Electrical characteristics

8 poles - 750 min^{-1}

Ex d / d e II B / C T4 Gb - IP55 - CLASS F - ΔT80K - S1

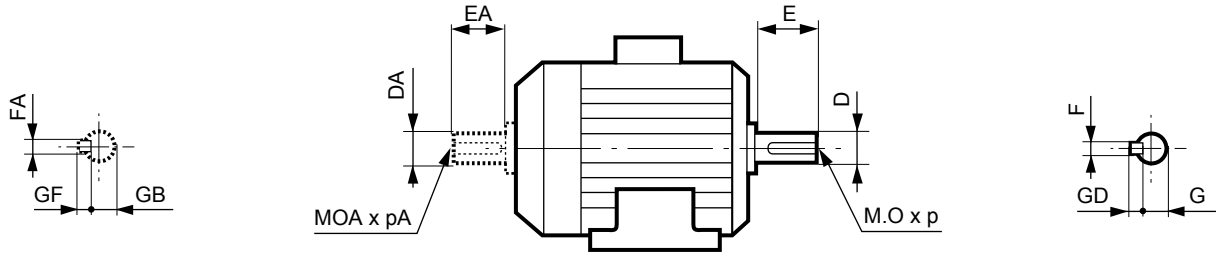
Type	400 V MAINS SUPPLY 50 Hz															
	Rated power	Rated speed	Rated torque	Rated current	Power factor			Efficiency IEC 60034-2-1 2007			Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Moment of inertia	Weight	Noise
	P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ			η			Is/In	Ms/Mn	M_M/Mn	J	IM B3	LP
	kW	min^{-1}	N.m	A	4/4	3/4	2/4	4/4	3/4	2/4				kg.m^2	kg	db(A)
FLSD 80L	0.18	710	2.42	0.8	0.64	0.58	0.46	50.3	49	43	3	1.7	1.7	0.0028	22	40
FLSD 80L	0.25	720	3.32	1.1	0.6	0.55	0.44	52.5	52	44	3.18	2.0	2.4	0.0036	22	40
FLSD 90S	0.37	685	5.16	1.2	0.71	0.57	0.45	62	61	57	3.5	1.6	1.6	0.0031	28	48
FLSD 90L	0.55	695	7.56	1.7	0.72	0.59	0.46	61	56	52	3.29	1.8	1.8	0.0037	30	48
FLSD 100L	0.75	720	9.95	2.3	0.68	0.6	0.47	68.9	68	64	4.09	1.9	1.9	0.0850	38	46
FLSD 100L	1.1	720	14.6	3.8	0.62	0.56	0.44	66	64	58	4.11	1.8	2.4	0.0117	41	46
FLSD 112M	1.5	725	19.8	4.8	0.63	0.57	0.45	70.6	70.1	66.1	4	2.1	2.2	0.0150	51	49
FLSD 132S	2.2	715	29.4	7.2	0.60	0.55	0.44	72.2	72.2	70.2	3.19	1.4	1.8	0.0253	89	56
FLSD 132M	3	705	40.6	9.1	0.63	0.57	0.46	74.3	74.3	71.3	3.1	1.3	1.9	0.0334	93	56
FLSD 160MA	4	722	53	11	0.62	0.55	0.44	81.4	81.1	78.7	4.3	1.6	2.2	0.086	188	54
FLSD 160MB	5.5	718	73	16	0.62	0.54	0.42	81.1	81.5	79.3	4.0	1.6	2.2	0.086	188	54
FLSD 160L	7.5	720	99	23	0.58	0.50	0.39	80.8	80.5	78.0	3.7	2.0	2.4	0.105	202	54
FLSD 180L	11	724	145	28	0.68	0.61	0.49	84.2	84.3	82.1	3.9	1.5	1.9	0.2	225	60
FLSD 200L	15	725	198	34	0.72	0.65	0.52	87.6	86.9	85.1	5.4	1.9	2.4	0.39	305	66
FLSD 225S	18.5	725	244	43	0.70	0.64	0.53	87.1	87.1	85.5	5.5	2.0	2.5	0.393	320	65
FLSD 225M	22	725	290	50	0.71	0.67	0.57	87.2	87.4	85.9	5.3	1.9	2.4	0.466	350	65
FLSD 250M	30	735	390	66	0.72	0.66	0.54	91.2	91.4	90.1	6.5	2.1	2.4	0.89	567	65
FLSD 280S	37	725	487	83	0.70	0.63	0.50	91.6	91.8	89.7	6.6	2.3	2.5	1.09	678	65
FLSD 280M	45	736	584	98	0.72	0.65	0.52	91.8	91.8	90.0	6.3	2.1	2.2	1.28	723	65
FLSD 315S**	55	743	707	108	0.78	0.72	0.63	93.7	93.7	93.0	7.3	2.0	2.5	3.1	1070	78
FLSD 315M**	75	737	972	140	0.83	0.74	0.65	92.4	92.7	92.1	7.4	2.0	2.6	3.1	1070	78
FLSD 315LA**	90	735	1169	167	0.83	0.74	0.64	93.0	93.2	92.5	7.3	2.0	2.5	4.2	1100	78
FLSD 315LB**	110	740	1420	204	0.82	0.74	0.63	93.2	93.1	92.3	7.2	1.6	2.2	5.1	1195	78
FLSD 355LA**	132	740	1703	244	0.83	0.75	0.64	93.3	93.4	92.5	6.7	1.7	2.7	5.5	1485	78
FLSD 355LB**	160	740	2065	296	0.82	0.74	0.63	94.3	94.1	92.6	6.9	1.8	2.7	6	1605	78

***** Not applicable to IIC motors***

For T5 and T6 temperature classes, please consult Leroy-Somer.

Shaft extensions

Dimensions in millimetres

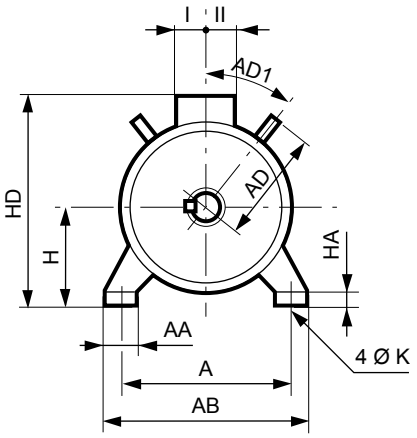


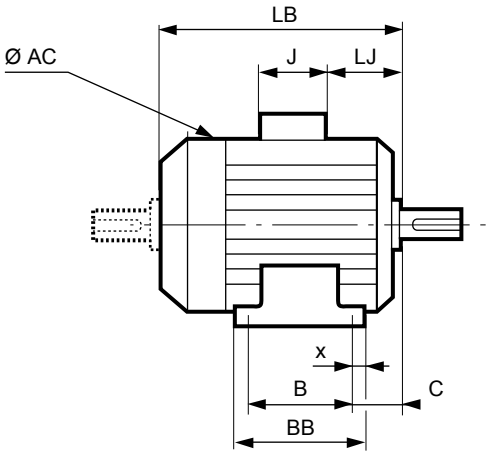
Type	Main shaft extensions													
	4, 6 and 8 poles							2 poles						
	F	GD	D	G	E	O	p	F	GD	D	G	E	O	p
FLSD 80 L	6	6	19j6	15.5	40	6	16	6	6	19j6	15.5	40	6	16
FLSD 90 S/L	8	7	24j6	20	50	8	19	8	7	24j6	20	50	8	19
FLSD 100 L	8	7	28j6	24	60	10	22	8	7	28j6	24	60	10	22
FLSD 112 M	8	7	28j6	24	60	10	22	8	7	28j6	24	60	10	22
FLSD 132 S/M	10	8	38j6	33	80	12	28	10	8	38j6	33	80	12	28
FLSD 160 M/MA/MB/L	12	8	42k6	37	110	16	36	12	8	42k6	37	110	16	36
FLSD 180 M/L	14	9	48k6	42.5	110	16	36	14	9	48k6	42.5	110	16	36
FLSD 200 L/LA/LB	16	10	55m6	49	110	20	42	16	10	55m6	49	110	20	42
FLSD 225 S/M	18	11	60m6	53	140	20	42	16	10	55m6	49	110	20	42
FLSD 250 M	18	11	65m6	58	140	20	42	18	11	60m6	53	140	20	42
FLSD 280 S/M	20	12	75m6	67.5	140	20	42	18	11	65m6	58	140	20	42
FLSD 315 S/M	22	14	80m6	71	170	20	42	18	11	65m6	58	140	20	42
FLSD 315 LA/LB	25	14	90m6	81	170	24	50	20	12	70m6	62.5	140	20	42
FLSD 355 LA/LB/LC/LD	28	16	100m6	90	210	24	50	22	14	80m6	71	170	20	42

Type	Secondary shaft extensions													
	4, 6 and 8 poles							2 poles						
	FA	GF	DA	GB	EA	OA	pA	FA	GF	DA	GB	EA	OA	pA
FLSD 80 L	5	5	14j6	11	30	5	15	5	5	14j6	11	30	5	15
FLSD 90 S/L	6	6	19j6	15.5	40	6	16	6	6	19j6	15.5	40	6	16
FLSD 100 L	8	7	24j6	20	50	8	19	8	7	24j6	20	50	8	19
FLSD 112 M	8	7	24j6	20	50	8	19	8	7	24j6	20	50	8	19
FLSD 132 S/M	8	7	28j6	24	50	10	22	8	7	28j6	24	50	10	22
FLSD 160 M/MA/MB/L	12	8	42k6	37	110	16	36	12	8	42k6	37	110	16	36
FLSD 180 M/L	14	9	48k6	42.5	110	16	36	14	9	48k6	42.5	110	16	36
FLSD 200 L/LA/LB	16	10	55m6	49	110	20	42	16	10	55m6	49	110	20	42
FLSD 225 S/M	18	11	60m6	53	140	20	42	16	10	55m6	49	110	20	42
FLSD 250 M	18	11	60m6	53	140	20	42	18	11	60m6	53	140	20	42
FLSD 280 S/M	18	11	60m6	53	140	20	42	18	11	60m6	53	140	20	42
FLSD 315 S/M	22	14	80m6	71	170	20	53	18	11	65m6	58	140	20	53
FLSD 315 LA/LB	25	14	90m6	81	170	24	53	20	12	70m6	62.5	140	20	53
FLSD 355 LA/LB/LC/LD	28	16	110m6	90	210	24	53	22	14	80m6	71	170	20	53

Foot mounted IM 1001 (IM B3)

Dimensions in millimetres



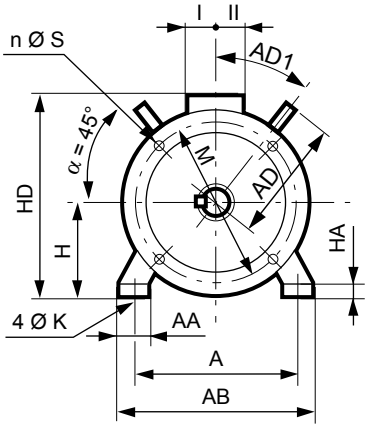


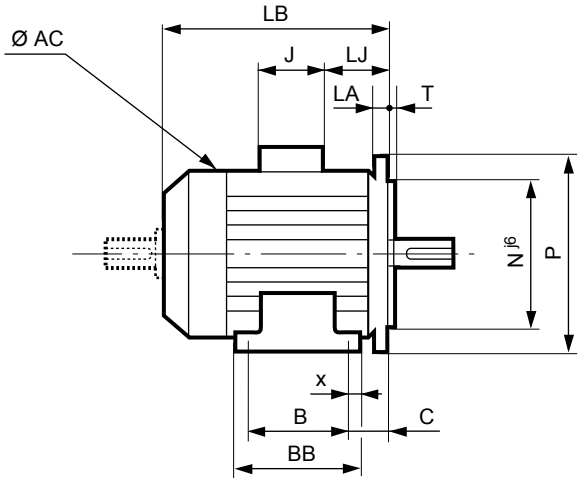
Type	Main dimensions																		
	A	AB	B	BB	C	X	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1
FLSD 80 L	125	157	100	132	50	10	34	9	10	80	172	283	258	26	142	80	77	-	-
FLSD 90 S	140	170	100	155	56	11	33	12	9.5	90	196	306	297	32	142	80	77	135	41
FLSD 90 L	140	170	125	155	56	11	33	12	9.5	90	196	306	297	32	142	80	77	135	41
FLSD 100 L	160	196	140	201	63	18	40	12	13	100	196	316	345	32	142	80	77	135	41
FLSD 112 M	190	230	140	186	70	14	47	12	14	112	230	337	346	34	142	80	77	146	45
FLSD 132 S	216	255	140	243	89	15	63	12	16	132	264	371	462	55.5	142	80	77	165	35
FLSD 132 M	216	255	178	243	89	15	63	12	16	132	264	371	462	55.5	142	80	77	165	35
FLSD 160 M/MA/MB	254	302	210	295	108	20	70	14.5	22	160	309	481	599	30	242	134	145	214	52
FLSD 160 L	254	302	254	295	108	20	70	14.5	22	160	309	481	599	30	242	134	145	214	52
FLSD 180 M	279	330	241	335	121	28	75	14.5	22	180	347	523	656	51	242	134	145	230	52
FLSD 180 L	279	330	279	335	121	28	75	14.5	22	180	347	523	656	51	242	134	145	230	52
FLSD 200 L/LA/LB	318	377	305	370	133	32	81	18.5	22	200	384	563	779	54	242	134	145	265	49
FLSD 225 S	356	428	286	428	149	32	80	18.5	28	225	384	588	779	54	242	134	145	265	49
FLSD 225 M	356	428	311	428	149	32	80	18.5	28	225	384	588	779	54	242	134	145	265	49
FLSD 250 M	406	476	349	435	168	41	80	24	25	250	481	713	830	80	319	181	190	309	49
FLSD 280 S	457	529	368	499	190	40	85	24	25	280	481	743	980	80	319	181	190	322	49
FLSD 280 M	457	529	419	499	190	40	85	24	25	280	481	743	980	80	319	181	190	322	49
FLSD 315 S	508	600	406	598	216	45	100	27	38	315	624	952	1203	96	400	195	340	-	-
FLSD 315 M	508	600	457	598	216	45	100	27	38	315	624	952	1203	96	400	195	340	-	-
FLSD 315 LA/LB	508	600	508	598	216	45	100	27	38	315	624	952	1203	96	400	195	340	-	-
FLSD 355 LA/LB	610	710	630	710	254	40	110	27	38	355	700	1027	1302	88	400	195	340	-	-
FLSD 355 LC/LD	610	710	630	710	254	40	110	27	38	355	700	1027	1426	88	400	195	340	-	-

* *AC: housing diameter without lifting rings*

Foot and flange mounted IM 2001 (IM B35)

Dimensions in millimetres



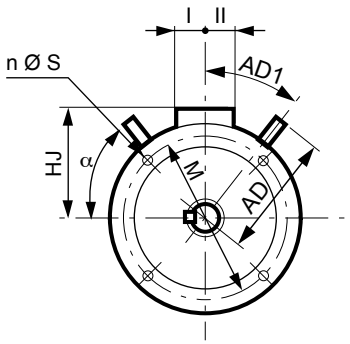


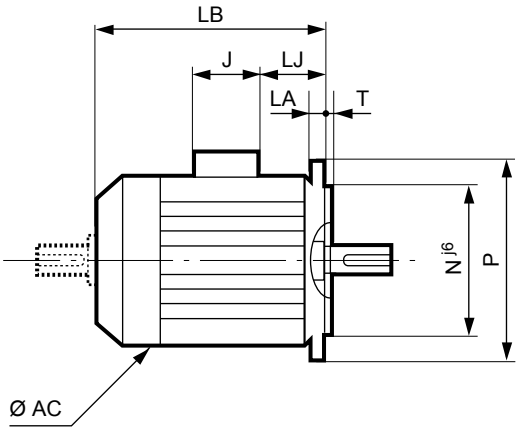
Type	Main dimensions																			
	A	AB	B	BB	C	X	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1	Symbol
FLSD 80 L	125	157	100	132	50	10	34	9	10	80	172	283	258	26	142	80	77	-	-	FF165
FLSD 90 S	140	170	100	155	56	11	33	12	9.5	90	196	306	297	32	142	80	77	135	41	FF165
FLSD 90 L	140	170	125	155	56	11	33	12	9.5	90	196	306	297	32	142	80	77	135	41	FF165
FLSD 100 L	160	196	140	201	63	18	40	12	13	100	196	316	345	32	142	80	77	135	41	FF215
FLSD 112 M	190	230	140	186	70	14	47	12	14	112	230	337	346	34	142	80	77	146	45	FF215
FLSD 132 S	216	255	140	243	89	15	63	12	16	132	264	371	462	55.5	142	80	77	165	35	FF265
FLSD 132 M	216	255	178	243	89	15	63	12	16	132	264	371	462	55.5	142	80	77	165	35	FF265
FLSD 160 M/MA/MB	254	302	210	295	108	20	70	14.5	22	160	309	481	599	30	242	134	145	214	52	FF300
FLSD 160 L	254	302	254	295	108	20	70	14.5	22	160	309	481	599	30	242	134	145	214	52	FF300
FLSD 180 M	279	330	241	335	121	28	75	14.5	22	180	347	523	656	51	242	134	145	230	52	FF300
FLSD 180 L	279	330	279	335	121	28	75	14.5	22	180	347	523	656	51	242	134	145	230	52	FF300
FLSD 200 L/LA/LB	318	377	305	370	133	32	81	18.5	22	200	384	563	779	54	242	134	145	265	49	FF350
FLSD 225 S	356	428	286	428	149	32	80	18.5	28	225	384	588	779	54	242	134	145	265	49	FF400
FLSD 225 M	356	428	311	428	149	32	80	18.5	28	225	384	588	779	54	242	134	145	265	49	FF400
FLSD 250 M	406	476	349	435	168	41	80	24	25	250	481	713	830	80	319	181	190	309	49	FF 500
FLSD 280 S	457	529	368	499	190	40	85	24	25	280	481	743	980	80	319	181	190	322	49	FF 500
FLSD 280 M	457	529	419	499	190	40	85	24	25	280	481	743	980	80	319	181	190	322	49	FF 500
FLSD 315 S	508	600	406	598	216	45	100	27	38	315	624	952	1203	96	400	195	340	-	-	FF 600
FLSD 315 M	508	600	457	598	216	45	100	27	38	315	624	952	1203	96	400	195	340	-	-	FF 600
FLSD 315 LA/LB	508	600	508	598	216	45	100	27	38	315	624	952	1203	96	400	195	340	-	-	FF 600
FLSD 355 LA/LB	610	710	630	710	254	40	110	27	38	355	700	1027	1302	88	400	195	340	-	-	FF 740
FLSD 355 LC/LD	610	710	630	710	254	40	110	27	38	355	700	1027	1426	88	400	195	340	-	-	FF 740

* *AC: housing diameter without lifting rings*

Flange mounted IM 3001 (IM B5) IM 3011 (IM V1)

Dimensions in millimetres





IEC symbol	Flange dimensions							
	M	N	P	T	n	α°	S	LA
FF 165	165	130	200	3.5	4	45	12	10
FF 165	165	130	200	3.5	4	45	12	10
FF 165	165	130	200	3.5	4	45	12	10
FF 215	215	180	250	4	4	45	15	11
FF 215	215	180	250	4	4	45	15	11
FF 265	265	230	300	4	4	45	14.5	13
FF 265	265	230	300	4	4	45	14.5	13
FF 300	300	250	350	5	4	45	18.5	15
FF 300	300	250	350	5	4	45	18.5	15
FF 300	300	250	350	5	4	45	18.5	15
FF 300	300	250	350	5	4	45	18.5	15
FF 350	350	300	400	5	4	45	18.5	15
FF 400	400	350	450	5	8	22.5	18.5	16
FF 400	400	350	450	5	8	22.5	18.5	16
FF 500	500	450	550	5	8	22.5	18.5	18
FF 500	500	450	550	5	8	22.5	18.5	18
FF 500	500	450	550	5	8	22.5	18.5	18
FF 600	600	550	660	6	8	22.5	24	22
FF 600	600	550	660	6	8	22.5	24	22
FF 600	600	550	660	6	8	22.5	24	22
FF 740	740	680	800	6	8	22.5	24	25
FF 740	740	680	800	6	8	22.5	24	25

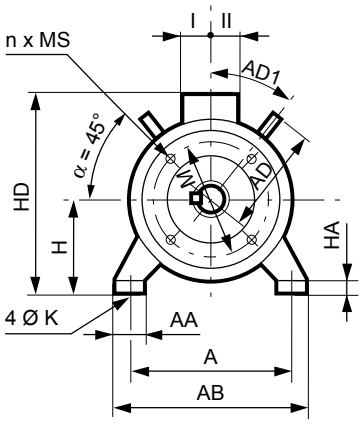
Type	Main dimensions								
	AC*	LB	HJ	LJ	J	I	II	AD	AD1
FLSD 80 L	196	297	203	32	142	80	77	-	-
FLSD 90 S	196	297	216	32	142	80	77	135	41
FLSD 90 L	196	345	216	32	142	80	77	135	41
FLSD 100 L	230	346	216	34	142	80	77	135	41
FLSD 112 M	264	462	225	55.5	142	80	77	146	48
FLSD 132 S	264	462	239	55.5	142	80	77	165	35
FLSD 132 M	309	599	239	30	242	134	145	165	35
FLSD 160 M/MA/MB	309	599	321	30	242	134	145	214	52
FLSD 160 L	347	656	321	51	242	134	145	214	52
FLSD 180 M	347	656	343	51	242	134	145	230	52
FLSD 180 L	347	656	343	51	242	134	145	230	52
FLSD 200 L/LA/LB	384	779	363	54	242	134	145	265	49
FLSD 225 S	384	779	363	54	242	134	145	265	49
FLSD 225 M	384	779	363	54	242	134	145	265	49
FLSD 250 M	481	830	463	80	319	181	190	309	49
FLSD 280 S	481	980	463	80	319	181	190	322	49
FLSD 280 M	481	980	463	80	319	181	190	322	49
FLSD 315 S	624	1203	511	96	400	195	340	-	-
FLSD 315 M	624	1203	511	96	400	195	340	-	-
FLSD 315 LA/LB	624	1203	511	96	400	195	340	-	-
FLSD 355 LA/LB	700	1302	551	88	400	195	340	-	-
FLSD 355 LC/LD	700	1426	551	88	400	195	340	-	-

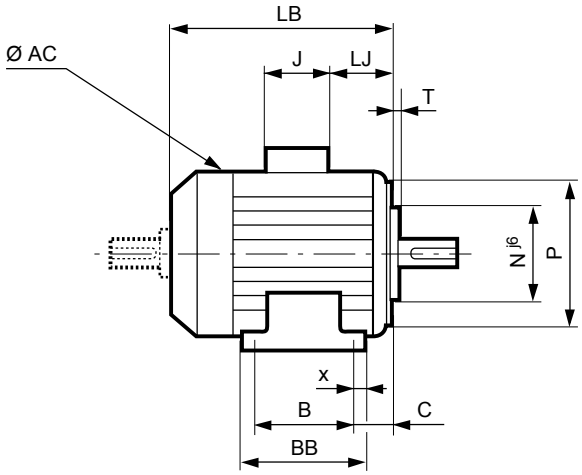
* *AC: housing diameter without lifting rings*

Flange mounted motors FF in position IM 3001 are only available up to frame size 250.
Dimensions of shaft extensions identical to those for foot mounted motors.

Foot and face mounted IM 2101 (IM B34)

Dimensions in millimetres



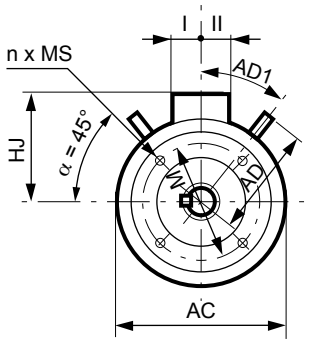


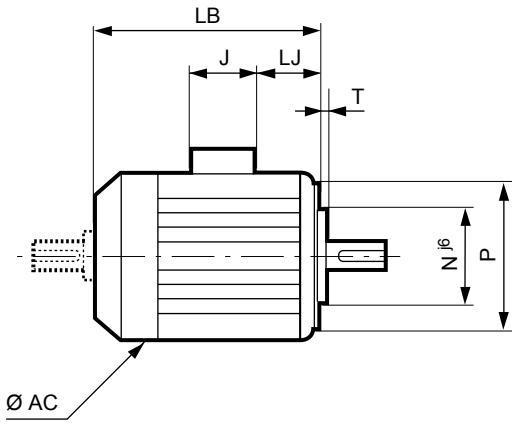
Type	Main dimensions																			
	A	AB	B	BB	C	X	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1	Symbol
FLSD 80 L	125	157	100	132	50	10	34	9	10	80	172	283	258	26	142	80	77	-	-	FT100
FLSD 90 S	140	170	100	155	56	11	33	12	9.5	90	196	306	297	32	142	80	77	135	41	FT115
FLSD 90 L	140	170	125	155	56	11	33	12	9.5	90	196	306	297	32	142	80	77	135	41	FT115
FLSD 100 L	160	196	140	201	63	18	40	12	13	100	196	316	345	32	142	80	77	135	41	FT130
FLSD 112 M	190	230	140	186	70	14	47	12	14	112	230	337	346	34	142	80	77	146	45	FT130
FLSD 132 S	216	255	140	243	89	15	63	12	16	132	264	371	462	55.5	142	80	77	165	35	FT215
FLSD 132 M	216	255	178	243	89	15	63	12	16	132	264	371	462	55.5	142	80	77	165	35	FT215

* *AC: housing diameter without lifting rings*

Face mounted IM 3601 (IM B14)

Dimensions in millimetres





IEC symbol	Faceplate dimensions					
	M	N	P	T	n	MS
FT 100	100	80	120	3	4	M6
FT 115	115	95	140	3	4	M8
FT 115	115	95	140	3	4	M8
FT 130	130	1101	160	3.5	4	M8
FT 130	130	110	160	3.5	4	M8
FT 215	215	180	250	4	4	M12
FT 215	215	180	250	4	4	M12

Type	Main dimensions								
	AC*	LB	HJ	LJ	J	I	II	AD	AD1
FLSD 80 L	172	258	203	32	142	80	77	-	-
FLSD 90 S	196	297	216	32	142	80	77	135	41
FLSD 90 L	196	297	216	32	142	80	77	135	41
FLSD 100 L	196	345	216	34	142	80	77	135	41
FLSD 112 M	230	346	225	55.5	142	80	77	146	48
FLSD 132 S	264	462	239	55.5	142	80	77	165	35
FLSD 132 M	264	462	239	30	242	134	145	165	35

* *AC: housing diameter without lifting rings*

Mechanical options

Dimensions in millimetres

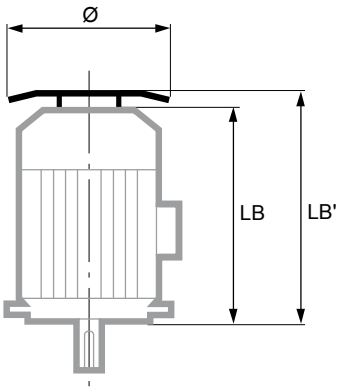
MODIFIED FLANGES

Motor type \ Flange type	(FF) Flange mounted				(FT) Face mounted				
	FF 130	FF 165	FF 215	FF 265	FT 100	FT 115	FT 130	FT 165	FT 215
FLSD 80	■	●			●				
FLSD 90	◆	●				●			
FLSD 100		◆	●				●		
FLSD 112		■	●				●		
FLSD 132				●				■	●

● Standard ■ Adapted shaft ◆ Adaptable without shaft modifications

DRIP COVER FOR OPERATION IN VERTICAL POSITION SHAFT FACING DOWN

Motor type	LB'	Ø
FLSD 80	LB + 22	145
FLSD 90-100	LB + 25	185
FLSD 112	LB + 25	208
FLSD 132	LB + 35	238
FLSD 160 M/L	LB + 58	300
FLSD 180 M/L	LB + 66	350
FLSD 200 L	LB + 66	350
FLSD 225 S/M	LB + 66	350
FLSD 250 M	LB + 74	470
FLSD 280 S/M	LB + 74	470
FLSD 315	LB + 125	420
FLSD 355	LB + 135	500

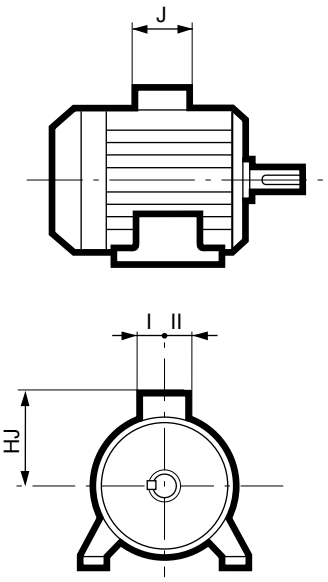


Mechanical options

Dimensions in millimetres

TERMINAL BOX

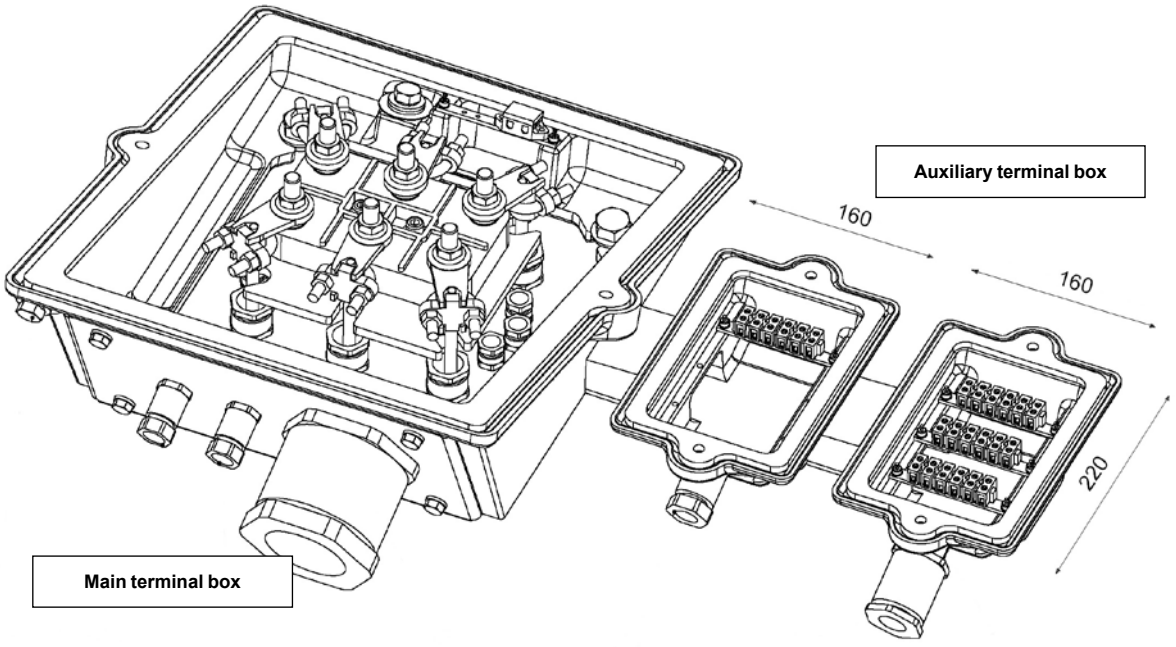
Optional "e" increased safety terminal box



Type	J	HJ	I	II
FLSD 80	158	196	79	79
FLSD 90 and 100	158	206	79	79
FLSD 112	158	218	79	79
FLSD 132	158	230	79	79
FLSD 160 and 180	223	311	113	156
FLSD 200 and 225	223	346	113	156
FLSD 250	360	470	208	205
FLSD 280	330	488	165	271
FLSD 315 S/M/L	452	540	220	269
FLSD 355	452	575	220	269

Auxiliary terminal box

All ATEX motors with frame size ≥ 160 mm can be fitted with one or two type "e" auxiliary terminal boxes to take the terminal blocks for connecting electrical options such as heat sensors and/or the heater. These auxiliary terminal boxes are fixed on the body of the main terminal box.



Mechanical options

ADAPTATION FOR VIBRATION SENSOR

On request, our motors can be equipped with tapped holes (for SPM type sensor) on faceplates, to take the vibration sensors (not supplied).

The adaptors form a connection with the snap-on transmitter.

DRAINING OF CONDENSATION

To drain off any moisture that may have accumulated inside during cooling of the machine, drain holes can be provided at the lowest points of the enclosure, depending on the operating position (IM etc). The holes are sealed using certified plugs.
Opening the holes periodically should be part of the regular maintenance procedure.

Frame size	Flameproof FLSD
80 to 132 mm	NA
160 to 280 mm	●
315 mm and above	◆

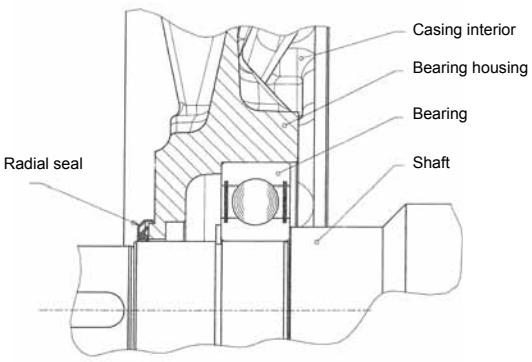
● optional ◆ please consult Leroy-Somer
NA: not applicable

TAPPED HOLES FOR POSITIONING

Tapped holes for positioning can be made on the cast iron motor feet in order to make it easier to adjust and align the motor.
They have a metric thread which can also be created to suit another standard diameter on request from size 250.

RADIAL SEAL

When a motor needs to be mounted in the vertical position, shaft facing up (position IM 1031, 2031 and 3031 for example) and its shaft extension is not correctly protected by the driven machine against rain or water splashes, it is advisable to use an optional radial seal on the drive end to avoid water getting into the motor around the shaft.



Mechanical options

FORCED VENTILATION

The ATEX motors described in this catalogue are approved to be supplied with frequency inverters.
This type of application sometimes requires the mounting of a forced ventilation unit for use at low speed (temperature rise) or at high speed (noise), in addition to the thermal protection.
The mounting of an axial forced ventilation unit is recommended for motors ≥ frame size 160.

Safety conditions: The forced ventilation unit is controlled by the power supply and should have the same degree of flameproof protection as the FLSD motor.
To adapt the motor to the application, it is necessary to inform the manufacturer of the operating characteristics (speed range, voltage, frequency, etc).

ENCODERS

All our safety motors can be fitted with an ATEX-certified incremental encoder.

This pulse generator supplies a number of pulses proportional to the motor speed. It can be supplied with a D.C. voltage of 5 V +/- 10% or 11-30 V regulated.

The drive encoder lines per revolution should be specified (at the time of ordering): 1024 or 4096 (for the incremental encoder) and 8192 (for the absolute encoder).

SPACE HEATERS

Type	Power (W)
FLSD 80	10
FLSD 90 to 132	25
FLSD 160 to 200	52
FLSD 225 to 250	100
FLSD 280 to 315	100*
FLSD 355	150*

The space heaters use 200/240 V, single-phase, 50 or 60 Hz.
** It is possible to increase the power when asking for estimate (quotation).*

Positions of the lifting rings

LIFTING THE MOTOR ONLY

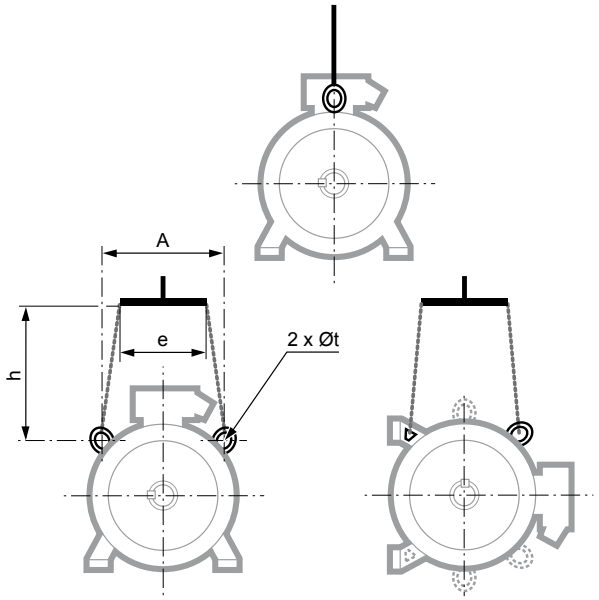
(not coupled to the machine)

The regulations stipulate that over 25 kg, suitable handling equipment must be used.

A diagram of the sling hoisting method appears below with the required dimensions.

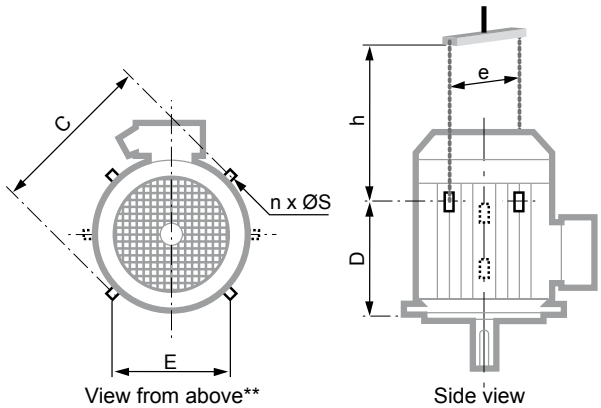
To prevent any damage to the motor during handling (for example: switching the motor from horizontal to vertical), it is essential to follow these instructions.

HORIZONTAL POSITION



Type	Horizontal position			
	A	e min.	h min.	Øt
FLSD 90	152	140	190	22
FLSD 100	152	140	190	22
FLSD 112	146	140	190	22
FLSD 132	176	160	190	22
FLSD 160	292	250	300	30
FLSD 180	324	250	300	30
FLSD 200	350	300	300	35
FLSD 225	350	300	300	35
FLSD 250	415	400	400	35
FLSD 280	430	400	400	40
FLSD 315	600	600	500	60
FLSD 355	600	600	500	60

VERTICAL POSITION



Type	Vertical position						
	C	E	D	n**	ØS	e min.*	h min.
FLSD 160	/	292	270	3	30	360	400
FLSD 180	/	324	290	3	30	410	450
FLSD 200	/	350	360	3	35	445	500
FLSD 225	/	350	360	3	35	445	500
FLSD 250	/	415	380	3	35	560	600
FLSD 280	/	430	430	3	40	560	650
FLSD 315	700	600	860	4	60	700	550
FLSD 355	700	600	860	4	60	700	550

** If the motor is fitted with a drip cover, allow an additional 50 to 100 mm to avoid damaging it when the load is swung.*

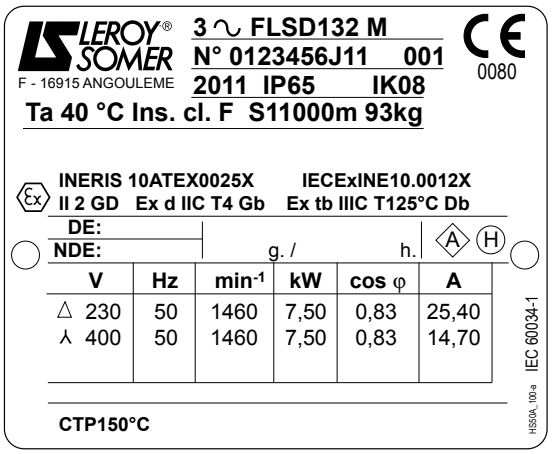
*** If n = 2, the lifting rings form an angle of 90° with respect to the terminal box axis. If n = 4, this angle becomes 45°.*

Separate ring ≤ 25 kg
Built-in ring > 25 kg

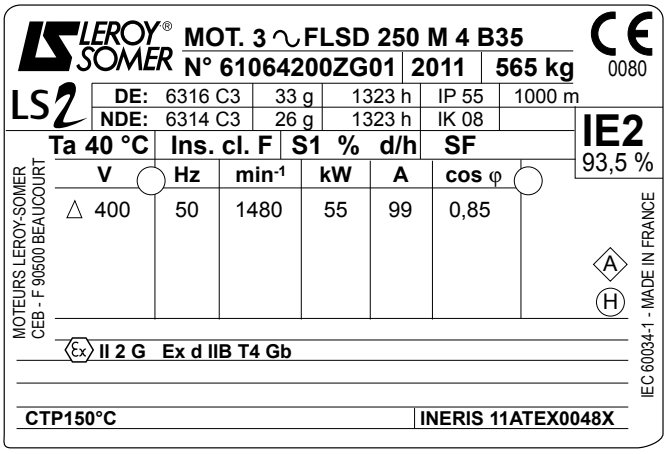
Identification and marking

NAMEPLATES

FLSD 80 to FLSD 132



FLSD 160 to FLSD 355



DEFINITION OF SYMBOLS USED ON NAMEPLATES

Legal mark of conformity of product to the requirements of European Directives

ATEX specific marking

: Mark for protection against risks of explosion

II 2G or 2GD : ATEX marking
Ex d or d e : "Gas" protection type
IIB or IIC : "Gas" equipment group
T4 : "Gas" temperature class
Gb : "Gas" EPL
Ex tb : "Dust" protection type (optional)
IIIC : "Dust" equipment group (optional)
T125°C : Maximum surface temperature (optional)
Db : "Dust" EPL
0080 : INERIS Notified Body
INERIS 10ATEX0025X : EC type-examination certificate number

Zone	ATEX marking	Gas protection type marking	Dust protection type marking (option)	Ingress protection
/	I M2	Ex d I Mb	-	IP55
1 & 2	II 2 G	Ex d IIB T4 Gb (1) Ex d IIC T4 Gb (1) Ex d IIB T5 Gb (1) Ex d IIC T5 Gb (1) Ex d IIB T6 Gb (1) Ex d IIC T6 Gb (1)	-	IP55
1 & 21 2 & 22	II 2 GD	Ex d IIB T4 Gb (1) Ex d IIC T4 Gb (1) Ex d IIB T5 Gb (1) Ex d IIC T5 Gb (1) Ex d IIB T6 Gb (1) Ex d IIC T6 Gb (1)	Ex tb IIIC T125°C Db Ex tb IIIC T125°C Db Ex tb IIIC T100°C Db Ex tb IIIC T100°C Db Ex tb IIIC T85°C Db Ex tb IIIC T85°C Db	IP65

(1): or Ex d e

Motor

MOT 3 ~ : Three-phase A.C. motor
FLSD : Series
132 : Frame size
M : Housing symbol

Motor no.

