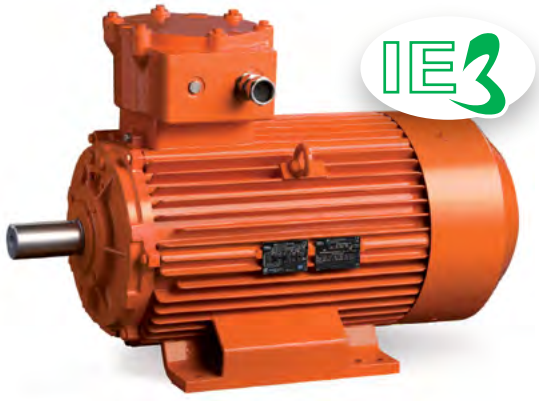
IMfinity®

Motors for explosive atmospheres (ATEX)



3-phase induction motors
Variable speed and fixed speed
IE3 Premium efficiency
Frame size 80 to 355
Power rating 0.75 to 400 kW

ATEX GAS – Zones 1 & 2
ATEX DUST – Zones 21 & 22

LEROY-SOMER™

Nidec
All for dreams

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
Contents

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General information
Introduction

Nidec Leroy-Somer describes in this catalogue the Premium efficiency induction motors of its new IMfinity® generation for use in explosive gas and dust atmospheres (ATEX).

These motors have been designed to incorporate the latest European standards, and can satisfy most industrial requirements.
They stand out as benchmark products in the Nidec Leroy-Somer range for ATEX applications.

Other motors, ranging in power from 0.045 to 2200 kW and with particular designs, are included in the Nidec Leroy-Somer motor programme.

ATEX GAS motors - Zone 1

FLSD series

 II 2 G Ex db *or* db eb II B *or* C T4 *or* T5 *or* T6 Gb

Premium Efficiency

IE3 powered by the mains
IE3 powered by the drive

ATEX GAS motors - Zone 2

FLSN / LSN series

 II 3 G Ex ec II C T3 Gc

Premium Efficiency

IE3 cast iron or aluminium on mains
IE3 cast iron or aluminium on drive

ATEX DUST motors - Zone 21

FLSPX / LSPX series

 II 2 D Ex tb III C T125°C Db

Premium Efficiency

IE3 cast iron or aluminium on mains
IE3 cast iron or aluminium on drive

ATEX DUST motors - Zone 22

FLSES / LSES series

 II 3 D Ex tc III B T125°C Dc

Premium Efficiency

IE3 cast iron or aluminium on mains
IE3 cast iron or aluminium on drive

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
General information
Quality commitment

The Nidec Leroy-Somer quality management system is based on:
- controlling processes from as early as the initial sales offering up until delivery to the customer, including design, manufacturing launch and production
- a total quality policy based on the continuous improvement of operational processes, involving all departments in the company in order to guarantee customer satisfaction in terms of delivery times, conformity and cost
- indicators used to monitor process 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 trained in and taking part in analyses and actions for continuous improvement of our processes
- the motors in this catalogue which have been studied to measure the impact of their life cycle on the environment

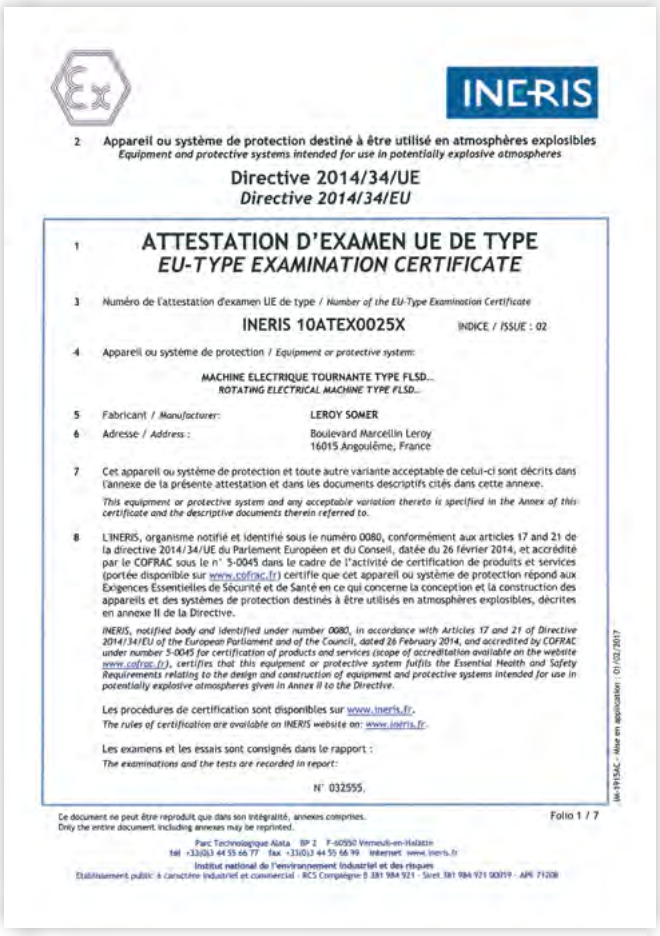
Nidec Leroy-Somer has entrusted the certification of its expertise to various international organisations.
Certification is granted by independent professional auditors, and recognises the high standards of the **company's quality assurance procedures.** All activities resulting in the final version of the products have therefore received official certification **ISO 9001: 2015 from the DNV**. Similarly, our environmental approach has enabled us to obtain ISO 14001: 2015 certification.
Products for particular applications or those designed to operate in specific environments are also approved or certified by the following bodies: LCIE, DNV, INERIS, EFECTIS, UL, BSRIA, TUV, EAC, which check the technical performance of the products against the various standards or recommendations.

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
General information
Certification

The ATEX motors presented in this catalogue comply with the national and/or international standards that govern the construction of this type of equipment.

CE type-examination certificates are drawn up by notified bodies in accordance with the European ATEX Directive No. 2014/34/EU.
The certificates issued by the organisations mentioned below are obligatorily recognised in all EU Member States.

They allow CE marking or the distinctive EU mark to be affixed to the certified equipment.



2 Appareil ou système de protection destiné à être utilisé en atmosphères explosibles
Equipment and protective systems intended for use in potentially explosive atmospheres

Directive 2014/34/UE
Directive 2014/34/EU

1 **ATTESTATION D'EXAMEN UE DE TYPE**
EU-TYPE EXAMINATION CERTIFICATE

3 Numéro de l'attestation d'examen UE de type / *Number of the EU-Type Examination Certificate*
INERIS 10ATEX0025X INDICE / ISSUE : 02

4 Appareil ou système de protection / *Equipment or protective system:*
MACHINE ELECTRIQUE TOURNANTE TYPE FLSD...
ROTATING ELECTRICAL MACHINE TYPE FLSD...

5 Fabricant / *Manufacturer:* LEROY SOMER

6 Adresse / *Address :* Boulevard Marcellin Leroy 16015 Angoulême, France

7 Cet appareil ou système de protection et toute autre variante acceptable de celui-ci sont décrits dans l'annexe de la présente attestation et dans les documents descriptifs cités dans cette annexe.
This equipment or protective system and any acceptable variation thereto is specified in the Annex of this certificate and the descriptive documents therein referred to.

8 L'INERIS, organisme notifié et identifié sous le numéro 0080, conformément aux articles 17 and 21 de la directive 2014/34/UE du Parlement Européen et du Conseil, datée du 26 février 2014, et accrédité par le COFRAC sous le n° 5-0045 dans le cadre de l'activité de certification de produits et services (portée disponible sur www.cofrac.fr) certifie que cet appareil ou système de protection répond aux Exigences Essentielles de Sécurité et de Santé en ce qui concerne la conception et la construction des appareils et des systèmes de protection destinés à être utilisés en atmosphères explosibles, décrites en annexe II de la Directive.
INERIS, notified body and identified under number 0080, in accordance with Articles 17 and 21 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, and accredited by COFRAC under number 5-0045 for certification of products and services (scope of accreditation available on the website www.cofrac.fr), certifies that this equipment or protective system fulfils the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

Les procédures de certification sont disponibles sur www.ineris.fr.
The rules of certification are available on INERIS website on: www.ineris.fr.

Les examens et les essais sont consignés dans le rapport :
The examinations and the tests are recorded in report:

N° 032555.

Ce document ne peut être reproduit que dans son intégralité, annexes comprises. Folio 1 / 7
Only the entire document including annexes may be reprinted.

Parc Technologique Alata BP 2 F-60550 Verneuil-en-Halatte
tél +33(0)3 44 55 66 77 fax +33(0)3 44 55 66 99 Internet www.ineris.fr
Institut national de l'environnement industriel et des risques
Etablissement public à caractère industriel et commercial - RCS Compiègne B 381 984 921 - Siret 381 984 921 00019 - APE 7120B

(2) Appareil ou système de protection destiné à être utilisé en atmosphères explosibles
Equipment and protective systems intended for use in potentially explosive atmospheres
Annexe VIII

Directive 2014/34/UE
Directive 2014/34/EU

(1) **ATTESTATION D'EXAMEN DE TYPE**
TYPE EXAMINATION CERTIFICATE

(3) Numéro de l'attestation d'examen de type / *Number of the Type Examination Certificate*
INERIS 18ATEX3011X INDICE / ISSUE : 00

(4) Appareil / *Equipment:*
MACHINE ÉLECTRIQUE TOURNANTE TYPE FLSN . . . et FLSES . . .
ROTATING ELECTRICAL MACHINE TYPE FLSN . . . et FLSES . . . *FLSN . . . and FLSES . . .*

(5) Fabricant / *Manufacturer:* Constructions Electriques de Beaucourt (CEB), société du groupe Nidec Leroy-Somer Holding SA.,

(6) Adresse / *Address:* 14 rue de Dampierre F- 90500 BEAUCOURT

(7) Cet appareil et toute autre variante acceptable de celui-ci sont décrits dans l'annexe de la présente attestation et dans les documents descriptifs cités dans cette annexe.
This equipment or protective system and any other acceptable alternative of this one are described in the annex of this certificate and the descriptive documents quoted in this annex.

(8) L'INERIS certifie que cet appareil répond aux Exigences Essentielles de Sécurité et de Santé en ce qui concerne la conception et la construction des appareils destinés à être utilisés en atmosphères explosibles soumis à l'annexe VIII de la directive.Ces exigences sont décrites dans l'annexe II de la Directive 2014/34/UE du 26 février 2014.
INERIS certifies that this equipment fulfils the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres and submitted to the Annex VIII of the Directive.
These requirements are described in the Annex II of the Directive 2014/34/EU of the 26 February 2014.

Les examens et les essais sont consignés dans le rapport / *The examinations and the tests are recorded in report:*

n ° 031302.

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ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
General information
Definition of atmospheres and zones

ATMOSPHERES WITH EXPLOSIVE RISK AND EUROPEAN DIRECTIVES

An explosive risk zone is anywhere in which an explosive or potentially explosive atmosphere may be present, and where the explosive character may be permanent, intermittent or accidental.
An explosive atmosphere is one in which a mixture of air and flammable substances (in the form of combustible gases, vapours, mists or dust) exists permanently. A potentially explosive atmosphere is one which is liable to become explosive as a result of particular or accidental local conditions.
In areas with an explosive risk, electrical installations must be limited to what is essential for operational requirements.

Two European Directives govern the equipment and protection of workers in these areas.

Directive 2014/34/EU
This Directive harmonises the essential safety requirements that must be met by equipment and protective systems intended for use in (potentially) explosive atmospheres, in compliance with the free movement of goods within the European Union.

Directive 1999/92/EC
This Directive concerns the protection of workers by stipulating the minimum requirements for the health and safety of workers liable to be exposed to the risk of explosive atmospheres.

In particular, it imposes the following obligations on a site operator:
- **to define the zones in which explosive atmospheres may occur and to characterise them;**
- **to choose electrical equipment suited to the previously defined zones;**
- **to provide the appropriate conditions for the installation, operation and maintenance of this equipment.**

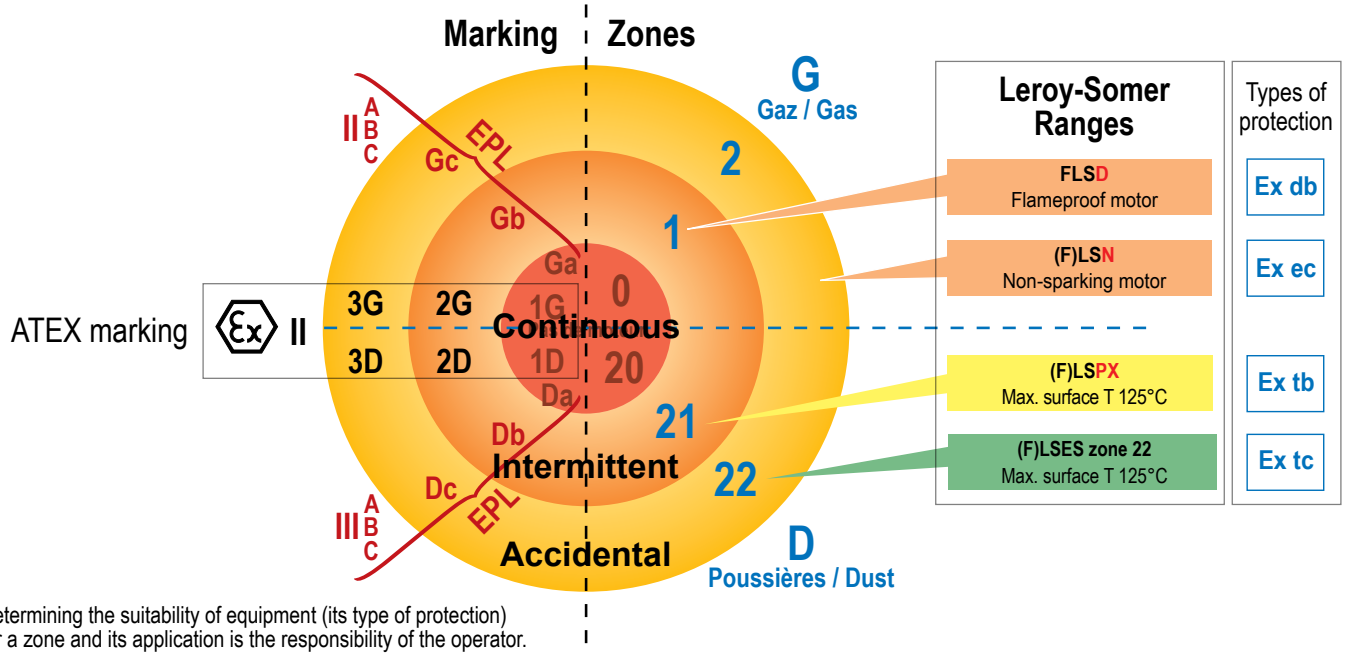
DEFINITION OF EXPLOSION-RISK ZONES

The IEC 60079-10-1 and -2 standards define the danger zones according to the risk of explosive atmospheres occurring there, as illustrated in the following diagram:

Zone 0 (gas) and 20 (dust)
A location in which an explosive atmosphere is present continuously or for long periods. Only electrical control and measuring equipment may be installed there, and therefore no electric motors.

Zone 1 (gas) and 21 (dust)
A location in which an explosive atmosphere is present occasionally or intermittently.

Zone 2 (gas) and 22 (dust)
A location in which an explosive atmosphere is accidentally present and only under abnormal operating circumstances.



Determining the suitability of equipment (its type of protection) for a zone and its application is the responsibility of the operator.

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
General information
Definition of atmospheres and zones

Electrical equipment installed in locations where there is a risk of explosion is classified, according to standard 60079-0, into three groups of equipment:
- **Group I:** Firedamp mines - This group concerns only firedamp (methane) in mines.
- **Group II:** Explosive gas atmospheres - The gases present are classified into three subdivisions A, B or C depending on the severity of the risks.
- **Group III:** Explosive dust atmospheres - Different types of dust are classified into three subdivisions A, B or C depending on their properties.

Directive 2014/34/UE equipment classification					IEC60079-0 equipment classification (Equipment Protection Level)					Zones
Use	ATEX Group	Category	Protection level	If ATEX presence	Use	Equipment group	EPL	Protection level	If ATEX presence	60079-10
Firedamp mines	I	M1 All firedamp content	Very high	Power on	Firedamp mines	I	Ma All firedamp content	Very high	Power on	
		M2 Within a certain value	High	Power off			Mb Within a certain value	High	Power off	
Surface Industries	II	1G	Very high	Power on	Gas explosive atmospheres	II A B C	Ga	Very high	Power on	0
		2G	High				Gb	High		1
		3G	Normal				Gc	Reinforced		2
		1D	Very high		Dust explosive 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 airborne particles
IIIB : non-conductive dust (electrical resistivity >10^3Ω.m)
IIIC : conductive dust

CLASSIFICATION OF GAS EQUIPMENT GROUPS

Gases are classified into three subdivisions according to the risks following an explosion. These risks increase from subdivision A to subdivision C. **Equipment certified for use in the presence of a type C gas can therefore be used in the presence of type A and B gases.**

TEMPERATURE CLASSES

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

In order to select the different 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 of the equipment	450 °C	300 °C	200 °C	135 °C	100 °C	85 °C

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
General information
Classification of common gases

Gas	Ignition temperature °C	Temperature class of the equipment.	Explosion group
Acetaldehyde	140	T4	IIA
Acetic acid	464	T1	IIA
Acetic anhydride	316	T2	IIA
Acetone	465	T1	IIA
Acetylene	305	T2	IIC
Ammonia	630	T1	IIA
Amyl acetate	380	T2	IIA
Benzene (pure)	498	T1	IIA
Butane n	365	T2	IIA
Butanol n	343	T2	IIA
Carbon disulfide	95	T6	IIC
Carbon monoxide	605	T1	IIB
Cyclohexanone	420	T2	IIA
Dichloroethylene	460	T1	IIA
Dichloromethane	625	T1	IIA
Diesel DIN 51601/04.78	220 to 300	T3	IIA
Diethyl ether	180	T4	IIB
Ethane	472	T2 - T1	IIA
Ethyl acetate	427	T2	IIA
Ethyl alcohol	425	T2	IIA - IIB
Ethyl chloride	510	T1	IIA
Ethylene	425	T2	IIB
Ethylene glycol	235	T3	IIB
Ethylene oxide	440	T2	IIB
Fuel oil EL DIN 51 603 part 1/12.81	220 to 300	T3	IIA
Fuel oil L DIN 51 603 part 2/10.76	220 to 300	T3	IIA
Fuel oils M and S DIN 51 603 part 2/10.76	220 to 300	T3	IIA
Hexane n	225	T3	IIA
Hydrogen	560	T1	IIC
Hydrogen sulphide	270	T3	IIB
Kerosene (or fuel-oil No. 1)	220 to 300	T3	IIA
Mains gas	560	T1	IIB
Methane	537	T1	IIA
Methanol	385	T2	IIA
Naphthalene	520	T1	IIA
Oleic acid	360	T2	IIB
Phenol	595	T1	IIA
Propane	450	T2	IIA
Propylene alcohol	405	T2	IIB
Special spirits with initial boiling point > 135 °C	220 to 300	T3	IIA
Spirits for motors with initial boiling point < 135 °C	220 to 300	T3	IIA
Tetralin (tetrahydronaphthalene)	425	T2	IIB
Toluene	482	T1	IIA

Values for guidance only

CLASSIFICATION OF DUST EQUIPMENT GROUPS

Dusts are classified into three groups according to their characteristics:

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

DUST IGNITION TEMPERATURES

Combustible dusts are dangerous because they can generate an explosive atmosphere when dispersed in the air (dust cloud). Furthermore, a layer of combustible dust can ignite and act as a source of ignition 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	(fusion)

The maximum surface temperature of the equipment must be at all times:
- < layer ignition T° -75°C
- < 2/3 cloud ignition T°

All ATEX dust or ATEX gas-dust motors offered in this catalogue are qualified and marked for temperature class T 125°C.

TYPE OF PROTECTION FOR ELECTRICAL EQUIPMENT

European standards define, depending on the type of protection chosen, the design rules specific to electrical equipment for use in explosive atmospheres.
These types of protection are each covered by a specific standard supplementing standard IEC 60079-0 (general rules) and are symbolised by a lower case letter. The following distinctions apply:
- db: flameproof enclosures
- eb: increased safety
- ec: non-sparking
- p: pressurized enclosure
- q: powder filling
- o: oil immersion
- i: intrinsic safety
- m: encapsulation
- t: protection by enclosure

TYPE OF PROTECTION FOR MOTORS IN EXPLOSIVE GAS ATMOSPHERES

Electric motors protected by "db" flameproof enclosure (EN 60079-1)

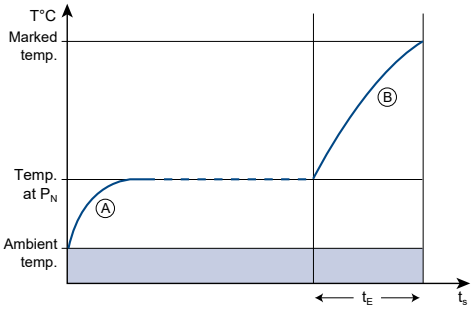
The requirements they must satisfy include the following:
- withstanding an internal explosion of the air/gas mixture without damage or permanent deformation of the enclosure,
- ensuring that ignition inside the enclosure cannot be transmitted to the surrounding explosive atmosphere,
- presenting a surface temperature lower than the external ignition temperature of the gas.

These three conditions require:
- highly robust construction of the enclosure,
- minimum seal lengths and smaller gaps so that the explosion of the air/gas mixture inside the enclosure is not transmitted to the surrounding explosive atmosphere (bearing / casing sockets, shaft passages, etc.),
- limited temperature rise, taking into account unfavourable operating conditions (voltage limits), and guaranteeing, depending on the ambient temperature, a surface temperature lower than the temperature class imposed by the nature of the gas present.

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

The "eb" protection type concerns equipment which, in normal operation, does not produce arcs, sparks or hot spots; this excludes in particular all rotating machines with commutator.
This requires, among other things, in terms of their design:
- special precautions in order to avoid any arcing or sparks: minimum air gaps and creepage distances between live elements and earthings, absence of mechanical friction, insulation, minimum distances in ventilation systems, specific fan materials, etc.
- temperature at any point on the motor (including the stator and rotor) below the ignition temperature of the gas. This temperature must take into account a locked rotor time as defined in EN 60079-7.

In the event of rotor failure and jamming, a control device must be able to disconnect the motor from the power supply within a time $t < t_E$.



- T°C = Internal temperature at the hottest spot
- Marked temp = Temperature limit (slightly below the rated temperature class)
- Temp. at P_N = Temperature at nominal rating
- Ambient temperature = Highest permissible ambient temperature
- t_S = time in seconds
- t_E = locked rotor time
- Ⓐ = temperature rise in normal service
- Ⓑ = temperature rise in locked rotor test

Electric motors with "ec" non-sparking protection (EN 60079-7)

The "ec" protection type concerns equipment that does not generate sparks, arcs or hot spots and operates in an exceptionally explosive atmosphere.

(Only usable in zone 2).

This requires in terms of equipment design:

- precautions to avoid any arcing or sparking: minimum air gaps and creepage distances between live elements and earthings.

- temperature at any point on the motor (including the stator and rotor) below the ignition temperature of the gas. However, any jamming of the rotor falls outside this requirement.

TYPE OF PROTECTION BY TB OR TC ENCLOSURE FOR MOTORS IN EXPLOSIVE DUST ATMOSPHERES

Type of protection "t" by enclosure prevents the risk of explosion by:
- the non-penetration of dust into the motor thanks to its "IP" Protection Index which must be at least:
  - IP 65 for motors installed in zone 21 and/or exposed to conductive dusts (Ex tb).
  - IP 55 for motors installed in zone 22 (Ex tc) (non-conductive dusts).
- the maximum surface temperature of the motor never exceeding under any circumstances the temperature class indicated on the nameplate.
- no production of sparks or arcs outside the engine.

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
General information
Equipment certification

For equipment installed in the European Union, the 2014/34/EU ATEX Directive governs the means of demonstrating compliance with the various standards for equipment intended for use in explosive zones. As a minimum, electrical equipment suitable for use in zones 0 or 20 and 1 or 21 must always be certified by a notified body with the necessary approvals.

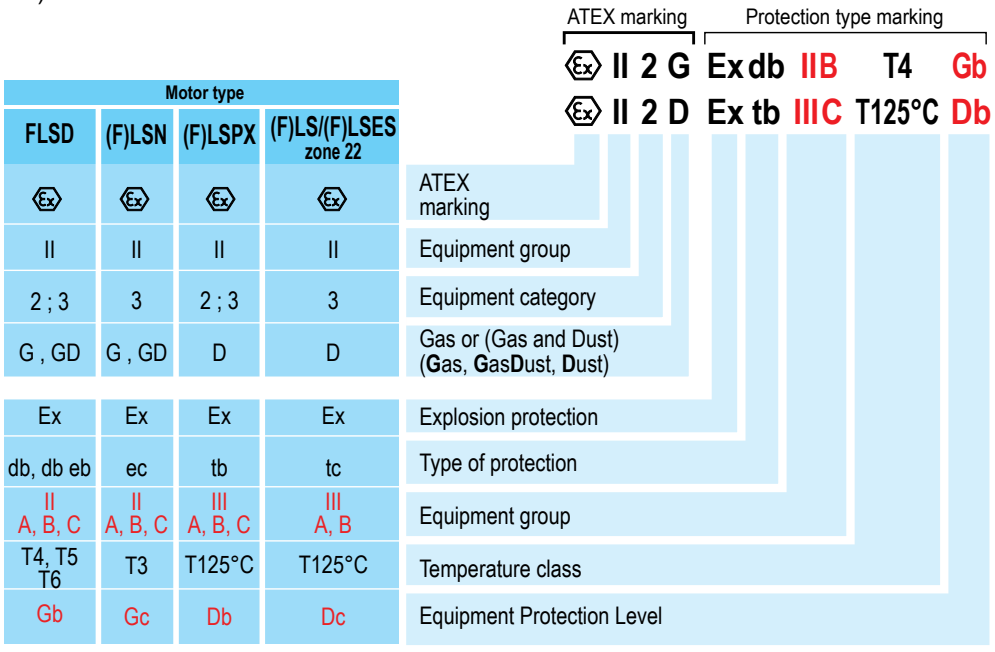
Outside Europe, some countries accept the local use of components approved in accordance with the rules in force in the EU.
In order to facilitate the circulation of electrical equipment used in explosive atmospheres and to simplify the acquisition of any local certifications, the International Electrotechnical Commission has for some years been proposing **voluntary IECEx certification**, which is increasingly recognised in many countries outside Europe as well as by major international clients. **Some of the motor ranges in this catalogue have IECEx certification.**

In North America and particularly in the USA, the regulation to be taken into consideration is the NEC (National Electrical Code) for the installation and certification rules. Unfortunately, there is no mutual recognition between EN/IEC and NEC standards. For installations outside North America, it is often the case that American firms based in Europe, Asia or Africa invite tenders with reference to the NEC.

	NEC 500	Types of product	CENELEC
	Class I	Gas	Group I (mines) and II (surface)
	Class II	Dust	Group III
	Class III	Airborne fibres and dusts	
	Division (DIV) 1	Gas and dusts	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 dusts	IIIC
	Group F	Coal dust	IIIB
	Group D	Non-conductive dusts	IIIB

Equipment marking

Two types of markings must appear on electrical equipment operating in explosive gas and/or dust atmospheres:
- Markings as per ATEX Directive 2014/34/EU, with the logo Ex, indication of the group and category of the equipment, and the symbol G, D or GD.
- IEC markings (standard 60079-0) with indication of the type of protection, equipment group, temperature class and EPL (Equipment Protection Level).



THE IECEx SYSTEM

This is an international certification system for verifying compliance with IEC standards concerning the safety of equipment, service facilities and personnel in explosive atmospheres.

Created in September 1999, this system aims to facilitate the circulation of electrical equipment and services used in explosive atmospheres, while maintaining the necessary level of safety (source: www.iecex.com).
It is a system that provides the internationally recognised means of proving that products and services comply with IEC standards.

The voluntary and international aspects of the IECEx system differentiate it from certification under ATEX, for example, which is compulsory and only applies in the European Union.

The IECEx system includes global certification programmes for both service facilities and equipment.
IECEx certification comprises:
- product testing,
- assessment of control, quality and testing procedures,
- audits of industrial plants, routine monitoring and inspections.

Also, IECEx has produced a comprehensive set of operational documents and procedures to develop a single internationally standardised approach to Ex certification.

The approach includes:
- A standardised method for obtaining IECEx certification.
- A unique set of operational procedures, and test procedures that are always applied in the same way.
- Single-source technical and operational assistance to maintain operations.
- Test procedures that are assessed and controlled on a centralised basis.

IECEx CERTIFICATION

A manufacturer who needs to have equipment certified under the IECEx system must apply to an IECEx competent body in any Member State. To date, there are 30 IECEx Member States.

The body conducts or coordinates the certification activities.

An assessment of the manufacturer's quality system is carried out by the body itself and the auditor then publishes an IECEx Quality Assessment Report (QAR).

Type testing of products is carried out on behalf of the body by an authorised laboratory.
In addition to its assessment work, the laboratory draws up an IECEx Test Report (ExTR).
The ExTR is then submitted to the body for approval.

Based on the QAR and ExTR, the body then publishes the Certificate of Conformity (CoC).
The CoC certifies that the equipment in question is in conformity with the IEC standards in force.
Once published by the body, the ExTR and QAR are registered on the IECEx website.
This confirms that an ExTR and QAR exist for the product.

IECEx CERTIFIED MOTORS

For IECEx certified motors, the certification number is indicated on their nameplate, e.g., "IECEx INE 10.0012X".
In this case, "INE" signifies that the IECEx certificate has been published by INERIS, an approved certification body in France.
Furthermore, the certificates are published in electronic form and are publicly available on the IECEx website.
They can therefore be consulted and printed at any time from the internet.

IECEx certification is particularly useful for certain markets.
In Australia, New Zealand and Singapore, for example, IECEx certificates are accepted, while not all IEC certificates are accepted.

Other countries, such as Russia, China and Korea, may accept the ExTR as a basis for their national certification.

IECEx marking was introduced in 2008 and certifies that a motor has been approved by a certification body of a Member State and can therefore be placed on the market without further testing.

Nidec Leroy-Somer offers IECEx certification on a wide range of its low-voltage ATEX motors, such as:
- **FLSD series (Ex db and Ex db eb flameproof motors).**
- **FLSN series in cast iron (Ex ec non-sparking motors) and LSN series in aluminium.**
- **FLSPX zone 21 and FLSES zone 22 series in cast iron, Ex t anti-dust motors.**

BENEFITS OF THE IECEx SYSTEM FOR CUSTOMERS

A significant advantage of IECEx is the availability of manufacturers' certificates on the IECEx website.
Customers can therefore confirm the validity of IECEx certificates at any time, unlike ATEX, for example. This increases the customer's confidence that the motor vendor is obliged to maintain the necessary quality systems.

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 Premium efficiency three-phase induction motors responds to changes in the standards as well as the latest demands of system integrators and users.

STANDARD IEC 60034-30-1 (MARCH 2014)

This defines the principle to be adopted and brings global harmonisation to energy efficiency classes for electric motors throughout the world.

Motors concerned
Single-speed, single-phase and three phase cage induction or permanent magnet motors, on a sinusoidal mains supply.

Sphere of application:
- U_n from 50 to 1000 V
- P_n from 0.12 to 1000 kW
- 2, 4, 6 and 8 poles
- Continuous duty at rated power without exceeding the specified insulation class. Generally known as S1 duty.
- 50 and 60 Hz frequency
- On the mains
- Marked for an ambient temperature between -20°C and +60°C
- Marked for an altitude up to 4000 m

Motors not concerned
- Motors with frequency inverter when the motor cannot be tested without one.
- Brake motors when the brake forms an integral part of the motor and can neither be removed nor supplied by a separate source when being tested.
- Motors which are fully integrated in a machine and cannot be tested separately (such as rotor/stator).

STANDARD FOR MEASURING THE EFFICIENCY OF ELECTRIC MOTORS: IEC 60034-2-1 (JUNE 2014)

This concerns asynchronous induction motors:
- Single-phase and three-phase with power ratings of 1 kW or less. The preferred method is the D.O.L. 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.

Notes:
- The 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 the previous 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%

ERP (ENERGY RELATED PRODUCT) DIRECTIVE 2009/125/EC (21 OCTOBER 2009)

This establishes a framework for setting the eco-design requirements to be applied to “energy-consuming products”. These products are grouped into lots. Motors come under lot 11 of the eco-design programme, as do pumps, fans and circulating pumps.

DECREE IMPLEMENTING EUROPEAN ERP (ENERGY RELATED PRODUCT) DIRECTIVE EU/2019/1781 + EU/4/2014

This is based on standard IEC 60034- 30-1 for defining efficiency classes. It specifies the efficiency levels to be attained for machines sold in the European market and outlines the timetable for their implementation.

Classes of efficiency	Level of efficiency
IE1	Standard
IE2	High
IE3	Premium
IE4	Super Premium

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.

Motors concerned: 3-phase motors from 0.75 to 1000 kW with 2, 4, 6 and 8 poles; duty S1, S3 ≥ 80%, S6 ≥ 80%.
Obligation to place Premium efficiency motors on the market:
- Class IE3 from 1st January 2015 for power ratings from 7.5 to 375 kW.
- Class IE3 from 1st January 2017 for power ratings from 0.75 to 375 kW.
- Class IE3 from July 2021 for power ratings from 375 to 1000 kW.

Motors not concerned:
- Motors designed to operate when fully immersed in liquid.
- Motors which are fully integrated in another product (rotor/stator).
- Motors with duty other than continuous duty.
- Motors designed to operate in the following conditions:
  - altitude > 4000 m
  - ambient air temperature > 60°C
  - maximum operating temperature > 400°C
  - ambient air temperature < -30°C or < 0°C for air-cooled motors
  - cooling water temperature at product entry < 0°C or > 32°C
  - "Ex eb" increased safety motors as per directive ATEX 2014/34/EU
  - brake motors

LIST OF STANDARDS QUOTED IN THIS DOCUMENT

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 rotating machine enclosures
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 performance of single-speed three-phase cage induction motors for supply voltages up to and including 660 V.
IEC 60034-14	EN 60034-14	Electrical rotating machines: mechanical vibration of certain machines with frame sizes 56 mm and higher. Measurement, evaluation and limits of vibrational intensity
IEC 60034-17		Cage induction motors when fed from converters - Application guide
IEC 60034-30-1		Electrical rotating machines: efficiency classes for single-speed three-phase cage induction motors (IE code)
IEC 60038		IEC standard voltages
IEC 60072-1		Dimensions and output powers for electrical rotating machines: between 56 and 400 frame size and flanges of 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 - Basic dynamic loadings 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 housings against extreme mechanical impacts.
ISO 12944-2		Corrosion protection
IEC 60079-0	EN 60079-0	Electrical equipment for explosive atmospheres: general rules
IEC 60079-1	EN 60079-1	Electrical equipment for explosive atmospheres: flameproof enclosures "d"
IEC 60079-15	EN 60079-15	Electrical equipment for explosive atmospheres: non-sparking "n"
IEC 60079-31	EN 60079-31	Electrical equipment for use in the presence of combustible dust.

MAIN PRODUCT MARKINGS WORLDWIDE

There are lots of special markings throughout the world. They mainly concern product conformance with current user safety standards in different countries. Some markings or labels only concern energy regulations. The same country can therefore have two markings: one for safety and one for energy.

CE	This marking is mandatory throughout the European Union. It means that the product is in conformity with all the relevant directives. If the product is not in conformity with a relevant directive, it cannot be CE rated and cannot therefore bear the **CE** mark.
C SA US	In **Canada and the United States:** The **CSA** mark accompanied by the letters C and US means that the product is approved for the US and Canadian markets, in accordance with the relevant American and Canadian standards. If a product has characteristics applicable to more than one type of product (e.g., electrical equipment incorporating fuel combustion), the mark indicates conformance with all the relevant standards.
c UL us	This marking only applies to finished products such as complete machines. A motor is just a component and is not therefore affected by this marking.

Note: c CSA us and c UL us mean the same thing but one is delivered by the CSA and the other by the UL.

c UL us	**The c UL us mark**, which is optional, indicates conformance with Canadian requirements and those of the United States. UL encourages manufacturers distributing products bearing the UL Recognized Component Mark for both countries to use this combined mark.

For Canada at least c UR us or c CSA us is required. Both are also possible.

Components covered by the UL "Recognized Component Mark" programme are designed to be installed in another device, system or end product. They should be installed in the factory, not in the field and it is possible that their performance capability will be restricted and will limit their use. When a complete product or system containing UL Recognized components is assessed, the end product assessment process can be rationalised.

CSA	**Canada:** energy efficiency conformity logo (optional).
ee	**USA:** energy efficiency conformity logo (optional).
NEMA Premium	**USA and Canada:** EISA conformity logo (optional).
CCC	This marking is mandatory for the Chinese market. It indicates that the product conforms to the regulations currently in force (safety of users). The electric motors concerned are rated ≤ 1.1 kW.
EAC	The EAC mark replaces the GOST mark. It is the equivalent of the CE mark for the European Union market. This new mark covers regulations for Russia, Kazakhstan and Belarus. All products marketed in these three countries must bear this marking.

Other markings concern specific applications, such as ATEX for example.

CERTIFICATION OF NIDEC LEROY-SOMER MOTORS (versions derived from standard design)

Country	Initials	Certification No.	Application
CANADA	**CSA**	LR 57 008 166,631	Standard adapted range (see section “Supply voltage”) Complete motors
USA	**UL or FU**	E 68554 SA 6704 E 206450	Impregnation systems Stator / rotor assemblies for sealed units Complete motors
FRANCE	**LCIE** **INERIS**	-	Sealing, shocks, safety

For approved special products, see the relevant documents.

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
General information
Definition of IP protection index

IP (INGRESS PROTECTION) RATING OF ELECTRICAL EQUIPMENT ENCLOSURES

In accordance with IEC 60034-5 - EN 60034-5 (IP) - IEC 62262 (IK)

1st digit: protection against solid materials			2nd digit protection against liquids			3rd digit 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 larger than 50 mm (e.g. 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 larger than 12 mm (e.g. 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 larger than 2.5 mm (e.g. 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 larger than 1 mm (e.g. 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		Protected 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 : Protection rating

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

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
General information
Operating conditions

NORMAL OPERATING CONDITIONS

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

The EN 60079-0 standard concerning electrical equipment for explosive atmospheres extends the ambient temperature range T_a from -20 to +40°C as standard. In this case, no additional marking is required on the certified or approved equipment.

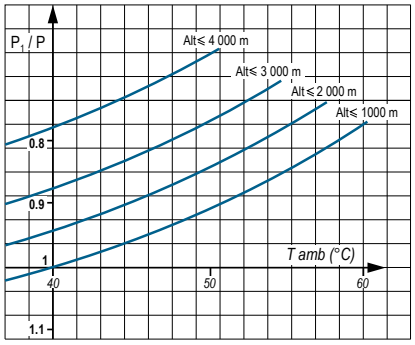
Temperatures outside this range can be considered when certifying the equipment. Additional marking must then be provided. These extensions require special consultation.

b - FLSD motors are designed to operate in environments with a relative humidity of up to 95% at 40°C.

POWER CORRECTION

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

Correction coefficients table*



** For FLSD Ex db eb IIB or IIC T4 motors and (F)LSN Ex ec II T3 motors.*
Not applicable to FLSD T5 or T6 motors (please contact us).

HARSH ENVIRONMENTS

Certain conditions of use require finishes suited to the environment: very dusty, damp or aggressive environments.
The essential criteria for anti-corrosion protection are based on suitable components meeting the requirements of the ATEX Directive (fastenings, plates, cover), metal cable glands, protection of the active parts (stator and rotor), special paints.

VIK

VIK EXECUTION

ATEX motors of the type Exdb eb IIC T4 Gb and Ex ec IIC T3 Gc can be produced in compliance with the VIK recommendations issued by German heavy industry, which apply to equipment used in explosive atmospheres.

The main characteristics to be satisfied by motors manufactured according to this recommendation are as follows:
- Finish suited to corrosive atmospheres (paint, screws, etc.).
- Two stainless steel nameplates, including one inside the terminal box.
- For flameproof and non-sparking motors, IE3 efficiency level is required.
- Drip cover if motor placed in vertical position with shaft end downwards.
- Marking with the VIK logo.
- Captive screws for fixing terminal box covers.
- Corrosion-resistant earth terminal secured to the housing with a caliper.
- Winding PTC sensors.
- Flat grease nipples (M10 x 1) as per DIN 3404.

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
General information
Impregnation and enhanced protection

NORMAL ATMOSPHERIC PRESSURE (750 MM HG)

The selection table below enables selection of the construction method best suited for operation in environments where the temperature and relative humidity vary widely.
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".
T: Tropicalization
TC: Complete Tropicalization

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

INFLUENCE OF ATMOSPHERIC PRESSURE

As atmospheric pressure decreases, air particles rarefy and the environment becomes increasingly conductive.
- P > 550 mm Hg:
standard impregnation according to previous table - Possible derating or forced ventilation.
- P > 200 mm Hg:
Coating of bearings - Flying leads up to a zone at P ~ 750 mm Hg - Derating to take account of insufficient ventilation - Forced ventilation.
- P < 200 mm Hg: Special manufacture based on specification.

In all cases, these problems should be resolved by a special contract worked out on the basis of a specification.

Ambient temperature \ Relative humidity	RH ≤ 95%	RH > 95 % [1]	Influence on construction
θ < - 40 °C	ask for quotation	ask for quotation	
- 16°C to + 50°C	T Standard	TC Standard	
-40°C to +50°C [2]	T1	TC1	Increasing derating
-16°C to +65°C [2]	T2	TC2	
+65°C to +90°C [2]	T3	TC3	
θ > +90 °C	ask for quotation	ask for quotation	
Plate mark	**T**	**TC**	
Influence on construction	Increased protection of windings		

1. Atmosphere without high levels of condensation
2. For motors with frame size ≥ 280 mm and IP23 motors with frame size ≥ 315 mm: ask for quotation

Standard construction

SPACE HEATERS

Severe climatic conditions, e.g. T amb < - 40°C, RH > 95% 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 terminal block in the motor terminal box.

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

DC SUPPLY 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 DC voltage source. This method can only be used on motors of less than 10 kW.

This is easily calculated: if R is the resistance of the windings in series, the DC 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.

AC INJECTION HEATING

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

See the mechanical and electrical options pages for each motor family to find the space heater values.

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
Environment
Paint finish

Surface protection is defined in the ISO 12944 standard. This standard defines the planned service life of a paint system until the first major application of maintenance paint. Durability is not a guarantee.
The EN ISO 12944 standard comprises 8 sections. Part 2 covers the classification of the environments.
Nidec Leroy-Somer motors are protected with a range of surface finishes.
The surfaces receive appropriate special treatments, as shown below.

PREPARATION OF SURFACES

Surfaces	Parts	Surface treatment
Cast iron	Endshields	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

CLASSIFICATION OF ENVIRONMENTS

Nidec Leroy-Somer paint systems according to the categories.

Atmospheric corrosivity categories	Corrosion protection as per ISO 12944 -2	Durability class	ISO 6270 Equivalent water condensation No. of hours	ISO 9227 Salt mist No. of hours	Equivalent system Nidec Leroy-Somer	Description of system
Others	-	-			Non-painted	No coating except for cast iron parts
		-			Primary	1 primary coat / Ph-Zn Pu
Medium	C3	Limited	48	120	C3L	1 polyurethane coat
		Medium	120	240		
		High	240	480		
		Very high	480	720		
High	C4	Limited	120	240		
		Medium	240	480	C4M	1 primary coat / Ph-Zn Pu
						1 polyurethane coat
					C4M-EP*	1 primary coat / Ph-Zn Pu
						1 epoxy coat
		High	480	720		
		Very high	720	1440		
Very high	C5	Limited	240	480		
		Medium	480	720	C5M	1 primary coat / Ph-Zn Pu
						1 Ph-Zn Pu intermediate coat
						1 polyester / acrylic coat
		High	720	1440		
		Very high	-	-		

C3L limited for all versions

The **I**a system applies to the group of moderate climates and the **II**a system to the group of general climates, as defined in standard IEC 60721.2.1.

Standard paint colour references:

RAL 2004 **ATEX GAS**

RAL 1007 **ATEX DUST ZONES 21**

RAL 6000 **ATEX DUST ZONES 22**

AIRBORNE INTERFERENCE

EMISSION

For standard motors, the enclosure acts as an electromagnetic screen, 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 enclosures (especially finned aluminium alloy frames)isolatesexternalelectromagnetic sources to the extent that any field penetrating the enclosure 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, variable 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 CISPR 11 standard, currently undergoing study, will define the permissible rejection and immunity rates.
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 2014/30/EU 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 2014/35/EU

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.

PRODUCT CE MARKING

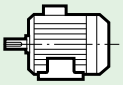
The fact that motors comply with the essential requirements of the Directives is shown by the **CE** mark on their nameplates and/or packaging and documentation.

MOUNTINGS AND POSITIONS (AS PER STANDARD IEC 60034-7)

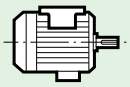
Foot mounted motors

• all frame sizes

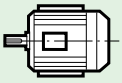
IM 1001 (IM B3)
- Horizontal shaft
- Feet on floor



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

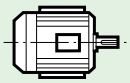


IM 1051 (IM B6)
- Horizontal shaft
- Wall mounted with feet on left when viewed from drive end

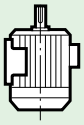


IM 1011 (IM V5)
- Vertical shaft downwards
- Feet on wall

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



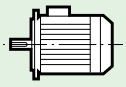
IM 1031 (IM V6)
- Vertical shaft upwards
- Feet on wall



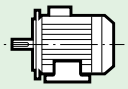
(FF) flange mounted motors

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

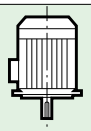
IM 3001 (IM B5)
- Horizontal shaft



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

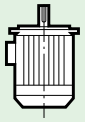


IM 3011 (IM V1)
- Vertical shaft downwards



IM 2011 (IM V15)
- Vertical shaft downwards
- Feet on wall

IM 3031 (IM V3)
- Vertical shaft upwards

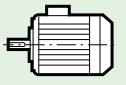


IM 2031 (IM V36)
- Vertical shaft upwards
- Feet on wall

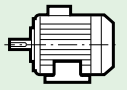
(FT) face mounted motors

• all frame sizes ≤ 132 mm

IM 3601 (IM B14)
- Horizontal shaft



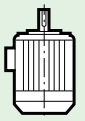
IM 2101 (IM B34)
- Horizontal shaft
- Feet on floor



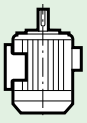
IM 3611 (IM V18)
- Vertical shaft downwards

IM 2111 (IM V58)
- Vertical shaft downwards
- Feet on wall

IM 3631 (IM V19)
- Vertical shaft upwards



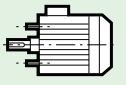
IM 2131 (IM V69)
- Vertical shaft upwards
- Feet on wall



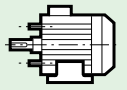
Motors without drive end shield

Warning: 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 and threaded rods
- Horizontal shaft



Frame height (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 contact us, specifying the coupling method and the axial and radial loads if applicable

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
Construction
Mains connection

TERMINAL BOX

Placed as standard on the 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 front or rear of the motor housing).

FLYING LEADS

According to specification, motors can be supplied with flying leads using single-core cables (as an option, the cables can be protected by a sheath) or multicore cables.

Please state cable characteristics (cross-section, length, number of conductors), connection method (flying leads or on a terminal block) and the drill hole position.

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

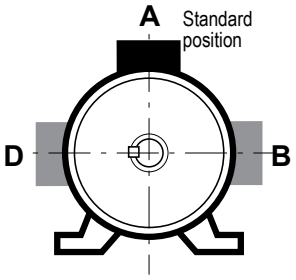
This is situated inside the terminal box. Consisting of a threaded stud with a hexagonal nut, it is used to connect cables with cross-sections at least as large as the cross-section of the phase conductors.

The earth terminal is indicated by the symbol: ⏚ in the terminal box moulding.

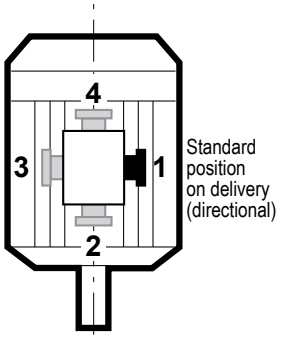
A second earth terminal is installed on the motor.

In the VIK version, for Ex db eb IIC T4 Gb and Ex ec IIC T3 Gc motors, an earth terminal is always fixed to the housing by means of a caliper.

Terminal box positions in relation to the drive end (motor in IM 1001 position)



Plug positions in relation to the drive end



Position 2 not recommended (impossible on standard flange mounted (FF) motor)

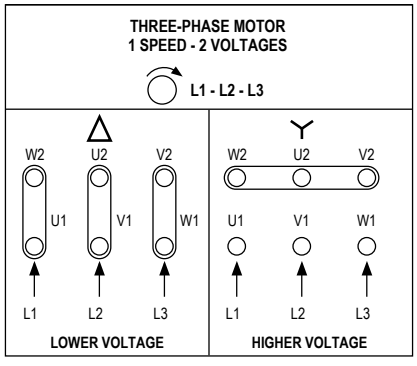
Position of the terminal box	A	B	D
LSN - LSES - LSPX	●	■	■
FLSN - FLSES - FLSPX 80 to 225 MT	●	-	-
FLSN - FLSES - FLSPX 225M to 355	●	■	■
FLSD 80 to 280	●	-	-
FLSD 315	●	■	■

● : standard
■ : please contact us
- : not available

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

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

◆ : standard
✶ : possible by simply turning round the terminal box



PERMISSIBLE RADIAL LOAD ON THE MAIN DRIVE SHAFT

In pulley and belt couplings, the drive shaft carrying the pulley is subjected to a radial force Fpr applied at a distance X (mm) from the shoulder of the drive shaft (length E).

Radial force acting on the drive end: Fpr

The radial force Fpr expressed in daN applied to the drive end is found by the formula:

$$Fpr = 1.91\ 10^6 \frac{P_N \cdot k}{D \cdot N_N} \pm P_P$$

where:
PN = rated motor power (kW)
D = external diameter of the drive pulley (mm)
N_N = rated motor speed (min^{-1})
k = factor depending on the type of transmission
PP = weight of the pulley (daN)

The weight of the pulley is positive when it acts in the same direction as the tension force in the belt (and negative when it acts in the opposite direction).

Range of values for factor k(*)
- toothed belts: k = 1 to 1.5
- V-belts: k = 2 to 2.5
- flat belts
  - with tensioner: k = 2.5 to 3
  - without tensioner: k = 3 to 4

(*) A more accurate figure for factor k can be obtained from the transmission suppliers.

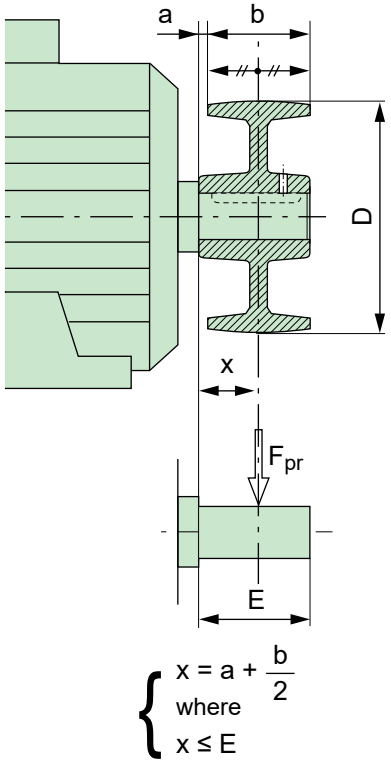
Permissible radial force on the drive shaft

The charts on the following pages indicate, for each type of motor, the radial force FR at a distance X permissible on the drive end shaft extension, for a bearing life L10h of 25,000 hours.

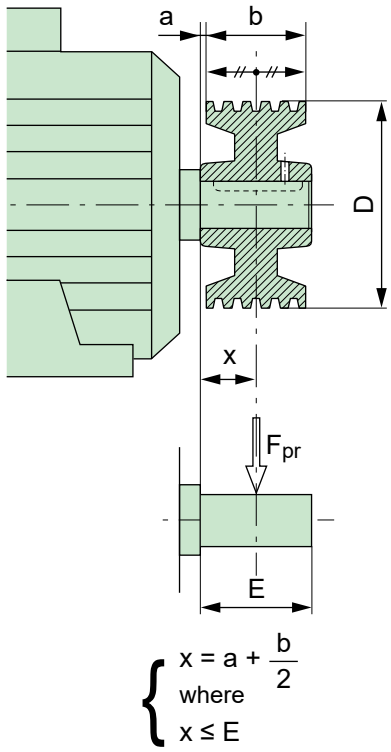
Note: For frame sizes ≥ 315 M, the selection charts are applicable for a motor installed with the shaft horizontal.

Change in bearing life depending on the radial load factor

For a radial load Fpr (Fpr ≠ FR), applied at distance X, the bearing life L10h changes, as a rough estimate, in the ratio kR (kR = Fpr/FR) as shown in the chart below, for standard fitting arrangements.
If the load factor kR is greater than 1.05, you should consult our technical department, stating mounting position and direction of force before opting for a special fitting arrangement.

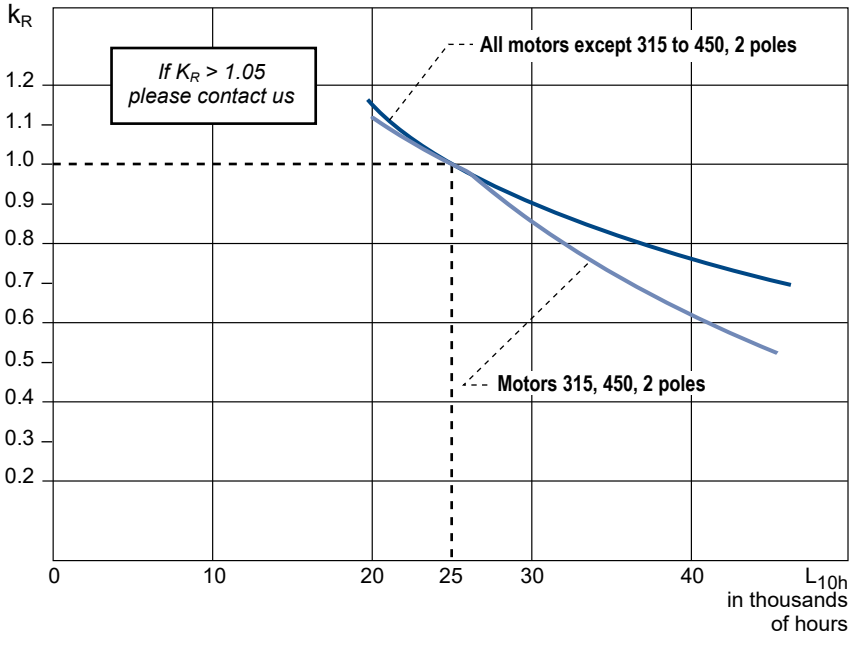


$$\begin{cases} x = a + \frac{b}{2} \\ \text{where} \\ x \le E \end{cases}$$



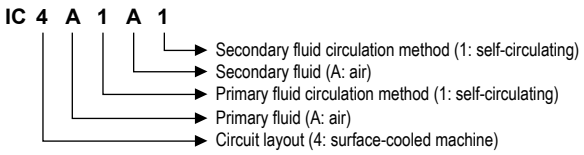
$$\begin{cases} x = a + \frac{b}{2} \\ \text{where} \\ x \le E \end{cases}$$

Change in bearing life L_{10h} depending on the radial load factor k_R for standard fitting arrangements.



ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
Construction
Cooling mode

Designation system for the IC (International Cooling) coded cooling method in the IEC 60034-6 standard.
The standard allows for two designations (general formula and simplified formula) as shown in the example opposite.



NB: The letter A may be omitted if this will not lead to confusion. This contracted formula becomes the simplified formula. Simplified formula: ***IC 411.***

Circuit layout

Characteristic number	Abbreviated designation	Description
0(1)	Free circulation	The coolant enters and leaves the machine freely. It is taken from and returned to the fluid round the machine.
1(1)	Machine with one intake pipe	The coolant is taken up elsewhere than from the fluid round the machine, brought into the machine through an intake pipe and emptied into the fluid round the machine.
2(1)	Machine with one outlet pipe	The coolant is taken up from the fluid round the machine, brought away from the machine by an outlet pipe and does not go back into the fluid round the machine.
3(1)	Machine with two pipes (intake and outlet)	The coolant is taken up elsewhere than from the fluid round the machine, brought to the machine through an intake pipe, then taken away from the machine through an outlet pipe and does not go back into the fluid round the machine.
4	Surface-cooled machine using the fluid around the machine	The primary coolant circulates in a closed circuit, transferring its heat to a secondary coolant (the one surrounding the machine) through the machine casing. The casing surface is either smooth or finned to improve heat transmission.
5(2)	Integrated heat exchanger (using the surrounding environment)	The primary coolant circulates in a closed circuit, transferring its heat to a secondary coolant (the one surrounding the machine) in an integral heat exchanger inside the machine.
6(2)	Machine-mounted heat exchanger (using the surrounding environment)	The primary coolant circulates in a closed circuit, transferring its heat to a secondary coolant (the one surrounding the machine) in a heat exchanger that forms an independent unit, mounted on the machine.
7(2)	Integrated heat exchanger (not using the surrounding environment)	The primary coolant circulates in a closed circuit, transferring its heat to a secondary coolant (which is not the one round the machine) in an integral heat exchanger inside the machine.
8(2)	Machine-mounted heat exchanger (not using the surrounding environment)	The primary coolant circulates in a closed circuit, transferring its heat to a secondary coolant (which is not the one round the machine) in a heat exchanger that forms an independent unit, mounted on the machine.
9(2)(3)	Separate heat exchanger (may or may not be using the surrounding environment)	The primary coolant circulates in a closed circuit, transferring its heat to the secondary fluid in a heat exchanger that forms an independent unit, away from the machine.