0123456 : Motor batch number
J : Month of production
11 : Year of production
001 : Serial number

kg : Weight
IP65 : Ingress protection
IK08 : Shock resistance index
I cl.F : Insulation class F
40°C : Maximum ambient operating temperature
S1 : Duty
V : Supply voltage
Hz : Supply frequency
min-1 : Speed of rotation
kW : Rated power
cos φ : Power factor
A : Rated current
Δ : Delta connection
Y : Star connection

Bearings

DE : Drive end bearing
NDE : Non drive end bearing
g : Amount of grease at each regreasing (in g)
h : Regreasing interval (in hours)
A : Vibration level
H : Balancing mode

Name

II 2 G Ex e IIC T3 (or T4) Gb
II 3 G Ex nA IIC T3 Gc
II 2 D Ex tb IIIC T125°C Db
II 3 D Ex tc IIIB T125°C Dc

The complete motor **reference** described below will enable you to **order** the desired equipment.

The selection method consists of following the terms in the designation.

4P 1500 min-1	FLSN	180	MR	18.5 kW	LS2/IE2	IM 1001 IM B3	230 / 400 V	50 Hz	IP 55
No. of poles Speed(s)	Series designation	Frame size IEC 60072	Housing designation and manufacturer code	Rated power	Range/Efficiency class	Mounting arrangement IEC 60034-7	Mains voltage	Mains frequency	Protection IEC 60034-5

Description

Description	Materials	Comments
Housing with cooling fins	Cast iron	- lifting rings for frame size ≥ 90 - earth terminal with an optional jumper screw - stainless steel nameplate with marking
Stator	Insulated low-carbon magnetic steel laminations Electroplated copper	- low carbon content guarantees long-term lamination pack stability - welded laminations - semi-enclosed slots - class F insulation
Rotor	Insulated low-carbon magnetic steel laminations Aluminium	- inclined cage bars - rotor cage pressure die-cast in aluminium (or alloy for special applications), or soldered in copper - shrink-fitted to shaft, or keyed for soldered rotor - rotor balanced dynamically, class A, 1/2 key
Shaft	Steel	- for frame size ≤ 132: closed keyway - for frame size ≥ 160: open keyway
End shields	Cast iron	
Bearings and lubrication		- permanently greased bearings frame size 80 to 225 - regreasable bearings frame size 250 to 450 - bearings preloaded at NDE up to 315 S, preloaded at DE from size 315 M upwards
Labyrinth seal **Lipseals**	Plastic or steel Synthetic rubber	- labyrinth seal at drive end for foot mounted motors, frame size ≤ 132 - lipseal at drive end for foot and flange mounted or flange mounted motors, frame size ≤ 132 - lipseal at drive end and non drive end for frame sizes 160 to 250 inclusive - decompression grooves for 280 M to 355 LD - labyrinth seal at drive end and non drive end for frame sizes ≥ 355 LK
Fan	Composite up to size 280 inclusive Metal from 315 ST upwards	- 2 directions of rotation: straight blades
Fan cover	Pressed steel	- fitted, on request, with a drip cover for operation in vertical position, shaft end facing down
Terminal box	Cast iron body and cover for all frame sizes	- IP 55 or IP 65 - fitted with a block with 6 terminals up to 355 LD, 6 or 12 terminals for frame sizes 355LK/400/450 - terminal box fitted with plugs up to 132 - from the 160 to the 355, drilled cable gland mounting plate with plugs (FLSE, FLSN and FLSPX) or undrilled cable gland mounting plate (FLSES) (nozzle and cable gland as options) - 1 earth terminal in each terminal box

Other construction types

CORROBLOC FINISH

The CORROBLOC finish is a top coat for the basic cast iron motor described above. In addition to the basic construction, its special finishes resist corrosion in particularly harsh environments, and these qualities are enhanced with age.

Description	Materials	Comments
Stator - Rotor		- dielectric and anti-corrosion protection for frame sizes 80 to 132
Nameplate	Stainless steel	- nameplate: indelible marking
Screws	Stainless steel	- captive screws for terminal box cover (frame size ≤ 132)
Terminal box	Cast iron body and cover	
Cable glands	Brass	
External finish		- system IIIa (see External finish section)

Bearings and lubrication

PERMANENTLY GREASED BEARINGS

Under normal operating conditions, the service life in hours of the lubricant is indicated in the table below for ambient temperatures less than 55°C.

Series	Type	Number of poles	Types of permanently greased bearing		Grease life according to speed of rotation								
					3000 rpm			1500 rpm			1000 rpm		
			N.D.E.	D.E.	25°C	40°C	55°C	25°C	40°C	55°C	25°C	40°C	55°C
FLSE FLSN FLSPX FLSES	80 L	2	6203 CN	6204 C3	≥40000	≥40000	25000	-	-	-	-	-	-
	80 LG	4	6204 C3	6205 C3	-	-	-	≥40000	≥40000	31000	-	-	-
	90 S	2; 4; 6			≥40000	≥40000	24000				≥40000	≥40000	34000
	90 L	4			-	-	-				-	-	-
	90 LU	2; 6	6205 C3	6205 C3	≥40000	≥40000	24000	-	-	-	≥40000	≥40000	34000
	100 L	2; 4	6205 C3	6206 C3	≥40000	≥40000	22000	≥40000	≥40000	30000	-	-	-
	100 LK	4; 6			-	-	-				≥40000	≥40000	33000
	112 MG	2; 6			≥40000	≥40000	22000	-	-	-			
	112 MU	4	6206 C3	6206 C3	-	-	-	≥40000	≥40000	30000	-	-	-
	132 S	2; 4; 6	6207 C3	6308 C3	≥40000	≥40000	19000	≥40000	≥40000	25000	≥40000	≥40000	30000
	132 M	6			-	-	-	-	-	-			
	132 MU	2; 4	6307 C3	6308 C3	≥40000	≥40000	19000	≥40000	≥40000	25000	-	-	-
	132 MR	4; 6	6308 C3	6308 C3	-	-	-	≥40000	≥40000	25000	≥40000	≥40000	30000
	160 M	2; 4; 6	6210 C3	6309 C3	≥40000	34800	17400	≥40000	≥40000	25500	≥40000	≥40000	33000
	160 L	6			-	-	-	-	-	-	≥40000	≥40000	33000
	160 LU	2; 4	6210 C3	6309 C3	≥40000	34800	17400	≥40000	≥40000	25500	-	-	-
		6	6210 C3	6309 C3	-	-	-	-	-	-	≥40000	≥40000	29300
	180 M	2	6212 C3	6310 C3	≥40,000	28200	14100	-	-	-	-	-	-
	180 MR	4	6210 C3	6310 C3	-	-	-	≥40000	≥40000	23300	-	-	-
	180 L	6	6212 C3	6310 C3	-	-	-	-	-	-	≥40000	≥40000	26300
	180 LUR	4	6312 C3	6310 C3	-	-	-	≥40000	≥40000	20300	-	-	-
	200 LU	2; 4; 6	6312 C3	6312 C3	≥40000	23400	11700	≥40000	≥40000	20300	≥40000	≥40000	26300
	225 SR	4	6312 C3	6313 C3	-	-	-	≥40000	37500	18800	-	-	-
	225 M	4; 6	6314 C3	6314 C3	-	-	-	≥40000	36000	18000	≥40000	≥40000	24000
	225 MR	2	6312 C3	6313 C3	39600	19800	9900	-	-	-	-	-	-

NB: On request, all motors can be fitted with grease nipples.

Bearings and lubrication

BEARINGS WITH GREASE NIPPLES

The chart opposite shows the greasing intervals, depending on the type of motor, for standard bearing assemblies fitted with grease nipples, operating at an ambient temperature of 25°C, 40°C and 55°C on a horizontal shaft machine.

The chart below is valid for FLSES/ FLSN/FLSPX/FLSES motors lubricated with Polyrex EM103 grease, which is used as standard.

SPECIAL CONSTRUCTION AND ENVIRONMENT

For vertical shaft machines, the greasing intervals will be approximately 80% of the values stated in the table below.

NB: The quality and quantity of grease and the greasing interval are shown on the machine nameplate.

For special assemblies (motors fitted with DE roller bearings or other types), machines of frame size ≥ 160 mm have bearings with grease nipples.

Instructions for bearing maintenance are given on the nameplates on these machines.

Series	Type	Number of poles	Type of bearing for bearings with grease nipples		Quantity of grease	Greasing intervals in hours								
						3000 rpm			1500 rpm			1000 rpm		
			N.D.E.	D.E.	g	25°C	40°C	55°C	25°C	40°C	55°C	25°C	40°C	55°C
FLSE FLSN FLSPX FLSES	160 M*	2; 4; 6	6210 C3	6309 C3	13	17600	8800	4400	25800	12900	6450	29200	14600	7300
	160 L*	6			13	-	-	-	-	-	-	29200	14600	7300
	160 LU*	2; 4			13	17600	8800	4400	17600	8800	4400	-	-	-
		6			15	-	-	-	-	-	-	29200	14600	7300
	180 M*	2	6212 C3	6310 C3	15	14400	7200	3600	-	-	-	-	-	-
	180 MR*	4	6210 C3	6310 C3	15	-	-	-	24200	12100	6050	-	-	-
	180 L*	6	6212 C3	6310 C3	20	-	-	-	-	-	-	27800	13900	6950
	180 LUR*	4	6312 C3	6310 C3	20	-	-	-	21400	10700	5350	-	-	-
	200 LU*	2; 4; 6	6312 C3	6312 C3	20	12000	6000	3000	21400	10700	5350	25000	12500	6250
	225 SR*	4	6312 C3	6313 C3	25	-	-	-	20000	10000	5000	-	-	-
	225 M*	4; 6	6314 C3	6314 C3	25	-	-	-	18800	9400	4700	25400	12700	6350
	225 MR*	2	6312 C3	6313 C3	25	10600	5300	2650	-	-	-	-	-	-
	250 M	2; 4; 6	6314 C3	6314 C3	25	9400	4700	2350	18800	9400	4700	25400	12700	6350
	280 S/M	2; 4; 6	6314 C3	6316 C3	35	7200	3600	1800	21000	13230	6615	29000	29000	18270
	315 S/M/L	2	6316 C3	6218 C3	35	7400	5880	2920	-	-	-	-	-	-
	315 S/M/L	4; 6	6316 C3	6320 C3	50	-	-	-	15600	12400	6160	25000	25000	12500
	355 L	2	6316 C3	6218 C3	35	7400	3700	1850	-	-	-	-	-	-
	355 L	4; 6	6316 C3	6322 C3	60	-	-	-	13200	8316	4160	22000	13860	6930
	355 LK	4; 6	6324 C3	6324 C3	72	-	-	-	7500	3700	2800	20000	20000	10000
	400 L/LV	4; 6	6324 C3	6324 C3	72	-	-	-	7500	3700	2800	20000	20000	10000
	400 LK/450 L	4; 6	6328 C3	6328 C3	93	-	-	-	4600	2300	1100	10000	6000	3000

** bearing with grease nipples on request*

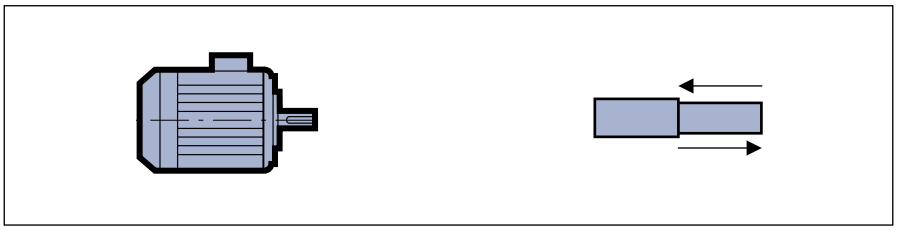
BEARING FITTING ARRANGEMENTS

FLSE-FLSN-FLSPX-FLSES series		Horizontal shaft	Vertical shaft	
			Shaft facing down	Shaft facing up
Foot mounted motors	Mounting arrangement	B3	V5	V6
	standard mounting	The DE bearing is: - located at DE for frame ≤ 132 - locked for frame ≥ 160	The DE bearing is locked	The DE bearing is: - located at DE for frame ≤ 90 - locked for frame ≥ 100
	on request	DE bearing locked for frame < 132		DE bearing locked for frame < 90
Flange mounted motors (or foot and flange)	Mounting arrangement	B5/B35/B14/B34	V1/V15/V18/V58	V3/V36/V19/V69
	standard mounting	The DE bearing is locked on frames 80 to 280	The DE bearing is locked on frames 80 to 280	The DE bearing is locked on frames 80 to 280
		The NDE bearing is locked on frames 315 to 450	The NDE bearing is locked on frames 315 to 450	The NDE bearing is locked on frames 315 to 450

Axial loads

Horizontal motor

For a bearing life L_{10h} of 25,000 hours and 40,000 hours

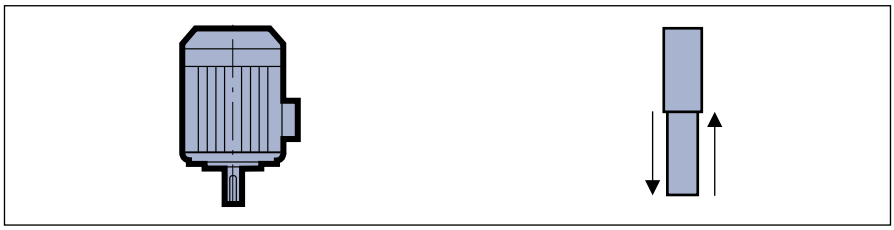


Series	Type	Number of poles	Permissible axial load (in daN) on main shaft extension for standard bearing assembly IM B3/B6 IM B7/B8 IM B5/B35 IM B14/B34											
			3000 rpm				1500 rpm				1000 rpm			
			→		←		→		←		→		←	
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours
FLSE FLSN FLSPX FLSES	80 L	2	32	23	62	53	-	-	-	-	-	-	-	-
	80 LG	4	-	-	-	-	47	34	87	74	-	-	-	-
	90 S/L	2; 4; 6	29	20	69	59	45	32	85	72	60	44	100	84
	90 LU	2; 6	25	18	75	64	-	-	-	-	54	40	104	87
	100 L	2; 4	43	30	93	80	65	47	115	97	-	-	-	-
	100 LK	4; 6	-	-	-	-	62	43	112	95	85	59	135	115
	112 MG	2; 6	42	29	92	78	-	-	-	-	81	57	131	111
	112 MU	4	-	-	-	-	56	39	116	98	-	-	-	-
	132 S	2; 4; 6	74	54	134	80	158	111	228	194	131	99	191	159
	132 M	6	-	-	-	-	-	-	-	-	190	146	260	216
	132 MU	2; 4	105	73	185	157	145	121	235	198	-	-	-	-
	132 MR	4	-	-	-	-	144	101	234	199	-	-	-	-
	160 M	2; 4; 6	126	91	226	191	174	128	274	228	240	183	340	283
	160 LU	2; 4; 6	123	88	223	188	177	130	277	230	207	152	307	252
	160 L	6	-	-	-	-	-	-	-	-	222	166	322	266
	180 M	2	185	116	233	146	-	-	-	-	-	-	-	-
	180 MR	4	-	-	-	-	193	140	293	240	-	-	-	-
	180 L	6	-	-	-	-	-	-	-	-	276	212	324	260
	180 LUR	4	-	-	-	-	223	169	286	232	-	-	-	-
	200 LU	2; 4; 6	247	193	310	256	333	261	396	324	392	280	455	343
	225 SR	4	-	-	-	-	370	290	433	353	-	-	-	-
	225 M	4; 6	-	-	-	-	412	322	492	402	485	378	565	458
	225 MR	2	279	219	342	282	-	-	-	-	-	-	-	-
	250 M	2; 4; 6	307	240	387	320	407	317	487	397	468	361	548	441
	280 S/M	2; 4; 6	342	258	484	400	483	372	625	514	581	445	723	587
	315 S/M/LA/LB	2; 6	411	348	165	102	-	-	-	-	933	761	687	515
	315 S/M/LA/LB	4	-	-	-	-	814	670	568	424	-	-	-	-
	355 LA/LB/LC	2	393	333	147	87	-	-	-	-	-	-	-	-
	355 LA/LB/LC	4; 6	-	-	-	-	876	724	630	478	947	764	701	518
	355 LKA	6	-	-	-	-	-	-	-	-	937	760	615	440
	355 LKB	6	-	-	-	-	-	-	-	-	897	725	577	405
	400 LA	4; 6	-	-	-	-	873	-	593	-	941	-	661	-
	400 LB/LVB	4; 6	-	-	-	-	862	-	582	-	923	-	943	-
	400 LKB	6	-	-	-	-	-	-	-	-	1162	-	941	-
	450 LA/LVA	4; 6	-	-	-	-	1061	-	707	-	1179	-	808	-
	450 LB/LKB	4; 6	-	-	-	-	1041	-	687	-	1162	-	941	-

Axial loads

Vertical motor
Shaft facing down

For a bearing life L_{10h} of 25,000 hours and 40,000 hours

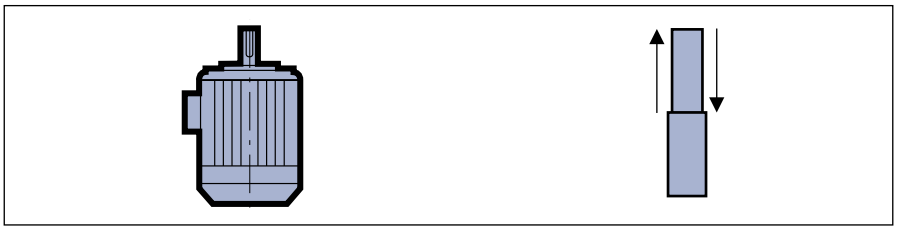


Series	Type	Number of poles	Permissible axial load (in daN) on main shaft extension for standard bearing assembly IM V5 IM V1/V15 IM V18/V58											
			3000 rpm ↓		3000 rpm ↑		1500 rpm ↓		1500 rpm ↑		1000 rpm ↓		1000 rpm ↑	
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours
FLSE FLSN FLSPX FLSES	80 L	2	30	21	64	55	-	-	-	-	-	-	-	-
	80 LG	4	-	-	-	-	45	32	92	78	-	-	-	-
	90 S/L	2; 4; 6	27	17	74	64	42	29	91	78	56	41	106	90
	90 LU	2; 6	21	14	80	68	-	-	-	-	50	37	111	94
	100 L	2; 4	40	26	99	86	60	42	123	104	-	-	-	-
	100 LK	4; 6	-	-	-	-	55	38	123	104	79	58	147	125
	112 MG	2; 6	36	25	101	86	-	-	-	-	74	54	144	122
	112 MU	4	-	-	-	-	49	31	129	111	-	-	-	-
	132 S	2; 4; 6	67	47	145	125	147	103	247	210	122	90	207	175
	132 M	6	-	-	-	-	-	-	-	-	179	134	279	235
	132 MU	2; 4	93	65	204	173	136	98	253	215	-	-	-	-
	132 MR	4	-	-	-	-	129	90	260	221	-	-	-	-
	160 M	2; 4; 6	105	69	261	225	152	105	314	267	215	158	379	323
	160 LU	2; 4; 6	100	65	261	226	152	105	322	275	178	122	362	306
	160 L	6	-	-	-	-	-	-	-	-	195	139	369	313
	180 M	2	155	97	278	174	-	-	-	-	-	-	-	-
	180 MR	4	-	-	-	-	168	114	345	291	-	-	-	-
	180 L	6	-	-	-	-	-	-	-	-	237	172	394	329
	180 LUR	4	-	-	-	-	188	134	348	293	-	-	-	-
	200 LU	2; 4; 6	205	150	370	316	286	214	469	396	343	226	534	434
	225 SR	4	-	-	-	-	317	236	520	438	-	-	-	-
	225 M	4; 6	-	-	-	-	337	245	614	522	413	305	690	581
	225 MR	2	233	172	412	351	-	-	-	-	-	-	-	-
	250 M	2; 4; 6	246	178	482	414	326	235	616	524	384	276	688	580
	280 S/M	2; 4; 6	396	307	484	395	507	394	670	557	602	461	793	651
	315 S/M/LA/LB	2; 6	226	156	417	347	-	-	-	-	-	-	-	-
	315 S/M/LA/LB	4					601	449	893	741	683	515	1042	873
	355 LA/LB/LC	2	135	65	524	454	-	-	-	-	-	-	-	-
	355 LA/LB/LC	4; 6	-	-	-	-	516	350	1123	957	566	364	1328	1126
	355 LKA	6	-	-	-	-	-	-	-	-	650	442	1349	1140
	355 LKB	6	-	-	-	-	-	-	-	-	393	185	1624	1416
	400 LA	4; 6	-	-	-	-	672	-	1058	-	649	-	1315	-
	400 LB/LVB	4; 6	-	-	-	-	612	-	1106	-	571	-	1372	-
	400 LKB	6	-	-	-	-	-	-	-	-	671	-	1772	-
	450 LA/LVA	4; 6	-	-	-	-	868	-	1247	-	791	-	1668	-
	450 LB/LKB	4; 6	-	-	-	-	729	-	1366	-	671	-	1772	-

Axial loads

Vertical motor
Shaft facing up

For a bearing life L_{10h} of 25,000 hours and 40,000 hours



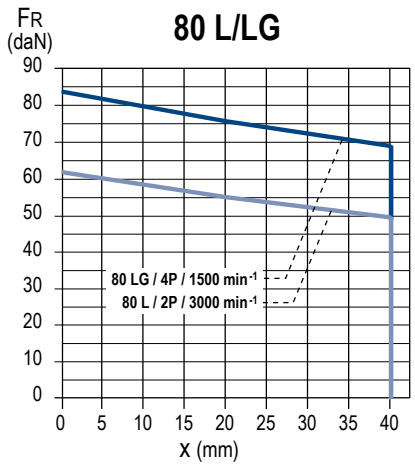
Series	Type	Number of poles	Permissible axial load (in daN) on main shaft extension for standard bearing assembly IM V6 IM V3/V36 IM V19/V69											
			3000 rpm				1500 rpm				1000 rpm			
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours
FLSE FLSN FLSPX FLSES	80 L	2	60	51	34	25	-	-	-	-	-	-	-	-
	80 LG	4	-	-	-	-	85	72	52	38	-	-	-	-
	90 S/L	2; 4; 6	67	57	34	24	82	69	51	38	96	81	66	50
	90 LU	2; 6	71	60	30	81	-	-	-	-	100	84	61	46
	100 L	2; 4	90	76	49	36	110	92	73	54	-	-	-	-
	100 LK	4; 6	-	-	-	-	105	88	73	54	129	108	97	72
	112 MG	2; 6	86	72	51	37	-	-	-	-	123	103	94	70
	112 MU	4	-	-	-	-	109	91	69	51	-	-	-	-
	132 S	2; 4; 6	127	107	86	66	217	182	177	129	182	150	147	115
	132 M	6	-	-	-	-	-	-	-	-	249	205	209	165
	132 MU	2; 4	173	145	124	89	216	179	173	135	-	-	-	-
	132 MR	4	-	-	-	-	219	184	170	124	-	-	-	-
	160 M	2; 4; 6	205	169	161	125	252	205	214	167	315	258	279	223
	160 LU	2; 4; 6	200	165	161	126	252	205	222	175	278	222	262	206
	160 L	6	-	-	-	-	-	-	-	-	295	239	269	213
	180 M	2	203	127	230	144	-	-	-	-	-	-	-	-
	180 MR	4	-	-	-	-	268	214	245	191	-	-	-	-
	180 L	6	-	-	-	-	-	-	-	-	285	220	346	281
	180 LUR	4	-	-	-	-	251	197	285	230	-	-	-	-
	200 LU	2; 4; 6	268	213	304	250	349	277	406	333	406	289	471	371
	225 SR	4	-	-	-	-	380	299	457	375	-	-	-	-
	225 M	4; 6	-	-	-	-	417	325	534	442	493	385	610	501
	225 MR	2	296	235	349	288	-	-	-	-	-	-	-	-
	250 M	2; 4; 6	326	258	402	334	406	315	536	444	464	356	608	500
	280 S/M	2; 4; 6	396	307	484	395	507	394	670	557	602	461	793	651
	315 S/M/L	2	226	156	417	347	-	-	-	-	-	-	-	-
	315 S/M/L	4; 6	-	-	-	-	601	449	893	741	683	515	1042	873
	355 L	2	135	65	524	454	-	-	-	-	-	-	-	-
	355 L	4; 6	-	-	-	-	516	350	1123	957	566	364	1328	1126

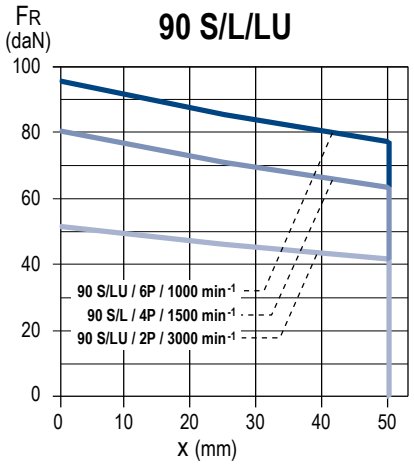
400 and 450: please consult Leroy-Somer

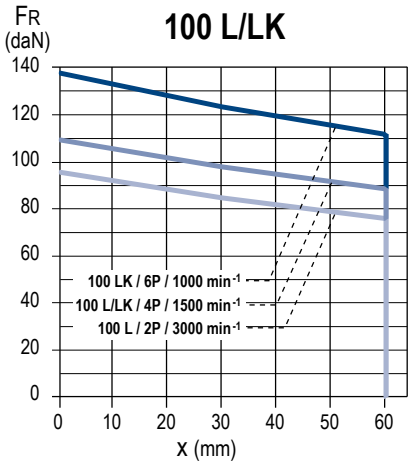
Radial loads

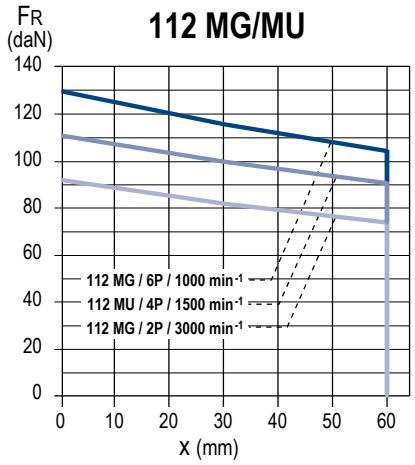
STANDARD FITTING ARRANGEMENT

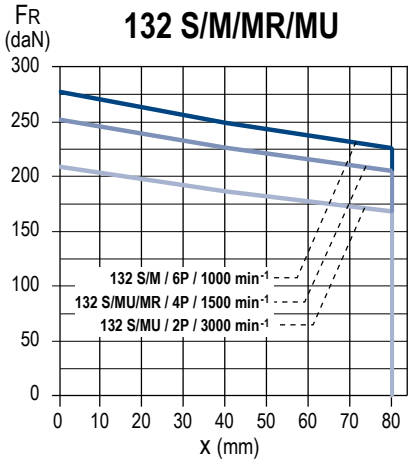
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: Distance with respect to the shaft shoulder

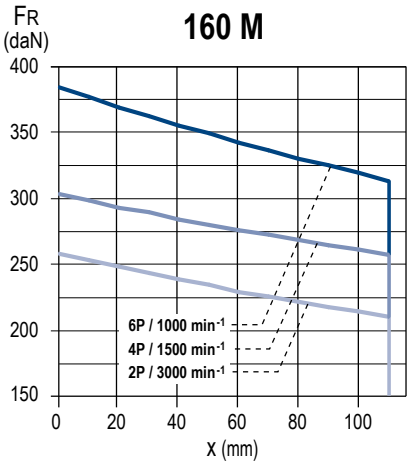


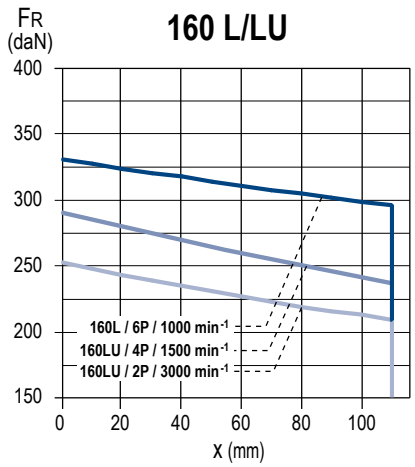


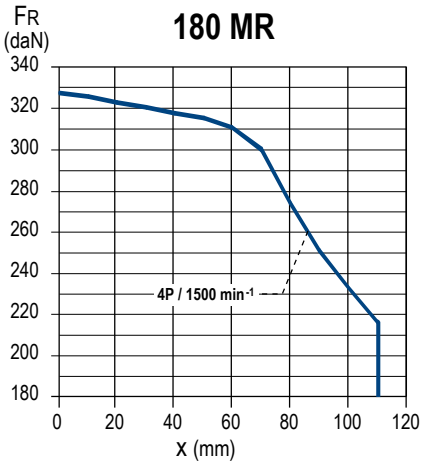


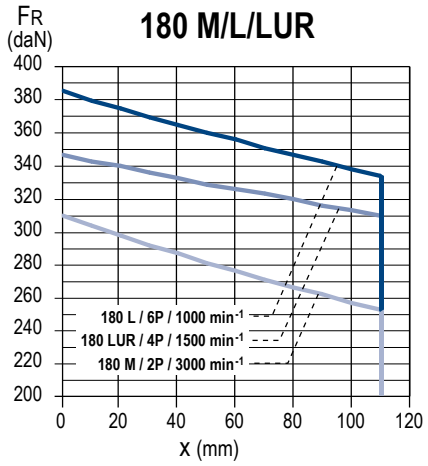








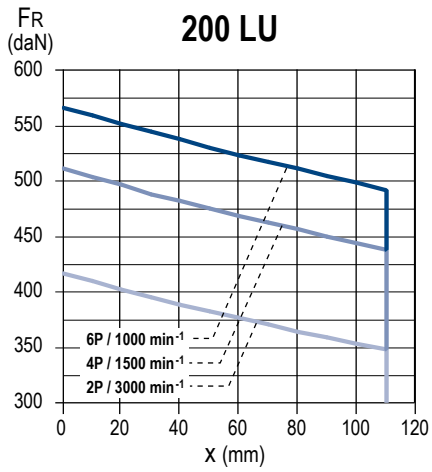


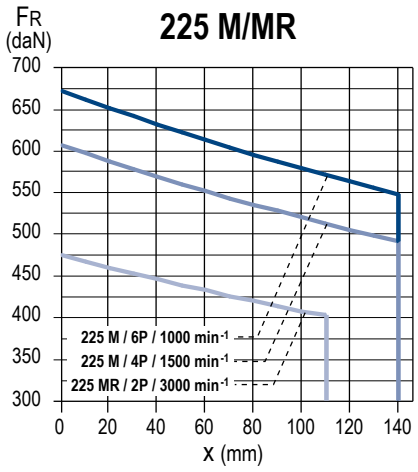


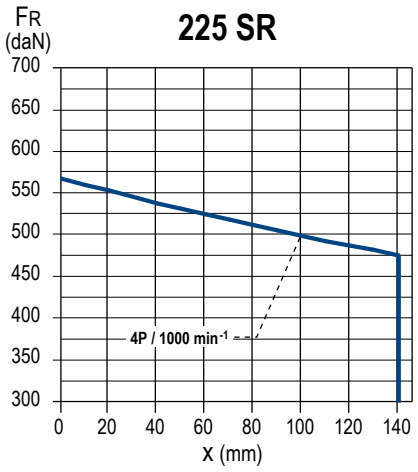
Radial loads

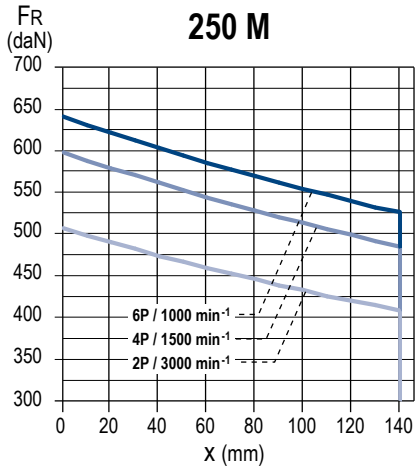
STANDARD FITTING ARRANGEMENT

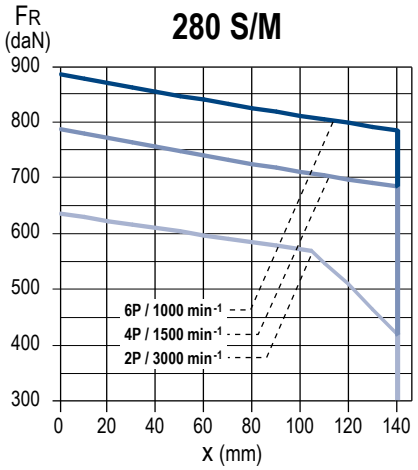
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: Distance with respect to the shaft shoulder

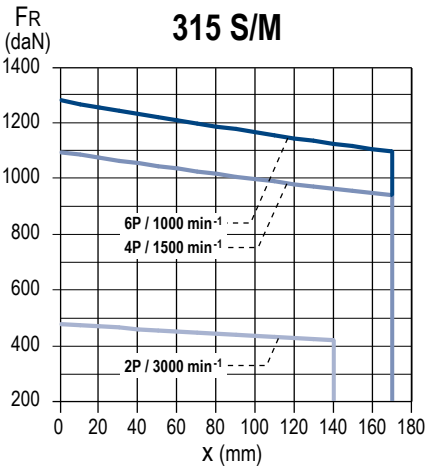


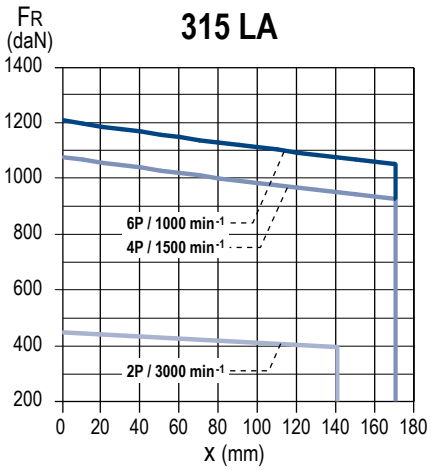


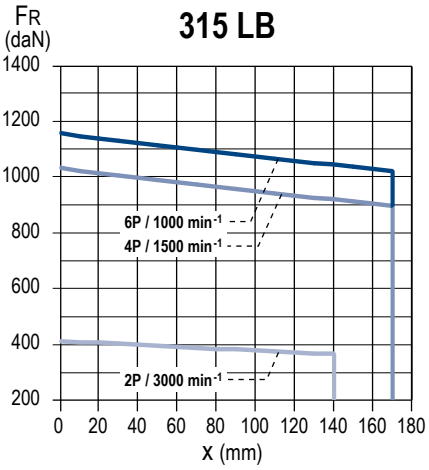








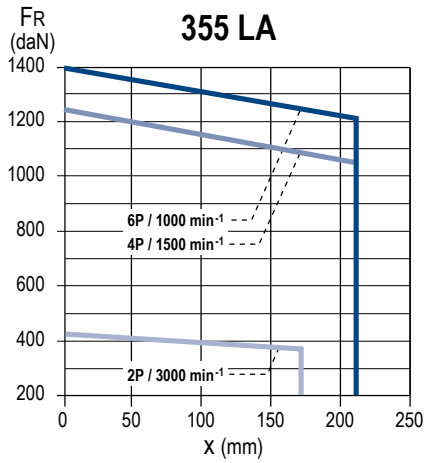


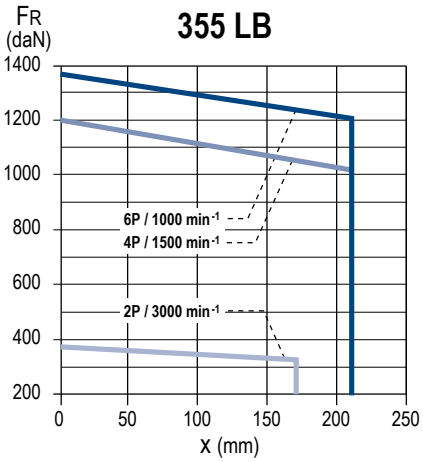


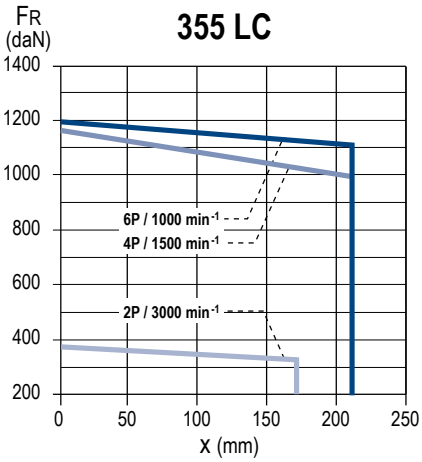
Radial loads

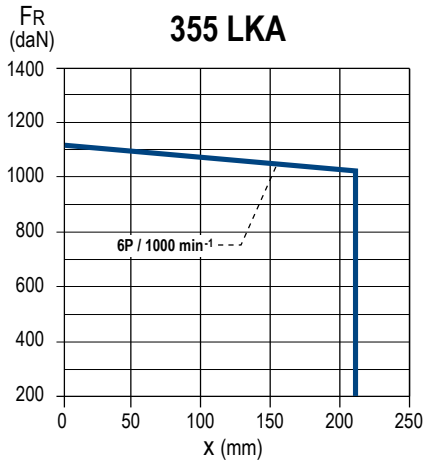
STANDARD FITTING ARRANGEMENT

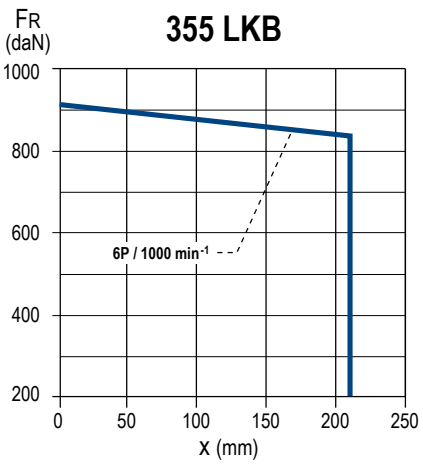
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: Distance with respect to the shaft shoulder

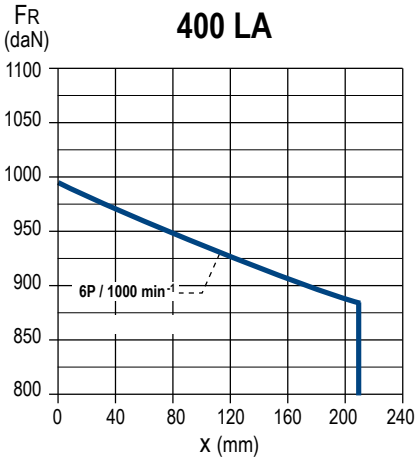


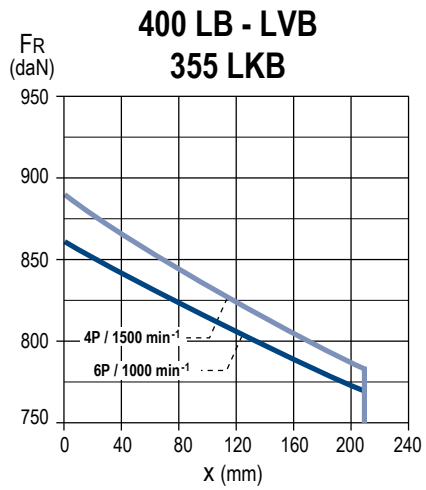


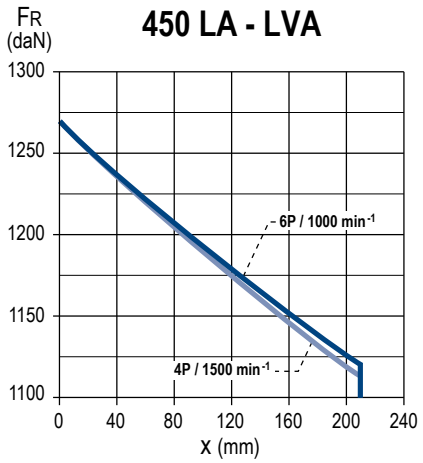


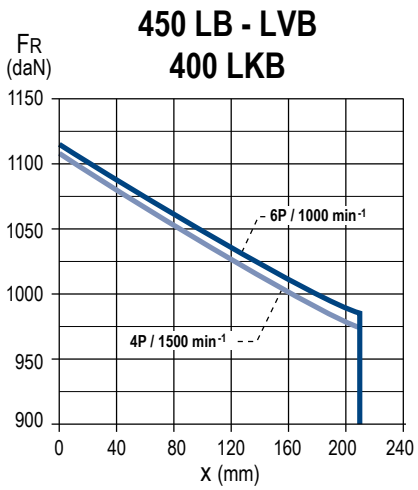












Radial loads

SPECIAL FITTING ARRANGEMENT

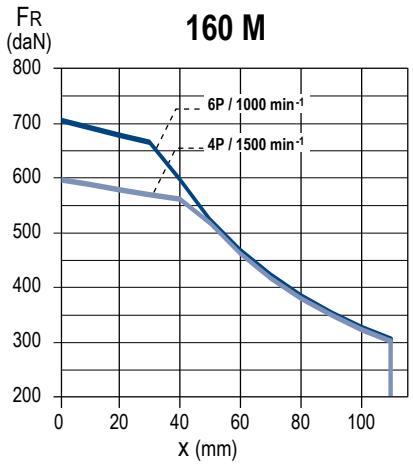
Type of drive end roller bearings

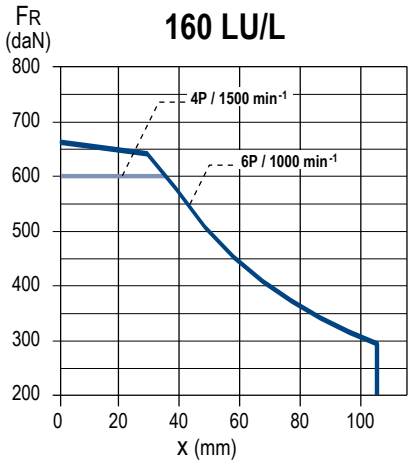
Series	Type	Number of poles	Non-drive end bearing (N.D.E.)	Drive end bearing (D.E.)
FLSE FLSN FLSPX FLSES	160M	4; 6	6210 C3	NU 309
	160L	6		
	160LU	4		
	160LU	6	6210 C3	NU 310
	180MR	4		
	180L	6	6312 C3	NU 310
	180LUR	4		
	200LU	4; 6	6312 C3	NU 312
	225SR	4	6312 C3	NU 313
	225M	4; 6	6314 C3	NU 314
	250M	4; 6	6314 C3	NU 314
	280S/M	4; 6	6314 C3	NU 316
	315S/M/L	4; 6	6316 C3	NU 320
	355L	4; 6	6316 C3	NU 322
	355 LK	6	6324 C3	NU 324
	400 LA/LB	4; 6	6324 C3	NU 324
	400 LKA/LKB	4; 6	6328 C3	NU 328
	450 LA/LB/LVA/LVB	4; 6	6328 C3	NU 328

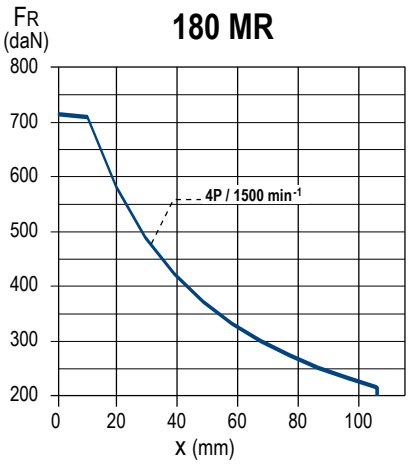
Radial loads

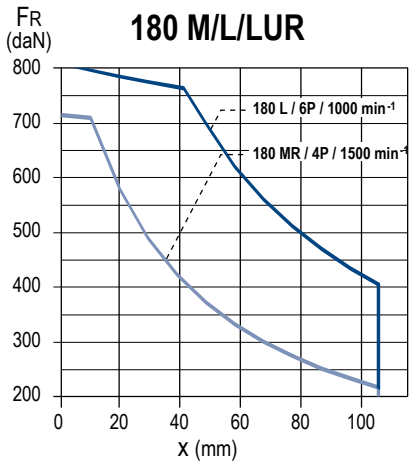
SPECIAL FITTING ARRANGEMENT

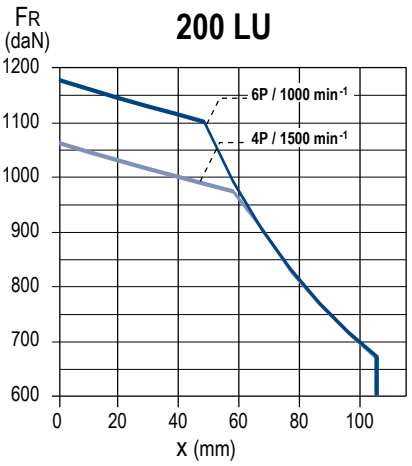
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: Distance with respect to the shaft shoulder

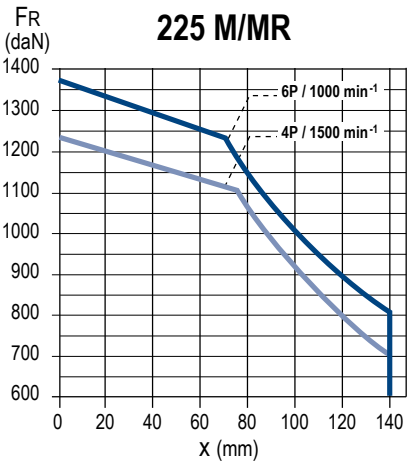


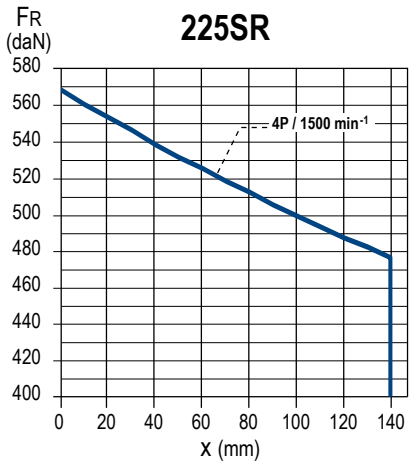


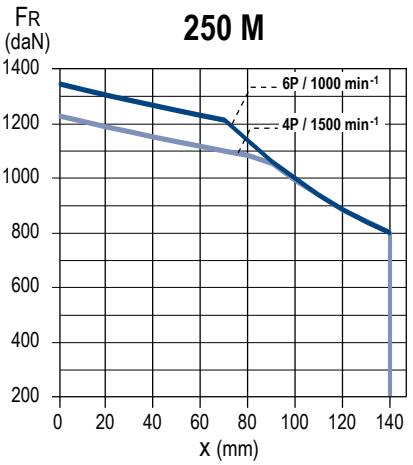


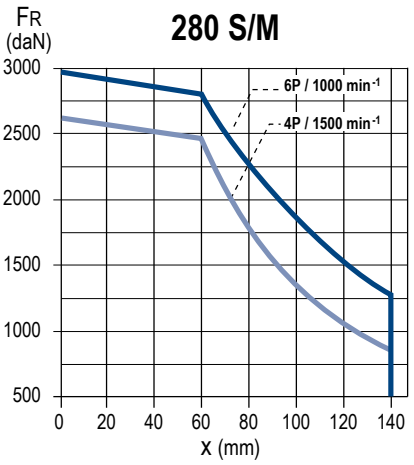








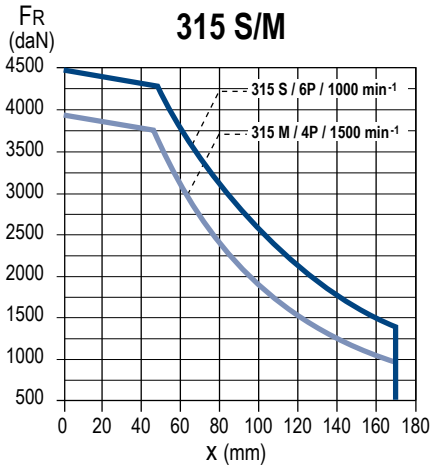


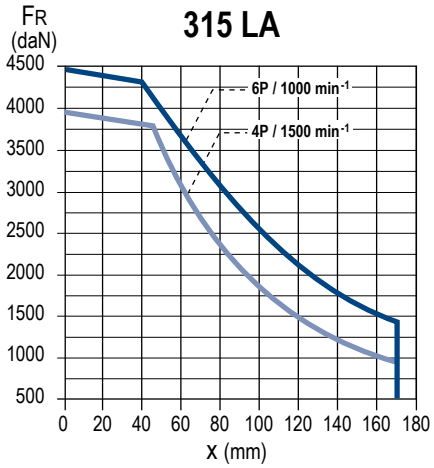


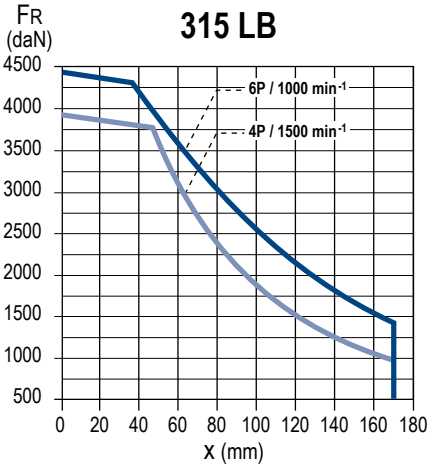
Radial loads

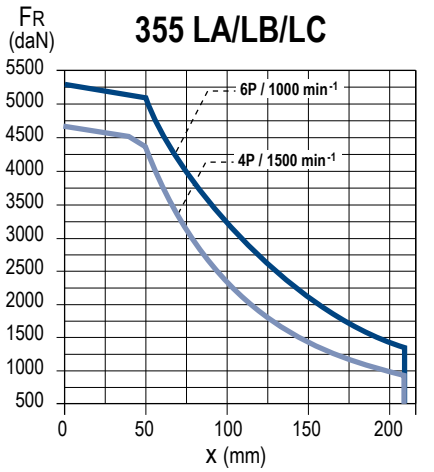
SPECIAL FITTING ARRANGEMENT

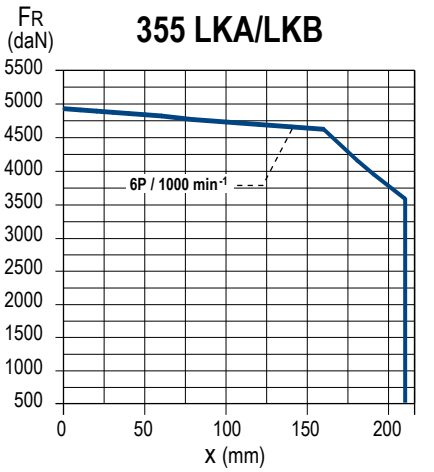
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: Distance with respect to the shaft shoulder

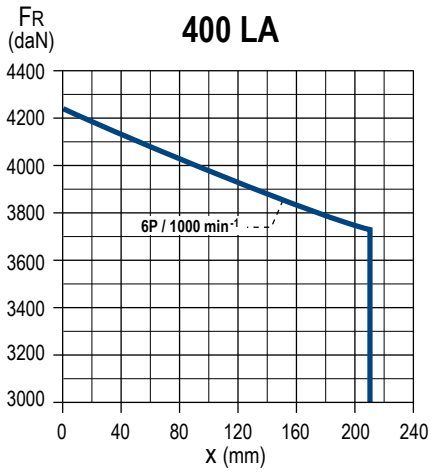


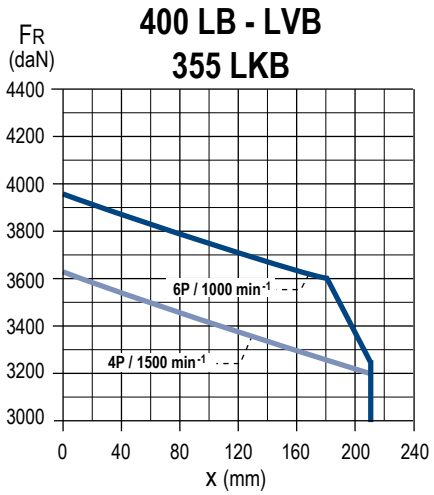


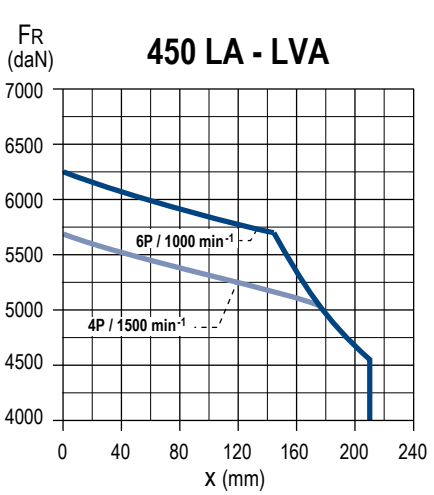


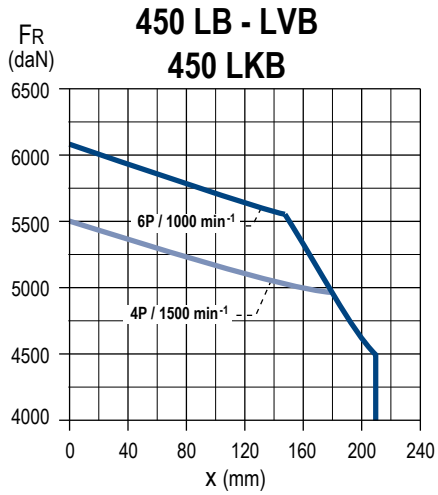












Mains connection

DESCRIPTIVE TABLE OF TERMINAL BOXES FOR RATED SUPPLY VOLTAGE OF 400 V (according to EN 50262)

Series	Type	Number of poles	Power + auxiliaries	
			Number of drill holes	Drill hole diameter
FLSE FLSN FLSPX FLS	80	2; 4; 6; 8	1 (2 if auxiliaries)	ISO M20 x 1.5 (1M20 + 1M16)
	90	2; 4; 6; 8		
	100	2; 4; 6; 8		
	112	2; 4; 6; 8		
	132	2; 4; 6; 8		ISO M25 x 1.5 (1M25 + 1M16)
	160	2; 4; 6; 8		
	180 MR	2; 4; 6; 8		
	180 M/L/LUR	2; 4; 6; 8		ISO M32 x 1.5 (1M32 + 1M16)
	200	2; 4; 6; 8		ISO M40 x 1.5 (1M40 + 1M16)
	225 SR/MR	2; 4; 6; 8		
	225 M	2; 4; 6; 8		ISO M50 x 1.5 (1M50 + 1M16)
	250	2; 4; 6; 8		
	280	2; 4; 6; 8		ISO M63 x 1.5 (1M63 + 1M16)
	315	2; 4; 6; 8		ISO M75 x 1.5 (1M75 + 1M16)
	355	2; 4; 6; 8		

Series	Type	Number of poles	Power + auxiliaries	
			Number of drill holes	Drill hole diameter
FLSES	80	2; 4	1 (2 if auxiliaries)	ISO M20 x 1.5 (1M20 + 1M16)
	90	2; 4; 6		
	100	2; 4; 6		
	112	2; 4; 6		
	132	2; 4; 6	2 (3 if auxiliaries)	ISO M25 x 1.5 (2M25 + 1M16)
	160	2; 4; 6	0	Removable undrilled mounting plate
	180	2; 4; 6		
	200	2; 4; 6		
	225	2; 4; 6		
	250	2; 4; 6		
	280	2; 4; 6		
	315	2; 4; 6		
	355	2; 4; 6		

TERMINAL BLOCKS DIRECTION OF ROTATION

Standard motors have a block with 6 terminals whose marking complies with IEC 60034-8.
When the motor is running in U1, V1, W1 or 1U, 1V, 1W from a direct mains supply L1, L2, L3, it turns clockwise when seen from the drive end.
If any two of the phases are changed over, the motor will run in an anti-clockwise direction (make sure that the motor has been designed to run in both directions).
If the motor is fitted with accessories (thermal protection or space heater), these must be connected on screw dominos with labelled wires.

Tightening torque for the nuts on the terminal blocks.

Terminal	M5	M6	M8	M10	M12	M14	M16
Torque N.m	3.2	5	10	20	35	50	65

Series	Type	400 V mains power supply		
		230/400 V connections		400 VD connections
		Number of poles	Terminals	Terminals
FLSE FLSN FLSPX FLSES	80 to 112	2; 4; 6	M5	M5
	132 S to 160	2; 4; 6	M6	M6
	180 M	2	M6	M6
	180 L	6	M6	M6
	180 LUR	4	M8	M6
	200 LU	2 (30 kW); 4; 6 (18.5 kW)	M8	M6
	200 LU	2 (37 kW); 6 (22 kW)	M8	M8
	225 M	6	M8	M8
	225 to 250	4	M10	M10
	250 M	6	M10	M10
	280 to 315	2; 4; 6	M12	M12
	355 L	2; 4; 6	M12	M12
	355 LK	4; 6	M14	M14
	400/450	4; 6	M14	M14

2 poles - 3000 min^{-1}

Ex e IIC T3 Gb - IP55 - CLASS F - ΔT80K - S1

Type	400 V MAINS SUPPLY 50 Hz												
	Rated power	Rated speed	Rated torque	Rated current	Power factor	Efficiency IEC 60034-2-1 2007	Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Locked rotor time	Moment of inertia	Weight	Noise
	P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ	η	Is/In	Ms/Mn	M_M/Mn	t_E	J	IM B3	LP
	kW	min^{-1}	N.m	A	4/4	4/4				s	kg.m^2	kg	db(A)
FLSE 80 L	0.75	2872	2.5	1.6	0.84	77.4	6.8	2.9	3.0	7.6	0.0007	15	61
FLSE 80 L	1.1	2870	3.75	2.3	0.86	76.5	7.9	3.2	3.1	7.5	0.0009	18	61
FLSE 90 L	1.5	2860	5	2.9	0.88	81.7	7.8	3.1	3.1	7	0.0019	23.5	64
FLSE 90 L	2.2	2884	7.5	4.2	0.87	83.9	8.5	2.4	3.1	6	0.0019	27.7	64
FLSE 100 LK	3	2900	10.1	5.5	0.91	84.5	7.6	1.8	2.5	8	0.0069	42	66
FLSE 112 MU	4	2928	13.5	7.1	0.92	86.9	9.6	2.0	3.0	7	0.0099	54	69
FLSE 132 SM	5.5	2926	18.6	9.7	0.91	88.2	7.7	1.7	2.6	8.6	0.0263	71	72
FLSE 132 SM	7.5	2929	25.4	13.1	0.92	88.8	8.5	1.7	2.6	8.5	0.031	75	72

4 poles - 1500 min^{-1}

Ex e IIC T3 Gb - IP55 - CLASS F - ΔT80K - S1

Type	400 V MAINS SUPPLY 50 Hz												
	Rated power	Rated speed	Rated torque	Rated current	Power factor	Efficiency IEC 60034-2-1 2007	Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Locked rotor time	Moment of inertia	Weight	Noise
	P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ	η	Is/In	Ms/Mn	M_M/Mn	t_E	J	IM B3	LP
	kW	min^{-1}	N.m	A	4/4	4/4				s	kg.m^2	kg	db(A)
FLSE 80 L	0.75	1430	5	2	0.72	72	5.3	2.2	2.3	10	0.0024	17	44
FLSE 90 L	1.1	1440	7.5	2.5	0.83	76.9	6.0	2.2	2.6	8.1	0.0032	22	50
FLSE 90 L	1.5	1450	10	3.7	0.75	76.1	6.2	1.7	2.0	7.2	0.0037	23	50
FLSE 100 LK	2.2	1460	15	4.4	0.84	83.4	6.0	1.5	1.9	9.5	0.0077	41	52
FLSE 100 LK	3	1457	20	5.9	0.85	84.3	6.4	1.6	1.9	8	0.0107	44	52
FLSE 112 MU	4	1458	27.2	7.7	0.86	85.2	7.6	2.0	2.1	8.4	0.0137	52	52
FLSE 132 SM	5.5	1464	37.4	10.3	0.87	86.8	7.9	1.8	2.5	9	0.0196	66	59
FLSE 132 M	7.5	1457	50	14.8	0.85	84.4	7.9	1.9	2.6	5.5	0.023	71	59

2 poles - 3000 min^{-1}

Ex nA IIC T3 Gc - Ex tb IIIC T125°C Db - Ex tc IIIB T125°C Dc - IP55 - CLASS F - ΔT80K - S1 - CLASS IE2

Series	Type	400 V MAINS SUPPLY 50 Hz															
		Rated power	Rated speed	Rated torque	Rated current	Power factor			Efficiency IEC 60034-2-1 2007			Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Moment of inertia	Weight	Noise
		P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ			η			Is/In	Ms/Mn	M_M/Mn	J	IM B3	LP
		kW	min^{-1}	N.m	A	4/4	3/4	2/4	4/4	3/4	2/4				kg.m^2	kg	db(A)
FLSN FLSPX FLSES	80 L	0.75	2855	2.5	1.6	0.85	0.78	0.66	78.8	79.1	77.3	6.5	2.4	3.0	0.00084	17.5	61
	80 L	1.1	2854	3.7	2.3	0.87	0.81	0.69	80.1	80.9	79.6	6.1	1.8	2.3	0.00106	17.9	61
	90 S	1.5	2855	5.0	3.0	0.88	0.82	0.72	81.4	81.6	79.7	8.0	3.7	3.1	0.00169	23.2	64
	90 LU	2.2	2844	7.4	4.2	0.91	0.87	0.79	83.8	84.9	84.3	8.0	3.4	2.9	0.00251	29	64
	100 L	3	2848	10.0	5.6	0.91	0.87	0.78	84.8	85.9	85.4	8.1	3.8	4.3	0.00291	34.8	66
	112 MG	4	2915	13.4	7.5	0.91	0.88	0.8	86.7	87.8	87.6	7.8	3.3	3.7	0.00748	42	69
	132 S	5.5	2915	18.7	10.3	0.9	0.88	0.82	88.1	89.0	88.6	7.6	2.6	3.3	0.0154	68	72
	132 S	7.5	2920	24.5	13.4	0.92	0.9	0.85	88.1	88.6	87.8	7.7	2.9	3.2	0.0203	77	72
	132 MU	9	2920	29.4	16.0	0.91	0.89	0.84	88.9	90.0	90.0	7.9	1.8	2.2	0.0219	79	72
	160 M	11	2950	35.2	20.3	0.86	0.82	0.73	89.5	89.6	88.1	6.9	3.1	3.0	0.0373	115	74
	160 M	15	2946	48.7	26.8	0.89	0.86	0.79	90.7	90.6	89.4	8.0	3.4	3.5	0.0530	134	74
	160 LU	18.5	2945	60.6	33.0	0.89	0.86	0.8	91.3	91.8	91.2	8.0	3.7	3.6	0.0592	141	74
	180 M	22	2938	71.5	37.6	0.92	0.91	0.88	91.4	92.0	91.7	7.7	2.4	2.9	0.0812	168	75
	200 LU	30	2950	97.1	52.7	0.89	0.87	0.81	92.3	92.5	91.8	7.3	2.9	3.1	0.113	236	75
	200 LU	37	2954	120	64.1	0.9	0.87	0.81	92.9	93.1	92.5	7.9	2.9	3.3	0.137	258	75
	225 MR	45	2954	145	77.7	0.9	0.87	0.81	93.2	93.4	92.7	8.1	3.1	3.5	0.159	276	76
	250 M	55	2960	178	94.4	0.9	0.89	0.84	93.7	93.9	93.2	7.5	2.3	2.9	0.332	390	77
	280 S	75	2954	242	127	0.9	0.89	0.84	94.6	94.9	94.6	6.8	2.4	2.7	0.430	505	78
	280 M	90	2954	291	150	0.91	0.89	0.85	94.9	95.3	95.2	7.3	2.4	2.3	0.510	548	79
	315 S	110	2970	354	186	0.9	0.89	0.84	95.1	95.1	94.4	6.3	1.8	2.5	1.30	980	82
	315 M	132	2967	425	224	0.9	0.89	0.85	94.7	95.0	94.5	6.3	1.9	2.2	1.36	1020	82
	315 LA	160	2964	516	270	0.9	0.9	0.87	95.2	95.5	95.2	6.0	1.8	2.6	1.48	1060	82
	315 LB	200	2972	643	336	0.9	0.88	0.83	95.7	95.9	95.5	7.3	2.4	3.0	1.92	1190	82
	355 LA	250	2978	802	439	0.86	0.83	0.76	95.7	95.7	95.0	7.1	2.1	3.1	3.26	1540	84
	355 LB	315	2981	1009	540	0.88	0.86	0.81	95.7	95.7	95.1	7.6	2.6	3.3	3.68	1713	84
	355 LC	355	2981	1137	623	0.87	0.84	0.78	95.7	95.4	94.5	7.1	2.2	2.8	3.71	1731	83
	355 LD*1	400	2977	1284	623	0.89	0.87	0.82	95.3	95.5	95.4	7.8	2.0	2.7	4.03	1915	84

Motor not affected by IE2

1. Class F temperature rise

4 poles - 1500 min^{-1}

Ex nA IIC T3 Gc - Ex tb IIIC T125°C Db - Ex tc IIIB T125°C Dc - IP55 - CLASS F - ΔT80K - S1 - CLASS IE2

Series	Type	400 V MAINS SUPPLY 50 Hz															
		Rated power	Rated speed	Rated torque	Rated current	Power factor			Efficiency IEC 60034-2-1 2007			Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Moment of inertia	Weight	Noise
		P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ			η			Is/In	Ms/Mn	M_M/Mn	J	IM B3	LP
		kW	min^{-1}	N.m	A	4/4	3/4	2/4	4/4	3/4	2/4				kg.m^2	kg	db(A)
FLSN FLSPX FLSES	**80 L***	0.55	1410	3.7	1.6	0.74	0.69	0.56	67.2	67.4	63	4.4	2.1	2.3	0.0013	15	44
	80 LG	0.75	1442	5	1.6	0.81	0.73	0.61	81.8	82.9	81.9	6.0	2.0	2.9	0.00279	19.9	44
	90 S	1.1	1445	7.3	2.4	0.82	0.74	0.59	81.8	82.2	79.6	6.7	2.4	2.7	0.00312	21.9	50
	90 L	1.5	1445	9.9	3.2	0.82	0.74	0.6	82.9	84.2	83.3	6.8	2.4	3.1	0.00404	24.4	50
	90 LU	1.8	1450	14.2	3.8	0.82	0.74	0.6	83.5	84.0	82.5	7.3	2.8	3.2	0.00404	25.3	50
	100 L	2.2	1450	14.2	4.7	0.81	0.72	0.58	84.4	85.3	84.5	7.8	3.2	3.6	0.00531	34	52
	100 LK	3	1450	19.5	6.1	0.83	0.76	0.65	85.6	87.2	87.3	6.5	2.0	2.8	0.0108	42	52
	112 MU	4	1455	26.1	8.2	0.81	0.74	0.61	87	87.9	87.4	7.8	2.4	3.2	0.0129	47	52
	132 S	5.5	1460	36.2	10.8	0.84	0.78	0.67	88.1	88.8	88.3	7.8	2.6	3.4	0.0226	70	59
	132 MU	7.5	1455	49.2	14.3	0.86	0.81	0.71	88.8	89.9	89.8	7.9	2.7	3.4	0.0294	84	59
	132 MR	9	1465	58	18.1	0.8	0.73	0.61	89.3	89.4	88.1	8.1	3.4	3.3	0.0328	88	59
	160 M	11	1464	71.6	20.6	0.84	0.8	0.69	91	91.7	91.6	8.1	2.9	3.3	0.0731	125	65
	160 LU	15	1464	98	27.5	0.86	0.81	0.71	91.5	92.3	92.3	7.9	2.8	3.2	0.0861	136	65
	180 MR	18.5	1459	120	34.3	0.85	0.81	0.71	91.2	92.0	92.1	7.5	3.0	3.5	0.0957	144	64
	180 LUR	22	1471	142	42	0.81	0.76	0.64	92.2	92.6	92.0	7.4	3.3	3.3	0.139	180	64
	200 LU	30	1470	195	56.1	0.84	0.79	0.7	92.7	93.4	93.5	6.4	2.6	2.2	0.204	246	66
	225 SR	37	1470	241	69.5	0.83	0.79	0.69	92.9	93.7	93.8	6.6	2.7	2.7	0.247	275	66
	225 M	45	1479	291	81.4	0.85	0.82	0.73	93.7	94.1	93.9	6.8	2.6	2.4	0.576	366	68
	250 M	55	1480	357	102	0.83	0.79	0.69	94.1	94.5	94.2	6.6	2.3	2.5	0.625	400	68
	280 S	75	1481	484	140	0.82	0.77	0.66	94.1	94.1	93.5	7.2	2.9	2.8	0.800	503	74
	280 M	90	1480	581	166	0.83	0.79	0.69	94.4	94.7	94.3	7.5	2.9	2.7	0.940	553	74
	315 S	110	1484	708	199	0.84	0.81	0.73	94.8	95.1	94.6	6.5	2.5	2.4	2.24	1022	75
	315 M	132	1481	851	236	0.85	0.82	0.75	95.1	95.4	95.2	6.7	2.6	2.3	2.64	1092	74
	315 LA	160	1482	1031	278	0.87	0.84	0.76	95.5	95.9	95.8	7.0	3.1	2.8	2.26	1051	74
	315 LB	200	1473	1297	350	0.86	0.83	0.73	95.9	96.1	95.8	7.2	3.2	3.0	2.75	1163	74
	355 LA	250	1490	1603	437	0.86	0.83	0.74	95.9	95.9	95.4	7.5	2.5	3.2	5.16	1486	80
	355 LB	315	1488	2020	546	0.87	0.84	0.75	95.9	96.1	95.7	8.0	1.8	2.7	5.90	1605	77
	355 LC	355	1487	2280	621	0.86	0.82	0.73	95.9	96	95.7	7.4	1.8	2.9	6.60	1695	80
	355 LD*[1]	400	1489	2564	696	0.87	0.84	0.77	95.9	95.9	94.9	7.4	2.1	2.1	7.40	1930	80
	400 LB*	400	1491	2559	694	0.87	0.85	0.78	95.6	96.2	95.1	8.0	2.0	2.6	11.70	2350	82
	355 LKB*	450	1490	2880	774	0.88	0.86	0.79	95.4	95.5	94.8	7.6	1.8	2.3	11.70	2320	82
	400 LB*	450	1490	2880	774	0.88	0.86	0.79	95.4	95.5	94.8	7.6	1.8	2.3	11.70	2350	87
	355 LKB*	500	1490	3200	862	0.88	0.86	0.79	95.1	95.1	94.2	6.5	1.7	2.2	11.70	2320	82
	400 LVB*	500	1490	3200	862	0.88	0.86	0.79	95.1	95.1	94.2	6.5	1.7	2.2	11.70	2350	87
	450 LA*	500	1492	3200	866	0.87	0.84	0.77	95.8	95.2	95.3	8.0	1.6	2.2	21.00	3100	82
	450 LVA*	550	1491	3525	942	0.88	0.85	0.78	95.8	95.8	95.2	7.9	1.5	2.1	21.00	3100	85
	450 LB*	630	1493	4030	1090	0.87	0.84	0.77	95.9	95.9	95.2	8.2	1.5	2.1	24.00	3450	82

**** Motor not affected by IE2***

1. Class F temperature rise

FLSN and FLSPX motors up to 400 kW max.

6 poles - 1000 min^{-1}

Ex nA IIC T3 Gc - Ex tb IIIC T125°C Db - Ex tc IIIB T125°C Dc - IP55 - CLASS F - ΔT80K - S1 - CLASS IE2

Series	Type	400 V MAINS SUPPLY 50 Hz															
		Rated power	Rated speed	Rated torque	Rated current	Power factor			Efficiency IEC 60034-2-1 2007			Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Moment of inertia	Weight	Noise
		P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ			η			Is/In	Ms/Mn	M_M/Mn	J	IM B3	LP
		kW	min^{-1}	N.m	A	4/4	3/4	2/4	4/4	3/4	2/4				kg.m^2	kg	db(A)
FLS	**80 L***	0.25	950	2.5	0.8	0.74	0.68	0.55	60.3	58.2	54.0	3.6	2.0	1.9	0.0022	14	40
	80 L*	0.37	940	3.8	1.2	0.74	0.68	0.55	61.0	59.9	55.2	3.8	1.9	2.1	0.0028	16	40
	80 L*	0.55	955	5.5	1.8	0.67	0.59	0.46	65.1	64.0	59.0	4.4	2.5	2.6	0.0036	17.5	40
FLSN FLSPX FLSES	**90 S**	0.75	940	7.6	1.94	0.73	0.64	0.5	76.3	76.9	74.1	4.2	2.0	2.2	0.00320	21.4	45
	90 LU	1.1	945	11.1	2.7	0.75	0.66	0.53	78.5	79.5	77.8	4.6	2.1	2.4	0.00482	26.5	45
	100 LK	1.5	955	15	3.43	0.79	0.73	0.6	79.9	81.9	81.6	5.3	1.8	2.0	0.0111	35.1	48
	112 MG	2.2	960	22.1	5.2	0.74	0.65	0.52	82.1	82.7	82.1	5.5	2.1	2.4	0.0111	43	48
	132 S	3	965	29.9	6.6	0.78	0.72	0.6	85.1	86.3	86.1	6.0	2.4	2.5	0.0219	63	55
	132M	4	964	39.4	8.8	0.77	0.71	0.59	85.3	86.5	85.9	6.1	2.4	2.7	0.0285	71	55
	132 MR	5.5	969	54.1	13.3	0.69	0.64	0.52	86.3	87.4	86.5	6.0	2.4	2.9	0.0403	89	55
	160 M	7.5	974	74	16.4	0.75	0.68	0.56	88.3	88.5	87.3	5.7	1.8	2.7	0.0912	110	56
	160 L	9	973	87.4	19.2	0.77	0.7	0.59	88	88.3	87.3	5.9	1.9	2.7	0.108	119	72
	160 LU	11	970	107.9	23.7	0.76	0.68	0.55	88.7	89.0	87.7	5.8	1.9	2.7	0.127	130	56
	180 L	15	973	147	30.1	0.8	0.74	0.63	90.1	91.0	90.9	6.9	2.5	3.1	0.205	172	63
	200 LU	18.5	978	181	37.1	0.79	0.74	0.64	90.9	91.6	91.2	6.8	2.4	3.0	0.259	230	65
	200 LU	22	975	214	44.2	0.79	0.75	0.65	90.9	91.6	91.2	6.7	2.3	2.9	0.307	250	65
	225 M	30	985	291	56	0.84	0.8	0.71	93	93.6	93.3	6.6	2.5	2.8	0.646	339	66
	250 M	37	984	357	68.5	0.84	0.8	0.7	93.1	93.6	93.4	6.3	2.2	2.6	0.780	369	66
	280 S	45	985	436	81	0.86	0.83	0.74	93.6	94.1	94.0	6.6	2.3	2.4	1.03	505	65
	280 M	55	982	535	99	0.86	0.83	0.76	93.5	94.2	94.4	6.3	2.4	2.3	1.20	546	65
	315 S	75	987	726	140	0.82	0.78	0.69	94.2	94.5	93.9	5.8	2.6	1.9	2.60	974	72
	315 M	90	985	873	168	0.82	0.79	0.71	94.3	94.6	94.2	5.7	2.1	1.9	3.00	1033	72
	315 LA	110	988	1063	205	0.82	0.78	0.68	94.6	94.9	94.4	6.7	2.6	2.1	3.45	1105	72
	315 LB	132	985	1280	240	0.84	0.81	0.73	94.7	95.1	94.9	6.1	2.4	2.4	3.95	1182	72
	355 LA	160	991	1542	293	0.83	0.79	0.69	95.0	95.0	94.3	7.2	1.9	3.0	6.80	1420	76
	355 LB	200	991	1927	370	0.82	0.77	0.67	95.2	95.3	94.6	6.9	1.9	3.0	7.70	1517	76
	355 LC	250	989	2414	448	0.84	0.81	0.72	95.5	95.7	95.4	6.6	1.8	2.7	9.30	1688	76
	355 LKA	315	993	3029	579	0.82	0.78	0.68	95.7	95.8	95.2	7.8	2.1	3.2	13.45	2330	79
	355 LKB	355	991	3420	668	0.80	0.75	0.65	95.7	95.9	95.5	6.9	1.9	2.8	20.70	2725	79
	400 LA*	400	996	3851	778	0.78	0.72	0.61	95.1	94.8	93.6	8.0	2.0	2.2	33.00	3230	80
	400 LKB*	500	996	4809	958	0.79	0.73	0.62	95.4	95.2	94.2	8.0	2.0	2.2	35.00	3350	80
	450 LB*	500	996	4809	958	0.79	0.73	0.62	95.4	95.2	94.2	8.0	2.0	2.2	35.00	3400	80
	450 LB*	550	996	5273	1038	0.80	0.74	0.63	95.6	95.7	95.0	7.5	1.8	1.9	35.00	3400	80

**** Motor not affected by IE2***

FLSN and FLSPX motors up to 250 kW max.

8 poles - 750 min^{-1}

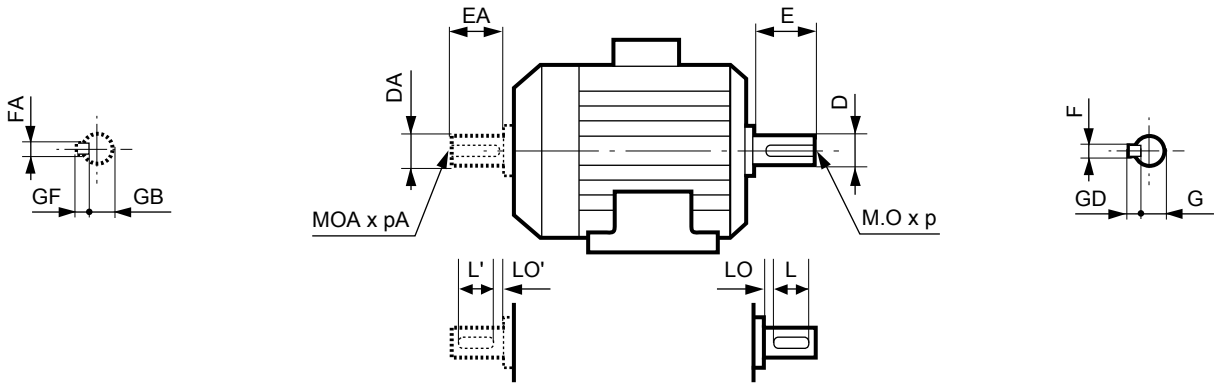
Ex nA IIC T3 Gc - Ex tb IIIC T125°C Db - Ex tc IIIB T125°C Dc - IP55 - CLASS F - ΔT80K - S1

Series	Type	400 V MAINS SUPPLY 50 Hz															
		Rated power	Rated speed	Rated torque	Rated current	Power factor			Efficiency IEC 60034-2-1 2007			Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Moment of inertia	Weight	Noise
		P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ			η			Is/In	Ms/Mn	M_M/Mn	J	IM B3	LP
		kW	min^{-1}	N.m	A	4/4	3/4	2/4	4/4	3/4	2/4				kg.m^2	kg	db(A)
FLSN FLSPX FLS	80 L	0.18	710	2.42	0.8	0.64	0.58	0.46	50.3	49.0	43.0	3.0	1.7	1.7	0.0028	15.5	40
	80 L	0.25	720	3.32	1.1	0.6	0.55	0.44	52.5	52.0	44.0	3.2	2.0	2.4	0.0036	17	40
	90 S	0.37	685	5.16	1.2	0.71	0.57	0.45	62.0	61.0	57.0	3.5	1.6	1.6	0.00314	22	45
	90 L	0.55	695	7.56	1.7	0.72	0.59	0.46	61.0	56.0	52.0	3.3	1.8	1.8	0.0037	23	45
	100 LK	0.75	720	9.95	2.3	0.68	0.60	0.47	68.9	68.0	64.0	4.1	1.9	1.9	0.0085	41	48
	100 LK	1.1	720	14.6	3.8	0.62	0.56	0.44	66.0	64.0	58.0	4.1	1.8	2.4	0.0117	43	48
	112 M	1.5	725	19.8	4.8	0.63	0.57	0.45	70.6	70.1	66.1	4.0	2.1	2.2	0.015	45	49
	132 S	2.2	715	29.4	7.2	0.60	0.55	0.44	72.2	72.2	70.2	3.2	1.4	1.8	0.0253	71	54
	132 M	3	705	40.6	9.1	0.63	0.57	0.46	74.3	74.3	71.3	3.1	1.3	1.9	0.0334	81	54
	160 MA	4	710	53.8	11.3	0.63	0.56	0.44	79.8	80.3	78.4	3.8	1.4	1.7	0.062	105	56
	160 MB	5.5	710	74	15	0.65	0.58	0.46	80.4	80.9	79.0	3.8	1.4	1.7	0.071	111	56
	160 L	7.5	715	100	20	0.65	0.58	0.46	81.4	91.9	80.0	3.8	1.5	1.8	0.086	128	56
	180 L	11	724	145	27	0.70	0.63	0.51	83.6	83.4	80.9	3.9	1.4	1.7	0.21	175	62
	200 L	15	729	197	34	0.72	0.66	0.53	86.7	86.6	84.8	5.0	1.8	2.6	0.32	265	62
	225 ST	18.5	727	243	41	0.73	0.67	0.54	87.6	87.5	85.7	5.0	1.6	2.3	0.38	285	65
	225 M	22	732	287	48	0.72	0.68	0.58	90.8	91.3	90.4	5.9	1.8	2.5	0.83	388	65
	250 M	30	729	393	61	0.78	0.74	0.64	89.9	90.4	89.5	6.2	1.8	2.5	0.83	393	65
	280 S	37	723	489	75	0.78	0.74	0.64	90.8	90.9	89.8	4.5	1.3	1.8	1.4	472	65
	280 M	45	730	589	102	0.70	0.66	0.55	90.5	90.6	89.5	6.0	2.3	3.2	1.75	563	65
	315 ST	55	738	712	102	0.83	0.80	0.71	93.1	93.4	92.9	7.4	2.1	3.0	2.7	850	75
	315 M	75	743	964	147	0.78	0.76	0.68	93.7	93.9	93.2	7.4	2.0	2.2	3.1	1000	78
	315 LA	90	742	1158	177	0.78	0.76	0.68	93.7	93.9	93.2	6.7	1.9	2.1	4.2	1030	78
	315 LB	110	742	1416	222	0.76	0.74	0.66	93.8	94.0	93.3	7.2	2.0	2.2	5.1	1125	78
	355 LA	132	741	1701	258	0.78	0.75	0.68	94.4	94.3	93.3	6.7	2.0	2.2	5.5	1415	78
	355 LB	160	741	2062	312	0.78	0.75	0.68	94.4	94.3	93.3	6.9	2.0	2.2	6	1535	78
	355 LD	200	741	2577	364	0.84	0.81	0.74	94.1	94.0	93.0	6.7	1.6	1.7	6.5	1935	78
	355 LKA	250	743	3213	464	0.82	0.77	0.67	94.4	94.2	93.3	6.8	1.6	2.2	18.5	2170	78
	400 LA	250	743	3213	464	0.82	0.77	0.67	94.4	94.2	93.3	6.8	1.6	2.2	18.5	2200	78
	355 LKB	300	741	3866	552	0.83	0.78	0.68	94.1	93.9	93.1	6.0	1.1	1.5	21.6	2370	78
	400 LB	300	741	3866	552	0.83	0.78	0.68	94.1	93.9	93.1	6.0	1.1	1.5	21.6	2400	78
	400 LKA	350	746	4480	652	0.81	0.78	0.69	95.3	95.0	94.1	6.2	1.7	1.4	40	3100	78
	450 LA	350	746	4480	652	0.81	0.78	0.69	95.3	95.0	94.1	6.2	1.7	1.4	40	3150	78
	400 LKB	400	746	5120	737	0.82	0.79	0.71	95.2	94.9	94.0	6.7	1.9	1.6	47	3420	78
	400 LB	400	746	5120	737	0.82	0.79	0.71	95.2	94.9	94.0	6.7	1.9	1.6	47	3470	78

FLSN and FLSPX motors up to 200 kW max.