Coolant

Characteristic letter	Type of fluid
A	Air
F	Freon
H	Hydrogen
N	Nitrogen
C	Carbon dioxide
W	Water
U	Oil
S	Any other fluid (must be identified separately)
Y	The fluid has not yet been selected (used temporarily)

Mode of circulation

Characteristic number	Abbreviated designation	Description
0	Free circulation	The circulation of the coolant is due only to differences in temperature. Ventilation caused by the rotor is negligible.
1	Self-circulation	The circulation of the coolant depends on the rotational speed of the main machine, and is caused by the action of the rotor alone, or a device mounted directly on it.
2, 3, 4		Not yet defined.
5(4)	Built-in and independent device	The coolant is circulated by a built-in device which is powered independently of the rotational speed of the main machine.
6(4)	Independent device mounted on the machine	The coolant is circulated by a device mounted on the machine which is powered independently of the rotational speed of the main machine.
7(4)	Entirely separate and independent device or using the pressure of the coolant circulation system	The coolant is circulated by a separate electrical or mechanical device, independent of and not mounted on the machine, or by the pressure in the coolant circulation system.
8(4)	Relative displacement	The circulation of the coolant is produced by the relative movement between the machine and the coolant, either by displacement of the machine in relation to the coolant, or by the flow of the surrounding coolant.
9	All other devices	The coolant is circulated using a method other than those defined above: it must be described in full.

(1) Filters or labyrinth seals for dust removal or noise protection can be fitted inside the casing or in the ducting. The first characteristic numbers 0 to 3 also apply to machines in which the coolant is taken up at the outlet of a water-cooler designed to lower the temperature of the ambient air or recirculated through a water-cooler so as not to increase the ambient temperature.

(2) The nature of the heat exchanger elements is not specified (smooth or finned tubes, corrugated surfaces, etc).

(3) A separate heat exchanger can be installed near to or at a distance from the machine. A secondary gas coolant may or may not be the surrounding environment.

(4) Use of such a device does not exclude the ventilating action of the rotor or the existence of an additional fan mounted directly on the rotor.

MOTOR VENTILATION

In compliance with IEC 60034-6, the motors in this catalogue are cooled using method IC 411, i.e.: "surface-cooled machine using the ambient air circulating round the machine".

Cooling is achieved by a fan mounted at the non-drive end of the motor, inside a fan cover which acts as a safety guard (check according to IEC 600 34-5). The fan draws the air through the grille in the cover and blows it along the housing fins, giving an identical heat balance in either direction of rotation (except for LSES 2-pole motors of frame size 315 mm).

NB: Obstruction, even accidental, of the fan cover grille (grille clogged or placed against a wall) seriously impairs motor cooling.

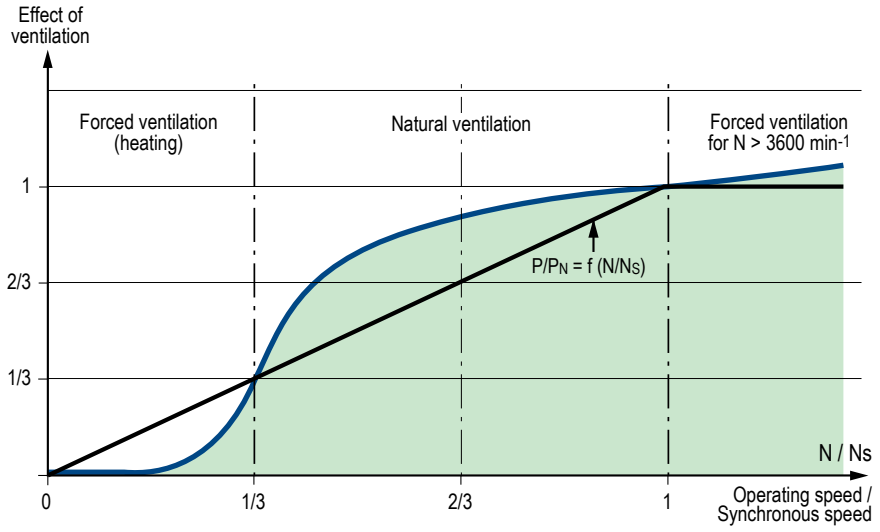
We recommend a minimum distance of 1/3 of the frame size between the end of the fan cover and any possible obstacle (wall, machine, etc).

Variable speed motor cooling (ventilation)

Special precautions need to be taken when standard induction motors are being used with variable speed, powered by an inverter or voltage controller.

During prolonged operation at low speed, cooling efficiency is greatly diminished. It is therefore advisable to install a forced ventilation unit that will produce a constant flow of air at any motor speed.

In prolonged operation at high speed, the fan may make excessive noise. It is again advisable to install a forced ventilation unit.



NON-VENTILATED APPLICATIONS IN CONTINUOUS DUTY

Motors can be supplied without fans. Dimensions will depend on the application.

These motors shall be subject to special qualification.

IC 418 COOLING

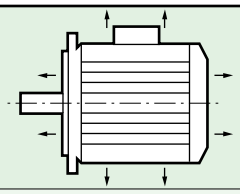
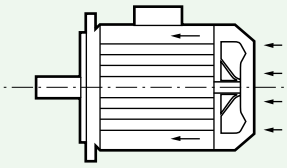
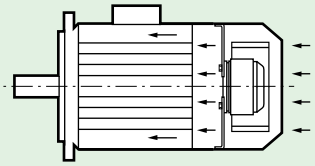
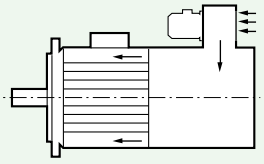
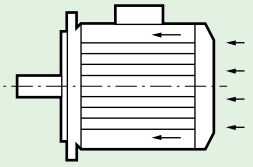
If they are placed in the air flow from a fan, these motors are capable of supplying their rated power if the speed of the air between the housing fins and the overall flow rate of the air between the fins comply with the data in the table opposite.

Type LSES/FLSES	2 poles		4 poles		6 poles	
	flow rate m^3/h	speed m/s	flow rate m^3/h	speed m/s	flow rate m^3/h	speed m/s
80	120		60	4	40	2.5
90	200	11.5	75	5.5	60	3.5
100	300	15	130	7.5	95	5
112	460	18	200	9	140	6
132	570	21	300	10.5	220	7
160	1000	21	600	12.5	420	9
180	1200	21	900	16	600	10
200	1800	23	1200	16	750	10
225	2000	24	1500	18	1700	13
250	3000	25	2600	20	1700	13
280	3000	25	2600	20	2000	15
315	5000	25	2600	20	2000	15
355	5200	25	2800	20	2200	15
400	5500	25	3000	20	2600	15
450	6000	25	3200	20	2600	15

These air flows are valid for normal operating conditions as described in the "Environmental limitations" section.

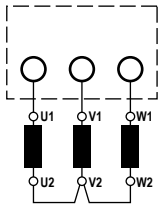
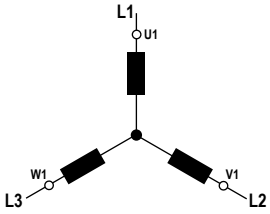
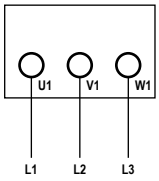
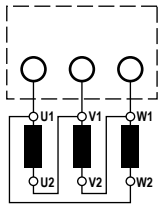
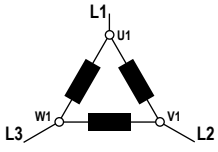
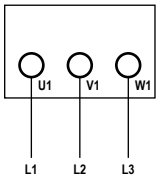
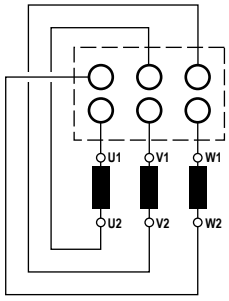
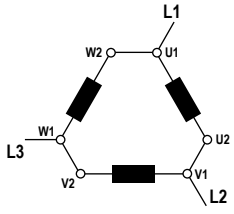
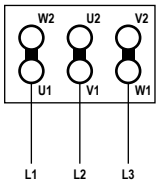
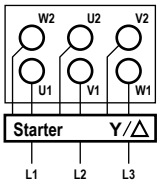
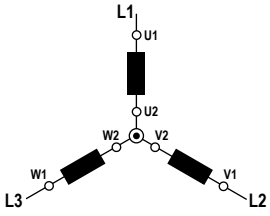
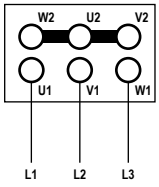
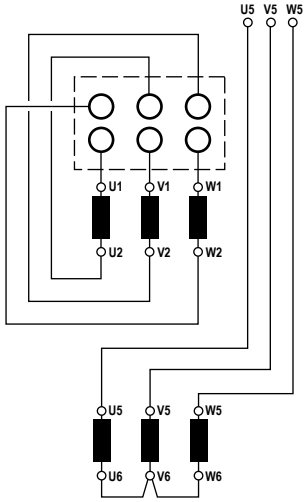
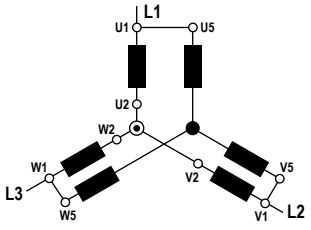
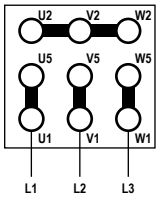
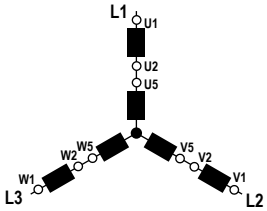
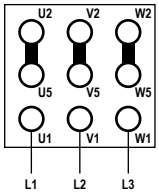
ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
Construction
Cooling mode

STANDARD CODES

IC 410	Enclosed machine, surface-cooled by natural convection and radiation. No external fan.	
IC 411	Enclosed machine. Smooth or finned ventilated casing. External shaft-mounted fan.	
IC 416 A*	Enclosed machine. Smooth or finned enclosed casing. External motorized axial (A) fan supplied with the machine.	
IC 416 R*	Enclosed machine. Smooth or finned enclosed casing. External motorized radial (R) fan supplied with the machine.	
IC 418	Enclosed machine. Smooth or finned casing. No external fan. Ventilation provided by air flow coming from the driven system.	

** Features not within manufacturer's standard range.*

SINGLE-SPEED MOTORS

Voltages and connection	Internal wiring diagrams	Winding outline diagrams	External connection diagrams	
			D.O.L. starting	Y / Δ starting
Single voltage type motors (3 TERMINALS)				
- Voltage: U - Connection: Y internal e.g. 400 V/Y				—
- Voltage: U - Connection: internal Δ e.g. 400 V / Δ				—
Dual-voltage motors with Y, Δ connections (6 TERMINALS)				
- Voltage: U - Connection: Δ (at the lower voltage) e.g. 230 V / Δ				
- Voltage: U √3 - Connection: Y (at the higher voltage) e.g. 400 V/Y				—
Dual-voltage motors with series-parallel connections (9 TERMINALS)				
- Voltage: U - Connection: Y Y (at the lower voltage) e.g. 230 V/ Y Y				—
- Voltage: 2 U - Connection: Y (series-star at the higher voltage) e.g. 460 V/Y				—

DEFINITIONS

LOAD RATINGS

Static load rating Co:
This is the load for which permanent deformation at point of contact between a bearing race and the ball (or roller) with the heaviest load reaches 0.01% of the diameter of the ball (or roller).

Dynamic load rating C:
This is the load (constant in intensity and direction) for which the nominal service life of the bearing will reach 1 million revolutions.
The static load rating C_o and dynamic load rating C are obtained for each bearing by following the method in ISO 281.

SERVICE LIFE

The service life of a bearing is the number of revolutions (or number of operating hours at a constant speed) that the bearing can accomplish before the first signs of fatigue (spalling) begin to appear on a ring, ball or roller.

Nominal service life L10h
According to the ISO recommendations, the nominal service life is the length of time achieved or exceeded by 90% of apparently identical bearings operating under the conditions specified by the manufacturer.

Note: The majority of bearings last much longer than the nominal service life; the average service life achieved or exceeded by 50% of bearings is around 5 times longer than the nominal service life.

DETERMINATION OF NOMINAL SERVICE LIFE

Constant load and speed of rotation
The nominal service life of a bearing expressed in operating hours L_{10h}, the dynamic load rating C expressed in daN and the applied loads (radial load F_r and axial load F_a) are related by the following equation:

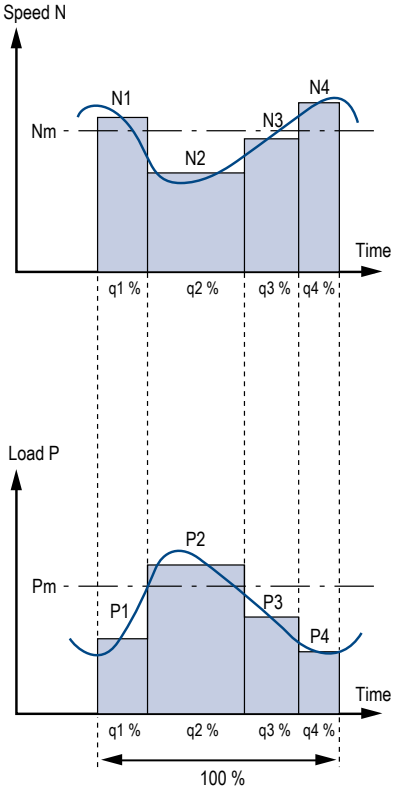
$$L_{10h} = \frac{1000000}{60 \cdot N} \cdot \left(\frac{C}{P}\right)^p$$

where N = speed of rotation (min^{-1})
P ($P = X F_r + Y F_a$): equivalent dynamic load (F_r, F_a, P in daN)
p: exponent which is a function of the contact between the races and balls (or rollers)
p = 3 for ball bearings
p = 10/3 for roller bearings

The formulae that give Equivalent Dynamic Load (values of factors X and Y) for different types of bearing may be obtained from the various manufacturers.

Variable load and speed of rotation
For bearings with periodically variable load and speed, the nominal service life is established using the equation:

$$L_{10h} = \frac{1000000}{60 \cdot N_m} \cdot \left(\frac{C}{P_m}\right)^p$$



N_m: average speed of rotation

$$N_m = N_1 \cdot \frac{q_1}{100} + N_2 \cdot \frac{q_2}{100} + \ldots (min^{-1})$$

P_m: average equivalent dynamic load

$$P_m = \sqrt[p]{P_1^p \cdot \left(\frac{N_1}{N_m}\right) \cdot \frac{q_1}{100} + P_2^p \cdot \left(\frac{N_2}{N_m}\right) \cdot \frac{q_2}{100} + \ldots (daN)}$$

with q_1, q_2,... as %

Nominal service life L_{10h} is applicable to bearings made of bearing steel and normal operating conditions (lubricant film present, no contamination, correctly fitted, etc.).
Situations and data differing from these conditions will lead to either a reduction or an increase in service life compared to the nominal service life.

Corrected nominal service life
If the ISO recommendations (DIN ISO 281) are used, improvements to bearing steel, manufacturing processes and the effects of operating conditions may be integrated in the nominal service life calculation.
The theoretical pre-fatigue service life L_{nah} is thus calculated using the formula:
$L_{nah} = a_1 a_2 a_3 L_{10h}$
where:
a_1: failure probability factor.
a_2: factor for the characteristics and tempering of the steel.
a_3: factor for the operating conditions (lubricant quality, temperature, speed of rotation, etc).

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 straight forward 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.

LUBRICATION WITH GREASE

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 PROVIDES THE LUBRICATION

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 oil types used in the composition of 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 sinks 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 GREASE PROPERTIES

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 occurs.

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.

DUTY CYCLES

(as per IEC 60034-1)

The typical duty cycles are described below:

1 - Continuous duty - Type S1
Operation at constant load of sufficient duration for thermal equilibrium to be reached (see figure 1).

2 - Short-time duty - Type S2
Operation at constant load during a given time, less than that required for thermal equilibrium to be reached, followed by a rest and de-energized period of sufficient duration to re-establish machine temperatures within 2 K of the coolant (see figure 2).

3 - Intermittent periodic duty - Type S3
A sequence of identical duty cycles, each consisting of a period of operation at constant load and a rest and de-energized period (see figure 3). Here, the cycle is such that the starting current does not significantly affect the temperature rise.

4 - Intermittent periodic duty with starting - Type S4
A sequence of identical duty cycles, each consisting of a significant starting period, a period of operation at constant load and a rest and de-energized period (see figure 4).

5 - Intermittent periodic duty with electrical braking - Type S5
A sequence of periodic duty cycles, each consisting of a starting period, a period of operation at constant load, a period of rapid electrical braking and a rest and de-energized period (see figure 5).

6 - Periodic continuous duty with intermittent load - Type S6
A sequence of identical duty cycles, each consisting of a period of operation at constant load and a period of operation at no load. There is no rest and de-energized period (see figure 6).

7 - Periodic continuous duty with electrical braking - Type S7
A sequence of identical duty cycles, each consisting of a starting period, a period of operation at constant load and a period of electrical braking. There is no rest and de-energized period (see figure 7).

8 - Periodic continuous duty with related changes of load and speed - Type S8
A sequence of identical duty cycles, each consisting of a period of operation at constant load corresponding to a predetermined rotation speed, followed by one or more periods of operation at other constant loads corresponding to different rotation speeds (in induction motors, this can be done by changing the number of poles). There is no rest and de-energized period (see figure 8).

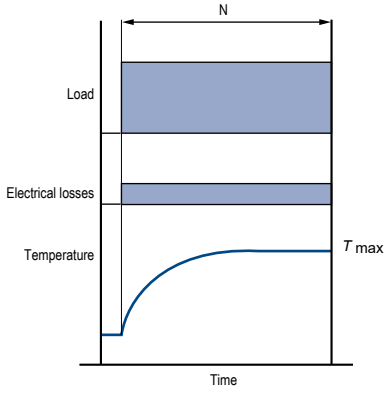
9 - Duty with non-periodic variations in load and speed - Type S9
This is a duty in which the load and speed generally vary non-periodically within the permissible operating range. This duty frequently includes applied overloads which may be much higher than the full load or loads (see figure 9).

Note: For this type of duty, the appropriate full load values must be used as the basis for calculating overload.

10 - Operation at discrete constant loads - Type S10
This duty consists of a maximum of 4 discrete load values (or equivalent loads), each value being applied for sufficient time for the machine to reach thermal equilibrium. The minimum load during a load cycle may be zero (no-load operation or rest and de-energized period) (see figure 10).

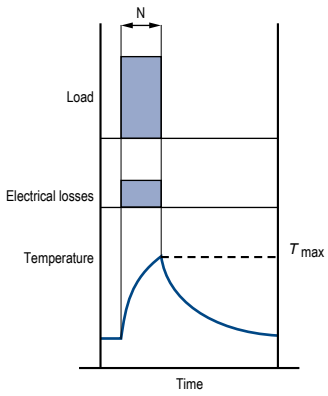
NB: only S1 duty type is affected by IEC 60034-30-1

Fig. 1. - Continuous duty. Type S1.



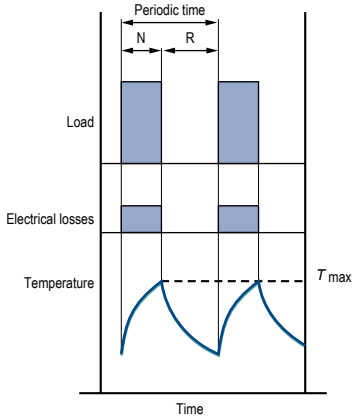
N = operation at constant load
T_{max} = maximum temperature attained

Fig. 2. - Short-time duty. Type S2.



N = operation at constant load
T_{max} = maximum temperature attained

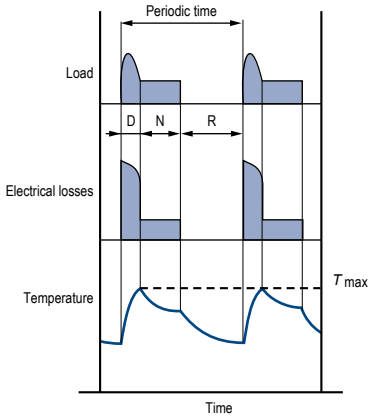
Fig. 3. - Intermittent periodic duty. Type S3.



N = operation at constant load
R = rest
T_{max} = maximum temperature attained
Running factor (%) = $\frac{N}{N+R} \cdot 100$

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
Operation
Duty cycle - Definitions

Fig. 4. - Intermittent periodic duty with starting. Type S4.



D = starting

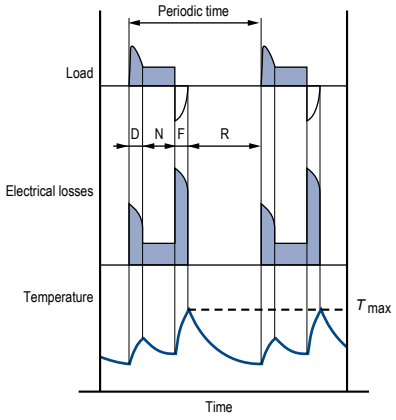
N = operation at constant load

R = rest

T_{max} = maximum temperature attained during cycle

$$\text{Operating factor (\%)} = \frac{D + N}{N + R + D} \cdot 100$$

Fig. 5. - Intermittent periodic duty with electrical braking. Type S5.



D = starting

N = operation at constant load

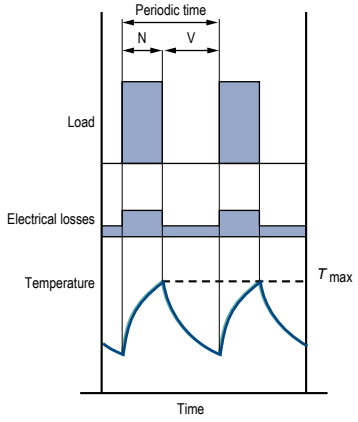
F = electrical braking

R = rest

T_{max} = maximum temperature attained during cycle

$$\text{Operating factor (\%)} = \frac{D + N + F}{D + N + F + R} \cdot 100$$

Fig. 6. - Periodic continuous duty with intermittent load. Type S6.



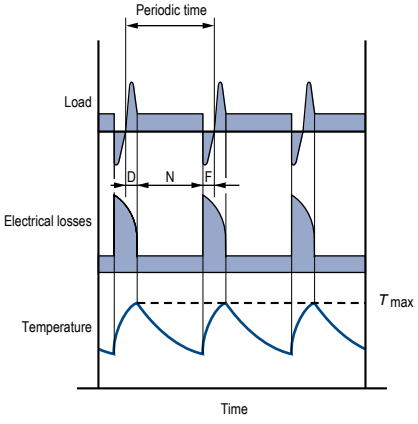
N = operation at constant load

V = no-load operation

T_{max} = maximum temperature attained during cycle

$$\text{Operating factor (\%)} = \frac{N}{N + V} \cdot 100$$

Fig. 7. - Periodic continuous duty with electrical braking. Type S7.



D = starting

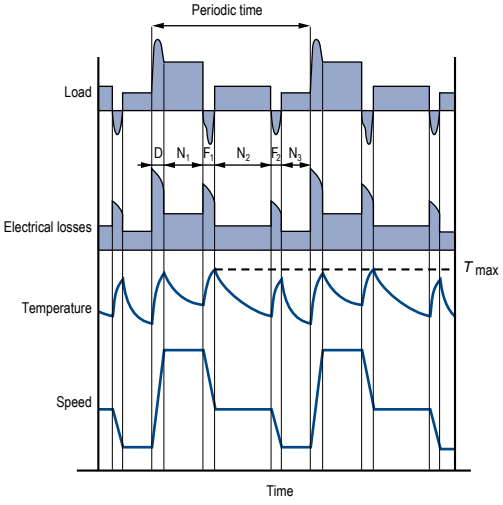
N = operation at constant load

F = electrical braking

T_{max} = maximum temperature attained during cycle

Operating factor = 1

Fig. 8. 8 - Periodic continuous duty with related changes of load and speed. Type S8.



F_1F_2 = electric braking

D = starting

$N_1N_2N_3$ = operation at constant loads

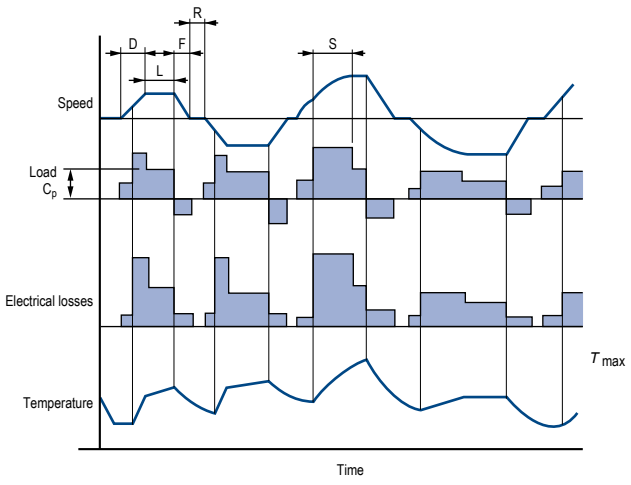
T_{max} = maximum temperature attained during cycle

$$\textbf{Operating factor} = \frac{D + N_1}{D + N_1 + F_1 + N_2 + F_2 + N_3}\ 100\ \%$$

$$\frac{F_1 + N_2}{D + N_1 + F_1 + N_2 + F_2 + N_3}\ 100\ \%$$

$$\frac{F_2 + N_3}{D + N_1 + F_1 + N_2 + F_2 + N_3}\ 100\ \%$$

Fig. 9. - Duty with non-periodic variations in load and speed. Type S9.



D = starting

L = operation at variable loads

F = electrical braking

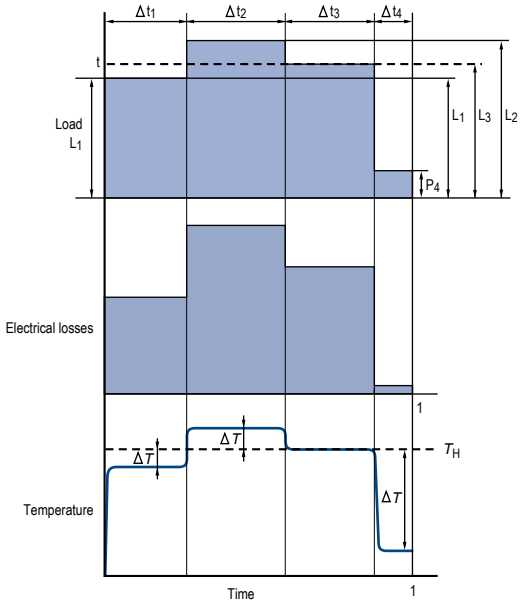
R = rest

S = operation at overload

C_p = full load

T_{max} = maximum temperature attained

Fig. 10 - Duty at discrete constant loads. Type S10.



L = load

N = rated power for type S1 duty

p = $p / \frac{L}{N}$ = reduced load

t = time

T_p = total cycle time

t_i = discrete period within a cycle

Δt_i = t_i / T_p = relative duration of period within a cycle

Pu = electrical losses

H_N = temperature at rated power for type S1 duty

ΔH_i = increase or decrease in temperature rise during the i'th period of the cycle

Power is determined according to duty cycle. See "Operation" section, § “Power - Torque - Efficiency - Power Factor (Cos φ)”.

For duty ratings between S3 and S8 inclusive, the default cycle is 10 minutes unless otherwise indicated.

REGULATIONS AND STANDARDS

The IEC 60038 standard gives the European reference voltage as 230/400V three-phase and 230 V single-phase, with a tolerance of ±10%.
The IEC 60034-1 standard states ±2% tolerance for the frequency.

All other voltages and frequencies are available on request.

- For motors of frame size ≤ 160 mm, maximum operating voltage: 700V
- For motors of frame size ≥ 180 mm, maximum operating voltage: 1000 V

EFFECTS ON MOTOR PERFORMANCE

VOLTAGE RANGE

The characteristics of motors will of course vary with a corresponding variation in voltage of ±10% around the rated value.

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

	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

* According to standard IEC 60034-1, the additional temperature rise must not exceed 10 K within ±5% of U_N.

SIMULTANEOUS VARIATION OF VOLTAGE AND FREQUENCY

Within the tolerances defined in guide 106 of the IEC (see § D2.1), machine input and performance are unaffected if the variations are of the same polarity and the voltage/frequency ratio U/f remains constant.

If this is not the case, variations in performance are significant and require the machine specification to be changed.

Variation in main motor parameters (approx.) within the limits defined in IEC Guide 106.

$U_{/f}$	Pu	M	N	Cos φ	Efficiency
Constant	$Pu\ \frac{f'}{f}$	M	$N\ \frac{f'}{f}$	cos φ unchanged	Efficiency unchanged
Variable	$Pu\left(\frac{u'/u}{f/f'}\right)^2$	$M\left(\frac{u'/u}{f/f'}\right)^2$	$N\ \frac{f'}{f}$	Dependent on the machine saturation status	

M = minimum and maximum values of starting torque.

USE OF 400 V - 50 HZ MOTORS ON 460 V - 60 HZ SUPPLIES

For a rated power at 60 Hz equal to the rated power at 50 Hz, the main characteristics are modified according to the following variations:

- Efficiency increases by 0.5 - 1.5%
- Power factor decreases by 0.5 to 1.5%
- Rated current decreases by 0 to 5%
- IS/IN increases by around 10%
- Slip and rated torque MN, MD / MN, MM / MN remain more or less constant.

USE ON SUPPLIES WITH U' VOLTAGES DIFFERENT FROM THE VOLTAGES IN THE CHARACTERISTICS TABLES

In this case, the machine windings should be adjusted.
As a result, only the current values will be changed and become:

$$I' = I_{400V} \times \frac{400}{U'}$$

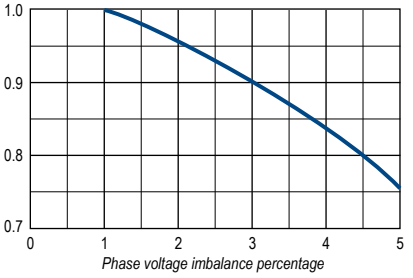
PHASE VOLTAGE IMBALANCE

The phase imbalance for voltage is calculated as follows:

$$\text{Phase voltage imbalance as a \%} = 100 \times \frac{\text{maximum difference in voltage compared to the average voltage value}}{\text{average voltage value}}$$

The effect on motor performance is summarized in the table opposite.
When this imbalance is known before the motor is purchased it is advisable, in order to establish the type of motor required, to apply the derating specified in standard IEC 60892, illustrated on the graph opposite.

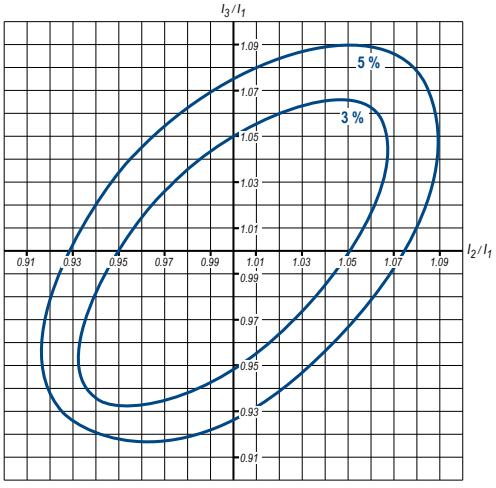
Percentage imbalance	0	2	3.5	5
Stator current	100	101	104	107.5
Increase in losses as a %	0	4	12.5	25
Temperature rise	1	1.05	1.14	1.28



PHASE CURRENT IMBALANCE

Voltage imbalances induce current imbalances. Natural lack of symmetry due to manufacture also induces current imbalances.

The chart opposite shows the ratios in which the negative phase component is equal to 5% (and 3%) of the positive phase components in three-phase current supplies without zero components (neutral absent or not connected).
Inside the curve, the negative phase component is lower than 5% (and 3%).



INSULATION CLASS

The machines in this catalogue have been designed with a class F insulation system for the windings.
Class F allows for temperature rises of 105 K (measured by the resistance variation method) and maximum temperatures at the hot spots in the machine of 155°C (Ref. IEC 60085 and IEC 60034-1).
Complete impregnation with tropicalized varnish of thermal class 180°C gives protection against attacks from the environment, such as: 90% relative humidity, interference, etc.
For special constructions, the winding is class H and impregnated with special varnishes which enable it to operate in conditions of high temperatures with relative air humidity of up to 100%.

The insulation of the windings is monitored in two ways:
a - Dielectric inspection which involves checking the leakage current, at an applied voltage of (2U + 1000) V, in conditions complying with standard IEC 60034-1 (systematic test).
b - Monitoring the insulation resistance between the windings and between the windings and the earth (sampling test) at a DC voltage of 500 V or 1000 V.

TEMPERATURE RISE AND THERMAL RESERVE

Nidec Leroy-Somer motors are built to have a maximum winding temperature rise of 80 K under normal operating conditions (ambient temperature 40°C, altitude below 1000 m, rated voltage and frequency, rated load).

The result is a thermal reserve linked to the following factors:
- a difference of 25 K between the nominal temperature rise (U_n, F_n, P_n) and the permissible temperature rise (105 K) for class F insulation;
- a difference of 10°C minimum at the voltage limits.

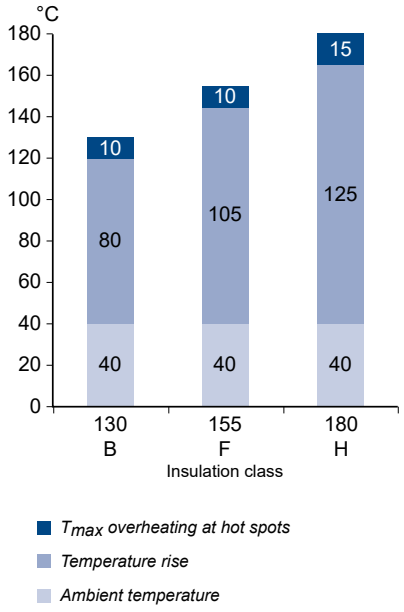
In IEC 60034-1 and 60034-2, temperature rise (Δθ), is calculated using the winding resistance variation method, with the formula:

$$\Delta T = \frac{R_2 - R_1}{R_1} (235 + T_1) + (T_1 - T_2)$$

R_1: cold resistance measured at ambient temperature T_1

R_2: stabilized hot resistance measured at ambient temperature T_2
235: coefficient for a copper winding (for an aluminium winding, the coefficient is 225)

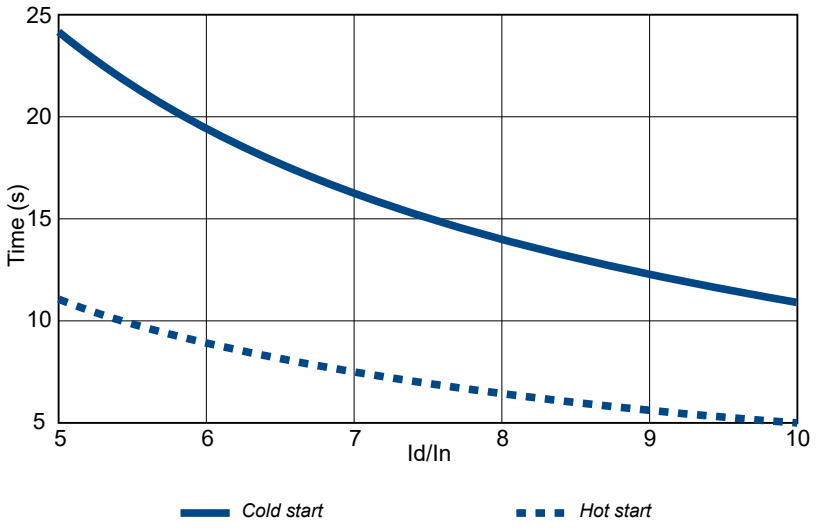
Temperature rise (ΔT) and maximum temperatures at hot spots (Tmax) for insulation classes (IEC 60034-1).*



ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
Operation
Starting times and starting current

PERMISSIBLE STARTING TIMES AND LOCKED ROTOR TIMES

The calculated starting times must remain within the limits of the graph opposite which defines maximum starting times in relation to the current surge.
Three successive cold starts and two consecutive hot starts are allowed with return to stop between each start.
Permissible motor starting time as a function of the ratio I_D/I_N.



Note: For IP55 motors with frame size ≥ 355 LD, 2 successive cold starts and 1 hot start are allowed (after thermal stabilisation at rated power). A stop of at least 15 minutes must be observed between each successive start.

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
Operation
Power - Torque - Cos φ

DEFINITIONS

The useful power (Pu) at the motor shaft is linked to the torque (M) by the equation:

$$Pu = M.\omega$$

where Pu in W, M in N.m, ω in rad/s and where ω is expressed as a function of the speed of rotation in min^{-1} by the equation:

$$\omega = 2\pi.N/60$$

The active power (P) drawn from the mains is expressed as a function of the apparent power (S) and the reactive power (Q) by the equation:

$$S = \sqrt{P^2 + Q^2}$$

(S in VA, P in W and Q in VAR)

The power P is linked to the output power Pu by the equation:

$$P = \frac{Pu}{\eta}$$

where η is the efficiency of the machine.

The output power Pu at the motor shaft is expressed as a function of the phase-to-phase mains voltage (U in Volts), of the absorbed line current (I in Amps) by the equation:

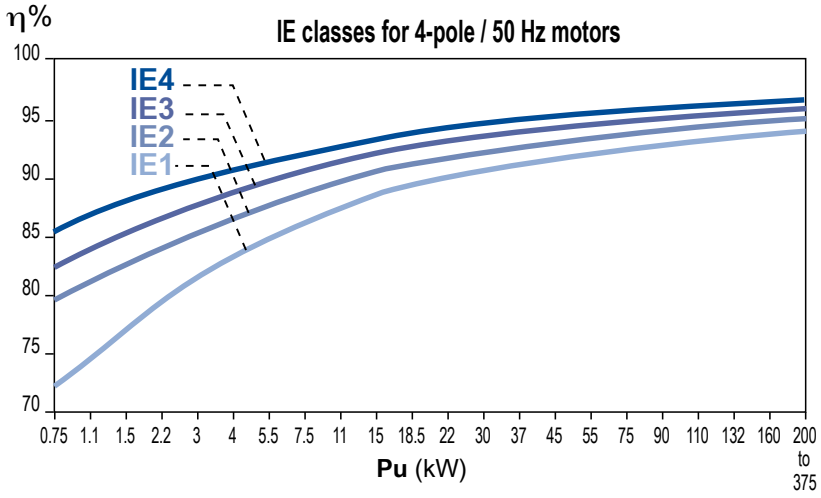
$$Pu = U.I.\ \sqrt{3}\ .\ \cos\varphi\ .\ \eta$$

where cos φ is the power factor found from the ratio:

$$\cos\varphi = \frac{P}{S}$$

EFFICIENCY

In accordance with the agreements signed at the Rio and Buenos Aires international conferences, **the new generation of motors with aluminium or cast iron casing** has been designed to improve efficiency in order to reduce atmospheric pollution (carbon dioxide).
The improved efficiency of low voltage industrial motors (representing around 50% of installed power in industry) has had a large impact on energy consumption.



Advantages of improvement in efficiency

Motor characteristics	Effects on the motor	Customer benefits
Increase in efficiency and in power factor	-	Lower operating costs Longer service life (x2 or 3) Better return on investment
Noise reduction	-	Improved working conditions
Vibration reduction	-	Quiet operation and longer service life of equipment being driven
Temperature reduction	Longer service life of fragile components (insulation system components, greased bearings)	Reduced number of operating incidents and reduced maintenance costs
	Increased capability of instantaneous or extended overloads	Wider field of applications (voltages, altitude, ambient temperature, etc.)

INFLUENCE OF LOAD ON EFFICIENCY AND COS φ

See the selection data.

Overrating motors in a number of applications causes them to operate at about 3/4 load, resulting in optimum motor efficiency.

RATED POWER P_N IN RELATION TO DUTY CYCLE

GENERAL RULES FOR STANDARD MOTORS

$$P_n = \sqrt{\frac{n \times t_d \times [I_D/I_n \times P]^2 + (3600 - n \times t_d)P^2u \times fdm}{3600}}$$

Iterative calculation where:

$t_{d(s)}$	starting time achieved with motor rated $P_{(w)}$
n	number of (equivalent) starts per hour
fdm	(OF) operating factor (decimal)
I_D/I_n	current demand for motor rated P
$P_{u\ (w)}$	motor output power during the duty cycle using OF (in decimal), operating factor
$P_{(w)}$	motor rated power selected for the calculation

Note: n and OF are defined in section D4.6.2.
Sp = specification

S1	OF = 1; n ≤ 6
S2	n = 1 operating life determined by specification (Sp)
S3	OF according to Sp; n ~ 0 (no effect of starting on temperature rise)
S4	OF according to Sp; n according to Sp; t_d, P_u, P according to Sp (replace n with 4n in the above formula)
S5	OF according to Sp; n = n starts + 3 n brakings = 4 n; t_d, P_u, P as per Sp (replace n with 4n in the above formula)
S6	$P = \sqrt{\frac{\Sigma^n{}_1(P^2{}_i \cdot t_i)}{\Sigma^n{}_1 t_i}}$
S7	same formula as S5 but OF = 1
S8	at high speed, same formula as in S1 at low speed, same formula as in S5
S9	S8 duty formula after complete description of cycle with OF on each speed
S10	same formula as S6

In addition, see the warning regarding precautions to be taken. Variations in voltage and/or frequency greater than standard should also be taken into account. The application should also be taken into account (general at constant torque, centrifugal at quadratic torque, etc.).

DETERMINATION OF THE POWER IN INTERMITTENT DUTY CYCLES FOR ADAPTED MOTORS

RMS POWER IN INTERMITTENT DUTY

This is the rated power absorbed by the driven machine, usually defined by the manufacturer.
If the power absorbed by the machine varies during a cycle, the rms power P is calculated using the equation:

$$P = \sqrt{\frac{\Sigma^n{}_1(P^2{}_i \cdot t_i)}{\Sigma^n{}_1 t_i}} = \sqrt{\frac{P^2{}_1 \cdot t_1 + P^2{}_2 \cdot t_2 \cdots + P^2{}_n \cdot t_n}{t_1 + t_2 + \cdots t_n}}$$

if, during the working time the absorbed power is:

P1 for period t1
P2 for period t2

Pn for period tn

Power values lower than 0.5 PN are replaced by 0.5 PN in the calculation of rms power P (no-load operation is a special case).

Additionally, it is also necessary to check that for a particular motor of power PN:

- the actual starting time is at most equal to 5 seconds,
- the maximum output of the cycle does not exceed twice the rated output power P,
- there is still sufficient accelerating torque during the starting period.

Load factor (FC)
Expressed as a percentage, this is the ratio of the period of operating time with a load during the cycle to the total powered-up time during the cycle.

Operating factor (fdm / OF)
Expressed as a percentage, this is the ratio of the motor powered-up time during the cycle to the total cycle time, provided that the total cycle time is less than 10 minutes.

Starting class
Class: n = nD + k.nF + k'.ni
nD: number of complete starts per hour;
nF: number of electrical braking operations per hour.

"Electrical braking" means any braking directly involving the stator winding or the rotor winding:

- Regenerative braking (with frequency drive, multipole motor, etc).
- Reverse-current braking (the most commonly used).
- DC injection braking.

ni: number of pulses (incomplete starts up to a third of maximum speed) per hour.

k and k' are constants determined as follows:

	k	k'
Cage induction motors	3	0.5

- Reversing the direction of rotation involves braking (usually electrical) and starting.
- Braking with Nidec Leroy-Somer electro-mechanical brakes, as with any other brakes that are independent of the motor, does not constitute electrical braking in the sense described above.

CALCULATING DERATING

• Input criteria (load)
- RMS power during the cycle = P
- Moment of inertia related to the speed of the motor: $J_{c/m}$
- Operating factor = OF (fdm)
- Class of starts per hour = n
- Resistive torque during starting = M_r
- Engine speed = N

• Selection in catalogue
- Motor rated power = P_n
- Starting current Id, cosφ
- Moment of rotor inertia J_m
- Average starting torque M_{mot}
- Efficiency at P_n (ηP_n) and at P(ηP)

Calculations
- Starting time:

$$t_d = \frac{\pi}{30} \cdot N \cdot \frac{(J_e + J_r)}{M_{mot} - M_r}$$

- Cumulative starting time per hour:

$$n \times t_d$$

- Energy to be dissipated per hour during starts = sum of the energy dissipated in the rotor (= inertia acceleration energy) and the energy dissipated in the stator during the cumulative starting time per hour:

$$E_d = \frac{1}{2}(J_e + J_r)\left(\frac{\pi \cdot N}{30}\right)^2 \times n + n \times t_d \sqrt{3} U I_d \cos\varphi_d$$

- Energy to be dissipated during operation

$$E_f = P.\ (1 - \eta P)\ .\ [(OF) \times 3600 - n \times t_d]$$

- Energy that the motor can dissipate at rated power with the Operating Factor for Intermittent Duty.

$$E_m = (OF)\ 3600.\ P_n.(1 - \eta P_n)$$

(The heat dissipated when the motor is at rest can be ignored).

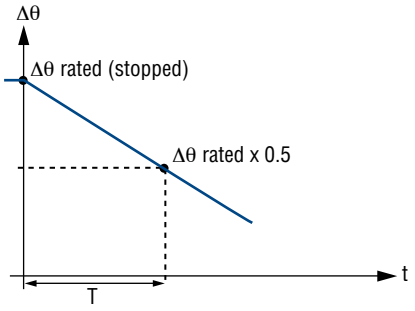
Dimensioning is correct if the following relationship is verified =

$$\boxed{E_m \geq E_d + E_f}$$

If the sum of $E_d + E_f$ is lower than 0.75 E_m, check whether a motor with the next lowest power rating would be more suitable.

EQUIVALENT THERMAL CONSTANT

The equivalent thermal constant enables the machine cooling time to be predetermined.



Thermal constant = $\frac{T}{\ln 2}$ = 1.44 T

Cooling curve $\Delta\theta = f(t)$
where:

$\Delta\theta$ = temperature rise in S1 duty

T = time taken to go from the nominal temperature rise to half its value

t = time

ln = natural logarithm

TRANSIENT OVERLOAD AFTER OPERATING IN TYPE S1 DUTY CYCLE

At rated voltage and frequency, the motors can withstand an overload of:
1.20 for an OF = 50 %
1.40 for an OF = 10 %

However, it is necessary to ensure that the maximum torque is much greater than 1.5 times the rated torque corresponding to the overload.

NOISE EMITTED BY ROTATING MACHINES

In a compressible medium, the mechanical vibrations of an elastic body create pressure waves which are characterized by their amplitude and frequency. The pressure waves constitute an audible noise if they have a frequency of between 16 Hz and 16000 Hz.

Noise is measured by a microphone linked to a frequency analyser. Measurements are taken in an anechoic chamber on machines at no-load, and a sound pressure level Lp or a sound power level Lw can then be established. Measurement can also be carried out in situ on machines which may be on-load, using an acoustic intensity meter which can differentiate between sound sources and identify the sound emissions from the machine.

The concept of noise is linked to hearing. The auditory sensation is determined by integrating weighted frequency components with isosonic curves (giving a sensation of constant sound level) according to their intensity.

The weighting is carried out on sound meters using filters whose bandwidth takes into account, to a certain extent, the physiology of the human ear:
Filter A: used for low and medium noise levels. High attenuation, narrow bandwidth.
Filter B: used for very high noise levels. Wide bandwidth.
Filter C: very low attenuation over the whole of the audible frequency range.
Filter A is used most frequently for sound levels emitted by rotating machinery. It is this filter which has been used to establish the standardized characteristics.

A few basic definitions:
The unit of reference is the bel, and the sub-multiple decibel dB is used here.

Sound pressure level in dB

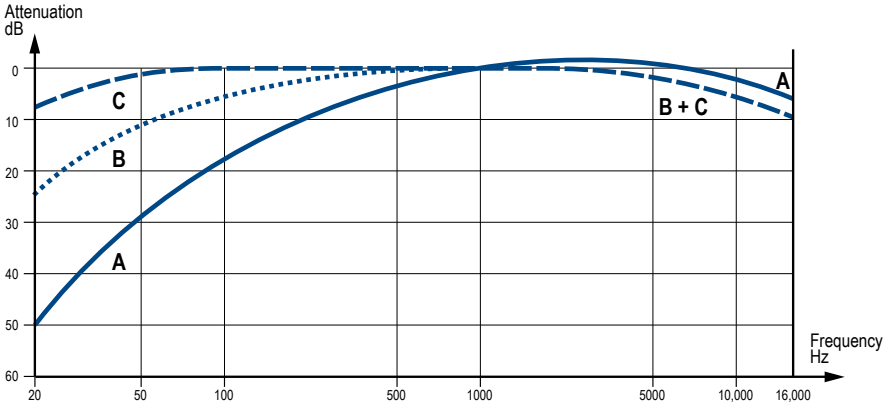
$L_p = 20\log_{10}\left(\frac{P}{P_0}\right)$ $p_0 = 2.10^{-5}$ Pa

Sound power level in dB

$L_W = 10\log_{10}\left(\frac{P}{P_0}\right)$ $p_0 = 10^{-12}$ W

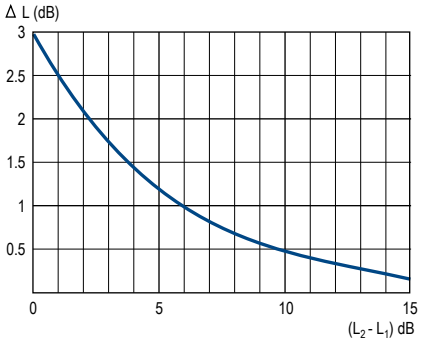
Sound intensity level in dB

$L_W = 10\log_{10}\left(\frac{I}{I_0}\right)$ $I_0 = 10^{-12}$ W/m²



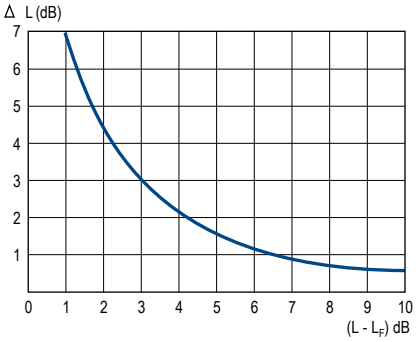
CORRECTION OF MEASUREMENTS

For differences of less than 10 dB between 2 sound sources or where there is background noise, corrections can be made by addition or subtraction using the rules below.



Addition of levels

If L1 and L2 are the separately measured levels (L2 ≥ L1), the resulting sound level LR will be obtained by the formula:
LR = L2 + ΔL
ΔL is found by using the curve above.



Subtraction of levels*

This is most commonly used to eliminate background noise from measurements taken in a "noisy" environment.
If L is the measured level and LF the background noise level, the actual sound level LR will be obtained by the calculation:
LR = L - ΔL
ΔL is found by using the curve above.

**This method is the one normally used for measuring sound power and pressure levels. It is also an integral part of sound intensity measurement.*

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
Operation
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).

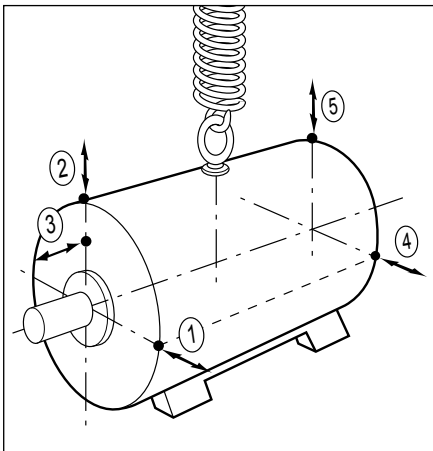
For VIK version motors, this +3dB(A) tolerance is not accepted.

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

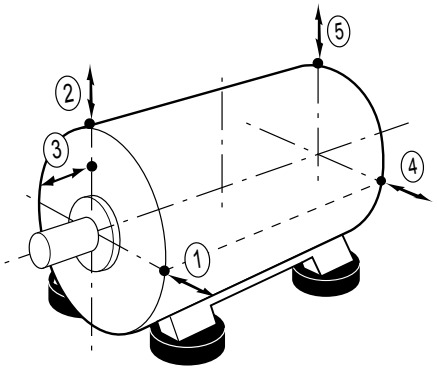
VIBRATION LEVELS - BALANCING

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 vibrations disturb operation: bad fastening of the frame, incorrect coupling, bushing 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
- 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

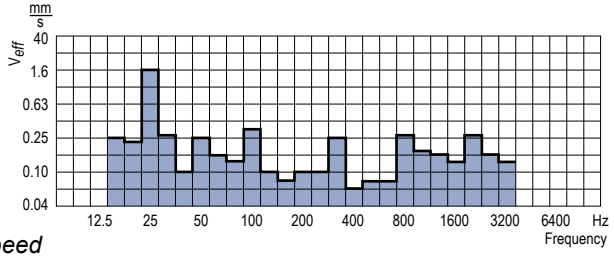


Measuring system for machines on flexible mountings

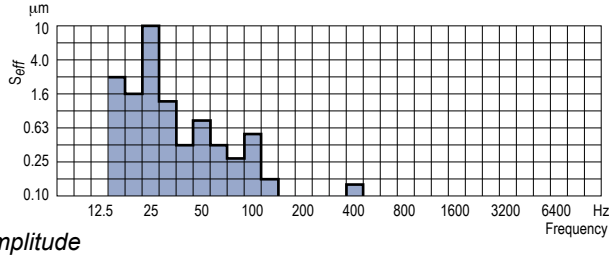
The measurement points quoted in the standards are indicated in the drawings above.
At each point, the results should be lower than those given in the tables below for each balancing class and only the highest value is to be taken as the "vibration level".

MEASURED MAGNITUDE

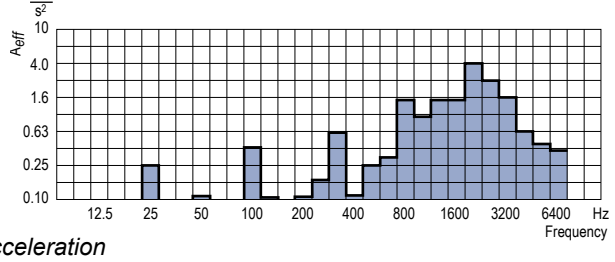
The vibration speed can be chosen as the variable to be measured. This is the speed at which the machine moves either side of its static position. It is measured in mm/s.
As the vibratory movements are complex and non-harmonic, it is the root mean square (rms) value of the speed of vibration which is used to express the vibration level.
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.
The rms speed of vibration is the variable chosen by the standards.
However, if preferred, the table of vibration amplitudes may still be used (for measuring sinusoidal and similar vibrations).



Vibration speed



Vibration amplitude



Vibration acceleration

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/s^2	Displacement µm	Speed mm/s	Acceleration m/s^2	Displacement µm	Speed mm/s	Acceleration m/s^2
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

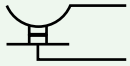
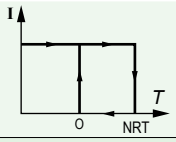
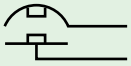
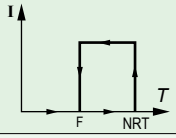
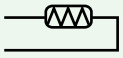
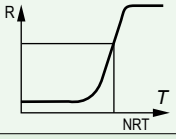
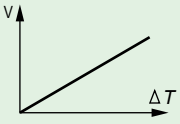
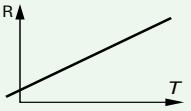
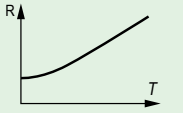
For large machines and special requirements with regard to vibration, balancing can be carried out *in situ* (finished assembly). Prior consultation is essential, as the machine dimensions may be modified by the necessary addition of balancing disks mounted on the shaft extensions.

THERMAL PROTECTION

Motors are protected by a manual or automatic overcurrent relay, placed between the isolating switch and the motor. This relay can 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	Breaker rating (A)	Protection provided	Mounting Number of devices*
Normally open thermal protection **PTO**	Bimetallic strip, indirectly heated, with normally open (NO) contact 		2.5 A at 250 V with cos j 0.4	general surveillance for non-transient overloads	Mounted in control circuit 2 in series
Normally closed thermal protection **PTF**	Bimetallic strip, indirectly heated, with normally closed (Nc) contact 		2.5 A at 250 V with cos j 0.4	general surveillance for non-transient overloads	Mounted in control circuit 2 in parallel
Positive temperature coefficient thermistor **PTC**	Non-linear variable resistor, indirectly heated 		0	general surveillance for transient overloads	Mounted with associated relay in control circuit 3 in series
Thermocouples ***T*** (*T* < 150°C) Constantan Copper ***K*** (*T* < 1000°C) Copper-nickel	Peltier effect		0	continuous surveillance of hot spots at regular intervals	Mounted in control panels with associated reading equipment (or recorder) 1 per hot spot
Platinum temperature sensor **PT 100**	Non-linear variable resistor, indirectly heated		0	continuous high-precision surveillance of key hot spots	Mounted in control panels with associated reading equipment (or recorder) 1 per hot spot
Temperature sensor **PT 1000**	Resistance depending on the winding temperature		0	continuous high-precision surveillance of key hot spots	Mounted in control panels 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.

** The number of devices relates to the winding protection.*

FITTING THE VARIOUS THERMAL PROTECTIONS

- PTO or PTF, in the control circuits.
- PTC, with relay, in the control circuits.
- PT 100 or thermocouples, with associated reading equipment or recorder, in the installation control panel 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).