Shaft extensions

Dimensions in millimetres

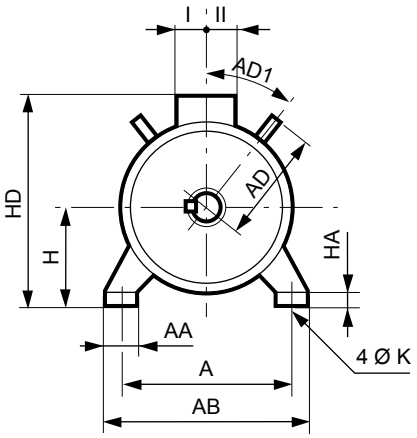


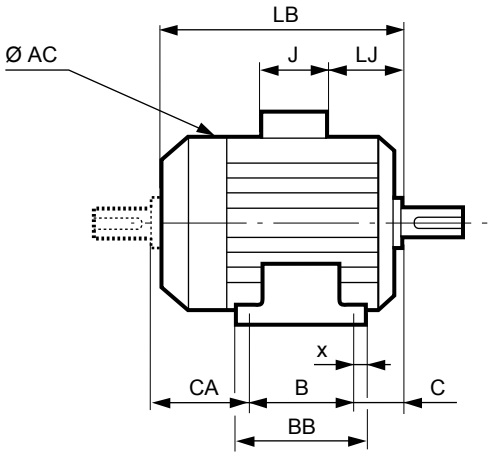
Series	Type	Main shaft extensions																		
		4 and 6 poles									2 poles									
		F	GD	D	G	E	O	p	L	LO	F	GD	D	G	E	O	p	L	LO
FLSE FLSN FLSPX FLSES	80 L/LG	6	6	19j6	15.5	40	6	16	30	6	6	6	19j6	15.5	40	6	16	30	6
	90 S/L/LU	8	7	24j6	20	50	8	19	40	6	8	7	24j6	20	50	8	19	40	6
	100 L/LK	8	7	28j6	24	60	10	22	50	6	8	7	28j6	24	60	10	22	50	6
	112 MG/MU	8	7	28j6	24	60	10	22	50	6	8	7	28j6	24	60	10	22	50	6
	132 S/M/MR/MU	10	8	38k6	33	80	12	28	63	10	10	8	38k6	33	80	12	28	63	10
	160 M/L/LU	12	8	42k6	37	110	16	36	100	6	12	8	42k6	37	110	16	36	100	6
	180 M/MR/L/LUR	14	9	48k6	42.5	110	16	36	98	12	14	9	48k6	42.5	110	16	36	98	12
	200 LU	16	10	55m6	49	110	20	42	90	20	16	10	55m6	49	110	20	42	90	20
	225 SR/M/MR	18	11	60m6	53	140	20	42	125	15	16	10	55m6	49	110	20	42	90	20
	250 M	18	11	65m6	58	140	20	42	125	15	18	11	60m6	53	140	20	42	125	15
	280 S/M	20	12	75m6	67.5	140	20	42	125	15	18	11	65m6	58	140	20	42	125	15
	315 S/M	22	14	80m6	71	170	20	42	140	30	18	11	65m6	58	140	20	42	125	15
	315 L	25	14	90m6	81	170	24	50	140	30	20	12	70m6	62.5	140	20	42	125	15
	355 L/LK	28	16	100m6	90	210	24	50	180	30	22	14	80m6	71	170	20	42	140	30
	400 L/LK/LV	28	16	110m6	100	210	24	50	180	30	-	-	-	-	-	-	-	-	-
	450 L/LV	32	18	120m6	109	210	24	50	180	30	-	-	-	-	-	-	-	-	-

Series	Type	Secondary shaft extensions																	
		4 and 6 poles									2 poles								
		FA	GF	DA	GB	EA	OA	pA	L'	LO'	FA	GF	DA	GB	EA	OA	pA	L'	LO'
FLSE FLSN FLSPX FLSES	80 L/LG	5	5	14j6	11	30	5	15	25	3.5	5	5	14j6	11	30	5	15	25	3.5
	90 S/L/LU	6	6	19j6	15.5	40	6	16	30	6	6	6	19j6	15.5	40	6	16	30	6
	100 L/LK	8	7	24j6	20	50	8	19	40	6	8	7	24j6	20	50	8	19	40	6
	112 MG/MU	8	7	24j6	20	50	8	19	40	6	8	7	24j6	20	50	8	19	40	6
	132 S/M/MR/MU	8	7	28k6	24	60	10	22	50	6	8	7	28k6	24	60	10	22	50	6
	160 M/L/LU	12	8	42k6	37	110	16	36	100	6	12	8	42k6	37	110	16	36	100	6
	180 M/MR/L/LUR	14	9	48k6	42.5	110	16	36	98	12	14	9	48k6	42.5	110	16	36	98	12
	200 LU	16	10	55m6	49	110	20	42	90	20	16	10	55m6	49	110	20	42	90	20
	225 SR/M/MR	18	11	60m6	53	140	20	42	125	15	16	10	55m6	49	110	20	42	90	20
	250 M	18	11	60m6	53	140	20	42	125	15	18	11	60m6	53	140	20	42	125	15
	280 S/M	20	12	60m6	53	140	20	42	125	15	18	11	60m6	53	140	20	42	125	15
	315 S/M	20	12	70m6	62.5	140	20	42	125	15	18	11	65m6	58	140	20	42	125	15
	315 L	20	12	70m6	62.5	140	20	42	125	15	20	12	70m6	62.5	140	20	42	125	15
	355 L	20	12	70m6	62.5	140	20	42	125	15	20	12	70m6	62.5	140	20	42	125	15
	355 LK	28	16	100m6	90	210	24	50	180	30	22	14	80m6	71	170	20	42	140	30
	400 L/LK/LV	28	16	110m6	100	210	24	50	180	30	-	-	-	-	-	-	-	-	-
	450 L/LV	32	18	120m6	109	210	24	50	180	30	-	-	-	-	-	-	-	-	-

Foot mounted IM 1001 (IM B3)

Dimensions in millimetres



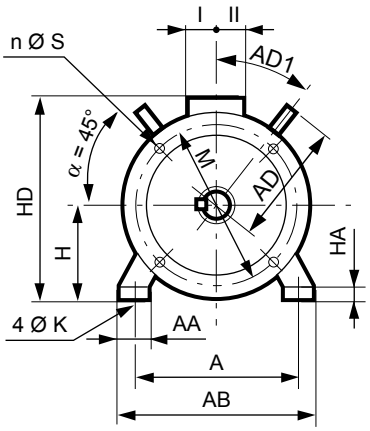


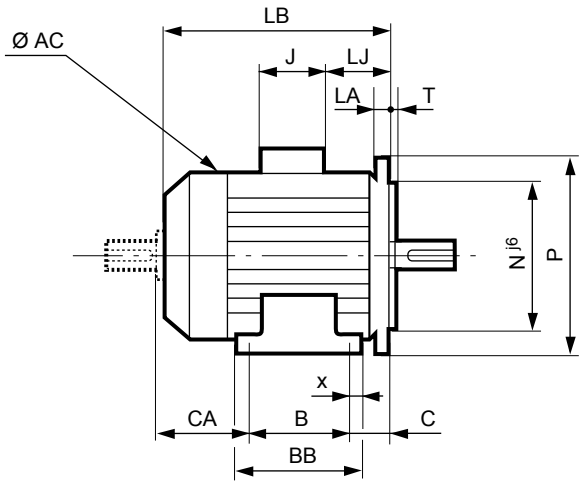
Series	Type	Main dimensions																		
		A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1
FLSE FLSN FLSPX FLSES	80 L	125	170	100	130	50	18	32	10	10	80	170	228	212	7	136	68	68	-	-
	80 LG	125	170	100	130	50	23	32	10	10	80	185	238	245	9	136	68	68	-	-
	90 S	140	170	100	162	56	29	26	10	10	90	185	248	239	8.5	136	68	68	135	40
	90 L	140	170	125	162	56	29	26	10	10	90	185	248	239	8.5	136	68	68	135	40
	90 LU	140	170	125	162	56	29	26	10	10	90	185	248	266	8.5	136	68	68	135	40
	100 L	160	196	140	185	63	29	40	12	13	100	204	258	300	8	136	68	68	270	40
	100 LK	160	200	140	174	63	22	42	12	12	100	226	277	319	52	120	60	60	-	-
	112 MG	190	230	140	174	70	32	48	12	12	112	233	294	309	18.5	136	68	68	148	40
	112 MU	190	230	140	174	70	32	48	12	12	112	233	294	305	18.5	136	68	68	148	40
	132 S	216	255	140	240	89	48	63	12	16	132	262	347	385	23	136	68	68	165	37.5
	132 M	216	255	178	240	89	48	63	12	16	132	262	347	385	23	136	68	68	165	37.5
	132 MR	216	255	178	240	89	48	63	12	16	132	262	347	447	23	136	68	68	165	37.5
	132 MU	216	255	178	240	89	48	63	12	16	132	262	347	447	23	136	68	68	165	37.5
	160 M	254	294	210	294	108	20	65	14.5	20	160	312	440	495	30	246	126	147	-	-
	160 L	254	294	254	294	108	20	65	14.5	20	160	312	440	495	30	246	126	147	-	-
	160 LU	254	294	254	294	108	20	65	14.5	20	160	312	440	510	30	246	126	147	-	-
	180 M	279	330	279	335	121	28	70	14.5	28	180	350	481	552	42	246	126	147	-	-
	180 MR	279	324	241	295	121	25	80	14.5	25	180	312	460	510	30	246	126	147	-	-
	180 L	279	330	279	335	121	28	70	14.5	28	180	350	481	552	42	246	126	147	-	-
	180 LUR	279	330	279	335	121	28	70	14.5	28	180	350	481	552	42	246	126	147	-	-
	200 LU	318	374	305	361	133	28	80	18.5	44	200	410	530	672	49	246	126	147	230	45
	225 SR	356	426	286	375	149	32	80	18.5	26	225	410	555	679	55.5	246	126	147	230	45
	225 M	356	426	311	375	149	32	80	18.5	26	225	540	664	779	69.5	352	173	210	-	-
	225 MR	356	426	311	375	149	32	80	18.5	26	225	410	555	679	55.5	246	126	147	230	45
	250 M	406	476	349	413	168	32	80	24	26	250	540	689	779	69.5	352	173	210	-	-
	280 S	457	527	368	432	190	32	80	24	26	280	540	719	959	69.5	352	173	210	-	-
	280 M	457	527	419	483	190	32	80	24	26	280	540	719	959	69.5	352	173	210	-	-
	315 S	508	600	406	610	216	58	100	28	35	315	600	840	1177	101	452	219	269	343	45
	315 M	508	600	457	610	216	58	100	28	35	315	600	840	1177	101	452	219	269	343	45
	315 LA	508	600	508	610	216	58	100	28	35	315	600	840	1177	101	452	219	269	343	45
	315 LB	508	600	508	610	216	58	100	28	35	315	600	840	1177	101	452	219	269	343	45
	355 LA	610	710	630	756	254	76	100	28	35	355	822	922	1303	121	452	219	269	-	-
	355 LB	610	710	630	756	254	76	100	28	35	355	822	922	1303	121	452	219	269	-	-
	355 LC	610	710	630	756	254	76	100	28	35	355	822	922	1303	121	452	219	269	-	-
	355 LK	610	750	630	815	254	40	128	28	45	355	787	1117	1702	52	700	224	396	-	-
	400 L/LV	686	800	710	815	280	65	128	35	45	400	787	1162	1702	52	700	224	396	-	-
	400 LK	686	824	800	950	280	59	140	35	45	400	877	1210	1740	68	700	224	396	-	-
	450 L/LV	750	890	800	950	315	94	140	35	45	450	877	1260	1740	68	700	224	396	-	-

* *AC: housing diameter without lifting rings*

Foot and flange mounted IM 2001 (IM B35)

Dimensions in millimetres



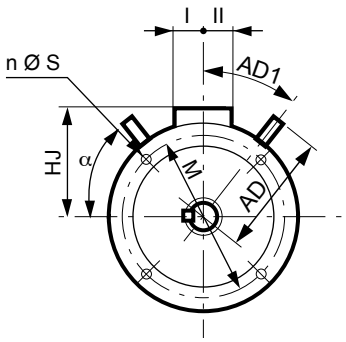


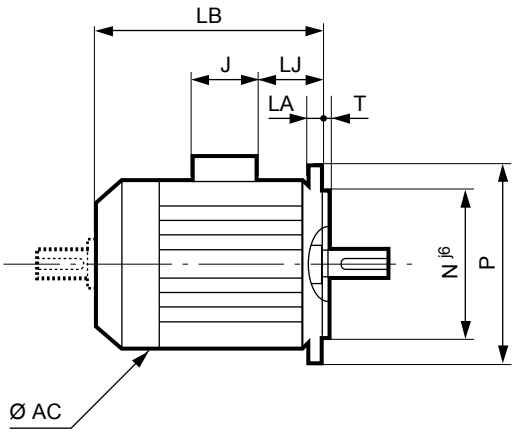
Series	Type	Main dimensions																			
		A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1	Symbol
FLSE FLSN FLSPX FLSES	80 L	125	170	100	130	50	18	32	10	10	80	170	228	212	7	136	68	68	-	-	FF 165
	80 LG	125	170	100	130	70	23	32	10	10	80	185	238	265	9	136	68	68	-	-	FF 165
	90 S	140	170	100	162	76	29	26	10	10	90	185	248	261	46	136	68	68	135	40	FF 165
	90 L	140	170	125	162	76	29	26	10	10	90	185	248	261	8.5	136	68	68	135	40	FF 165
	90 LU	140	170	125	162	76	29	26	10	10	90	185	248	288	46	136	68	68	135	40	FF 165
	100 L	160	196	140	185	76	29	40	12	13	100	204	258	300	46	136	68	68	270	40	FF 215
	100 LK	160	200	140	174	63	22	42	12	12	100	226	277	319	52	120	60	60	-	-	FF 215
	112 MG	190	230	140	174	70	32	48	12	12	112	233	294	309	18.5	136	68	68	148	40	FF 215
	112 MU	190	230	140	174	70	32	48	12	12	112	233	294	305	18.5	136	68	68	148	40	FF 215
	132 S	216	255	140	240	89	48	63	12	16	132	262	347	385	23	136	68	68	165	37.5	FF 265
	132 M	216	255	178	240	89	48	63	12	16	132	262	347	385	23	136	68	68	165	37.5	FF 265
	132 MR	216	255	178	240	89	48	63	12	16	132	262	347	447	23	136	68	68	165	37.5	FF 265
	132 MU	216	255	178	240	89	48	63	12	16	132	262	347	447	23	136	68	68	165	37.5	FF 265
	160 M	254	294	210	294	108	20	65	14.5	20	160	312	440	495	30	246	126	147	-	-	FF 300
	160 L	254	294	254	294	108	20	65	14.5	20	160	312	440	495	30	246	126	147	-	-	FF 300
	160 LU	254	294	254	294	108	20	65	14.5	20	160	312	440	510	30	246	126	147	-	-	FF 300
	180 M	279	330	279	335	121	28	70	14.5	28	180	350	481	552	42	246	126	147	-	-	FF 300
	180 MR	279	324	241	295	121	25	80	14.5	25	180	312	460	510	30	246	126	147	-	-	FF 300
	180 L	279	330	279	335	121	28	70	14.5	28	180	350	481	552	42	246	126	147	-	-	FF 300
	180 LUR	279	330	279	335	121	28	70	14.5	28	180	350	481	552	42	246	126	147	-	-	FF 300
	200 LU	318	374	305	361	133	28	80	18.5	44	200	410	530	672	49	246	126	147	230	45	FF 350
	225 SR	356	426	286	375	149	32	80	18.5	26	225	410	555	679	55.5	246	126	147	230	45	FF 400
	225 M	356	426	311	375	149	32	80	18.5	26	225	540	664	779	69.5	352	173	210	-	-	FF 400
	225 MR	356	426	311	375	149	32	80	18.5	26	225	410	555	679	55.5	246	126	147	230	45	FF 400
	250 M	406	476	349	413	168	32	80	24	26	250	540	689	779	69.5	352	173	210	-	-	FF 500
	280 S	457	527	368	432	190	32	80	24	26	280	540	719	959	69.5	352	173	210	-	-	FF 500
	280 M	457	527	419	483	190	32	80	24	26	280	540	719	959	69.5	352	173	210	-	-	FF 500
	315 S	508	600	406	610	216	58	100	28	35	315	600	840	1177	101	452	219	269	343	45	FF 600
	315 M	508	600	457	610	216	58	100	28	35	315	600	840	1177	101	452	219	269	343	45	FF 600
	315 LA	508	600	508	610	216	58	100	28	35	315	600	840	1177	101	452	219	269	343	45	FF 600
	315 LB	508	600	508	610	216	58	100	28	35	315	600	840	1177	101	452	219	269	343	45	FF 600
	355 LA	610	710	630	756	254	76	100	28	35	355	822	922	1303	121	452	219	269	-	-	FF 740
	355 LB	610	710	630	756	254	76	100	28	35	355	822	922	1303	121	452	219	269	-	-	FF 740
	355 LC	610	710	630	756	254	76	100	28	35	355	822	922	1303	121	452	219	269	-	-	FF 740
	355 LK	610	750	630	815	254	40	128	28	45	355	787	1117	1702	52	700	224	396	-	-	FF 740
	400 L/LV	686	800	710	815	280	65	128	35	45	400	787	1162	1702	52	700	224	396	-	-	FF 940
	400 LK	686	824	800	950	280	59	140	35	45	400	877	1210	1740	68	700	224	396	-	-	FF 940
	450 L/LV	750	890	800	950	315	94	140	35	45	450	877	1260	1740	68	700	224	396	-	-	FF 1080

** AC: housing diameter without lifting rings*

Flange mounted IM 3001 (IM B5) IM 3011 (IM V1)

Dimensions in millimetres





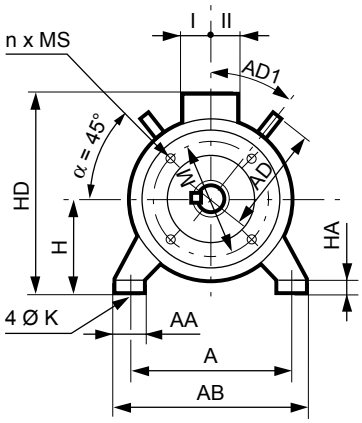
IEC symbol	Flange dimensions							
	M	N	P	T	n	α°	S	LA
FF 165	165	130	200	3.5	4	45	12	10
FF 165	165	130	200	3.5	4	45	12	10
FF 165	165	130	200	3.5	4	45	12	10
FF 165	165	130	200	3.5	4	45	12	10
FF 165	165	130	200	3.5	4	45	12	10
FF 215	215	180	250	4	4	45	14.5	12
FF 215	215	180	250	4	4	45	14.5	12
FF 215	215	180	250	4	4	45	14.5	12
FF 215	215	180	250	4	4	45	14.5	11
FF 265	265	230	300	4	4	45	14.5	12
FF 265	265	230	300	4	4	45	14.5	12
FF 265	265	230	300	4	4	45	14.5	12
FF 265	265	230	300	4	4	45	14.5	12
FF 300	300	250	350	5	4	45	18.5	14
FF 300	300	250	350	5	4	45	18.5	14
FF 300	300	250	350	5	4	45	18.5	14
FF 300	300	250	350	5	4	45	18.5	14
FF 300	300	250	350	5	4	45	18.5	14
FF 300	300	250	350	5	4	45	18.5	14
FF 350	350	300	400	5	4	45	18.5	15
FF 400	400	350	450	5	8	22.5	18.5	16
FF 400	400	350	450	5	8	22.5	18.5	16
FF 400	400	350	450	5	8	22.5	18.5	16
FF 500	500	450	550	5	8	22.5	18.5	18
FF 500	500	450	550	5	8	22.5	18.5	18
FF 500	500	450	550	5	8	22.5	18.5	18
FF 600	600	550	660	6	8	22.5	24	25
FF 600	600	550	660	6	8	22.5	24	22
FF 600	600	550	660	6	8	22.5	24	22
FF 600	600	550	660	6	8	22.5	24	22
FF 740	740	680	800	6	8	22.5	24	25
FF 740	740	680	800	6	8	22.5	24	25
FF 740	740	680	800	6	8	22.5	24	25
FF 740	740	680	800	6	8	22.5	24	25
FF 940	940	880	1000	6	8	22.5	28	28
FF 940	940	880	1000	6	8	22.5	28	28
FF 1080	1080	1000	1150	6	8	22.5	28	30

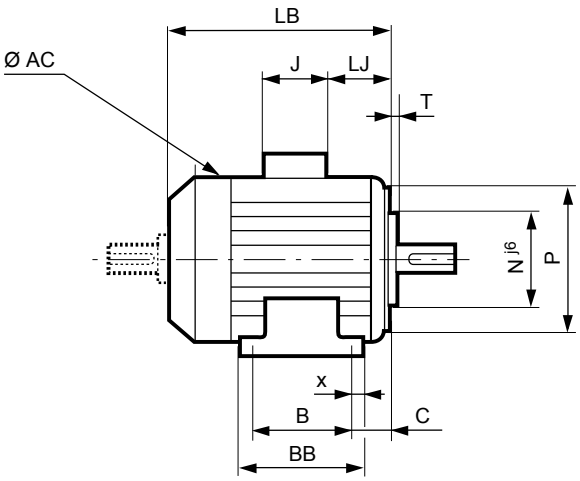
Series	Type	Main dimensions								
		AC*	LB	HJ	LJ	J	I	II	AD	AD1
FLSE FLSN FLSPX FLSES	80 L	170	212	148	7	136	68	68	-	-
	80 LG	185	265	158	9	136	68	68	-	-
	90 S	185	261	158	46	136	68	68	135	40
	90 L	185	261	158	8.5	136	68	68	135	40
	90 LU	185	288	158	46	136	68	68	135	40
	100 L	204	300	158	46	136	68	68	270	40
	100 LK	226	319	177	52	120	60	60	-	-
	112 MG	233	309	182	18.5	136	68	68	148	40
	112 MU	233	305	182	18.5	136	68	68	148	40
	132 S	262	385	215	23	136	68	68	165	37.5
	132 M	262	385	215	23	136	68	68	165	37.5
	132 MR	262	447	215	23	136	68	68	165	37.5
	132 MU	262	447	215	23	136	68	68	165	37.5
	160 M	312	495	280	30	246	126	147	-	-
	160 L	312	495	280	30	246	126	147	-	-
	160 LU	312	510	280	30	246	126	147	-	-
	180 M	350	552	301	42	246	126	147	-	-
	180 MR	312	510	280	30	246	126	147	-	-
	180 L	350	552	301	42	246	126	147	-	-
	180 LUR	350	552	301	42	246	126	147	-	-
	200 LU	410	672	330	49	246	126	147	230	45
	225 SR	410	679	330	55.5	246	126	147	230	45
	225 M	540	779	439	69.5	352	173	210	-	-
	225 MR	410	679	330	55.5	246	126	147	230	45
	250 M	540	779	439	69.5	352	173	210	-	-
	280 S	540	959	439	69.5	352	173	210	-	-
	280 M	540	959	439	69.5	352	173	210	-	-
	315 S	600	1177	525	101	452	219	269	343	45
	315 M	600	1177	525	101	452	219	269	343	45
	315 LA	600	1177	525	101	452	219	269	343	45
	315 LB	600	1177	525	101	452	219	269	343	45
	355 LA	688	1303	567	121	452	219	269	-	-
	355 LB	688	1303	567	121	452	219	269	-	-
	355 LC	688	1303	567	121	452	219	269	-	-
	355 LK	787	1702	762	52	700	224	396	-	-
	400 L/LV	787	1702	762	52	700	224	396	-	-
	400 LK	877	1740	810	68	700	224	396	-	-
	450 L/LV	877	1740	810	68	700	224	396	-	-

* *AC: housing diameter without lifting rings*

Foot and face mounted IM 2101 (IM B34)

Dimensions in millimetres



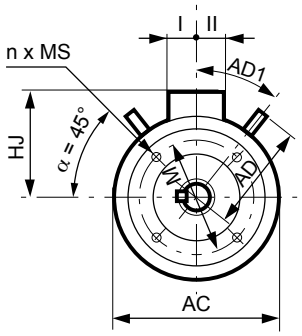


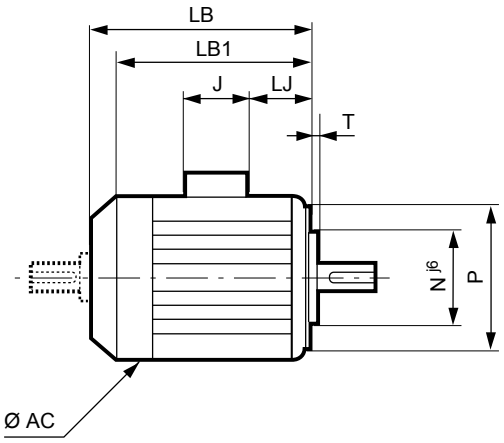
Series	Type	Main dimensions																			
		A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1	Symbol
FLSE FLSN FLSPX FLSES	**80 L**	125	170	100	130	50	18	32	10	10	80	170	228	212	7	136	68	68	-	-	FT 100
	80 LG	125	170	100	130	70	23	32	10	10	80	185	238	245	9	136	68	68	-	-	FT 100
	90 S	140	170	100	162	76	29	26	10	10	90	185	248	239	8.5	136	68	68	135	40	FT 115
	90 L	140	170	125	162	76	29	26	10	10	90	185	248	239	8.5	136	68	68	135	40	FT 115
	90 LU	140	170	125	162	76	29	26	10	10	90	185	248	266	8.5	136	68	68	135	40	FT 115
	100 L	160	196	140	185	63	29	40	12	13	100	204	258	300	8	136	68	68	270	40	FT 130
	100 LK	160	200	140	174	63	22	42	12	12	100	226	277	319	52	120	60	60	-	-	FT 130
	112 MG	190	230	140	174	70	32	48	12	12	112	233	294	309	18.5	136	68	68	148	40	FT 130
	112 MU	190	230	140	174	70	32	48	12	12	112	233	294	305	18.5	136	68	68	148	40	FT 130
	132 S	216	255	140	240	89	48	63	12	16	132	262	347	385	23	136	68	68	165	37.5	FT 215
	132 M	216	255	178	240	89	48	63	12	16	132	262	347	385	23	136	68	68	165	37.5	FT 215
	132 MR	216	255	178	240	89	48	63	12	16	132	262	347	447	23	136	68	68	165	37.5	FT 215
	132 MU	216	255	178	240	89	48	63	12	16	132	262	347	447	23	136	68	68	165	37.5	FT 215

* *AC: housing diameter without lifting rings*

Face mounted IM 3601 (IM B14)

Dimensions in millimetres





IEC symbol	Faceplate dimensions					
	M	N	P	T	n	MS
FT 100	100	80	120	3	4	M6
FT 100	100	80	120	3	4	M6
FT 115	115	95	140	3	4	M8
FT 115	115	95	140	3	4	M8
FT 115	115	95	140	3	4	M8
FT 130	130	110	160	3.5	4	M8
FT 130	130	110	160	3.5	4	M8
FT 130	130	110	160	3.5	4	M8
FT 130	130	110	160	3.5	4	M8
FT 215	215	180	250	4	4	M12
FT 215	215	180	250	4	4	M12
FT 215	215	180	250	4	4	M12
FT 215	215	180	250	4	4	M12

Series	Type	Main dimensions								
		AC*	LB	LB1**	LJ	J	I	II	AD	AD1
FLSE FLSN FLSPX FLSES	80 L	170	212	7	136	68	68	-	-	-
	80 LG	185	245	9	136	68	68	-	-	-
	90 S	185	239	8.5	136	68	68	135	40	40
	90 L	185	239	8.5	136	68	68	135	40	40
	90 LU	185	266	8.5	136	68	68	135	40	40
	100 L	204	300	8	136	68	68	270	40	40
	100 LK	226	319	52	120	60	60	-	-	-
	112 MG	233	309	18.5	136	68	68	148	40	40
	112 MU	233	305	18.5	136	68	68	148	40	40
	132 S	262	385	23	136	68	68	165	37.5	37.5
	132 M	262	385	23	136	68	68	165	37.5	37.5
	132 MR	262	447	23	136	68	68	165	37.5	37.5
	132 MU	262	447	23	136	68	68	165	37.5	37.5

* *AC: housing diameter without lifting rings*
** *LB1: non-ventilated motor*

Non-standard flanges

Optionally, Leroy-Somer motors can be fitted with flanges and faceplates that are larger or smaller than standard. This means that motors can be adapted to all types of situation without the need for costly and time-consuming modifications.

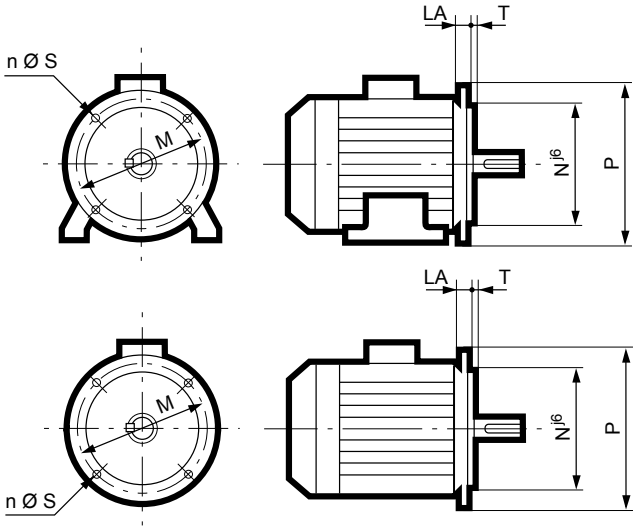
The tables below give the flange and faceplate dimensions and indicate flange/motor compatibility.
The bearing and shaft extension for each frame size remain standard.

Dimensions in millimetres

(FF) FLANGE MOUNTED

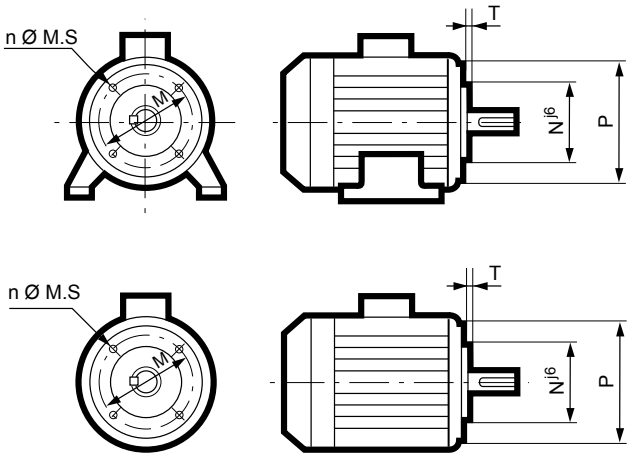
IEC symbol	Flange dimensions						
	M	N	P	T	n	S	LA
FF 115	115	95	140	3	4	10	10
FF 130	130	110	160	3.5	4	10	10
FF 165	165	130	200	3.5	4	12	10
FF 215	215	180	250	4	4	15	12
FF 265	265	230	300	4	4	15	14
FF 300	300	250	350	5	4	18.5	14
FF 350	350	300	400	5	4	18.5	15
FF 400	400	350	450	5	8	18.5	16
FF 500	500	450	550	5	8	18.5	18**
FF 600	600	550*	660	6	8	24	22
FF 740	740	680*	800	6	8	24	25
FF 940	940	880*	1000	6	8	28	28
FF 1080	1080	1000*	1150	6	8	28	30

** Tolerance Njs6*
*** LA = 22 for frame size ≥ 280*



(FT) FACE MOUNTED

Symbol IEC	Faceplate dimensions					
	M	N	P	T	n	M.S
FT 85	85	70	105	2.5	4	M6
FT 100	100	80	120	3	4	M6
FT 115	115	95	140	3	4	M8
FT 130	130	110	160	3.5	4	M8
FT 165	165	130	200	3.5	4	M10
FT 215	215	180	250	4	4	M12
FT 265	265	230	300	4	4	M12



Mechanical options

MODIFIED FLANGES

Motor type		Mounting forms \ Flange type	(FF) Flange mounted														(FT) Face mounted								
			FF 85	FF 100	FF 115	FF 130	FF 165	FF 215	FF 265	FF 300	FF 350	FF 400	FF 500	FF 600	FF 740	FF 940	FT 65	FT 75	FT 85	FT 100	FT 115	FT 130	FT 165	FT 215	FT 265
FLSE FLSN FLSPX FLSES	80 L	all	■	■	■	■	●	◆									◆	◆	◆	●	◆	◆	◆		
	80 LG/90	B5/B35 (1)	◆	◆	◆	◆	●	■	■										◆	◆	■	■	◆		
	80 LG/90	B3/B14/B34	■	■	■	■	■	■	■										◆	◆	●	◆	◆		
	100 L	all	■	■	■	■	■	●	■										◆	◆	◆	●	◆		
	100 LK	all				■	■	●	◆												◆	●	◆	◆	
	112 MU/MG	all				■	■	●	◆												◆	●	◆	◆	
	132 S/M/MR/MU	all					■	■	●	◆												■	■	●	
	160 M/L/LU	all						◆	◆	●	◆														
	180 M/MR/L/LUR	all							●	●	◆	◆(1)													
	200 LU	all									●	◆													
	225 SR/M/MR	all										●	◆												
	250 M	all										◆	●												
	280 S/M	all										◆(1)	●												
	315 S	all											◆(1)	●											
	315 M/ML	all												●											
	355 L	all												◆(1)	●										
	355 LK	all													●	◆									
	400 L	all													●	◆									
	400 LK	all													●	◆									
	450	all													●	◆									

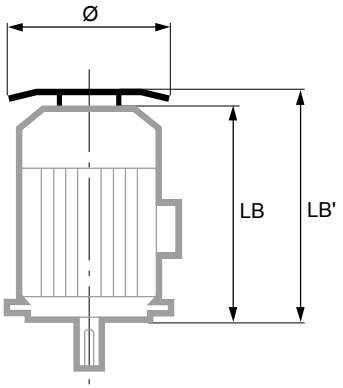
● Standard ■ Adapted shaft ◆ Adaptable without shaft modifications

(1) Dimension C need not comply with IEC 60072

Dimensions in millimetres

DRIP COVER FOR OPERATION IN VERTICAL POSITION SHAFT END FACING DOWN

Series	Motor type	LB'	Ø
FLSE FLSN FLSPX FLSES	80 L/LG	LB + 20	145
	90 S/L/LU	LB + 20	185
	100 L/LK	LB + 20	185
	112 MG	LB + 20	185
	112 MU	LB + 25	210
	132 S	LB + 25	210
	132 MR/MU/M	LB + 30	240
	160 M/L/LU	LB + 60	320
	180 M/MR	LB + 60	320
	180 L/LUR	LB + 60	360
	200 LU	LB + 75	400
	225 SR	LB + 75	400
	225 M/MR	LB + 130	420
	250 M	LB + 130	420
	280 S/M	LB + 130	420
	315 S/M/L	LB + 118	620
	355 L	LB + 112	710
	355 LK	LB + 160	650
	400 LK/450	LB + 160	650

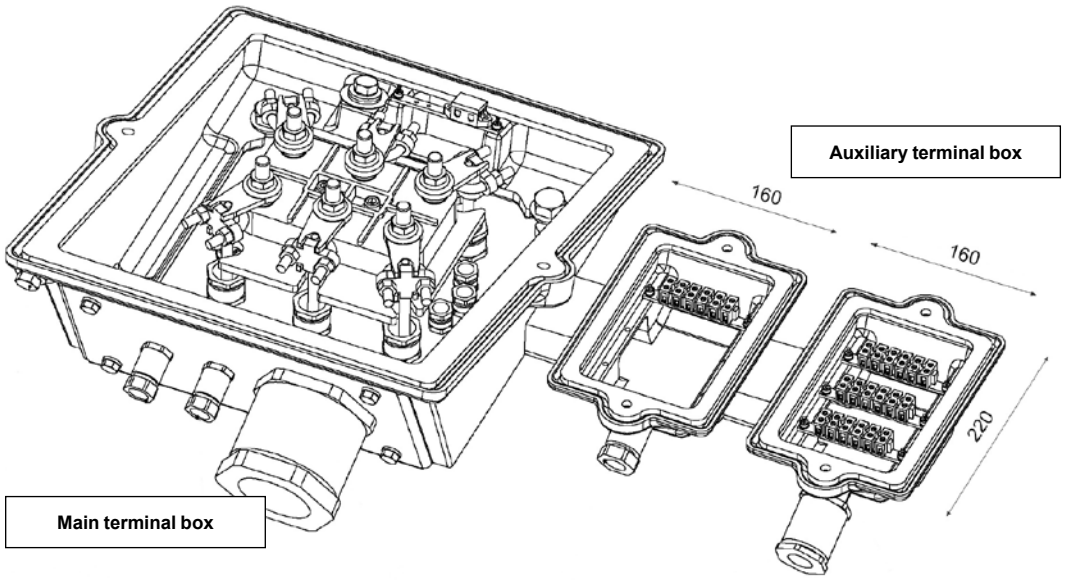


Mechanical options

TERMINAL BOX

Auxiliary terminal box

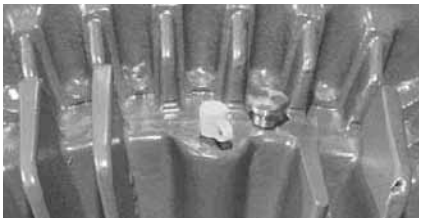
All ATEX motors with frame size ≥ 160 mm can be fitted with one or two type "e" auxiliary terminal boxes to take the terminal blocks for connecting electrical options such as heat sensors and/or the heater. These auxiliary terminal boxes are fixed on the body of the main terminal box.



ADAPTATION FOR VIBRATION SENSOR

On request, our motors can be equipped with tapped holes (for SPM type sensor) on faceplates, to take the vibration sensors (not supplied).

The adaptors form a connection with the snap-on transmitter.

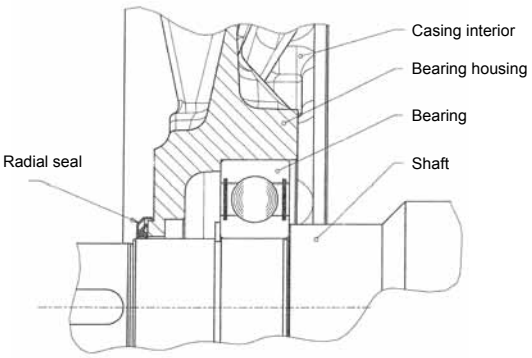


TAPPED HOLES FOR POSITIONING

Tapped holes for positioning can be made on the cast iron motor feet in order to make it easier to adjust and align the motor.
They have a metric thread which can also be created to suit another standard diameter on request.

RADIAL SEAL

When a motor needs to be mounted in the vertical position, shaft end facing up (position IM 1031, 2031 and 3031 for example) and its shaft end is not correctly protected by the driven machine against rain or water splashes, it is advisable to use an optional radial seal on the drive end to avoid water getting into the motor around the shaft.

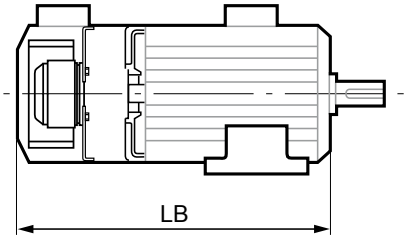


Mechanical options

FORCED VENTILATION

The integration of high-efficiency motors within a process often requires accessories to make operation easier: forced ventilation for motors used at high or low speeds.

Notes:
- Without forced ventilation, there is a possibility of overspeed with optional class B balancing.
- The motor temperature is monitored by probes built into the windings.



Series	Type	LB dimensions with Forced Ventilation	
		Foot or face mounted motors	Flange mounted motor
FLSE FLSN FLSPX FLSES	160 M	641	
	160 L		
	160 LU	702	
	180 MR	641	
	180 M	689	
	180 L		
	180 LUR		
	200 LU	819	
	225 SR	825.5	
	225 MR		
	225 M	917	
	250 M		
	280 S	1167	
	280 M	1167	
	315 S	1477	
	315 M		
	315 LA/LB		
	355 LA/LB/LC	1668	
	355 LKA/LKB	1995	

ENCODERS

All our safety motors can be fitted with an ATEX-certified incremental encoder.

This pulse generator supplies a number of pulses proportional to the motor speed. It can be supplied with a D.C. voltage of 5 V +/- 10% or 11-30 V regulated.

The drive encoder lines per revolution should be specified (at the time of ordering): 1024 or 4096 (for the incremental encoder) and 8192 (for the absolute encoder).

SPACE HEATERS

Series	Type	Power (W)
FLSE FLSN FLSPX FLSES	80 L/LG	10
	90 to 132	25
	160 to 200	52
	225 SR/MR	52
	225 M	100
	250 M	100
	280 to 315	100*
	355	150*

The space heaters use 200/240 V, single-phase, 50 or 60 Hz.

** It is possible to increase the power when asking for estimate (quotation).*

Position of the lifting rings

LIFTING THE MOTOR ONLY

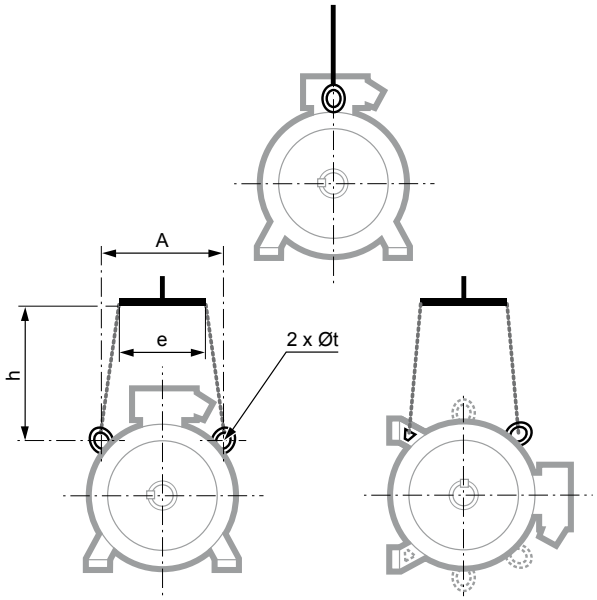
(not coupled to the machine)

The regulations stipulate that over 25 kg, suitable handling equipment must be used.

All our motors are fitted with grab handles, making them easier to handle without risk. A diagram of the sling hoisting method appears below with the required dimensions.