BUILT-IN DIRECT THERMAL PROTECTIONS

For low rated currents, bimetallic strip-type protection can be used. The line current passes through the strip, which shuts down or restores the supply circuit as necessary. The design of this type of protection allows for manual or automatic reset.

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
Operation
Starting methods for induction motors

The two essential parameters for starting squirrel cage synchronous motors are:
- starting torque,
- starting current.

These two parameters and the resistive torque determine the starting time.
These three 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 supply, 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 RTU, DeviceNet, Profibus, Ethernet/IP, Profinet, Modbus TCP, 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 1600A / 400V or 690V
• 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 Nidec 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.

• Other features
- Installation trips in the event of an earth fault.
- 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, Ethernet/IP, Profinet, Modbus TCP, 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.

OVERVIEW

The braking torque equals the torque developed by the motor increased by the resistant torque of the driven machine.

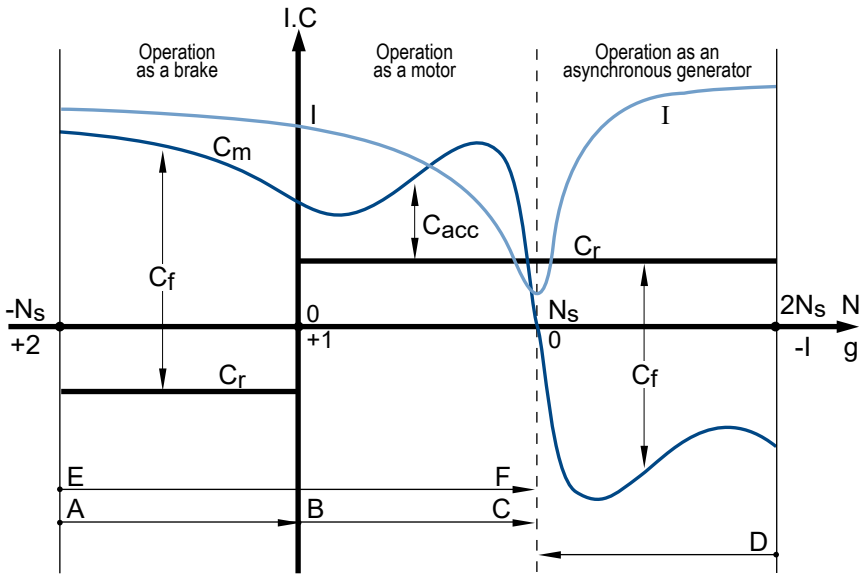
$$C_f = C_m + C_r$$

C_f = braking torque
C_m = motor torque
C_r = resistive torque

Braking time, i.e.: the time required for an induction motor to change from speed N to stop, is calculated by the formula:

$$T_f = \frac{\Pi \cdot J \cdot N}{30 \cdot C_f(moy)}$$

T_f (in s) = braking time
J (in kgm^2) = moment of inertia
N (in min^{-1}) = speed of rotation
C_f (av) (in N.m) = average braking torque during the time period



Curves I = f(N), C_m = f (N), C_r = f(N), in the motor's starting and braking zones.

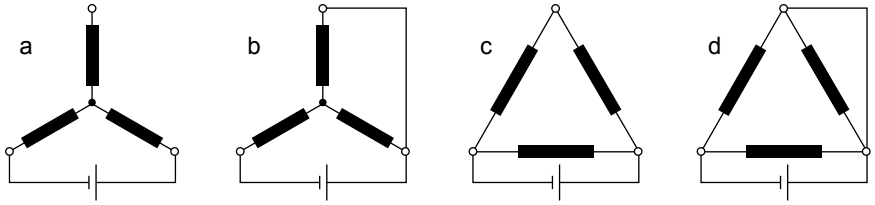
I = *current absorbed*
C = *torque value*
C_f = *braking torque*
C_r = *resistive torque*
C_m = *motor torque*
N = *speed of rotation*
g = *slip*
N_s = *synchronous speed*
AB = *reverse current braking*
BC = *starting, acceleration*
DC = *regenerative braking*
EF = *reversal*

REVERSE-CURRENT BRAKING

This method of braking is obtained by reversing two of the phases.
In general, an isolator disconnects the motor from the supply at the time the speed changes to N=0.
In cage induction motors, the average braking torque is generally greater than the starting torque.
Braking torque varies in different types of machine, as it depends on the rotor cage construction.
This method of braking involves a large amount of absorbed current, more or less constant and slightly higher than the starting current.
Thermal stresses during braking are three times higher than during acceleration.
Accurate calculations are required for repetitive braking.
Note: The direction of rotation of a motor is changed by reverse-current braking and restarting.
Thermically, one reversal is the equivalent of 4 starts. Care must therefore be taken when choosing a machine.

DC INJECTION BRAKING

Operating stability can be a problem when reverse-current braking is used, due to the flattening out of the braking torque curve in the speed interval (O, — N_S).
There is no such problem with DC injection braking: this can be used on both cage induction and slip-ring motors.
With this braking method, the induction motor is connected to the mains and braking occurs when the AC voltage is cut off and DC voltage is applied to the stator.
There are four different ways of connecting the windings to the DC voltage.
The DC voltage applied to the stator is usually supplied by a rectifier plugged into the mains.
Thermal stresses are approximately three times lower than for reverse-current braking.
The shape of the braking torque curve in the speed interval (0, — N_S) is similar to that of the curve Tm = f (N) and is obtained by changing the abscissa variable to $N_f = N_S$ — N.



Motor winding connections for DC voltage

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
Operation
Braking

The braking current is calculated using the formula:

$$I_f = k1_i \times I_d \sqrt{\frac{C_f - C_{fe}}{k_2 - Cd}}$$

The values of k1 according to the 4 connections are:

$k1_a = 1.225$ $k1_c = 2.12$
$k1_b = 1.41$ $k1_d = 2.45$

The braking torque can be found by:

$$C_f = \frac{\Pi \cdot J \cdot N}{30 \cdot T_f}$$

In the formulae above:

If (in A) = direct current for braking
Id (in A) = starting current in the phase
= $\frac{1}{\sqrt{3}}$ Id as per catalogue (for Δ connection)
Cf (in N.m) = average braking torque during the time period (Ns, N)
Cfe (in N.m) = average external braking torque
Cd (in N.m) = starting torque
J (in kgm2) = total moment of inertia at motor shaft
N (in min-1) = speed of rotation
Tf (in s) = braking time
k1i = numerical factors for connections a, b, c and d in the diagram
k2 = numerical factors taking account of the average braking torque (k2 = 1.7)

The DC voltage to be applied to the windings is calculated by:
Uf = k3i . k4 . If . R1

k3 values for the four diagrams are as follows:

$k3_a = 2$ $k3_b = 1.5$
$k3_c = 0.66$ $k3_d = 0.5$

Uf (in V) = DC voltage for braking
If (in A) = direct current for braking
R1 (in Ω) = stator phase resistance at 20°C
k3i = numerical factors for diagrams a, b, c and d
k4 = numerical factor taking account of the temperature rise in the motor (k4 = 1.3)

MECHANICAL BRAKING

Electromechanical brakes (DC or AC field excitation) can be fitted at the non-drive end of the motor.

For further details, see our “Brake motors” catalogue.

DECELERATION BRAKES

For safety reasons, deceleration brakes are fitted at the rear (non-drive end) of motors used on hazardous machines (for example, where cutting tools may come into contact with the operator).

The range of brakes is determined by its braking torques:
2.5 - 4 - 8 - 16 - 32 - 60 N.m

The appropriate brake is selected in the factory according to the number of motor poles, the driven inertia, the number of brakings per hour and the required braking time.

APPLICATIONS AND CHOICE OF SOLUTIONS

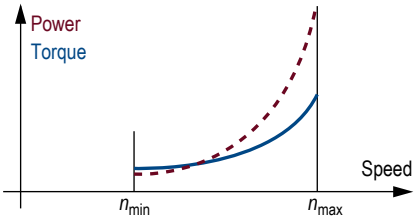
In principle, there are three typical types of load. It is essential to determine the speed range and the application torque (or power) in order to select the drive system:

Centrifugal machines

The torque varies as the square of the speed (or cube of the power). The torque required for acceleration is low (about 20% of rated torque). The starting torque is low.

- Sizing: depends on the power or torque at maximum speed.
- Drive selected for normal duty.

Typical applications: ventilation, pumping, etc.

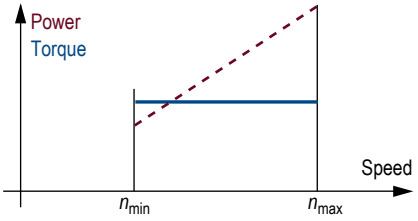


Applications with constant torque

The torque remains constant throughout the speed range. The torque required for acceleration may be high, depending on the machine (higher than the rated torque).

- Sizing: depends on the torque required over the entire speed range.
- Drive selected for heavy duty.

Typical machines: extruders, crushers, gantries, presses, etc.

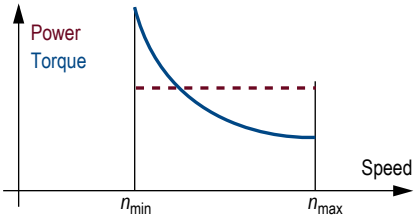


Applications with constant power

The torque decreases as the speed increases. The torque required for acceleration is no more than the rated torque. The starting torque is at its maximum.

- Sizing: depends on the torque required at minimum speed and the range of operating speeds.
- Drive selected for heavy duty.
- An encoder feedback is advisable for improved regulation.

Typical machines: winders, machine tool spindles, etc.

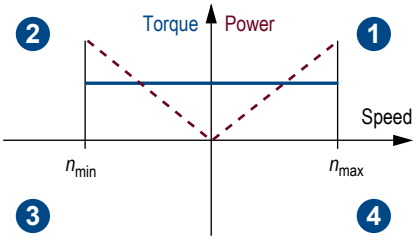


4-QUADRANT MACHINES

These applications have a torque/speed operating type as described opposite, but the load becomes a driving load in certain stages of the cycle.

- Sizing: see above depending on the load.
- In the case of repetitive braking, install a reinforced insulation system (RIS).
- Drive selection: to dissipate the power from a driving load, it is possible to use a braking resistor, or to send power back to the grid. In the latter case, a regenerative or 4-quadrant drive should be used.

Typical machines: centrifuges, travelling cranes, presses, machine tool spindles, etc.

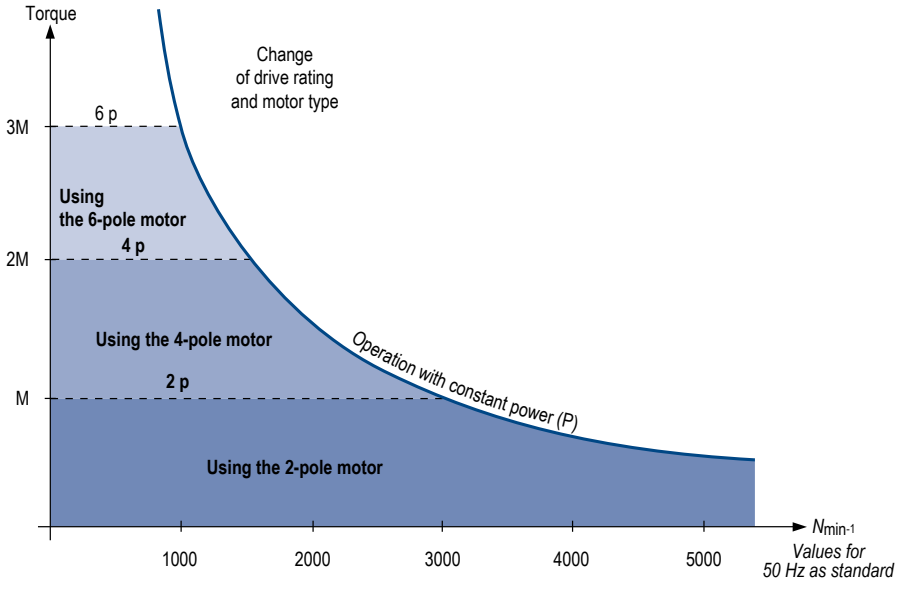


CHOICE OF INVERTER / MOTOR COMBINATION

The curve below expresses the output torque of a 50 Hz motor (2, 4 or 6 poles) supplied by a drive.
For a frequency inverter with power P_N operating at constant power P within a determined range of speeds, it is possible to optimise the choice of motor and its number of poles to give a maximum amount of torque.

Example: the Unidrive M400-034-00056A-3.5 T drive can supply the following motors:
LSES 90 - 2 p - 2.2 kW - 7.1 N.m
LSES 100 - 4 p - 2.2 kW - 14.6 N.m
LSES 112 - 6 p - 2.2 kW - 21.9 N.m

The choice of the motor and speed drive combination will therefore depend on the application.



USING THE MOTOR AT CONSTANT TORQUE FROM 0 TO 87 HZ

Using motors with a Δ connection in conjunction with a frequency inverter increases the constant torque range from 50 to 87 Hz, which can increase the power by the same ratio.

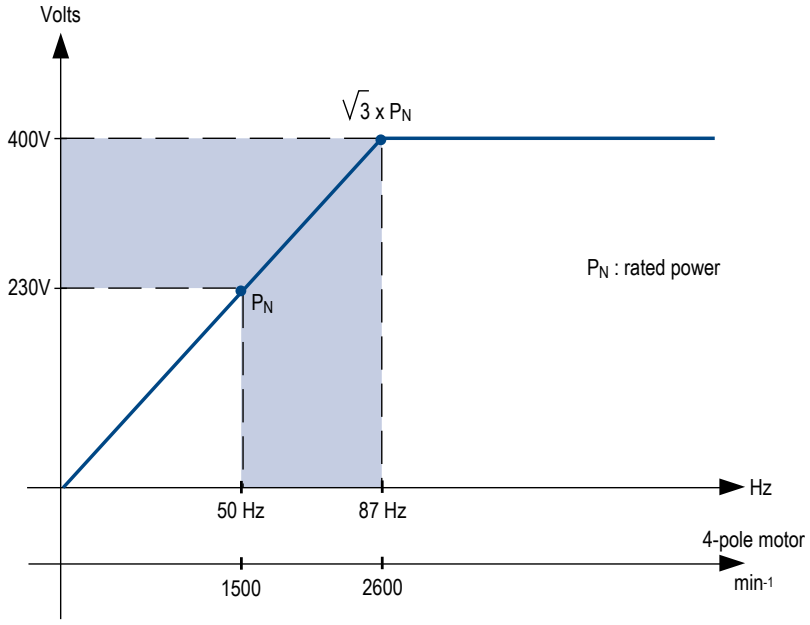
The size of the frequency inverter is determined by the current value at 230 V and programmed with a voltage/ frequency ratio of 400 V, 87 Hz.

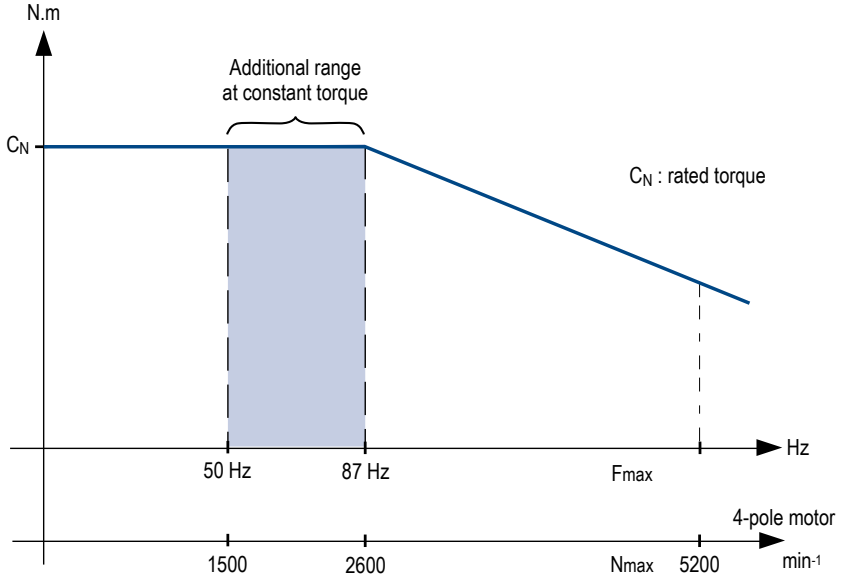
Example of selection with 4 poles:
- For constant torque of 195 Nm from 750 to 2600 min^{-1}:
  -> selection: 30 kW 4P LSES motor
  + 100 A drive

Example of selection with 2 poles:
- For constant power of 4 kW from 3000 to 5200 min^{-1}:
  -> selection: 3 kW 2P LSES motor
  + 11 A drive

CAUTION: Max. mechanical speed by frame size to be complied with.

Characteristics of motors on drives
230V Δ connection 400 V 50 Hz supply





MOTORS USED WITH VARIABLE SPEED DRIVE

GENERAL

Drive control by a frequency inverter can in fact result in an increase in the machine temperature rise, due to a significantly lower supply voltage than on the mains, additional losses related to the wave form produced by the drive (PWM) and the reduction in speed of the cooling fan.

Standard IEC 60034-17 describes numerous good practices for all types of electric motor, however since this is Nidec Leroy-Somers' area of specialist expertise, we describe the best ways to deal with variable speed in the section below.

The homologation conditions of our safety motors allow them to operate on frequency drives on condition that the required precautions are taken to ensure that under all circumstances there is compliance with the temperature class marked on the nameplate.

Consequently a reduction must generally be made in the rated power of the motor. Derating tables have been produced by our design bureau based on under-load tests on platforms, and on the requirements of IEC 60034-17. Depending on the application, the desired speed range and the torque profile of the driven machine, Nidec Leroy-Somer will select the most suitable safety motor. The drive, if of a type not designed for operation in an explosive zone, must be located in a non-explosive zone.

The specific instructions given in the specific instruction manuals must be followed if a drive is used. In particular the following minimum requirements must be observed:

- Check that the drive switching frequency is 3kHz minimum.
- Check that the motor has a second nameplate indicating the maximum characteristics and performance levels of the motor during its use at variable speed.
- The reference voltage, usually 400V 50 Hz, is given on the motor nameplate. The drive must deliver a constant voltage/frequency ratio.
- Programme the maximum current value as well as the min and max frequency values shown on the second nameplate of the motor into the drive.
- Connect all the temperature sensors present on the motor (windings and, if relevant, bearing housings) to safety devices which are independent of those used for operation under normal conditions.

NAMEPLATES ON MOTORS OPERATING WITH VARIABLE SPEED DRIVES

The performance levels of motors operating using variable speed drives, shown on the speed drive nameplate, are values obtained with PWM supplies, with 360V at the motor terminals, in continuous operation:

That is, for the following two cases:

* **400V rated voltage before drive + drive voltage drop of 40V.**
* **Rated voltage -10% + drive with no voltage drop.**

Please contact us for other cases.

Some applications require special construction specifications:

- Do not use a motor for lifting that is not rated S3 or S4.
- Do not use the motor with a different duty type from that on the nameplate and in particular not in lifting applications.

In certain cases, the use of forced ventilation (where the fan is driven by an auxiliary motor whose type has been certified) may prove necessary. For small motors (frame height less than 160), the standard self-ventilated cooling mode (IC411) is nevertheless to be preferred.

A device for measuring the actual speed of the motor, using an incremental or absolute encoder which is ATEX certified, may also be installed at the rear of most of our safety motors.

ATEX motors supplied through a frequency inverter are equipped with thermal protective devices in the winding. These must operate independently of measuring and control devices required for operation. Our derating tables are based on a drive supply whose switching frequency is equal to or greater than 3 kHz.

The nameplates of our motors indicate the T/Tn ratio (see electrical characteristics tables for each series).

For use of the motor with a drive with voltage drop and continuous operation (1h min) in the 45-50 Hz frequency range, use T/Tn = 95%.

MOTOR ADAPTATION

A motor is always characterised by the following parameters depending on the design:

- temperature class
- voltage range
- frequency range
- thermal reserve

CHANGE IN MOTOR BEHAVIOUR

The above parameters are subject to change when the power is supplied by the drive, due to the following phenomena:

- voltage drops in the drive components,
- current increase in proportion with the decrease in voltage,
- difference in motor power supply according to the type of control (flux vector or *U/f*).

The main consequence is an increase in the motor current, which leads to higher copper losses and therefore a higher winding temperature (even at 50 Hz).

Reducing the speed leads to a reduction in air flow and hence a reduction in cooling efficiency, and as a result the motor temperature rise will increase again. Conversely, during prolonged operation at high speed, as the noise emitted by

the ventilation can become troublesome for the environment, the use of forced ventilation is recommended.

Above the synchronous speed, the iron losses increase and hence cause further temperature rise in the motor.

The control mode influences the heating of the motor according to its type:

- A *U/f* ratio gives the fundamental voltage maximum at 50 Hz but requires more current at low speed to obtain a high starting torque and therefore generates a temperature rise at low speed when the motor is poorly ventilated.
- Flux vector control requires less current at low speed while providing significant torque but regulates the voltage at 50 Hz and causes a voltage drop at the motor terminals, therefore requiring more current at the same power.

Consequences for the motor

Recap: Nidec Leroy-Somer recommends the connection of PTC sensors, monitored by the drive, to protect the motor as much as possible.

CONSEQUENCES OF SUPPLY FROM DRIVES

Supplying the motor from a variable speed drive with a diode rectifier induces a voltage drop (~5%).

Some PWM techniques can be used to limit this voltage drop (~2%), to the detriment of the machine temperature rise (injection of harmonics of orders 5 and 7).

The non-sinusoidal signal (PWM) provided by the drive generates voltage peaks at the winding terminals due to the significant voltage variations relating to switching of the IGBTs (also called dV/dt). Repeated overvoltages can eventually damage the windings depending on their value and/or the motor design.

The value of the voltage peaks is proportional to the supply voltage. This value can exceed the limit voltage for the windings which is related to the wire grade, the impregnation type and the insulation that may or may not be present in the slot bottoms or between phases.

Another reason for attaining high voltage values is when regeneration phenomena occur in the case of a driving load, hence the need to prioritise freewheel stops or stops that follow the longest permissible ramp.

WINDING INSULATION AND RECOMMENDATIONS RELATING TO THE MECHANISM OF ROTATION

The insulation systems used for Nidec Leroy-Somer motors and recommendations for protection systems on the mechanisms of rotation are indicated in our good practice guide ref. 5626.

EXTREME OPERATING CONDITIONS AND OTHER POINTS

MOTOR CONNECTIONS

Nidec Leroy-Somer does not recommend any specific connections for applications operating with a single motor on a single drive.

TRANSIENT OVERLOADS

Drives are designed to withstand transient overload. When the overload values are too high, the system will automatically shut down. Nidec Leroy-Somer motors are designed to withstand these overloads, however in the event of very repetitive operation we still recommend use of a temperature sensor in the winding of the motor.

STARTING TORQUE AND CURRENT

Thanks to advances in control electronics, the torque available when the motor is switched on can be adjusted to a value between the rated torque and the variable speed drive breakdown torque. The starting current will be directly related to the torque (120 or 180%).

ADJUSTING THE SWITCHING FREQUENCY

The variable speed drive switching frequency has an impact on losses in the motor and the drive, on the acoustic noise and the torque ripple.

A low switching frequency has an adverse effect on temperature rise in motors.

Nidec Leroy-Somer recommends a variable speed drive switching frequency of at least 3 kHz.

In addition, a high switching frequency optimises the acoustic noise and torque ripple level.

OPERATION AT SPEEDS HIGHER THAN THOSE ASSIGNED BY THE MAINS FREQUENCIES

(speed higher than 3600 min^{-1}) can be risky:

- the cage may be damaged,
- bearing life may be impaired,
- there may be increased vibration,
- etc.

When high-speed motors are used, they often need to be adapted, and an in-depth mechanical and electrical design study is needed.

CHOICE OF MOTOR

There are two possibilities:

a - The frequency inverter is not supplied by Nidec Leroy-Somer

All the motors in this catalogue can be used with a frequency inverter. Depending on the application, motors will need to be derated by around 10% compared to the motor operating curves in order to guarantee that motors will not be damaged.

b - The frequency inverter is supplied by Nidec Leroy-Somer

As these two ranges have been specifically designed for use in combination, excellent performance is guaranteed, in accordance with the curves on the previous pages.

GOOD WIRING PRACTICES AND TYPICAL MOTOR DRIVE CONNECTIONS

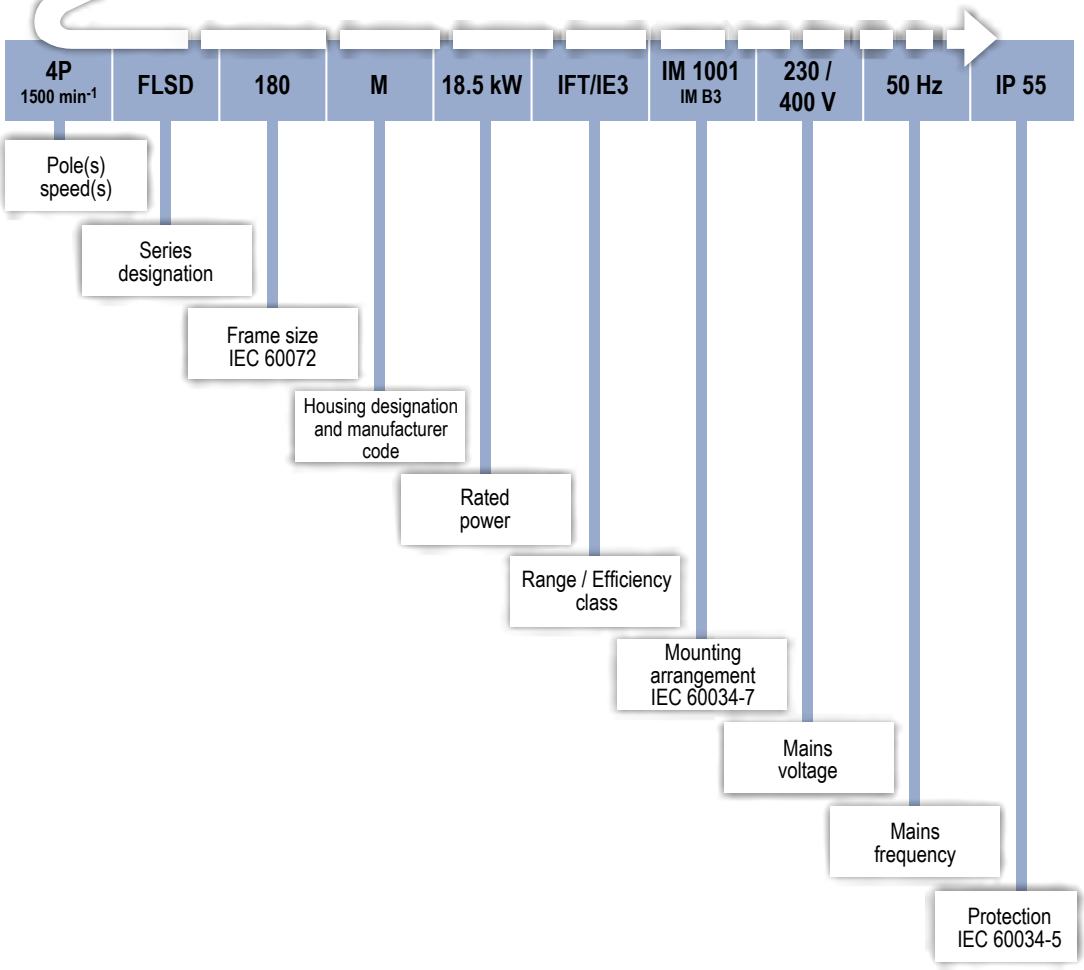
The wiring and connection rules for Nidec Leroy-Somer motors are indicated in our good practice guide, ref. 5626.

ATEX GAS motors - Zone 1
FLSD series
General information - Designation

ATEX GAS motors - Zone 1	FLSD series
	Ex II 2 G Ex db *or* db eb II B *or* C T4 *or* T5 *or* T6 Gb
	Premium Efficiency
	IE3 powered by the mains IE3 powered by the drive

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.



ATEX GAS motors - Zone 1
FLSD series - Cast iron
General information - Identification and marking

NAMEPLATES

The nameplate identifies the motors, indicates the main performance and shows compatibility of the motor concerned with the main standards and regulations concerning them.
All motors in this catalogue with power between 0.75 and 400 kW are fitted with two information plates: one indicating the motor's performance when supplied from the mains, and the other the motor's performance when supplied from a drive.

DEFINITION OF SYMBOLS USED ON NAMEPLATES

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

SPECIFIC MARKING: ATEX Ex IECEX

II 2G or II 2G and II 2D: ATEX/IECEx marking
Ex db or db(eb): "flameproof enclosure" protection type.
II B or II C: "gas" equipment group
T4: "gas" temperature class
Gb: "gas" EPL level
Ex tb: "dust" protection type (option)
IIIC: "dust" equipment group (if tb)
T125°C: max. surface temperature (if tb)
Db: "dust" EPL level
0080: INERIS Notified Body
INERIS ... X: ATEX attestation number
IECEx INE...: IECEx certificate No.

Zone	ATEX/IECEx marking	Gas protection mode marking	Dust protection mode marking (if tb)	Min. protection rating
/	Ex I M2	Ex db I Mb		IP55
1 & 2	Ex II 2 G	Ex db IIB T4 Gb (1) Ex db IIC T4 Gb (1) Ex db IIB T5 Gb (1) Ex db IIC T5 Gb (1) Ex db IIB T6 Gb (1) Ex db IIC T6 Gb (1)		IP55
1 & 21 2 & 22	Ex II 2D	Ex db IIB T4 Gb (1) Ex db IIC T4 Gb (1) Ex db IIB T5 Gb (1) Ex db IIC T5 Gb (1) Ex db IIB T6 Gb (1) Ex db 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 db eb

MOTOR SYMBOLS

MOT 3 ~: three-phase AC motor
FLSD: motor type
280: frame size
M: housing symbol
4: 4 poles
B3: operating position
No.: Serial number
2017: year of construction
IM: operating position symbol
°C: maximum ambient temperature
Ins. cl.: winding insulation class
S: standard operating duty
%: operating duty
d/h: number of starts per hour
SF: duty factor
IE %: efficiency level and efficiency, at rated load and voltage
2/4: efficiency at 2/4 load
3/4: efficiency at 3/4 load
kg: weight
DE: drive end bearing
NDE: non drive end bearing
g: quantity of grease to be added per bearing at each re-lubrication (in g)
h: interval in hours between re-lubrication
IP: protection rating
IK: shock resistance
m: maximum operating altitude
V: supply voltage
Hz: supply frequency
min^{-1}: speed of rotation (rpm)
kW: rated power
A: rated current
cos: power factor
%: efficiency at 4/4 load
Δ: delta coupling
人: star coupling
POLYREX EM 103: bearing grease reference
Insulated bearing: NDE: isolated non drive end bearing
Manufactured by CEB: equipment manufacturer
EAC Ex: equipment for explosive atmospheres certified for Eurasia
cURus E68554: insulation system class F homologated for USA and Canada
A: vibration level code
H: balancing mode code
NY: starting requirements code
279 E: plate reference

ATEX GAS motors - Zone 1
FLSD series - Cast iron
General information - Identification and marking

Inverter settings PWM: characteristics for setting the PWM drive enabling compliance with the motor temperature class

Motor performance valid for 400 V - 50 Hz at inverter input: motor performance valid for 400V - 50Hz at drive input

Duty S9: performances given for S9 duty

Min.Fsw: minimum switching frequency of the drive in kHz

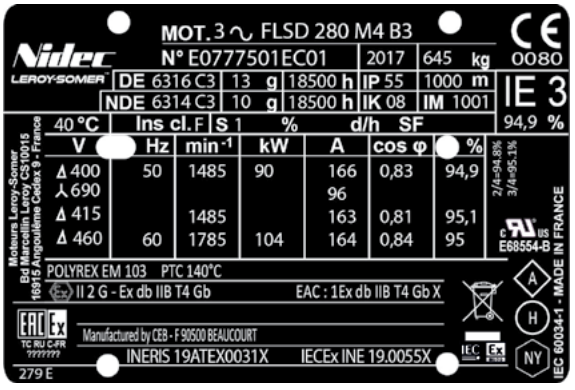
Nmax: admissible maximum motor speed in min^{-1} (rpm)

PTC 140°C: PTC sensor type - temperature limit = 140°C

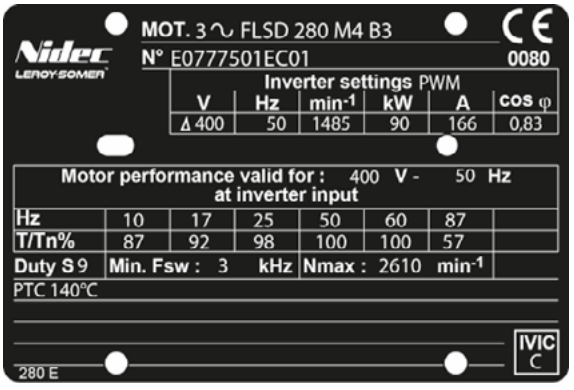
IVIC: pulse voltage insulation class code

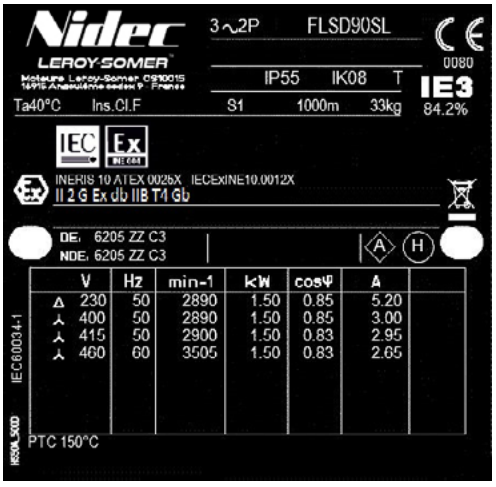
CAST IRON MOTOR NAMEPLATES - FLSD ZONE 1

Mains supply plate



Drive supply plate





ATEX GAS motors - Zone 1
FLSD series - Cast iron
General information - Description

The motor enclosure is designed in such a way that no internal explosion can be transmitted to the explosive atmosphere around the motor.
This enclosure must withstand, without being damaged, any pressure levels caused by an internal explosion.
The shape, length and gap of the assembly joints, at shaft passages, cable entries, etc., are designed to render hot gases on the outside non-hazardous.
In addition, the external temperature of the motor enclosure must not exceed the ignition temperature of the explosive atmosphere present in the installation zone.
No mechanism outside the motor enclosure (e.g., fan) must be a potential source of sparks, arcing or dangerous overheating.

The Ex db motors from Nidec Leroy-Somer are certified to comply with Directive 2014/34/EU and the IECEx system regulations.

Lastly, Ex db or Ex db eb motors can also be used for applications in Ex t zone 21 dusty atmospheres.
The following definitions are therefore possible:
- Ex tb IIIB T125°C Db, IP65 for zone 21 + Ex db or Ex db eb, IIB or IIC T4 Gb
- Ex tb IIIC T125°C Db, IP65 for zone 21 + Ex db or Ex db eb, IIB or IIC T4 Gb

Since the ingress of dust is prevented, only the external temperature class is important for both applications: T4 (=135°C) for gas and T125°C for dust

Designations	Materials	Comments
Finned housing	Cast iron	- with integral feet , or without feet • 4, 6 or 8 securing holes for frames with feet • lifting rings for frame size ≥ 90 - external earth terminal
Stator	Insulated low-carbon magnetic steel laminations Electroplated enamelled copper	- low carbon content guarantees long-term lamination pack stability - semi-enclosed slots - class F insulation - 1 set of PTC sensors in the windings from FLSD 80 to FLSD 315
Rotor	Insulated low-carbon magnetic steel laminations Aluminium (A5L) or copper	- squirrel cage with sloping bars - rotor cage pressure die-cast in aluminum (or alloys for special applications) or copper-soldered - assembly by hot shrinking on the shaft or by keying - class A rotor balanced dynamically, 1/2 key
Shaft	Steel	- for frame size ≤ 132: • tapped at drive end • closed keyway - for frame size ≥ 160: • tapped at drive end • open keyway
End shields	Cast iron	
Bearings and lubrication		- regreasable bearings from frame size 160 - bearing preloaded at the rear from 80 to 280 and preloaded at the front from 315 S
Labyrinth seal **Lip seals**	Technopolymer or steel Synthetic rubber	- gasket or labyrinth seal at the front and rear for frame sizes 80 to 132 and 315 - decompression grooves for frame sizes 160 to 280 and 315
Fan	Composite material up to and including 280 Metallic from 315, and in IIIC	- bi-directional: straight blades
Fan cover	Steel plate	- fitted with a drip cover (option)
Terminal box	Cast iron	- "db" type in standard version and "eb" type as an option (see below) - equipped with one or more ISO drill holes with plug or cable gland - directional: 4 positions - indoor earth terminal - terminal block

ATEX GAS motors - Zone 1
FLSD series - Cast iron
General information - Description

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.

Designations	Materials	Comments
Stator - Rotor		- protection and anti-corrosion for frame sizes 80 to 132
Nameplate	Stainless steel	- nameplate: indelible marking
Fastenings	Steel with anti-corrosion coating	- stainless steel screws from FLSD 160 on
Terminal box	Body and cover made of cast-iron	
Cable gland or plug	Brass	- Ex protection mode identical to the terminal box
Paint finish		- C4M system (see Paint section)

INCREASED SAFETY TERMINAL BOX VERSION Ex db eb, IIB or IIC

These motors have a "db" type flameproof casing and an "eb" increased safety type terminal box.

Terminal box	Cast iron	- "eb" type increased safety - "db" type separation between motor enclosure and "eb" type terminal box - safety block

VERSIONS Ex db IIC and Ex db eb IIC

Available up to frame size 315 included.

Flameproof motor - "db" terminal box

Flameproof motor - "eb" terminal box

ATEX GAS motors - Zone 1
FLSD series - Cast iron - IE3
Electrical characteristics - Mains supply

Type	Gas group	Rated power	Rated torque	Starting torque/ Rated torque	Maximum torque/ Rated torque	Starting current/ Rated current	Moment of inertia	Weight	Noise	400V 50Hz								
										Rated speed	Rated current	Efficiency IEC 60034-2-1 2007			Power factor		
		P_n kW	M_n N.m	M_d/M_n	M_m/M_n	I_d/I_n	J kg.m²	IM B3 kg	LP db(A)	N_n min⁻¹	I_n A	η 4/4	η 3/4	η 2/4	Cos φ 4/4	Cos φ 3/4	Cos φ 2/4
2 poles																	
FLSD 80 L	IIB-IIC	0.75	2.5	3.1	3.5	7.6	0.00096	25	59	2885	1.6	82.6	82.7	80.5	0.82	0.75	0.62
FLSD 90 SL	IIB-IIC	1.1	3.7	2.6	3.2	6.85	0.00203	28	59	2885	2.2	85.6	86.6	85.9	0.85	0.79	0.68
FLSD 90 SL	IIB-IIC	1.5	5	2.9	3	7	0.00225	30	68	2890	3	85.1	86.1	85.4	0.85	0.79	0.68
FLSD 90 LU	IIB-IIC	2.2	7.3	3.5	3.6	8.2	0.00294	36	70	2895	4.3	87.0	88.2	88.1	0.86	0.80	0.70
FLSD 100 L	IIB-IIC	3	9.9	3.2	3.6	8.1	0.00370	40	66	2895	5.8	87.1	88.1	87.8	0.86	0.81	0.70
FLSD 112 MG	IIB-IIC	4	13.1	2.5	3	7.25	0.00944	50	70	2920	7.3	88.5	89.5	89.4	0.89	0.85	0.77
FLSD 132 SM	IIB-IIC	5.5	17.9	2	2.8	6.4	0.00993	73	67	2935	10.3	90.0	90.8	90.4	0.86	0.82	0.73
FLSD 132 SM	IIB-IIC	7.5	24.4	2.1	2.9	6.95	0.01120	86	67	2940	13.8	91.2	92.0	91.8	0.86	0.82	0.75
FLSD 132 M	IIB-IIC	9	29.2	2.5	3.2	7.55	0.01222	96	67	2940	16.8	91.3	92.0	91.7	0.85	0.80	0.72
FLSD 160 MA	IIB-IIC	11	35.6	2.7	3.2	7.51	0.041	170	68	2954	20.1	91.2	91.4	90.7	0.87	0.84	0.76
FLSD 160 MB	IIB-IIC	15	48.7	2.8	3.1	7.54	0.048	181	68	2951	26.7	91.9	92.7	92.5	0.89	0.87	0.81
FLSD 160 L	IIB-IIC	18.5	59.9	2.7	3.3	7.84	0.055	190	68	2950	32.6	92.4	92.9	92.9	0.88	0.86	0.79
FLSD 180 M	IIB-IIC	22	71.4	2.5	3.2	7.66	0.970	258	69	2955	38.5	93.4	94.0	93.9	0.89	0.87	0.81
FLSD 200 LA	IIB-IIC	30	97.1	2.2	3	7.35	0.141	344	77	2954	54.1	93.4	93.6	93.1	0.86	0.82	0.75
FLSD 200 LB	IIB-IIC	37	121.2	2.1	3	7.04	0.141	350	76	2945	65.2	93.7	93.9	93.9	0.88	0.86	0.80
FLSD 225 MR	IIB-IIC	45	145.9	2.4	3	7.69	0.164	376	76	2948	78.6	94.0	94.6	94.6	0.88	0.86	0.79
FLSD 250 M	IIB-IIC	55	177.8	1.9	2.6	6.92	0.356	572	80	2970	93.9	94.7	95.0	94.6	0.90	0.88	0.83
FLSD 280 S	IIB-IIC	75	243	2	2.3	6.03	0.564	744	80	2963	125	95.0	95.5	95.6	0.91	0.90	0.88
FLSD 280 M	IIB-IIC	90	291	2.5	2.8	7.73	0.564	744	80	2968	150	95.3	95.6	95.5	0.91	0.90	0.85
FLSD 315 S	IIB	110	354	2.1	2.6	6.58	1.24	1290	79	2975	184	95.9	96.0	95.5	0.90	0.89	0.85
FLSD 315 S	IIC	110	352	2.2	2.4	7.09	1.51	1398	79	2981	182	96.5	96.2	95.4	0.90	0.89	0.86
FLSD 315 M	IIB	132	424	2.1	2.5	6.71	1.29	1295	79	2975	221	96.0	96.1	95.6	0.90	0.90	0.89
FLSD 315 M	IIC	132	424	1.8	2.0	5.8	1.51	1398	79	2975	219	96.2	96.2	95.6	0.90	0.90	0.89
FLSD 315 LA	IIB	160	516	2.1	2.8	6.64	1.39	1330	79	2972	268	96.4	96.5	96.1	0.90	0.89	0.84
FLSD 315 LA	IIC	160	513	2	2.1	6.69	1.51	1398	79	2976	266	96.3	96.3	95.7	0.90	0.90	0.87
FLSD 315 LB	IIB-IIC	200	645	2.3	2.3	7.28	1.51	1398	79	2976	335	96.3	96.6	96.4	0.90	0.89	0.84
4 poles																	
FLSD 90 SL[1]	IIB-IIC	0.75	5	2.2	2.9	6.45	0.00338	28	51	1452	1.7	83.8	84.4	83.1	0.79	0.71	0.58
FLSD 90 SL	IIB-IIC	1.1	7.3	2.5	3.1	6.75	0.00421	34	49	1450	2.3	84.9	85.8	85.0	0.81	0.74	0.61
FLSD 90 LU	IIB-IIC	1.5	9.9	2.9	3.6	7.35	0.00526	37	51	1454	3.3	85.4	85.8	84.1	0.78	0.70	0.56
FLSD 100 LG	IIB-IIC	2.2	14.4	2.7	2.7	6.92	0.01155	49	50	1460	4.4	89.6	90.0	89.1	0.81	0.75	0.63
FLSD 100 LG	IIB-IIC	3	19.6	2.5	3.3	7.27	0.01155	49	50	1462	6	88.7	89.3	88.7	0.82	0.76	0.64
FLSD 112 MU	IIB-IIC	4	26.2	2.7	3	6.6	0.01431	54	50	1458	8.1	88.8	89.5	88.9	0.80	0.75	0.64
FLSD 132 SM	IIB-IIC	5.5	35.9	2.9	3.7	8.35	0.02304	85	60	1462	10.5	90.1	90.7	90.2	0.84	0.78	0.67
FLSD 132 MU	IIB-IIC	7.5	49.1	3	3.4	8.1	0.02960	100	62	1458	13.8	90.4	91.5	91.9	0.87	0.82	0.73
FLSD 160 M	IIB-IIC	11	72.3	2.1	3.4	7.96	0.070	180	58	1470	20.7	91.6	92.4	92.4	0.85	0.80	0.69
FLSD 160 L	IIB-IIC	15	99.2	2.3	3.3	7.94	0.097	199	58	1468	27.9	92.1	92.6	92.7	0.86	0.81	0.71
FLSD 180 M	IIB-IIC	18.5	120.1	2.9	3.1	7.4	0.132	248	63	1472	34.7	92.6	92.6	92.0	0.83	0.79	0.70
FLSD 180 L	IIB-IIC	22	142.8	2.8	3.2	7.31	0.149	260	63	1472	41.3	93.0	93.2	93.0	0.83	0.79	0.69
FLSD 200 L	IIB-IIC	30	193.9	3	2.8	7.21	0.259	369	64	1478	55.7	93.6	94.0	93.6	0.83	0.79	0.69
FLSD 225 SK	IIB-IIC	37	239.4	2	2.6	6.76	0.571	519	65	1483	68.3	94.1	94.6	94.4	0.84	0.80	0.71
FLSD 225 MK	IIB-IIC	45	290	2	2.5	6.84	0.63	537	65	1484	82.4	94.2	94.6	94.6	0.84	0.80	0.73
FLSD 250 M	IIB-IIC	55	355	2.2	2.8	7.39	0.73	608	69	1484	100.6	94.6	95.0	94.9	0.84	0.80	0.72
FLSD 280 S	IIB-IIC	75	485	2.4	2.9	7.85	0.89	729	70	1484	138	95.0	95.0	94.5	0.83	0.78	0.68
FLSD 280 M	IIB-IIC	90	581	2.4	2.8	7.7	1.02	765	70	1483	166	95.2	95.2	94.4	0.83	0.79	0.70
FLSD 315 S	IIB	110	708	2	2.5	6.85	2.27	1289	71	1486	191	95.7	95.6	95.0	0.87	0.85	0.78
FLSD 315 S	IIC	110	708	2.4	2.2	6.2	3.03	1446	71	1483	188	96.0	96.2	95.9	0.88	0.87	0.83
FLSD 315 M	IIB	132	852	2.8	2.8	6.72	2.27	1289	71	1487	235	95.9	95.9	95.6	0.85	0.82	0.76
FLSD 315 M	IIC	132	849	2.5	2.4	6.6	3.03	1446	71	1484	226	96.0	96.2	95.8	0.88	0.87	0.82
FLSD 315 LA	IIB	160	1032	2.3	2.5	6.44	2.62	1357	71	1484	279	96.0	96.3	96.1	0.87	0.848	0.78
FLSD 315 LA	IIC	160	1029	2.7	2.6	7.2	3.03	1446	71	1485	273	96.0	96.1	95.7	0.88	0.857	0.793
FLSD 315 LB	IIB-IIC	200	1288	2.9	2.5	7.59	3.03	1446	71	1485	355	96.0	96.3	96.1	0.846	0.811	0.72
6 poles																	
FLSD 90 SL[1]	IIB-IIC	0.75	7.6	1.9	2.3	4.45	0.00380	29	40	950	1.9	79.1	80.1	78.3	0.72	0.63	0.49
FLSD 90 LU	IIB-IIC	1.1	11	2.3	2.6	4.8	0.00520	35	57	954	2.8	81.7	82.3	80.3	0.71	0.62	0.48
FLSD 100 LG	IIB-IIC	1.5	14.8	2.4	2.8	5.65	0.01526	46	47	966	3.6	83.8	84.4	82.9	0.72	0.63	0.50
FLSD 112 MU	IIB-IIC	2.2	21.7	2.4	2.9	5.6	0.01901	53	45	968	5.4	84.5	85.1	83.5	0.70	0.62	0.49
FLSD 132 SM	IIB-IIC	3	29.5	2.7	3.1	6.4	0.02546	82	50	972	6.8	87.3	87.7	86.3	0.73	0.66	0.53
FLSD 132 M	IIB-IIC	4	39.4	2.4	2.9	6.25	0.03046	89	54	970	9.2	86.9	87.0	85.8	0.72	0.65	0.53
FLSD 132 MU	IIB-IIC	5.5	54.4	2.5	2.9	6.3	0.03723	98	55	966	11.7	88.3	89.0	88.7	0.77	0.71	0.59
FLSD 160 M	IIB-IIC	7.5	73.6	2	3.1	6.4	0.118	188	55	978	16	89.1	89.1	87.5	0.76	0.69	0.57
FLSD 160 LK	IIB-IIC	11	108	2.3	2.9	6.77	0.211	240	55	976	21.4	90.3	90.5	90.3	0.83	0.78	0.68
FLSD 180 L	IIB-IIC	15	146.6	2.7	3.2	7.1	0.250	272	58	977	30.7	91.2	91.2	90.4	0.78	0.72	0.59
FLSD 200 LA	IIB-IIC	18.5	181.7	2.6	3	7.26	0.300	348	58	978	36.4	91.8	92.4	92.0	0.80	0.75	0.65
FLSD 200 LB	IIB-IIC	22	214.6	2.6	3	7.1	0.346	369	58	980	44.7	92.2	92.1	91.3	0.77	0.72	0.60
FLSD 225 MK	IIB-IIC	30	291.8	2.3	2.5	6.52	0.760	504	64	985	55.3	93.0	93.4	93.0	0.84	0.81	0.71
FLSD 250 M	IIB-IIC	37	358.9	2.7	2.8	7.52	0.937	590	64	986	67.9	93.3	93.6	93.3	0.85	0.81	0.72
FLSD 280 S	IIB-IIC	45	436	2.8	2.7	7.22	1.36	751	60	986	79	94.4	94.8	94.8	0.87	0.84	0.76
FLSD 280 M	IIB-IIC	55	534	2.8	2.6	7.12	1.36	751	60	986	98	94.3	94.8	94.7	0.86	0.82	0.74
FLSD 315 S	IIB	75	727	2.0	2.1	7.03	2.67	1255	70	991	138	95.0	95.3	95.0	0.83	0.80	0.73
FLSD 315 S	IIC	75	724	2.4	1.9	5.8	2.67	1255	70	989	137	95.9	96.0	95.7	0.82	0.82	0.78
FLSD 315 M	IIB	90	869	2.7	2	7.07	2.67	1255	70	991	165	95.0	95.4	95.2	0.82	0.79	0.72
FLSD 315 M	IIC	90	869	2.5	2.1	6.20	2.67	1255	70	989	166	95.3	95.4	95.0	0.82	0.81	0.77
FLSD 315 LA	IIB-IIC	110	1066	2.8	2.2	6.59	3.60	1394	70	989	205	95.5	95.9	95.6	0.82	0.79	0.71
FLSD 315 LB	IIB-IIC	132	1277	3.0	2.2	7.24	3.94	1457	70	992	246	95.6	95.9	95.7	0.82	0.78	0.70

[1]: The power of 0.75 kW is not feasible at frame size 80.
For temperature classes T5 and T6, please contact us.

IMfinity® ATEX 3-phase induction motors - IE3 efficiency class

ATEX GAS motors - Zone 1
FLSD series - Cast iron - IE3
Electrical characteristics - Mains supply

II 2 G Ex db or db eb II B or C T4 Gb

IEC Ex INE 004

IEC Ex INE 010

Type	Rated power	415V 50Hz				460V 60Hz			
		Rated speed	Rated current	Efficiency	Power factor	Rated speed	Rated current	Efficiency	Power factor
	P_n kW	N_n min^{-1}	I_n A	η 4/4	Cos φ 4/4	N_n min^{-1}	I_n A	η 4/4	Cos φ 4/4
2 poles									
FLSD 80 L	0.75	2895	1.6	83.0	0.79	3505	1.4	83.7	0.79
FLSD 90 SL	1.1	2895	2.15	85.9	0.83	3505	1.95	84.8	0.83
FLSD 90 SL	1.5	2900	2.95	85.3	0.83	3505	2.65	86.0	0.83
FLSD 90 LU	2.2	2905	4.15	87.5	0.85	3510	3.7	88.2	0.85
FLSD 100 L	3	2910	5.6	87.5	0.85	-	-	-	-
FLSD 112 MG	4	2930	7.15	89.0	0.88	3535	6.4	89.9	0.88
FLSD 132 SM	5.5	2940	9.9	90.5	0.85	3545	9	90.8	0.85
FLSD 132 SM	7.5	2945	13.5	91.5	0.85	3550	12	92.2	0.85
FLSD 132 M	9	2950	16.3	91.4	0.84	3554	14.6	92.3	0.84
FLSD 160 MA	11	2958	19.52	91.5	0.86	3559	17	91.9	0.86
FLSD 160 MB	15	2954	25.69	92.5	0.88	3557	22.59	92.7	0.89
FLSD 160 L	18.5	2954	32.04	92.5	0.87	3553	27.86	92.9	0.88
FLSD 180 M	22	2960	36.8	93.6	0.89	3561	32.6	94.1	0.89
FLSD 200 LA	30	2959	53.08	93.6	0.84	3560	46.44	93.8	0.86
FLSD 200 LB	37	2951	62.7	93.8	0.88	3553	55.4	93.8	0.88
FLSD 225 MR	45	2954	76.86	94.1	0.87	3556	67.3	94.4	0.88
FLSD 250 M	55	2971	91.3	94.5	0.89	3572	81.29	94.1	0.89
FLSD 280 S	75	2967	121	95.2	0.91	3566	107	95.4	0.92
FLSD 280 M	90	2972	145	95.6	0.91	3574	128	95.3	0.91
FLSD 315 S	110	2979	179	96.0	0.90	3581	158	95.4	0.90
FLSD 315 S	110	2983	175	96.6	0.90	3584	159	96.3	0.90
FLSD 315 M	132	2976	214	96.0	0.90	3580	194	95.7	0.90
FLSD 315 M	132	2978	211	96.4	0.90	3580	190	96.2	0.90
FLSD 315 LA	160	2975	258	96.2	0.89	3575	232	96.2	0.90
FLSD 315 LA	160	2978	256	96.4	0.90	3580	230	96.3	0.90
FLSD 315 LB	200	2978	323	96.5	0.89	3582	290	96.4	0.90
4 poles									
FLSD 90 SL	0.75	1454	1.6	84.0	0.78	1762	1.5	85.7	0.76
FLSD 90 SL	1.1	1454	2.3	84.9	0.79	1758	2.1	86.5	0.78
FLSD 90 LU	1.5	1456	3.2	85.6	0.76	1762	2.9	86.9	0.75
FLSD 100 LG	2.2	1470	4.3	89.8	0.79	1770	3.9	90.6	0.79
FLSD 100 LG	3	1462	6	88.8	0.79	1768	5.2	89.9	0.80
FLSD 112 MU	4	1462	8.1	89.4	0.78	1764	7.7	85.5	0.77
FLSD 132 SM	5.5	1466	10.3	90.2	0.82	1768	9.2	91.7	0.82
FLSD 132 MU	7.5	1462	13.5	90.9	0.85	1766	12.1	91.8	0.85
FLSD 160 M	11	1473	20.2	92.0	0.83	1775	17.8	92.5	0.83
FLSD 160 L	15	1471	26.9	92.2	0.84	1773	24.2	93.0	0.84
FLSD 180 M	18.5	1474	33.8	92.8	0.82	1775	30.1	93.6	0.83
FLSD 180 L	22	1475	40.5	93.1	0.81	1774	35.7	93.6	0.83
FLSD 200 L	30	1480	54.8	93.7	0.82	1781	47.9	94.1	0.82
FLSD 225 SK	37	1485	66.7	94.2	0.83	1787	59.7	94.5	0.83
FLSD 225 MK	45	1484	80.4	94.3	0.83	1785	71.8	95.0	0.83
FLSD 250 M	55	1485	97.7	94.8	0.83	1787	87.4	95.4	0.83
FLSD 280 S	75	1486	135	95.1	0.82	1787	121	95.4	0.82
FLSD 280 M	90	1484	161	95.3	0.82	1787	144	95.4	0.82
FLSD 315 S	110	1486	186	95.7	0.86	1788	166	95.8	0.87
FLSD 315 S	110	1485	181	96.1	0.88	1785	164	96.1	0.88
FLSD 315 M	132	1487	230	95.8	0.84	1789	203	96.2	0.85
FLSD 315 M	132	1485	218	96.2	0.88	1786	197	96.2	0.88
FLSD 315 LA	160	1486	270	95.9	0.86	1788	248	96.3	0.89
FLSD 315 LA	160	1486	265	96.1	0.87	1787	238	96.3	0.88
FLSD 315 LB	200	1487	350	96.1	0.83	1788	310	96.3	0.84
6 poles									
FLSD 90 SL	0.75	956	1.9	79.4	0.69	-	-	-	-
FLSD 90 LU	1.1	958	2.8	81.7	0.68	-	-	-	-
FLSD 100 LG	1.5	970	3.6	84.1	0.69	-	-	-	-
FLSD 112 MU	2.2	972	5.3	84.6	0.68	-	-	-	-
FLSD 132 SM	3	974	6.8	86.8	0.71	-	-	-	-
FLSD 132 M	4	972	9.2	87.0	0.70	-	-	-	-
FLSD 132 MU	5.5	970	11.5	88.5	0.75	-	-	-	-
FLSD 160 M	7.5	980	15.8	89.4	0.74	1181	14	91.0	0.74
FLSD 160 LK	11	978	20.9	90.4	0.81	1179	18.6	91.7	0.81
FLSD 180 L	15	979	30.1	91.3	0.76	1181	26.6	91.7	0.76
FLSD 200 LA	18.5	980	35.8	92.0	0.79	1181	31.6	93.0	0.79
FLSD 200 LB	22	983	44	92.3	0.75	1183	39.1	93.0	0.76
FLSD 225 MK	30	987	54.5	93.0	0.83	1187	47.9	94.1	0.84
FLSD 250 M	37	987	66.2	93.4	0.83	1188	58.5	94.1	0.84
FLSD 280 S	45	987	77	94.6	0.86	1187	68	94.6	0.86
FLSD 280 M	55	986	96	94.5	0.85	1187	85	94.8	0.85
FLSD 315 S	75	992	134	94.8	0.82	1192	118	95.1	0.83
FLSD 315 S	75	990	132	96.0	0.82	1190	119	96.1	0.82
FLSD 315 M	90	992	161	95.1	0.82	1193	141	95.3	0.83
FLSD 315 M	90	990	160	95.4	0.82	1190	144	95.6	0.82
FLSD 315 LA	110	990	200	95.5	0.81	1190	176	95.8	0.82
FLSD 315 LB	132	993	240	95.7	0.80	1193	214	95.9	0.81

For temperature classes T5 and T6, please contact us.

ATEX GAS motors - Zone 1
FLSD series - Cast iron - IE3
Electrical characteristics - Drive-powered

Type	400V 50Hz				% Rated torque M_n at					400V 87Hz Δ[1]				Maximum mechanical speed[2]
	Rated power P_n kW	Rated speed N_n min^{-1}	Rated current I_n A	Power factor Cos φ 4/4	10Hz	17Hz	25Hz	50Hz	87Hz	Rated power P_n kW	Rated speed N_n min^{-1}	Rated current I_n A	Power factor Cos φ 4/4	
2 poles														
FLSD 80 L	0.75	2870	1.75	0.84	2.33	2.5	2.5	2.5	1.43	-	-	-	-	7200
FLSD 90 SL	1.1	2870	2.35	0.86	3.39	3.65	3.65	3.65	2.08	-	-	-	-	7200
FLSD 90 SL	1.5	2870	3.25	0.87	4.6	4.95	4.95	4.95	2.82	-	-	-	-	7200
FLSD 90 LU	2.2	2875	4.6	0.89	6.74	7.25	7.25	7.25	4.13	-	-	-	-	7200
FLSD 100 L	3	2875	6.15	0.88	9.21	9.9	9.9	9.9	5.64	-	-	-	-	7200
FLSD 112 MG	4	2910	7.95	0.91	12.18	13.1	13.1	13.1	7.47	-	-	-	-	7200
FLSD 132 SM	5.5	2930	14.9	0.88	22.69	24.4	24.4	24.4	13.91	-	-	-	-	6700
FLSD 132 SM	7.5	2930	14.9	0.88	22.69	24.4	24.4	24.4	13.91	-	-	-	-	6700
FLSD 132 M	9	2935	17.9	0.87	27.16	29.2	29.2	29.2	16.64	-	-	-	-	5220
FLSD 160 MA	11	2949	22.5	0.89	35.6	35.6	35.6	35.6	-	-	-	-	-	3600
FLSD 160 MB	15	2943	30.1	0.90	48.7	48.7	48.7	48.7	-	-	-	-	-	3600
FLSD 160 L	18.5	2941	37	0.90	59.9	59.9	59.9	59.9	-	-	-	-	-	3600
FLSD 180 M	22	2952	43.1	0.90	71.4	71.4	71.4	71.4	-	-	-	-	-	3600
FLSD 200 LA	30	2946	59.9	0.88	97.1	97.1	97.1	97.1	-	-	-	-	-	3600
FLSD 200 LB	37	2923	73.6	0.89	110.3	113.9	118.8	121.2	-	-	-	-	-	3600
FLSD 225 MR	45	2942	88.3	0.90	140.1	140.1	140.1	140.1	-	-	-	-	-	3600
FLSD 250 M	55	2963	106.3	0.90	165.4	165.4	165.4	165.4	-	-	-	-	-	3600
FLSD 280 S	75	2949	143.3	0.91	213.5	228.0	242.6	242.6	-	-	-	-	-	3600
FLSD 280 M	90	2961	168.9	0.92	258.6	273.2	290.6	290.6	-	-	-	-	-	3600
FLSD 315 S	110	2966	207	0.90	353.6	353.6	353.6	353.6	-	-	-	-	-	3600
FLSD 315 M	132	2966	249.3	0.90	403.2	415.9	424.4	424.4	-	-	-	-	-	3600
FLSD 315 LA	160	2967	299.7	0.90	490.4	505.9	516.2	516.2	-	-	-	-	-	3600
FLSD 315 LB	200	2966	375.6	0.90	566.7	573.2	586	586	-	-	-	-	-	3600
4 poles														
FLSD 90 SL	0.75	1445	1.75	0.82	4.6	4.95	4.95	4.95	2.82	-	-	-	-	7200
FLSD 90 SL	1.1	1440	2.5	0.83	6.74	7.25	7.25	7.25	4.13	-	-	-	-	7200
FLSD 90 LU	1.5	1445	3.45	0.81	9.16	9.85	9.85	9.85	5.61	-	-	-	-	7200
FLSD 100 LG	2.2	1435	4.9	0.79	14.4	14.4	14.4	14.4	8.33	-	-	-	-	7200
FLSD 100 LG	3	1456	6.4	0.84	16.41	19.6	19.6	19.6	11.17	-	-	-	-	7200
FLSD 112 MU	4	1450	8.5	0.83	21.93	26.2	26.2	26.2	14.93	-	-	-	-	7200
FLSD 132 SM	5.5	1456	11.2	0.86	33.39	35.9	35.9	35.9	20.46	-	-	-	-	6700
FLSD 132 MU	7.5	1460	13.8	0.86	49.1	49.1	49.1	49.1	28.22	-	-	-	-	6700
FLSD 160 M	11	1462	22.8	0.88	72.3	72.3	72.3	72.3	54.2	-	-	-	-	2610
FLSD 160 L	15	1456	31	0.88	99.2	99.2	99.2	99.2	65.5	-	-	-	-	2610
FLSD 180 M	18.5	1463	38.4	0.86	120.1	120.1	120.1	120.1	68.46	-	-	-	-	2610
FLSD 180 L	22	1467	45.9	0.86	142.8	142.8	142.8	142.8	81.4	-	-	-	-	2610
FLSD 200 L	30	1471	61.2	0.86	193.7	193.7	193.7	193.7	110.41	-	-	-	-	2610
FLSD 225 SK	37	1483	75.9	0.85	239	239	239	239	136.23	-	-	-	-	2610
FLSD 225 MK	45	1481	92.1	0.86	278.5	281.4	287.2	287.2	163.7	-	-	-	-	2610
FLSD 250 M	55	1482	110.8	0.86	354.9	354.9	354.9	354.9	202.29	-	-	-	-	2610
FLSD 280 S	75	1481	151.2	0.86	436.1	460.4	484.6	484.6	276.22	-	-	-	-	2610
FLSD 280 M	90	1478	181.4	0.86	505.2	528.4	551.7	551.7	314.47	-	-	-	-	2610
FLSD 315 S	110	1483	212.3	0.88	679.7	693.8	708.0	708.0	403.56	-	-	-	-	2610
FLSD 315 M	132	1482	256.2	0.88	818	835.1	852.1	852.1	485.7	-	-	-	-	2610
FLSD 315 LA	160	1478	309.6	0.88	897.8	959.7	1011.3	1011.3	576.44	-	-	-	-	2610
FLSD 315 LB	200	1483	388.9	0.87	1069	1146.2	1223.5	1223.5	697.4	-	-	-	-	2610
6 poles														
FLSD 90 SL	0.75	945	2.05	0.75	7.02	7.55	7.55	7.55	4.30	-	-	-	-	7200
FLSD 90 LU	1.1	945	2.85	0.74	10.23	11	11	11	6.27	-	-	-	-	7200
FLSD 100 LG	1.5	962	3.8	0.74	13.08	14.8	14.8	14.8	8.44	-	-	-	-	7200
FLSD 112 MU	2.2	962	5.65	0.74	19.17	21.7	21.7	21.7	12.37	-	-	-	-	7200
FLSD 132 SM	3	970	7.1	0.76	27.44	29.5	29.5	29.5	16.82	-	-	-	-	6700
FLSD 132 M	4	966	9.7	0.75	36.64	39.4	39.4	39.4	22.46	-	-	-	-	6700
FLSD 132 MU	5.5	962	12.5	0.79	50.59	54.4	54.4	54.4	31.01	-	-	-	-	6700
FLSD 160 M	7.5	976	17.2	0.81	73.6	73.6	73.6	73.6	41.95	-	-	-	-	1740
FLSD 160 LK	11	973	24.3	0.85	108	108	108	108	61.56	-	-	-	-	1740
FLSD 180 L	15	976	33.7	0.82	146.6	146.6	146.6	146.6	83.56	-	-	-	-	1740
FLSD 200 LA	18.5	972	40.1	0.83	181.7	181.7	181.7	181.7	103.57	-	-	-	-	1740
FLSD 200 LB	22	978	48.4	0.82	214.6	214.6	214.6	214.6	122.32	-	-	-	-	1740
FLSD 225 MK	30	985	61.5	0.87	291.8	291.8	291.8	291.8	166.33	-	-	-	-	1740
FLSD 250 M	37	985	75	0.87	358.9	358.9	358.9	358.9	204.57	-	-	-	-	1740
FLSD 280 S	45	984	85.9	0.88	436.2	436.2	436.2	436.2	248.63	-	-	-	-	1740
FLSD 280 M	55	984	109.6	0.88	502.1	518.1	534.1	534.1	304.44	-	-	-	-	1740
FLSD 315 S	75	990	154.5	0.84	727	727	727	727	414.39	-	-	-	-	1740
FLSD 315 M	90	990	184	0.84	869	869	869	869	495.33	-	-	-	-	1740
FLSD 315 LA	110	987	227.9	0.83	1023.4	1044.7	1066	1066	607.62	-	-	-	-	1740
FLSD 315 LB	132	990	270.2	0.83	1251	1263.7	1276.5	1276.5	727.61	-	-	-	-	1740

IMfinity® ATEX 3-phase induction motors - IE3 efficiency class

ATEX GAS motors - Zone 1
FLSD series - Cast iron - IE3
Ex db eb IIC T4 Gb as per VIK

Gas	group type	Rated power	Rated torque	Starting torque/ Rated torque	Maximum torque/ Rated torque	Starting current/ Rated current	Moment of inertia	Weight	Noise	400V 50Hz							
										Rated speed	Rated current	Efficiency IEC 60034-2-1 2007			Power factor		
		P_n kW	M_n N.m	M_d/M_n	M_m/M_n	I_d/I_n	J kg.m²	IM B3 kg	LP db(A)	N_n min⁻¹	I_n A	η 4/4	η 3/4	η 2/4	Cos φ 4/4	Cos φ 3/4	Cos φ 2/4
2 poles																	
FLSD 80 L	**IIC**	0.75	2.5	3.1	3.5	7.6	0.00095	25	59	2885	1.6	82.6	82.7	80.5	0.82	0.75	0.62
FLSD 90 SL	**IIC**	1.1	3.65	2.6	3.2	6.85	0.00201	28	59	2885	2.2	85.6	86.6	85.9	0.85	0.79	0.68
FLSD 90 SL	**IIC**	1.5	4.95	2.9	3.0	7	0.00223	30	68	2890	3	85.1	86.1	85.4	0.85	0.79	0.68
FLSD 90 LU	**IIC**	2.2	7.25	3.5	3.6	8.2	0.00292	36	70	2895	4.25	87.0	88.2	88.1	0.86	0.80	0.70
FLSD 100 L	**IIC**	3	9.9	3.2	3.6	8.1	0.00370	40	66	2895	5.75	87.1	88.1	87.8	0.86	0.81	0.70
FLSD 112 MG	**IIC**	4	13.1	2.5	3.0	7.25	0.00944	50	70	2920	7.3	88.5	89.5	89.4	0.89	0.85	0.77
FLSD 132 SM	**IIC**	5.5	17.9	2.0	2.8	6.4	0.00993	73	67	2935	10.3	90.0	90.8	90.4	0.86	0.82	0.73
FLSD 132 SM	**IIC**	7.5	24.4	2.1	2.9	6.95	0.01120	86	67	2940	13.8	91.2	92.0	91.8	0.86	0.82	0.75
FLSD 132 M	**IIC**	9	29.2	2.5	3.2	7.55	0.01222	96	67	2940	16.8	91.3	92.0	91.7	0.85	0.80	0.72
FLSD 160 MA	**IIC**	11	35.6	2.7	3.2	7.51	0.04100	170	68	2954	20.1	91.2	91.4	90.7	0.87	0.84	0.76
FLSD 160 MB	**IIC**	15	48.7	2.8	3.1	7.54	0.04800	181	68	2951	26.7	91.9	92.7	92.5	0.89	0.87	0.81
FLSD 160 L	**IIC**	18.5	59.9	2.7	3.3	7.84	0.05540	190	68	2950	32.6	92.4	92.9	92.9	0.88	0.86	0.79
FLSD 180 M	**IIC**	22	71.4	2.5	3.2	7.66	0.970	258	69	2955	38.5	93.4	94.0	93.9	0.89	0.87	0.81
FLSD 200 LA	**IIC**	30	97.1	2.2	3.0	7.35	0.141	344	77	2954	54.1	93.4	93.6	93.1	0.86	0.82	0.75
FLSD 200 LB	**IIC**	37	121.2	2.1	3.0	7.04	0.141	350	76	2945	65.2	93.7	93.9	93.9	0.88	0.86	0.80
FLSD 225 MR	**IIC**	45	145.9	2.4	3.0	7.69	0.164	376	76	2948	78.6	94.0	94.6	94.6	0.88	0.86	0.79
FLSD 250 M	IIC	55	177.4	1.9	2.7	6.89	0.356	572	77	2969	93.7	94.7	95.0	95.0	0.90	0.88	0.84
FLSD 280 S	IIC	75	243	2.0	2.3	6.03	0.564	744	80	2963	125	95.0	95.5	95.6	0.91	0.90	0.88
FLSD 280 M	IIC	90	291	2.5	2.8	7.73	0.564	744	80	2968	150	95.3	95.6	95.5	0.91	0.90	0.85
FLSD 315 S	IIC	110	352	2.2	2.4	7.1	1.51	1398	79	2981	182	96.5	96.2	95.4	0.90	0.89	0.86
FLSD 315 M	IIC	132	424	1.8	2.0	5.8	1.51	1398	79	2975	219	96.2	96.2	95.6	0.90	0.90	0.89
FLSD 315 LA	IIC	160	513	2.0	2.1	6.69	1.51	1398	79	2976	266	96.3	96.3	95.7	0.90	0.90	0.87
FLSD 315 LB	IIC	200	645	2.3	2.3	7.28	1.51	1398	79	2976	335	96.3	96.6	96.4	0.90	0.89	0.84
4 poles																	
FLSD 90 SL	**IIC**	0.75	4.95	2.2	2.9	6.45	0.00335	26	51	1452	1.7	83.8	84.4	83.1	0.79	0.71	0.58
FLSD 90 SL	**IIC**	1.1	7.25	2.5	3.1	6.75	0.00418	31	49	1450	2.3	84.9	85.8	85.0	0.81	0.74	0.61
FLSD 90 LU	**IIC**	1.5	9.85	2.9	3.6	7.35	0.00524	35	51	1454	3.3	85.4	85.8	84.1	0.78	0.70	0.56
FLSD 100 LG	**IIC**	2.2	14.4	2.7	2.7	6.92	0.01155	47	50	1460	4.4	89.6	90.0	89.1	0.81	0.75	0.63
FLSD 100 LG	**IIC**	3	19.6	2.5	3.3	7.27	0.01155	47	50	1462	6.0	88.7	89.3	88.7	0.82	0.76	0.64
FLSD 112 MU	**IIC**	4	26.2	2.7	3.0	6.6	0.01431	54	0	1458	8.1	88.8	89.5	88.9	0.80	0.75	0.64
FLSD 132 SM	**IIC**	5.5	35.9	2.9	3.7	8.35	0.02304	82	60	1462	10.5	90.1	90.7	90.2	0.84	0.78	0.67
FLSD 132 MU	**IIC**	7.5	49.1	3.0	3.4	8.1	0.02989	100	62	1458	13.8	90.4	91.5	91.9	0.87	0.82	0.73
FLSD 160 M	**IIC**	11	72.3	2.1	3.4	7.96	0.070	180	58	1470	20.7	91.6	92.4	92.4	0.85	0.80	0.69
FLSD 160 L	**IIC**	15	99.2	2.3	3.3	7.94	0.097	199	58	1468	27.9	92.1	92.6	92.7	0.86	0.81	0.71
FLSD 180 M	**IIC**	18.5	120.1	2.9	3.1	7.4	0.132	248	63	1472	34.7	92.6	92.6	92.0	0.83	0.79	0.70
FLSD 180 L	**IIC**	22	142.8	2.8	3.2	7.31	0.149	260	63	1472	41.3	93.0	93.2	93.0	0.83	0.79	0.69
FLSD 200 L	**IIC**	30	193.9	3.0	2.8	7.21	0.259	369	64	1478	55.7	93.6	94.0	93.6	0.83	0.79	0.69
FLSD 225 SK	**IIC**	37	239.4	2.0	2.6	6.76	0.571	519	65	1483	68.3	94.1	94.6	94.4	0.84	0.80	0.71
FLSD 225 MK	**IIC**	45	290.1	2.0	2.5	6.84	0.628	537	65	1484	82.4	94.2	94.6	94.6	0.84	0.80	0.73
FLSD 250 M	IIC	55	354.9	2.2	2.8	7.39	0.728	608	69	1484	100.6	94.6	95.0	94.9	0.84	0.80	0.72
FLSD 280 S	IIC	75	485	2.4	2.9	7.85	0.89	729	70	1484	138	95.0	95.0	94.5	0.83	0.78	0.68
FLSD 280 M	IIC	90	581	2.4	2.8	7.7	1.02	765	70	1483	166	95.2	95.2	94.4	0.83	0.79	0.70
FLSD 315 S	IIC	110	708	2.4	2.2	6.2	3.03	1446	71	1483	188	96.0	96.2	95.9	0.88	0.87	0.83
FLSD 315 M	IIC	132	849	2.5	2.4	6.6	3.03	1446	71	1484	226	96.0	96.2	95.8	0.88	0.87	0.82
FLSD 315 LA	IIC	160	1029	2.7	2.6	7.2	3.03	1446	71	1485	273	96.0	96.1	95.7	0.88	0.86	0.79
FLSD 315 LB	IIC	200	1288	2.9	2.5	7.59	3.03	1446	71	1485	355	96.0	96.3	96.1	0.85	0.81	0.72
6 poles																	
FLSD 90 SL		0.75	7.6	1.9	2.3	4.45	0.00378	29	40	950	1.9	79.1	80.1	78.3	0.72	0.63	0.49
FLSD 90 LU		1.1	11	2.3	2.6	4.8	0.00519	35	57	954	2.8	81.7	82.3	80.3	0.71	0.62	0.48
FLSD 100 LG		1.5	14.8	2.4	2.8	5.65	0.01523	46	47	966	3.6	83.8	84.4	82.9	0.72	0.63	0.50
FLSD 112 MU		2.2	21.7	2.4	2.9	5.6	0.01901	53	45	968	5.4	84.5	85.1	83.5	0.70	0.62	0.49
FLSD 132 SM		3	29.5	2.7	3.1	6.4	0.02546	82	50	972	6.8	87.3	87.7	86.3	0.73	0.66	0.53
FLSD 132 M		4	39.4	2.4	2.9	6.25	0.03046	89	54	970	9.2	86.9	87.0	85.8	0.72	0.65	0.53
FLSD 132 MU		5.5	54.4	2.5	2.9	6.3	0.03723	98	55	966	11.7	88.3	89.0	88.7	0.77	0.71	0.59
FLSD 160 M		7.5	73.6	2.0	3.1	6.4	0.118	188	55	978	16.0	89.1	89.1	87.5	0.76	0.69	0.57
FLSD 160 LK		11	108	2.3	2.9	6.77	0.211	240	55	976	21.4	90.3	90.5	90.3	0.83	0.78	0.68
FLSD 180 L		15	146.6	2.7	3.2	7.1	0.250	272	58	977	30.7	91.2	91.2	90.4	0.78	0.72	0.59
FLSD 200 LA		18.5	181.7	2.6	3.0	7.26	0.300	348	58	978	36.4	91.8	92.4	92.0	0.80	0.75	0.65
FLSD 200 LB		22	214.6	2.6	3.0	7.1	0.346	369	58	980	44.7	92.2	92.1	91.3	0.77	0.72	0.60
FLSD 225 MK		30	292	2.3	2.5	6.52	0.760	504	64	985	55.3	93.0	93.4	93.0	0.84	0.81	0.71
FLSD 250 M		37	359	2.7	2.8	7.52	0.937	590	64	986	67.9	93.3	93.6	93.3	0.85	0.81	0.72
FLSD 280 S		45	436	2.8	2.7	7.22	1.36	751	60	986	79	94.4	94.8	94.8	0.87	0.84	0.76
FLSD 280 M		55	534	2.8	2.6	7.12	1.36	751	60	986	98	94.3	94.8	94.7	0.86	0.82	0.74
FLSD 315 S		75	724	2.4	1.9	5.8	3.60	1394	70	989	137	95.9	96.0	95.7	0.82	0.82	0.78
FLSD 315 M		90	869	2.5	2.1	6.2	3.60	1394	70	989	166	95.3	95.4	95.0	0.82	0.81	0.77
FLSD 315 LA		110	1066	2.8	2.2	6.59	3.60	1394	70	989	205	95.5	95.9	95.6	0.82	0.79	0.71
FLSD 315 LB		132	1277	3.0	2.2	7.25	3.94	1457	70	991	246	95.6	95.9	95.7	0.82	0.78	0.70

ATEX GAS motors - Zone 1
FLSD series - Cast iron - IE3
Ex db eb IIC T4 Gb as per VIK

Gas	Rated power	415V 50Hz				460V 60Hz			
		Rated speed	Rated current	Efficiency	Power factor	Rated speed	Rated current	Efficiency	Power factor
	P_n kW	N_n min^{-1}	I_n A	η 4/4	Cos φ 4/4	N_n min^{-1}	I_n A	η 4/4	Cos φ 4/4
2 poles									
FLSD 80 L	0.75	2895	1.6	83.0	0.79	3505	1.4	83.7	0.79
FLSD 90 SL	1.1	2895	2.2	85.9	0.83	3505	2	84.8	0.83
FLSD 90 SL	1.5	2900	3	85.3	0.83	3505	2.7	86.0	0.83
FLSD 90 LU	2.2	2905	4.2	87.5	0.85	3510	3.7	88.2	0.85
FLSD 100 L	3	2910	5.6	87.5	0.85	-	-	-	-
FLSD 112 MG	4	2930	7.2	89.0	0.88	3535	6.4	89.9	0.88
FLSD 132 SM	5.5	2940	9.9	90.5	0.85	3545	9	90.8	0.85
FLSD 132 SM	7.5	2945	13.5	91.5	0.85	3550	12	92.2	0.85
FLSD 132 M	9	2950	16.3	91.4	0.84	3554	14.6	92.3	0.84
FLSD 160 MA	11	2958	19.5	91.5	0.86	3559	17	91.9	0.86
FLSD 160 MB	15	2954	25.7	92.5	0.88	3557	22.6	92.7	0.89
FLSD 160 L	18.5	2954	32	92.5	0.87	3553	27.9	92.9	0.88
FLSD 180 M	22	2960	36.8	93.6	0.89	3561	32.6	94.1	0.89
FLSD 200 LA	30	2959	53.1	93.6	0.84	3560	46.4	93.8	0.86
FLSD 200 LB	37	2951	62.7	93.8	0.88	3553	55.4	93.8	0.88
FLSD 225 MR	45	2954	76.9	94.1	0.87	3556	67.3	94.4	0.88
FLSD 250 M	55	2972	90.7	94.9	0.89	3574	80	94.7	0.89
FLSD 280 S	75	2967	121	95.2	0.91	3566	107	95.4	0.92
FLSD 280 M	90	2972	145	95.6	0.91	3574	128	95.3	0.91
FLSD 315 S	110	2983	175	96.6	0.90	3584	159	96.3	0.90
FLSD 315 M	132	2978	211	96.4	0.90	3580	190	96.2	0.90
FLSD 315 LA	160	2978	256	96.4	0.90	3580	230	96.3	0.90
FLSD 315 LB	200	2978	323	96.5	0.89	3582	290	96.4	0.90
4 poles									
FLSD 90 SL	0.75	1454	1.6	84.0	0.78	1762	1.5	85.7	0.76
FLSD 90 SL	1.1	1454	2.3	84.9	0.79	1758	2.1	86.5	0.78
FLSD 90 LU	1.5	1456	3.2	85.6	0.76	1762	2.9	86.9	0.75
FLSD 100 LG	2.2	1470	4.3	89.8	0.79	1770	3.9	90.6	0.79
FLSD 100 LG	3	1462	6	88.8	0.79	1768	5.2	89.9	0.80
FLSD 112 MU	4	1462	8.1	89.4	0.78	1764	7.7	85.5	0.77
FLSD 132 SM	5.5	1466	10.3	90.2	0.82	1768	9.2	91.7	0.82
FLSD 132 MU	7.5	1462	13.5	90.9	0.85	1766	12.1	91.8	0.85
FLSD 160 M	11	1473	20.2	92.0	0.83	1775	17.8	92.5	0.83
FLSD 160 L	15	1471	26.9	92.2	0.84	1773	24.2	93.0	0.84
FLSD 180 M	18.5	1474	33.8	92.8	0.82	1775	30.1	93.6	0.83
FLSD 180 L	22	1475	40.5	93.1	0.81	1774	35.7	93.6	0.83
FLSD 200 L	30	1480	54.8	93.7	0.82	1781	47.9	94.1	0.82
FLSD 225 SK	37	1485	66.7	94.2	0.83	1787	59.7	94.5	0.83
FLSD 225 MK	45	1484	80.4	94.3	0.83	1785	71.8	95.0	0.83
FLSD 250 M	55	1485	97.7	94.8	0.83	1787	87.4	95.4	0.83
FLSD 280 S	75	1486	135	95.1	0.82	1787	121	95.4	0.82
FLSD 280 M	90	1484	161	95.3	0.82	1787	144	95.4	0.82
FLSD 315 S	110	1485	181	96.1	0.88	1785	164	96.1	0.88
FLSD 315 M	132	1485	218	96.2	0.88	1786	197	96.2	0.88
FLSD 315 LA	160	1486	265	96.1	0.87	1787	238	96.3	0.88
FLSD 315 LB	200	1487	350	96.1	0.83	1788	310	96.3	0.84
6 poles									
FLSD 90 SL	0.75	956	1.9	79.4	0.69	-	-	-	-
FLSD 90 LU	1.1	958	2.8	81.7	0.68	-	-	-	-
FLSD 100 LG	1.5	970	3.6	84.1	0.69	-	-	-	-
FLSD 112 MU	2.2	972	5.3	84.6	0.68	-	-	-	-
FLSD 132 SM	3	974	6.8	86.8	0.71	-	-	-	-
FLSD 132 M	4	972	9.2	87.0	0.70	-	-	-	-
FLSD 132 MU	5.5	970	11.5	88.5	0.75	-	-	-	-
FLSD 160 M	7.5	980	15.8	89.4	0.74	1181	14	91.0	0.74
FLSD 160 LK	11	978	20.9	90.4	0.81	1179	18.6	91.7	0.81
FLSD 180 L	15	979	30.1	91.3	0.76	1181	26.6	91.7	0.76
FLSD 200 LA	18.5	980	35.8	92.0	0.79	1181	31.6	93.0	0.79
FLSD 200 LB	22	983	44	92.3	0.75	1183	39.1	93.0	0.76
FLSD 225 MK	30	987	54.5	93.0	0.83	1187	47.9	94.1	0.84
FLSD 250 M	37	987	66.2	93.4	0.83	1188	58.5	94.1	0.84
FLSD 280 S	45	987	76.9	94.6	0.86	1187	68	94.6	0.86
FLSD 280 M	55	986	96.1	94.46	0.85	1187	85	94.8	0.85
FLSD 315 S	75	990	131.7	95.98	0.82	1190	119	96.1	0.82
FLSD 315 M	90	989	160.1	95.41	0.82	1190	144	95.6	0.82
FLSD 315 LA	110	990	200	95.50	0.81	1190	176	95.8	0.82
FLSD 315 LB	132	993	240.1	95.72	0.80	1193	214	95.9	0.81

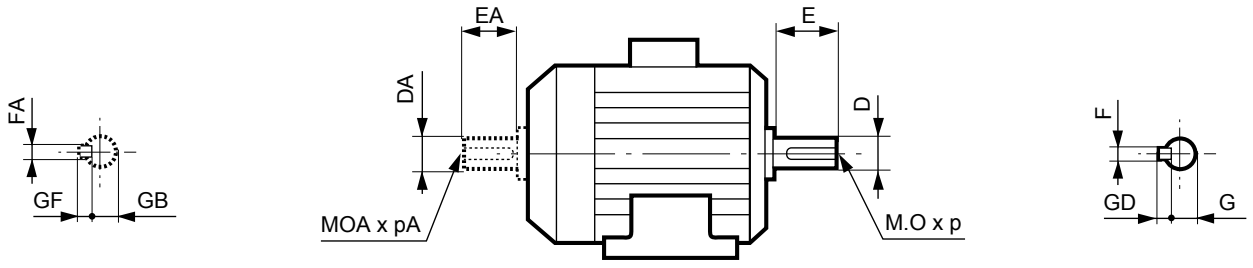
IMfinity® ATEX 3-phase induction motors - IE3 efficiency class

ATEX GAS motors - Zone 1

FLSD series - Cast iron - Mechanical characteristics

Shaft ends

Dimensions in millimetres



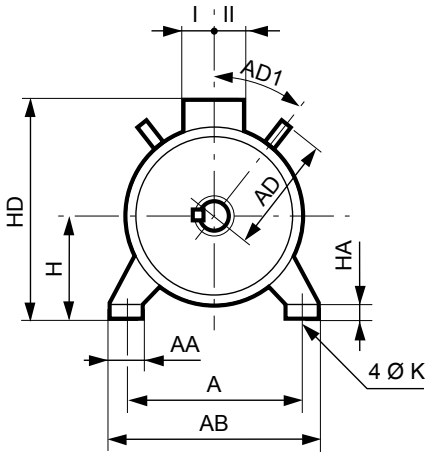
Type	Main shaft end													
	4 and 6 poles							2 poles						
	F	GD	D	G	E	O	p	F	GD	D	G	E	O	p
FLSD 80 L	-	-	-	-	-	-	-	6	6	19j6	15.5	40	6	16
FLSD 90 LU/SL	8	7	24j6	20	50	M8	19	8	7	24j6	20	50	8	19
FLSD 100 L	-	-	-	-	-	-	-	8	7	28j6	24	60	10	22
FLSD 100 LG	8	7	28j6	24	60	M10	22	-	-	-	-	-	-	-
FLSD 112 MG	-	-	-	-	-	-	-	8	7	28j6	24	60	10	22
FLSD 112 MU	8	7	28j6	24	60	M10	22	-	-	-	-	-	-	-
FLSD 132 M	10	8	38k6	33	80	M12	28	10	8	38k6	33	80	M12	28
FLSD 132 MU	10	8	38k6	33	80	M12	28	-	-	-	-	-	-	-
FLSD 132 SM	10	8	38k6	33	80	M12	28	10	8	38k6	33	80	M12	28
FLSD 160 L	12	8	42k6	37	110	M16	36	12	8	42k6	37	110	M16	36
FLSD 160 LK/M	12	8	42k6	37	110	M16	36	-	-	-	-	-	-	-
FLSD 160 MA/MB	-	-	-	-	-	-	-	12	8	42k6	37	110	M16	36
FLSD 180 L	14	9	48k6	42.5	110	M16	36	-	-	-	-	-	-	-
FLSD 180 M	14	9	48k6	42.5	110	M16	36	14	9	48k6	42.5	110	M16	36
FLSD 200 L/LA/LB	16	10	55m6	49	110	M20	42	16	10	55m6	49	110	M20	42
FLSD 225 MK/SK	18	11	60m6	53	140	M20	42	-	-	-	-	-	-	-
FLSD 225 MR	-	-	-	-	-	-	-	16	10	55m6	49	110	M20	42
FLSD 250 M	18	11	65m6	58	140	M20	42	18	11	60m6	53	140	M20	42
FLSD 280 M/S	20	12	75m6	67.5	140	M20	42	18	11	65m6	58	140	M20	42
FLSD 315 LA/LB	25	14	90m6	81	170	M24	50	20	12	70m6	62.5	140	M20	42
FLSD 315 M/S	22	14	80m6	71	170	M20	42	18	11	65m6	58	140	M20	42

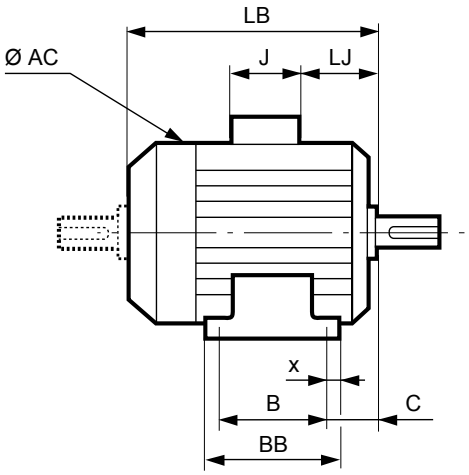
Type	Secondary shaft ends													
	4 and 6 poles							2 poles						
	FA	GF	DA	GB	EA	OA	pA	FA	GF	DA	GB	EA	OA	pA
FLSD 80 L	-	-	-	-	-	-	-	5	5	14j6	11	30	M5	15
FLSD 90 LU/SL	6	6	19j6	15.5	40	M6	16	6	6	19j6	15.5	40	M6	16
FLSD 100 L	-	-	-	-	-	-	-	8	7	24j6	20	50	M8	19
FLSD 100 LG	8	7	24j6	20	50	M8	19	-	-	-	-	-	-	-
FLSD 112 MG	-	-	-	-	-	-	-	8	7	24j6	20	50	M8	19
FLSD 112 MU	8	7	24j6	20	50	M8	19	-	-	-	-	-	-	-
FLSD 132 M	8	7	28j6	24	60	M10	22	8	7	28j6	24	60	M10	22
FLSD 132 MU	8	7	28j6	24	60	M10	22	-	-	-	-	-	-	-
FLSD 132 SM	8	7	28j6	24	60	M10	22	8	7	28j6	24	60	M10	22
FLSD 160 L	12	8	42k6	37	110	M16	36	12	8	42k6	37	110	M16	36
FLSD 160 LK/M	12	8	42k6	37	110	M16	36	-	-	-	-	-	-	-
FLSD 160 MA/MB	-	-	-	-	-	-	-	12	8	42k6	37	110	M16	36
FLSD 180 L	14	9	48k6	42.5	110	M16	36							
FLSD 180 M	14	9	48k6	42.5	110	M16	36	14	9	48k6	42.5	110	M16	36
FLSD 200 L/LA/LB	16	10	55m6	49	110	M20	42	16	10	55m6	49	110	M20	42
FLSD 225 MK/SK	18	11	60m6	53	140	M20	42	-	-	-	-	-	-	-
FLSD 225 MR	-	-	-	-	-	-	-	16	10	55m6	49	110	M20	42
FLSD 250 M	18	11	60m6	53	140	M20	42	18	11	60m6	53	140	M20	42
FLSD 280 M/S	18	11	60m6	53	140	M20	42	18	11	60m6	53	140	M20	42
FLSD 315 LA/LB	20	12	70m6	63.5	140	M20	42	20	12	70m6	63.5	140	M20	42
FLSD 315 M/S	20	12	70m6	63.5	140	M20	42	18	11	65m6	58	140	M20	42

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Foot mounted IM 1001 (IMB3)

Ex db IIB T4 Gb

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	133	50	10	34	10	10	80	173	283	259	26	142	80	77	-	-
FLSD 90 LU	140	170	125	155	56	10	33	12	10	90	196	306	324	32	142	80	77	135	41
FLSD 90 SL	140	170	100	155	56	10	33	12	10	90	196	306	297	32	142	80	77	135	41
FLSD 100 L	160	196	140	201	63	18	40	12	13	100	209	316	345	32	142	80	77	135	41
FLSD 100 LG	160	196	140	200	63	10	38	12	13	100	231	325	347	33	142	80	77	148	34.5
FLSD 112 MG	190	230	140	186	70	14	48	12	12	112	231	337	346	33	142	80	77	148	34.5
FLSD 112 MU	190	230	140	186	70	14	48	12	12	112	231	337	387	33	142	80	77	148	34.5
FLSD 132 M	216	255	178	243	89	15	63	12	16	132	272	371	462	55.5	142	80	77	173	35
FLSD 132 MU	216	255	178	243	89	15	63	12	16	132	272	371	506	55.5	142	80	77	173	35
FLSD 132 SM	216	255	140	243	89	15	63	12	16	132	272	371	462	55.5	142	80	77	173	35
FLSD 160 L	254	302	254	295	108	20	70	14.5	22	160	309	481	596	30	242	134	145	214	52
FLSD 160 LK	254	302	254	295	108	20	70	14.5	22	160	309	503	657	51	242	134	145	214	52
FLSD 160 M	254	302	210	295	108	20	70	14.5	22	160	309	481	596	30	242	134	145	214	52
FLSD 160 MA	254	302	210	295	108	20	70	14.5	22	160	309	481	596	30	242	134	145	214	52
FLSD 160 MB	254	302	210	295	108	20	70	14.5	22	160	309	481	596	30	242	134	145	214	52
FLSD 180 L	279	330	279	335	121	28	75	14.5	22	180	347	523	653	51	242	134	145	230	52
FLSD 180 M	279	330	241	335	121	28	75	14.5	22	180	347	523	653	51	242	134	145	230	52
FLSD 200 L/LA/LB	318	377	305	370	133	32	81	18.5	22	200	384	563	776	54	242	134	145	265	49
FLSD 225 MK 4 poles	356	428	311	428	149	32	80	18.5	28	225	384	641	830	90.5	242	134	145	265	49
FLSD 225 MK 6 poles	356	428	311	428	149	32	80	18.5	28	225	384	688	830	51.5	320	180	190	265	49
FLSD 225 MR	356	445	311	400	149	44	90	18.5	30	225	384	588	776	54	242	134	145	265	49
FLSD 225 SK	356	428	286	428	149	32	80	18.5	28	225	384	641	830	90.5	242	134	145	265	49
FLSD 250 M	406	476	349	435	168	41	80	24	25	250	481	713	880	79	320	180	190	309	49
FLSD 280 M	457	529	368	499	190	40	85	24	25	280	481	743	1030	49	320	180	190	322	49
FLSD 280 S	457	529	419	499	190	40	85	24	25	280	481	743	1030	49	320	180	190	322	49
FLSD 315 LA/LB	508	600	508	598	216	45	100	27	38	315	624	893	1252	70	336	217	268	-	-
FLSD 315 M	508	600	457	598	216	45	100	27	38	315	624	893	1252	70	336	217	268	-	-
FLSD 315 S	508	600	406	598	216	45	100	27	38	315	624	893	1252	70	336	217	268	-	-

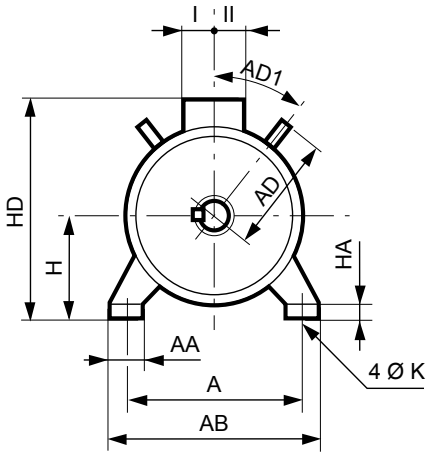
** AC: housing diameter without lifting rings*

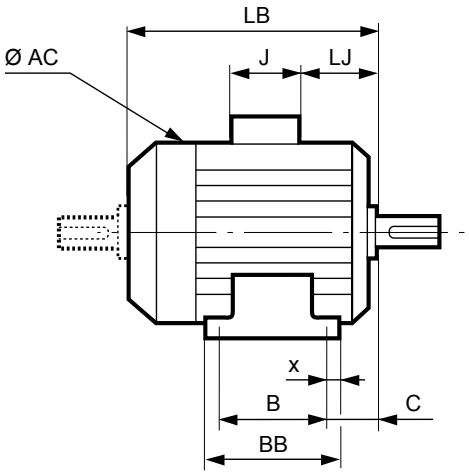
IMfinity® ATEX 3-phase induction motors - IE3 efficiency class

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Foot mounted IM 1001 (IMB3)

Ex db eb IIB T4 Gb

Dimensions in millimetres





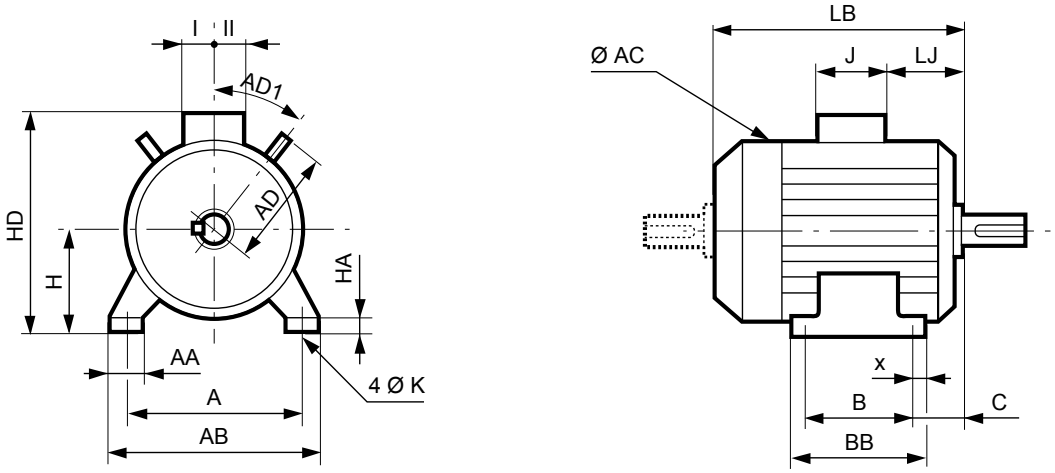
Type	Main dimensions																		
	A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1
FLSD 80 L	125	157	100	133	50	10	34	10	10	80	173	269.5	259	29	136	68	68	-	-
FLSD 90 LU	140	170	125	155	56	10	33	12	10	90	196	292.5	324	35	136	68	68	135	41
FLSD 90 SL	140	170	100	155	56	10	33	12	10	90	196	292.5	297	35	136	68	68	135	41
FLSD 100 L	160	196	140	201	63	18	40	12	13	100	209	302.5	345	35	136	68	68	135	41
FLSD 100 LG	160	196	140	200	63	10	38	12	13	100	231	311.5	347	36	136	68	68	148	34.5
FLSD 112 MG	190	230	140	186	70	14	48	12	12	112	231	323.5	346	36	136	68	68	148	34.5
FLSD 112 MU	190	230	140	186	70	14	48	12	12	112	231	323.5	387	33	136	68	68	148	34.5
FLSD 132 M	216	255	178	243	89	15	63	12	16	132	272	357.5	462	58.5	136	68	68	173	35
FLSD 132 MU	216	255	178	243	89	15	63	12	16	132	272	357.5	506	58.5	136	68	68	173	35
FLSD 132 SM	216	255	140	243	89	15	63	12	16	132	272	357.5	462	58.5	136	68	68	173	35
FLSD 160 L	254	302	254	295	108	20	70	14.5	22	160	309	465	596	28	246	126	147	214	52
FLSD 160 LK	254	302	254	295	108	20	70	14.5	22	160	309	487	657	49	246	126	147	214	52
FLSD 160 M	254	302	210	295	108	20	70	14.5	22	160	309	465	596	28	246	126	147	214	52
FLSD 160 MA	254	302	210	295	108	20	70	14.5	22	160	309	465	596	28	246	126	147	214	52
FLSD 160 MB	254	302	210	295	108	20	70	14.5	22	160	309	465	596	28	246	126	147	214	52
FLSD 180 L	279	330	279	335	121	28	75	14.5	22	180	347	507	653	49	246	126	147	230	52
FLSD 180 M	279	330	241	335	121	28	75	14.5	22	180	347	507	653	49	246	126	147	230	52
FLSD 200 L/LA/LB	318	377	305	370	133	32	81	18.5	22	200	384	547	776	52	246	126	147	265	49
FLSD 225 MK 4 poles	356	428	311	428	149	32	80	18.5	28	225	384	625	830	88.5	246	126	147	265	49
FLSD 225 MK 6 poles	356	428	311	428	149	32	80	18.5	28	225	384	665	830	35.5	352	175	210	265	49
FLSD 225 MR	356	445	311	400	149	44	90	18.5	30	225	384	572	776	52	246	126	147	265	49
FLSD 225 SK	356	428	286	428	149	32	80	18.5	28	225	384	625	830	88.5	246	126	147	265	49
FLSD 250 M	406	476	349	435	168	41	80	24	25	250	481	690	880	63	352	175	210	309	49
FLSD 280 M	457	529	368	499	190	40	85	24	25	280	481	720	1030	33	352	175	210	322	49
FLSD 280 S	457	529	419	499	190	40	85	24	25	280	481	720	1030	33	352	175	210	322	49
FLSD 315 LA/LB	508	600	508	598	216	45	100	27	38	315	624	940	1252	85	400	231	339	-	-
FLSD 315 M	508	600	457	598	216	45	100	27	38	315	624	940	1252	85	400	231	339	-	-
FLSD 315 S	508	600	406	598	216	45	100	27	38	315	624	940	1252	85	400	231	339	-	-

** AC: housing diameter without lifting rings*

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Foot mounted IM 1001 (IMB3)

Ex db IIC T4 Gb

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	133	50	10	34	10	10	80	173	283	259	26	142	80	77	-	-
FLSD 90 LU	140	170	125	155	56	10	33	12	10	90	196	306	324	32	142	80	77	135	41
FLSD 90 SL	140	170	100	155	56	10	33	12	10	90	196	306	297	32	142	80	77	135	41
FLSD 100 L	160	196	140	201	63	18	40	12	13	100	209	316	345	32	142	80	77	135	41
FLSD 100 LG	160	196	140	200	63	10	38	12	13	100	231	325	347	33	142	80	77	148	34.5
FLSD 112 MG	190	230	140	186	70	14	48	12	12	112	231	337	346	33	142	80	77	148	34.5
FLSD 112 MU	190	230	140	186	70	14	48	12	12	112	231	337	387	33	142	80	77	148	34.5
FLSD 132 M	216	255	178	243	89	15	63	12	16	132	272	371	462	55.5	142	80	77	173	35
FLSD 132 MU	216	255	178	243	89	15	63	12	16	132	272	371	506	55.5	142	80	77	173	35
FLSD 132 SM	216	255	140	243	89	15	63	12	16	132	272	371	462	55.5	142	80	77	173	35
FLSD 160 L	254	302	254	295	108	20	70	14.5	22	160	309	518	596	30	242	134	145	214	52
FLSD 160 LK	254	302	254	295	108	20	70	14.5	22	160	309	540	657	51	242	134	145	214	52
FLSD 160 M	254	302	210	295	108	20	70	14.5	22	160	309	518	596	30	242	134	145	214	52
FLSD 160 MA	254	302	210	295	108	20	70	14.5	22	160	309	518	596	30	242	134	145	214	52
FLSD 160 MB	254	302	210	295	108	20	70	14.5	22	160	309	518	596	30	242	134	145	214	52
FLSD 180 L	279	330	279	335	121	28	75	14.5	22	180	347	523	653	51	242	134	145	230	52
FLSD 180 M	279	330	241	335	121	28	75	14.5	22	180	347	523	653	51	242	134	145	230	52
FLSD 200 L/LA/LB	318	377	305	370	133	32	81	18.5	22	200	384	563	776	54	242	134	145	265	49
FLSD 225 MK 4 poles	356	428	311	428	149	32	80	18.5	28	225	384	641	830	90.5	242	134	145	265	49
FLSD 225 MK 6 poles	356	428	311	428	149	32	80	18.5	28	225	384	710	830	48.5	326	185	195	265	49
FLSD 225 MR	356	445	311	400	149	44	90	18.5	30	225	384	588	776	54	242	134	145	265	49
FLSD 225 SK	356	428	286	428	149	32	80	18.5	28	225	384	641	830	90.5	242	134	145	265	49
FLSD 250 M	406	476	349	435	168	41	80	24	25	250	481	735	880	76	326	185	195	309	49
FLSD 280 M	457	529	368	499	190	40	85	24	25	280	481	765	1030	46	326	185	195	322	49
FLSD 280 S	457	529	419	499	190	40	85	24	25	280	481	765	1030	46	326	185	195	322	49
FLSD 315 LA/LB	508	600	508	598	216	45	100	27	38	315	624	893	1252	70	336	217	268	-	-
FLSD 315 M	508	600	457	598	216	45	100	27	38	315	624	893	1252	70	336	217	268	-	-
FLSD 315 S	508	600	406	598	216	45	100	27	38	315	624	893	1252	70	336	217	268	-	-

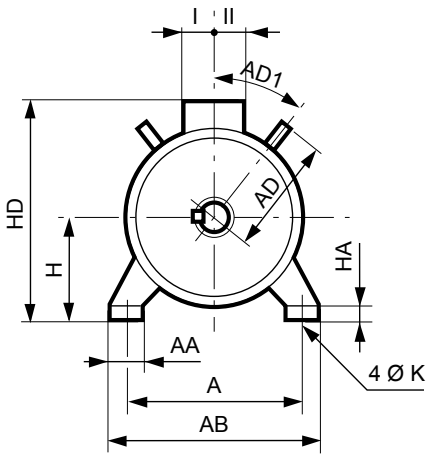
** AC: housing diameter without lifting rings*

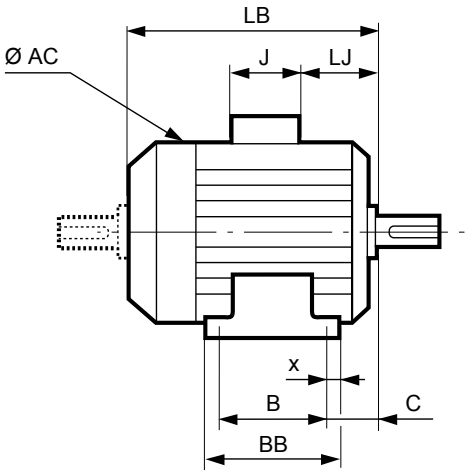
IMfinity® ATEX 3-phase induction motors - IE3 efficiency class

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Foot mounted IM 1001 (IMB3)

Ex db eb IIC T4 Gb

Dimensions in millimetres





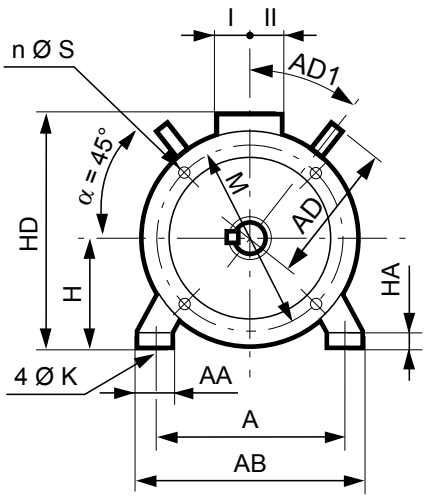
Type	Main dimensions																		
	A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1
FLSD 80 L	125	157	100	133	50	10	34	10	10	80	173	269.5	259	29	136	68	68	-	-
FLSD 90 LU	140	170	125	155	56	10	33	12	10	90	196	292.5	324	35	136	68	68	135	41
FLSD 90 SL	140	170	100	155	56	10	33	12	10	90	196	292.5	297	35	136	68	68	135	41
FLSD 100 L	160	196	140	201	63	18	40	12	13	100	209	302.5	345	35	136	68	68	135	41
FLSD 100 LG	160	196	140	200	63	10	38	12	13	100	231	311.5	347	36	136	68	68	148	34.5
FLSD 112 MG	190	230	140	186	70	14	48	12	12	112	231	323.5	346	36	136	68	68	148	34.5
FLSD 112 MU	190	230	140	186	70	14	48	12	12	112	231	323.5	387	36	136	68	68	148	34.5
FLSD 132 M	216	255	178	243	89	15	63	12	16	132	272	357.5	462	58.5	136	68	68	173	35
FLSD 132 MU	216	255	178	243	89	15	63	12	16	132	272	357.5	506	58.5	136	68	68	173	35
FLSD 132 SM	216	255	140	243	89	15	63	12	16	132	272	357.5	462	58.5	136	68	68	173	35
FLSD 160 L	254	302	254	295	108	20	70	14.5	22	160	309	465	596	28	246	126	147	214	52
FLSD 160 LK	254	302	254	295	108	20	70	14.5	22	160	309	487	657	49	246	126	147	214	52
FLSD 160 M	254	302	210	295	108	20	70	14.5	22	160	309	465	596	28	246	126	147	214	52
FLSD 160 MA	254	302	210	295	108	20	70	14.5	22	160	309	465	596	28	246	126	147	214	52
FLSD 160 MB	254	302	210	295	108	20	70	14.5	22	160	309	465	596	28	246	126	147	214	52
FLSD 180 L	279	330	279	335	121	28	75	14.5	22	180	347	507	653	49	246	126	147	230	52
FLSD 180 M	279	330	241	335	121	28	75	14.5	22	180	347	507	653	49	246	126	147	230	52
FLSD 200 L/LA/LB	318	377	305	370	133	32	81	18.5	22	200	384	547	776	52	246	126	147	265	49
FLSD 225 MK 4 poles	356	428	311	428	149	32	80	18.5	28	225	384	625	830	88.5	246	126	147	265	49
FLSD 225 MK 6 poles	356	428	311	428	149	32	80	18.5	28	225	384	665	830	35.5	352	175	210	265	49
FLSD 225 MR	356	445	311	400	149	44	90	18.5	30	225	384	572	776	52	246	126	147	265	49
FLSD 225 SK	356	428	286	428	149	32	80	18.5	28	225	384	625	830	88.5	246	126	147	265	49
FLSD 250 M	406	476	349	435	168	41	80	24	25	250	481	690	880	63	352	175	210	309	49
FLSD 280 M	457	529	368	499	190	40	85	24	25	280	481	720	1030	33	352	175	210	322	49
FLSD 280 S	457	529	419	499	190	40	85	24	25	280	481	720	1030	33	352	175	210	322	49
FLSD 315 LA/LB	508	600	508	598	216	45	100	27	38	315	624	940	1252	85	400	231	339	-	-
FLSD 315 M	508	600	457	598	216	45	100	27	38	315	624	940	1252	85	400	231	339	-	-
FLSD 315 S	508	600	406	598	216	45	100	27	38	315	624	940	1252	85	400	231	339	-	-

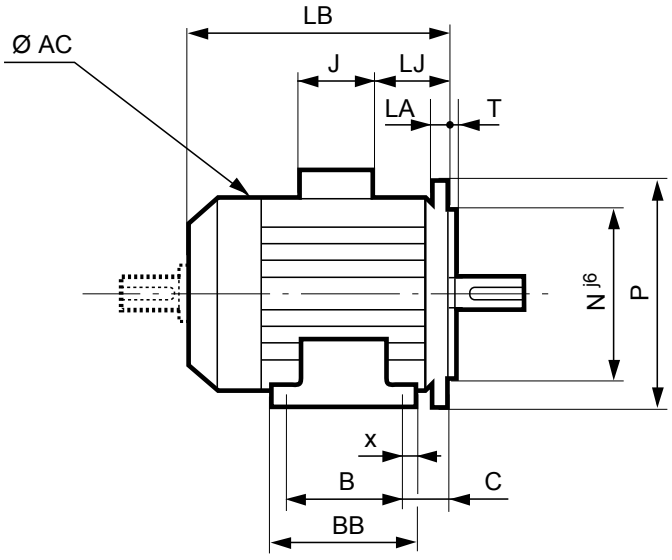
** AC: housing diameter without lifting rings*

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Foot and flange mounted IM 2001 (IM B35)