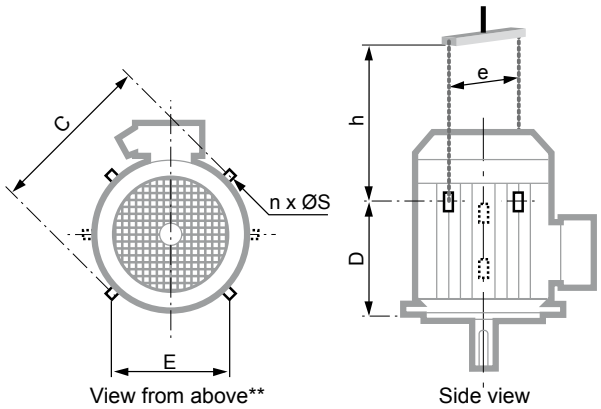
To prevent any damage to the motor during handling (for example: switching the motor from horizontal to vertical), it is essential to follow these instructions.

HORIZONTAL POSITION



Series	Type	Horizontal position			
		A	e min.	h min.	Øt
FLSE FLSN FLSPX FLSES	100	152	200	150	22
	112	145	200	150	22
	132	180	200	150	25
	160	200	260	150	14
	180 M/MR	200	260	150	14
	180 L/LUR	200	260	150	14
	225 SR/MR	270	260	150	14
	225 M	360	265	200	30
	250	360	380	200	30
	280	360	380	500	30
	315 S/M/LA/LB	440	400	500	60
	355	545	500	500	60
	355 LK	685	710	500	30
	400	735	710	500	30
	450	730	710	500	30

VERTICAL POSITION



Separate ring ≤ 25 kg
Built-in ring > 25 kg

Series	Type	Vertical position						
		C	E	D	n**	ØS	e min.*	h min.
FLSE FLSN FLSPX FLSES	160	320	200	230	2	14	320	350
	180 M/MR	320	200	230	2	14	320	270
	180 L/LUR	390	265	290	2	14	390	320
	225 SR/MR	410	300	295	2	14	410	450
	225 M	480	360	405	4	30	540	350
	250	480	360	405	4	30	590	550
	280 S	480	360	585	4	30	590	550
	280 M	480	360	585	4	30	590	550
	315S/ M/LA/LB	620	-	715	2	35	650	550
	355	760	-	750	2	35	800	550
	355 LK	810	350	1135	4	30	810	600
	400	810	350	1135	4	30	810	600
	450	960	400	1170	4	30	960	750

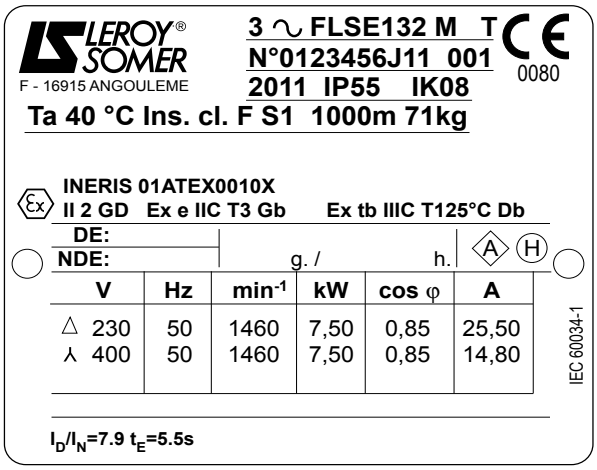
** If the motor is fitted with a drip cover, allow an additional 50 to 100 mm to avoid damaging it when the load is swung.*

*** If n = 2, the lifting rings form an angle of 90° with respect to the axis of the terminal box.*
If n = 4, this angle becomes 45°.

Identification and marking

NAMEPLATES

FLSE 80 to FLSE 132



DEFINITION OF SYMBOLS USED ON NAMEPLATES

Legal mark of conformity of product to the requirements of European Directives

ATEX specific marking

: Mark for protection against risks of explosion

II 2G or II 2GD : ATEX marking
Ex e : "Gas" protection type
IIC : "Gas" equipment group
T3 or T4 : "Gas" temperature class
Gb : "Gas" EPL
Ex tb : "Dust" protection type (optional)
IIIC : "Dust" equipment group (optional)
T125°C : Maximum surface temperature (optional)
Db : "Dust" EPL
0080 : INERIS Notified Body
INERIS 01ATEX0010X : EC type-examination certificate number

Zone	ATEX marking	Gas protection type marking	Dust protection type marking (option)	Ingress protection
1 & 2	II 2 G	Ex e IIC T3 Gb Ex e IIC T4 Gb	-	IP55
1 & 21 2 & 22	II 2 GD	Ex e IIC T3 Gb Ex e IIC T4 Gb	Ex tb IIIC T125°C Db Ex tb IIIC T125°C Db	IP65

Motor

MOT 3 ~ : Three-phase A.C. motor
FLSE : Series
132 : Frame size
M : Housing symbol
T : Impregnation index

Motor no.

0123456 : Motor batch number
J : Month of production
11 : Year of production
001 : Serial number

kg : Weight
IP55 : Ingress protection
IK08 : Shock resistance index
I cl.F : Insulation class F
40°C : Maximum ambient operating temperature
S1 : Duty
V : Supply voltage
Hz : Supply frequency
min^{-1} : Speed of rotation
kW : Rated power
cos φ : Power factor
A : Rated current
Δ : Delta connection
Y : Star connection
I_D/I_N : Starting current
t_E : Locked rotor time

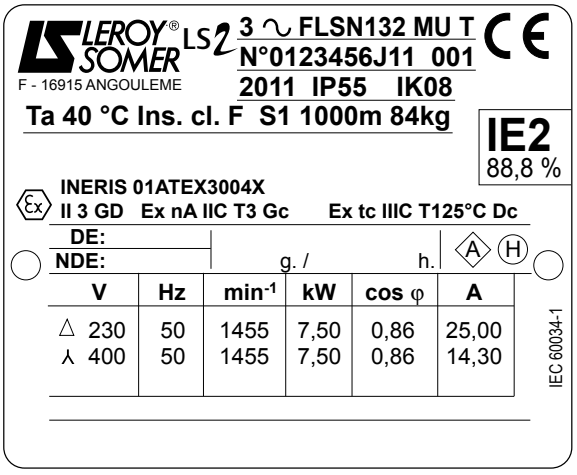
Bearings

DE : Drive end bearing
NDE : Non drive end bearing
g : Amount of grease at each regreasing (in g)
h : Regreasing interval (in hours)
A : Vibration level
H : Balancing mode

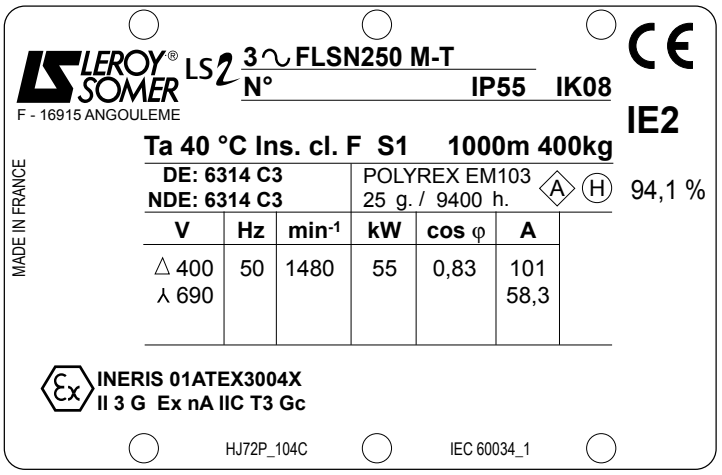
Identification and marking

NAMEPLATES

FLSN 80 to FLSN 132



FLSN 160 to FLSN 355



DEFINITION OF SYMBOLS USED ON NAMEPLATES

Legal mark of conformity of product to the requirements of European Directives

ATEX specific marking

: Mark for protection against risks of explosion

II 3G or II 3GD : ATEX marking
Ex nA : "Gas" protection type
IIC : "Gas" equipment group
T3 : "Gas" temperature class
Gc : "Gas" EPL
Ex tc : "Dust" protection type (optional)
IIIC : "Dust" equipment group (optional)
T125°C : Maximum surface temperature (optional)
Dc : "Dust" EPL
0080 : INERIS Notified Body
INERIS 01ATEX3004X : EC type-examination certificate number

Zone	ATEX marking	Gas protection type marking	Dust protection type marking (option)	Ingress protection
2	II 3 G	Ex nA IIC T3 Gc	-	IP55
2 & 22	II 3 GD	Ex nA IIC T3 Gc	Ex tc IIIC T125°C Dc	IP65

Motor

MOT 3 ~ : Three-phase A.C. motor
FLSN : Series
132 : Frame size
MU : Housing symbol
T : Impregnation index

Motor no.

0123456 : Motor batch number
J : Month of production
11 : Year of production
001 : Serial number
IE2 : Efficiency class
88.8% : Efficiency at 4/4 load

kg : Weight
IP55 : Ingress protection
IK08 : Shock resistance index
I cl.F : Insulation class F
40°C : Maximum ambient operating temperature
S1 : Duty
V : Supply voltage
Hz : Supply frequency
min-1 : Speed of rotation
kW : Rated power
cos φ : Power factor
A : Rated current
Δ : Delta connection
Y : Star connection

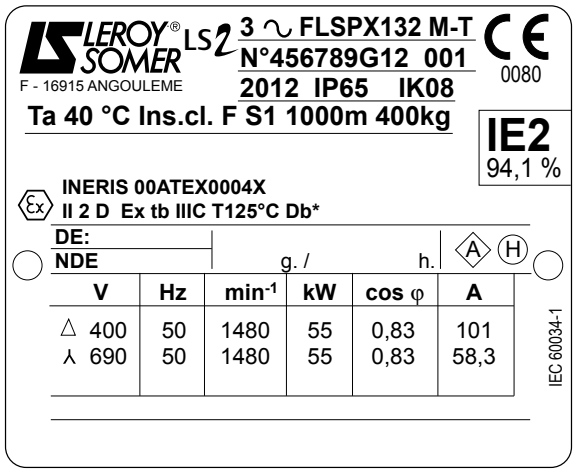
Bearings

DE : Drive end bearing
NDE : Non drive end bearing
g : Amount of grease at each regreasing (in g)
h : Regreasing interval (in hours)
A : Vibration level
H : Balancing mode

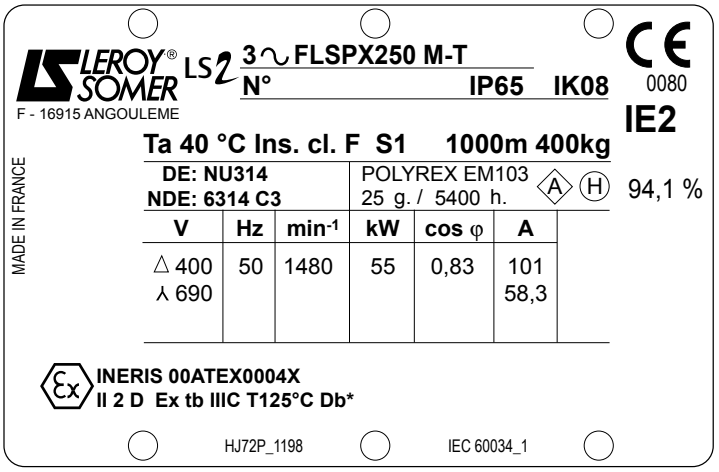
Identification and marking

NAMEPLATES

FLSPX 80 to FLSPX 132



FLSPX 160 to FLSPX 355



*II 3 D Ex tc IIIB T125°C Dc --> FLSES/FLS

DEFINITION OF SYMBOLS USED ON NAMEPLATES

Legal mark of conformity of product to the requirements of European Directives

ATEX specific marking

: Mark for protection against risks of explosion

II 2D or II 3D : ATEX marking

Ex tb or tc : "Dust" protection type

IIIB or IIIC : "Dust" equipment group

T125°C : Maximum surface temperature

Db or Dc : "Dust" EPL

0080 : INERIS Notified Body

INERIS 00ATEX0004X : EC type-examination certificate number

Zone	Type	ATEX marking	Dust protection type marking	Ingress protection
21	FLSPX	II 2 D	Ex tb IIIC T125°C Db	IP65
22	FLSES Non-conductive dust	II 3 D	Ex tc IIIB T125°C Dc	IP55

Motor

MOT 3 ~ : Three-phase A.C. motor
FLSPX : Series
132 : Frame size
M : Housing symbol
T : Impregnation index

Motor no.

456789 : Motor batch number
G : Month of production
12 : Year of production
001 : Serial number
IE2 : Efficiency class
94.1% : Efficiency at 4/4 load

kg : Weight
IP65 : Ingress protection
IK08 : Shock resistance index
I cl.F : Insulation class F
40°C : Maximum ambient operating temperature
S1 : Duty
V : Supply voltage
Hz : Supply frequency
min-1 : Speed of rotation
kW : Rated power
cos φ : Power factor
A : Rated current
Δ : Delta connection
Y : Star connection

Bearings

DE : Drive end bearing
NDE : Non drive end bearing
g : Amount of grease at each regreasing (in g)
h : Regreasing interval (in hours)
A : Vibration level
H : Balancing mode

Name

II 2 G Ex e IIC T3 (or **T4**) **Gb**
II 3 G Ex nA IIC T3 Gc
II 2 D Ex tb IIIC T125°C Db
II 3 D Ex tc IIIB T125°C Dc

The complete motor **reference** described below will enable you to **order** the desired equipment.

The selection method consists of following the terms in the designation.

4P 1500 min-1	LSPX	180	MT	18.5 kW	LS2/IE2	IM 1001 IM B3	230 / 400 V	50 Hz	IP 55
No. of poles Speed(s)	Series designation	Frame size IEC 60072	Housing designation and manufacturer code	Rated power	Range/Efficiency class	Mounting arrangement IEC 60034-7	Mains voltage	Mains frequency	Protection IEC 60034-5

Description

Description	Materials	Comments
Housing with cooling fins	Aluminium alloy	- with integral or screw-on feet, or without feet - 4 or 6 fixing holes for housings with feet - lifting rings for frame size ≥ 100 - earth terminal with an optional jumper screw
Stator	Insulated low-carbon magnetic steel laminations Electroplated copper	- low carbon content guarantees long-term lamination pack stability - semi-enclosed slots - class F insulation
Rotor	Insulated low-carbon magnetic steel laminations Aluminium	- inclined cage bars - rotor cage pressure die-cast in aluminium (or alloy for special applications) - shrink-fitted to shaft - rotor balanced dynamically, 1/2 key
Shaft	Steel	- for frame size ≤ 160 MP - LR: • centre hole • closed tapped keyway - for frame size ≥ 160 M - L: • tapped hole • open keyway
End shields	Aluminium alloy	- 80 - 90 NDE shield
	Cast iron	- 80 - 90 DE shield (except for 6-pole version and optional for 80 and 90 NDE shield) - 100 to 315 DE shield and NDE shield
Bearings and lubrication		- permanently greased bearings frame size 80 to 225 - regreasable bearings frame size 250 to 315 - bearings preloaded at non drive end
Labyrinth seal **Lipseals**	Plastic or steel Synthetic rubber	- lipseal or deflector at drive end for all flange mounted motors - lipseal, deflector or labyrinth seal for foot mounted motors
Fan	Composite material or aluminium alloy	- 2 directions of rotation: straight blades
Fan cover	Composite material or pressed steel	- fitted, on request, with a drip cover for operation in vertical position, shaft end facing down (steel cover)
Terminal box	Composite material or aluminium alloy	- IP 55 or IP 65 - can be turned, opposite the feet - fitted with a terminal block with 6 steel terminals as standard (brass as an option) - terminal box fitted with plugs, supplied without cable glands (cable glands as an option) - 1 earth terminal in each terminal box - fixing system consisting of a cover with captive screws

Bearings and lubrication

PERMANENTLY GREASED BEARINGS

Under normal operating conditions, the service life (L_{10h}) in hours of the lubricant is indicated in the table below for ambient temperatures less than 55°C.

Series	Type	Number of poles	Types of permanently greased bearing		Grease life L_{50g} according to speed of rotation								
					3000 rpm			1500 rpm			1000 rpm		
			N.D.E.	D.E.	25°C	40°C	55°C	25°C	40°C	55°C	25°C	40°C	55°C
LSE LSN LSPX LSES	80 L	2	6203 CN	6204 C3	≥40000	≥40000	25000	-	-	-	-	-	-
	80LG	2; 4	6204 C3	6205 C3	≥40000	≥40000	24000	≥40000	≥40000	31000	-	-	-
	90 S - L	2; 4; 6									≥40000	≥40000	34000
	90 LU	4	6205 C3	6205 C3	-	-	-	≥40000	≥40000	30000	-	-	-
	100 L	2; 4; 6	6205 C3	6206 C3	≥40000	≥40000	22000	≥40000	≥40000	30000	≥40000	≥40000	33000
	100 LR	4			-	-	-				-	-	-
	112 MR	2	6205 C3	6206 C3	≥40000	≥40000	22000	-	-	-	-	-	-
	112 MG	2; 6						-	-	-	≥40000	≥40000	33000
	112 MU	4	6206 C3	6206 C3	-	-	-	≥40000	≥40000	30000	-	-	-
	132 S	2; 6	6206 C3	6208 C3	≥40000	≥40000	19000	-	-	-	≥40000	≥40000	30000
	132 SU	2; 4						≥40000	≥40000	25000	-	-	-
	132 M	2; 4; 6	6207 C3	6308 C3	≥40000	≥40000	19000	≥40000	≥40000	25000	≥40000	≥40000	30000
	132 MU	4; 6	6307 C3	6308 C3	-	-	-	≥40000	≥40000	25000	≥40000	≥40000	30000
	160 MR	2; 4	6308 C3	6309 C3	≥40000	35000	15000	≥40000	≥40000	24000	-	-	-
	160 MP	2; 4	6208 C3	6309 C3	≥40000	35000	18000	≥40000	≥40000	24000	-	-	-
	160 M	6	6210 C3	6309 C3	-	-	-	-	-	-	≥40000	≥40000	27000
	160 LU	4; 6			-	-	-	≥40000	≥40000	23000			
	160 L	2; 4			≥40000	30000	15000				-	-	-
	180 MT	2; 4	6210 C3	6310 C3	≥40000	30000	15000	≥40000	≥40000	23000	-	-	-
	180 LR	4			-	-	-				-	-	-
	180 LUR	4; 6	6312 C3	6310 C3	-	-	-	≥40000	≥40000	22000	≥40000	≥40000	27000
	180 L	6	6212 C3	6310 C3	-	-	-	-	-	-	≥40000	≥40000	28000
	200 LR	2; 4; 6	6312 C3	6312 C3	≥40000	25000	12500	≥40000	≥40000	22000	≥40000	≥40000	27000
	200 L	2; 6	6214 C3	6312 C3	≥40000	25000	12500	-	-	-	≥40000	≥40000	27000
	200 LU	2; 6	6312 C3	6312 C3	≥40000	25000	12500	-	-	-	≥40000	≥40000	27000
	225 ST	4	6214 C3	6313 C3	-	-	-	≥40000	≥40000	21000	-	-	-
	225 MT	2			≥40000	22000	11000	-	-	-	-	-	-
	225 MR	2; 4; 6	6312 C3	6313 C3	≥40000	22000	11000	≥40000	≥40000	21000	≥40000	≥40000	26000
	225 MG	2; 4; 6	6216 C3	6314 C3	36000	18000	9000	40000	40000	20000	≥40000	≥40000	25000

NB: On request, all motors can be fitted with grease nipples except the 132 S/SU.

Bearings and lubrication

BEARINGS WITH GREASE NIPPLES

The chart opposite shows the greasing intervals, depending on the type of motor, for standard bearing assemblies fitted with grease nipples, operating at an ambient temperature of 25°C, 40°C and 55°C on a horizontal shaft machine.

The chart below is valid for LSES/ LSN/LSPX/LSES motors lubricated with Polyrex EM103 grease, which is used as standard.

SPECIAL CONSTRUCTION AND ENVIRONMENT

For vertical shaft machines, the greasing intervals will be approximately 80% of the values stated in the table below.

NB: The quality and quantity of grease and the greasing interval are shown on the machine nameplate.

For special assemblies (motors fitted with DE roller bearings or other types), machines of frame size ≥ 160 mm have bearings with grease nipples.

Instructions for bearing maintenance are given on the nameplates on these machines.

Series	Type	Number of poles	Type of bearing for bearings with grease nipples		Quantity of grease	Greasing intervals in hours								
						3000 rpm			1500 rpm			1000 rpm		
			N.D.E.	D.E.	g	25°C	40°C	55°C	25°C	40°C	55°C	25°C	40°C	55°C
LSE LSN LSPX LSES	160 M*	6	6210 C3	6309 C3	13	-	-	-	-	-	-	31600	15800	7900
	160 LU*	4; 6				-	-	-	25800	12900	6450	31600	15800	7900
	160 L*	2; 4				17600	8800	4400	25800	12900	6450	-	-	-
	180 MT*	2; 4	6210 C3	6310 C3	15	15600	7800	3900	24200	12100	6050	-	-	-
	180 LR*	4				-	-	-	24200	12100	6050	-	-	-
	180 LUR*	4; 6	6312 C3	6310 C3	20	-	-	-	21400	10700	5350	28000	14000	7000
	180 L*	6	6212 C3	6310 C3	15	-	-	-	-	-	-	28000	14000	7000
	200 LR*	2; 4; 6	6312 C3	6312 C3	20	12000	6000	3000	21400	10700	5350	28000	14000	7000
	200 L*	2; 6	6214 C3	6312 C3	20	11600	5800	2900	-	-	-	27600	13800	6900
	200 LU*	2; 6	6312 C3	6312 C3	20	12000	6000	3000	-	-	-	28000	14000	7000
	225 ST*	4	6214 C3	6313 C3	25	-	-	-	20000	10000	5000	-	-	-
	225 MT*	2				10600	5300	2650	-	-	-	-	-	-
	225 MR*	2; 4; 6	6312 C3	6313 C3	25	10600	5300	2650	20000	10000	5000	26800	13400	6700
	225 MG*	2; 4; 6	6216 C3	6314 C3	25	9400	4700	2350	18800	9400	4700	25600	12800	6400
	250 MZ	2	6312 C3	6313 C3	25	10600	5300	2650	-	-	-	-	-	-
	250 ME	4; 6	6216 C3	6314 C3	25	-	-	-	22000	11000	5500	30000	16000	8000
	250 MF	2				11000	5500	2750	-	-	-	-	-	-
	280 SC - MC	2							-	-	-	-	-	-
	280 SC	4; 6	6216 C3	6316 C3	35	-	-	-	20000	10000	5000	28000	14000	7000
	280 MC	6				-	-	-	-	-	-			
	280 MD	4	6218 C3	6316 C3	35	-	-	-	20000	10000	5000	-	-	-
	280 SU	2; 4; 6	6317 C3	6317 C3	40	8000	4000	2250	18000	9000	4500	24000	12000	6000
	280 SK	6				-	-	-	-	-	-	24000	12000	6000
	315 SN	2	6216 C3	6316 C3	35	9000	4500	2250	-	-	-	-	-	-
	315 SN	6	6218 C3	6317 C3	40	-	-	-	-	-	-	24000	12000	6000
	315 MP - MR	2	6317 C3	6317 C3	40	8000	4000	2250	-	-	-	-	-	-
	315 SP	4	6317 C3	6320 C3	50	-	-	-	15000	7500	3750	-	-	-
	315 MP - MR	4; 6										24000	12000	6000

** bearing with grease nipples on request*

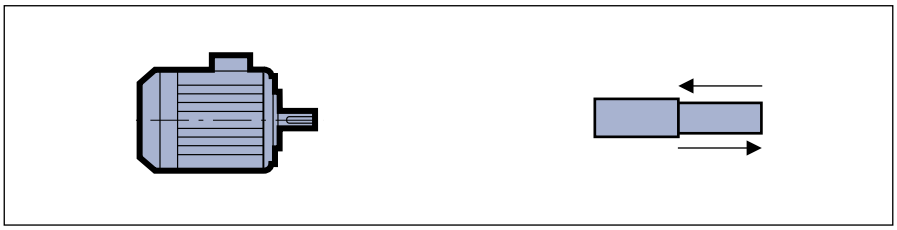
BEARING FITTING ARRANGEMENTS

LSE-LSN-LSPX-LSES series		Horizontal shaft	Vertical shaft	
			Shaft facing down	Shaft facing up
Foot mounted motors	Mounting arrangement	B3	V5	V6
	standard mounting	The DE bearing is: - located at DE for frame ≤ 180 - locked for frame ≥ 200	The DE bearing is: - located at DE for frame ≤ 180 - locked for frame ≥ 200	The DE bearing is: - locked for frame ≥ 100
	on request	DE bearing locked for frame < 132	The DE bearing is locked	
Flange mounted motors (or foot and flange)	Mounting arrangement	B5/B35/B14/B34	V1/V15/V18/V58	V3/V36/V19/V69
	standard mounting	The DE bearing is locked	The DE bearing is locked	The DE bearing is locked

Axial loads

Horizontal motor

For a bearing life L_{10h} of 25,000 hours and 40,000 hours

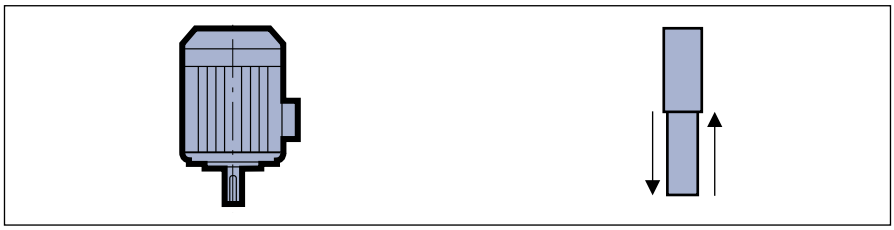


Series	Type	Number of poles	Permissible axial load (in daN) on main shaft extension for standard bearing assembly IM B3/B6 IM B7/B8 IM B5/B35 IM B14/B34											
			3000 rpm				1500 rpm				1000 rpm			
			→		←		→		←		→		←	
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours
LSE LSN LSPX LSES	80 L	2	32	23	62	53	-	-	-	-	-	-	-	-
	80 LG	2; 4	32	22	72	62	47	34	87	74	-	-	-	-
	90 S - L	2; 4; 6	29	20	69	59	45	32	85	72	60	44	100	84
	90 LU	4	-	-	-	-	42	28	92	78	-	-	-	-
	100 L	2; 4; 6	43	30	93	80	65	47	115	97	85	63	135	113
	100 LR	4	-	-	-	-	63	45	113	95	-	-	-	-
	112 MR	2	42	29	92	79	-	-	-	-	-	-	-	-
	112 MG	2; 6	46	32	96	82	-	-	-	-	81	60	131	110
	112 MU	4	-	-	-	-	56	39	116	98	-	-	-	-
	132 S	2; 6	74	54	134	114	-	-	-	-	131	99	191	159
	132 SU	2; 4	74	54	134	114	101	74	161	134	-	-	-	-
	132 M	2; 4; 6	110	82	180	152	157	120	227	190	190	146	260	216
	132 MU	4; 6	-	-	-	-	150	113	230	193	180	136	260	216
	160 MP	2; 4	149	113	229	193	211	163	291	243	-	-	-	-
	160 MR/LR	2; 4	144	108	234	198	204	156	294	246	-	-	-	-
	160 M	6	-	-	-	-	-	-	-	-	240	183	340	283
	160 L	2; 4	126	91	226	191	179	132	279	232	-	-	-	-
	160 LU	4; 6	-	-	-	-	185	138	285	238	217	161	317	261
	180 MT	2; 4	158	117	258	217	207	153	307	253	-	-	-	-
	180 LR	4	-	-	-	-	193	140	293	240	-	-	-	-
	180 L	6	-	-	-	-	-	-	-	-	277	213	325	261
	180 LUR	4; 6	-	-	-	-	199	147	262	210	224	162	287	225
	200 LR	2; 4; 6	237	184	300	247	294	224	357	287	337	254	400	317
	200 L	2; 6	249	195	315	261	-	-	-	-	367	283	433	349
	200 LU	2; 6	232	179	295	242	-	-	-	-	320	238	383	301
	225 ST	4	-	-	-	-	363	283	429	349	-	-	-	-
	225 MT	2	279	219	345	285	-	-	-	-	-	-	-	-
	225 MR	2; 4; 6	270	210	333	273	339	261	402	324	407	256	470	319
	225 MG	2; 4; 6	295	228	365	298	378	290	448	360	458	353	528	423
	250 MZ	2	277	217	340	280	-	-	-	-	-	-	-	-
	250 ME	4; 6	-	-	-	-	392	303	462	373	478	372	548	442
	250 MF	2	291	224	361	294	-	-	-	-	-	-	-	-
	280 SC	2; 4; 6	298	231	368	301	465	361	535	431	574	449	644	519
	280 SU	2; 4	480	398	300	218	577	469	397	289	-	-	-	-
	280 SK	6	-	-	-	-	-	-	-	-	705	574	525	394
	280 MC	2; 6	295	228	365	298	-	-	-	-	559	435	629	505
	280 MD	4	-	-	-	-	429	246	517	246	-	-	-	-
	315 SN	2; 6	349	271	419	341	-	-	-	-	553	423	641	511
	315 SP	4	-	-	-	-	792	650	612	470	-	-	-	-
	315 MP	2; 4; 6	492	409	312	229	764	623	584	443	884	717	704	537
	315 MR	2; 4; 6	467	386	287	206	753	613	573	433	856	613	676	433

Axial loads

Vertical motor
Shaft facing down

For a bearing life L_{10h} of 25,000 hours and 40,000 hours

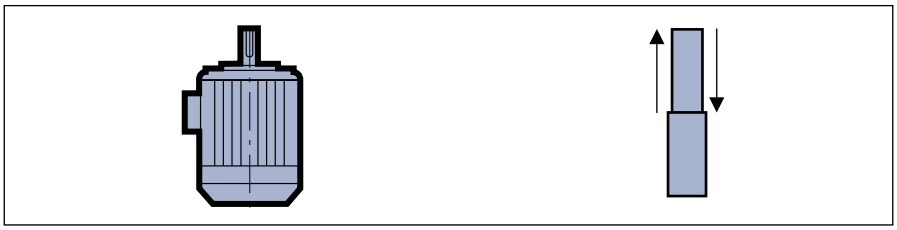


Series	Type	Number of poles	Permissible axial load (in daN) on main shaft extension for standard bearing assembly IM V5 IM V1/V15 IM V18/V58											
			3000 rpm				1500 rpm				1000 rpm			
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours
LSE LSN LSPX LSES	80 L	2	30	21	64	55	-	-	-	-	-	-	-	-
	80 LG	2; 4	30	20	75	65	45	32	92	78	-	-	-	-
	90 S - L	2; 4; 6	27	17	74	64	42	29	91	78	56	41	106	90
	90 LU	4	-	-	-	-	38	24	85	98	-	-	-	-
	100 L	2; 4; 6	40	26	99	86	60	42	123	104	80	58	143	121
	100 LR	4	-	-	-	-	57	39	122	104	-	-	-	-
	112 MR	2	38	25	99	86	-	-	-	-	-	-	-	-
	112 MG	2; 6	40	26	106	92	-	-	-	-	75	53	143	121
	112 MU	4	-	-	-	-	49	31	129	111	-	-	-	-
	132 S	2; 6	67	47	145	125	-	-	-	-	122	90	207	175
	132 SU	2; 4	65	45	147	127	91	64	177	150	-	-	-	-
	132 M	2; 4; 6	101	73	196	168	145	108	247	210	179	134	279	235
	132 MU	4; 6	-	-	-	-	136	98	253	215	165	121	286	242
	160 MP	2	137	101	249	212	197	148	316	268	-	-	-	-
	160 MR/LR	2; 4	129	93	257	221	187	138	323	274	-	-	-	-
	160 M	6	-	-	-	-	-	-	-	-	215	158	379	322
	160 L	2; 4	104	69	262	226	156	109	317	270	-	-	-	-
	160 LU	4; 6	-	-	-	-	160	112	329	281	187	131	372	316
	180 MT	2; 4	134	93	196	255	182	128	352	298	-	-	-	-
	180 LR	4	-	-	-	-	167	113	345	291	-	-	-	-
	180 L	6	-	-	-	-	-	-	-	-	239	175	391	326
	180 LUR	4; 6	-	-	-	-	163	110	334	280	183	120	377	314
	200 LR	2; 4; 6	202	148	358	304	258	187	431	360	296	212	492	408
	200 L	2; 6	211	156	370	316	-	-	-	-	315	230	523	438
	200 LU	2; 6	186	132	369	315	-	-	-	-	262	179	497	414
	225 ST	4	-	-	-	-	314	233	511	430	-	-	-	-
	225 MT	2	238	177	408	347	-	-	-	-	-	-	-	-
	225 MR	2; 4; 6	222	162	408	248	284	204	503	423	351	197	593	440
	225 MG	2; 4; 6	222	154	485	417	276	186	419	529	360	253	706	599
	250 MZ	2	229	168	415	354	-	-	-	-	-	-	-	-
	250 ME	4; 6	-	-	-	-	299	208	626	535	401	293	695	587
	250 MF	2	201	133	500	432	-	-	-	-	-	-	-	-
	280 SC	2; 4; 6	233	165	478	410	361	255	710	604	487	360	806	679
	280 SU	2; 4	294	210	585	501	358	246	760	648	-	-	-	-
	280 SK	6	-	-	-	-	-	-	-	-	502	368	850	716
	280 MD	4	-	-	-	-	310	125	726	453				
	315 SN	2; 6	259	180	567	458	-	-	-	-	419	286	886	753
	315 SP	4	-	-	-	-	607	463	892	748	-	-	-	-
	315 MP	2; 4; 6	326	242	560	476	559	416	912	769	661	491	1070	900
	315 MR	2; 4; 6	275	191	586	502	521	378	952	808	604	378	1109	808

Axial loads

Vertical motor
Shaft facing up

For a bearing life L_{10h} of 25,000 hours and 40,000 hours



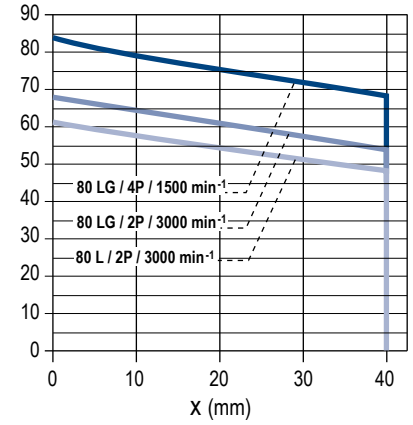
Series	Type	Number of poles	Permissible axial load (in daN) on main shaft extension for standard bearing assembly IM V6 IM V3/V36 IM V19/V69											
			3000 rpm				1500 rpm				1000 rpm			
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours
LSE LSN LSPX LSES	80 L	2	60	51	34	25	-	-	-	-	-	-	-	-
	80 LG	2; 4	69	59	35	25	85	72	52	38	-	-	-	-
	90 S - L	2; 4; 6	67	57	34	24	82	69	51	38	96	81	66	50
	90 LU	4	-	-	-	-	87	74	48	35	-	-	-	-
	100 L	2; 4; 6	90	76	49	36	110	92	73	54	130	108	93	72
	100 LR	4	-	-	-	-	107	89	72	54	-	-	-	-
	112 MR	2	88	75	49	36	-	-	-	-	-	-	-	-
	112 MG	2; 6	89	76	56	42	-	-	-	-	125	103	93	71
	112 MU	4; 6	-	-	-	-	109	91	69	51	-	-	-	-
	132 S	2; 6	127	107	86	66	-	-	-	-	182	150	147	115
	132 SU	2; 4	125	105	87	67	151	90	116	124	-	-	-	-
	132 M	2; 4; 6	171	143	126	98	215	178	177	140	249	205	209	165
	132 MU	4; 6	-	-	-	-	216	179	173	135	245	201	206	162
	160 MP	2	217	181	169	132	276	228	236	188	-	-	-	-
	160 MR/LR	2; 4	219	183	167	131	277	228	233	184	-	-	-	-
	160 M	6	-	-	-	-	-	-	-	-	315	258	279	222
	160 L	2; 4	204	169	162	126	256	209	217	170	-	-	-	-
	160 LU	4; 6	-	-	-	-	260	212	229	181	287	231	272	216
	180 MT	2; 4	234	193	196	155	282	228	252	198	-	-	-	-
	180 LR	4	-	-	-	-	267	213	245	191	-	-	-	-
	180 L	6	-	-	-	-	-	-	-	-	287	223	343	278
	180 LUR	4; 6	-	-	-	-	226	173	271	217	246	183	314	251
	200 LR	2; 4; 6	265	211	295	241	321	250	368	297	359	275	429	345
	200 L	2; 6	277	222	304	250	-	-	-	-	381	296	457	376
	200 LU	2; 6	249	195	306	252	-	-	-	-	325	242	434	351
	225 ST	4	-	-	-	-	380	299	445	364	-	-	-	-
	225 MT	2	304	243	342	281	-	-	-	-	-	-	-	-
	225 MR	2; 4; 6	285	225	345	285	347	267	440	360	414	260	530	377
	225 MG	2; 4; 6	292	224	415	347	346	256	549	459	430	323	636	529
	250 MZ	2	292	231	352	291	-	-	-	-	-	-	-	-
	250 ME	4; 6	-	-	-	-	369	278	556	465	471	363	625	517
	250 MF	2	271	203	430	363	-	-	-	-	-	-	-	-
	280 SC	2; 4; 6	303	235	408	340	431	325	640	534	557	430	736	609
	280 SU	2; 4	114	30	765	681	178	66	940	828	-	-	-	-
	280 SK	6	-	-	-	-	-	-	-	-	322	188	1030	896
	280 MD	4	-	-	-	-	398	125	638	453	-	-	-	-
	315 SN	2; 6	329	250	497	418	-	-	-	-	507	374	798	665
	315 SP	4	-	-	-	-	427	283	1072	928	-	-	-	-
	315 MP	2; 4; 6	146	62	740	656	379	236	1092	949	481	311	1250	1080
	315 MR	2; 4; 6	95	11	766	682	341	198	1132	988	341	198	1132	988

Radial loads

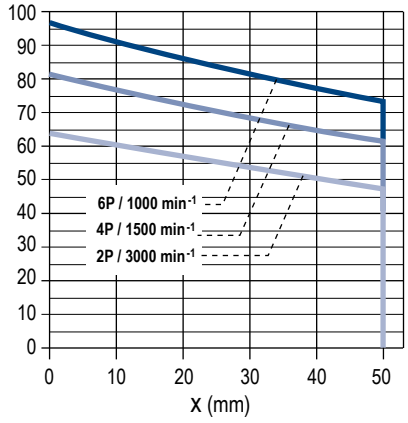
STANDARD FITTING ARRANGEMENT

Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: Distance with respect to the shaft shoulder