Ex db IIB T4 Gb

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	Symb
FLSD 80 L	125	157	100	133	50	10	34	10	10	80	173	283	259	26	142	80	77	-	-	FF165
FLSD 90 LU	140	170	125	155	56	10	33	12	10	90	196	306	324	32	142	80	77	135	41	FF165
FLSD 90 SL	140	170	100	155	56	10	33	12	10	90	196	306	297	32	142	80	77	135	41	FF165
FLSD 100 L	160	196	140	201	63	18	40	12	13	100	209	316	345	32	142	80	77	135	41	FF215
FLSD 100 LG	160	196	140	200	63	10	38	12	13	100	231	325	347	33	142	80	77	148	34.5	FF215
FLSD 112 MG	190	230	140	186	70	14	48	12	12	112	231	337	346	33	142	80	77	148	34.5	FF215
FLSD 112 MU	190	230	140	186	70	14	48	12	12	112	231	337	387	33	142	80	77	148	34.5	FF215
FLSD 132 M	216	255	178	243	89	15	63	12	16	132	272	371	462	55.5	142	80	77	173	35	FF265
FLSD 132 MU	216	255	178	243	89	15	63	12	16	132	272	371	506	55.5	142	80	77	173	35	FF265
FLSD 132 SM	216	255	140	243	89	15	63	12	16	132	272	371	462	55.5	142	80	77	173	35	FF265
FLSD 160 L	254	302	254	295	108	20	70	14.5	22	160	309	481	596	30	242	134	145	214	52	FF300
FLSD 160 LK	254	302	254	295	108	20	70	14.5	22	160	309	503	657	51	242	134	145	214	52	FF300
FLSD 160 M	254	302	210	295	108	20	70	14.5	22	160	309	481	596	30	242	134	145	214	52	FF300
FLSD 160 MA	254	302	210	295	108	20	70	14.5	22	160	309	481	596	30	242	134	145	214	52	FF300
FLSD 160 MB	254	302	210	295	108	20	70	14.5	22	160	309	481	596	30	242	134	145	214	52	FF300
FLSD 180 L	279	330	279	335	121	28	75	14.5	22	180	347	523	653	51	242	134	145	230	52	FF300
FLSD 180 M	279	330	241	335	121	28	75	14.5	22	180	347	523	653	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	776	54	242	134	145	265	49	FF350
FLSD 225 MK 4 poles	356	428	311	428	149	32	80	18.5	28	225	384	641	830	90.5	242	134	145	265	49	FF400
FLSD 225 MK 6 poles	356	428	311	428	149	32	80	18.5	28	225	384	688	830	51.5	320	180	190	265	49	FF400
FLSD 225 MR	356	445	311	400	149	44	90	18.5	30	225	384	588	776	54	242	134	145	265	49	FF400
FLSD 225 SK	356	428	286	428	149	32	80	18.5	28	225	384	641	830	90.5	242	134	145	265	49	FF400
FLSD 250 M	406	476	349	435	168	41	80	24	25	250	481	713	880	79	320	180	190	309	49	FF500
FLSD 280 M	457	529	368	499	190	40	85	24	25	280	481	743	1030	49	320	180	190	322	49	FF500
FLSD 280 S	457	529	419	499	190	40	85	24	25	280	481	743	1030	49	320	180	190	322	49	FF500
FLSD 315 LA/LB	508	600	508	598	216	45	100	27	38	315	624	893	1252	70	336	217	268	-	-	FF600
FLSD 315 M	508	600	457	598	216	45	100	27	38	315	624	893	1252	70	336	217	268	-	-	FF600
FLSD 315 S	508	600	406	598	216	45	100	27	38	315	624	893	1252	70	336	217	268	-	-	FF600

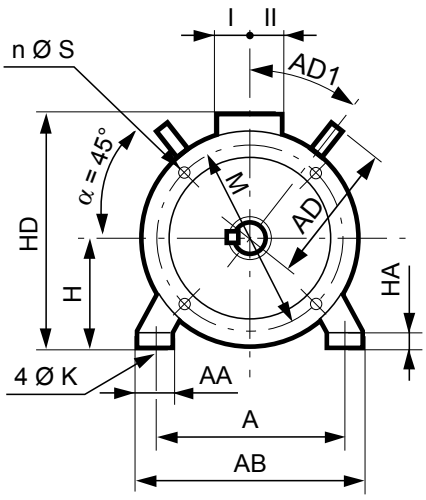
** AC: housing diameter without lifting rings*

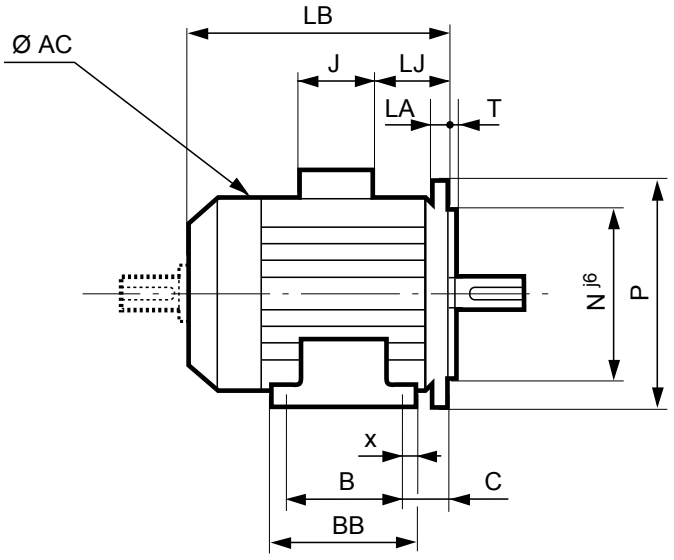
IMfinity® ATEX 3-phase induction motors - IE3 efficiency class

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Foot and flange mounted IM 2001 (IM B35)

Ex db eb IIB T4 Gb

Dimensions in millimetres





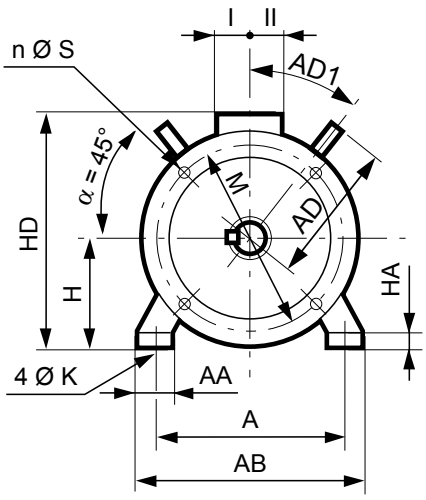
Type	Main dimensions																			
	A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1	Symb
FLSD 80 L	125	157	100	133	50	10	34	10	10	80	173	269.5	259	29	136	68	68	-	-	FF165
FLSD 90 LU	140	170	125	155	56	10	33	12	10	90	196	292.5	324	35	136	68	68	135	41	FF165
FLSD 90 SL	140	170	100	155	56	10	33	12	10	90	196	292.5	297	35	136	68	68	135	41	FF165
FLSD 100 L	160	196	140	201	63	18	40	12	13	100	209	302.5	345	35	136	68	68	135	41	FF215
FLSD 100 LG	160	196	140	200	63	10	38	12	13	100	231	311.5	347	36	136	68	68	148	34.5	FF215
FLSD 112 MG	190	230	140	186	70	14	48	12	12	112	231	323.5	346	36	136	68	68	148	34.5	FF215
FLSD 112 MU	190	230	140	186	70	14	48	12	12	112	231	323.5	387	33	136	68	68	148	34.5	FF215
FLSD 132 M	216	255	178	243	89	15	63	12	16	132	272	357.5	462	58.5	136	68	68	173	35	FF265
FLSD 132 MU	216	255	178	243	89	15	63	12	16	132	272	357.5	506	58.5	136	68	68	173	35	FF265
FLSD 132 SM	216	255	140	243	89	15	63	12	16	132	272	357.5	462	58.5	136	68	68	173	35	FF265
FLSD 160 L	254	302	254	295	108	20	70	14.5	22	160	309	465	596	28	246	126	147	214	52	FF300
FLSD 160 LK	254	302	254	295	108	20	70	14.5	22	160	309	487	657	49	246	126	147	214	52	FF300
FLSD 160 M	254	302	210	295	108	20	70	14.5	22	160	309	465	596	28	246	126	147	214	52	FF300
FLSD 160 MA	254	302	210	295	108	20	70	14.5	22	160	309	465	596	28	246	126	147	214	52	FF300
FLSD 160 MB	254	302	210	295	108	20	70	14.5	22	160	309	465	596	28	246	126	147	214	52	FF300
FLSD 180 L	279	330	279	335	121	28	75	14.5	22	180	347	507	653	49	246	126	147	230	52	FF300
FLSD 180 M	279	330	241	335	121	28	75	14.5	22	180	347	507	653	49	246	126	147	230	52	FF300
FLSD 200 L/LA/LB	318	377	305	370	133	32	81	18.5	22	200	384	547	776	52	246	126	147	265	49	FF350
FLSD 225 MK 4 poles	356	428	311	428	149	32	80	18.5	28	225	384	625	830	88.5	246	126	147	265	49	FF400
FLSD 225 MK 6 poles	356	428	311	428	149	32	80	18.5	28	225	384	665	830	35.5	352	175	210	265	49	FF400
FLSD 225 MR	356	445	311	400	149	44	90	18.5	30	225	384	572	776	52	246	126	147	265	49	FF400
FLSD 225 SK	356	428	286	428	149	32	80	18.5	28	225	384	625	830	88.5	246	126	147	265	49	FF400
FLSD 250 M	406	476	349	435	168	41	80	24	25	250	481	690	880	63	352	175	210	309	49	FF500
FLSD 280 M	457	529	368	499	190	40	85	24	25	280	481	720	1030	33	352	175	210	322	49	FF500
FLSD 280 S	457	529	419	499	190	40	85	24	25	280	481	720	1030	33	352	175	210	322	49	FF500
FLSD 315 LA/LB	508	600	508	598	216	45	100	27	38	315	624	940	1252	85	400	231	339	-	-	FF600
FLSD 315 M	508	600	457	598	216	45	100	27	38	315	624	940	1252	85	400	231	339	-	-	FF600
FLSD 315 S	508	600	406	598	216	45	100	27	38	315	624	940	1252	85	400	231	339	-	-	FF600

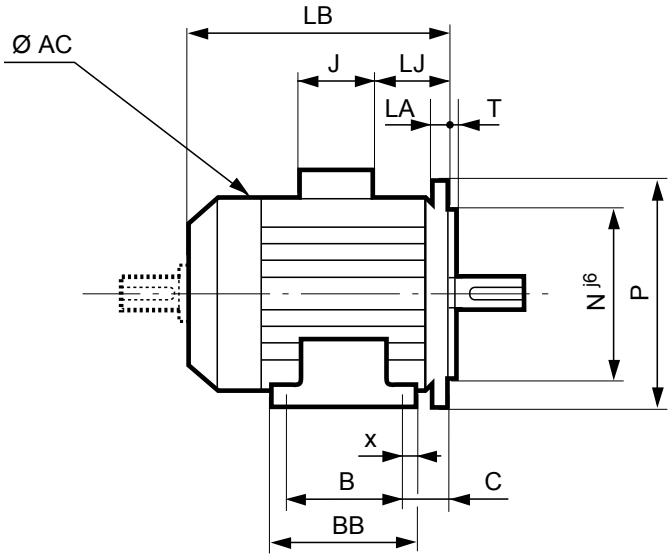
** AC: housing diameter without lifting rings*

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Foot and flange mounted IM 2001 (IM B35)

Ex db IIC T4 Gb

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	Symb
FLSD 80 L	125	157	100	133	50	10	34	10	10	80	173	283	259	26	142	80	77	-	-	FF165
FLSD 90 LU	140	170	125	155	56	10	33	12	10	90	196	306	324	32	142	80	77	135	41	FF165
FLSD 90 SL	140	170	100	155	56	10	33	12	10	90	196	306	297	32	142	80	77	135	41	FF165
FLSD 100 L	160	196	140	201	63	18	40	12	13	100	209	316	345	32	142	80	77	135	41	FF215
FLSD 100 LG	160	196	140	200	63	10	38	12	13	100	231	325	347	33	142	80	77	148	34.5	FF215
FLSD 112 MG	190	230	140	186	70	14	48	12	12	112	231	337	346	33	142	80	77	148	34.5	FF215
FLSD 112 MU	190	230	140	186	70	14	48	12	12	112	231	337	387	33	142	80	77	148	34.5	FF215
FLSD 132 M	216	255	178	243	89	15	63	12	16	132	272	371	462	55.5	142	80	77	173	35	FF265
FLSD 132 MU	216	255	178	243	89	15	63	12	16	132	272	371	506	55.5	142	80	77	173	35	FF265
FLSD 132 SM	216	255	140	243	89	15	63	12	16	132	272	371	462	55.5	142	80	77	173	35	FF265
FLSD 160 L	254	302	254	295	108	20	70	14.5	22	160	309	518	596	30	242	134	145	214	52	FF300
FLSD 160 LK	254	302	254	295	108	20	70	14.5	22	160	309	540	657	51	242	134	145	214	52	FF300
FLSD 160 M	254	302	210	295	108	20	70	14.5	22	160	309	518	596	30	242	134	145	214	52	FF300
FLSD 160 MA	254	302	210	295	108	20	70	14.5	22	160	309	518	596	30	242	134	145	214	52	FF300
FLSD 160 MB	254	302	210	295	108	20	70	14.5	22	160	309	518	596	30	242	134	145	214	52	FF300
FLSD 180 L	279	330	279	335	121	28	75	14.5	22	180	347	560	653	51	242	134	145	230	52	FF300
FLSD 180 M	279	330	241	335	121	28	75	14.5	22	180	347	560	653	51	242	134	145	230	52	FF300
FLSD 200 L/LA/LB	318	377	305	370	133	32	81	18.5	22	200	384	600	776	54	242	134	145	265	49	FF350
FLSD 225 MK 4 poles	356	428	311	428	149	32	80	18.5	28	225	384	678	830	90.5	242	134	145	265	49	FF400
FLSD 225 MK 6 poles	356	428	311	428	149	32	80	18.5	28	225	384	710	830	48.5	326	185	195	265	49	FF400
FLSD 225 MR	356	445	311	400	149	44	90	18.5	30	225	384	625	776	54	242	134	145	265	49	FF400
FLSD 225 SK	356	428	286	428	149	32	80	18.5	28	225	384	678	830	90.5	242	134	145	265	49	FF400
FLSD 250 M	406	476	349	435	168	41	80	24	25	250	481	735	880	76	326	185	195	309	49	FF500
FLSD 280 M	457	529	368	499	190	40	85	24	25	280	481	765	1030	46	326	185	195	322	49	FF500
FLSD 280 S	457	529	419	499	190	40	85	24	25	280	481	765	1030	46	326	185	195	322	49	FF500
FLSD 315 LA/LB	508	600	508	598	216	45	100	27	38	315	624	893	1252	70	336	217	268	-	-	FF600
FLSD 315 M	508	600	457	598	216	45	100	27	38	315	624	893	1252	70	336	217	268	-	-	FF600
FLSD 315 S	508	600	406	598	216	45	100	27	38	315	624	893	1252	70	336	217	268	-	-	FF600

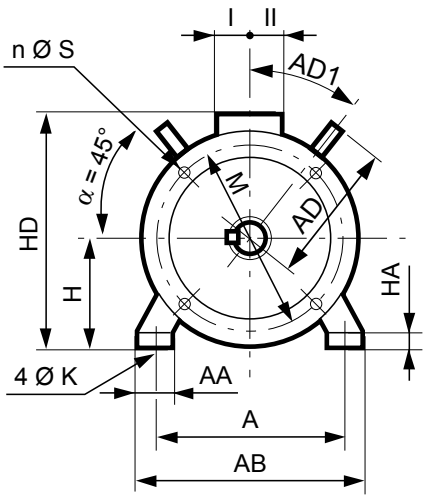
** AC: housing diameter without lifting rings*

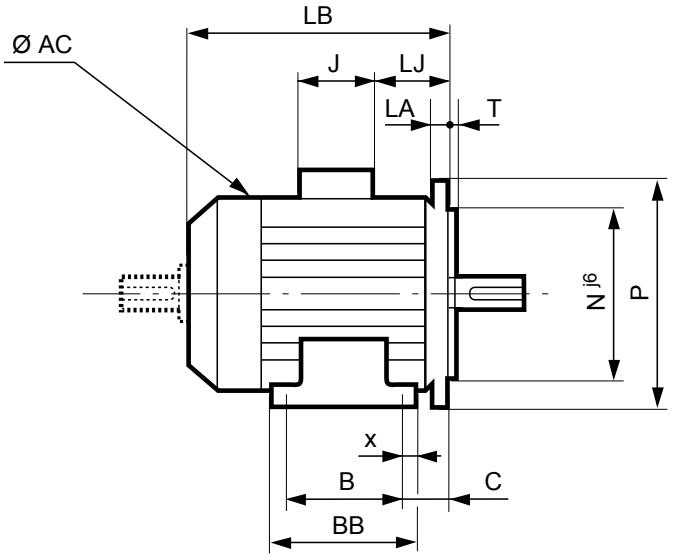
IMfinity® ATEX 3-phase induction motors - IE3 efficiency class

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Foot and flange mounted IM 2001 (IM B35)

Ex db eb IIC T4 Gb

Dimensions in millimetres



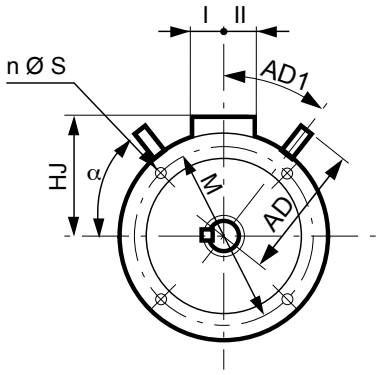


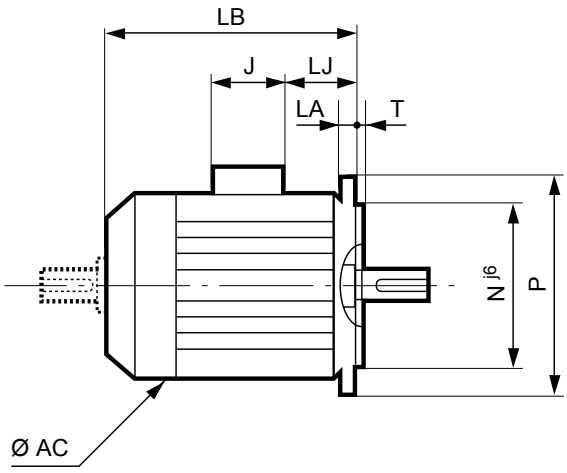
Type	Main dimensions																			
	A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1	Symb
FLSD 80 L	125	157	100	133	50	10	34	10	10	80	173	269.5	259	29	136	68	68	-	-	FF165
FLSD 90 LU	140	170	125	155	56	10	33	12	10	90	196	292.5	324	35	136	68	68	135	41	FF165
FLSD 90 SL	140	170	100	155	56	10	33	12	10	90	196	292.5	297	35	136	68	68	135	41	FF165
FLSD 100 L	160	196	140	201	63	18	40	12	13	100	209	302.5	345	35	136	68	68	135	41	FF215
FLSD 100 LG	160	196	140	200	63	10	38	12	13	100	231	311.5	347	36	136	68	68	148	34.5	FF215
FLSD 112 MG	190	230	140	186	70	14	48	12	12	112	231	323.5	346	36	136	68	68	148	34.5	FF215
FLSD 112 MU	190	230	140	186	70	14	48	12	12	112	231	323.5	387	36	136	68	68	148	34.5	FF215
FLSD 132 M	216	255	178	243	89	15	63	12	16	132	272	357.5	462	58.5	136	68	68	173	35	FF265
FLSD 132 MU	216	255	178	243	89	15	63	12	16	132	272	357.5	506	58.5	136	68	68	173	35	FF265
FLSD 132 SM	216	255	140	243	89	15	63	12	16	132	272	357.5	462	58.5	136	68	68	173	35	FF265
FLSD 160 L	254	302	254	295	108	20	70	14.5	22	160	309	465	596	28	246	126	147	214	52	FF300
FLSD 160 LK	254	302	254	295	108	20	70	14.5	22	160	309	487	657	49	246	126	147	214	52	FF300
FLSD 160 M	254	302	210	295	108	20	70	14.5	22	160	309	465	596	28	246	126	147	214	52	FF300
FLSD 160 MA	254	302	210	295	108	20	70	14.5	22	160	309	465	596	28	246	126	147	214	52	FF300
FLSD 160 MB	254	302	210	295	108	20	70	14.5	22	160	309	465	596	28	246	126	147	214	52	FF300
FLSD 180 L	279	330	279	335	121	28	75	14.5	22	180	347	507	653	49	246	126	147	230	52	FF300
FLSD 180 M	279	330	241	335	121	28	75	14.5	22	180	347	507	653	49	246	126	147	230	52	FF300
FLSD 200 L/LA/LB	318	377	305	370	133	32	81	18.5	22	200	384	547	776	52	246	126	147	265	49	FF350
FLSD 225 MK 4 poles	356	428	311	428	149	32	80	18.5	28	225	384	625	830	88.5	246	126	147	265	49	FF400
FLSD 225 MK 6 poles	356	428	311	428	149	32	80	18.5	28	225	384	665	830	35.5	352	175	210	265	49	FF400
FLSD 225 MR	356	445	311	400	149	44	90	18.5	30	225	384	572	776	52	246	126	147	265	49	FF400
FLSD 225 SK	356	428	286	428	149	32	80	18.5	28	225	384	625	830	88.5	246	126	147	265	49	FF400
FLSD 250 M	406	476	349	435	168	41	80	24	25	250	481	690	880	63	352	175	210	309	49	FF500
FLSD 280 M	457	529	368	499	190	40	85	24	25	280	481	720	1030	33	352	175	210	322	49	FF500
FLSD 280 S	457	529	419	499	190	40	85	24	25	280	481	720	1030	33	352	175	210	322	49	FF500
FLSD 315 LA/LB	508	600	508	598	216	45	100	27	38	315	624	940	1252	85	400	231	339	-	-	FF600
FLSD 315 M	508	600	457	598	216	45	100	27	38	315	624	940	1252	85	400	231	339	-	-	FF600
FLSD 315 S	508	600	406	598	216	45	100	27	38	315	624	940	1252	85	400	231	339	-	-	FF600

** AC: housing diameter without lifting rings*

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Flange mounted IM 3001 (IM B5) - IM 3011 (IM V1)

Dimensions in millimetres





Symbol IEC	Flange dimensions							
	M	N	D	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	14.5	10
FF 215	215	180	250	4	4	45	14.5	13
FF 215	215	180	250	4	4	45	14.5	13
FF 215	215	180	250	4	4	45	14.5	13
FF 265	265	230	300	4	4	45	14.5	13.5
FF 265	265	230	300	4	4	45	14.5	13.5
FF 265	265	230	300	4	4	45	14.5	13.5
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 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 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	60	24	22
FF 600	600	550	660	6	8	60	24	22
FF 600	600	550	660	6	8	60	24	22

Type	Main dimensions								
	AC*	LB	HJ	LJ	J	I	II	AD	AD1
FLSD 80 L	173	259	203	26	142	80	77	-	-
FLSD 90 LU	196	344	216	52	142	80	77	135	41
FLSD 90 SL	196	317	216	52	142	80	77	135	41
FLSD 100 L	209	345	216	32	142	80	77	135	41
FLSD 100 LG	231	347	225	33	142	80	77	148	34.5
FLSD 112 MG	231	346	225	33	142	80	77	148	34.5
FLSD 112 MU	231	387	225	33	142	80	77	148	34.5
FLSD 132 M	272	462	239	55.5	142	80	77	173	35
FLSD 132 MU	272	506	239	55.5	142	80	77	173	35
FLSD 132 SM	272	462	239	55.5	142	80	77	173	35
FLSD 160 L	309	596	358	30	242	134	145	214	52
FLSD 160 LK	347	657	380	51	242	134	145	214	52
FLSD 160 M	309	596	358	30	242	134	145	214	52
FLSD 160 MA	309	596	358	30	242	134	145	214	52
FLSD 160 MB	309	596	358	30	242	134	145	214	52
FLSD 180 L	347	653	380	51	242	134	145	230	52
FLSD 180 M	347	653	380	51	242	134	145	230	52
FLSD 200 L/LA/LB	384	776	400	54	242	134	145	265	48
FLSD 225 MK 4 poles	490	830	485	81	326	185	195	309	50
FLSD 225 MK 6 poles	490	830	453	123	242	134	145	309	50
FLSD 225 MR	384	776	400	54	242	134	145	265	48
FLSD 225 SK	490	830	453	123	242	134	145	309	50
FLSD 250 M	481	830	485	76	326	185	195	309	49
FLSD 280 M	481	980	485	45	326	185	195	322	49
FLSD 280 S	481	980	485	45	326	185	195	322	49
FLSD 315 LA/LB	624	1252	578	70	336	217	268	-	-
FLSD 315 M	624	1252	578	70	336	217	268	-	-
FLSD 315 S	624	1252	578	70	336	217	268	-	-

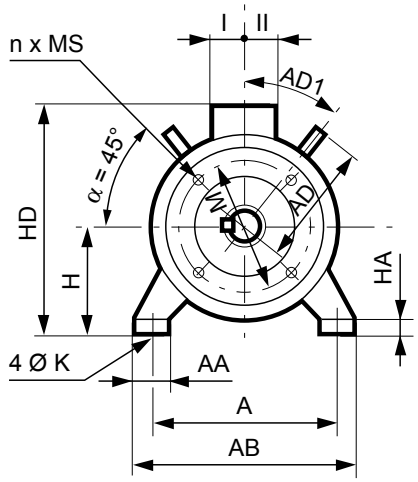
** AC: housing diameter without lifting rings*

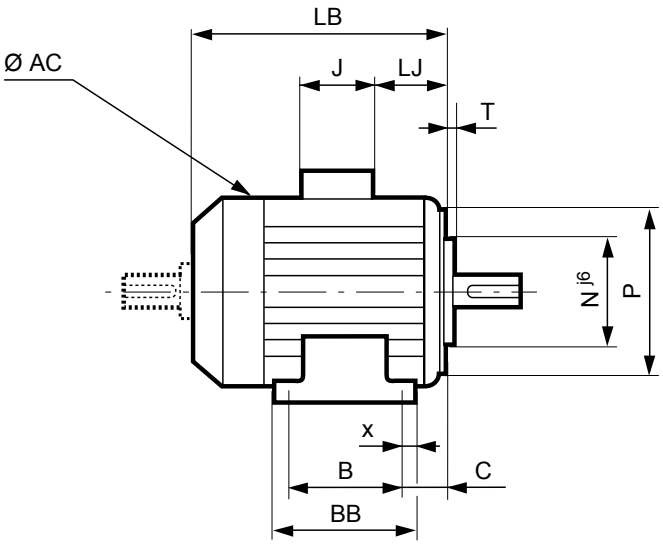
The shape of the FF flange-mounted motors in IM 3001 stops at frame size 250.
Dimensions of shaft extensions identical to those for foot mounted motors.

IMfinity® ATEX 3-phase induction motors - IE3 efficiency class

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Foot and face mounted IM 2101 (IM B34)

Dimensions in millimetres





Ex db IIB T4 - Ex db IIC T4 Gb

Type	Main dimensions																			
	A	AB	B	BB	C	X	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1	Symb.
FLSD 80 L	125	157	100	133	50	10	34	10	10	80	173	283	259	26	142	80	77	-	-	FT 100
FLSD 90 LU	140	170	125	155	56	10	33	12	10	90	196	306	324	32	142	80	77	135	41	FT 115
FLSD 90 SL	140	170	100	155	56	10	33	12	10	90	196	306	297	32	142	80	77	135	41	FT 115
FLSD 100 L	160	196	140	201	63	18	40	12	13	100	209	316	345	32	142	80	77	135	41	FT 130
FLSD 100 LG	160	196	140	200	63	10	38	12	13	100	231	325	347	33	142	80	77	148	34.5	FT 130
FLSD 112 MG	190	230	140	186	70	14	48	12	12	112	231	337	346	33	142	80	77	148	34.5	FT 130
FLSD 112 MU	190	230	140	186	70	14	48	12	12	112	231	337	387	33	142	80	77	148	34.5	FT 130
FLSD 132 M	216	255	178	243	89	15	63	12	16	132	272	371	462	55.5	142	80	77	173	35	FT 215
FLSD 132 MU	216	255	178	243	89	15	63	12	16	132	272	371	506	55.5	142	80	77	173	35	FT 215
FLSD 132 SM	216	255	140	243	89	15	63	12	16	132	272	371	462	55.5	142	80	77	173	35	FT 215

** AC: housing diameter without lifting rings*

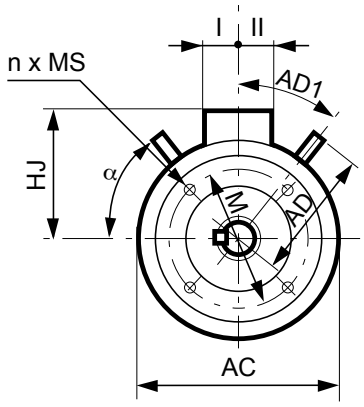
Ex db eb IIB T4 Gb - Ex db eb IIC T4 Gb - Ex db eb IIC T4 Gb VIK

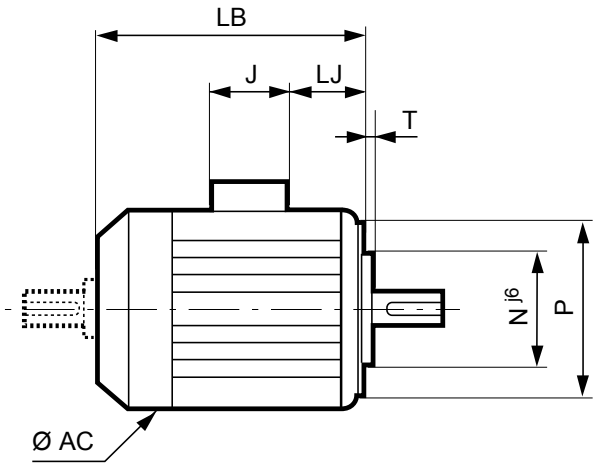
Type	Main dimensions																			
	A	AB	B	BB	C	X	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1	Symb.
FLSD 80 L	125	157	100	133	50	10	34	10	10	80	173	269.5	259	29	136	68	68	-	-	FT 100
FLSD 90 LU	140	170	125	155	56	10	33	12	10	90	196	292.5	324	35	136	68	68	135	41	FT 115
FLSD 90 SL	140	170	100	155	56	10	33	12	10	90	196	292.5	297	35	136	68	68	135	41	FT 115
FLSD 100 L	160	196	140	201	63	18	40	12	13	100	209	302.5	345	35	136	68	68	135	41	FT 130
FLSD 100 LG	160	196	140	200	63	10	38	12	13	100	231	311.5	347	36	136	68	68	148	34.5	FT 130
FLSD 112 MG	190	230	140	186	70	14	48	12	12	112	231	323.5	346	36	136	68	68	148	34.5	FT 130
FLSD 112 MU	190	230	140	186	70	14	48	12	12	112	231	323.5	387	36	136	68	68	148	34.5	FT 130
FLSD 132 M	216	255	178	243	89	15	63	12	16	132	272	357.5	462	58.5	136	68	68	173	35	FT 215
FLSD 132 MU	216	255	178	243	89	15	63	12	16	132	272	357.5	506	58.5	136	68	68	173	35	FT 215
FLSD 132 SM	216	255	140	243	89	15	63	12	16	132	272	357.5	462	58.5	136	68	68	173	35	FT 215

** AC: housing diameter without lifting rings*

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Face mounted IM 3601 (IM B14)

Dimensions in millimetres





Symbol IEC	Flange dimensions							
	M	N	D	T	n	α°	S	LA
FT 100	100	80	120	3	4	45	M6	-
FT 115	115	95	140	3	4	45	M8	-
FT 115	115	95	140	3	4	45	M8	-
FT 130	130	110	160	3.5	4	45	M8	-
FT 130	130	110	160	3.5	4	45	M8	-
FT 130	130	110	160	3.5	4	45	M8	-
FT 130	130	110	160	3.5	4	45	M8	-
FT 215	215	180	250	4	4	45	M12	-
FT 215	215	180	250	4	4	45	M12	-
FT 215	215	180	250	4	4	45	M12	-

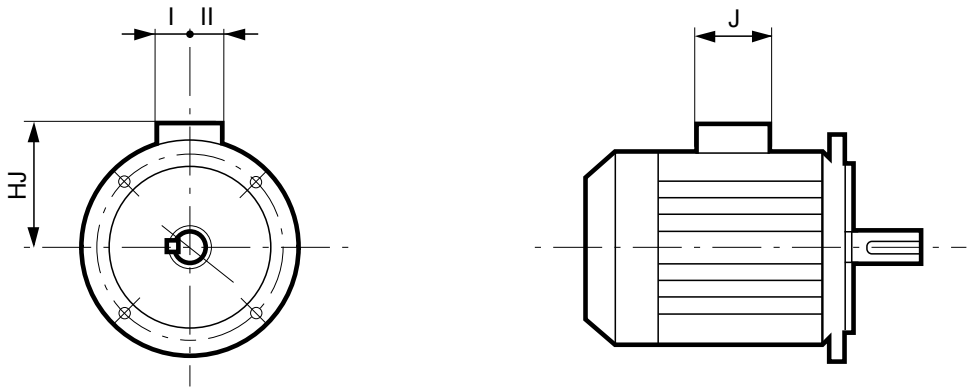
Type	Main dimensions								
	AC*	LB	HJ	LJ	J	I	II	AD	AD1
FLSD 80 L	173	259	203	26	142	80	77	-	-
FLSD 90 LU	196	324	216	32	142	80	77	135	41
FLSD 90 SL	196	297	216	32	142	80	77	135	41
FLSD 100 L	209	345	216	32	142	80	77	135	41
FLSD 100 LG	231	347	225	33	142	80	77	148	34.5
FLSD 112 MG	231	346	225	33	142	80	77	148	34.5
FLSD 112 MU	231	387	225	33	142	80	77	148	34.5
FLSD 132 M	272	462	239	55.5	142	80	77	173	35
FLSD 132 MU	272	506	239	55.5	142	80	77	173	35
FLSD 132 SM	272	462	239	55.5	142	80	77	173	35

** AC: housing diameter without lifting rings*

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Terminal box

Dimensions in millimetres

Increased safety "eb" terminal box



Type	J	HJ	I	II
FLSD 80 L	142	203	80	77
FLSD 90 LU	142	216	80	77
FLSD 90 SL	142	216	80	77
FLSD 100 L	142	216	80	77
FLSD 100 LG	142	225	80	77
FLSD 112 MG	142	225	80	77
FLSD 112 MU	142	225	80	77
FLSD 132 M	142	239	80	77
FLSD 132 MU	142	239	80	77
FLSD 132 SM	142	239	80	77
FLSD 160 L	246	305	126	147
FLSD 160 LK	246	327	126	147
FLSD 160 M	246	305	126	147
FLSD 160 MA	246	305	126	147
FLSD 160 MB	246	305	126	147
FLSD 180 L	246	347	126	147
FLSD 180 M	246	347	126	147
FLSD 200 L/LA/LB	246	347	126	147
FLSD 225 MK 4 poles	246	400	126	147
FLSD 225 MK 6 poles	352	440	175	210
FLSD 225 MR	246	347	126	147
FLSD 225 SK	246	400	126	147
FLSD 250 M	352	440	175	210
FLSD 280 M	352	440	175	210
FLSD 280 S	352	440	175	210
FLSD 315 LA/LB	400	625	231	339
FLSD 315 M	400	625	231	339
FLSD 315 S	400	625	231	339

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Bearings and lubrication

PERMANENTLY GREASED BEARINGS

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

Type	Frame size	Polarity	Bearing type Permanently greased	
			Rear bearing N.D.E.	Front Bearing D.E.
FLSD	80	2; 4; 6	6204 ZZ C3	6204 ZZ C3
	90	2; 4; 6	6205 ZZ C3	6205 ZZ C3
	100 L	2; 4; 6	6205 ZZ C3	6206 ZZ C3
	100 LG - 112 MG/MU	2; 4; 6	6206 ZZ C3	6206 ZZ C3
	132 M	2; 4; 6	6308 ZZ C3	6308 ZZ C3

BEARINGS WITH GREASE NIPPLES

For open bearing assemblies of frame size ≥ 160 mm fitted with grease nipples, the table below indicates, depending on the type of motor, the lubrication intervals to be respected at 25°C, 40°C and 55°C for a machine installed with a horizontal shaft.

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

Series	Type	Polarity	Type of bearings for bearing housings with grease nipples		25°C				40°C				55°C			
					N.D.E.		D.E.		N.D.E.		D.E.		N.D.E.		D.E.	
			N.D.E.	D.E.	Quantity of grease in grams	Regreasing intervals in hours	Quantity of grease in grams	Regreasing intervals in hours	Quantity of grease in grams	Regreasing intervals in hours	Quantity of grease in grams	Regreasing intervals in hours	Quantity of grease in grams	Regreasing intervals in hours	Quantity of grease in grams	Regreasing intervals in hours
FLSD	160 MA/MB/L	2	6210 C3	6309 C3	8	19300	11	18500	8	19300	11	18500	8	19300	11	18500
	180 M		6212 C3	6310 C3	11	14900	13	16200	11	14900	13	16200	11	14900	13	16200
	200 LA/LB, 225 MR		6313 C3	6313 C3	20	11000	20	11000	20	11000	20	11000	20	11000	20	11000
	250 M, 280 S/M		6314 C3	6316 C3	23	9700	29	7500	23	9700	29	7500	23	9700	29	7500
	315 S/M (IIB/IIC)		6316 C3	6218 C3	29	7500	21	7500	29	7500	21	7500	29	7500	21	7500
	315 LA/LB (IIB/IIC)		6316 C3	6218 C3	29	7500	21	7500	29	7500	21	7500	29	7500	21	4700
	160 M/L	4	6210 C3	6309 C3	8	25000	11	25000	8	25000	11	25000	8	25000	11	25000
	180 M/L		6212 C3	6310 C3	11	25000	13	25000	11	25000	13	25000	11	25000	13	25000
	200 L		6313 C3	6313 C3	20	25000	20	25000	20	25000	20	25000	20	25000	20	25000
	225 SK/MK, 250 M		6314 C3	6316 C3	23	25000	29	21900	23	25000	29	21900	23	25000	29	21900
	280 S/M		6314 C3	6316 C3	23	25000	29	21900	23	25000	29	21900	23	25000	29	13800
	315 S (IIB/IIC)		6316 C3	6320 C3	29	21900	44	16600	29	21900	44	16600	29	21900	44	16600
	315 M (IIB/IIC)		6316 C3	6320 C3	29	21900	44	16600	29	21900	44	16600	29	21900	44	13100
	315 LA/LB (IIB/IIC)		6316 C3	6320 C3	29	21900	44	16600	29	21900	44	16600	29	21900	44	8200
	160 M	6	6210 C3	6309 C3	8	25000	11	25000	8	25000	11	25000	8	25000	11	25000
	160 LK, 180 L		6212 C3	6310 C3	11	25000	13	25000	11	25000	13	25000	11	25000	13	25000
	200 LA/LB		6313 C3	6313 C3	20	25000	20	25000	20	25000	20	25000	20	25000	20	25000
	225 MK, 250 M, 280 S/M		6314 C3	6316 C3	23	25000	29	25000	23	25000	29	25000	23	25000	29	25000
	315 S/M/LA/LB		6316 C3	6320 C3	29	25000	44	25000	29	25000	44	25000	29	25000	44	25000

CONSTRUCTION AND SPECIAL ATMOSPHERES

For a machine installed with a vertical shaft, the lubrication intervals are approximately 80% of the values shown in the table above.
NB: The quality and quantity of grease along with the lubrication interval are indicated on the machine nameplate.

In the case of special fitting arrangements (motors with roller bearing at the front or other mountings), machines with frame size ≥ 160 mm are fitted with grease nipple bearings.
The instructions required for bearing housing maintenance are shown on the machine nameplate.

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Bearings and lubrication

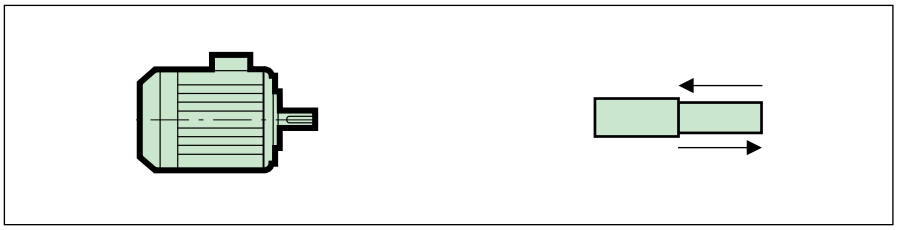
BEARING MOUNTING PRINCIPLE

FLSD series		Horizontal shaft	Vertical shaft	
			Shaft end down	Shaft end up
Foot mounted motors	Mounting arrangements	B3 / B6 / B7 / B8	V5	V6
	standard fitting	The Front bearing is: - at Front stop for frame size ≤ 132 - locked for 160 ≤ frame size ≤ 315 S The Rear bearing is locked from 315 M to 315 LB.	The Front bearing is: - at Front stop for frame size ≤ 132 - locked for 160 ≤ frame size ≤ 315 S The Rear bearing is locked from 315 M to 315 LB.	The Front bearing is: - at Front stop for frame size ≤ 90 - locked for 100 ≤ frame size ≤ 315 S The Rear bearing is locked from 315 M to 315 LB.
	on request	Front bearing locked for frame size ≤ 132	Front bearing locked for frame size ≤ 132	Front bearing locked for frame size ≤ 90
Flange mounted motors (or feet and flange)	Mounting arrangements	B5 / B35 / B14 / B34	V1 / V15 / V18 / V58	V3 / V36 / V19 / V69
	standard fitting	The Front bearing is locked from 80 to 315 S. The Rear bearing is locked from 315 M to 315 LB.	The Front bearing is locked from 80 to 315 S. The Rear bearing is locked from 315 M to 315 LB.	The Front bearing is locked from 80 to 315 S. The Rear bearing is locked from 315 M to 315 LB.

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Axial loads

Horizontal motor

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



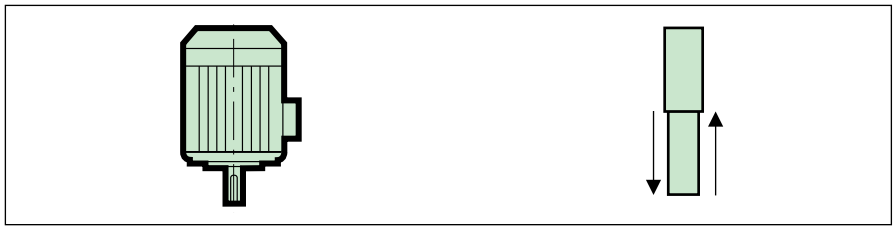
Series	Type	Polarity	Permissible axial load (daN) on the main drive shaft for standard fitting of bearings IM B3 / B6 IM B7 / B8 IM B5 / B35 IM B14 / B34											
			3000 rpm				1500 rpm				1000 rpm			
			→		←		→		←		→		←	
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	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

IMfinity® ATEX 3-phase induction motors - IE3 efficiency class

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Axial loads

Vertical motor
Shaft end downwards

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

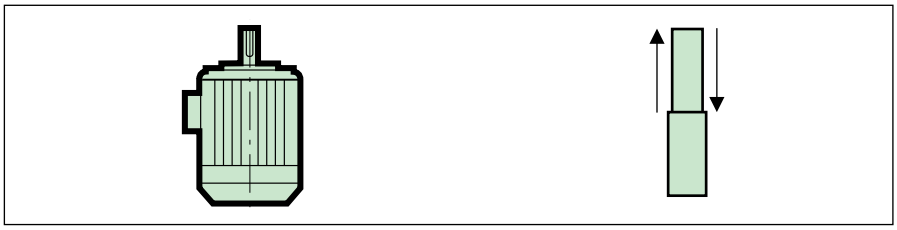


Series	Type	Polarity	Permissible axial load (daN) on the main drive shaft for standard fitting of bearings IM V5 IM V1 / V15 IM V18 / V58											
			3000 rpm				1500 rpm				1000 rpm			
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 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

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Axial loads

Vertical motor
Shaft end upwards

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

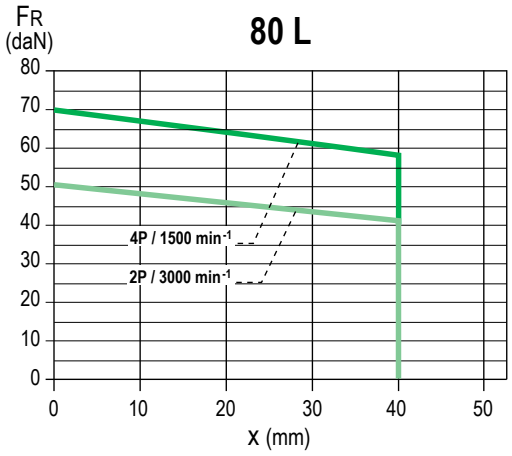


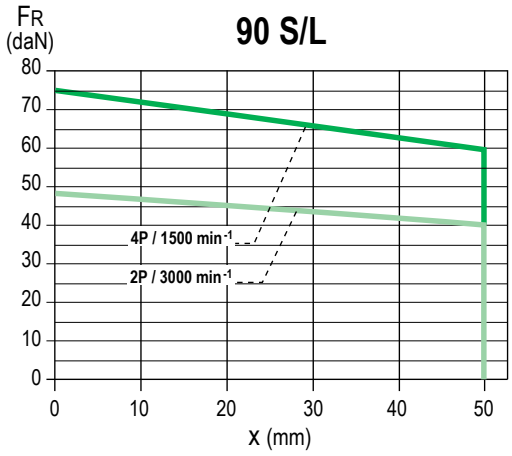
Series	Type	Polarity	Permissible axial load (daN) on the main drive shaft for standard fitting of bearings IM V6 / IM V3 / V36 / IM V19 / V69											
			3000 rpm ↓		3000 rpm ↑		1500 rpm ↓		1500 rpm ↑		1000 rpm ↓		1000 rpm ↑	
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours
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

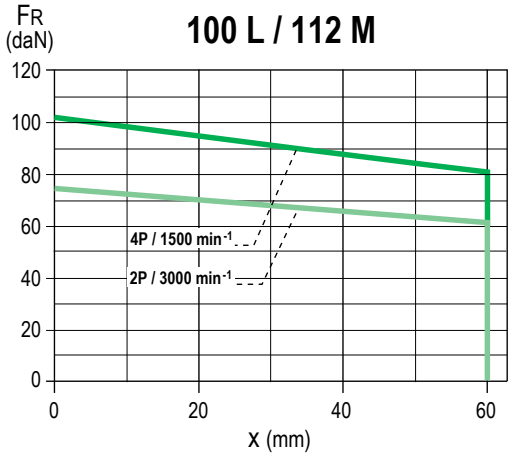
ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Radial loads

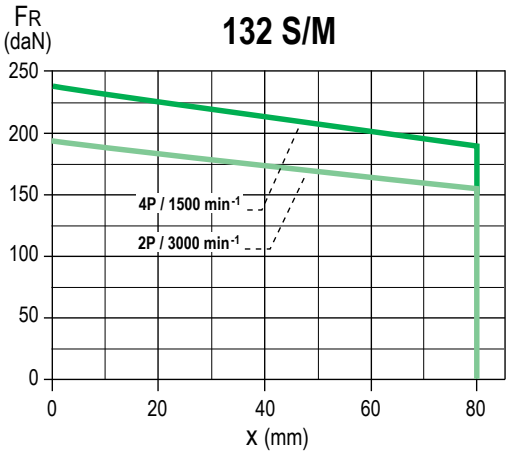
STANDARD FITTING ARRANGEMENT

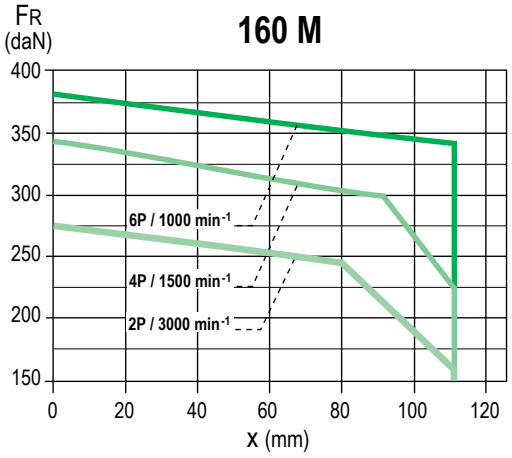
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder

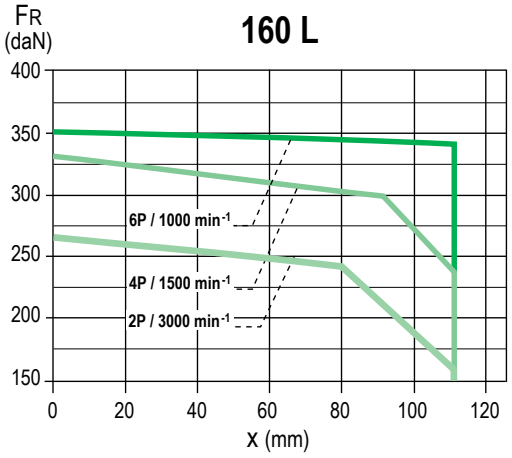










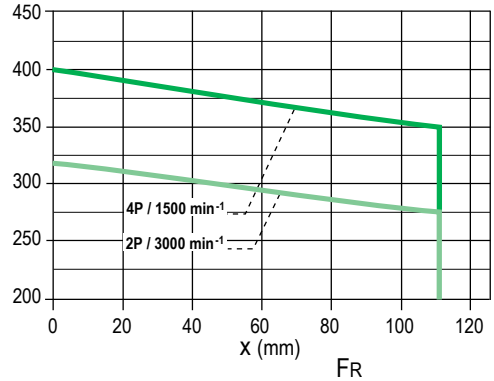


ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Radial loads

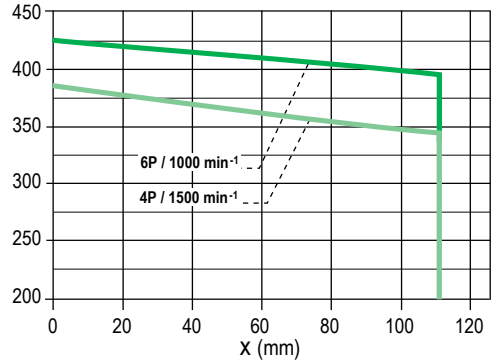
STANDARD FITTING ARRANGEMENT

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

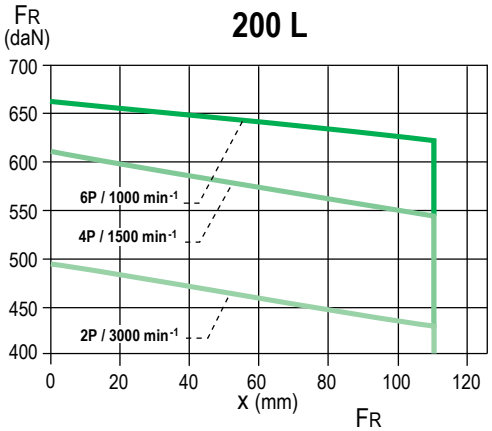
180 M



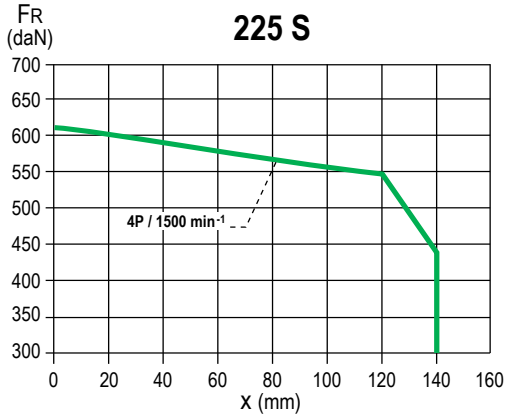
180 L



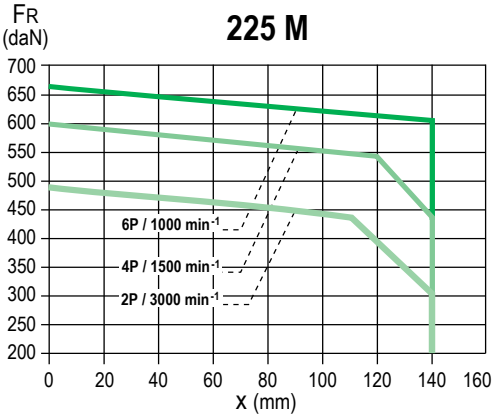
200 L



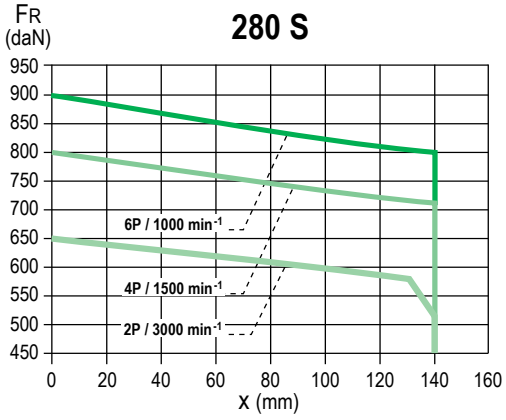
225 S



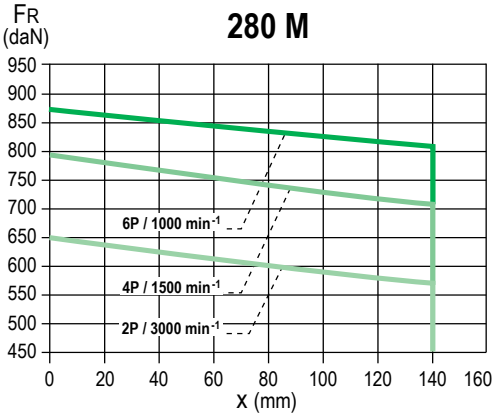
225 M



280 S



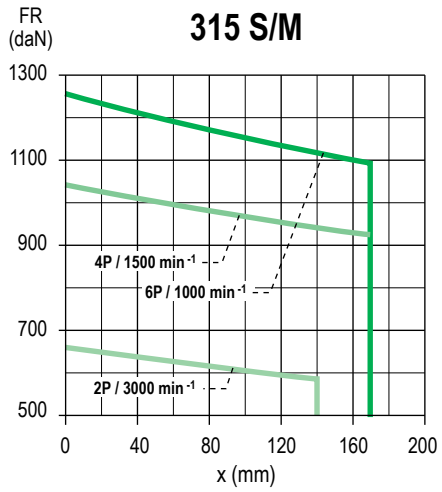
280 M

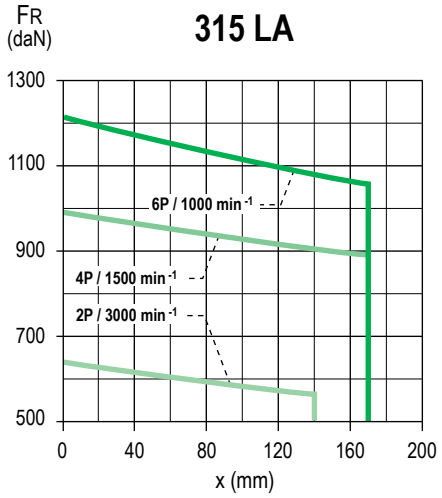


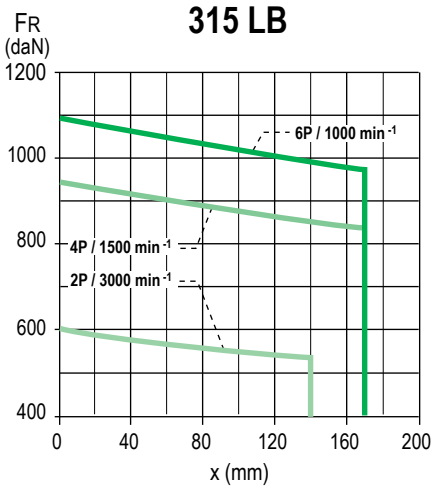
ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Radial loads

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







ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Radial loads

SPECIAL FITTING ARRANGEMENT

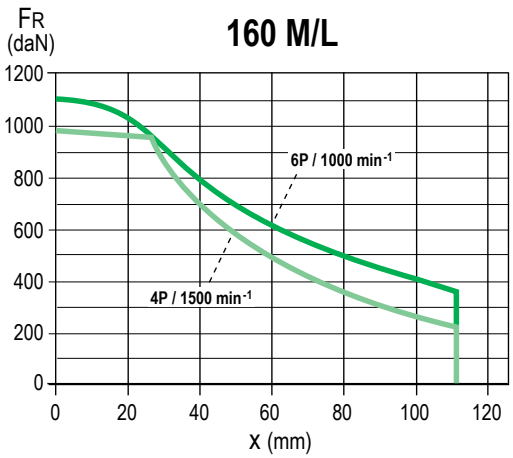
Type of drive end roller bearings

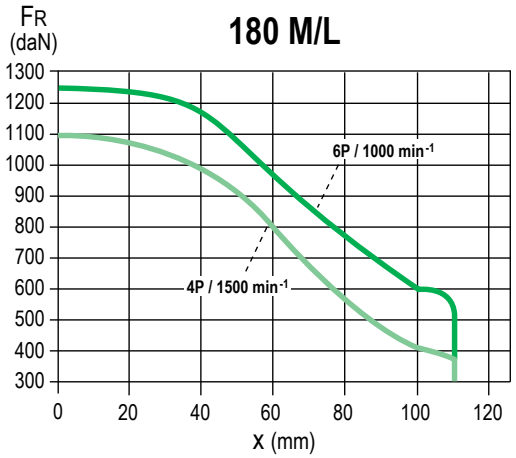
Series	Type	Polarity	Rear bearing (N.D.E.)	Front Bearing (D.E.)
FLSD	160 M/L	4	6210 C3	NU 309
	180 M/L		6212 C3	NU 310
	200 L		6313 C3	NU 313
	225 SK/MK, 250 M		6314 C3	NU 316
	280 S/M		6314 C3	NU 316
	315 S (IIB/IIC)		6316 C3	NU 320
	315 M (IIB/IIC)		6316 C3	NU 320
	315 LA/LB (IIB/IIC)		6316 C3	NU 320
	160 M	6	6210 C3	NU 309
	160 LK, 180 L		6212 C3	NU 310
	200 LA/LB		6313 C3	NU 313
	225 MK, 250 M, 280 S/M		6314 C3	NU 316
	315 S/M/LA/LB		6316 C3	NU 320

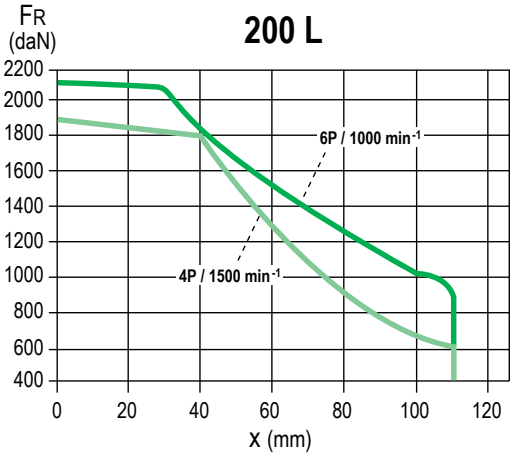
ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Radial loads

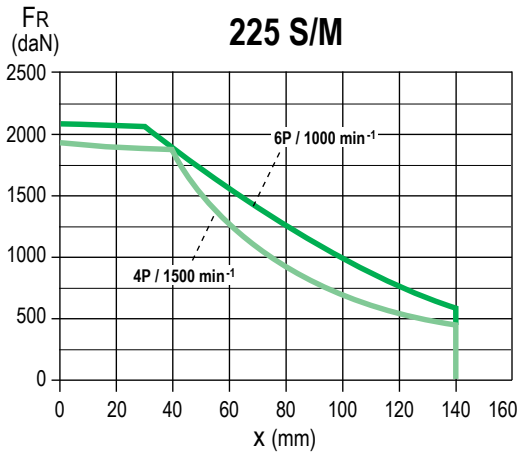
SPECIAL FITTING ARRANGEMENT

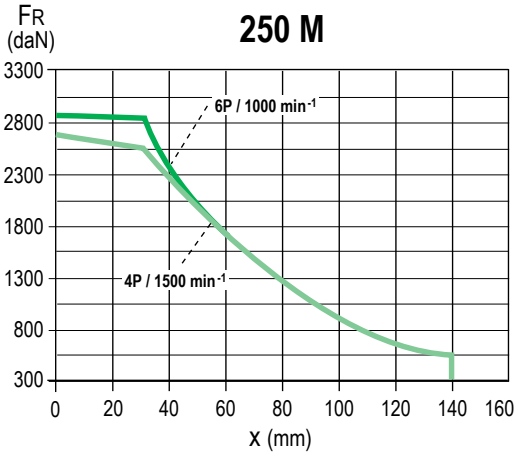
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder

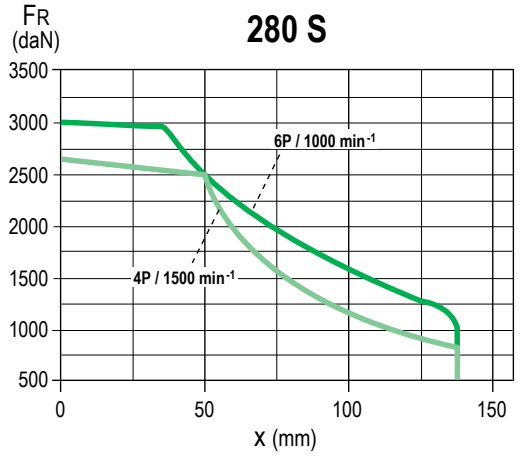








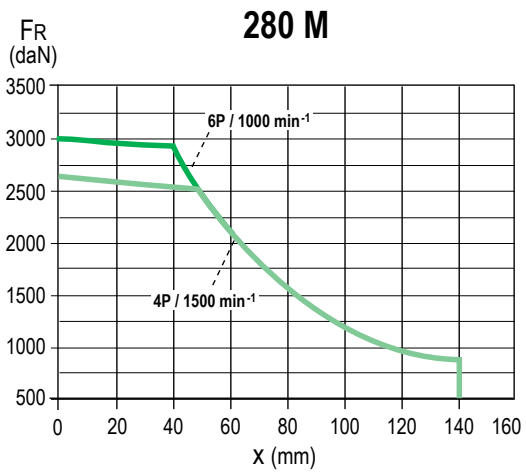


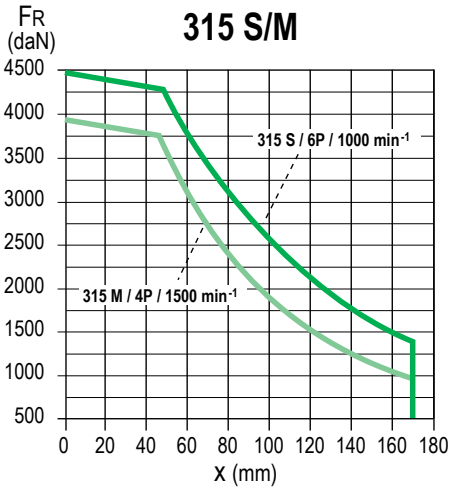


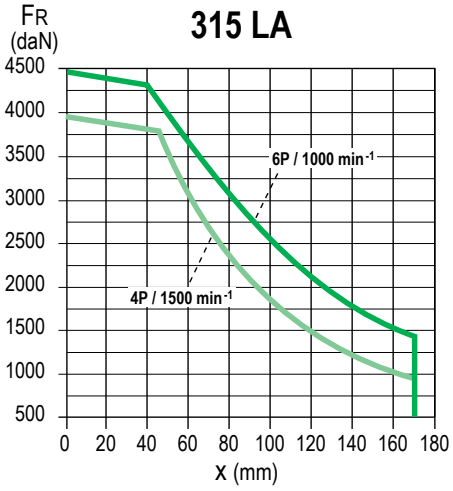
ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Radial loads

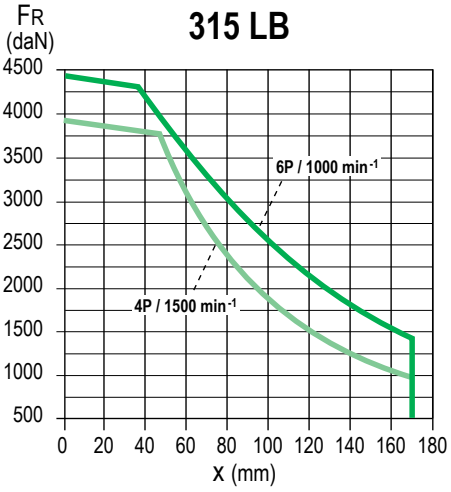
SPECIAL FITTING ARRANGEMENT

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









ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Terminal box connections

DESCRIPTIVE TABLE OF TERMINAL BOXES FOR RATED SUPPLY VOLTAGE 400 V (AS PER EN 50262)

Series	Type	Number and type of standard drill holes	Max. size of power cable entry/entries		
			1 main entry + 1 auxiliary drill hole ISO M20 x 1.5	1 main entry + 2 auxiliary drill holes ISO M20 x 1.5	2 main entries + 2 auxiliary drill holes ISO M20 x 1.5
FLSD	80	2 ISO M20 x 1.5	1 ISO M32 x 1.5	1 ISO M32* x 1.5	NA
	90				
	100				
	112	1 ISO M25 x 1.5 1 ISO M20 x 1.5			
	132				
	160	1 ISO M40 x 1.5 1 ISO M20 x 1.5	1 ISO M40 x 1.5	1 ISO M40 x 1.5	2 ISO M40 x 1.5
	180				
	200	1 ISO M50 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
	225				
	250				
	280	1 ISO M63 x 1.5 1 ISO M20 x 1.5			
	315	1 ISO M75 x 1.5 1ISO M20 x 1.5	1 ISO M80 x 1.5	1 ISO M80 x 1.5	2 ISO M80 x 1.5

** In "db" and "db eb" terminal boxes, the 2nd auxiliary entry must be installed in position 3.*

SUPPLY CABLES

FLSD 80-112

The motors are supplied with cable entries with plugs.
On request, they can be fitted with:
- a larger cable gland,
- a second cable gland for power and/or an ISO M20 x 1.5 cable gland for accessories,
- cable glands for shielded cables.