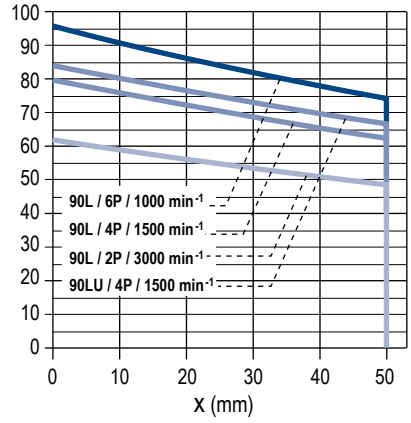
80 L / LG



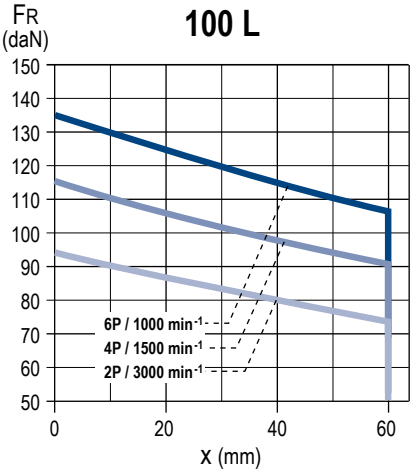
90 S



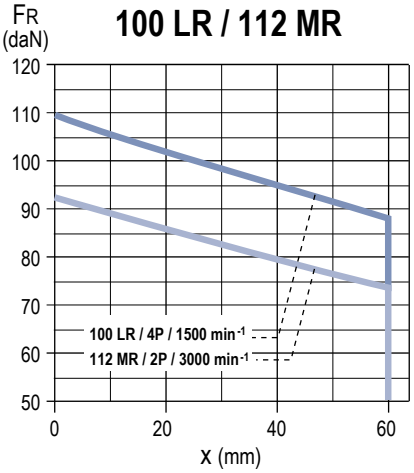
90 L / LU



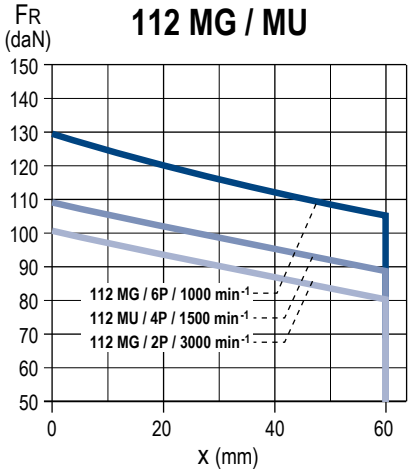
100 L



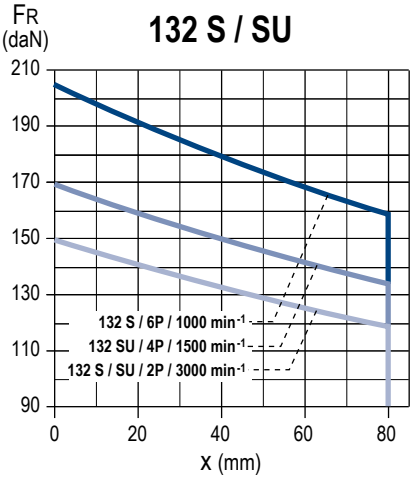
100 LR / 112 MR



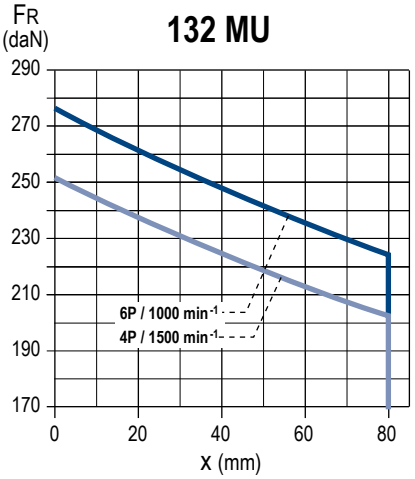
112 MG / MU



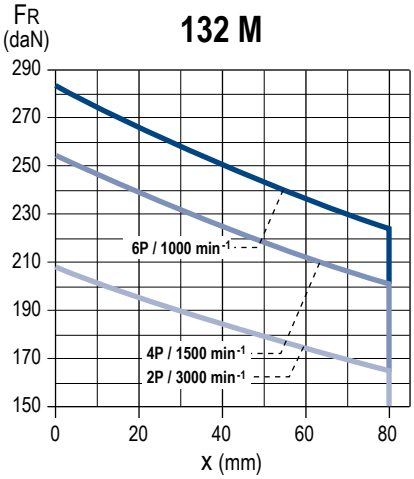
132 S / SU



132 MU



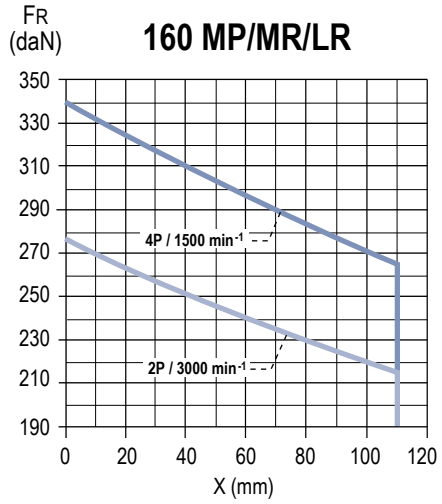
132 M

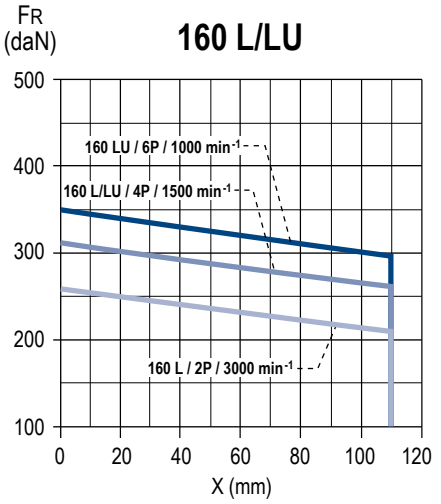


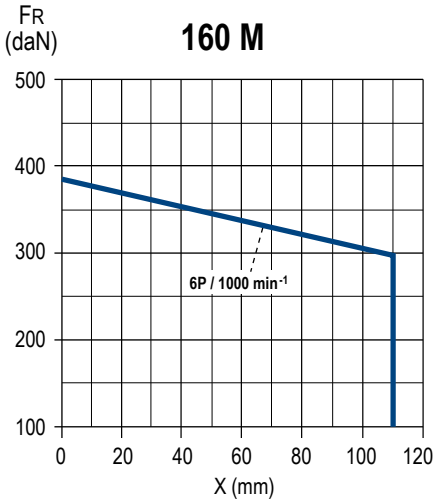
Radial loads

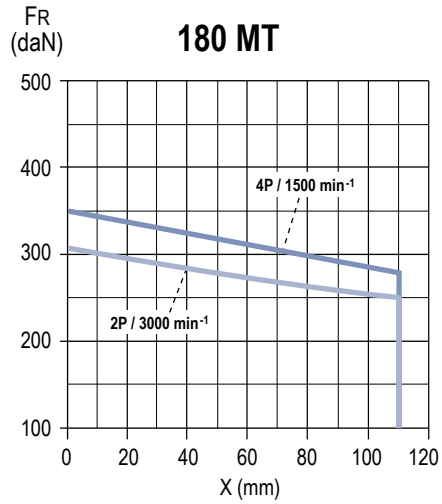
STANDARD FITTING ARRANGEMENT

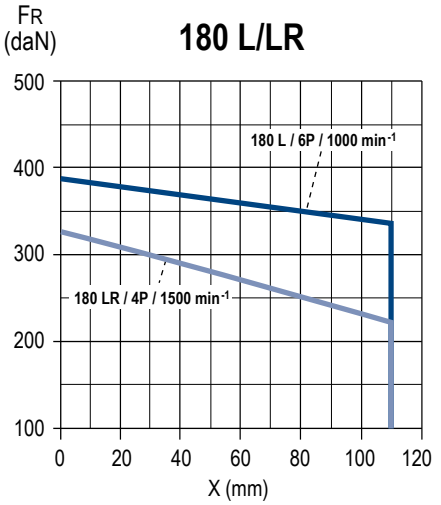
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: Distance with respect to the shaft shoulder

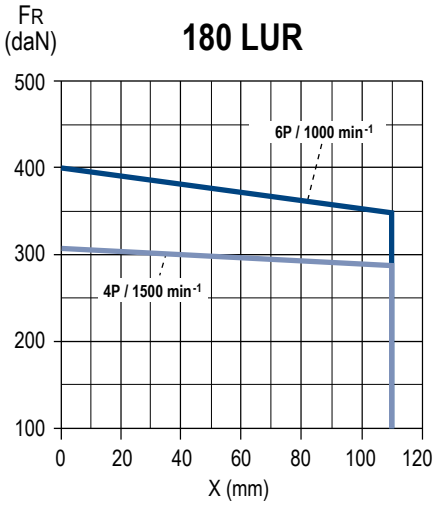


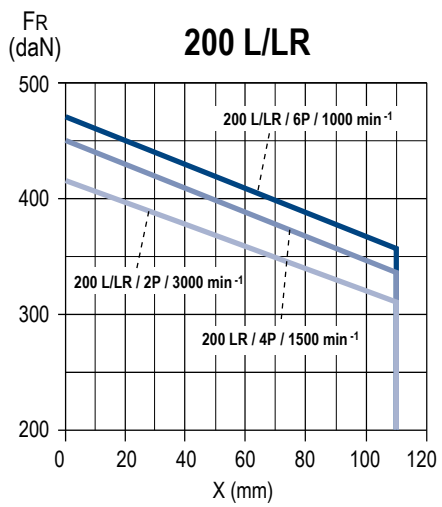


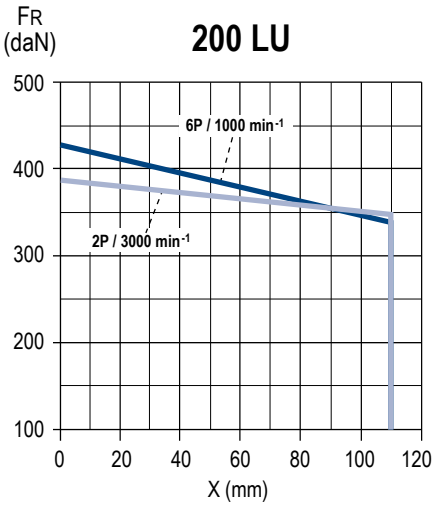


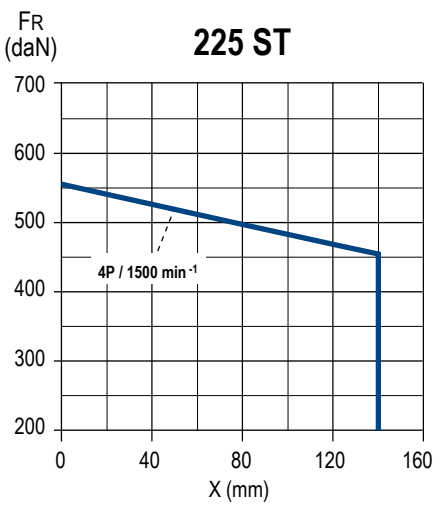








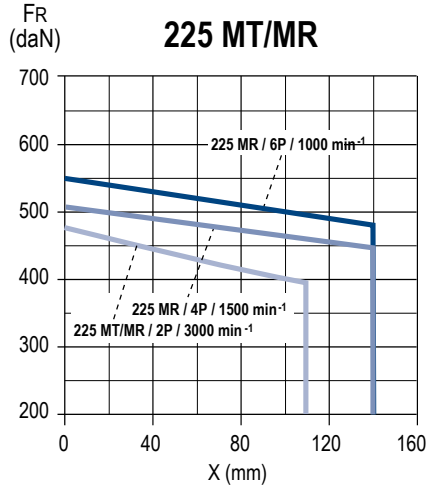


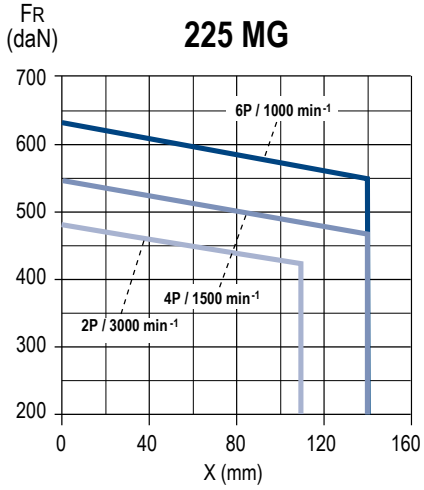


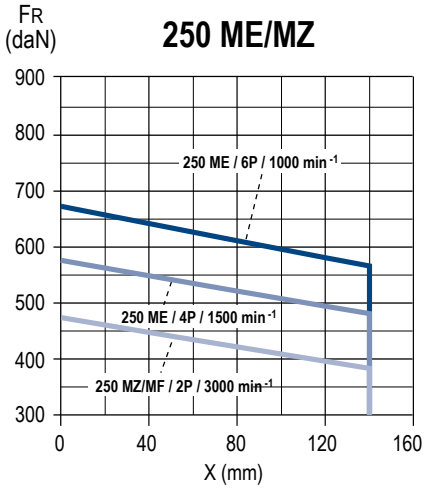
Radial loads

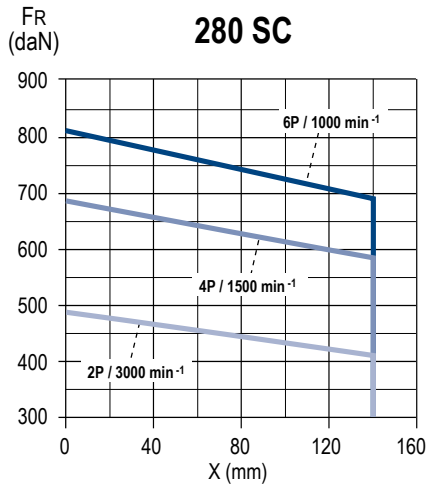
STANDARD FITTING ARRANGEMENT

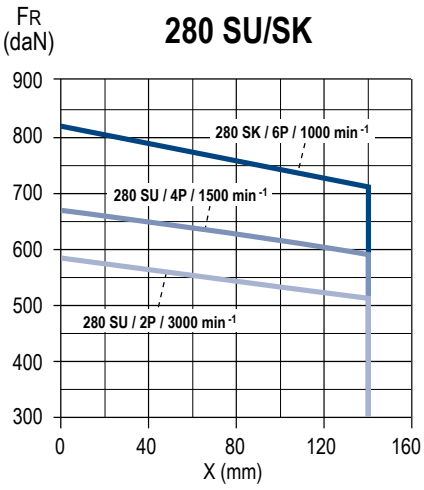
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: Distance with respect to the shaft shoulder

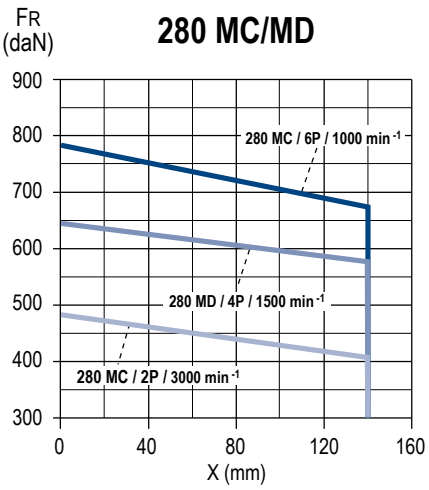


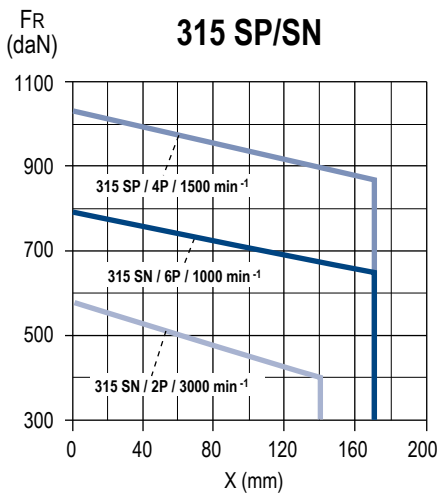


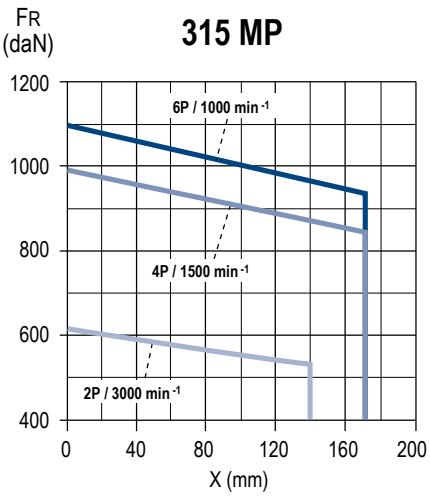


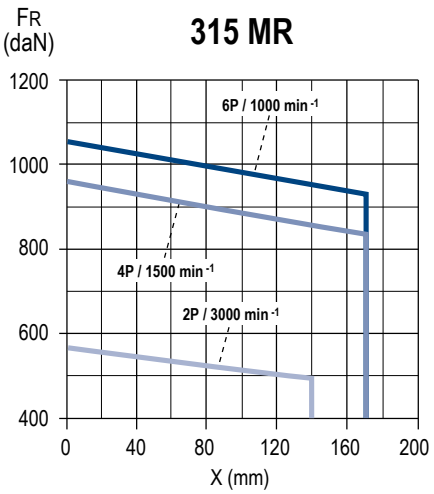












Radial loads

SPECIAL FITTING ARRANGEMENT

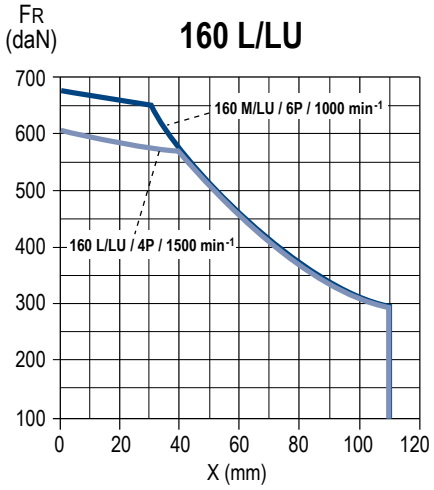
Type of drive end roller bearings

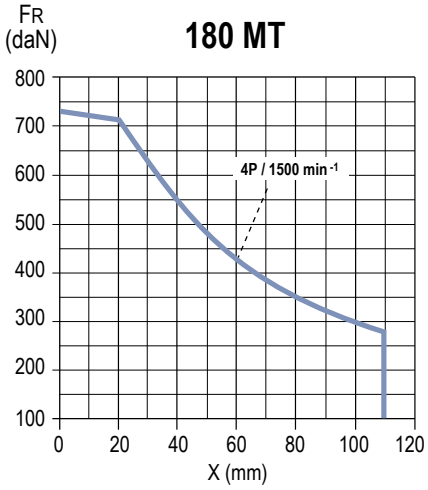
Series	Type	Number of poles	Non-drive end bearing (N.D.E.)	Drive end bearing (D.E.)
LSE LSN LSPX LSES	160 M	6	6210 C3	NU 309
	160 L/LU	4; 6		
	180 MT	4	6210 C3	NU 310
	180 LR	4		
	180 L	6	6212 C3	NU 310
	200 LR	4; 6	6312 C3	NU 312
	200 L	6	6214 C3	NU 312
	225 ST	4	6214 C3	NU 313
	225 MR	4; 6	6312 C3	NU 313
	250 ME	4; 6	6216 C3	NU 314
	280 SC	4; 6	6216 C3	NU 316
	280 MC	6		
	280 MD	4	6218 C3	NU 316
	315 SN	6	6218 C3	NU 317
	315 SP	4	6317 C3	NU 320
	315 MP/MR	4; 6	6317 C3	NU 320

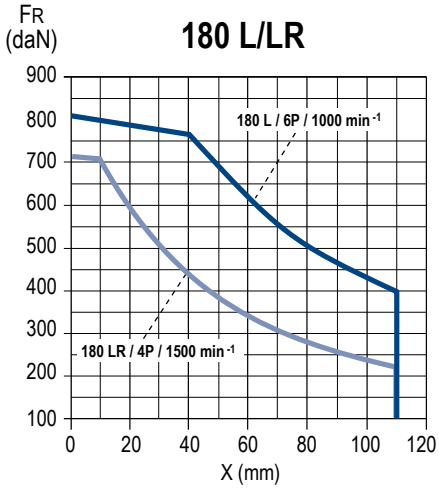
Radial loads

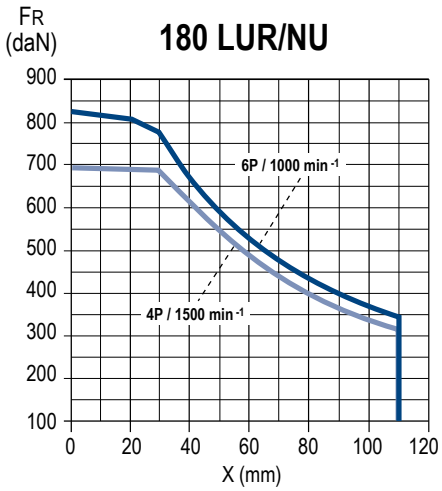
SPECIAL FITTING ARRANGEMENT

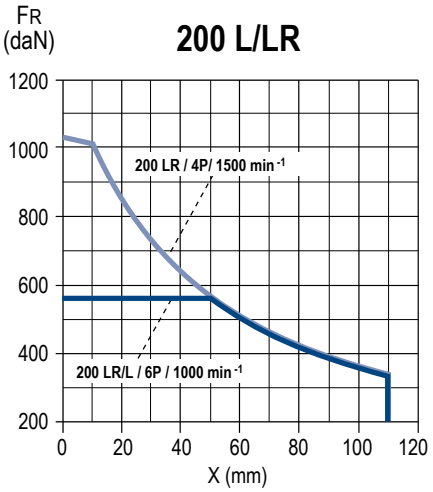
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: Distance with respect to the shaft shoulder

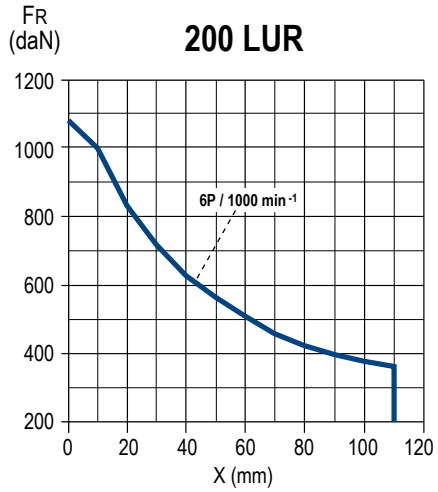


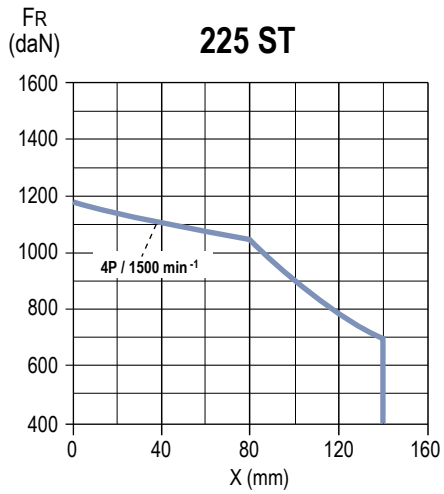


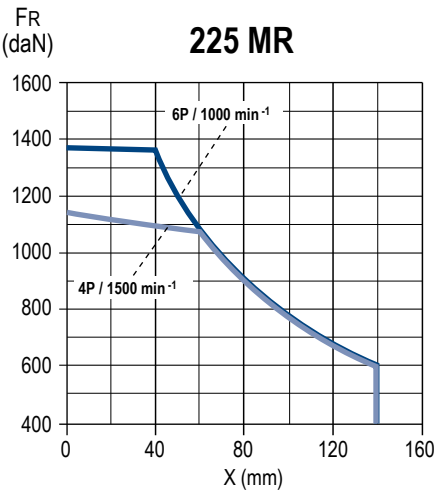


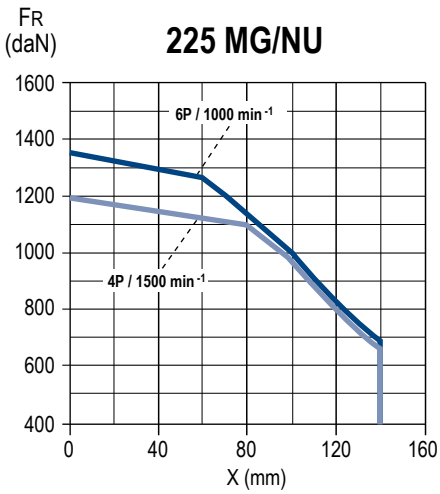








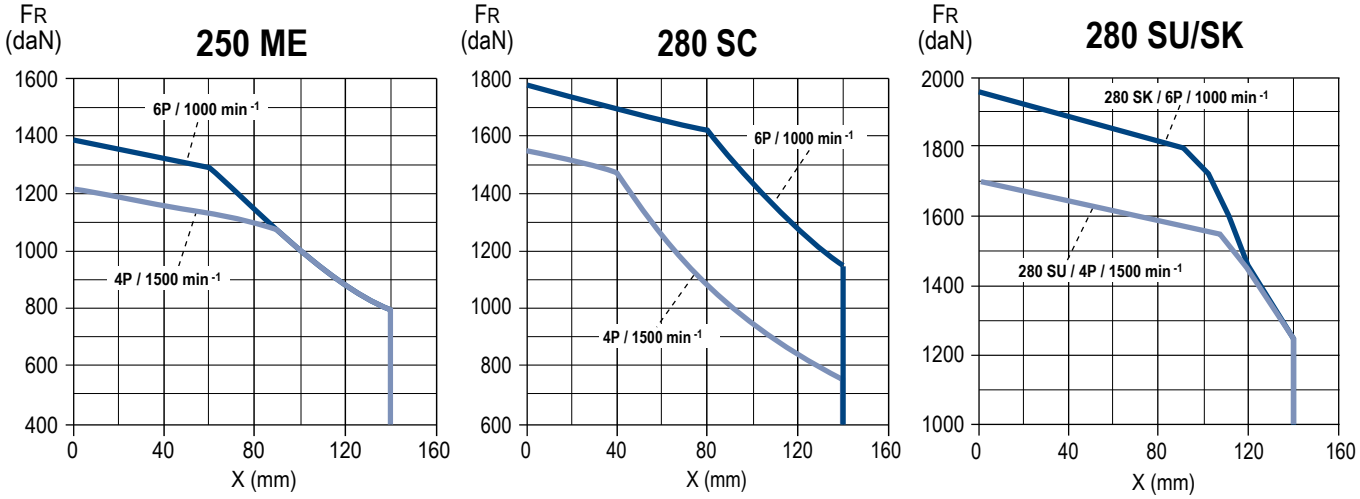


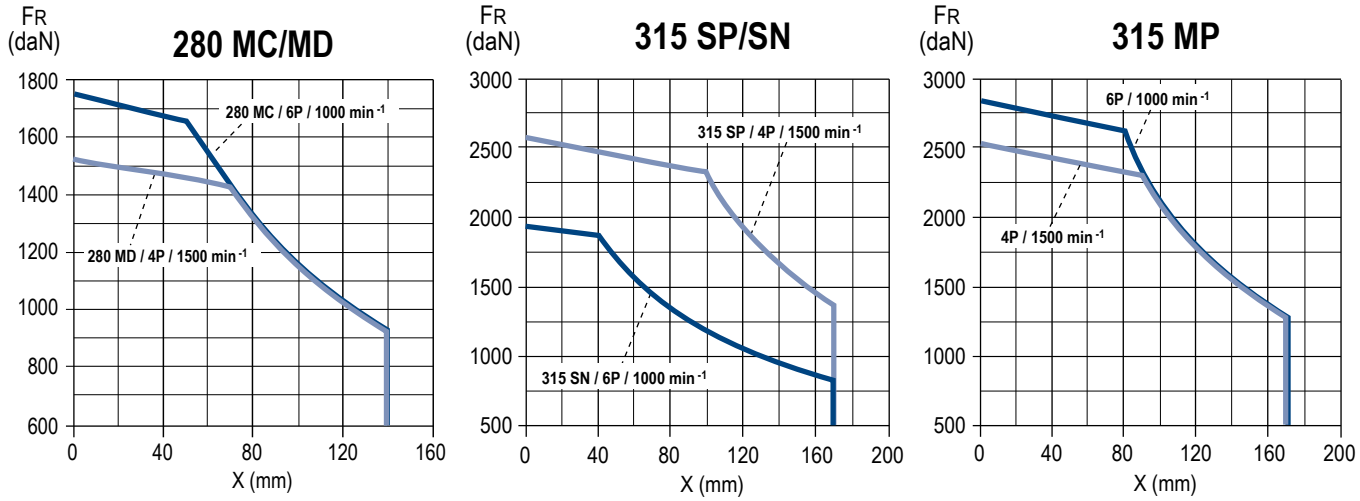


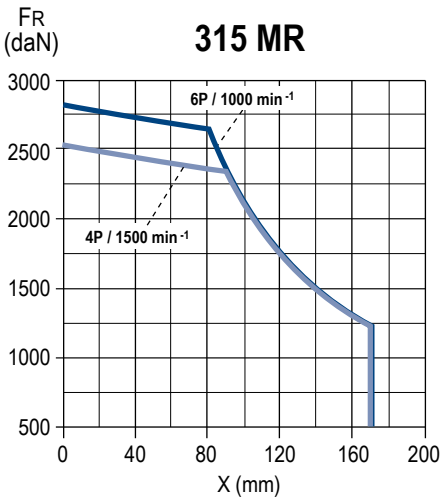
Radial loads

SPECIAL FITTING ARRANGEMENT

Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: Distance with respect to the shaft shoulder







Mains connection

DESCRIPTIVE TABLE OF TERMINAL BOXES FOR RATED SUPPLY VOLTAGE OF 400 V (according to EN 50262)

Series	Type	Number of poles	Terminal box material	Power + auxiliaries	
				Number of drill holes	Drill hole diameter*
LSE LSN LSPX LS	80	2; 4; 6; 8	Aluminium alloy	1 (2 if auxiliaries)	ISO M20 x 1.5 (1M20 + 1M16)
	90	2; 4; 6; 8			
	100	2; 4; 6; 8			
	112	2; 4; 6; 8			
	132	2; 4; 6; 8		2 (3 if auxiliaries)	ISO M25 x 1.5 (2M25 + 1M16)
	160	2; 4; 6; 8			
	180	2; 4; 6; 8		3	2 x M40 + 1 x M16
	200	2; 4; 6; 8			
	225	2; 4; 6; 8			2 x M50 + 1 x M16
	250 MZ	2			
	250 ME	2; 4; 6			2 x M63 + 1 x M16
	280	2; 4; 6; 8			

Series	Type	Number of poles	Terminal box material	Power + auxiliaries	
				Number of drill holes	Drill hole diameter*
LSES	80	2; 4; 6	Plastic	1 (2 if auxiliaries)	ISO M20 x 1.5 (1M20 + 1M16)
	90	2; 4; 6			
	100	2; 4; 6			
	112	2; 4; 6			
	132	2; 4; 6	Aluminium alloy	2 (3 if auxiliaries)	ISO M25 x 1.5 (2M25 + 1M16)
	160 MP/MR/LR	2; 4; 6			
	160 L/LU/M	2; 4; 6		3	2 x M25 + 1 x M16
	180	2; 4; 6			2 x M40 + 1 x M16
	200	2; 4; 6			
	225	2; 4; 6			2 x M50 + 1 x M16
	250 MZ	2			
	250 ME	4; 6			2 x M63 + 1 x M16
	280	2; 4; 6			
	315	2; 4; 6		0	Removable undrilled mounting plate

** As an option, both ISO M25 cable glands may be replaced by 1 ISO x M25 and 1 ISO x M32 (to comply with standard DIN 42925).*

TERMINAL BLOCKS DIRECTION OF ROTATION

Standard motors are fitted with a block of six 6 terminals complying with standard NFC 51 120, with the terminal markings complying with IEC 60034-8 (or NFEN 60034-8).
When the motor is running in U1, V1, W1 or 1U, 1V, 1W from a direct mains supply L1, L2, L3, it turns clockwise when seen from the drive end.
If any two of the phases are changed over, the motor will run in an anti-clockwise direction (make sure that the motor has been designed to run in both directions).
If the motor is fitted with accessories (thermal protection or space heater), these must be connected on screw dominos with labelled wires.

Tightening torque for the nuts on the terminal blocks.

Terminal	M4	M5	M6	M8	M10	M12	M16
Torque N.m	2	3.2	5	10	20	35	65

Series	Type	400 V mains power supply		
		230/400 V connections		400 VD connections
		Number of poles	Terminals	Terminals
LSE LSN LSPX LSES	80 to 112	2; 4; 6	M5	M5
	132 S/SU	2; 4; 6	M5	M5
	132 M/MP/MU	2; 4; 6	M6	M6
	160	2; 4; 6	M6	M6
	180 MT/L	2; 4; 6	M6	M6
	180 LR	4	M8	M6
	200 LR	2; 4; 6	M8	M6
	200 L	2; 6	M8	M8
	225 ST	4	M10	M8
	225 MR	4	M10	M8
		6	M8	M8
	250 ME	4; 6	M10	M8
	250 MZ	2	M10	M8
	280 SC	2	M12	M10
		4	M12	M8
		6	M10	M8
	280 MC	2	M12	M10
		6	M10	M8
	280 MD	4	M12	M10
	315 SN	2	M16	M12
		6	M12	M10
	315 SP	4	M16	M12
	315 MP	2; 4; 6 (110 kW)	M16	M12
		6 (90 kW)	M12	M10
	315 MR	2; 4 (160 kW)	M16	M12
		2; 4 (200 kW)	M16	M16
		6	M16	M12

Electrical characteristics

2 poles - 3000 min^{-1}

Ex e IIC T3 Gb - IP55 - CLASS F - ΔT80K - S1

Type	400 V MAINS SUPPLY 50 Hz												
	Rated power	Rated speed	Rated torque	Rated current	Power factor	Efficiency IEC 60034-2-1 2007	Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Locked rotor time	Moment of inertia	Weight	Noise
	P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ	η	Is/In	Ms/Mn	M_M/Mn	t_E	J	IM B3	LP
	kW	min^{-1}	N.m	A	4/4	4/4				s	kg.m^2	kg	db(A)
LSE 80 L	0.75	2872	2.5	1.6	0.84	77.4	6.8	2.9	3.0	7.6	0.0009	9.7	61
LSE 80 L	1.1	2870	3.75	2.3	0.86	76.5	7.9	3.2	3.1	7.5	0.0011	11.3	61
LSE 90 L	1.5	2860	5	2.9	0.88	81.7	7.8	3.1	3.1	7	0.0017	14	64
LSE 90 L	2.2	2884	7.5	4.2	0.87	83.9	8.5	2.4	3.1	6	0.0022	17.8	64
LSE 100 L	3	2887	10.1	5.6	0.89	84.5	9.9	2.3	2.3	6	0.0029	24	66
LSE 112 MU	4	2928	13.5	7.1	0.92	86.9	9.6	2.0	3.0	7	0.0088	39	66
LSE 132 SM	5.5	2926	18.6	9.7	0.91	88.2	7.7	1.7	2.6	8.6	0.016	49	72
LSE 132 SM	7.5	2929	25.4	13.1	0.92	88.8	8.5	1.7	2.6	8.5	0.018	54	72
LSE 160 MP	11	2935	36	19.1	0.92	89	9.8	1.7	2.6	6	0.023	72	72
LSE 160 L	15	2933	48.8	26.7	0.89	89.6	7.8	2.6	3.1	5	0.044	88	72
LSE 180 MT	18.5	2939	60.1	32.7	0.89	89.9	8.3	2.8	3.1	7	0.052	99	72
LSE 200 LT	22	2946	71.3	36.8	0.92	92.4	8.5	2.6	3.3	9	0.089	154	73
LSE 200 L	30	2956	96.9	50.9	0.91	92.2	7.8	2.7	3.1	7	0.12	180	73
LSE 225MT	37	2951	120	62.7	0.91	92.4	7.8	2.7	3.1	6	0.14	200	73
LSE 250 MZ	45	2959	145	76.8	0.9	92.9	8.5	3.1	3.4	8	0.173	235	78
LSE 280 SC	55	2970	177	92	0.91	93.7	8.5	2.7	3.3	12	0.39	330	79
LSE 280 SC	75	2968	241	129	0.90	93.3	8.5	2.6	3.4	8	0.39	330	79
LSE 280 MC	90	2968	290	154	0.90	93.6	8.4	2.6	3.3	10	0.47	375	79

4 poles - 1500 min^{-1}

Ex e IIC T3 Gb - IP55 - CLASS F - ΔT80K - S1

Type	400 V MAINS SUPPLY 50 Hz												
	Rated power	Rated speed	Rated torque	Rated current	Power factor	Efficiency IEC 60034-2-1 2007	Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Locked rotor time	Moment of inertia	Weight	Noise
	P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ	η	Is/In	Ms/Mn	M_M/Mn	t_E	J	IM B3	LP
	kW	min^{-1}	N.m	A	4/4	4/4				s	kg.m^2	kg	db(A)
LSE 80 L	0.75	1430	5	2	0.72	72	5.3	2.2	2.3	10	0.0024	10.9	47
LSE 90 L	1.1	1440	7.5	2.5	0.83	79.5	6.0	2.2	2.6	8.1	0.0032	13.5	48
LSE 90 L	1.5	1450	10	3.7	0.75	76.1	6.2	1.7	2.0	7.2	0.0032	14.2	48
LSE 100 L	2.2	1444	15	4.5	0.85	81.7	6.5	2.1	2.2	7.5	0.0055	22.5	48
LSE 100 L	3	1423	20	6.2	0.85	81.3	6.8	2.0	2.1	7	0.0055	22.9	48
LSE 112 MU	4	1458	27.2	7.7	0.86	85.2	7.6	2.0	2.1	8.4	0.014	36.5	49
LSE 132 SM	5.5	1464	37.4	10.3	0.87	86.8	7.9	1.8	2.5	9	0.019	54.7	62
LSE 132 M	7.5	1457	50	14.8	0.85	84.4	7.9	1.9	2.6	5.5	0.023	59.9	62
LSE 160 MR	11	1468	74.7	22	0.82	87.5	9.8	2.4	3.1	5	0.035	78	62
LSE 160 L	15	1460	98.5	28.2	0.85	88.4	7.8	2.8	3.3	7	0.085	100	62
LSE 180 MR	18.5	1456	121	33.7	0.87	89.8	8.3	3.0	3.4	6	0.096	112	64
LSE 180 LU	22	1464	144	39.7	0.87	90.6	7.1	3.0	3.0	6	0.151	165	64
LSE 200 L	30	1472	195	54.8	0.85	91.7	6.6	2.7	2.6	6	0.24	205	64
LSE 225 SR	37	1471	240	68.2	0.84	92	6.6	3.0	2.9	12	0.29	235	64
LSE 250 ME	45	1480	290	81.3	0.85	92.9	7.3	2.7	2.6	12	0.63	320	66
LSE 250 ME	55	1478	355	102	0.84	92.5	7.0	2.7	2.8	10	0.63	320	66
LSE 280 SC	75	1478	485	138	0.84	93.1	7.2	2.8	2.9	6	0.83	380	69
LSE 280 MD	90	1479	581	162	0.85	93.9	8.0	3.2	3.0	8	1.03	450	69

6 poles - 1000 min^{-1}

Ex e IIC T3 Gb - IP55 - CLASS F - ΔT80K - S1

Type	400 V MAINS SUPPLY 50 Hz												
	Rated power	Rated speed	Rated torque	Rated current	Power factor	Efficiency IEC 60034-2-1 2007	Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Locked rotor time	Moment of inertia	Weight	Noise
	P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ	η	Is/In	Ms/Mn	M_M/Mn	t_E	J	IM B3	LP
	kW	min^{-1}	N.m	A	4/4	4/4				s	kg.m^2	kg	db(A)
LSE 80 L	0.37	948	3.7	1.2	0.68	63.3	3.7	1.6	2.0	12	0.0032	9.7	41
LSE 80 L	0.55	955	5.5	1.8	0.64	66.6	4.5	2.1	2.4	8.4	0.0042	11	41
LSE 90 L	0.75	935	7.5	2.2	0.67	73	4.6	2.6	2.6	10.5	0.0039	13.5	51
LSE 90 LU	1.1	915	11.5	2.9	0.79	73.2	5.6	2.8	2.9	9	0.0051	17	51
LSE 100 L	1.5	928	15	4.2	0.67	74.9	5.0	2.7	2.7	8.5	0.0069	20	50
LSE 112 M	2.2	960	22.7	5.3	0.76	78.3	6.2	2.2	2.7	7.3	0.0087	24.2	51
LSE 132 SM	3	963	30	7	0.74	82.9	4.3	1.2	1.6	6.9	0.026	43.4	55
LSE 132 M	4	966	40	9.1	0.74	84.2	4.6	1.3	1.6	7.1	0.034	59.4	55
LSE 132 MU	5.5	963	55	12.3	0.75	84.8	4.7	1.4	1.6	7.1	0.043	66.5	55
LSE 160 M	7.5	965	74.2	15.9	0.79	84.4	5.0	1.7	2.4	12	0.084	81	56
LSE 160 L	11	963	109	23.6	0.78	84.7	6.0	1.8	2.5	12	0.126	105	56
LSE 180 L	15	971	140	30.6	0.8	86.4	6.4	2.4	2.7	6	0.191	135	60
LSE 200 LT	18.5	972	172	38.9	0.77	87.6	6.5	2.5	2.8	6	0.237	160	62
LSE 200 L	22	974	216	44.1	0.8	88.6	6.2	2.0	2.7	10	0.287	190	62
LSE 225 MR	30	976	294	61.9	0.77	89.5	6.7	2.7	3.0	8	0.38	235	63
LSE 250 ME	37	978	361	71.1	0.81	89.5	6.2	2.3	2.5	12	0.85	305	65
LSE 280 SC	45	978	439	86.5	0.81	89.6	6.2	2.3	2.5	12	0.99	340	65
LSE 280 MC	55	978	537	106	0.81	89.7	6.0	2.4	2.5	12	1.19	385	65

2 poles - 3000 min^{-1}

Ex e IIC T4 Gb - IP55 - CLASS F - ΔT80K - S1

Type	400 V MAINS SUPPLY 50 Hz												
	Rated power	Rated speed	Rated torque	Rated current	Power factor	Efficiency IEC 60034-2-1 2007	Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Locked rotor time	Moment of inertia	Weight	Noise
	P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ	η	Is/In	Ms/Mn	M_M/Mn	t_E	J	IM B3	LP
	kW	min^{-1}	N.m	A	4/4	4/4				s	kg.m^2	kg	db(A)
LSE 80 L	0.75	2879	2.5	1.5	0.84	81.2	7.3	2.5	3.0	5	0.0011	11.3	61
LSE 90 L	1.1	2865	3.7	2.1	0.91	81.9	7.6	2.1	2.7	5	0.0021	16	64
LSE 90 L	1.5	2865	5	2.9	0.92	82.5	8.6	3.2	3.1	5	0.0021	17	64
LSE 100 LG	2.2	2850	7.4	4.2	0.93	85.4	8.8	2.8	3.4	5	0.0029	35	66
LSE 112 MU	3	2924	10.1	5.3	0.94	85	9.1	2.7	3.4	5	0.0088	39	66
LSE 132 SM	4	2944	13.5	7.5	0.87	86.7	9.7	2.1	3.2	5	0.016	49	72
LSE 132 SM	5.5	2953	18.6	9.7	0.92	87.9	8.9	1.7	2.7	5	0.018	54	72
LSE 160 MP	7.5	2933	25.4	12.9	0.94	88.3	5.9	1.4	2.2	7.3	0.023	68	72

Electrical characteristics

4 poles - 1500 min^{-1}

Ex e IIC T4 Gb - IP55 - CLASS F - ΔT80K - S1

Type	400 V MAINS SUPPLY 50 Hz												
	Rated power	Rated speed	Rated torque	Rated current	Power factor	Efficiency IEC 60034-2-1 2007	Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Locked rotor time	Moment of inertia	Weight	Noise
	P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ	η	Is/In	Ms/Mn	M_M/Mn	t_E	J	IM B3	LP
	kW	min^{-1}	N.m	A	4/4	4/4				s	kg.m^2	kg	db(A)
LSE 80 L	0.55	1425	3.75	1.4	0.76	73	5.2	1.9	2.2	9	0.0024	10.9	47
LSE 90 SL	0.75	1450	5	1.7	0.81	79.4	6.5	2.0	2.7	6	0.0032	13.5	48
LSE 90 L	1.1	1447	7.5	2.5	0.78	80.1	6.7	1.8	2.3	5.5	0.0037	15.2	48
LSE 100 L	1.5	1442	10	3.3	0.8	80.9	6.3	1.8	2.2	6	0.0064	25.5	48
LSE 100 LG	2.2	1466	15	4.4	0.84	85.5	7.3	1.8	2.2	5	0.0109	30.5	48
LSE 112 MU	3	1464	20	5.9	0.85	86.1	7.6	2.0	2.2	5	0.014	36.5	49
LSE 132 SM	4	1465	27.5	7.4	0.89	86.3	7.7	1.8	2.6	5	0.019	54.7	62
LSE 132 SM	5.5	1466	37.5	10.4	0.87	87.5	8.1	2.0	2.7	5	0.023	59.9	62
LSE 132 MU	7.5	1461	50	13.8	0.88	87.6	7.4	1.6	2.3	5	0.0306	65.5	62

Electrical characteristics

2 poles - 3000 min^{-1}

Ex nA IIC T3 Gc - Ex tb IIIC T125°C Db - Ex tc IIIB T125°C Dc - IP55 - CLASS F - ΔT80K - S1 - CLASS IE2

Series	Type	400 V MAINS SUPPLY 50 Hz															
		Rated power	Rated speed	Rated torque	Rated current	Power factor			Efficiency IEC 60034-2-1 2007			Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Moment of inertia	Weight	Noise
		P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ			η			Is/In	Ms/Mn	M_M/Mn	J	IM B3	LP
		kW	min^{-1}	N.m	A	4/4	3/4	2/4	4/4	3/4	2/4				kg.m^2	kg	db(A)
LS	**56 M***	0.09	2860	0.3	0.44	0.55	0.45	0.4	54	45.2	37.1	5.0	5.3	5.4	0.00015	3.8	54
	56 M*	0.12	2820	0.4	0.5	0.6	0.55	0.45	58.7	54	45.2	4.6	4.0	4.1	0.00015	3.8	54
	63 M*	0.18	2790	0.6	0.52	0.75	0.65	0.55	67.4	66.9	59.3	5.0	3.3	2.9	0.00019	4.8	57
	63 M*	0.25	2800	0.9	0.71	0.75	0.65	0.55	67.8	67.3	59.2	5.4	3.2	2.9	0.00025	6	57
	71 L*	0.37	2800	1.3	0.98	0.8	0.7	0.6	68.4	67.6	63.9	5.2	3.3	3.9	0.00035	6.4	62
	71 L*	0.55	2800	1.9	1.32	0.8	0.7	0.55	75.7	75.2	71.1	6.0	3.2	3.1	0.00045	7.3	62
LSN LSPX LSES	**71 LG**	0.75	2825	2.5	1.7	0.83	0.76	0.64	77.7	77.7	74.8	6.4	3.4	3.4	0.000692	7.5	62
	80 L	0.75	2860	2.5	1.7	0.85	0.77	0.66	78.6	78.8	77.2	6.0	2.4	3.0	0.00073	9.5	61
	80 L	1.1	2845	3.7	2.3	0.85	0.78	0.64	79.7	80.9	79.2	7.0	2.8	3.4	0.00095	10.7	61
	90 S	1.5	2860	5.0	3.2	0.84	0.76	0.62	81.7	82.3	80.6	7.8	3.4	4.5	0.00149	12.9	64
	90 L	2.2	2870	7.2	4.5	0.84	0.76	0.63	83.7	83.7	81.6	8.7	4.0	4.1	0.00197	16.1	64
	100 L	3	2870	10.0	5.9	0.87	0.81	0.69	84.8	85.5	84.4	8.5	4.0	4.0	0.00267	22.2	66
	112 MR	4	2864	13.4	7.9	0.85	0.79	0.66	86.2	86.9	86.0	8.6	4.2	3.7	0.00323	26.5	66
	132 S	5.5	2923	17.9	10.0	0.90	0.86	0.76	88.1	88.9	88.4	8.3	2.5	3.5	0.00881	35	72
	132 SU	7.5	2923	24.1	13.3	0.91	0.88	0.79	88.1	88.9	88.9	8.6	2.7	3.1	0.01096	41	72
	160 MP	11	2927	35.9	21.2	0.84	0.77	0.66	89.6	90.1	89.4	8.3	3.6	4.6	0.01940	63	72
	160 MR	15	2928	49.2	27.2	0.89	0.84	0.75	90.4	91.4	91.3	9.0	2.7	3.8	0.02560	75	72
	160 L	18.5	2944	60.1	32.9	0.89	0.86	0.79	91.5	91.9	91.4	8.4	2.9	3.0	0.05000	101	72
	180 MT	22	2938	71.9	38.9	0.89	0.87	0.80	91.8	92.3	91.9	8.4	2.7	3.2	0.06000	105	69
	200 LR	30	2952	97.3	51.2	0.92	0.90	0.85	92.3	92.7	92.1	8.6	3.0	3.5	0.10000	155	77
	200 L	37	2943	119	64.8	0.89	0.87	0.81	92.6	93.1	92.7	7.1	2.2	2.5	0.12000	182	73
	225 MT	45	2953	145	79.5	0.88	0.85	0.78	93.1	93.4	92.8	7.9	3.0	3.4	0.14000	203	73
	250 MZ	55	2950	179	95.7	0.89	0.86	0.80	93.5	93.8	93.4	7.9	3.0	3.3	0.17000	238	76
	280 SC	75	2967	241	128	0.90	0.88	0.82	94.3	94.5	93.9	8.2	2.7	3.0	0.36000	340	81
	280 MC	90	2969	287	153	0.90	0.88	0.82	94.6	94.8	94.3	8.4	2.8	3.4	0.43000	370	80
	315 SN	110	2964	353	185	0.91	0.90	0.86	94.4	94.9	94.7	8.3	2.8	3.3	0.55000	447	80
	315 MP	132	2976	425	223	0.89	0.88	0.83	94.9	94.7	93.7	7.6	2.8	3.0	1.67000	718	84
	315 MR	160	2975	512	270	0.90	0.89	0.85	94.9	94.8	94.0	7.6	2.9	3.1	1.97000	823	83
	315 MR	200	2982	641	348	0.88	0.83	0.75	95.3	94.8	93.4	8.7	3.8	3.9	2.05000	849	85

**** LS zone 22 only (not IE2)***

LSN and LSPX motors up to 90 kW max.

4 poles - 1500 min^{-1}

Ex nA IIC T3 Gc - Ex tb IIIC T125°C Db - Ex tc IIIB T125°C Dc - IP55 - CLASS F - ΔT80K - S1 - CLASS IE2

Series	Type	400 V MAINS SUPPLY 50 Hz															
		Rated power	Rated speed	Rated torque	Rated current	Power factor			Efficiency IEC 60034-2-1 2007			Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Moment of inertia	Weight	Noise
		P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ			η			Is/In	Ms/Mn	M_M/Mn	J	IM B3	LP
		kW	min^{-1}	N.m	A	4/4	3/4	2/4	4/4	3/4	2/4				kg.m^2	kg	db(A)
LS	56M*	0.06	1380	0.4	0.29	0.76	0.69	0.62	41.8	37.1	29.7	2.8	2.4	2.5	0.00025	4	47
	56M*	0.09	1400	0.6	0.39	0.6	0.52	0.42	55.2	49.6	42.8	3.2	2.8	2.8	0.00025	4	47
	63M*	0.12	1380	0.8	0.44	0.7	0.58	0.47	56.1	53.9	46.8	3.2	2.4	2.3	0.00035	4.8	49
	63M*	0.18	1390	1.2	0.64	0.65	0.55	0.44	61.6	58	51.3	3.7	2.6	2.6	0.00048	5	49
	71M*	0.25	1425	1.7	0.8	0.65	0.55	0.44	69.4	66.8	59.8	4.6	2.7	2.9	0.00068	6.4	49
	71M*	0.37	1420	2.5	1.06	0.7	0.59	0.47	72.1	71.7	66.4	4.9	2.4	2.8	0.00085	7.3	49
	71L*	0.55	1400	3.8	1.62	0.7	0.62	0.49	70.4	70	65.1	4.8	2.3	2.5	0.0011	8.3	49
LSN LSPX LSES	80L	0.55	1410	3.7	1.42	0.76	0.68	0.55	73.2	69.1	62.1	4.5	2.0	2.3	0.0013	8.2	47
	80LG	0.75	1445	5.0	1.7	0.77	0.69	0.55	80.1	80.8	79.0	5.6	1.8	2.6	0.00261	11.7	47
	90S	1.1	1435	7.5	2.4	0.82	0.75	0.62	81.5	83.3	83.0	5.4	1.9	2.5	0.00298	12.2	48
	90L	1.5	1445	9.9	3.2	0.80	0.71	0.55	83.0	83.9	82.4	5.5	1.9	2.4	0.00374	14.6	48
	100L	2.2	1440	14.6	4.6	0.82	0.74	0.63	84.7	85.9	86.1	6.3	2.3	2.2	0.00531	21.3	48
	100LR	3	1439	19.9	6.5	0.78	0.72	0.58	85.5	86.7	86.4	7.1	3.0	4.1	0.00665	25.7	48
	112MU	4	1455	26.3	8.4	0.79	0.71	0.57	87.0	87.9	87.5	7.2	2.5	3.2	0.0129	35	49
	132SU	5.5	1455	35.9	11.9	0.76	0.67	0.53	87.7	88.4	87.5	7.2	2.6	3.7	0.0157	42	49
	132M	7.5	1458	48.6	14.6	0.83	0.76	0.63	88.9	89.8	89.3	8.0	2.9	3.9	0.0252	57	62
	160MR	11	1459	72.2	21.2	0.83	0.78	0.66	90.1	90.9	90.5	8.2	3.3	4.0	0.035	77	62
	160L	15	1457	97.9	28.2	0.84	0.80	0.69	90.8	91.8	92.1	7.4	2.2	3.1	0.07	91	62
	180MT	18.5	1458	121	35.1	0.83	0.78	0.66	91.4	92.1	92.1	7.6	2.9	3.6	0.08	103	64
	180LR	22	1458	144	41.0	0.84	0.79	0.67	91.8	92.5	92.5	7.8	2.8	3.3	0.09	115	64
	200LR	30	1463	196	56.5	0.83	0.78	0.67	92.4	92.9	92.5	7.0	2.8	2.8	0.16	164	69
	225ST	37	1469	240	69.7	0.82	0.78	0.68	92.9	93.7	93.8	6.3	2.7	2.7	0.23	205	64
	225MR	45	1471	292	84.1	0.83	0.79	0.68	93.3	93.9	93.8	6.9	2.3	2.4	0.29	235	64
	250ME	55	1482	355	102	0.84	0.79	0.69	94.1	94.4	93.9	7.4	2.6	2.7	0.65	328	69
	280SC	75	1482	483	139	0.83	0.78	0.67	94.5	94.6	94.0	8.8	2.4	2.9	0.86	392	70
	280MD	90	1481	582	166	0.83	0.78	0.68	94.6	94.8	94.3	7.9	3.4	3.7	1.03	455	69
	315SP	110	1488	706	204	0.82	0.78	0.67	94.5	94.1	92.8	7.9	3.1	3.4	2.32	670	76
	315MP	132	1486	855	238	0.85	0.81	0.72	95.4	95.2	94.3	7.9	3.1	3.4	2.79	758	70
	315MR	160	1484	1027	288	0.84	0.80	0.72	95.2	95.2	94.5	7.5	2.8	2.9	3.25	850	77
	315MR	200	1484	1295	361	0.84	0.79	0.68	95.7	95.8	95.2	7.6	2.8	3.0	3.25	850	77

LS zone 22 only (not IE2)

LSN and LSPX motors up to 90 kW max.

6 poles - 1000 min^{-1}

Ex nA IIC T3 Gc - Ex tb IIIC T125°C Db - Ex tc IIIB T125°C Dc - IP55 - CLASS F - ΔT80K - S1 - CLASS IE2

Series	Type	400 V MAINS SUPPLY 50 Hz															
		Rated power	Rated speed	Rated torque	Rated current	Power factor			Efficiency IEC 60034-2-1 2007			Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Moment of inertia	Weight	Noise
		P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ			η			Is/In	Ms/Mn	M_M/Mn	J	IM B3	LP
		kW	min^{-1}	N.m	A	4/4	3/4	2/4	4/4	3/4	2/4				kg.m^2	kg	db(A)
LS	56M*	0.045	860	0.5	0.3	0.66	0.59	0.52	34.0	31.5	25.3	2.0	1.7	1.7	0.00025	4	54
	56M*	0.06	850	0.7	0.4	0.67	0.60	0.53	33.4	30.9	25.0	2.0	1.7	1.7	0.00025	4	54
	63M*	0.09	860	1.0	0.5	0.80	0.70	0.63	35.0	32.0	26.0	2.1	1.6	1.6	0.0006	5.5	48
	71M*	0.12	950	1.2	0.8	0.51	0.44	0.38	45.6	40.5	32.0	3.0	2.4	3.0	0.0007	6.5	52
	71M*	0.18	945	1.8	1.0	0.52	0.46	0.38	52.8	48.8	40.7	3.3	2.3	2.9	0.0011	7.6	52
	71L*	0.25	915	2.6	1.2	0.60	0.52	0.43	51.9	49.6	42.2	3.1	2.0	2.2	0.0013	7.9	52
LSN LSPX LSES	80L*	0.25	955	2.5	0.9	0.67	0.64	0.48	62.8	62.7	56.0	3.9	1.6	1.8	0.0024	8.4	41
	80L*	0.37	950	3.7	1.1	0.72	0.67	0.57	65.8	59.7	59.0	4.3	1.7	2.2	0.0032	9.7	41
	80L*	0.55	950	5.5	1.8	0.64	0.60	0.47	68.0	63.0	55.0	4.9	2.1	2.6	0.0042	11	41
	90S	0.75	953	7.6	2.1	0.68	0.59	0.46	76.6	77.1	74.4	4.1	1.6	2.1	0.00319	14	51
	90L	1.1	955	11.0	3.0	0.67	0.58	0.45	79.1	79.5	77.4	4.8	2.0	3.1	0.0044	16.6	51
	100L	1.5	957	14.9	4.0	0.66	0.58	0.45	80.5	81.1	79.0	4.7	2.0	2.2	0.00587	22.1	50
	112MG	2.2	957	20.9	5.0	0.73	0.65	0.51	82.2	83.3	82.0	5.3	1.6	2.4	0.011	28	51
	132S	3	962	29.1	7.0	0.72	0.64	0.50	83.8	84.5	83.1	6.2	2.2	3.1	0.0154	38	55
	132M	4	963	39.4	9.0	0.75	0.68	0.56	85.2	86.7	86.4	5.7	2.0	2.6	0.0249	48	55
	132MU	5.5	963	55	12.9	0.72	0.66	0.54	86.4	87.4	86.9	5.6	2.5	2.8	0.0364	63	55
	160M	7.5	970	73	15.5	0.80	0.76	0.65	87.2	88.3	88.3	5.0	1.4	2.1	0.09	82	56
	160LU	11	970	108	23.0	0.79	0.74	0.62	88.7	89.3	88.9	5.4	1.7	2.5	0.13	98	56
	180L	15	973	148	30.1	0.80	0.74	0.63	90.0	90.9	90.7	6.9	2.5	3.1	0.19	134	60
	200LR	18.5	973	182	36.6	0.81	0.76	0.66	90.5	91.5	91.6	6.9	2.4	2.8	0.25	165	63
	200L	22	975	215	43.6	0.80	0.75	0.65	91.3	92.0	91.9	6.8	2.3	2.9	0.3	187	62
	225MR	30	977	293	63	0.75	0.70	0.59	91.8	92.2	91.6	7.2	2.8	3.1	0.4	234	63
	250ME	37	983	358	68	0.85	0.81	0.72	92.7	93.1	92.6	6.0	2.0	2.3	0.72	286	65
	280SC	45	982	439	86	0.82	0.78	0.67	93.0	93.5	93.3	6.1	2.0	2.5	0.83	312	65
	280MC	55	982	536	103	0.82	0.78	0.67	93.4	93.7	93.1	6.5	2.4	2.8	1.03	354	65
	315SN	75	982	729	136	0.85	0.82	0.74	93.7	94.3	94.1	6.5	2.4	2.5	1.4	460	65
	315MP	90	986	872	168	0.82	0.79	0.71	94.1	94.5	94.2	6.0	1.8	2.4	2.93	642	69
	315MP	110	988	1062	209	0.80	0.76	0.66	94.6	94.8	94.1	6.5	2.4	2.6	3.54	718	74
	315MR	132	987	1278	248	0.81	0.77	0.67	94.7	95.0	94.7	6.6	2.5	2.5	4.2	840	68

LS zone 22 only (not IE2)

LSN and LSPX motors up to 55 kW max.

8 poles - 750 min^{-1}

Ex nA IIC T3 Gc - Ex tb IIIC T125°C Db - Ex tc IIIB T125°C Dc - IP55 - CLASS F - ΔT80K - S1

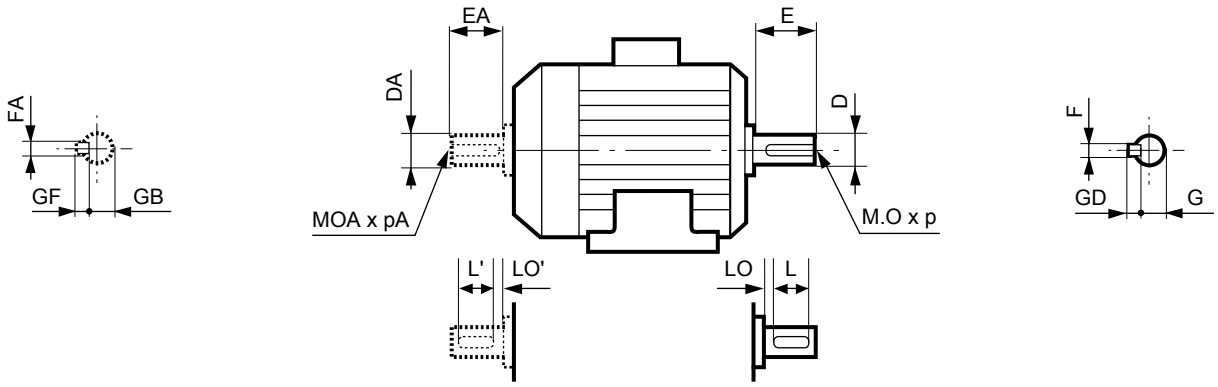
Series	Type	400 V MAINS SUPPLY 50 Hz															
		Rated power	Rated speed	Rated torque	Rated current	Power factor			Efficiency IEC 60034-2-1 2007			Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Moment of inertia	Weight	Noise
		P_N	N_N	M_N	$I_{N\ (400V)}$	Cos φ			η			Is/In	Ms/Mn	M_M/Mn	J	IM B3	LP
		kW	min^{-1}	N.m	A	4/4	3/4	2/4	4/4	3/4	2/4				kg.m^2	kg	db(A)
LSN LSPX LS	**71L***	0.09	690	1.3	0.5	0.55	0.45	0.4	42	40	34	2.8	1.3	1.5	0.0013	8	40
	71L*	0.12	650	1.8	0.9	0.55	0.45	0.4	42	40	34	2.1	1.3	1.4	0.0013	8	40
	80L	0.18	705	2.4	0.79	0.63	0.54	0.45	50	46	41	2.9	1.5	1.9	0.0031	9.7	41
	80L	0.25	700	3.4	0.98	0.68	0.6	0.51	52	50	43	2.8	1.7	1.9	0.0041	11.3	41
	90L	0.37	685	5.2	1.2	0.72	0.63	0.52	60	60	54	3.8	1.7	1.8	0.0038	13.5	43
	90L	0.55	670	7.8	1.7	0.72	0.61	0.52	61.5	60	57	3.5	1.7	1.7	0.0047	15.2	43
	100L	0.75	670	10.7	2.4	0.71	0.58	0.47	61.5	60.5	53	3.5	1.8	2.2	0.0047	18	43
	100L	1.1	670	15.7	3.7	0.68	0.6	0.49	61	60.5	56	3.7	2.0	2.2	0.0068	21.8	43
	112MG	1.5	710	20.2	4.7	0.64	0.55	0.43	70.1	67.1	60.6	3.8	2.0	2.1	0.015	24	49
	132SM	2.2	713	29.5	6.1	0.68	0.56	0.45	75.3	75.7	69.2	4	1.7	2.0	0.0253	45.6	54
	132M	3	712	40.2	8	0.65	0.56	0.45	78.1	81.2	77.3	4.3	1.9	2.2	0.033	53.9	54
	160M	4	718	53.2	11	0.63	0.55	0.43	81.6	81.7	79.6	3.9	1.7	2.3	0.068	84	66
	160M	5.5	716	73.4	15.1	0.63	0.55	0.43	81.7	81.9	80.2	3.9	1.7	2.3	0.071	89	66
	160L	7.5	714	100	20.6	0.63	0.55	0.43	81.8	82.4	81.0	3.9	1.9	2.3	0.09	101	66
	180L	11	720	146	25.6	0.72	0.68	0.57	84.5	84.8	82.7	3.8	1.4	1.9	0.205	140	68
	200L	15	725	198	32.9	0.75	0.7	0.57	86.3	86.5	84.9	4.4	1.6	2.1	0.27	185	65
	225ST	18.5	725	244	42.4	0.72	0.66	0.54	86.1	86.3	84.8	4.2	1.6	2.1	0.33	210	65
	225MR	22	725	290	51.9	0.7	0.63	0.51	86.1	85.9	83.8	4.4	1.9	2.3	0.4	240	65
	250ME	30	732	391	60.7	0.78	0.74	0.62	90.2	91.2	90.9	5.8	1.6	2.4	0.86	312	65
	280SC	37	731	483	73.8	0.79	0.73	0.63	90.4	91.1	90.7	5.6	1.6	2.4	0.92	334	65
	280MC	45	730	589	88.5	0.8	0.76	0.64	90.5	91.4	90.5	5.4	1.6	2.3	1.13	378	65
	315SP*	55	738	712	105	0.81	0.78	0.71	92.1	92.1	91.1	5.4	1.8	2.4	3.1	660	74
	315MR*	75	738	971	143	0.81	0.78	0.71	92.5	92.7	92	5.4	1.8	2.4	4.38	815	74

**** LS zone 22***

LSN and LSPX motors up to 45 kW max.

Shaft extensions

Dimensions in millimetres

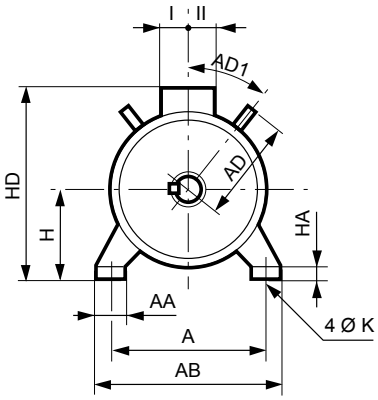


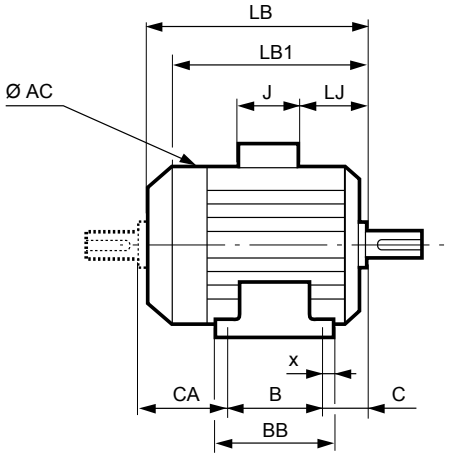
Series	Type	Main shaft extensions																	
		4, 6 and 8 poles									2 poles								
		F	GD	D	G	E	O	p	L	LO	F	GD	D	G	E	O	p	L	LO
LS	56 M	3	3	9j6	7	20	4	10	16	3	3	3	9j6	7	20	4	10	16	3
	63 M	4	4	11j6	8.5	23	4	10	18	3.5	4	4	11j6	8.5	23	4	10	18	3.5
	71 L	5	5	14j6	11	30	5	15	25	3.5	5	5	14j6	11	30	5	15	25	3.5
LSE LSN LSPX LSES	80L/LG	6	6	19j6	15.5	40	6	16	30	6	6	6	19j6	15.5	40	6	16	30	6
	90S/L	8	7	24j6	20	50	8	19	40	6	8	7	24j6	20	50	8	19	40	6
	100L/LR	8	7	28j6	24	60	10	22	50	6	8	7	28j6	24	60	10	22	50	6
	112MR/MG/MU	8	7	28j6	24	60	10	22	50	6	8	7	28j6	24	60	10	22	50	6
	132S/SU/M/MU/SM	10	8	38k6	33	80	12	28	63	10	10	8	38k6	33	80	12	28	63	10
	160MP/MR/LR/M/L/LU	12	8	42k6	37	110	16	36	100	6	12	8	42k6	37	110	16	36	100	6
	180MT/L/LR	14	9	48k6	42.5	110	16	36	98	12	14	9	48k6	42.5	110	16	36	98	12
	200L/LR	16	10	55m6	49	110	20	42	97	13	16	10	55m6	49	110	20	42	97	13
	225ST/MR/MT	18	11	60m6	53	140	20	42	126	14	16	10	55m6	49	110	20	42	97	13
	250ME/MZ	18	11	65m6	58	140	20	42	126	14	18	11	60m6	53	140	20	42	126	14
	280SC/MC/MD	20	12	75m6	67.5	140	20	42	125	15	18	11	65m6	58	140	20	42	125	14
	315SN/SP/MP/MR	22	14	80m6	71	170	20	42	155	15	18	11	65m6	58	140	20	42	126	14

Series	Type	Secondary shaft extensions																	
		4, 6 and 8 poles									2 poles								
		FA	GF	DA	GB	EA	OA	pA	L'	LO'	FA	GF	DA	GB	EA	OA	pA	L'	LO'
LS	56 M	3	3	9j6	7	20	4	10	16	3	3	3	9j6	7	20	4	10	16	3
	63 M	4	4	11j6	8.5	23	4	10	18	3.5	4	4	11j6	8.5	23	4	10	18	3.5
	71 L	5	5	14j6	11	30	5	15	25	3.5	5	5	14j6	11	30	5	15	25	3.5
LSE LSN LSPX LSES	80L/LG	5	5	14j6	11	30	5	15	25	3.5	5	5	14j6	11	30	5	15	25	3.5
	90S/L	6	6	19j6	15.5	40	6	16	30	6	6	6	19j6	15.5	40	6	16	30	6
	100L/LR	8	7	24j6	20	50	8	19	40	6	8	7	24j6	20	50	8	19	40	6
	112MR/MG/MU	8	7	24j6	20	50	8	19	40	6	8	7	24j6	20	50	8	19	40	6
	132S/SU/M/MU/SM	8	7	28k6	24	60	10	22	50	6	8	7	28k6	24	60	10	22	50	6
	160MP/MR/LR	12	8	38k6	37	80	16	36	100	6	12	8	38k6	37	80	16	36	100	6
	160M/L/LU	12	8	42k6	37	110	16	36	100	6	12	8	42k6	37	110	16	36	100	6
	180MT/L/LR	14	9	48k6	42.5	110	16	36	98	12	14	9	48k6	42.5	110	16	36	98	12
	200L/LR	16	10	55m6	49	110	20	42	97	13	16	10	55m6	49	110	20	42	97	13
	225ST/MR/MT	18	11	60m6	53	140	20	42	126	14	16	10	55m6	49	110	20	42	97	13
	250ME/MZ	18	11	60m6	53	140	20	42	126	14	18	11	60m6	53	140	20	42	126	14
	280SC/MC/MD	18	11	65m6	58	140	20	42	126	14	18	11	65m6	58	140	20	42	126	14
	315SN	20	12	75m6	67.5	140	20	42	125	15	18	11	65m6	58	140	20	42	125	14
	315SP/MP/MR	22	14	80m6	71	170	24	42	155	15	18	11	65m6	58	140	20	42	126	14

Foot mounted IM 1001 (IM B3)

Dimensions in millimetres



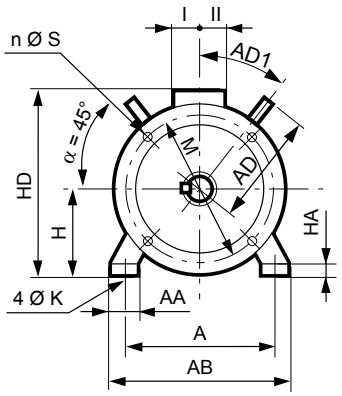


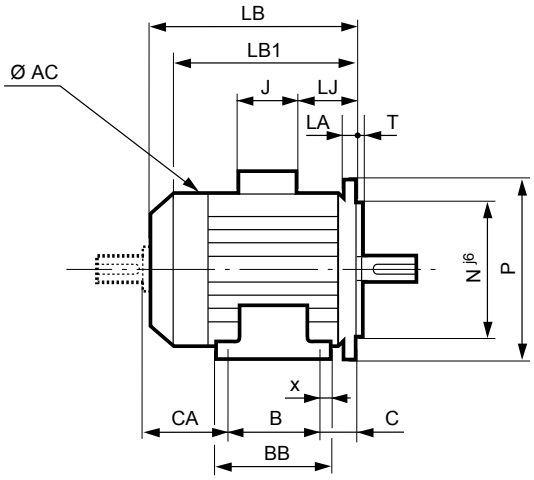
Series	Type	Main dimensions																				
		A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LB1**	LJ	J	I	II	AD	AD1	CA
LS	56 M	90	104	71	87	36	8	24	6	7	56	110	140	156	134	16	86	43	43	51	-	51
	63 M	100	115	80	96	40	8	26	7	9	63	124	152	172	165	26	86	43	43	55	-	55
	71 L	112	126	90	106	45	8	24	7	9	71	140	170	193	166	21	86	43	43	61	-	61
LSE LSN LSPX LSES	80 L	125	157	100	120	50	10	29	10	10	80	170	205	215	177	26	86	43	43	-	-	68
	80 LG	125	157	100	125	50	14	31	10	10	80	185	215	247	204	26	86	43	43	-	-	99
	90 S	140	172	100	120	56	10	37	10	11	90	190	225	218	177	26	86	43	43	-	-	66
	90 L	140	172	125	162	56	28	39	10	11	90	190	225	245	204	26	86	43	43	-	-	68
	100 L	160	196	140	165	63	12	40	12	13	100	200	240	290	250	27	86	43	43	118	45	93
	100 LR	160	196	140	165	63	12	40	12	13	100	200	240	309	264	27	86	43	43	118	45	111
	112 MR	190	220	140	165	70	13	45	12	14	112	200	252	309	264	27	86	43	43	118	45	104
	112 MU	190	220	140	165	70	12	52	12	14	112	235	261	333	288	36	86	43	43	-	-	130
	112 MG	190	220	140	165	70	12	52	12	14	112	235	261	315	265	36	86	43	43	-	-	110
	132 S	216	250	140	170	89	16	42	12	16	132	220	304	350	306	33	126	63	63	130	45	128
	132 SU	216	250	140	170	89	16	42	12	16	132	220	304	377	329	33	126	63	63	130	45	152
	132 M/SM	216	250	178	208	89	15	50	12	15	132	265	322	385	327	17	126	63	63	140	45	126
	132 MU	216	250	178	208	89	15	50	12	15	132	265	322	412	351	17	126	63	63	140	45	148
	160 MP	254	294	210	294	108	20	64	14.5	25	160	264	350	468	407	59	126	63	63	155	45	154
	160 MR	254	294	210	294	108	20	64	14.5	25	160	264	350	495	440	59	126	63	63	155	45	138
	160 M	254	294	254	294	108	20	60	14.5	25	160	312	395	495	435	43	135	88	64	-	-	182
	160 L	254	294	254	294	108	20	60	14.5	25	160	312	395	495	435	43	135	88	64	-	-	138
	160 LU	254	294	254	294	108	20	60	14.5	25	160	312	395	510	450	43	135	88	64	-	-	153
	180 MT	279	324	241	316	121	20	79	14.5	28	180	312	428	495	435	55	186	112	98	-	-	138
	180 LR	279	324	279	316	121	20	79	14.5	28	180	312	428	520	450	55	186	112	98	-	-	125
	180 L	279	339	279	329	121	25	86	14.5	25	180	350	436	552	481	64	186	112	98	-	-	159
	200 LR	318	378	305	365	133	30	108	18.5	30	200	350	456	620	539	70	186	112	98	-	-	194
	200 L	318	388	305	375	133	35	103	18.5	36	200	390	476	621	539	77	186	112	98	-	-	194
	200 LU	318	388	305	375	133	35	103	18.5	36	200	390	476	669	587	77	186	112	98	-	-	194
	225 ST	356	431	286	386	149	50	127	18.5	36	225	390	535	628	545	61	231	119	142	-	-	203
	225 MT	356	431	311	386	149	50	127	18.5	36	225	390	535	628	545	61	231	119	142	-	-	178
	225 MR	356	431	311	386	149	50	127	18.5	36	225	390	535	678	593	61	231	119	142	-	-	228
	225 MG	356	420	311	375	142	30	65	18.5	30	225	479	630	810	728	68	292	151	181	-	-	360
	250 MZ	406	470	349	449	168	70	150	24	47	250	390	560	676	593	61	231	119	142	-	-	171
	250 ME	406	470	349	420	168	35	90	24	36	250	479	656	810	716	68	292	151	181	-	-	303
	250 MF	406	470	349	420	168	35	90	24	36	250	479	656	870	776	68	292	151	181	-	-	353
	280 MC	457	520	419	478	190	35	90	24	35	280	479	686	810	716	68	292	151	181	-	-	211
	280 SC	457	520	368	478	190	35	90	24	35	280	479	686	810	716	68	292	151	181	-	-	262
	280 SK	457	533	368	495	190	40	85	24	35	280	586	746	921	827	99	292	151	181	-	-	312
	280 SU	457	533	368	495	190	40	85	24	35	280	586	746	991	897	99	292	151	181	-	-	382
	280 MD	457	520	419	478	190	35	90	24	35	280	479	686	870	870	68	292	151	181	-	-	271
	315 SN	508	594	406	537	216	40	140	28	50	315	479	805	870	776	4.5	418	180	236	-	-	248
	315 MP	508	594	457	537	216	40	114	28	70	315	586	865	947	845	62	418	180	236	-	-	290
	315 MR	508	594	457	537	216	40	114	28	70	315	586	865	1017	947	62	418	180	236	-	-	360
	315 SP	508	594	406	537	216	40	114	28	70	315	586	865	947	845	62	418	180	236	-	-	341

* *AC: housing diameter without lifting rings*
** *LB1: non-ventilated motor*

Foot and flange mounted IM 2001 (IM B35)

Dimensions in millimetres



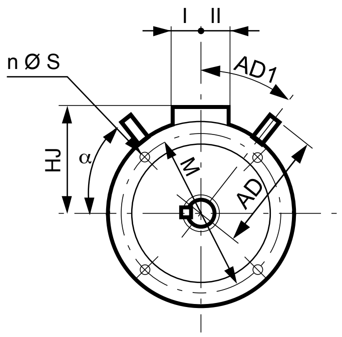


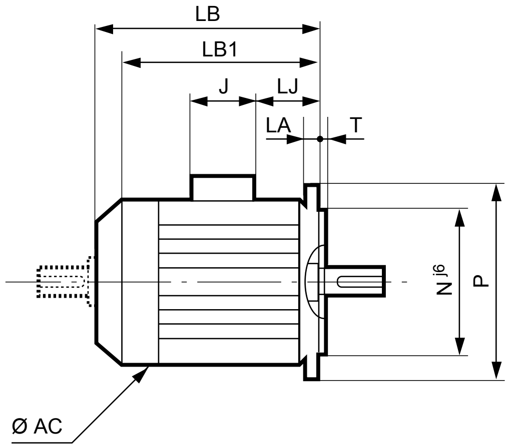
Series	Type	Main dimensions																					
		A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LB1**	LJ	J	I	II	AD	AD1	CA	Symbol
LS	56 M	90	104	71	87	36	8	24	6	7	56	110	140	156	134	16	86	43	43	-	-	51	FF 100
	63 M	100	115	80	96	40	8	26	7	9	63	124	152	172	165	26	86	43	43	-	-	55	FF 115
	71 L	112	126	90	106	45	8	24	7	9	71	140	170	193	166	21	86	43	43	-	-	61	FF 130
LSE LSN LSPX LSES	80 L	125	157	100	120	50	10	29	10	10	80	170	205	215	177	26	86	43	43	-	-	68	FF 165
	80 LG	125	157	100	125	70	14	31	10	10	80	185	215	267	224	46	86	43	43	-	-	99	FF 165
	90 S	140	172	100	120	76	10	37	10	11	90	190	225	237	197	46	86	43	43	-	-	66	FF 165
	90 L	140	172	125	162	76	28	39	10	11	90	190	225	265	225	46	86	43	43	-	-	68	FF 165
	100 L	160	196	140	165	63	12	40	12	13	100	200	240	290	250	27	86	43	43	118	45	93	FF 215
	100 LR	160	196	140	165	63	12	40	12	13	100	200	240	309	264	27	86	43	43	118	45	111	FF 215
	112 MR	190	220	140	165	69	13	45	12	14	112	200	252	309	264	27	86	43	43	118	45	104	FF 215
	112 MU	190	220	140	165	70	12	52	12	14	112	235	261	333	288	36	86	43	43	-	-	130	FF 215
	112 MG	190	220	140	165	70	12	52	12	14	112	235	261	315	265	36	86	43	43	-	-	110	FF 215
	132 S	216	250	140	170	89	16	42	12	16	132	220	304	350	306	33	126	63	63	130	45	128	FF 265
	132 SU	216	250	140	170	89	16	42	12	16	132	220	304	377	329	33	126	63	63	130	45	152	FF 265
	132 M/SM	216	250	178	208	89	15	50	12	15	132	265	322	385	327	17	126	63	63	140	45	126	FF 265
	132 MU	216	250	178	208	89	15	50	12	15	132	265	322	412	351	17	126	63	63	140	45	148	FF 265
	160 MP	254	294	210	294	108	20	64	14.5	25	160	264	350	468	407	59	126	63	63	155	45	154	FF 300
	160 MR	254	294	210	294	108	20	64	14.5	25	160	264	350	495	440	59	126	63	63	155	45	138	FF 300
	160 M	254	294	254	294	108	20	60	14.5	25	160	312	395	495	435	43	135	88	64	-	-	182	FF 300
	160 L	254	294	254	294	108	20	60	14.5	25	160	312	395	495	435	43	135	88	64	-	-	138	FF 300
	160 LU	254	294	254	294	108	20	60	14.5	25	160	312	395	510	450	43	135	88	64	-	-	153	FF 300
	180 MT	279	324	241	316	121	20	79	14.5	28	180	312	428	495	435	55	186	112	98	-	-	138	FF 300
	180 LR	279	324	279	316	121	20	79	14.5	28	180	312	428	520	450	55	186	112	98	-	-	125	FF 300
	180 L	279	339	279	329	121	25	86	14.5	25	180	350	436	552	481	64	186	112	98	-	-	159	FF 300
	200 LR	318	378	305	365	133	30	108	18.5	30	200	350	456	620	539	70	186	112	98	-	-	194	FF 350
	200 L	318	388	305	375	133	35	103	18.5	36	200	390	476	621	539	77	186	112	98	-	-	194	FF 350
	200 LU	318	388	305	375	133	35	103	18.5	36	200	390	476	669	587	77	186	112	98	-	-	194	FF 350
	225 ST	356	431	286	386	149	50	127	18.5	36	225	390	535	628	545	61	231	119	142	-	-	203	FF 400
	225 MT	356	431	311	386	149	50	127	18.5	36	225	390	535	628	545	61	231	119	142	-	-	178	FF 400
	225 MR	356	431	311	386	149	50	127	18.5	36	225	390	535	676	593	61	231	119	142	-	-	228	FF 400
	225 MG	356	420	311	375	142	30	65	18.5	30	225	479	630	810	728	68	292	151	181	-	-	360	FF 400
	250 MZ	406	470	349	449	168	70	150	24	47	250	390	560	676	593	61	231	119	142	-	-	171	FF 500
	250 ME	406	470	349	420	168	35	90	24	36	250	479	656	810	716	68	292	151	181	-	-	303	FF 500
	250 MF	406	470	349	420	168	35	90	24	36	250	479	656	870	776	68	292	151	181	-	-	353	FF 500
	280 MC	457	520	419	478	190	35	90	24	35	280	479	686	810	716	68	292	151	181	-	-	211	FF 500
	280 SC	457	520	368	478	190	35	90	24	35	280	479	686	810	716	68	292	151	181	-	-	262	FF 500
	280 SK	457	533	368	495	190	40	85	24	35	280	586	746	921	827	99	292	151	181	-	-	312	FF 500
	280 SU	457	533	368	495	190	40	85	24	35	280	586	746	991	897	99	292	151	181	-	-	382	FF 500
	280 MD	457	520	419	478	190	35	90	24	35	280	479	686	870	870	68	292	151	181	-	-	271	FF 500
	315 SN	508	594	406	537	216	40	140	28	50	315	479	805	870	776	4.5	418	180	236	-	-	248	FF 600
	315 MP	508	594	457	537	216	40	114	28	70	315	586	865	947	845	62	418	180	236	-	-	290	FF 600
	315 MR	508	594	457	537	216	40	114	28	70	315	586	865	1017	947	62	418	180	236	-	-	360	FF 600
	315 SP	508	594	406	537	216	40	114	28	70	315	586	865	947	845	62	418	180	236	-	-	341	FF 600

* *AC: housing diameter without lifting rings*
** *LB1: non-ventilated motor*

Flange mounted IM 3001 (IM B5) IM 3011 (IM V1)

Dimensions in millimetres





IEC symbol	Flange dimensions							
	M	N	P	T	n	α°	S	LA
FF 100	100	80	120	2.5	4	45	7	5
FF 115	115	95	140	3	4	45	10	10
FF 130	130	110	160	3.5	4	45	10	10
FF 165	165	130	200	3.5	4	45	12	10
FF 165	165	130	200	3.5	4	45	12	10
FF 165	165	130	200	3.5	4	45	12	10
FF 165	165	130	200	3.5	4	45	12	10
FF 215	215	180	250	4	4	45	14.5	12
FF 215	215	180	250	4	4	45	14.5	12
FF 215	215	180	250	4	4	45	14.5	11
FF 215	215	180	250	4	4	45	14.5	11
FF 215	215	180	250	4	4	45	14.5	11
FF 265	265	230	300	4	4	45	14.5	12
FF 265	265	230	300	4	4	45	14.5	12
FF 265	265	230	300	4	4	45	14.5	12
FF 265	265	230	300	4	4	45	14.5	12
FF 300	300	250	350	5	4	45	18.5	14
FF 300	300	250	350	5	4	45	18.5	14
FF 300	300	250	350	5	4	45	18.5	14
FF 300	300	250	350	5	4	45	18.5	14
FF 300	300	250	350	5	4	45	18.5	14
FF 300	300	250	350	5	4	45	18.5	14
FF 300	300	250	350	5	4	45	18.5	14
FF 300	300	250	350	5	4	45	18.5	14
FF 350	350	300	400	5	4	45	18.5	15
FF 350	350	300	400	5	4	45	18.5	15
FF 350	350	300	400	5	4	45	18.5	15
FF 400	400	350	450	5	8	22.5	18.5	16
FF 400	400	350	450	5	8	22.5	18.5	16
FF 400	400	350	450	5	8	22.5	18.5	16
FF 400	400	350	450	5	8	22.5	18.5	16
FF 500	500	450	550	5	8	22.5	18.5	18
FF 500	500	450	550	5	8	22.5	18.5	18
FF 500	500	450	550	5	8	22.5	18.5	18
FF 500	500	450	550	5	8	22.5	18.5	18
FF 500	500	450	550	5	8	22.5	18.5	18
FF 500	500	450	550	5	8	22.5	18.5	18
FF 500	500	450	550	5	8	22.5	18.5	18
FF 500	500	450	550	5	8	22.5	18.5	18
FF 600	600	550	660	6	8	22.5	24	22
FF 600	600	550	660	6	8	22.5	24	22
FF 600	600	550	660	6	8	22.5	24	22
FF 600	600	550	660	6	8	22.5	24	22

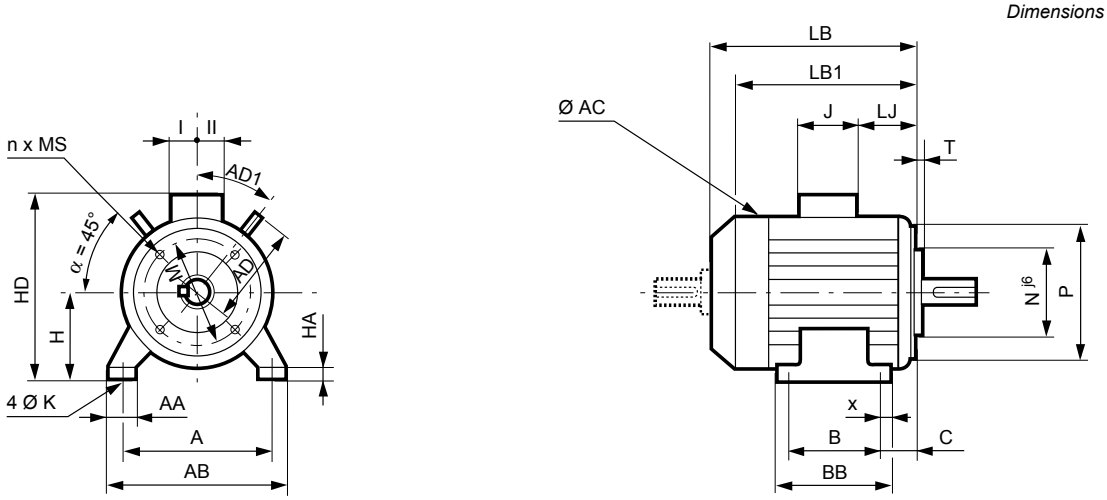
Series	Type	Main dimensions									
		AC*	LB	LB1**	HJ	LJ	J	I	II	AD	AD1
LS	56 M	110	156	134	84	16	86	43	43	-	-
	63 M	124	172	165	89	26	86	43	43	-	-
	71 L	140	193	166	99	21	86	43	43	-	-
LSE LSN LSPX LSES	80 L	170	215	177	125	26	86	43	43	-	-
	80 LG	185	267	224	135	46	86	43	43	-	-
	90 S	190	237	197	135	46	86	43	43	-	-
	90 L	190	265	225	135	46	86	43	43	-	-
	100 L	200	290	250	140	27	86	43	43	118	45
	100 LR	200	309	264	140	27	86	43	43	118	45
	112 MR	200	309	264	140	27	86	43	43	118	45
	112 MU	235	333	288	149	36	86	43	43	-	-
	112 MG	235	315	265	149	36	86	43	43	-	-
	132 S	220	350	306	172	33	126	63	63	130	45
	132 SU	220	377	329	172	33	126	63	63	130	45
	132 M/SM	265	385	327	190	17	126	63	63	140	45
	132 MU	265	412	351	190	17	126	63	63	140	45
	160 MP	264	468	407	190	59	126	63	63	155	45
	160 MR	264	495	440	190	59	126	63	63	155	45
	160 M	312	495	435	235	43	135	88	64	-	-
	160 L	312	495	435	235	43	135	88	64	-	-
	160 LU	312	510	450	235	43	135	88	64	-	-
	180 MT	312	495	435	248	55	186	112	98	-	-
	180 LR	312	520	450	248	55	186	112	98	-	-
	180 L	350	552	481	256	64	186	112	98	-	-
	200 LR	350	620	539	256	70	186	112	98	-	-
	200 L	390	621	539	276	77	186	112	98	-	-
	200 LU	390	669	587	276	77	186	112	98	-	-
	225 ST	390	628	545	310	61	231	119	142	-	-
	225 MT	390	628	545	310	61	231	119	142	-	-
	225 MR	390	676	593	310	61	231	119	142	-	-
	225 MG	479	810	728	405	68	292	151	181	-	-
	250 MZ	390	676	593	310	61	231	119	142	-	-
	250 ME	479	810	716	406	68	292	151	181	-	-
	250 MF	479	870	776	406	68	292	151	181	-	-
	280 MC	479	810	716	406	68	292	151	181	-	-
	280 SC	479	810	716	406	68	292	151	181	-	-
	280 SK	586	921	827	466	99	292	151	181	-	-
	280 SU	586	991	897	466	99	292	151	181	-	-
	280 MD	479	870	870	406	68	292	151	181	-	-
	315 SN	479	870	776	490	4.5	418	180	236	-	-
	315 MP	586	947	845	550	62	418	180	236	-	-
	315 MR	586	1017	947	550	62	418	180	236	-	-
	315 SP	586	947	845	550	62	418	180	236	-	-

* *AC: housing diameter without lifting rings*
** *LB1: non-ventilated motor*

For a frame size ≥ 250mm for IM 3001 use, please consult Leroy Somer.
Dimensions of shaft extensions identical to those for foot mounted motors.