FLSD 132-315

Motors of sizes greater than or equal to 132 are fitted as standard with a threaded cable entry with plug for power and an ISO M20 x 1.5 auxiliary entry with plug.
As an option, they can be fitted with:
- an oversized cable entry,
- a second cable entry for power and/or an additional entry for auxiliaries,
- cable glands for shielded or non-shielded cable(s).

Depending on the ambient temperature, especially above 40°C, the power cable must be suitable for 100°C.

TERMINAL BLOCKS DIRECTION OF ROTATION

Standard motors are fitted with a 6-terminal safety block, with the terminal markings complying with or 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 shaft end.

If any two of the phases are changed over, the motor will run in the opposite direction (make sure that the motor has been designed to run in both directions).

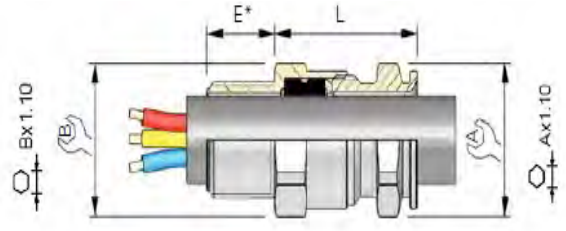
If the motor is fitted with accessories (thermal protection or space heater), these must be connected on terminal blocks with labelled wires.

Frame size	Terminals	Material	Torque tightening (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 & 315 LB	M12	steel	35

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Terminal box connections

CABLE GLAND TYPES FOR UNSHIELDED CABLES
(as option only)

Cable gland: Ex for unshielded cable(s)
Type: ADE 1F2
Anchoring: requires additional anchoring
Material: Nickel-plated brass as standard



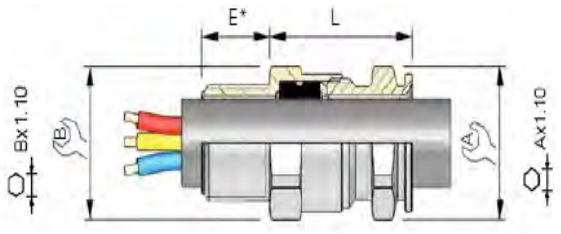
Example of selection: ADE 1F2 M25 No. 5

Selection table			Dimensions				
Series	Thread	Thread code	Tightening range	A	B	L	ADE size
	ISO		External sheath Min - Max (mm)				
ADE 1F2	12	M12	4.5 - 8.0	17	17	25	4
ADE 1F2	16	M16	4.5 - 8.5	17	19	25	4
ADE 1F2	16	M16	7.0 - 12.0	19	19	28	5
ADE 1F2	20	M20	2.8 - 5.5	15	24	24	3
ADE 1F2	20	M20	4.5 - 8.5	17	24	25	4
ADE 1F2	20	M20	7.0 - 12.0	19	24	28	5
ADE 1F2	20	M20	10.0 - 16.0	24	24	32	6
ADE 1F2	25	M25	7.0 -12.0	19	30	28	5
ADE 1F2	25	M25	10.0 - 16.0	24	30	32	6
ADE 1F2	25	M25	13.5 - 20.5	30	30	37	7
ADE 1F2	32	M32	18.0 - 27.5	41	41	46	8
ADE 1F2	40	M40	23.0 - 34.0	48	48	50	9
ADE 1F2	50	M50	29.0 - 41.0	55	55	52	10
ADE 1F2	50	M50	35.0 - 45.0	64	64	57	11
ADE 1F2	63	M63	42.0 - 56.0	72	72	60	12
ADE 1F2	75	M75	50.0 - 65.0	85	85	68	13
ADE 1F2	90	M90	58.0 - 74.0	95	95	69	14
ADE 1F2	90	M90	66.0 - 83.0	110	110	80	15
ADE 1F2	110	M110	75.0 - 93.0	120	120	80	16
ADE 1F2	110	M110	85.0 - 104.0	135	135	90	17

ATEX GAS motors - Zone 1
FLSD series - Cast iron - Mechanical characteristics
Terminal box connections

CABLE GLAND TYPES FOR SHIELDED CABLES
(as option only)

Cable gland: Ex for shielded cable(s)
Type: ADE 4F
Anchoring: 100%
Material: Nickel-plated brass as standard



Example of selection: ADE 4F M25 No. 7

Selection table			Dimensions						
Series	Thread	Thread code	Tightening range		Conductors	A	B	L	ADE size
	ISO		Internal sheath Min - Max (mm)	External sheath Min - Max (mm)	Shielding thickness (mm)				
ADE 4F	12	M12	4.5 - 8.0	7.0 - 12.0	0.2 - 0.9	19	19	46	5
ADE 4F	16	M16	2.8 - 5.5	4.5 - 8.5	0.2 - 0.9	17	19	41	4
ADE 4F	16	M16	4.5 - 8.5	7.0 - 12.0	0.2 - 0.9	19	19	46	5
ADE 4F	16	M16	7.0 - 12.0	10.0 - 16.0	0.2 - 1.3	24	24	51	6
ADE 4F	20	M20	2.8 - 5.5	4.5 - 8.5	0.2 - 0.9	17	24	41	4
ADE 4F	20	M20	4.5 - 8.5	7.0 - 12.0	0.2 - 0.9	19	24	46	5
ADE 4F	20	M20	7.0 - 12.0	10.0 - 16.0	0.2 - 1.25	24	24	51	6
ADE 4F	20	M20	10.0 - 15.5	13.5 - 21.0	0.2 - 1.25	30	30	57	7
ADE 4F	25	M25	7.0 - 12.0	10.0 - 16.0	0.2 - 1.25	24	30	51	6
ADE 4F	25	M25	10.0 - 15.5	13.5 - 21.0	0.2 - 1.25	30	30	57	7
ADE 4F	25	M25	13.5 - 20.5	18.0 - 27.5	0.2 - 1.6	41	41	68	8
ADE 4F	32	M32	13.5 - 21.0	18.0 - 27.5	0.2 - 1.6	41	41	68	8
ADE 4F	32	M32	18.0 - 26.0	23.0 - 34.0	0.2 - 1.6	48	48	76	9
ADE 4F	40	M40	18.0 - 27.5	23.0 - 34.0	0.2 - 1.6	48	48	76	9
ADE 4F	40	M40	23.0 - 34.0	29.0 - 41.0	0.2 - 2.0	55	55	88	10
ADE 4F	50	M50	23.0 - 34.0	29.0 - 41.0	0.2 - 2.0	55	55	88	10
ADE 4F	50	M50	29.0 - 41.0	35.0 - 48.0	0.2 - 2.5	64	64	97	11
ADE 4F	63	M63	35.0 - 48.0	42.0 - 56.0	0.2 - 2.5	72	72	102	12
ADE 4F	63	M63	42.0 - 53.0	50.0 - 65.0	0.2 - 2.5	85	85	117	13
ADE 4F	75	M75	42.0 - 56.0	50.0 - 65.0	0.2 - 2.5	85	85	117	13
ADE 4F	75	M75	52.0 - 62.5	58.0 - 74.0	0.2 - 2.5	95	95	124	14
ADE 4F	90	M90	58.0 - 74.0	66.0 - 83.0	0.2 - 3.15	110	110	133	15
ADE 4F	90	M90	66.0 - 78.0	75.0 - 93.0	0.2 - 3.15	120	120	140	16
ADE 4F	90	M90	66.0 - 83.0	85.0 - 104.0	0.2 - 3.5	135	135	150	17
ADE 4F	110	M110	75.0 - 93.0	85.0 - 104.0	0.2 - 3.5	135	135	150	17

ATEX GAS motors - Zone 1
FLSD series - Cast iron
Optional equipment

Mechanical adaptations	Frame size
DE and NDE bearings with 1 machining, for vibration sensor in position 12H, 12H-3H, or 12H-3H-9H	≥ 160
Different FF flanges from IEC	All
Different FT flanges from IEC	≤ 132
DE roller bearing	≥ 160 - 4p & +
Insulated DE or NDE bearing	≥ 280
2nd standard catalogue NDE shaft end	All
2nd special NDE shaft end	All
Keyed cylindrical NDE shaft (secondary shaft end) as per IEC	All
Stainless-steel shaft	All
Class B balancing	All
Stainless steel fan cover	All
Steel fan cover + drip cover	All
Metal fan	All
Nameplate in stainless steel (as standard from HA 160 on)	All
Stainless-steel fastenings	≥ 160
Three-phase axial forced ventilation - IC 416 A	≥ 160
Incremental encoder / 1024 or 4096 pts / 5v or 11/30 V	All
Condensates evacuation holes	≥ 160
Positioning holes (jacking screws)	≥ 250
Radial seal for motor in vertical position with shaft end upwards	All

Electrical adaptations	Frame size
Terminal board with anti-rotation system as standard	All
Increased safety “eb” terminal box	All
Non-magnetic PE support plate for "db eb" version	≥ 160
Special voltages (excluding variable speed)	All
Definition for Id/In ≤ 7.5	All
Insulation class H	≥ 160
Auxiliary boxes for "db eb" motors	≥ 160
ATEX brass PE for unshielded cable	All
ATEX brass PE for shielded cable	All
ATEX brass PE auxiliary for unshielded cable	All
ATEX brass PE auxiliary for shielded cable	All
Flying lead via 1 metre single-core cable 6 + 1	≥ 160
Cable entry on the left as seen from the shaft end	All
Preparation for NPT cable glands	All

Protection	Frame size
Standard winding PTC thermistor probe (triple probe)	All
Winding PT 100 probe (1 per phase)	All
Endshield PTC thermistor probe (triple probe)	≥ 160
Endshield PT 100 probe (per probe)	≥ 160
Endshield thermocouple	≥ 160
Endshield PTO or PTF thermostatic probe	≥ 160
Space heaters when stopped (220-230 V)	All

Finish	Frame size
VIK version for “db eb IIC” motors (see page 20)	All
IP 65	All
Definition for gas + dust motor, Ex t IIIB / IIIC T125°C Db	All
IP 56 stopped with fan (IC 411)	All
C3H, C4M, C4H, C5-IL or C5-IM paint	All
Other paint shades	All
Operating temperature: -55°C < T° < -20°C or -55°C < T° < +60°C	All
Version for temperature class T5	All
Version for temperature class T6	All
Complete tropicalization (stator + rotor)	All

ATEX GAS motors - Zone 1
FLSD series - Cast iron
Optional equipment

Dimensions in millimetres

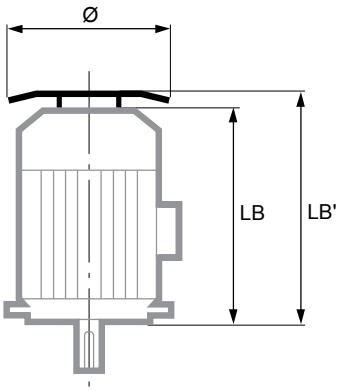
MODIFIED FLANGES

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 ■ Modified shaft ◆ Adaptable without shaft modifications

DRIP COVER FOR OPERATION IN VERTICAL POSITION, SHAFT END DOWNWARDS

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



SPACE HEATERS

Type	Power (W)
FLSD 80	16
FLSD 90 to 132	25
FLSD 160 to 200	50
FLSD 225 to 250	100
FLSD 280 to 315	100*

The space heaters use 200/240 V single-phase, 50 or 60 Hz.
** Power increase possible subject to quote.*

FORCED VENTILATION

The ATEX motors described in this catalogue are certified to be supplied with variable speed drives.

This type of application sometimes requires the installation of forced ventilation for use at low speed (heating) or high speed (noise), in addition to the thermal protections.
The installation of an axial forced ventilation is recommended for motors with frame size ≥ 160.

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

ATEX GAS motors - Zone 1
FLSD series - Cast iron
Handling - Position of lifting rings

LIFTING THE MOTOR ONLY

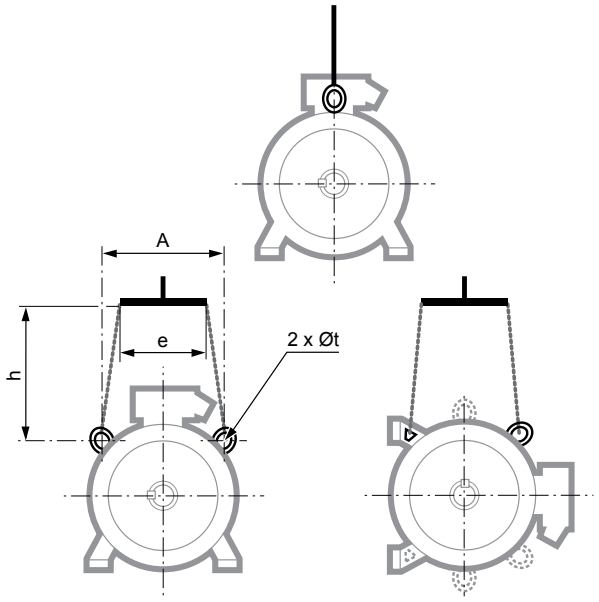
(not coupled to the machine)

The regulations stipulate that in excess of 25 kg suitable handling equipment must be used.

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

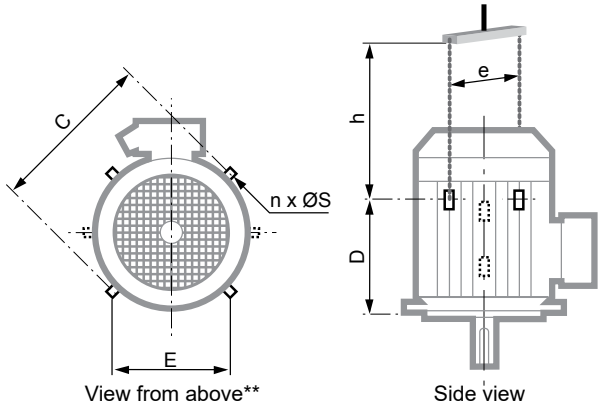
To prevent any damage to the motor during handling (for example: switching the motor from horizontal to vertical), it is essential to follow these instructions.

HORIZONTAL POSITION



Type	Horizontal position			
	A	min. e	min. h	Øt
FLSD 90	152	150	190	22
FLSD 100	152	150	190	22
FLSD 100 LG	146	200	190	22
FLSD 112	146	200	190	22
FLSD 132	176	180	190	22
FLSD 160 M/L	292	250	300	30
FLSD 160 LK	324	250	300	30
FLSD 180 M/L	324	250	300	30
FLSD 200 L	350	300	300	35
FLSD 225 MR	350	300	300	35
FLSD 225 SK/MK	415	400	400	35
FLSD 250 M	415	400	400	35
FLSD 280 S/M	430	400	400	40
FLSD 315 S/M/L	445	400	500	35

VERTICAL POSITION



View from above** Side view

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

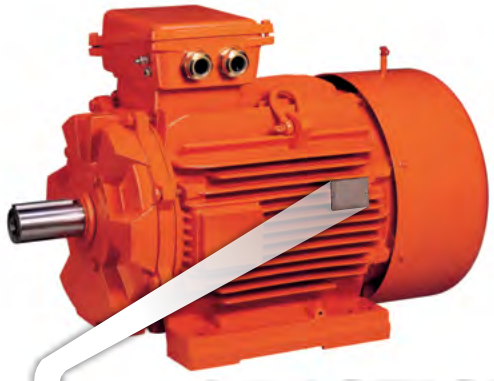
Type	Vertical position						
	C	E	D	n**	ØS	min. e*	min. h
FLSD 160 M/L	/	292	270	3	30	360	400
FLSD 160 LK	/	324	300	3	30	410	450
FLSD 180 M/L	/	324	300	3	30	410	450
FLSD 200 L	/	350	360	3	35	445	500
FLSD 225 MR	/	350	360	3	35	445	500
FLSD 225 SK/MK	/	415	380	3	35	560	600
FLSD 250 M	/	415	380	3	35	560	600
FLSD 280 S/M	/	430	430	3	40	560	650
FLSD 315 S/M/L	630	445	817	2	35	650	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°.

ATEX GAS motors - Zone 2
FLSN series - Cast iron
General information - Designation

ATEX GAS motors - Zone 2	FLSN series
	Ex II 3 G Ex ec II C T3 Gc **Premium Efficiency** IE3 cast iron on mains IE3 cast iron on drive



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	IFT/IE3	IM 1001 IM B3	230 / 400 V	50 Hz	IP 55
Pole(s) 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

ATEX GAS motors - Zone 2
FLSN series - Cast iron
General information - Identification and marking

NAMEPLATES

The nameplate identifies the motors, indicates the main performance and shows compatibility of the motor concerned with the main standards and regulations concerning them.
All motors in this catalogue with power between 0.75 and 400 kW are fitted with two information plates: one indicating the motor's performance when supplied from the mains, and the other the motor's performance when supplied from a drive.

DEFINITION OF SYMBOLS USED ON NAMEPLATES

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

SPECIFIC MARKING: ATEX Ex IECEX

II 3G or II 3G and II 3D: ATEX/IECEx marking
Ex ec: "non-sparking enclosure" protection mode
IIC: "gas" equipment group
T3: "gas" temperature class
Gc: "gas" EPL level
Ex tc: "dust" protection mode (option)
IIIC: "dust" equipment group (if tc)
T125°C: max. surface temperature (if tc)
Dc: "dust" EPL level
INERIS ... X: ATEX attestation number
IECEx INE…: IECEx certificate No.

Zone	ATEX/IECEx marking	Gas protection mode marking	Dust protection mode marking (if tc)	Protection rating min.
2	Ex II 3 G	Ex ec IIC T3 Gc	/	IP 55
2 & 22	Ex II 3 D	Ex ec IIC T3 Gc	Ex tc IIIC T125°C Dc	IP 65

MOTOR SYMBOLS

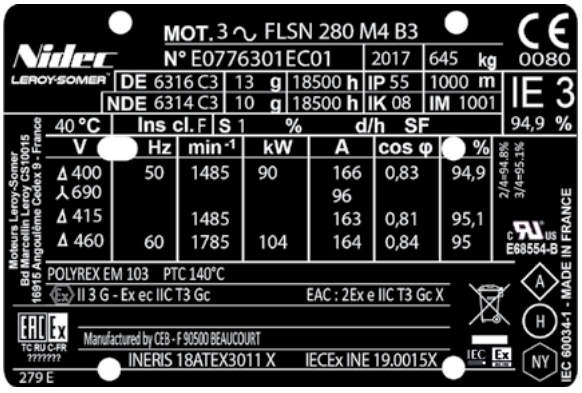
MOT 3 ~: three-phase AC motor
FLSN: motor type
280: frame size
M: housing symbol
4: 4 poles
B3: operating position
No.: Serial number
2017: year of construction
IM: operating position symbol
°C: maximum ambient temperature
Ins. cl.: winding insulation class
S: standard operating duty
%: operating duty
d/h: number of starts per hour
SF: duty factor
IE %: efficiency level and efficiency at rated load and voltage
2/4: efficiency at 2/4 load
3/4: efficiency at 3/4 load
kg: weight
DE: drive end bearing
NDE: non drive end bearing
g: quantity of grease to be added per bearing at each re-lubrication (in g)
h: interval in hours between re-lubrication
IP: protection rating
IK: shock resistance
m: maximum operating altitude
V: supply voltage
Hz: supply frequency
min^{-1}: speed of rotation (rpm)
kW: rated power
A: rated current
cos: power factor
%: efficiency at 4/4 load
Δ: delta coupling
人 : star coupling
POLYREX EM 103: bearing grease reference
Insulated bearing: NDE: isolated non drive end bearing
Manufactured by CEB: equipment manufacturer
EAC Ex: equipment for explosive atmospheres certified for Eurasia
cURus E68554: insulation system class F homologated for USA and Canada
A : vibration level code
H : balancing mode code
NY : starting requirements code
279 E: plate reference

ATEX GAS motors - Zone 2
FLSN series - Cast iron
General information - Identification and marking

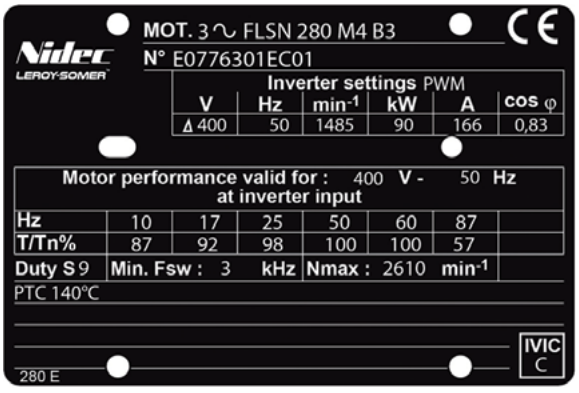
Inverter settings PWM: characteristics for setting the PWM drive enabling compliance with the motor temperature class
Motor performance valid for 400 V - 50 Hz at inverter input: motor performance valid for 400V - 50Hz at drive input
Duty S9: performances given for S9 duty
Min.Fsw: minimum switching frequency of the drive in kHz
Nmax: admissible maximum motor speed in min^{-1} (rpm)
PTC 140°C: PTC sensor type - temperature limit = 140°C
IVIC: pulse voltage insulation class code

CAST IRON MOTOR NAMEPLATES - FLSN ZONE 2

Mains supply plate



Drive supply plate



ATEX GAS motors - Zone 2
FLSN series - Cast iron
General information - Description

The motor enclosure is designed in such a way that no sparks can be produced under any motor operating conditions within the manufacturer's allowable limits, and no temperature rise can occur during normal operation.
The Ex ec motors in cast iron casings from Nidec Leroy-Somer are certified to comply with Directive 2014/34/EU and the IECEx system regulations.
Nidec Leroy-Somer can also provide self-certification with a Declaration of Conformity.

Lastly, Ex ec motors can also be used for applications in Ex t zone 22 dusty atmospheres.

The following definitions are therefore possible:
- Ex tc IIIB T125°C Dc, IP 55 for zone 22 + Ex ec IIC T3
- Ex tc IIIC T125°C Dc, IP 65 for zone 22 + Ex ec IIC T3

Designations	Materials	Comments
Finned housing	Cast iron	- lifting rings for frame size ≥ 90 - ground 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 - plate assemblies - semi-enclosed slots - class F insulation - 1 set of PTC sensors in the windings from FLSN 80 to FLSN 355
Rotor	Insulated low-carbon magnetic steel laminations Aluminium	- inclined cage bars - rotor cage pressure die-cast in aluminum (or alloys for special applications) or copper-soldered - assembly by hot shrinking on the shaft or by keying for soldered rotor - class A rotor balanced dynamically, 1/2 key
Shaft	Steel	- for frame size ≤ 132: closed keyway - for frame size ≥ 160: open keyway
End shields	Cast iron	
Bearings and lubrication		- protected ball bearings, permanently greased for frame size 80 to 225 - protected ball bearings, regreasable for frame size 250 to 355 - preloaded bearings at the rear up to 315 S, at the front from 315 M
Labyrinth seal **Lip seals**	Technopolymer or steel Synthetic rubber	- labyrinth seal at front for foot mounted motors with frame size ≤ 132 - front gasket for foot and face mounted motors or fastening flanges with frame size ≤ 132 - gasket at front and rear for frame sizes 160 to 250 included - decompression grooves for 280 M to 355 LD
Fan	Composite up to and including 280 Metallic from 315 S	- bi-directional: straight blades
Fan cover	Steel plate	- fitted, on request, with a drip cover for operation in vertical position, shaft end downwards
Terminal box	Body and cover in cast iron for all frame sizes	- IP 55 or IP 65 - fitted with a terminal block with 6 terminals up to 355 LD - terminal box fitted with plugs up to 132 - from 160 to 355, drilled cable gland support plate with plugs (optional flared feed and cable gland) - 1 ground terminal in each terminal box

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.

Designations	Materials	Comments
Stator - Rotor		- dielectric and anti-corrosion protection for frame sizes 80 to 132
Nameplate	Stainless steel	- nameplate: indelible marking
Fastenings	Stainless steel	- captive terminal box cover screws frame size ≤ 132
Terminal box	Body and cover made of cast-iron	
Cable gland	Brass	- optional
Paint finish		- C4M system (see Paint section)

ATEX GAS motors - Zone 2
FLSN series - Cast iron - IE3
Electrical characteristics - Mains supply

IEC Ex INE 004 *
IEC Ex INE 010

Type	Rated power	Rated torque	Starting torque/ Rated torque	Maximum torque/ Rated torque	Starting current/ Rated current	Moment of inertia	Weight	Noise	400V 50Hz							
									Rated speed	Rated current	Efficiency IEC 60034-2-1 2007			Power factor		
	P_n kW	M_n N.m	M_d/M_n	M_m/M_n	I_d/I_n	J kg.m²	IM B3 kg	LP db(A)	N_n min⁻¹	I_n A	η 4/4	η 3/4	η 2/4	Cos φ 4/4	Cos φ 3/4	Cos φ 2/4
2 poles																
FLSN 80 L	0.75	2.5	2.8	3.6	7	0.00095	16.2	59	2885	1.6	82.6	82.7	80.5	0.82	0.75	0.62
FLSN 80 LG	1.1	3.65	2.4	3.1	6.8	0.00201	22.5	59	2885	2.2	85.6	86.6	85.9	0.85	0.79	0.68
FLSN 90 SL	1.5	4.95	2.9	3	7	0.00223	24	68	2890	3	85.1	86.1	85.4	0.85	0.79	0.68
FLSN 90 LU	2.2	7.25	3.4	3.2	8.1	0.00292	28.2	70	2895	4.25	87.0	88.2	88.1	0.86	0.80	0.70
FLSN 100 LG	3	9.8	3	3.6	8.3	0.00822	41.5	67	2935	5.6	88.5	88.8	87.6	0.88	0.83	0.73
FLSN 112 MG	4	13.1	2.1	3	7.3	0.00941	44.8	66	2920	7.3	88.5	89.5	89.4	0.89	0.85	0.77
FLSN 132 SM	5.5	17.9	2	2.8	6.4	0.00974	69.3	67	2935	10.3	90.0	90.8	90.4	0.86	0.82	0.73
FLSN 132 SM	7.5	24.4	2	2.9	6.9	0.01102	74.6	67	2940	13.8	91.2	92.0	91.8	0.86	0.82	0.75
FLSN 160 M	11	35.6	3.3	3	8.2	0.0712	120	68	2950	19.9	91.9	92.4	92.0	0.87	0.83	0.75
FLSN 160 M	15	48.6	2.9	2.9	7.2	0.0551	133	68	2950	26.7	92.4	93.1	93.1	0.88	0.85	0.79
FLSN 160 LUR	18.5	59.9	2.8	2.7	7.4	0.0626	135	69	2950	32.9	92.5	93.2	93.2	0.88	0.86	0.79
FLSN 180 MUR	22	71.2	3	3.4	8	0.1012	195	74	2952	38	93.6	94.1	93.8	0.89	0.87	0.81
FLSN 200 LU	30	97.1	2.1	3	7.2	0.1186	210	71	2950	53.1	93.9	94.3	94.0	0.87	0.84	0.77
FLSN 200 LU	37	120	2	3.3	6.9	0.1388	230	75	2945	64.5	94.0	94.6	94.5	0.88	0.86	0.80
FLSN 225 MR	45	145	2.3	3.1	7.1	0.1597	254	71	2956	81.8	94.4	94.7	94.4	0.84	0.80	0.70
FLSN 250 M	55	177	2.1	3.2	7.6	0.3356	378	78	2968	95.3	94.5	94.6	93.7	0.88	0.85	0.79
FLSN 280 S	75	241	2.1	2.7	7	0.48	565	79	2966	126	94.9	95.3	95.2	0.91	0.89	0.85
FLSN 280 M	90	290	2.2	2.8	7.4	0.57	615	80	2967	151	95.3	95.7	95.5	0.90	0.89	0.85
FLSN 315 S	110	353	2.1	2.6	6.7	1.17	940	82	2975	185	95.9	96.0	95.5	0.90	0.89	0.85
FLSN 315 M	132	424	2.1	2.5	6.7	1.25	1015	82	2975	221	96.0	96.1	95.6	0.90	0.89	0.84
FLSN 315 LA	160	514	2	2.9	6.6	1.34	1088	82	2975	268	96.0	96.1	95.6	0.90	0.89	0.84
FLSN 315 LB	200	643	2.1	2.9	6.9	1.45	1150	82	2973	334	96.3	96.5	96.0	0.90	0.88	0.84
FLSN 355 LA	250	802	2.2	2.9	6.8	3.02	1590	83	2978	428	96.0	96.0	95.3	0.88	0.86	0.80
FLSN 355 LB	315	1008	2.6	3	7.8	3.62	1740	84	2983	537	96.3	96.4	96.2	0.88	0.86	0.82
FLSN 355 LC	355	1137	2.8	2.7	7.1	3.64	1740	84	2981	610.2	96.3	96.4	96.2	0.87	0.86	0.82
FLSN 355 LD	400	1284	2.7	2.7	7	3.70	1770	84	2986	667.3	97.1	97.2	96.9	0.89	0.88	0.86
4 poles																
FLSN 80 LG	0.75	4.95	2.2	3.1	6.6	0.00335	22	57	1452	1.6	83.8	84.4	83.1	0.79	0.71	0.58
FLSN 90 SL	1.1	7.25	2.4	3.2	7.5	0.00418	24.6	48	1450	2.3	84.9	85.8	85.0	0.81	0.74	0.61
FLSN 90 LU	1.5	9.85	2.8	3.5	7.3	0.00524	28.2	51	1454	3.2	85.4	85.8	84.1	0.78	0.70	0.56
FLSN 100 LR	2.2	14.5	3.4	3.8	8.2	0.00676	36.4	49	1452	4.6	86.9	87.4	86.2	0.78	0.70	0.57
FLSN 100 LG	3	19.6	2.4	3.2	7.3	0.01152	42.2	50	1462	6	88.7	89.3	88.7	0.82	0.76	0.64
FLSN 112 MU	4	26.2	2.7	3.1	7	0.01429	49	50	1458	8.1	88.8	89.5	88.9	0.80	0.75	0.64
FLSN 132 SM	5.5	35.9	2.8	3.6	8.3	0.02286	70.9	60	1462	10.5	90.1	90.7	90.2	0.84	0.78	0.67
FLSN 132 MR	7.5	49.1	2.8	3.4	8.4	0.03313	89.4	61	1460	13.8	90.6	91.5	91.3	0.86	0.81	0.71
FLSN 160 M	11	71.7	2.2	2.8	7.6	0.0712	115	59	1466	20.1	91.7	92.7	92.8	0.86	0.82	0.73
FLSN 160 LUR	15	97.4	2.3	3.2	8	0.0954	140	58	1470	27.2	92.3	93.0	92.9	0.86	0.82	0.72
FLSN 180 M	18.5	120	3	3.3	8	0.1333	165	67	1470	34.1	92.8	93.5	93.4	0.84	0.80	0.71
FLSN 180 LUR	22	143	3.3	3.3	7.9	0.1555	190	68	1470	41.3	93.0	93.6	93.4	0.83	0.79	0.69
FLSN 200 LU	30	194	3	2.9	7.2	0.2035	250	64	1474	54.9	93.9	94.4	94.2	0.84	0.80	0.70
FLSN 225 S	37	238	2	2.6	6.7	0.5753	355	65	1484	67.5	94.0	94.4	94.1	0.84	0.80	0.71
FLSN 225 M	45	289	2.1	2.7	6.7	0.6482	380	64	1486	84.4	94.9	95.2	94.9	0.81	0.76	0.66
FLSN 250 MR	55	354	2	2.4	6.9	0.7701	440	67	1482	101	94.8	95.2	95.1	0.83	0.79	0.70
FLSN 280 S	75	482	2.4	2.8	7.5	0.85	595	74	1484	137	95.0	95.2	94.9	0.83	0.79	0.69
FLSN 280 M	90	579	2.7	2.7	7.9	0.98	645	74	1483	165.2	95.3	95.7	95.3	0.83	0.78	0.68
FLSN 315 S	110	707	2.1	2.7	7.1	1.84	930	74	1486	196	95.6	95.7	95.2	0.85	0.81	0.73
FLSN 315 M	132	848	2.8	2.8	6.8	2.09	985	74	1487	234	95.9	95.9	95.6	0.85	0.82	0.76
FLSN 315 LA	160	1030	2.3	2.5	6.4	2.35	1045	74	1484	277	96.0	96.3	96.1	0.87	0.85	0.78
FLSN 315 LB	200	1287	2.7	3	7.2	2.86	1245	74	1486	354	96.2	96.4	96.0	0.85	0.81	0.72
FLSN 355 LA	250	1604	2.6	3.1	7.5	4.90	1445	80	1488	436	96.3	96.4	94.7	0.86	0.82	0.71
FLSN 355 LAL	280	1798	2.3	2.9	7.3	5.80	1560	80	1489	483	96.2	96.3	95.8	0.87	0.84	0.74
FLSN 355 LB	315	2028	2.4	2.9	7.5	6.56	1720	80	1488	549	96.3	96.4	96.2	0.86	0.83	0.76
FLSN 355 LC	355	2280	2.5	2.9	7.5	6.56	1720	80	1487	629	96.3	96.3	95.8	0.85	0.81	0.72
FLSN 355 LD	375	2402	1.7	3.2	8.3	6.60	1750	80	1491	651.7	96.6	96.4	95.7	0.86	0.82	0.74
6 poles																
FLSN 90 SL	0.75	7.6	1.8	2.3	4.4	0.00378	24	40	950	1.9	79.1	80.1	78.3	0.72	0.63	0.49
FLSN 90 LU	1.1	11	2.2	2.5	4.8	0.00519	29	57	954	2.7	81.7	82.3	80.3	0.71	0.62	0.48
FLSN 100 LG	1.5	14.8	2.3	2.8	5.6	0.01523	41	47	966	3.6	83.8	84.4	82.9	0.72	0.63	0.50
FLSN 112 MU	2.2	21.7	2.2	2.7	5.6	0.01899	49	45	968	5.3	84.5	85.1	83.5	0.70	0.62	0.49
FLSN 132 SM	3	29.5	2.6	3	6.4	0.02528	65	50	972	6.8	87.3	87.7	86.3	0.73	0.66	0.53
FLSN 132 M	4	39.4	2.4	2.9	6.3	0.03027	73	54	970	9.2	86.9	87.0	85.8	0.72	0.65	0.53
FLSN 132 MU	5.5	54.4	2.6	2.8	6.3	0.03699	87	55	966	11.7	88.3	89.0	88.7	0.77	0.71	0.59
FLSN 160 MU	7.5	73.2	2	3	6.4	0.1295	117	57	978	17.4	89.5	88.7	88.3	0.77	0.67	0.57
FLSN 180 L	11	107	2.9	3.8	8.2	0.2048	170	61	982	22.6	91.0	91.3	90.3	0.77	0.70	0.58
FLSN 180 LUR	15	146	3.2	2.7	7.4	0.2530	202	60	978	31.9	91.3	91.6	90.9	0.74	0.68	0.56
FLSN 200 LU	18.5	181	2.4	3	7	0.2588	210	60	978	36.5	91.8	92.5	92.3	0.80	0.75	0.64
FLSN 200 LU	22	214	2.8	3.5	7.3	0.2588	245	62	980	44.6	92.5	92.9	92.5	0.77	0.72	0.61
FLSN 225 M	30	291	2.2	2.4	6.5	0.8802	342	65	986	55.3	93.2	93.7	93.4	0.84	0.80	0.71
FLSN 250 M	37	358	2.4	2.6	6.9	0.9142	397	64	986	68.1	93.5	94.0	93.7	0.84	0.80	0.71
FLSN 280 S	45	436	0.6	3.1	7.5	1.08	555	70	986	82	94.1	94.4	94.0	0.84	0.80	0.70
FLSN 280 M	55	533	2.9	3.1	7.3	1.28	605	70	986	100	94.4	94.6	94.2	0.84	0.79	0.69
FLSN 315 S	75	727	2	2.1	7	2.50	965	70	991	137	95.0	95.3	95.0	0.83	0.80	0.73
FLSN 315 M	90	867	3	2	7	2.96	1035	69	991	165	95.0	95.4	95.2	0.83	0.80	0.72
FLSN 315 LA	110	1066	3	2.2	6.6	3.44	1150	69	989	204	95.5	95.9	95.6	0.81	0.79	0.71
FLSN 315 LB	132	1276	3	2.3	6.9	3.77	1165	67	992	247	95.8	96.0	95.7	0.80	0.76	0.67
FLSN 355 LA	160	1545	2	2.9	7.3	8.02	1520	76	993	283	96.0	96.0	95.4	0.85	0.81	0.73
FLSN 355 LB	200	1930	1.9	2.7	7.1	9.84	1750	76	993	345	96.0	96.2	95.9	0.87	0.84	0.77
FLSN 355 LC	250	2404	2.2	3.2	7.6	10.44	1800	76	993	455.2	96.2	96.2	95.5	0.82	0.78	0.67

For power > 400 kW, please contact us.

For power > 375 kW, please contact us.

For power > 250 kW, please contact us.

** available March 2021*

ATEX GAS motors - Zone 2
FLSN series - Cast iron - IE3
Electrical characteristics - Mains supply

IEC Ex INE 004 *
IEC Ex INE 010

Type	Rated power	415V 50Hz				460V 60Hz			
		Rated speed	Rated current	Efficiency	Power factor	Rated speed	Rated current	Efficiency	Power factor
	P_n kW	N_n min^{-1}	I_n A	η 4/4	Cos φ 4/4	N_n min^{-1}	I_n A	η 4/4	Cos φ 4/4
2 poles									
FLSN 80 L	0.75	2895	1.6	83.0	0.79	3505	1.4	83.7	0.79
FLSN 80 LG	1.1	2895	2.15	85.9	0.83	3505	1.95	84.8	0.83
FLSN 90 SL	1.5	2900	2.95	85.3	0.83	3505	2.65	86.1	0.83
FLSN 90 LU	2.2	2905	4.1	87.5	0.85	3510	3.7	88.2	0.85
FLSN 100 LG	3	2940	5.5	88.7	0.86	3545	4.9	88.7	0.87
FLSN 112 MG	4	2930	7.15	88.9	0.88	3535	6.4	89.9	0.88
FLSN 132 SM	5.5	2940	9.9	90.5	0.85	3545	9	90.8	0.85
FLSN 132 SM	7.5	2945	13.5	91.5	0.85	3550	12	92.2	0.85
FLSN 160 M	11	2954	19.4	92.4	0.85	3554	17.3	92.4	0.86
FLSN 160 M	15	2956	25.7	92.7	0.87	3556	23	93.2	0.88
FLSN 160 LUR	18.5	2952	31.8	92.7	0.87	3558	28.4	93.2	0.87
FLSN 180 MUR	22	2958	37.1	93.8	0.88	3560	33.1	93.8	0.88
FLSN 200 LU	30	2954	51.7	94.0	0.86	3554	46.4	94.0	0.87
FLSN 200 LU	37	2950	62.8	94.3	0.87	3552	56.3	94.2	0.88
FLSN 225 MR	45	2960	80.7	94.4	0.82	3564	70.6	95.1	0.84
FLSN 250 M	55	2972	87.2	94.6	0.87	3574	83.3	94.3	0.88
FLSN 280 S	75	2968	122	95.2	0.90	3566	110	94.1	0.91
FLSN 280 M	90	2971	146	95.5	0.90	3567	132	95.0	0.90
FLSN 315 S	110	2977	177.3	95.9	0.90	3575	161	95.0	0.90
FLSN 315 M	132	2976	213	96.0	0.90	3575	193	95.4	0.90
FLSN 315 LA	160	2976	258.4	96.2	0.89	3575	233	95.8	0.90
FLSN 315 LB	200	2974	322.9	96.6	0.89	3575	291	95.8	0.90
FLSN 355 LA	250	2982	413	96.2	0.88	3578	372	95.8	0.88
FLSN 355 LB	315	2985	524	96.2	0.87	3583	469	95.8	0.88
FLSN 355 LC	355	2983	596	96.3	0.86	3581	535	95.8	0.87
FLSN 355 LD	400	2988	645.5	97.3	0.89	3589	585	96.5	0.89

For power > 400 kW, please contact us.

4 poles									
FLSN 80 LG	0.75	1454	1.6	84.0	0.78	1762	1.4	85.7	0.76
FLSN 90 SL	1.1	1454	2.3	84.9	0.79	1758	2	86.5	0.78
FLSN 90 LU	1.5	1456	3.2	85.6	0.76	1762	2.9	86.9	0.75
FLSN 100 LR	2.2	1456	4.6	87.0	0.76	1762	4.1	88.3	0.76
FLSN 100 LG	3	1462	6	88.8	0.79	1768	5.2	89.9	0.80
FLSN 112 MU	4	1462	8	89.4	0.78	1764	7.6	85.5	0.77
FLSN 132 SM	5.5	1466	10.3	90.2	0.82	1768	9.2	91.7	0.82
FLSN 132 MR	7.5	1464	13.5	91.0	0.85	1768	12.1	92.0	0.85
FLSN 160 M	11	1468	19.5	92.2	0.85	1772	17.5	92.9	0.85
FLSN 160 LUR	15	1474	26.8	92.6	0.84	1774	23.8	93.4	0.85
FLSN 180 M	18.5	1472	33.5	93.0	0.83	1774	29.9	93.6	0.83
FLSN 180 LUR	22	1474	40.2	93.2	0.82	1776	35.9	93.7	0.82
FLSN 200 LU	30	1476	53.7	94.2	0.82	1780	48.3	94.5	0.83
FLSN 225 S	37	1486	65.7	94.5	0.83	1786	59.4	94.5	0.83
FLSN 225 M	45	1486	82.5	95.0	0.80	1788	74.1	95.3	0.80
FLSN 250 MR	55	1484	98.4	95.0	0.82	1784	88.2	95.4	0.82
FLSN 280 S	75	1486	132.6	94.8	0.83	1784	117	95.4	0.84
FLSN 280 M	90	1487	163	95.1	0.81	1785	141	95.4	0.84
FLSN 315 S	110	1487	193.3	95.4	0.83	1786	172	95.8	0.84
FLSN 315 M	132	1487	229	95.8	0.84	1787	203	96.0	0.85
FLSN 315 LA	160	1486	276	96.1	0.84	1784	245.6	96.2	0.85
FLSN 315 LB	200	1487	345	96.0	0.84	1786	307	96.2	0.85
FLSN 355 LA	250	1490	425	96.2	0.85	1788	379	96.2	0.86
FLSN 355 LAL	280	1488	471	96.1	0.86	1787	420	96.2	0.87
FLSN 355 LB	315	1489	530	96.3	0.86	1787	472	96.2	0.87
FLSN 355 LC	355	1488	623.7	96.0	0.83	1786	532	96.2	0.87
FLSN 355 LD	375	1492	644.5	96.4	0.84	1790	573.2	96.2	0.85

For power > 375 kW, please contact us.

6 poles									
FLSN 90 SL	0.75	956	1.9	79.4	0.69	-	-	-	-
FLSN 90 LU	1.1	958	2.75	81.7	0.68	-	-	-	-
FLSN 100 LG	1.5	970	3.6	84.1	0.69	-	-	-	-
FLSN 112 MU	2.2	974	6.75	86.8	0.71	-	-	-	-
FLSN 132 SM	3	972	9.15	87.0	0.70	-	-	-	-
FLSN 132 M	4	970	11.5	88.5	0.75	-	-	-	-
FLSN 132 MU	5.5	970	11.7	88.5	0.74	-	-	-	-
FLSN 160 MU	7.5	980	17.1	89.6	0.74	-	-	-	-
FLSN 180 L	11	984	22.3	91.2	0.75	-	-	-	-
FLSN 180 LUR	15	982	31.7	91.4	0.72	-	-	-	-
FLSN 200 LU	18.5	980	36	92.1	0.78	-	-	-	-
FLSN 200 LU	22	984	42.2	92.7	0.74	-	-	-	-
FLSN 225 M	30	986	53.9	93.3	0.83	-	-	-	-
FLSN 250 M	37	986	66.5	93.7	0.83	-	-	-	-
FLSN 280 S	45	987	80	94.2	0.82	1186	70.3	94.5	0.85
FLSN 280 M	55	988	99	94.4	0.82	1186	87	94.5	0.84
FLSN 315 S	75	992	134	94.8	0.82	1190	122	95.0	0.81
FLSN 315 M	90	992	161	95.1	0.82	1191	145	95.0	0.82
FLSN 315 LA	110	992	198.7	95.5	0.81	1191	176	95.8	0.82
FLSN 315 LB	132	991	243	95.7	0.79	1190	217	95.8	0.80
FLSN 355 LA	160	994	276	96.0	0.84	1193	247	95.8	0.85
FLSN 355 LB	200	994	339	96.1	0.86	1193	312	95.8	0.84
FLSN 355 LC	250	994	454	95.9	0.80	1193	405	95.8	0.81

For power > 250 kW, please contact us.

** available March 2021*

ATEX GAS motors - Zone 2
FLSN series - Cast iron - IE3
Electrical characteristics - Drive-powered

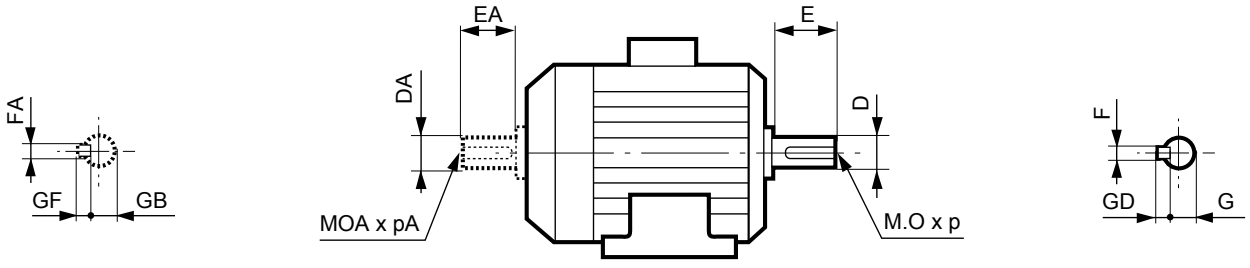
IEC Ex INE 004 *
IEC Ex INE 010

Type	400V 50Hz				% Rated torque M_n at					400V 87Hz Δ[1]				Maximum mechanical speed[2]
	Rated power P_n kW	Rated speed N_n min^{-1}	Rated current I_n A	Power factor Cos φ 4/4	10Hz	17Hz	25Hz	50Hz	87Hz	Rated power P_n kW	Rated speed N_n min^{-1}	Rated current I_n A	Power factor Cos φ 4/4	
2 poles														
FLSN 80 L	0.75	2885	1.6	0.83	2.3	2.5	2.5	2.5	1.4	1.31	4997	3	0.84	13500
FLSN 80 LG	1.1	2885	2.3	0.85	3.1	3.7	3.7	3.7	2.1	1.91	4997	4.3	0.86	13500
FLSN 90 SL	1.5	2890	3	0.85	4.2	5	5	5	2.8	2.61	5006	5.9	0.87	11700
FLSN 90 LU	2.2	2895	4.3	0.86	6.7	7.3	7.3	7.3	4.1	3.83	5014	8.2	0.89	11700
FLSN 100 LG	3	2875	6.2	0.88	9.2	9.9	9.9	9.9	5.6	5.22	5014	11.3	0.86	9900
FLSN 112 MG	4	2910	8	0.91	12.2	13.1	13.1	13.1	7.5	6.96	5058	14.7	0.87	9900
FLSN 132 SM	5.5	2925	11.1	0.88	16.7	17.9	17.9	17.9	10.2	9.57	5084	20.2	0.87	6700
FLSN 132 SM	7.5	2930	14.9	0.88	22.7	24.4	24.4	24.4	13.9	13.05	5092	27	0.86	6700
FLSN 160 M	11	2940	21.5	0.88	28.1	35.6	35.6	35.6	20.3	19.14	5120	38.2	0.89	6030
FLSN 160 M	15	2940	28.5	0.90	40.7	48.6	48.6	48.6	27.7	26.1	5110	52.4	0.88	6030
FLSN 160 LUR	18.5	2935	35.3	0.90	50.1	59.9	59.9	59.9	34.1	32.19	5110	65.1	0.88	4500
FLSN 180 MUR	22	2945	41.1	0.90	59.6	71.2	71.2	71.2	59.1	38.28	5113	75.8	0.89	4500
FLSN 200 LU	30	2945	56.9	0.88	72.2	87.4	97.1	97.1	80.6	-	-	-	-	4500
FLSN 200 LU	37	2935	69.4	0.89	89.3	108	120	120	99.6	-	-	-	-	4700
FLSN 225 MR	45	2940	84.7	0.89	108.6	131.4	146	146	121.2	-	-	-	-	4320
FLSN 250 M	55	2966	102	0.89	131.7	159.3	177	177	146.9	-	-	-	-	4050
FLSN 280 S	75	2950	142	0.91	200	212.1	224.1	224.1	-	-	-	-	-	3600
FLSN 280 M	90	2952	170	0.91	246.5	252.3	261	261	-	-	-	-	-	3600
FLSN 315 S	110	2966	207	0.90	353	353	353	353	-	-	-	-	-	3600
FLSN 315 M	132	2966	249.3	0.90	402.8	411.3	424	424	-	-	-	-	-	3600
FLSN 315 LA	160	2967	299.7	0.90	488.3	498.6	514	514	-	-	-	-	-	3600
FLSN 315 LB	200	2965	373.6	0.90	540.1	553	572.3	572.3	-	-	-	-	-	3600
FLSN 355 LA	250	2969	477	0.89	721.8	753.9	786	786	-	-	-	-	-	3600
FLSN 355 LB	315	2974	599.3	0.88	836.6	836.6	846.7	846.7	-	-	-	-	-	3600
FLSN 355 LC	355	2972	672.7	0.89	932.3	932.3	932.3	932.3	-	-	-	-	-	3600
FLSN 355 LD	400	2987	744.3	0.90	1065.7	1091.4	1129.9	1129.9	-	-	-	-	-	3600
For power > 400 kW, please contact us.														
4 poles														
FLSN 80 LG	0.75	1450	1.7	0.80	4.5	5	5	5	2.8	1.31	2511	3.1	0.82	13500
FLSN 90 SL	1.1	1450	2.3	0.81	6.5	7.3	7.3	7.3	4.2	1.91	2511	4.5	0.83	11700
FLSN 90 LU	1.5	1454	3.2	0.79	8.9	9.9	9.9	9.9	5.7	2.61	2518	6.1	0.81	11700
FLSN 100 LR	2.2	1445	4.9	0.81	13.5	14.5	14.5	14.5	8.3	3.83	2515	8.8	0.79	9900
FLSN 100 LG	3	1456	6.4	0.84	16.4	19.6	19.6	19.6	11.2	5.22	2529	11.7	0.81	9900
FLSN 112 MU	4	1450	8.5	0.83	21.9	26.2	26.2	26.2	14.9	6.96	2525	15.4	0.80	9900
FLSN 132 SM	5.5	1456	11.2	0.86	33.4	35.9	35.9	35.9	20.5	9.57	2532	20.2	0.84	6700
FLSN 132 MR	7.5	1456	14.9	0.88	45.7	49.1	49.1	49.1	28	13.05	2529	27.3	0.86	6700
FLSN 160 M	11	1462	21.5	0.88	60	71.7	71.7	71.7	40.9	19.14	2539	39.5	0.86	6030
FLSN 160 LUR	15	1466	29.5	0.87	81.5	97.4	97.4	97.4	55.5	26.1	2546	53.4	0.85	5670
FLSN 180 M	18.5	1464	36.4	0.86	94.9	120	120	120	68.4	32.19	2546	66.7	0.84	5670
FLSN 180 LUR	22	1466	44.1	0.85	113	143	143	143	81.5	38.28	2546	80.1	0.83	4500
FLSN 200 LU	30	1472	58.9	0.85	144.3	194	194	194	110.6	52.2	2553	107.4	0.84	4500
FLSN 225 S	37	1482	72.8	0.85	188.1	238	238	238	135.7	64.38	2570	132.4	0.84	4320
FLSN 225 M	45	1484	89.1	0.83	228.5	289	289	289	164.7	78.3	2570	161.7	0.83	4320
FLSN 250 MR	55	1480	108	0.84	279.8	354	354	354	201.8	95.7	2567	198.4	0.83	4050
FLSN 280 S	75	1478	150.4	0.86	424.2	453.1	482	482	274.7	-	-	-	-	2610
FLSN 280 M	90	1479	181.4	0.85	503.7	532.7	567.4	573.2	326.7	-	-	-	-	2610
FLSN 315 S	110	1484	215.6	0.87	692.9	699.9	707	707	403	-	-	-	-	2610
FLSN 315 M	132	1482	256.2	0.88	814.1	831	848	848	483.4	-	-	-	-	2610
FLSN 315 LA	160	1479	309.6	0.88	896.1	947.6	1009.4	1009.4	575.4	-	-	-	-	2610
FLSN 315 LB	200	1480	386.8	0.87	1042.4	1081.1	1119.7	1119.7	638.2	-	-	-	-	2610
FLSN 355 LA	250	1482	479.2	0.88	1347.4	1443.6	1539.8	1539.8	877.7	-	-	-	-	2610
FLSN 355 LAL	315	1487	541.8	0.87	1510.3	1546.3	1600.2	1600.2	912.1	-	-	-	-	2610
FLSN 355 LB	355	1486	602.6	0.88	1622.4	1683.2	1764.4	1764.4	1005.7	-	-	-	-	2610
FLSN 355 LC	355	1483	681.9	0.88	1892.4	1915.2	1938	1938	1104.7	-	-	-	-	2610
FLSN 355 LD	375	1491	729.9	0.86	1993.7	2017.7	2065.7	2065.7	1177.4	-	-	-	-	2610
For power > 375 kW, please contact us.														
6 poles														
FLSN 90 SL	0.75	950	1.9	0.72	7.6	7.6	7.6	7.6	4.3	1.31	1645	3.6	0.75	11700
FLSN 90 LU	1.1	954	2.8	0.71	11	11	11	11	6.3	1.91	1652	5.1	0.74	11700
FLSN 100 LG	1.5	962	3.8	0.74	13.1	14.8	14.8	14.8	8.4	2.61	1667	6.8	0.72	9900
FLSN 112 MU	2.2	962	5.7	0.74	19.2	21.7	21.7	21.7	12.4	3.83	1677	10	0.70	9900
FLSN 132 SM	3	970	7.1	0.76	27.4	29.5	29.5	29.5	16.8	5.22	1684	12.7	0.73	6700
FLSN 132 M	4	966	9.7	0.75	36.6	39.4	39.4	39.4	22.5	6.96	1680	17.2	0.72	6700
FLSN 132 MU	5.5	962	12.5	0.79	50.6	54.4	54.4	54.4	31	9.57	1673	22.7	0.76	6700
FLSN 160 MU	7.5	974	18.7	0.79	68.1	73.2	73.2	73.2	41.7	13.05	1694	30.2	0.77	6030
FLSN 180 L	11	978	24	0.80	89.6	107	107	107	61	19.14	1701	42.9	0.77	5670
FLSN 180 LUR	15	976	34.1	0.76	122.2	146	146	146	83.2	26.1	1694	61.3	0.74	4500
FLSN 200 LU	18.5	974	38.9	0.81	151.5	181	181	181	103.2	32.19	1694	70.6	0.79	4500
FLSN 200 LU	22	978	45	0.79	179.1	214	214	214	122	38.28	1697	84.7	0.77	4500
FLSN 225 M	30	984	58.9	0.86	243.6	291	291	291	165.9	52.2	1708	107.4	0.84	4050
FLSN 250 M	37	984	72.2	0.86	299.7	358	358	358	204.1	64.38	1708	131.2	0.84	4050
FLSN 280 S	45	983	90.4	0.87	422.9	427.3	436	436	248.5	-	-	-	-	1740
FLSN 280 M	55	982	109.5	0.87	490.4	511.7	533	533	303.8	-	-	-	-	1740
FLSN 315 S	75	990	154.2	0.84	727	727	727	727	414.4	-	-	-	-	1740
FLSN 315 M	90	990	184	0.84	867	867	867	867	494.2	-	-	-	-	1740
FLSN 315 LA	110	987	228.7	0.83	1023.4	1044.7	1066	1066	607.6	-	-	-	-	1740
FLSN 315 LB	132	989	273.5	0.82	1033.6	1071.8	1110.1	1110.1	632.8	-	-	-	-	1740
FLSN 355 LA	160	990	311.6	0.87	1545	1545	1545	1545	880.7	-	-	-	-	1740
FLSN 355 LB	200	990	386.1	0.88	1910.7	1910.7	1930	1930	1100.1	-	-	-	-	1740
FLSN 355 LC	250	992	486.3	0.87	2283.8	2331.9	2380	2380	1356.6	-	-	-	-	1740
For power > 250 kW, please contact us.														

** available March 2021*

ATEX GAS motors - Zone 2
FLSN series - Cast iron
Mechanical characteristics - Shaft end

Dimensions in millimetres

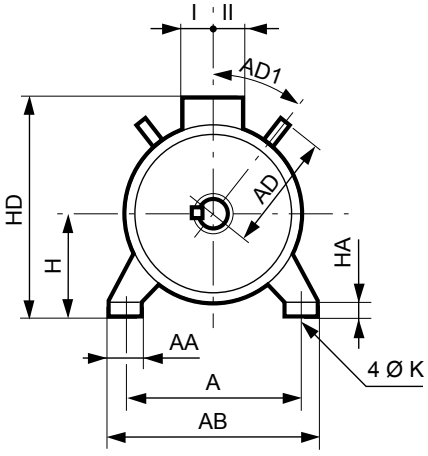


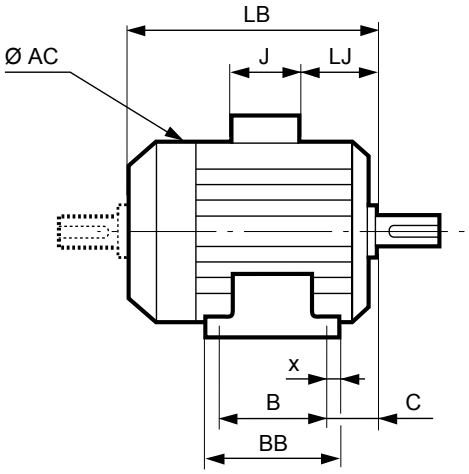
Type	Main shaft end																	
	4 and 6 poles									2 poles								
	F	GD	D	G	E	O	p	L	LO	F	GD	D	G	E	O	p	L	LO
FLSN 80 L/LG	6	6	19j6	15.5	40	M6	16	30	6	6	6	19j6	15.5	40	M6	16	30	6
FLSN 90 L/LU/SL	8	7	24j6	20	50	M8	19	40	6	8	7	24j6	20	50	M8	19	40	6
FLSN 100 L/LG/LR	8	7	28j6	24	60	M10	22	50	6	8	7	28j6	24	60	M10	22	50	6
FLSN 112 MG/MU	8	7	28j6	24	60	M10	22	50	6	8	7	28j6	24	60	M10	22	50	6
FLSN 132 M/MR/MU/SM	10	8	38k6	33	80	M12	28	63	10	10	8	38k6	33	80	M12	28	63	10
FLSN 160 L/LUR/M/MU	12	8	42k6	37	110	M16	36	90	20	12	8	42k6	37	110	M16	36	90	20
FLSN 180 L/LUR/M/MT/MUR	14	9	48k6	42.5	110	M16	36	90	20	14	9	48k6	42.5	110	M16	36	90	20
FLSN 200 LU	16	10	55m6	49	110	M20	42	90	20	16	10	55m6	49	110	M20	42	90	20
FLSN 225 M/S	18	11	60m6	53	140	M20	42	125	15	-	-	-	-	-	-	-	-	-
FLSN 225 MR	-	-	-	-	-	-	-	-	-	16	10	55m6	49	110	M20	42	90	20
FLSN 225 SR	18	11	60m6	53	140	M20	42	125	15	-	-	-	-	-	-	-	-	-
FLSN 250 M/MR	18	11	65m6	58	140	M20	42	126	14	18	11	60m6	53	140	M20	42	126	14
FLSN 280 M/S	20	12	75m6	67.5	140	M20	42	125	15	18	11	65m6	58	140	M20	42	125	15
FLSN 315 LA/LB	25	14	90m6	81	170	M24	50	140	30	20	12	70m6	62.5	140	M20	42	125	15
FLSN 315 M/S	22	14	80m6	71	170	M20	42	140	30	18	11	65m6	58	140	M20	42	125	15
FLSN 355 LA/LAL/LB/LC/LD	28	16	100m6	90	210	M24	50	180	30	22	14	80m6	71	170	M20	42	140	30

Type	Secondary shaft ends																	
	4 and 6 poles									2 poles								
	FA	GF	DA	GB	EA	OA	pA	L'	LO'	FA	GF	DA	GB	EA	OA	pA	L'	LO'
FLSN 80 L/LG	5	5	14j6	11	30	M5	15	25	3.5	5	5	14j6	11	30	M5	15	25	3.5
FLSN 90 L/LU/SL	6	6	19j6	15.5	40	M6	16	30	6	6	6	19j6	15.5	40	M6	16	30	6
FLSN 100 L/LG/LR	8	7	24j6	20	50	M8	19	40	6	8	7	24j6	20	50	M8	19	40	6
FLSN 112 MG/MU	8	7	24j6	20	50	M8	19	40	6	8	7	24j6	20	50	M8	19	40	6
FLSN 132 M/MR/MU/SM	8	7	28k6	24	60	M10	22	50	6	8	7	28k6	24	60	M10	22	50	6
FLSN 160 L/LUR/M/MU	12	8	42k6	37	110	M16	36	100	6	12	8	42k6	37	110	M16	36	100	6
FLSN 180 L/LUR/M/MT/MUR	12	8	42k6	37	110	M16	36	100	6	12	8	42k6	37	110	M16	36	100	6
FLSN 200 LU	16	10	55m6	49	110	M20	42	97	13	16	10	55m6	49	110	M20	42	97	13
FLSN 225 M/MR/S	18	11	60m6	53	140	M20	42	126	14	16	10	55m6	49	110	M20	42	97	13
FLSN 225 SR	18	11	60m6	53	140	M20	42	125	15	-	-	-	-	-	-	-	-	-
FLSN 250 M/MR	18	11	60m6	53	140	M20	42	125	15	18	11	60m6	53	140	M20	42	125	15
FLSN 280 M/S	18	11	60m6	53	140	M20	42	125	15	18	11	60m6	53	140	M20	42	125	15
FLSN 315 LA/LB	20	12	70m6	63.5	140	M20	42	125	15	20	12	70m6	63.5	140	M20	42	125	15
FLSN 315 M/S	20	12	70m6	63.5	140	M20	42	125	15	18	11	65m6	58	140	M20	42	125	15
FLSN 355 LA/LAL/LB/LC/LD	28	16	100m6	90	210	M24	50	180	30	22	14	80m6	71	170	M20	42	140	30

ATEX GAS motors - Zone 2
FLSN series - Cast iron - Mechanical characteristics
Foot mounted IM 1001 (IMB3)

Dimensions in millimetres

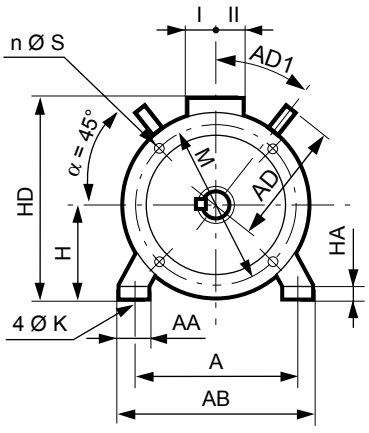


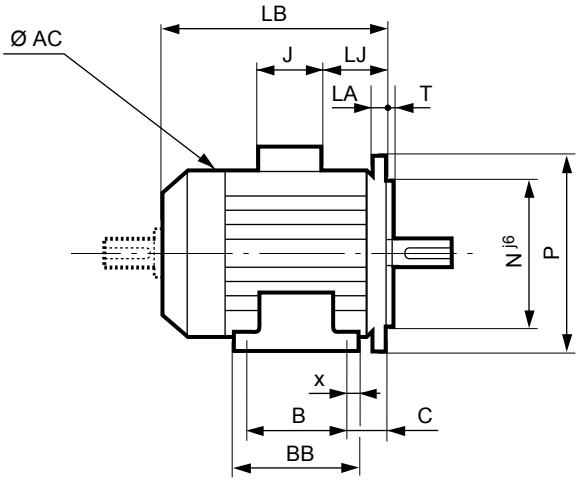


Type	Main dimensions																		
	A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1
FLSN 80 L	125	157	100	130	50	18	34	10	10	80	170	228	212	7	136	68	68	-	-
FLSN 80 LG	125	170	100	138	50	22	39	10	10	80	203	238	245	8	136	68	68	135	41
FLSN 90 L	140	170	125	162	56	28	33	10	10	90	203	248	239	8	136	68	68	135	41
FLSN 90 LU	140	170	125	162	56	28	33	10	10	90	203	248	266	8	136	68	68	135	41
FLSN 90 SL	140	170	125	162	56	28	33	10	10	90	203	248	239	8	136	68	68	135	41
FLSN 100 L	160	196	140	185	63	29	40	12	13	100	204	258	300	8	136	68	68	135	41
FLSN 100 LG	160	196	140	168	53	13	40	12	14	100	227	266	299	0.5	136	68	68	130	45
FLSN 100 LR	160	196	140	185	63	29	40	12	13	100	204	258	300	8	136	68	68	135	41
FLSN 112 MG	190	230	140	186	60	32	48	12	12	112	230	294	299	8	136	68	68	148	41
FLSN 112 MU	190	230	140	186	60	32	48	12	12	112	230	294	299	8	136	68	68	148	41
FLSN 132 M	216	255	178	240	89	50	63	12	16	132	270	335	385	22	136	68	68	165	37.5
FLSN 132 MR	216	255	178	240	89	50	63	12	16	132	270	335	447	22	136	68	68	165	37.5
FLSN 132 MU	216	255	178	240	89	50	63	12	16	132	270	335	447	22	136	68	68	165	37.5
FLSN 132 SM	216	255	140	240	89	50	63	12	16	132	270	335	385	22	136	68	68	165	37.5
FLSN 160 L	254	294	254	294	108	20	65	14.5	20	160	315	449	495	23	259	115	151	179	45
FLSN 160 LUR	254	294	254	294	108	20	65	14.5	20	160	315	449	510	23	259	115	151	179	45
FLSN 160 M	254	294	210	294	108	20	65	14.5	20	160	315	449	495	23	259	115	151	179	45
FLSN 160 MU	254	294	210	294	108	20	65	14.5	20	160	315	449	510	23	259	115	151	179	45
FLSN 180 L	279	330	279	337	121	32	70	14.5	28	180	361	490	552	35.5	259	115	151	190	45
FLSN 180 LUR	279	330	279	337	115	32	70	14.5	28	180	361	490	593	35.5	259	115	151	190	45
FLSN 180 M	279	330	241	337	121	32	70	14.5	28	180	361	490	552	35.5	259	115	151	190	45
FLSN 180 MT	279	330	241	337	121	32	70	14.5	28	180	361	490	537	29.5	259	115	151	190	45
FLSN 180 MUR	279	324	241	290	121	24	80	14.5	25	180	328	469	551	29.5	259	115	151	177	45
FLSN 200 LU	318	374	305	360	135	28	60	18.5	17	200	399	541	669	42.5	259	115	151	243	45
FLSN 225 M (IE3)	356	426	311	375	149	32	80	18.5	27	225	495	657	779	91.5	308	161	208	270	45
FLSN 225 M (IE2)	356	426	311	375	149	32	80	18.5	27	225	495	657	779	69.5	352	175	212	270	45
FLSN 225 MR	356	426	311	380	144.5	34	70	18.5	17	225	398	566	682	49	259	115	151	243	45
FLSN 225 S	356	426	286	375	149	32	80	18.5	27	225	487	661	779	91.5	308	161	208	276	45
FLSN 225 SR	356	426	286	380	144.5	34	70	18.5	17	225	398	566	674	44.5	259	115	151	243	45
FLSN 250 M	406	476	349	413	168	32	80	24	26	250	495	682	779	91.5	308	161	208	270	45
FLSN 250 MR	406	476	349	413	168	32	80	24	27	250	495	682	859	69.5	352	175	212	270	45
FLSN 280 M	457	527	419	486	92	33	80	24	30	280	481	717	959	69	352	175	212	303	45
FLSN 280 S	457	527	368	486	92	33	80	24	30	280	481	717	959	69	352	175	212	303	45
FLSN 315 LA	508	600	508	610	109	58	100	28	35	315	600	857	1177	119	416	217	264	343	45
FLSN 315 LB	508	600	508	610	109	58	100	28	35	315	600	847	1177	119	452	219	269	343	45
FLSN 315 LB (6P)	508	600	508	610	109	58	100	28	35	315	600	857	1177	101	416	217	264	343	45
FLSN 315 M	508	600	457	610	109	58	100	28	35	315	600	857	1177	119	416	217	264	343	45
FLSN 315 S	508	600	406	610	109	58	100	28	35	315	600	857	1177	119	416	217	264	343	45
FLSN 355 LA	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-
FLSN 355 LA (6P)	610	710	630	756	127	76	100	28	35	355	688	935	1303	139	416	217	264	-	-
FLSN 355 LAL	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-
FLSN 355 LB	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-
FLSN 355 LC	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-
FLSN 355 LD	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-

ATEX GAS motors - Zone 2
FLSN series - Cast iron - Mechanical characteristics
Foot and flange mounted IM 2001 (IM B35)

Dimensions in millimetres

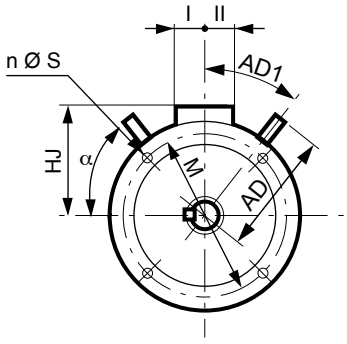


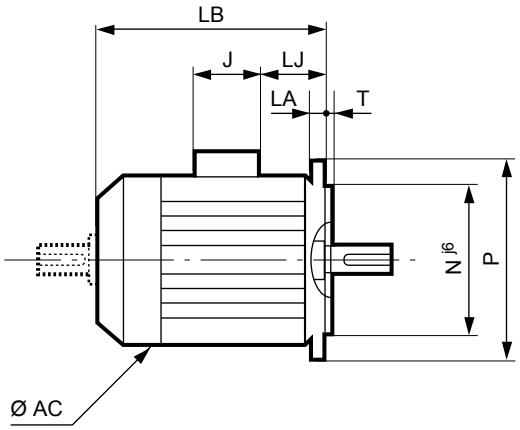


Type	Main dimensions																			
	A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1	Symb
FLSN 80 L	125	157	100	130	50	18	34	10	10	80	170	228	212	7	136	68	68	-	-	FF165
FLSN 80 LG	125	170	100	138	50	22	39	10	10	80	203	238	245	8	136	68	68	135	41	FF165
FLSN 90 L	140	170	125	162	56	28	33	10	10	90	203	248	239	8	136	68	68	135	41	FF165
FLSN 90 LU	140	170	125	162	56	28	33	10	10	90	203	248	266	8	136	68	68	135	41	FF165
FLSN 90 SL	140	170	125	162	56	28	33	10	10	90	203	248	239	8	136	68	68	135	41	FF165
FLSN 100 L	160	196	140	185	63	29	40	12	13	100	204	258	300	8	136	68	68	135	41	FF215
FLSN 100 LG	160	196	140	168	53	13	40	12	14	100	227	266	299	0.5	136	68	68	130	45	FF215
FLSN 100 LR	160	196	140	185	63	29	40	12	13	100	204	258	300	8	136	68	68	135	41	FF215
FLSN 112 MG	190	230	140	186	60	32	48	12	12	112	230	294	299	8	136	68	68	148	41	FF215
FLSN 112 MU	190	230	140	186	60	32	48	12	12	112	230	294	299	8	136	68	68	148	41	FF215
FLSN 132 M	216	255	178	240	89	50	63	12	16	132	270	335	385	22	136	68	68	165	37.5	FF265
FLSN 132 MR	216	255	178	240	89	50	63	12	16	132	270	335	447	22	136	68	68	165	37.5	FF265
FLSN 132 MU	216	255	178	240	89	50	63	12	16	132	270	335	447	22	136	68	68	165	37.5	FF265
FLSN 132 SM	216	255	140	240	89	50	63	12	16	132	270	335	385	22	136	68	68	165	37.5	FF265
FLSN 160 L	254	294	254	294	108	20	65	14.5	20	160	315	449	495	23	259	115	151	179	45	FF265
FLSN 160 LUR	254	294	254	294	108	20	65	14.5	20	160	315	449	510	23	259	115	151	179	45	FF300
FLSN 160 M	254	294	210	294	108	20	65	14.5	20	160	315	449	495	23	259	115	151	179	45	FF300
FLSN 160 MU	254	294	210	294	108	20	65	14.5	20	160	315	449	510	23	259	115	151	179	45	FF300
FLSN 180 L	279	330	279	337	121	32	70	14.5	28	180	361	490	552	35.5	259	115	151	190	45	FF300
FLSN 180 LUR	279	330	279	337	115	32	70	14.5	28	180	361	490	593	35.5	259	115	151	190	45	FF300
FLSN 180 M	279	330	241	337	121	32	70	14.5	28	180	361	490	552	35.5	259	115	151	190	45	FF300
FLSN 180 MT	279	330	241	337	121	32	70	14.5	28	180	361	490	537	29.5	259	115	151	190	45	FF300
FLSN 180 MUR	279	324	241	290	121	24	80	14.5	25	180	328	469	551	29.5	259	115	151	177	45	FF300
FLSN 200 LU	318	374	305	360	135	28	60	18.5	17	200	399	541	669	42.5	259	115	151	243	45	FF350
FLSN 225 M (IE3)	356	426	311	375	149	32	80	18.5	27	225	495	657	779	91.5	308	161	208	270	45	FF400
FLSN 225 M (IE2)	356	426	311	375	149	32	80	18.5	27	225	495	657	779	69.5	352	175	212	270	45	FF400
FLSN 225 MR	356	426	311	380	144.5	34	70	18.5	17	225	398	566	682	49	259	115	151	243	45	FF400
FLSN 225 S	356	426	286	375	149	32	80	18.5	27	225	487	661	779	91.5	308	161	208	276	45	FF400
FLSN 225 SR	356	426	286	380	144.5	34	70	18.5	17	225	398	566	674	44.5	259	115	151	243	45	FF400
FLSN 250 M	406	476	349	413	168	32	80	24	26	250	495	682	779	91.5	308	161	208	270	45	FF500
FLSN 250 MR	406	476	349	413	168	32	80	24	27	250	495	682	859	69.5	352	175	212	270	45	FF500
FLSN 280 M	457	527	419	486	92	33	80	24	30	280	481	717	959	69	352	175	212	303	45	FF500
FLSN 280 S	457	527	368	486	92	33	80	24	30	280	481	717	959	69	352	175	212	303	45	FF500
FLSN 315 LA	508	600	508	610	109	58	100	28	35	315	600	857	1177	119	416	217	264	343	45	FF600
FLSN 315 LB	508	600	508	610	109	58	100	28	35	315	600	847	1177	119	452	219	269	343	45	FF600
FLSN 315 LB (6P)	508	600	508	610	109	58	100	28	35	315	600	857	1177	101	416	217	264	343	45	FF600
FLSN 315 M	508	600	457	610	109	58	100	28	35	315	600	857	1177	119	416	217	264	343	45	FF600
FLSN 315 S	508	600	406	610	109	58	100	28	35	315	600	857	1177	119	416	217	264	343	45	FF600
FLSN 355 LA	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-	FF740
FLSN 355 LA (6P)	610	710	630	756	127	76	100	28	35	355	688	935	1303	139	416	217	264	-	-	FF740
FLSN 355 LAL	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-	FF740
FLSN 355 LB	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-	FF740
FLSN 355 LC	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-	FF740
FLSN 355 LD	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-	FF740

ATEX GAS motors - Zone 2
FLSN series - Cast iron - Mechanical characteristics
Flange mounted IM 3001 (IM B5) - IM 3011 (IM V1)

Dimensions in millimetres





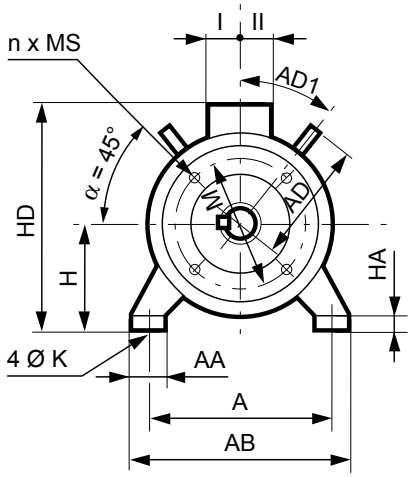
Type	Main dimensions								
	AC*	LB	HJ	LJ	J	I	II	AD	AD1
FLSN 80 L	170	212	149	7	136	68	68	-	-
FLSN 80 LG	203	245	159	8	136	68	68	135	41
FLSN 90 L	203	239	159	8	136	68	68	135	41
FLSN 90 LU	203	266	159	8	136	68	68	135	41
FLSN 90 SL	203	239	159	8	136	68	68	135	41
FLSN 100 L	204	300	159	8	136	68	68	135	41
FLSN 100 LG	227	299	184	0.5	136	68	68	130	45
FLSN 100 LR	204	300	159	8	136	68	68	135	41
FLSN 112 MG	230	299	183	8	136	68	68	148	41
FLSN 112 MU	230	299	183	8	136	68	68	148	41
FLSN 132 M	270	385	204	22	136	68	68	165	37.5
FLSN 132 MR	270	447	204	22	136	68	68	165	37.5
FLSN 132 MU	270	447	204	22	136	68	68	165	37.5
FLSN 132 SM	270	385	204	22	136	68	68	165	37.5
FLSN 160 L	315	495	495	23	259	115	151	179	45
FLSN 160 LUR	315	510	495	23	259	115	151	179	45
FLSN 160 M	315	495	495	23	259	115	151	179	45
FLSN 160 MU	315	510	495	23	259	115	151	179	45
FLSN 180 L	361	552	516	35.5	259	115	151	190	45
FLSN 180 LUR	361	593	516	35.5	259	115	151	190	45
FLSN 180 M	361	552	516	35.5	259	115	151	190	45
FLSN 180 MT	361	537	516	29.5	259	115	151	190	45
FLSN 180 MUR	328	551	495	29.5	259	115	151	177	45
FLSN 200 LU	399	669	547	42.5	259	115	151	243	45
FLSN 225 M (IE3)	495	779	465	91.5	308	161	208	270	45
FLSN 225 M (IE2)	495	779	465	69.5	352	175	212	270	45
FLSN 225 MR	398	682	547	49	259	115	151	243	45
FLSN 225 S	487	779	616	91.5	308	161	208	276	45
FLSN 225 SR	398	674	547	44.5	259	115	151	243	45
FLSN 250 M	495	779	406	91.5	308	161	208	270	45
FLSN 250 MR	495	859	406	69.5	352	175	212	270	45
FLSN 280 M	481	959	479	69	352	175	212	303	45
FLSN 280 S	481	959	479	69	352	175	212	303	45
FLSN 315 LA	600	1177	563	119	416	217	264	343	45
FLSN 315 LB	600	1177	675	119	452	219	269	343	45
FLSN 315 LB (6P)	600	1177	675	101	416	217	264	343	45
FLSN 315 M	600	1177	563	119	416	217	264	343	45
FLSN 315 S	600	1177	563	119	416	217	264	343	45
FLSN 355 LA	688	1303	713	121	452	219	269	-	-
FLSN 355 LA (6P)	688	1303	713	139	416	217	264	-	-
FLSN 355 LAL	688	1303	713	121	452	219	269	-	-
FLSN 355 LB	688	1303	713	121	452	219	269	-	-
FLSN 355 LC	688	1303	713	121	452	219	269	-	-
FLSN 355 LD	688	1303	713	121	452	219	269	-	-

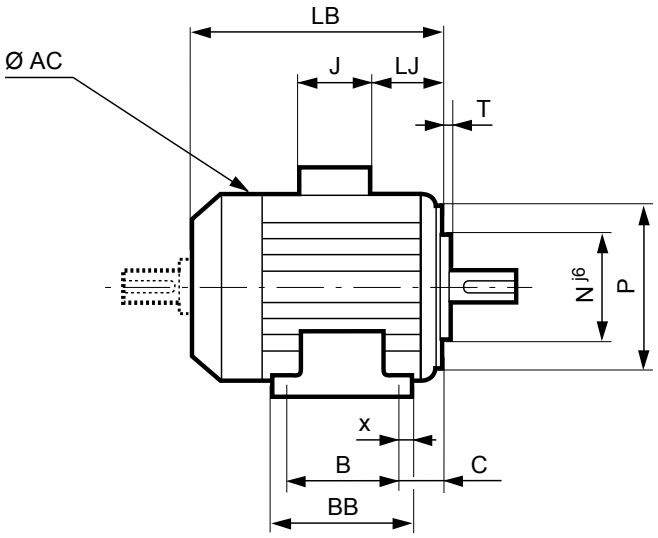
Symbol IEC	Flange dimensions							
	M	N	D	T	n	α°	S	LA
FF165	165	130	200	3.5	4	45	12	10
FF165	165	130	200	3.5	4	45	12	10
FF165	165	130	200	3.5	4	45	12	10
FF165	165	130	200	3.5	4	45	12	10
FF165	165	130	200	3.5	4	45	12	10
FF215	215	180	250	4	4	45	14.5	12
FF215	215	180	250	4	4	45	14.5	12
FF215	215	180	250	4	4	45	14.5	12
FF215	215	180	250	4	4	45	14.5	13
FF215	215	180	250	4	4	45	14.5	13
FF265	265	230	300	4	4	45	14.5	14
FF265	265	230	300	4	4	45	14.5	14
FF265	265	230	300	4	4	45	14.5	14
FF265	265	230	300	4	4	45	14.5	14
FF300	300	250	350	5	4	45	18.5	14
FF300	300	250	350	5	4	45	18.5	14
FF300	300	250	350	5	4	45	18.5	14
FF300	300	250	350	5	4	45	18.5	14
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	14
FF300	300	250	350	5	4	45	18.5	15
FF350	350	300	400	5	4	45	18.5	15
FF400	400	350	450	5	8	22.5	18.5	16
FF400	400	350	450	5	8	22.5	18.5	16
FF400	400	350	450	5	8	22.5	18.5	16
FF400	400	350	450	5	8	22.5	18.5	16
FF400	400	350	450	5	8	22.5	18.5	16
FF500	500	450	550	5	8	22.5	18.5	18
FF500	500	450	550	5	8	22.5	18.5	18
FF500	500	450	550	5	8	22.5	18.5	18
FF500	500	450	550	5	8	22.5	18.5	18
FF600	600	550	660	6	8	22.5	24	22
FF600	600	550	660	6	8	22.5	24	22
FF600	600	550	660	6	8	22.5	24	22
FF600	600	550	660	6	8	22.5	24	22
FF600	600	550	660	6	8	22.5	24	22
FF740	740	680	800	6	8	22.5	24	25
FF740	740	680	800	6	8	22.5	24	25
FF740	740	680	800	6	8	22.5	24	25
FF740	740	680	800	6	8	22.5	24	25
FF740	740	680	800	6	8	22.5	24	25
FF740	740	680	800	6	8	22.5	24	25

** AC: housing diameter without lifting rings*

ATEX GAS motors - Zone 2
FLSN series - Cast iron - Mechanical characteristics
Foot and face mounted IM 2101 (IM B34)

Dimensions in millimetres



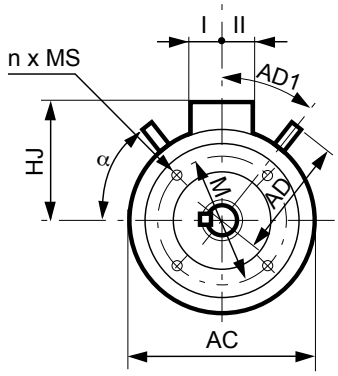


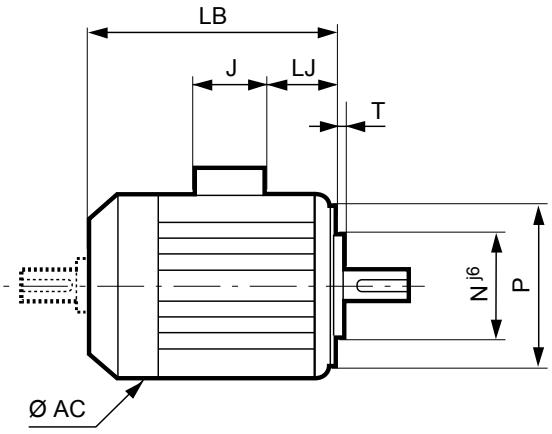
Type	Main dimensions																			
	A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1	Symb
FLSN 80 L	125	157	100	130	50	18	34	10	10	80	170	228	212	7	136	68	68	-	-	FT100
FLSN 80 LG	125	170	100	138	50	22	39	10	10	80	203	238	245	8	136	68	68	135	41	FT100
FLSN 90 L	140	170	125	162	56	28	33	10	10	90	203	248	239	8	136	68	68	135	41	FT115
FLSN 90 LU	140	170	125	162	56	28	33	10	10	90	203	248	266	8	136	68	68	135	41	FT115
FLSN 90 SL	140	170	125	162	56	28	33	10	10	90	203	248	239	8	136	68	68	135	41	FT115
FLSN 100 L	160	196	140	185	63	29	40	12	13	100	204	258	300	8	136	68	68	135	41	FT130
FLSN 100 LG	160	196	140	168	53	13	40	12	14	100	227	266	299	0.5	136	68	68	130	45	FT130
FLSN 100 LR	160	196	140	185	63	29	40	12	13	100	204	258	300	8	136	68	68	135	41	FT130
FLSN 112 MG	190	230	140	186	60	32	48	12	12	112	230	294	299	8	136	68	68	148	41	FT130
FLSN 112 MU	190	230	140	186	60	32	48	12	12	112	230	294	299	8	136	68	68	148	41	FT130
FLSN 132 M	216	255	178	240	89	50	63	12	16	132	270	335	385	22	136	68	68	165	37.5	FT165
FLSN 132 MR	216	255	178	240	89	50	63	12	16	132	270	335	447	22	136	68	68	165	37.5	FT165
FLSN 132 MU	216	255	178	240	89	50	63	12	16	132	270	335	447	22	136	68	68	165	37.5	FT165
FLSN 132 SM	216	255	140	240	89	50	63	12	16	132	270	335	385	22	136	68	68	165	37.5	FT165

** AC: housing diameter without lifting rings*

ATEX GAS motors - Zone 2
FLSN series - Cast iron - Mechanical characteristics
Face mounted IM 3601 (IM B14)

Dimensions in millimetres





Type	Main dimensions								
	AC*	LB	HJ	LJ	J	I	II	AD	AD1
FLSN 80 L	170	212	149	7	136	68	68	-	-
FLSN 80 LG	203	245	159	8	136	68	68	135	41
FLSN 90 SL	203	239	159	8	136	68	68	135	41
FLSN 90 L	203	266	159	8	136	68	68	135	41
FLSN 90 LU	203	239	159	8	136	68	68	135	41
FLSN 100 L	204	300	159	8	136	68	68	135	41
FLSN 100 LR	227	299	184	0.5	136	68	68	130	45
FLSN 100 LG	204	300	159	8	136	68	68	135	41
FLSN 112 MG	230	299	183	8	136	68	68	148	41
FLSN 112 MU	230	299	183	8	136	68	68	148	41
FLSN 132 SM	270	385	204	22	136	68	68	165	37.5
FLSN 132 M	270	447	204	22	136	68	68	165	37.5
FLSN 132 MR	270	447	204	22	136	68	68	165	37.5
FLSN 132 MU	270	385	204	22	136	68	68	165	37.5

** AC: housing diameter without lifting rings*

Type	Flange dimensions						
	M	N	D	T	n	α°	S
FT100	100	80	120	3	4	45	M6
FT100	100	80	120	3	4	45	M6
FT115	115	95	140	3	4	45	M8
FT115	115	95	140	3	4	45	M8
FT115	115	95	140	3	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT165	165	130	200	3.5	4	45	M10
FT165	165	130	200	3.5	4	45	M10
FT165	165	130	200	3.5	4	45	M10
FT165	165	130	200	3.5	4	45	M10

ATEX GAS motors - Zone 2
FLSN series - Cast iron - Mechanical characteristics
Bearings and lubrication

PERMANENTLY GREASED BEARINGS

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

Series	Type	Polarity	Bearing types Permanently greased		Bearing service life as a function of rotation speed								
					3000 min-1			1500 min-1			1000 min-1		
			N.D.E.	D.E.	25°C	40°C	55°C	25°C	40°C	55°C	25°C	40°C	55°C
FLSN	80 L	2	6203 C3	6204 C3	≥ 40000	≥ 40000	25000	-	-	-	-	-	-
	80 LG	4	6204 C3	6205 C3	-	-	-	≥ 40000	≥ 40000	31000	-	-	-
	90 SL/L	2; 4; 6			≥ 40000	≥ 40000	24000				≥ 40000	≥ 40000	34000
	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 LG	4; 6			-	-	-				≥ 40000	≥ 40000	33000
	112 MG	2; 6			≥ 40000	≥ 40000	22000	-	-	-			
	112 MU	4	6206 C3	6206 C3	-	-	-	≥ 40000	≥ 40000	30000	-	-	-
	132 SM/M	2; 4; 6	6207 C3	6308 C3	≥ 40000	≥ 40000	19000	≥ 40000	≥ 40000	25000	≥ 40000	≥ 40000	30000
	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	37800	18900	≥ 40000	≥ 40000	36900	≥ 40000	≥ 40000	20050
	160 MU	6			-	-	-	-	-	-			
	160 LUR	2; 4; 6	6210 C3	6310 C3	≥ 40000	24500	12250	≥ 40000	36400	18200	≥ 40000	≥ 40000	22450
	180 M	2	6212 C3	6310 C3	34000	17000	8500	-	-	-	-	-	-
	180 MT	4	6210 C3	6310 C3	-	-	-	≥ 40000	35500	17750	-	-	-
	180 MUR	2	6312 C3	6310 C3	≥ 40000	22800	11400	-	-	-	-	-	-
	180 L	4; 6	6212 C3	6310 C3	-	-	-	≥ 40000	39500	19750	≥ 40000	≥ 40000	29050
	180 LUR	4; 6	6312 C3	6310 C3	-	-	-	≥ 40000	≥ 40000	22900	≥ 40000	≥ 40000	29900
	200 LU	2; 4; 6	6312 C3	6312 C3	28600	14300	7150	≥ 40000	25400	12700	≥ 40000	33200	16600
	225 S	4	6314 C3	6314 C3	-	-	-	≥ 40000	23700	11850	-	-	-
	225 SR	4	6312 C3	6313 C3	-	-	-	≥ 40000	≥ 40000	21500	-	-	-
	225 M	4; 6	6314 C3	6314 C3	-	-	-	≥ 40000	23700	11850	≥ 40000	25600	12800
	225 MR	2	6312 C3	6313 C3	≥ 40000	22800	11400	-	-	-	-	-	-

BEARINGS WITH GREASE NIPPLES

For open bearing assemblies of frame size ≥ 160 mm fitted with grease nipples, the table below indicates, depending on the type of motor, the lubrication intervals to be respected at 25°C, 40°C and 55°C for a machine installed with a horizontal shaft.

The table below is valid for FLSN motors lubricated with Polyrex EM103 grease used as standard.

Series	Type	Polarity	Bearing type for bearing housings with grease nipples		Quantity of grease	Lubrication intervals in hours								
						3000 min-1			1500 min-1			1000 min-1		
			N.D.E.	D.E.	g	25°C	40°C	55°C	25°C	40°C	55°C	25°C	40°C	55°C
FLSN	160 M*	2; 4; 6	6210 C3	6309 C3	13	22200	11100	5550	32400	16200	8100	39800	19900	9950
	160 MU	6				-	-	-	-	-	-	23400	11700	5850
	160 LUR*	2; 4; 6	6210 C3	6310 C3	15	19600	9800	4900	30400	15200	7600	38200	19100	6600
	180 M*	2	6212 C3	6310 C3	15	18000	9000	4500	-	-	-	-	-	-
	180 MT*	4	6210 C3	6310 C3	15	-	-	-	30400	15200	7600	-	-	-
	180 MUR*	2	6312 C3	6310 C3	15	10600	5300	2650	-	-	-	-	-	-
	180 L*	4; 6	6212 C3	6310 C3	20	-	-	-	29200	14600	7300	37200	18600	9300
	180 LUR*	4; 6	6312 C3	6310 C3	20	-	-	-	26800	13400	6700	35000	17500	8750
	200 LU*	2; 4; 6	6312 C3	6312 C3	20	15200	7600	3800	26800	13400	6700	35000	17500	8750
	225 S*	4	6314 C3	6314 C3	25	-	-	-	23600	11800	5900	-	-	-
	225 SR*	4	6312 C3	6313 C3	25	-	-	-	25200	12600	6300	-	-	-
	225 M*	4; 6	6314 C3	6314 C3	25	-	-	-	23600	11800	5900	32200	16100	8050
	225 MR*	2	6312 C3	6313 C3	25	13400	6700	3350	-	-	-	-	-	-
	250 M	2; 6	6314 C3	6314 C3	25	10400	5200	2600	-	-	-	32200	16100	8050
	250 MR	4				-	-	-	17800	8900	4450	-	-	-
	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 LA/LB/LC/LD	2	6316 C3	6218 C3	35	7400	3700	1850	-	-	-	-	-	-
	355 LA/LB/LC/LD	4; 6	6316 C3	6322 C3	60	-	-	-	13200	8316	4160	22000	13860	6930

** bearing housings with grease nipples on request*

ATEX GAS motors - Zone 2
FLSN series - Cast iron - Mechanical characteristics
Bearings and lubrication

CONSTRUCTION AND SPECIAL ATMOSPHERES

For a machine installed with a vertical shaft, the lubrication intervals are approximately 80% of the values shown in the tables above.

NB: The quality and quantity of grease along with the lubrication interval are indicated on the machine nameplate.

In the case of special fitting arrangements (motors with roller bearing at the front or other mountings), machines with frame size ≥ 160 mm are fitted with grease nipple bearings.
The instructions required for bearing housing maintenance are shown on the machine nameplate.

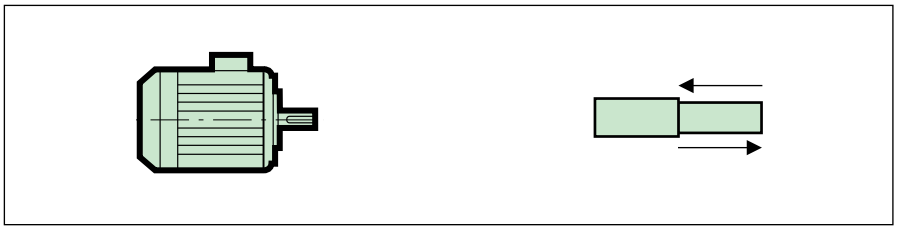
BEARING MOUNTING PRINCIPLE

FLSN series		Horizontal shaft	Vertical shaft	
			Shaft end down	Shaft end up
Foot mounted motors	Mounting arrangements	B3	V5	V6
	standard fitting	Front bearing: - at Front stop for frame size ≤ 132 - locked for frame size ≥ 160	Front bearing locked	Front bearing locked
Flange mounted motors (or feet and flange)	Mounting arrangements	B5 / B35 / B14 / B34	V1 / V15 / V18 / V58	V3 / V36 / V19 / V69
	standard fitting	Front bearing locked for frame size from 80 to ≤ 355 LD	Front bearing locked for frame size from 80 to ≤ 355 LD	Front bearing locked for frame size from 80 to ≤ 355 LD
		Rear bearing locked from 355 LKA to 450 LD	Rear bearing locked from 355 LKA to 450 LD	Rear bearing locked from 355L KA to 450 LD

ATEX GAS motors - Zone 2
FLSN series - Cast iron
Mechanical characteristics - Axial loads

HORIZONTAL MOTOR

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



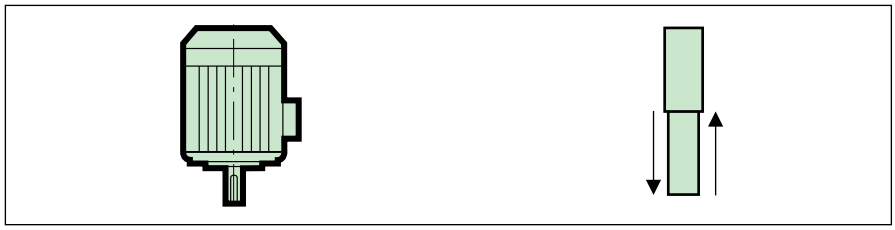
Series	Type	Polarity	Permissible axial load (daN) on the main drive shaft for standard fitting of bearings IM B3 / B6 IM B7 / B8 IM B5 / B35 IM B14 / B34											
			3000 min-1				1500 min-1				1000 min-1			
			→ 25,000 hours	→ 40,000 hours	← 25,000 hours	← 40,000 hours	→ 25,000 hours	→ 40,000 hours	← 25,000 hours	← 40,000 hours	→ 25,000 hours	→ 40,000 hours	← 25,000 hours	← 40,000 hours
FLSN	80 L	2	30	21	(60)	(51)	-	-	-	-	-	-	-	-
	80 LG	2; 4	28	19	(68)	(59)	48	34	(88)	(74)	-	-	-	-
	90 SL/L	2; 4; 6	29	23	(69)	(56)	45	32	(85)	(72)	56	40	(96)	(80)
	90 LU	2; 4; 6	22	13	(72)	(63)	38	25	(88)	(75)	47	32	(97)	(82)
	100 L	2; 4	40	26	(90)	(76)	61	43	(111)	(93)	-	-	-	-
	100 LR	4	-	-	-	-	61	43	(111)	(93)	-	-	-	-
	100 LG	4; 6	-	-	-	-	55	38	(105)	(88)	75	53	(125)	(103)
	112 MG	2; 6	37	24	(87)	(74)	-	-	-	-	82	61	(132)	(111)
	112 MU	4; 6	-	-	-	-	54	36	(114)	(96)	66	45	(126)	(105)
	132 SM/M	2; 4; 6	101	74	(171)	(144)	146	109	(216)	(179)	182	138	(252)	(208)
	132 MU	6	-	-	-	-	-	-	-	-	169	126	(249)	(206)
	132 MR	4	-	-	-	-	129	93	(219)	(183)	-	-	-	-
	160 M	2; 4	129	94	229	194	187	140	287	240	234	177	334	277
	160 MU	6	-	-	-	-	-	-	-	-	219	164	319	264
	160 L	2; 4	118	83	218	183	195	148	295	248	-	-	-	-
	160 LUR	2; 4; 6	158	117	258	217	212	158	312	258	257	193	357	293
	180 M	2; 4	189	148	237	196	228	174	291	237	-	-	-	-
	180 MT	4	-	-	-	-	215	161	315	261	-	-	-	-
	180 MUR	2	178	137	241	200	-	-	-	-	-	-	-	-
	180 L	4; 6	-	-	-	-	240	186	288	234	272	208	320	256
	180 LUR	4; 6	-	-	-	-	224	170	287	233	224	162	287	225
	200 LU	2; 4; 6	249	196	312	259	316	245	379	308	327	245	390	308
	225 S	4	-	-	-	-	427	336	490	399	-	-	-	-
	225 SR	4	-	-	-	-	370	290	433	353	-	-	-	-
	225 M	4; 6	-	-	-	-	416	325	496	405	511	402	591	482
	225 MR	2	280	220	343	283	-	-	-	-	-	-	-	-
	250 M	2; 6	308	240	388	320	-	-	-	-	506	400	506	400
	250 MR	4	-	-	-	-	413	322	493	402	-	-	-	-
	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/LD	2	393	333	147	87	-	-	-	-	-	-	-	-
	355 LAL	4	-	-	-	-	876	724	630	478	-	-	-	-
	355 LA/LB/LC/LD	4; 6	-	-	-	-	876	724	630	478	947	764	701	518

( ): permissible axial loads with Front bearing locked

ATEX GAS motors - Zone 2
FLSN series - Cast iron
Mechanical characteristics - Axial loads

VERTICAL MOTOR
SHAFT END DOWNWARDS

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



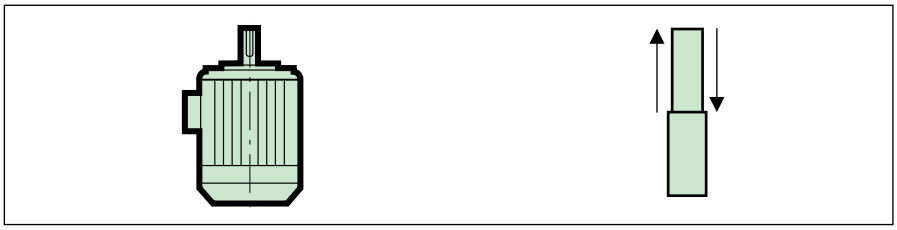
Series	Type	Polarity	Permissible axial load (daN) on the main drive shaft for standard fitting of bearings IM V5 IM V1 / V15 IM V18 / V58											
			3000 min-1				1500 min-1				1000 min-1			
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours
FLSN	80 L	2	29	20	(63)	(54)	-	-	-	-	-	-	-	-
	80 LG	2; 4	26	16	(72)	(62)	45	32	(93)	(78)	-	-	-	-
	90 SL/L	2; 4; 6	26	16	(73)	(63)	42	28	(91)	(78)	53	37	(101)	(86)
	90 LU	2; 4; 6	19	9	(77)	(67)	33	20	(95)	(82)	43	28	(105)	(89)
	100 L	2; 4	36	23	(96)	(83)	56	38	(119)	(101)	-	-	-	-
	100 LR	4	-	-	-	-	55	37	(120)	(102)	-	-	-	-
	100 LG	4; 6	-	-	-	-	48	31	(116)	(99)	68	46	(137)	(115)
	112 MG	2; 6	31	18	(98)	(85)	-	-	-	-	75	53	(145)	(123)
	112 MU	4; 6	-	-	-	-	45	28	(128)	(110)	57	36	(140)	(119)
	132 SM/M	2; 4; 6	90	62	(189)	(161)	135	98	(235)	(198)	171	127	(271)	(227)
	132 MU	6	-	-	-	-	-	-	-	-	154	110	(275)	(231)
	132 MR	4					113	77	(245)	(208)				
	160 M	2; 4; 6	107	72	264	229	164	117	325	277	209	152	374	317
	160 MU	6	-	-	-	-	-	-	-	-	189	133	375	319
	160 L	2; 4	94	59	256	221	174	126	331	284	-	-	-	-
	160 LUR	2; 4; 6	133	92	297	256	185	130	362	308	227	162	417	352
	180 M	2; 4	160	119	279	238	187	132	361	306	-	-	-	-
	180 MT	4	-	-	-	-	190	135	361	306	-	-	-	-
	180 MUR	2	144	102	294	252	-	-	-	-	-	-	-	-
	180 L	4; 6	-	-	-	-	206	151	346	291	233	169	391	326
	180 LUR	4; 6	-	-	-	-	187	132	355	300	183	120	377	314
	200 LU	2; 4; 6	207	153	375	320	262	190	471	398	269	186	505	422
	225 S	4	-	-	-	-	351	260	611	520	-	-	-	-
	225 SR	4	-	-	-	-	317	236	520	438	-	-	-	-
	225 M	4; 6	-	-	-	-	333	241	627	535	428	319	723	613
	225 MR	2	234	174	413	352	-	-	-	-	-	-	-	-
	250 M	2; 6	247	179	481	413	-	-	-	-	423	315	647	539
	250 MR	4	-	-	-	-	315	223	639	547	-	-	-	-
	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/LD	2	135	65	524	454	-	-	-	-	-	-	-	-
	355 LAL	4	-	-	-	-	516	350	1123	957	-	-	-	-
	355 LA/LB/LC/LD	4; 6	-	-	-	-	516	350	1123	957	566	364	1328	1126

( ): permissible axial loads with Front bearing locked

ATEX GAS motors - Zone 2
FLSN series - Cast iron
Mechanical characteristics - Axial loads

VERTICAL MOTOR SHAFT END UPWARDS

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



Series	Type	Polarity	Permissible axial load (daN) on the main drive shaft for standard fitting of bearings											
			IM V6 IM V3 / V36 IM V19 / V69											
			3000 min-1				1500 min-1				1000 min-1			
			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
FLSN	80 L	2	(59)	(50)	33	24	-	-	-	-	-	-	-	-
	80 LG	2; 4	(66)	(56)	32	22	(85)	(71)	53	39	-	-	-	-
	90 SL/L	2; 4; 6	(66)	(56)	33	23	(82)	(68)	51	38	(93)	(77)	61	46
	90 LU	2; 4; 6	(69)	(59)	27	18	(81)	(76)	43	38	(93)	(82)	55	32
	100 L	2	(86)	(72)	46	33	(106)	(88)	69	51	-	-	-	-
	100 LR	4	-	-	-	-	(105)	(87)	70	52	-	-	-	-
	100 LG	4; 6	-	-	-	-	(98)	(81)	67	49	(118)	(96)	87	66
	112 MG	2; 6	(81)	(68)	48	35	-	-	-	-	(125)	(103)	95	73
	112 MU	4; 6	-	-	-	-	(105)	(88)	68	50	(117)	(96)	80	60
	132 SM/M	2; 4; 6	(159)	(132)	120	91	(205)	(168)	165	128	(249)	(205)	179	135
	132 MU	6	-	-	-	-	-	-	-	-	(234)	(190)	195	151
	132 MR	4	-	-	-	-	(203)	(167)	155	118	-	-	-	-
	160 M	2; 4; 6	207	172	164	129	264	217	225	177	309	252	274	217
	160 MU	6	-	-	-	-	-	-	-	-	289	233	275	219
	160 L	2; 4	194	159	156	121	274	226	231	184	-	-	-	-
	160 LUR	2; 4; 6	233	192	197	156	285	230	262	208	327	262	317	252
	180 M	2; 4	208	167	231	190	250	195	298	243	-	-	-	-
	180 MT	4	-	-	-	-	290	235	261	206	-	-	-	-
	180 MUR	2	207	165	231	189	-	-	-	-	-	-	-	-
	180 L	4; 6	-	-	-	-	254	199	298	243	281	217	343	278
	180 LUR	4; 6	-	-	-	-	250	195	292	237	246	183	314	251
	200 LU	2; 4; 6	270	216	312	257	325	253	408	335	332	249	442	359
	225 S	4	-	-	-	-	414	323	548	457	-	-	-	-
	225 SR	4	-	-	-	-	380	299	457	375	-	-	-	-
	225 M	4; 6	-	-	-	-	413	321	547	455	508	399	643	533
	225 MR	2	297	237	350	289	-	-	-	-	-	-	-	-
	250 M	2; 6	327	259	401	333	-	-	-	-	423	315	647	539
	250 MR	4	-	-	-	-	395	303	559	467	-	-	-	-
	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 LA/LB/LC/LD	2	135	65	524	454	-	-	-	-	-	-	-	-
	355 LA/LB/LC/LD	4; 6	-	-	-	-	516	350	1123	957	566	364	1328	1126