Foot and face mounted IM 2101 (IM B34)

Dimensions in millimetres

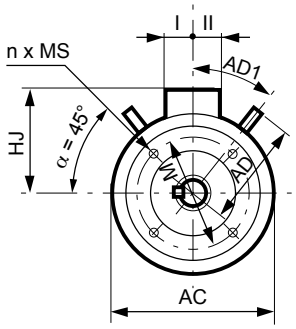


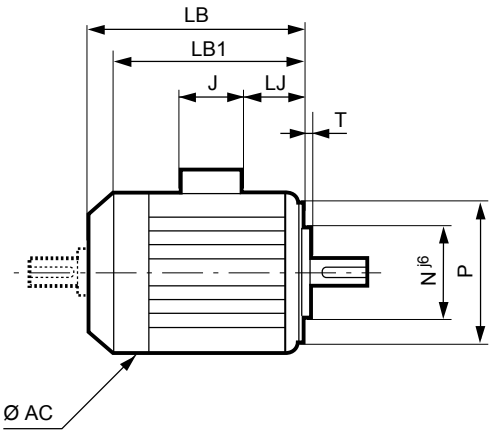
Series	Type	Main dimensions																				
		A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LB1**	LJ	J	I	II	AD	AD1	CA	Symbol
LS	56 M	90	104	71	87	36	8	24	6	7	56	110	140	156	134	16	86	43	43	-	-	51	FT 65
	63 M	100	115	80	96	40	8	26	7	9	63	124	152	172	165	26	86	43	43	-	-	55	FT 75
	71 L	112	126	90	106	45	8	24	7	9	71	140	170	193	166	21	86	43	43	-	-	61	FT 85
LSE LSN LSPX LSES	80 L	125	157	100	120	50	10	29	10	10	80	170	205	215	177	26	86	43	43	-	-	68	FT 100
	80 LG	125	157	100	125	50	14	31	10	10	80	185	215	247	204	26	86	43	43	-	-	99	FT 100
	90 S	140	172	100	120	56	10	37	10	11	90	190	225	218	177	26	86	43	43	-	-	66	FT 115
	90 L	140	172	125	162	56	28	39	10	11	90	190	225	245	204	26	86	43	43	-	-	68	FT 115
	100 L	160	196	140	165	63	12	40	12	13	100	200	240	290	250	27	86	43	43	118	45	93	FT 130
	100 LR	160	196	140	165	63	12	40	12	13	100	200	240	309	264	27	86	43	43	118	45	111	FT 130
	112 MR	190	220	140	165	69	13	45	12	14	112	200	252	309	264	27	86	43	43	118	45	104	FT 130
	112 MU	190	220	140	165	70	12	52	12	14	112	235	261	333	288	36	86	43	43	-	-	130	FT 130
	112 MG	190	220	140	165	70	12	52	12	14	112	235	261	315	265	36	86	43	43	-	-	110	FT 130
	132 S	216	250	140	170	89	16	42	12	16	132	220	304	350	306	33	126	63	63	130	45	128	FT 215
	132 SU	216	250	140	170	89	16	42	12	16	132	220	304	377	329	33	126	63	63	130	45	152	FT 215
	132 M/SM	216	250	178	208	89	15	50	12	15	132	265	322	385	327	17	126	63	63	140	45	126	FT 215
	132 MU	216	250	178	208	89	15	50	12	15	132	265	322	412	351	17	126	63	63	140	45	148	FT 215
	160 MP	254	294	210	294	108	20	64	14.5	25	160	264	350	468	407	59	126	63	63	155	45	154	FT 215
	160 MR	254	294	210	294	108	20	64	14.5	25	160	264	350	495	440	59	126	63	63	155	45	138	FT 215

** AC: housing diameter without lifting rings*
*** LB1: non-ventilated motor*

Face mounted IM 3601 (IM B14)

Dimensions in millimetres





IEC symbol	Faceplate dimensions					
	M	N	P	T	n	MS
FT 65	65	50	80	2.5	4	M5
FT 75	75	60	90	2.5	4	M5
FT 85	85	70	105	2.5	4	M6
FT 100	100	80	120	3	4	M6
FT 100	100	80	120	3	4	M6
FT 115	115	95	140	3	4	M8
FT 115	115	95	140	3	4	M8
FT 130	130	110	160	3.5	4	M8
FT 130	130	110	160	3.5	4	M8
FT 130	130	110	160	3.5	4	M8
FT 130	130	110	160	3.5	4	M8
FT 130	130	110	160	3.5	4	M8
FT 215	215	180	250	4	4	M12
FT 215	215	180	250	4	4	M12
FT 215	215	180	250	4	4	M12
FT 215	215	180	250	4	4	M12
FT 215	215	180	250	4	4	M12
FT 215	215	180	250	4	4	M12

Series	Type	Main dimensions									
		AC*	LB	LB1**	HJ	LJ	J	I	II	AD	AD1
LS	56 M	110	156	134	84	16	86	43	43	-	-
	63 M	124	172	165	89	26	86	43	43	-	-
	71 L	140	193	166	99	21	86	43	43	-	-
LSE LSN LSPX LSES	80 L	170	215	177	125	25.5	86	43	43	-	-
	80 LG	185	247	204	135	25.5	86	43	43	-	-
	90 S	190	218	177	135	25.5	86	43	43	-	-
	90 L	190	245	204	135	25.5	86	43	43	-	-
	100 L	200	290	250	140	26.5	86	43	43	118	45
	100 LR	200	309	264	140	26.5	86	43	43	118	45
	112 MR	200	309	264	140	26.5	86	43	43	118	45
	112 MU	235	315	265	149	35.5	86	43	43	-	-
	112 MG	235	333	288	149	35.5	86	43	43	-	-
	132 S	220	350	306	172	32.5	126	63	63	130	45
	132 SU	220	377	329	172	32.5	126	63	63	130	45
	132 M/SM	265	385	327	190	17	126	63	63	140	45
	132 MU	265	412	351	190	17	126	63	63	140	45
	160 MP	264	468	407	190	58.5	126	63	63	155	45
	160 MR/LR	264	495	440	190	58.5	126	63	63	155	45

** AC: housing diameter without lifting rings*
*** LB1: non-ventilated motor*

Non-standard flanges

Optionally, Leroy-Somer motors can be fitted with flanges and faceplates that are larger or smaller than standard. This means that motors can be adapted to all types of situation without the need for costly and time-consuming modifications.

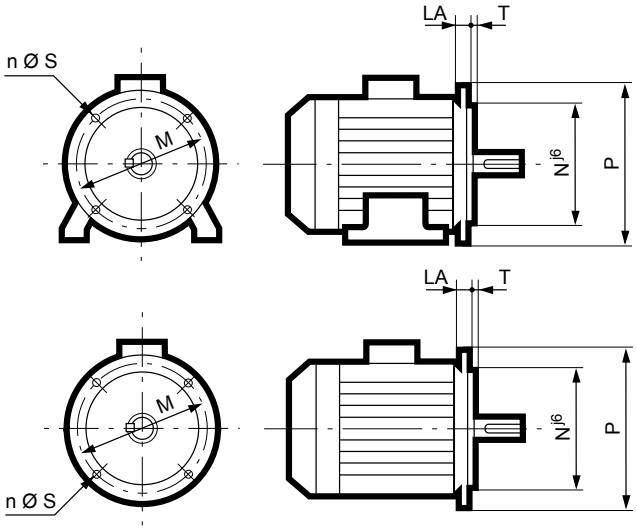
The tables below give the flange and faceplate dimensions and indicate flange/motor compatibility.
The bearing and shaft extension for each frame size remain standard.

Dimensions in millimetres

(FF) FLANGE MOUNTED

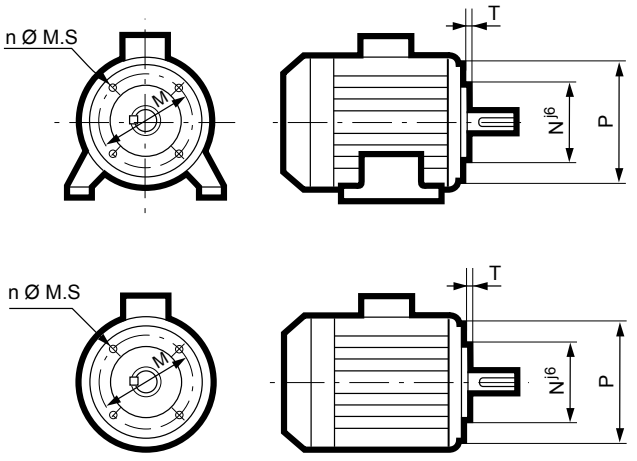
IEC symbol	Flange dimensions						
	M	N	P	T	n	S	LA
FF 100	100	80	120	2.5	4	7	5
FF 115	115	95	140	3	4	10	10
FF 130	130	110	160	3.5	4	10	10
FF 165	165	130	200	3.5	4	12	10
FF 215	215	180	250	4	4	15	12
FF 265	265	230	300	4	4	15	14
FF 300	300	250	350	5	4	18.5	14
FF 350	350	300	400	5	4	18.5	15
FF 400	400	350	450	5	8	18.5	16
FF 500	500	450	550	5	8	18.5	18
FF 600*	600	550	660	6	8	24	22

** Tolerance Njs6*



(FT) FACE MOUNTED

IEC symbol	Faceplate dimensions					
	M	N	P	T	n	M.S
FT 65	65	50	80	2.5	4	M5
FT 75	75	60	90	2.5	4	M5
FT 85	85	70	105	2.5	4	M6
FT 100	100	80	120	3	4	M6
FT 115	115	95	140	3	4	M8
FT 130	130	110	160	3.5	4	M8
FT 165	165	130	200	3.5	4	M10
FT 215	215	180	250	4	4	M12
FT 265	265	230	300	4	4	M12



Mechanical options

MODIFIED FLANGES

Motor type		Mounting forms \ Flange type	(FF) Flange mounted														(FT) Face mounted								
			FF 85	FF 100	FF 115	FF 130	FF 165	FF 215	FF 265	FF 300	FF 350	FF 400	FF 500	FF 600	FF 740	FF 940	FT 65	FT 75	FT 85	FT 100	FT 115	FT 130	FT 165	FT 215	FT 265
LSE LSN LSPX LSES	80 L	all	■	■	■	■	●	◆									◆	◆	◆	●	◆	◆			
	80 LG/90	B5/B35 (1)	◆	◆	◆	◆	●	■	■										◆	◆	■	■	◆		
	80 LG/90	B3/B14/B34	■	■	■	■	■	■	■										◆	◆	●	◆	◆		
	100 L/LR	all	■	■	■	■	■	●	■										◆	◆	◆	●	◆		
	100 LG	all				■	■	●	◆												◆	●	◆	◆	
	112 MU/MG	all				■	■	●	◆												◆	●	◆	◆	
	132 S/SU	all					■	◆	●													◆	◆	●	
	132 SM/M/MU	all					■	■	●	◆												■	■	●	
	160 MR/LR/MP	all							■	●	■													●	
	160 M/L/LU/LUR	all						◆	◆	●	◆														
	180	all							●	●	◆	◆(1)													
	200	all									●	◆													
	225	all										●	◆												
	250	all										◆	●												
	280	all										◆	●	◆											
	315	all											◆(1)	●											

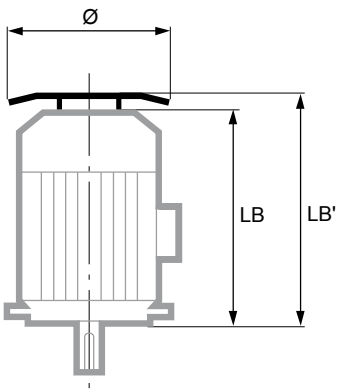
● Standard ■ Adapted shaft ◆ Adaptable without shaft modifications

(1) Dimension C need not comply with IEC 60072

DRIP COVER FOR OPERATION IN VERTICAL POSITION SHAFT END FACING DOWN

Dimensions in millimetres

Series	Motor type	LB'	Ø
LSE LSN LSPX LSES	80	LB + 20	145
	90	LB + 20	185
	100	LB + 20	185
	112 MR	LB + 20	185
	112 MG/MU	LB + 25	210
	132 S/SU	LB + 25	210
	132 M/MU/SM	LB + 30	240
	160 MP/LR	LB + 30	240
	160 M/L/LU	LB + 36.5	265
	180 MT/LR	LB + 36.5	265
	180 L	LB + 36.5	305
	200 LR	LB + 36.5	305
	200 L	LB + 36.5	350
	225	LB + 36.5	350
	250 MZ	LB + 36.5	350
	250 ME	LB + 55	420
	280	LB + 55	420
	315 SN	LB + 55	420
	315 SP/MP/MR	LB + 76.5	505



Mechanical options

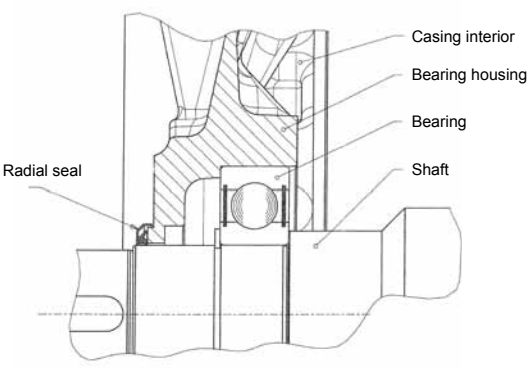
ADAPTATION FOR VIBRATION SENSOR

On request, our motors can be fitted with tapped holes (for SPM type sensor) on faceplates, to take the vibration sensors (not supplied).

The adaptors form a connection with the snap-on transmitter.

RADIAL SEAL

When a motor needs to be mounted in the vertical position, shaft end facing up (position IM 1031, 2031 and 3031 for example) and its shaft end is not correctly protected by the driven machine against rain or water splashes, it is advisable to use an optional radial seal on the drive end to avoid water getting into the motor around the shaft.

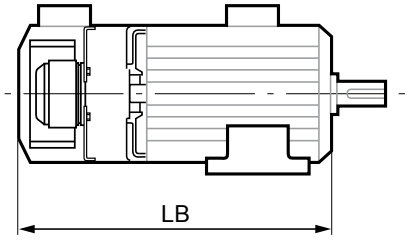


Mechanical options

FORCED VENTILATION

The integration of high-efficiency motors within a process often requires accessories to make operation easier: forced ventilation for motors used at high or low speeds.

Notes:
- Without forced ventilation, there is a possibility of overspeed with optional class B balancing.
- The motor temperature is monitored by probes built into the windings.



Series	Type	LB dimensions with Forced Ventilation	
		Foot or face mounted motors	Flange mounted motor
LSE LSN LSPX LSES/LS	160 L	687	
	160 M		
	180 MT		
	180 LR	702	
	180 L	741	
	200 LR	796	
	200 L	802	
	225 MR	853.5	
	225 ST	808.5	
	225 MT		
	250 ME	1012	
	250 MZ	853.5	
	280 MD	1072	
	280 SC	1012	
	280 MC		
	315 SN	1072	
	315 SP	1181	
	315 MP		
	315 MR	1251	

ENCODERS

All our safety motors can be fitted with an ATEX-certified incremental encoder.

This pulse generator supplies a number of pulses proportional to the motor speed. It can be supplied with a D.C. voltage of 5 V +/- 10% or 11-30 V regulated.

The drive encoder lines per revolution should be specified (at the time of ordering): 1024 or 4096 (for the incremental encoder) and 8192 (for the absolute encoder).

SPACE HEATERS

Series	Type	Power (W)
LSE LSN LSPX LSES/LS	80 L/LG	10
	90 to 160 MP/LR	25
	160 M/L to 225 ST/MT/MR	52
	250 MZ	52
	250 ME/MF	84
	280 SC/SU/MC/MD	84
	315 SN	84
	315 MP/MR	108

The space heaters use 200/240 V, single-phase, 50 or 60 Hz.

Mechanical and electrical options

INTEGRATED VARIABLE SPEED MOTORS: VARMECA IN ZONE 21 & 22 ONLY

VARMECA is a flux vector drive operating on all mains supplies (200 Volts to 480 Volts 50/60 Hz).

It is mounted instead of the terminal box in its position.

The drive allows low-speed operation at constant torque and high-speed operation at constant power (forced ventilation option mandatory).

In all circumstances, the Varmeca can be used to manage PTC and PTO motor sensors.

The variable speed drive offers a decentralised solution on the machine, the product being designed to operate in industrial conditions (resin-encapsulated electronics).

Numerous options can be incorporated: local speed control, FWD and REV operation, display unit, braking resistor, fieldbus.

Position of the lifting rings

LIFTING THE MOTOR ONLY

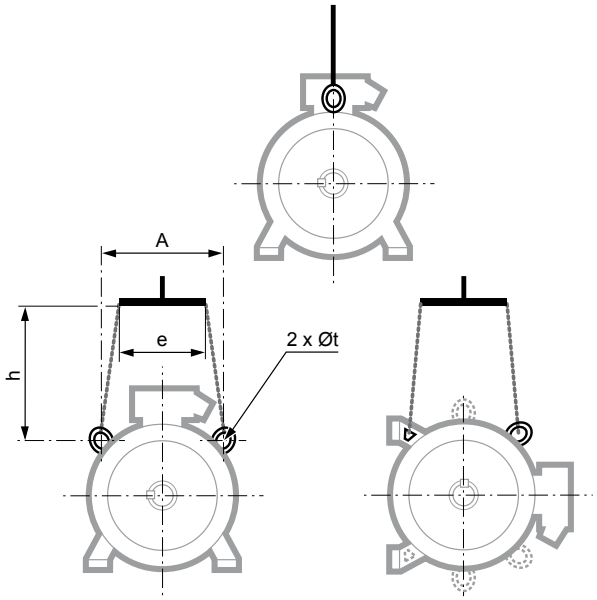
(not coupled to the machine)

The regulations stipulate that over 25 kg, suitable handling equipment must be used.

All our motors are fitted with grab handles, making them easier to handle without risk. A diagram of the sling hoisting method appears below with the required dimensions.

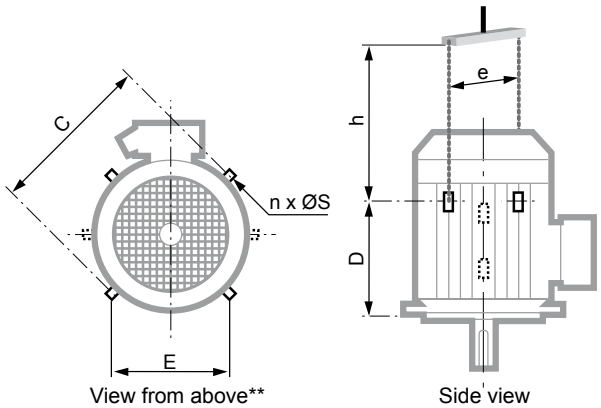
To prevent any damage to the motor during handling (for example: switching the motor from horizontal to vertical), it is essential to follow these instructions.

HORIZONTAL POSITION



Series	Type	Horizontal position			
		A	e min.	h min.	Øt
LSE LSN LSPX LSES	100 L/LR	165	165	150	9
	112 M/MR	165	165	150	9
	112 MG/MU	-	-	-	9
	132 S/SU	180	180	150	9
	132 M/MU/SM	200	180	150	14
	160 MP/MR/LR	200	180	110	14
	160 L/LU	200	180	110	14
	180 L	200	260	150	14
	200 L/LR	270	260	165	14
	225 ST/MT	270	260	150	14
	250 ME	400	400	500	30
	280 SC/MC/MD	400	400	500	30
	315 SN	400	400	500	30
	315 SP/MP/MR	360	380	500	17

VERTICAL POSITION



View from above** Side view

Separate ring ≤ 25 kg
Built-in ring > 25 kg

Series	Type	Vertical position						
		C	E	D	n**	ØS	e min.*	h min.
LSE LSN LSPX LSES	160 M/L/LU	320	200	230	2	14	320	350
	180 MR	320	200	230	2	14	320	270
	180 L	390	265	290	2	14	390	320
	200 L/LR	410	300	295	2	14	410	450
	225 ST/MT/MR	410	300	295	2	14	410	450
	250 MZ	410	300	295	2	14	410	450
	250 ME	500	400	502	4	30	500	500
	280 SC/SD/MC/MD	500	400	502	4	30	500	500
	315 SN	500	400	502	4	30	500	500
	315 SP/MP/MR	630	-	570	2	30	630	550

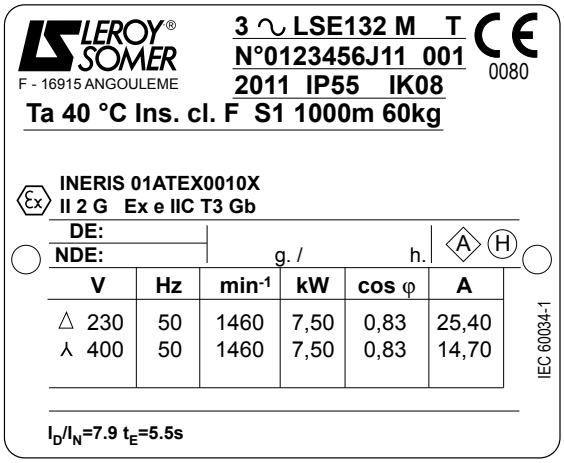
** If the motor is fitted with a drip cover, allow an additional 50 to 100 mm to avoid damaging it when the load is swung.*

*** If n = 2, the lifting rings form an angle of 90° with respect to the axis of the terminal box.*
If n = 4, this angle becomes 45°.

Identification and marking

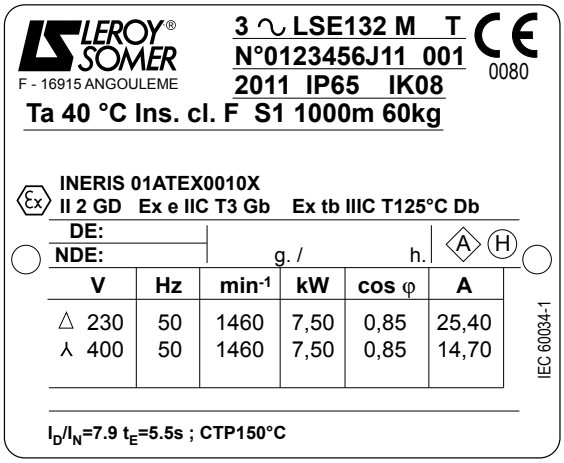
NAMEPLATES

LSE 80 to LSE 132


LEROY SOMER
F - 16915 ANGOULEME
3 ~ LSE132 M T
N°0123456J11 001
2011 IP55 IK08
0080
Ta 40 °C Ins. cl. F S1 1000m 60kg
INERIS 01ATEX0010X
II 2 G Ex e IIC T3 Gb
DE:
NDE:
g. / h.
A H

V	Hz	min-1	kW	cos φ	A
Δ 230	50	1460	7,50	0,83	25,40
Y 400	50	1460	7,50	0,83	14,70

IEC 60034-1
I_D/I_N=7.9 t_E=5.5s


LEROY SOMER
F - 16915 ANGOULEME
3 ~ LSE132 M T
N°0123456J11 001
2011 IP65 IK08
0080
Ta 40 °C Ins. cl. F S1 1000m 60kg
INERIS 01ATEX0010X
II 2 GD Ex e IIC T3 Gb Ex tb IIIC T125°C Db
DE:
NDE:
g. / h.
A H

V	Hz	min-1	kW	cos φ	A
Δ 230	50	1460	7,50	0,85	25,40
Y 400	50	1460	7,50	0,85	14,70

IEC 60034-1
I_D/I_N=7.9 t_E=5.5s ; CTP150°C

DEFINITION OF SYMBOLS USED ON NAMEPLATES

CE **Legal mark of conformity of product to the requirements of European Directives**

ATEX specific marking

: Mark for protection against risks of explosion

II 2G or II 2GD : ATEX marking
Ex e : "Gas" protection type
IIC : "Gas" equipment group
T3 or T4 : "Gas" temperature class
Gb : "Gas" EPL
Ex tb : "Dust" protection type (optional)
IIIC : "Dust" equipment group (optional)
T125°C : Maximum surface temperature (optional)
Db : "Dust" EPL
0080 : INERIS Notified Body
INERIS 01ATEX0010X : EC type-examination certificate number

Zone	ATEX marking	Gas protection type marking	Dust protection type marking (optional)	Ingress protection
1 & 2	II 2 G	Ex e IIC T3 Gb Ex e IIC T4 Gb	-	IP55
1 & 21 2 & 22	II 2 GD	Ex e IIC T3 Gb Ex e IIC T4 Gb	Ex tb IIIC T125°C Db Ex tb IIIC T125°C Db	IP65

Motor

MOT 3 ~ : Three-phase A.C. motor
LSE : Series
132 : Frame size
M : Housing symbol
T : Impregnation index

Motor no.

0123456 : Motor batch number
J : Month of production
11 : Year of production
001 : Serial number

kg : Weight
IP55 or IP65: Ingress protection

IK08 : Shock resistance index
I cl.F : Insulation class F
40°C : Maximum ambient operating temperature
S1 : Duty
V : Supply voltage
Hz : Supply frequency
min-1 : Speed of rotation
kW : Rated power
cos φ : Power factor
A : Rated current
Δ : Delta connection
Y : Star connection
I_D/I_N : Starting current
t_E : Locked rotor time

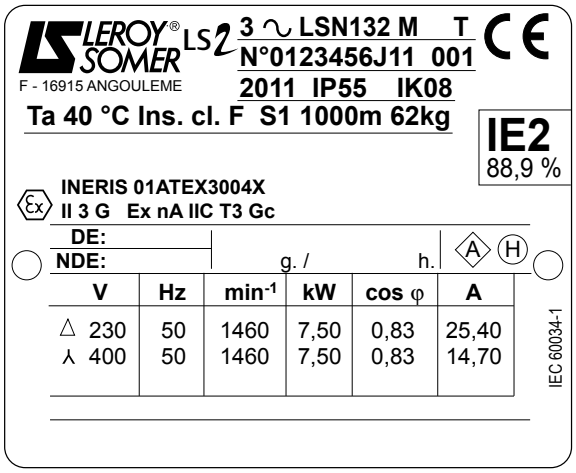
Bearings

DE : Drive end bearing
NDE : Non drive end bearing
g : Amount of grease at each regreasing (in g)
h : Regreasing interval (in hours)
A : Vibration level
H : Balancing mode

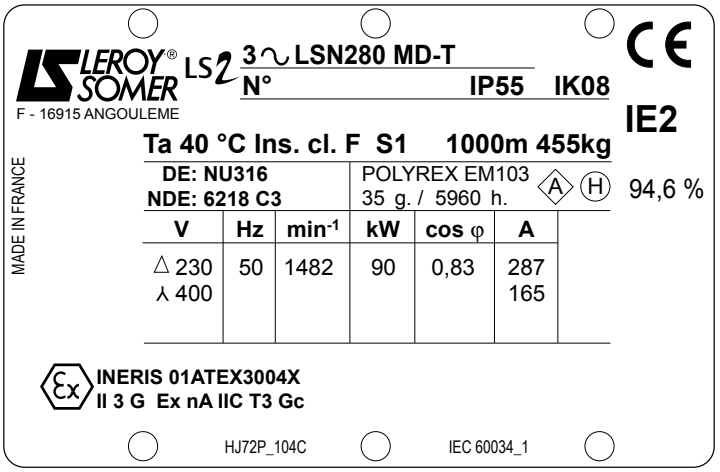
Identification and marking

NAMEPLATES

LSN 80 to LSN 132



LSN 160 to LSN 280



DEFINITION OF SYMBOLS USED ON NAMEPLATES

Legal mark of conformity of product to the requirements of European Directives

ATEX specific marking

: Mark for protection against risks of explosion

II 3G or II 3GD : ATEX marking
Ex nA : "Gas" protection type
IIC : "Gas" equipment group
T3 : "Gas" temperature class
Gc : "Gas" EPL
Ex tc : "Dust" protection type (optional)
IIIC : "Dust" equipment group (optional)
T125°C : Maximum surface temperature (optional)
Dc : "Dust" EPL
0080 : INERIS Notified Body
INERIS 01ATEX3004X : EC type-examination certificate number

Zone	ATEX marking	Gas protection type marking	Dust protection type marking (optional)	Ingress protection
2	II 3 G	Ex nA IIC T3 Gc	-	IP55
2 & 22	II 3 GD	Ex nA IIC T3 Gc	Ex tc IIIC T125°C Dc	IP65

Motor

MOT 3 ~ : Three-phase A.C. motor
LSN : Series
132 : Frame size
M : Housing symbol
T : Impregnation index

Motor no.

0123456 : Motor batch number
J : Month of production
11 : Year of production
001 : Serial number
IE2 : Efficiency class
88.9% : Efficiency at 4/4 load

kg : Weight
IP55 : Ingress protection
IK08 : Shock resistance index
I cl.F : Insulation class F
40°C : Maximum ambient operating temperature
S1 : Duty
V : Supply voltage
Hz : Supply frequency
min^{-1} : Speed of rotation
kW : Rated power
cos φ : Power factor
A : Rated current
Δ : Delta connection
Y : Star connection

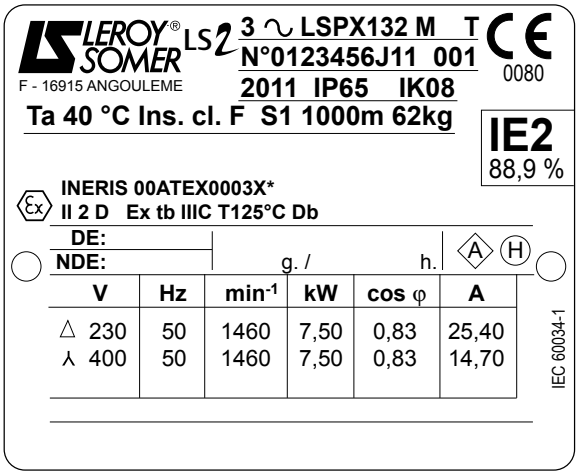
Bearings

DE : Drive end bearing
NDE : Non drive end bearing
g : Amount of grease at each regreasing (in g)
h : Regreasing interval (in hours)
A : Vibration level
H : Balancing mode

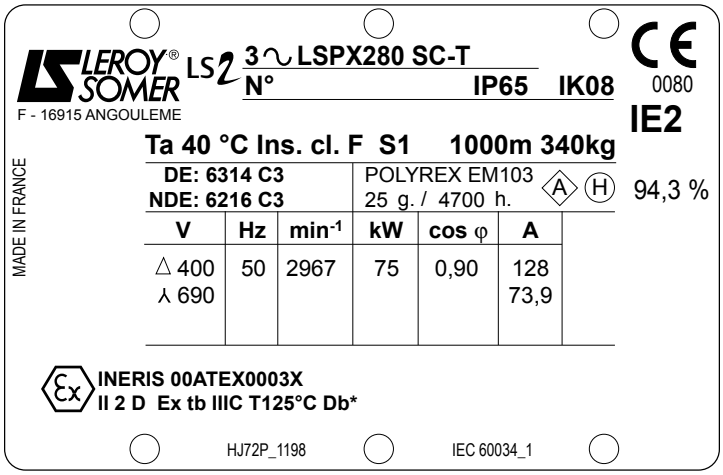
Identification and marking

NAMEPLATES

LSPX 80 to LSPX 132



LSPX 160 to LSPX 280



*II 3 D Ex tc IIIB T125°C Dc --> LSES/LS

DEFINITION OF SYMBOLS USED ON NAMEPLATES

CE **Legal mark of conformity of product to the requirements of European Directives**

ATEX specific marking

: Mark for protection against risks of explosion

II 2D or II 3D : ATEX marking
Ex tb or tc : "Dust" protection type
IIIB or IIIC : "Dust" equipment group
T125°C : Maximum surface temperature
Db or Dc : "Dust" EPL
0080 : INERIS Notified Body
INERIS 00ATEX0003X : EC type-examination certificate number

Zone	Type	ATEX marking	Dust protection type marking	Ingress protection
21	LSPX	II 2 D	Ex tb IIIC T125°C Db	IP65
22	LSES Non-conductive dust	II 3 D	Ex tc IIIB T125°C Dc	IP55

Motor

MOT 3 ~ : Three-phase A.C. motor
LSPX : Series
132 : Frame size
M : Housing symbol
T : Impregnation index

Motor no.

0123456 : Motor batch number
J : Month of production
11 : Year of production
001 : Serial number
IE2 : Efficiency class
88.9% : Efficiency at 4/4 load

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A : Rated current
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Y : Star connection

Bearings

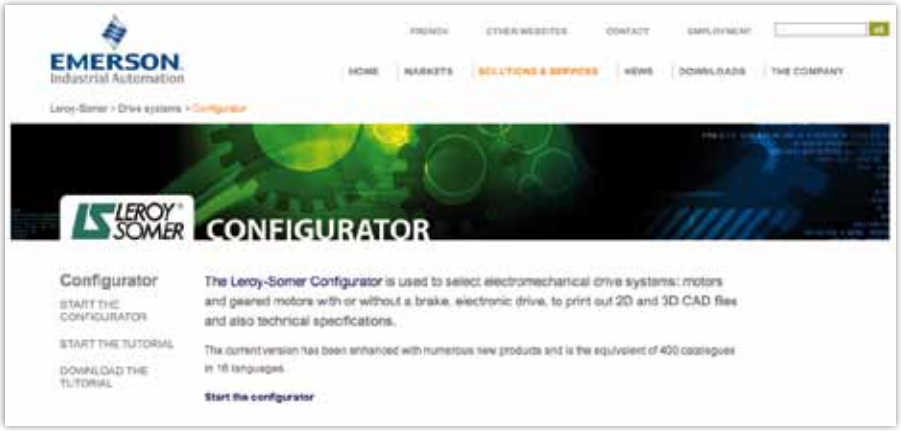
DE : Drive end bearing
NDE : Non drive end bearing
g : Amount of grease at each regreasing (in g)
h : Regreasing interval (in hours)
A : Vibration level
H : Balancing mode

Configurator

The Leroy-Somer configurator can be used to choose the most suitable motor and provides the technical specifications and corresponding drawings.

To register online:
www.leroy-somer.com/en/solutions_and_services/drive_systems/configurator

- Help with product selection
- Print-outs of technical specifications
- Print-outs of 2D and 3D CAD files
- The equivalent of 300 catalogues in 10 languages



Availability of products

Being able both to respond to urgent requests and adhere to promised customer lead times calls for a powerful logistics system.

The availability of motors is ensured by the network of approved partners and Leroy-Somer central services all working together.

The selection data in the "Guaranteed Availability Drive systems" catalogue specify the product delivery time for each family in the form of a colour code and according to the quantities per order.

Please consult Leroy-Somer.

Notes

Notes

International network

www.leroy-somer.com

ALGERIA
MOTEURS LEROY-SOMER
INTERNATIONAL DIVISION (FRANCE)

AUSTRALIA
LEROY-SOMER PTY LTD

AUSTRIA
LEROY-SOMER MARBAISE GMBH (GERMANY)

BELGIUM
LEROY-SOMER SA

BRAZIL
LEROY-SOMER DIVISION
EMERSON ELECTRIC DO BRASIL LTDA.

CHINA
EMERSON TRADING (SHANGHAI) CO LTD

CZECH REPUBLIC
M.L.S. HOLICE SPOL SRO

DENMARK
LEROY-SOMER DANMARK A/S

EGYPT
MOTEURS LEROY-SOMER
INTERNATIONAL DIVISION (FRANCE)

FRANCE
MOTEURS LEROY-SOMER

GERMANY
LEROY SOMER MARBAISE GMBH

GREECE
LEROY SOMER LTD

HUNGARY
IMI kft

INDIA
LEROY-SOMER DIVISION
EMERSON ELECTRIC CO

ITALY
LEROY-SOMER SPA

JAPAN
LEROY-SOMER DIVISION
EMERSON JAPAN LTD

KOREA
LEROY-SOMER DIVISION
EMERSON ELECTRIC (KOREA) LTD

NETHERLANDS
LEROY-SOMER BV

POLAND
FZN MARBAISE LS SP ZOO

ROMANIA
LEROY-SOMER DIVISION
EMERSON SRL

RUSSIA
LEROY-SOMER DIVISION
EMERSON LLC

SINGAPORE
LEROY-SOMER SOUTHEAST ASIA PTE LTD

SOUTH AFRICA
LEROY SOMER PTY LTD

SPAIN
LEROY-SOMER IBERICA S.A.

SWEDEN
LEROY-SOMER NORDEN AB

SWITZERLAND
LEROY-SOMER SA

TAIWAN
MOTEURS LEROY-SOMER (FRANCE)
LIAISON OFFICE - C/O EMERSON (TAIWAN) CO LTD

THAILAND
LEROY-SOMER DIVISION
EMERSON (THAILAND) LTD

TURKEY
LEROY-SOMER ELEKTROMEKANIK SISTEMLER
TICARET LTD STI

U.A.E.
LEROY-SOMER DIVISION
EMERSON FZE

UNITED KINGDOM
LEROY-SOMER LTD

USA
LEROY-SOMER POWER AND DRIVES
EMERSON ELECTRIC CO

VENEZUELA
LEROY-SOMER DIVISION
EMERSON VENEZUELA CA

LEROY® SOMER

EMERSON™
Industrial Automation

en - 2013.02 / g

Moteurs Leroy-Somer SAS - RCS 338 567 258 ANGOULÊME - Capital de 65 800 512 €