400 and 450: please contact us

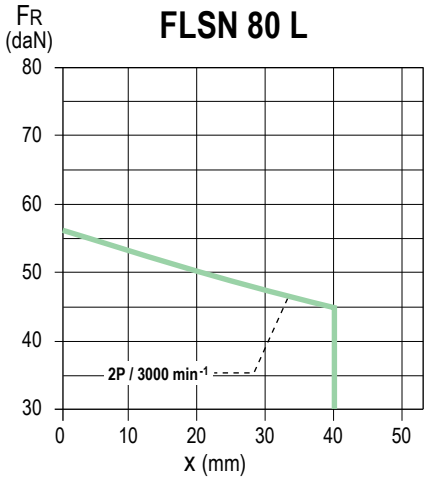
( ): permissible axial loads with Front bearing locked

ATEX GAS motors - Zone 2
FLSN series - Cast iron
Mechanical characteristics - Radial loads

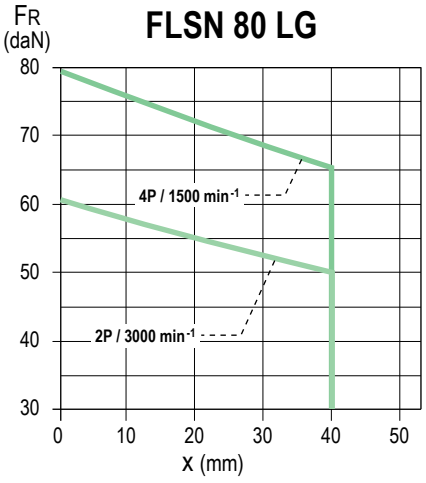
STANDARD FITTING ARRANGEMENT

Permissible radial load on main shaft extension with a bearing life L_{10h} of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder

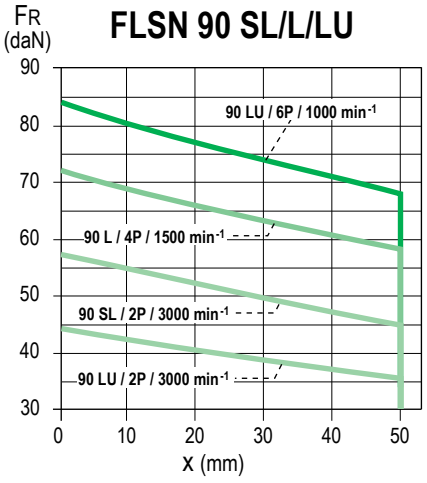
FLSN 80 L



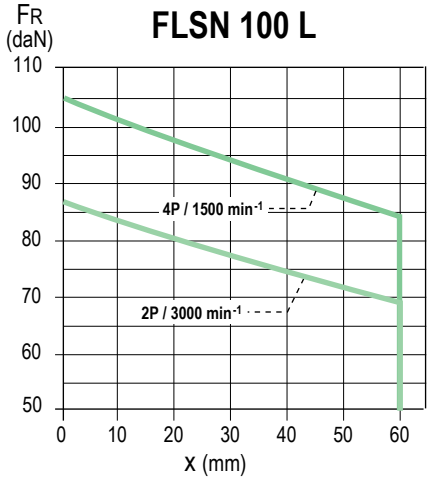
FLSN 80 LG



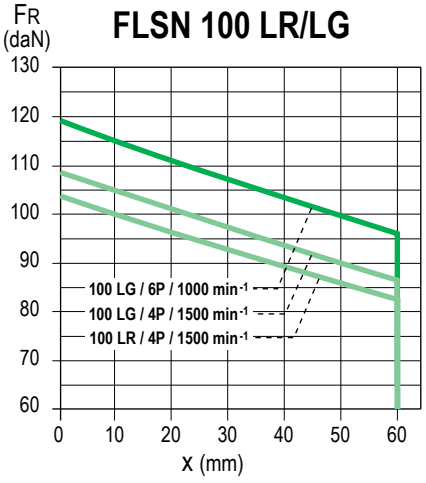
FLSN 90 SL/L/LU



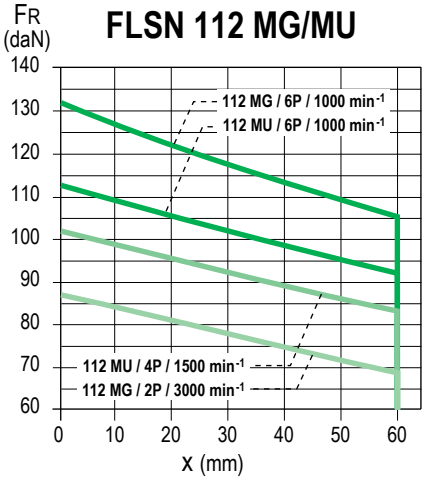
FLSN 100 L



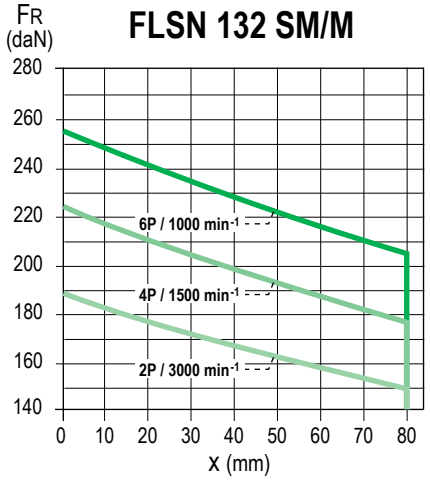
FLSN 100 LR/LG



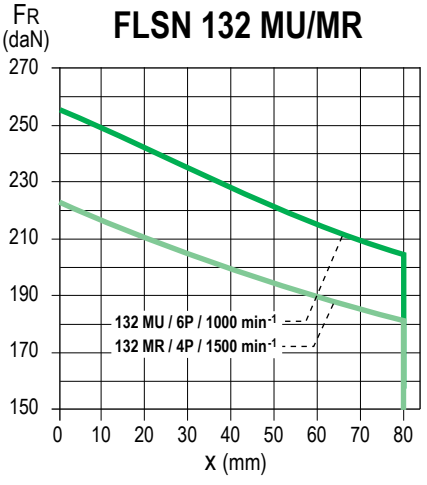
FLSN 112 MG/MU



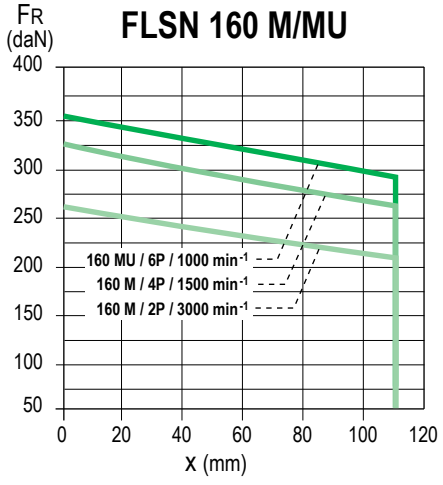
FLSN 132 SM/M



FLSN 132 MU/MR



FLSN 160 M/MU

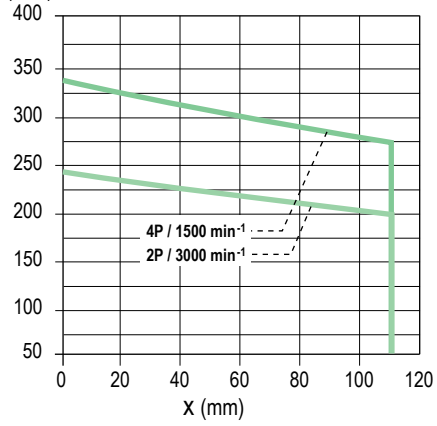


ATEX GAS motors - Zone 2
FLSN series - Cast iron
Mechanical characteristics - Radial loads

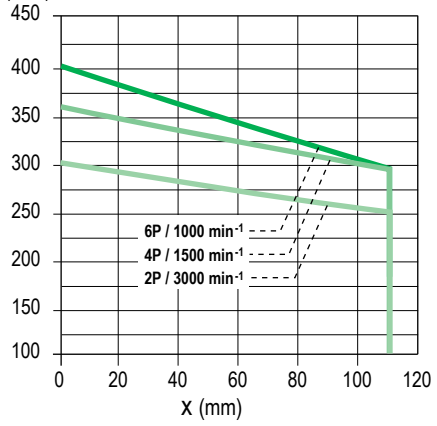
STANDARD FITTING ARRANGEMENT

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

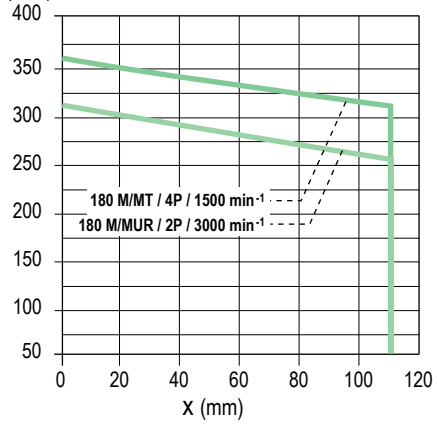
FLSN 160 L



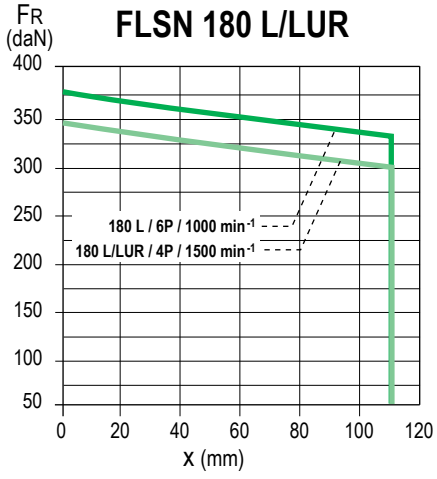
FLSN 160 LUR



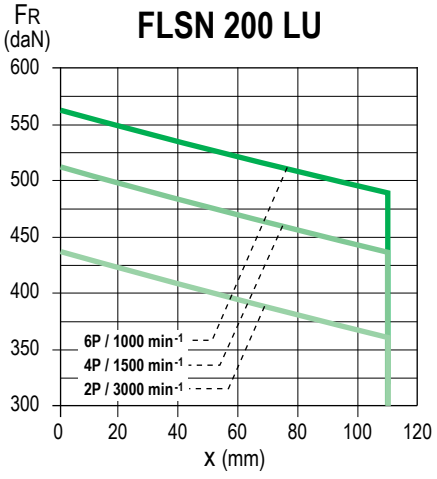
FLSN 180 M/MT/MUR



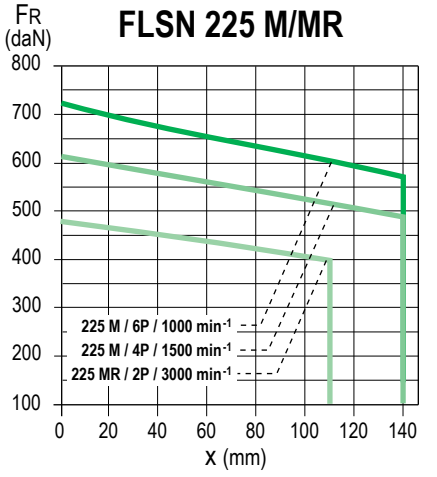
FLSN 180 L/LUR



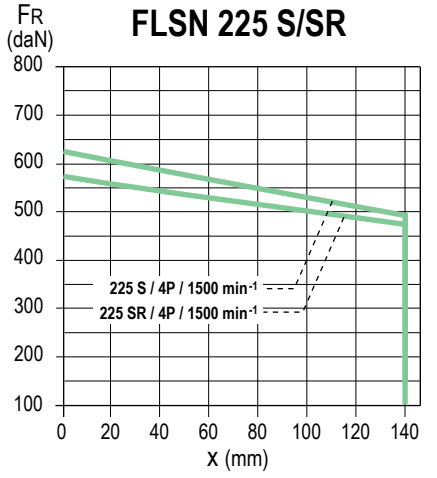
FLSN 200 LU



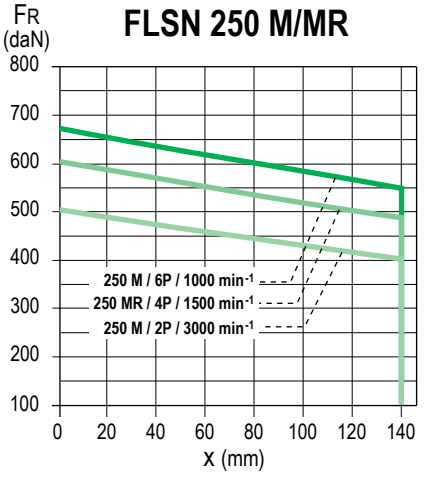
FLSN 225 M/MR



FLSN 225 S/SR



FLSN 250 M/MR



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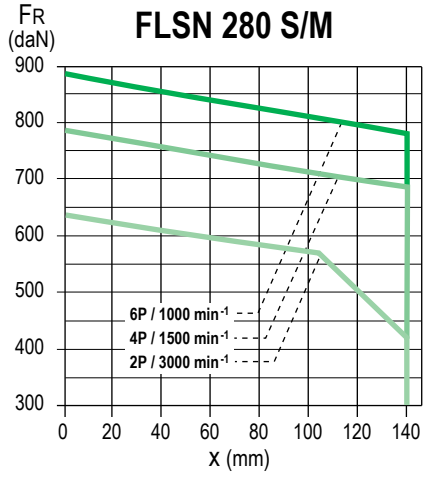
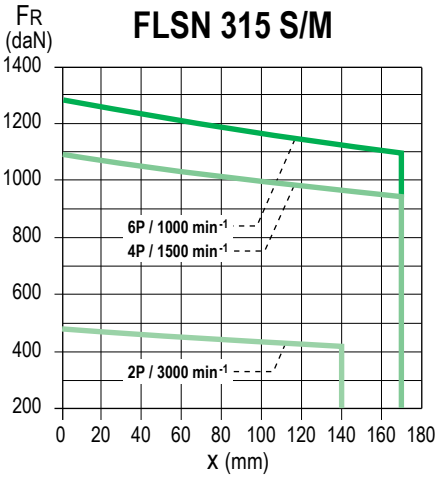
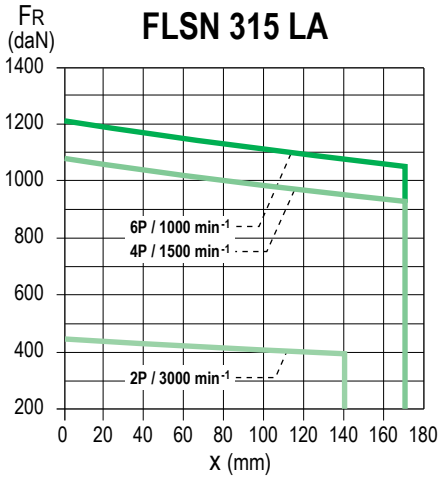


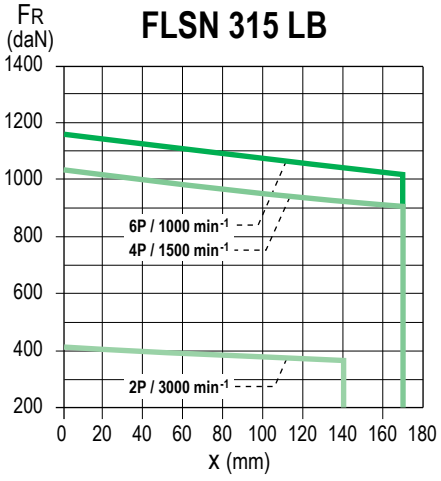
ATEX GAS motors - Zone 2
FLSN series - Cast iron
Mechanical characteristics - Radial loads

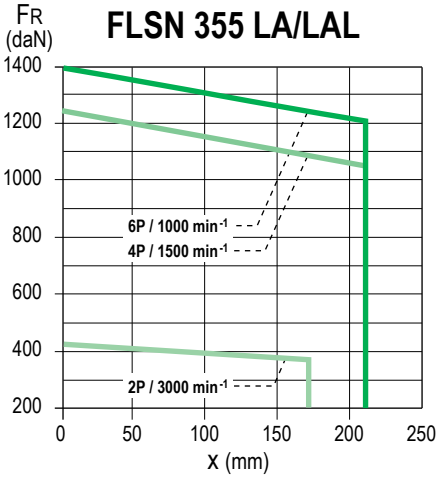
STANDARD FITTING ARRANGEMENT

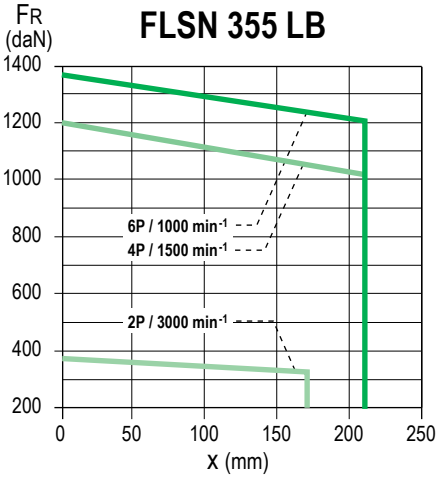
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder

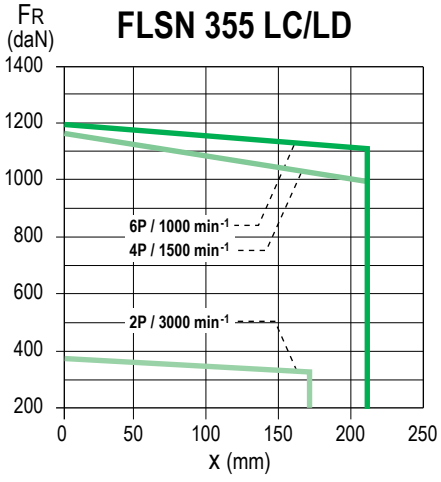












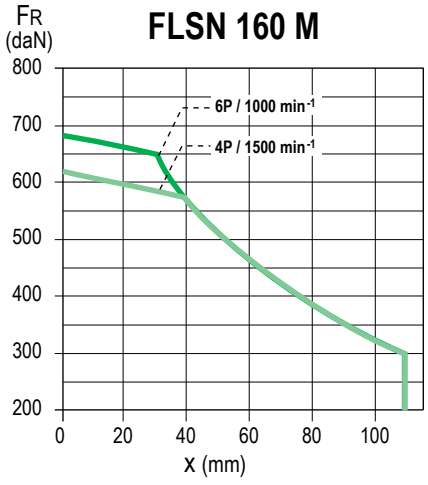
ATEX GAS motors - Zone 2
FLSN series - Cast iron
Mechanical characteristics - Radial loads

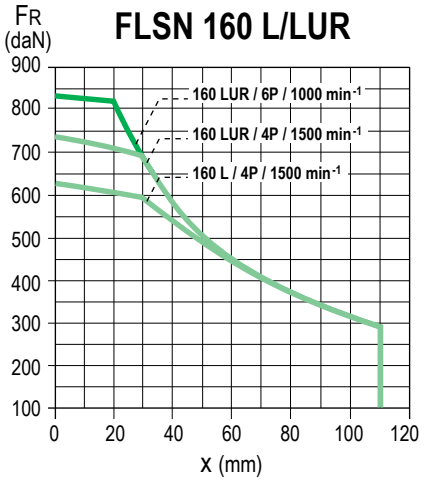
SPECIAL FITTING ARRANGEMENT

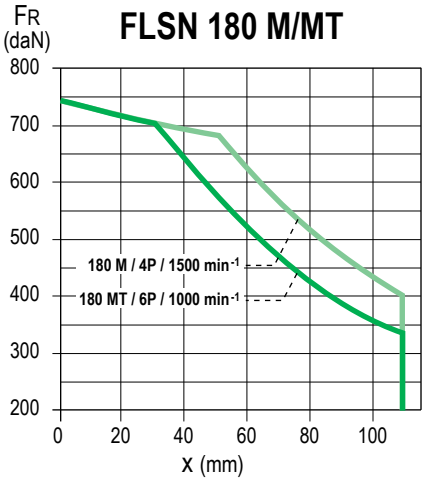
Type of drive end roller bearings

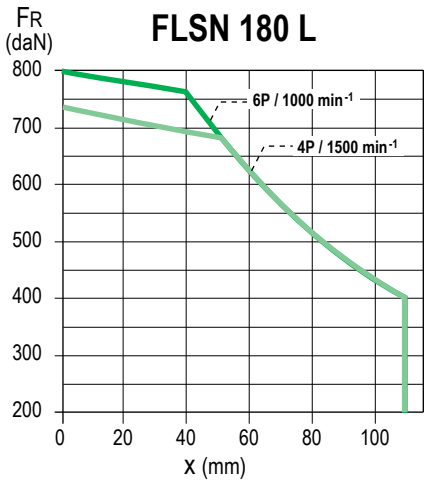
Series	Type	Polarity	Rear bearing (N.D.E.)	Front Bearing (D.E.)
FLSN	160 M/MU	4; 6	6210 C3	NU 309
	160 L	4		
	160 LUR	6	6210 C3	NU 310
	180 MT	4		
	180 M	4	6212 C3	NU 310
	180 L	4; 6	6312 C3	NU 310
	180 LUR			
	200 LU	4; 6	6312 C3	NU 312
	225 S	4	6314 C3	NU 314
	225 SR	4	6312 C3	NU 313
	225 M	4; 6	6314 C3	NU 314
	225 MR	2	6312 C3	NU 313
	250 M	6	6314 C3	NU 314
	250 MR	4		
	280 S/M	4; 6	6314 C3	NU 316
	315 S/M/L	4; 6	6316 C3	NU 320
	355 L	4; 6	6316 C3	NU 322

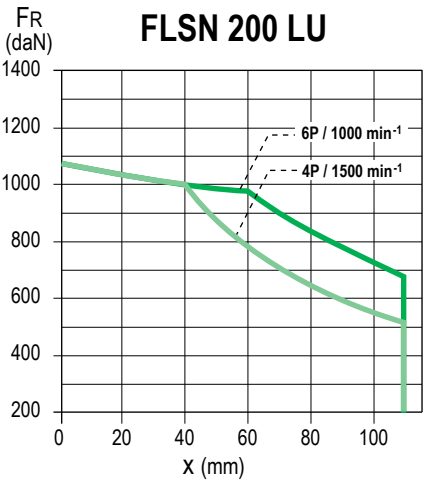
Permissible radial load on main shaft extension with a bearing life L_{10h} of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder

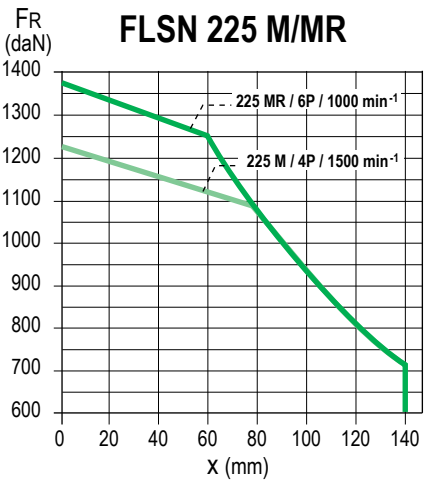










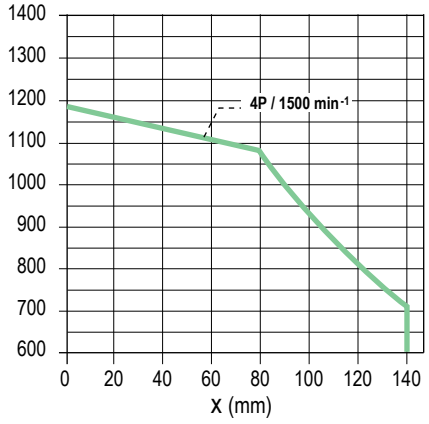


ATEX GAS motors - Zone 2
FLSN series - Cast iron
Mechanical characteristics - Radial loads

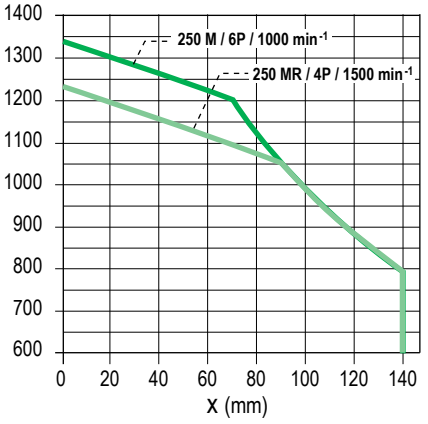
SPECIAL FITTING ARRANGEMENT

Permissible radial load on main shaft extension with a bearing life L_{10h} of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder

FLSN 225 SR/S



FLSN 250 M/MR



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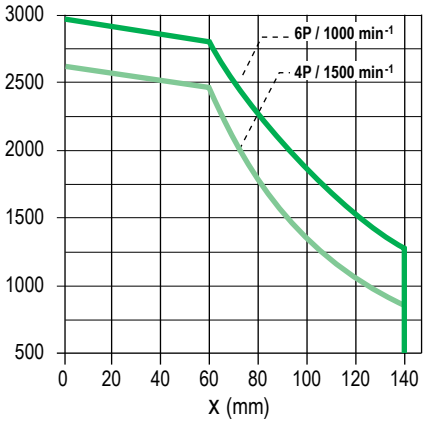
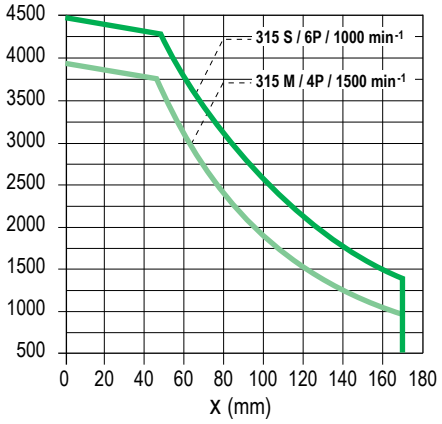
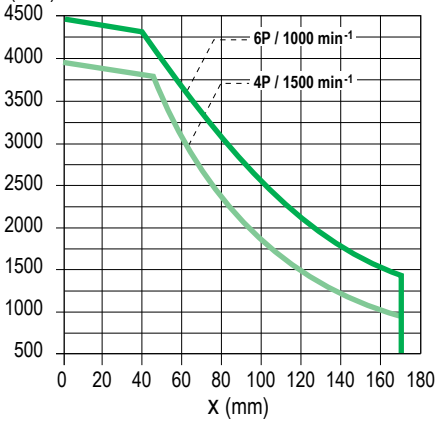


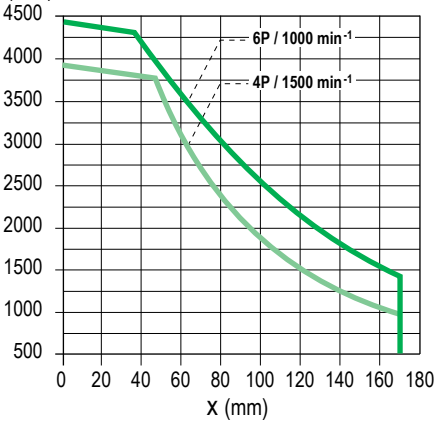
FLSN 315 S/M



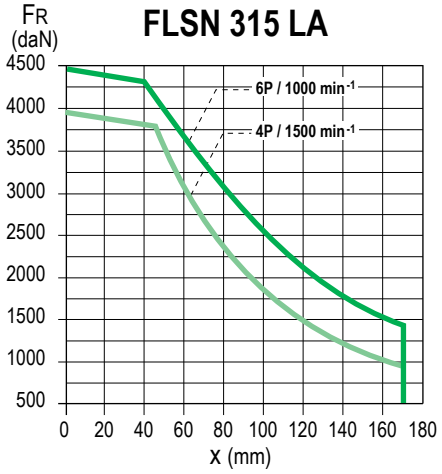
FLSN 315 LA



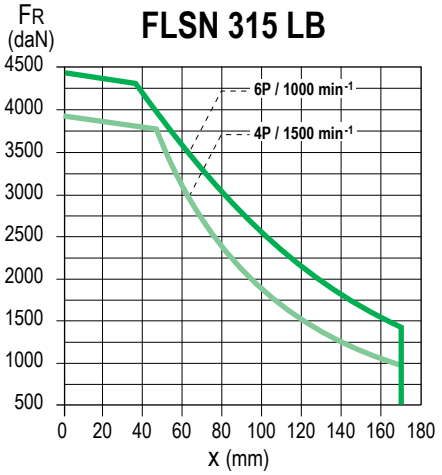
FLSN 315 LB



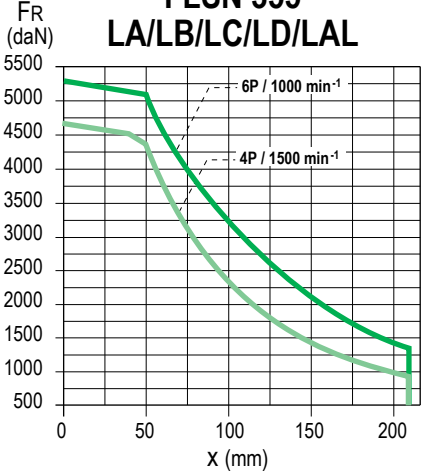
FLSN 315 LA



FLSN 315 LB



FLSN 355 LA/LB/LC/LD/LAL



ATEX GAS motors - Zone 2
FLSN series - Cast iron
Mechanical characteristics- Terminal box connections

INDICATION OF CABLE GLAND SIZE AND TYPE FOR 400V RATED SUPPLY VOLTAGE IF DRILLINGS REQUIRED WITHOUT DETAILS OF DIAMETERS

Series	Type	Polarity	Power + auxiliaries	
			Number of holes	Hole diameter
FLSN	80	2; 4; 6	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		
	180 MR	2; 4; 6	3	2M40 + 1M16
	180 M/L/LUR	2; 4; 6		
	200	2; 4; 6		
	225 SR/MR	2; 4; 6		2M50 + 1M16
	225 M	2; 4; 6		
	250	2; 4; 6		
	280	2; 4; 6	1 (2 if auxiliaries)	ISO M63 x 1.5 (1M63 + 1M16)
	315	2; 4; 6		ISO M75 x 1.5 (1M75 + 1M16)
	355	2; 4; 6		

If the motor is supplied with a cable gland support plate or un-drilled conduits:
- The drilling diameter of the smooth holes for cable glands or conduits must not be greater than the diameter of the thread of the cable gland or conduit + 2 mm and must be de-burred (broken angles about 0.5 mm x 45°) on each side of the thin plate.
- The installation of cable glands or conduit entry glands by the installer must ensure that the degree of safety (preservation of the flameproof character and/or of the IP) required by the application (gas and/or dust) and the motor temperature class is preserved.

TERMINAL BLOCKS DIRECTION OF ROTATION

Standard motors are fitted with a 6-terminal safety block, with the terminal markings complying with or 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 shaft end.
If any two of the phases are changed over, the motor will run in the opposite 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 terminal blocks 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	230/400V connection		400/690V connection
		Polarity	Terminals	Terminals
FLSN	80 to 112	2; 4; 6	M5	M5
	132 S to 160	2; 4; 6	M6	M6
	180 L	6	M6	M6
	180 M	4	M8	M6
	180 LUR	6	M6	M6
	180 MUR	2; 4	M8	M6
	200 LU	2 (30 kW); 4; 6	M8	M8
		2 (37 kW)	M10	M8
	225 M	4	M10	M8
		6	M8	
	225 to 250	2	M10	M8
		4		M10
	250 M	6	M8	M8
	280 to 315	2; 4; 6	M12	M12
	355 L	2; 4; 6	M12	M12

ATEX GAS motors - Zone 2
FLSN series - Cast iron
Optional equipment

Mechanical adaptations	Frame size
DE and NDE bearings with 1 machining, for vibration sensor in position 12H, 12H-3H, or 12H-3H-9H	≥ 132
Different FF flanges from IEC	All
Different FT flanges from IEC	≤ 132
DE roller bearing	≥ 160: 4p & +
Insulated DE or NDE bearing	≥ 280
2nd standard catalogue NDE shaft end	All
2nd special NDE shaft end	All
Conical shaft	All
Shaft with special keying	All
Keyed cylindrical NDE shaft (secondary shaft end) as per IEC	All
Stainless-steel shaft	All
Class B balancing	All
F type (full key) or N type (no key) balancing	All
Stainless steel fan cover	All
Steel fan cover + drip cover	All
Steel fan cover + anti-clogging	All
Metal fan	All
Stainless steel nameplate	All
Stainless-steel fastenings	All
Three-phase axial forced ventilation - IC 416 A	All
Incremental encoder / 1024 or 4096 pts / 5v or 11/30 V	All
Positioning holes (jacking screws)	≥ 250
Radial seal for motor in vertical position with shaft end upwards	All
Drain holes for operation in vertical position	All

Electrical adaptations	Frame size
Terminal board with anti-rotation system as standard	All
Special voltages (excluding variable speed)	All
Definition for Id/In ≤ 7.5	All
Insulation class H	All
Main box in position B or D	All
Auxiliary boxes	≥ 160
Plastic PE	All
ATEX brass PE for unshielded cable	All
ATEX brass PE for shielded cable	All
ATEX brass PE auxiliary for unshielded cable	All
ATEX brass PE auxiliary for shielded cable	All
Flying lead via 1 metre single-core cable 6 + 1	All
Cable entry on the left as seen from the shaft end	All
Preparation for NPT cable glands	All

Protection	Frame size
Winding PTC thermistor probe (triple probe)	All
Winding PT 100 probe (1 per phase)	All
Endshield PTC thermistor probe (triple probe)	≥ 160
Endshield PT 100 probe (per probe)	≥ 160
Endshield thermocouple	≥ 160
Space heaters when stopped (220-230 V)	All
Reinforced winding insulation system for variable speed drive power supply	All

Finish	Frame size
VIK version (see page 20)	All
IP 65	All
Definition for gas + dust motor, Ex tc IIIB / IIIC T125°C Dc	All
IP 56 stopped with fan (IC 411)	All
C3H, C4M, C4H, C5-IL or C5-IM paint	All
Other paint shades	All
Operating temperature: -55°C < T° < -20°C	All
Complete tropicalization (stator + rotor)	All

ATEX GAS motors - Zone 2
FLSN series - Cast iron
Optional equipment

NON-STANDARD FLANGES

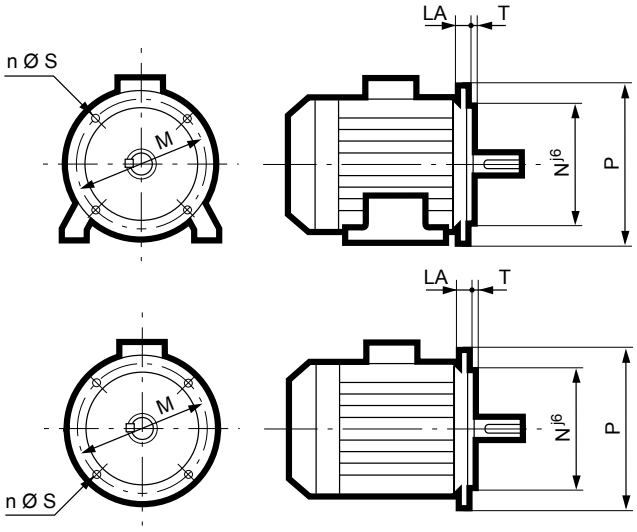
Optionally, Nidec Leroy-Somer motors can be fitted with flanges and faceplates that are larger or smaller than standard. This means that motors can be adapted to all types of situation without the need for costly and time-consuming modifications.
The tables below give the flange and faceplate dimensions and also indicate flange/motor compatibility.
The bearing and shaft end for each frame size remain standard.

Dimensions in millimetres

(FF) Flange mounted

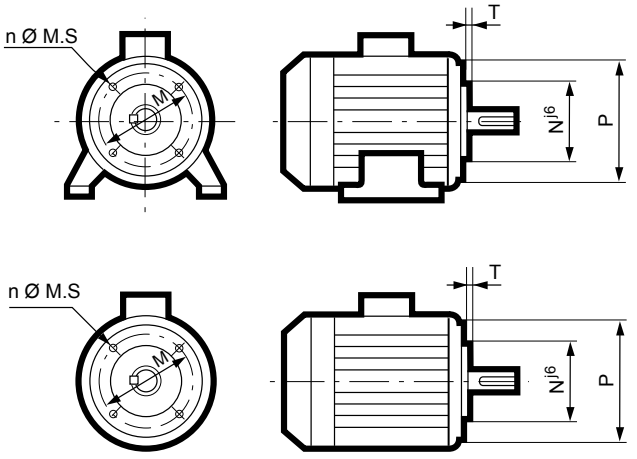
Symbol IEC	Flange dimensions						
	M	N	D	T	n	S	LA
FF 115	115	95	140	3	4	10	10
FF 130	130	110	160	3.5	4	10	10
FF 165	165	130	200	3.5	4	12	10
FF 215	215	180	250	4	4	15	12
FF 265	265	230	300	4	4	15	14
FF 300	300	250	350	5	4	18.5	14
FF 350	350	300	400	5	4	18.5	15
FF 400	400	350	450	5	8	18.5	16
FF 500	500	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

** Tolerance N js6*
*** shaft length = 22 for frame size ≥ 280*



(FT) Face mounted

Symbol IEC	Flange dimensions					
	M	N	D	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



ATEX GAS motors - Zone 2
FLSN series - Cast iron
Optional equipment

MODIFIED FLANGES

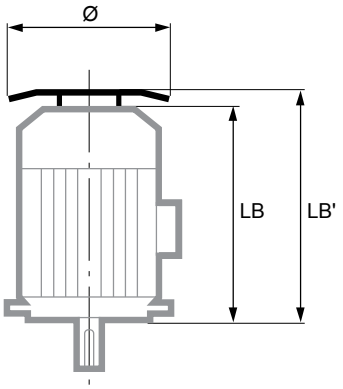
Motor type		Mountings \ Flange type	(FF) Flange mounted														(FT) Face mounted								
			FF 85	FF 100	FF 115	FF 130	FF 165	FF 215	FF 265	FF 300	FF 350	FF 400	FF 500	FF 600	FF 740	FF 940	FT 65	FT 75	FT 85	FT 100	FT 115	FT 130	FT 165	FT 215	FT 265
FLSN	80 L	all	■	■	■	■	●	◆									◆	◆	◆	●	◆	◆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

● Standard ■ Modified shaft ◆ Adaptable without shaft modifications

(1) Dimension C need not comply with IEC 60072

DRIP COVER FOR OPERATION IN VERTICAL POSITION, SHAFT END DOWNWARDS

Series	Motor type	LB'	Ø
FLSN	80 L/LG	LB + 20	145
	90 S/L/LU	LB + 20	185
	100 L	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



ATEX GAS motors - Zone 2
FLSN series - Cast iron
Optional equipment

SPACE HEATERS

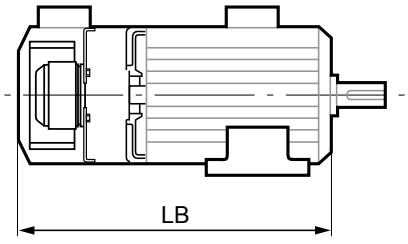
Series	Type	Power (W)
FLSN	80 L/LG	10
	90 to 132	25
	160 to 200	52
	225 SR/MR	52
	225 M	100
	250 M	100
	280 to 315	100*
	355	150*

The space heaters use 200/240 V single-phase, 50 or 60 Hz.
** Power increase possible subject to quote.*

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 sensors built into the winding.



Series	Type	LB dimensions with forced ventilation	
		Foot or face mounted motor	Flange mounted motor
FLSN	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	

** Forced ventilation only available for types 280, 315 and 355.*

ATEX GAS motors - Zone 2
FLSN series - Cast iron
Handling - Position of lifting rings

LIFTING THE MOTOR ONLY

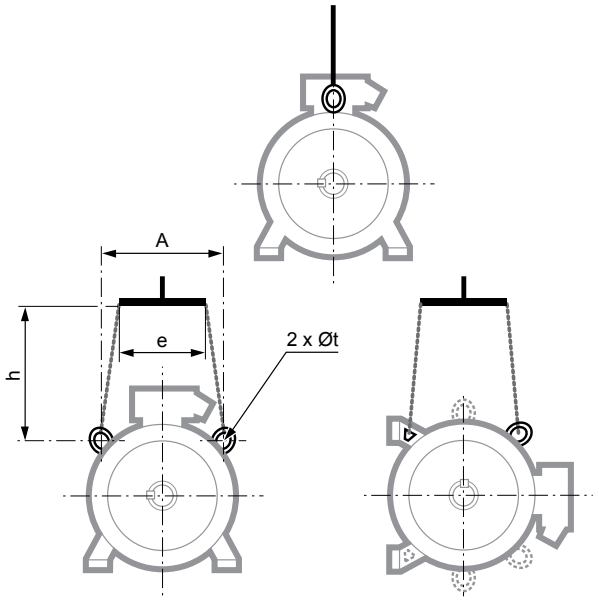
(not coupled to the machine)

The regulations stipulate that in excess of 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.

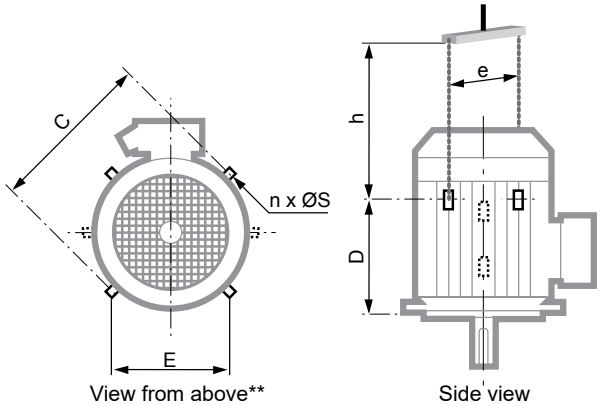
To prevent any damage to the motor during handling (for example: switching the motor from horizontal to vertical), it is essential to follow these instructions.

HORIZONTAL POSITION



Series	Type	Horizontal position			
		A	min. e	min. h	Øt
FLSN	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

VERTICAL POSITION



View from above** Side view

Series	Type	Vertical position						
		C	E	D	n**	ØS	min. e*	min. h
FLSN	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

** 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

ATEX GAS motors - Zone 2
LSN series - Aluminium
General information - Designation

ATEX GAS motors - Zone 2	LSN series
	Ex II 3 G Ex ec II C T3 Gc
	Premium Efficiency
	IE3 aluminium on mains
	IE3 aluminium on drive

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}	LSN	160	MR	9 kW	IFT/IE3	IM 1001 IM B3	230 / 400 V	50 Hz	IP 55
Pole(s) 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

ATEX GAS motors - Zone 2
LSN series - Aluminium
General information - Identification and marking

NAMEPLATES

The nameplate identifies the motors, indicates the main performance and shows compatibility of the motor concerned with the main standards and regulations concerning them.
All motors in this catalogue with power between 0.75 and 90 kW are fitted with two information plates: one indicating the motor's performance when supplied from the mains, and the other the motor's performance when supplied from a drive.

DEFINITION OF SYMBOLS USED ON NAMEPLATES

CE **Legal mark indicating the conformity of equipment with the requirements of European Directives**

SPECIAL MARKING (ATEX)

: protection marking against explosive risks
II 3G or II 3GD : ATEX marking
Ex ec : "gas" protection mode
IIC : "gas" equipment group
T3 : "gas" temperature class
Gc : "gas" EPL level
Ex tc : "dust" protection mode (option)
IIIC : "dust" equipment group (option)
T125°C : max. surface temperature (option)
Dc : "dust" EPL level
0080 : INERIS Notified Body
INERIS 01ATEX3004X* : CE type examination certificate No.:
* IECExINE10.0012X: IECEx certificate No.

Zone	ATEX marking	Marking of type of gas protection	Marking of type of dust protection (option)	Index of protection
2	II 3 G	Ex ec IIC T3 Gc	-	IP55
2 & 22	II 3 G	Ex ec IIC T3 Gc	Ex tc IIIC T125°C Dc	IP65

MAINS SUPPLY PLATE

MOT 3 ~ : three-phase AC motor
LSN : series
132 : frame size
MU : housing symbol
T : impregnation index

Motor no.

0123456 : motor serial number
J : month of production
11 : year of production
001 : batch number
IE3 : efficiency class
90.4% : efficiency at 4/4 load

kg : weight
IP55 : protection rating
IK08 : shock resistance
I cl.F : insulation class F
40°C : max. 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

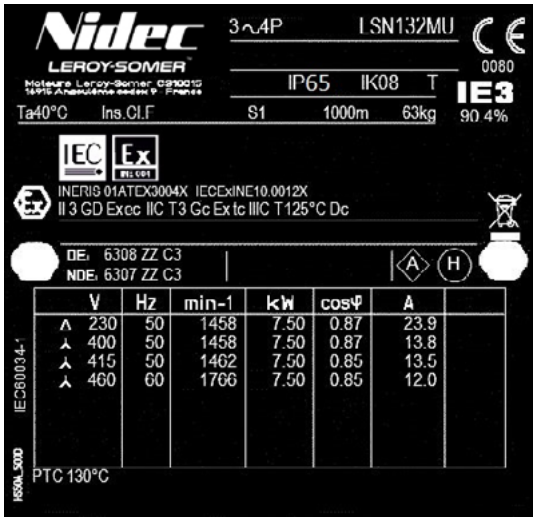
DE : drive end
Drive end bearing
NDE : non drive end
Bearing side opposite the drive
g : amount of grease at each regreasing (in g)
h : regreasing interval (hours)
A : vibration level
H : balancing mode

DRIVE SUPPLY PLATE

Inverter settings : required values for setting the frequency inverter
Motor performance : torque available on the motor shaft in % rated torque at the plate frequencies
Min. Fsw (kHz) : minimum switching frequency acceptable for the motor
Nmax (min^{-1}) : maximum mechanical speed acceptable for the motor

ALUMINIUM MOTOR NAMEPLATES - LSN ZONE 2

Mains supply plate



Drive supply plate

ATEX GAS motors - Zone 2
LSN series - Aluminium
General information - Description

The motor enclosure is designed in such a way that no sparks can be produced under any motor operating conditions within the manufacturer's allowable limits, and no temperature rise can occur during normal operation.

The Ex ec motors in aluminium casings from Nidec Leroy-Somer are certified to comply with Directive 2014/34/EU.

Nidec Leroy-Somer can also provide self-certification with a Declaration of Conformity.

Lastly, Ex ec motors can also be used for applications in Ex t zone 22 dusty atmospheres.
The following definitions are therefore possible:

- Ex tc IIIB T125°C Dc, IP 55 for zone 22 + Ex ec IIC T3
- Ex tc IIIC T125°C Dc, IP 65 for zone 22 + Ex ec IIC T3

Designations	Materials	Comments
Finned housing	Aluminium alloy	- with integral or screwed feet, or without feet - 4 or 6 securing holes for housings with feet - lifting rings for frame size ≥ 100 - ground 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 aluminum (or alloys for special applications) - assembly by hot shrinking on the shaft - rotor balanced dynamically, 1/2 key
Shaft	Steel	- for frame size ≤ 160 MP - LR: • tapped centre hole • closed keyway - for frame size≥ 160 M - L: • tapped centre hole • open keyway
End shields	Aluminium alloy	- 80 - 90 rear bearing
	Cast iron	- 80 - 90 front bearing (except 6-pole and optional for 80 and 90 rear bearings) - 100 to 280 front and rear bearings
Bearings and lubrication		- protected ball bearings, permanently greased for frame size 56 to 225 - protected ball bearings, regreasable for frame size 250 to 280 - bearings preloaded at rear
Labyrinth seal **Lip seals**	Technopolymer or steel Synthetic rubber	- gasket or deflector at the front for all face mounted motors - gasket, deflector or labyrinth seal for foot mounted motor
Fan	Composite material or aluminium alloy	- bi-directional: straight blades
Fan cover	Composite material or steel plate	- fitted, on request, with a drip cover for operation in vertical position, shaft end downwards (steel plate fan cover)
Terminal box	Composite material or aluminium alloy	- IP 55 - can be rotated 90° - fitted with a terminal block with 6 steel terminals as standard (brass as an option) - terminal box fitted with threaded plugs (supplied without cable glands) (cable glands as an option) - 1 ground terminal in each terminal box - fastening system consisting of a cover with captive screws

ATEX GAS motors - Zone 2
LSN series - Aluminium - IE3
Electrical characteristics - Mains supply

IEC Ex INE 004 *

Type	Rated power	Rated torque	Starting torque/ Rated torque	Maximum torque/ Rated torque	Starting current/ Rated current	Moment of inertia	Weight	Noise	400V 50Hz							
									Rated speed	Rated current	Efficiency IEC 60034-2-1 2007			Power factor		
	P_n kW	M_n N.m	M_d/M_n	M_m/M_n	I_d/I_n	J kg.m²	IM B3 kg	LP db(A)	N_n min⁻¹	I_n A	4/4 η	3/4 η	2/4 η	4/4 Cos φ	3/4 Cos φ	2/4 Cos φ
2 poles																
LSN 80 L	0.75	2.5	3.4	3.4	7.7	0.00095	9.9	58	2890	1.6	82.4	82.4	80.2	0.83	0.76	0.64
LSN 80 LG	1.1	3.65	2.6	2.6	7	0.00223	14.1	64	2885	2.2	85.6	86.9	86.7	0.85	0.80	0.69
LSN 90 SL	1.5	4.95	2.9	2.9	7.4	0.00223	15.6	64	2890	3	85.3	86.3	85.5	0.84	0.78	0.67
LSN 90 LU	2.2	7.25	3.1	3.1	8	0.00292	20.4	67	2895	4.25	86.9	88.1	87.8	0.86	0.80	0.69
LSN 100 LG	3	9.8	3	3	8.4	0.00941	32.4	67	2935	5.6	88.5	88.8	87.6	0.88	0.83	0.73
LSN 112 MG	4	13.1	2	2	7.1	0.00941	32.7	71	2920	7.2	89.0	90.1	90.1	0.90	0.86	0.78
LSN 132 S	5.5	18	2.3	2.3	7.5	0.01116	39.2	63	2925	10.1	89.4	90.5	90.5	0.88	0.84	0.75
LSN 132 SM	7.5	24.4	2.1	2.1	6.8	0.01102	55.7	67	2935	13.8	91.2	92.1	92.1	0.86	0.83	0.74
LSN 132 M	9	29.2	2.1	2.1	7.6	0.01203	59.3	67	2945	16.7	91.7	92.4	92.2	0.85	0.81	0.72
LSN 160 MP	11	35.7	1.9	1.9	6.9	0.01390	62.6	72	2940	19.9	91.5	92.3	92.1	0.87	0.83	0.74
LSN 160 M	15	48.6	2.3	2.3	7.9	0.0490	95	69	2945	26.5	91.9	92.6	92.6	0.89	0.87	0.81
LSN 160 L	18.5	59.9	2.8	2.8	7.6	0.0551	100	68	2950	32.8	92.6	93.3	93.2	0.88	0.84	0.76
LSN 180 MR	22	71.1	3.1	3.1	8.7	0.0628	105	69	2954	38.7	93.2	93.9	94.0	0.88	0.85	0.77
LSN 200 LR	30	97.3	2.6	2.6	7.6	0.1106	170	73	2945	51.5	93.5	94.2	94.4	0.90	0.88	0.83
LSN 200 L	37	120	2	2	7.1	0.2492	201	73	2945	63.9	93.9	94.5	94.4	0.89	0.87	0.81
LSN 225 MR	45	145	3.7	2.7	7.9	0.1597	227	76	2962	79.7	94.8	95.1	94.7	0.86	0.82	0.73
LSN 250 ME	55	176	2.3	2.4	8.3	0.3340	320	78	2974	95	94.5	94.6	90.3	0.88	0.86	0.79
LSN 280 SC**	75	241	2.3	2.3	8	0.4092	350	79	2970	126	95.2	95.5	95.1	0.90	0.88	0.82
LSN 280 MC**	90	289	2.5	2.5	8.5	0.4760	382	80	2972	151	95.5	95.8	95.5	0.90	0.87	0.82

** motors proposed in self-certification only

4 poles																
LSN 80 LG	0.75	4.95	2.2	2.9	6.4	0.00335	13.6	48	1450	1.6	83.6	84.3	83.0	0.81	0.73	0.59
LSN 90 SL	1.1	7.25	2.4	3.2	6.9	0.00418	16.2	45	1450	2.3	84.8	85.7	85.0	0.81	0.74	0.61
LSN 90 LU	1.5	9.85	2.9	3.7	7.6	0.00524	20.4	51	1452	3.2	85.6	86.2	85.1	0.79	0.70	0.57
LSN 100 L	1.8	11.8	2.4	2.8	6.4	0.00561	23	48	1456	3.8	86.6	87.3	86.1	0.79	0.71	0.57
LSN 100 LR	2.2	14.4	3.2	3.7	8	0.00676	25.8	47	1454	4.65	87.1	87.7	86.7	0.78	0.70	0.57
LSN 100 LG	3	19.6	2.4	3.2	7.2	0.01152	31	55	1464	6	89.2	89.9	89.9	0.81	0.74	0.61
LSN 112 MU	4	26.2	2.7	3.1	7.2	0.01312	34.4	54	1456	7.9	88.9	89.8	89.6	0.82	0.77	0.65
LSN 132 SM	5.5	35.9	2.8	3.6	8.4	0.02286	52	59	1462	10.5	90.3	91.0	90.6	0.84	0.77	0.65
LSN 132 MU	7.5	49.1	2.9	3.3	8.1	0.02965	62.6	61	1458	13.8	90.4	91.5	91.9	0.87	0.82	0.73
LSN 160 MR	9	58.7	3.1	3.6	8.7	0.03574	77.8	62	1464	17	91.0	91.8	91.7	0.84	0.78	0.67
LSN 160 M	11	71.7	2.2	3.1	7.3	0.0712	93	59	1466	20.2	91.4	92.4	92.6	0.86	0.82	0.73
LSN 160 LUR	15	97.6	2.5	3.4	8.5	0.0954	100	58	1468	27.3	92.1	92.9	93.0	0.86	0.82	0.72
LSN 180 M	18.5	120	2.9	2.8	7.7	0.1333	130	68	1468	33.9	92.8	93.6	93.5	0.85	0.81	0.72
LSN 180 LUR	22	143	3.2	3.1	8.2	0.1555	155	68	1470	41.1	93.0	93.4	93.3	0.83	0.79	0.69
LSN 200 LU	30	194	3	2.8	7.3	0.2704	225	63	1476	55	93.7	94.3	94.1	0.84	0.79	0.70
LSN 225 SR	37	239	3.2	3.1	7.9	0.2897	236	63	1480	70.2	93.9	94.2	93.8	0.81	0.76	0.65
LSN 225 MG	45	289	2.3	2.9	7.2	0.6573	318	70	1486	83.6	94.8	95.0	94.5	0.82	0.77	0.66
LSN 250 ME	55	354	2.3	2.7	7.3	0.7793	350	69	1484	101	94.7	95.1	95.0	0.83	0.79	0.70
LSN 280 SD**	75	482	2.4	3.2	8.1	0.9595	428	69	1486	139	95.0	95.2	94.9	0.82	0.78	0.69
LSN 280 MD**	90	579	2.6	3.4	8.3	1.0799	470	68	1484	168	95.5	95.7	95.4	0.81	0.76	0.65

** motors proposed in self-certification only

6 poles																
LSN 90 SL	0.75	7.5	1.9	2.3	4.3	0.00378	16	56	952	1.95	79.2	80.0	79.1	0.71	0.62	0.48
LSN 90 LU	1.1	11	2.3	2.7	4.8	0.00519	21.5	56	956	2.75	81.9	82.3	80.3	0.70	0.61	0.47
LSN 100 LG	1.5	14.8	2.3	2.8	5.6	0.01523	30	43	966	3.6	83.8	84.4	82.9	0.72	0.63	0.50
LSN 112 MU	2.2	21.7	2.3	2.7	5.4	0.01899	37	46	966	5.4	84.3	84.8	83.5	0.70	0.61	0.49
LSN 132 SM	3	29.5	2.7	3.1	6.6	0.02528	48	50	972	6.8	87.5	88.0	86.9	0.73	0.65	0.53
LSN 132 M	4	39.3	2.6	2.9	6.4	0.03027	54	56	972	9.05	87.4	88.1	87.1	0.73	0.65	0.53
LSN 132 MU	5.5	54.4	2.6	2.8	6.4	0.03699	63.1	57	966	11.7	88.1	89.2	89.1	0.77	0.70	0.58
LSN 160 MU	7.5	73.2	2	3	6.9	0.1295	82	58	978	16.1	89.6	89.7	88.4	0.75	0.67	0.54
LSN 180 L	11	107	3	3.4	8.6	0.2048	130	62	982	22.6	91.1	91.3	90.3	0.77	0.70	0.57
LSN 180 LUR	15	146	3	3.1	8.4	0.2530	150	63	980	30.7	91.5	91.9	91.3	0.77	0.70	0.58
LSN 200 L	18.5	180	2.2	2.8	7.1	0.3300	200	61	980	36.2	92.1	92.8	92.6	0.80	0.75	0.66
LSN 200 LU	22	214	2.8	3.5	7.3	0.3901	236	62	980	44.6	92.5	93.0	92.5	0.77	0.71	0.61
LSN 225 MG	30	291	2.2	2.4	6.6	0.7222	284	64	986	55.3	93.3	93.7	93.3	0.84	0.80	0.70
LSN 250 ME	37	358	2.3	2.8	7.1	0.9234	310	64	986	66.9	93.9	94.4	94.3	0.85	0.81	0.72
LSN 280 SC**	45	437	2.2	2.4	6.6	1.1279	377	64	984	80.4	93.9	94.5	94.5	0.86	0.83	0.74
LSN 280 MD**	55	533	2.8	3	7.7	1.3995	444	59	986	98.6	94.7	95.2	95.0	0.85	0.81	0.72

** motors proposed in self-certification only

** available March 2021*

ATEX GAS motors - Zone 2
LSN series - Aluminium - IE3
Electrical characteristics - Mains supply

Type	Rated power	415V 50Hz				460V 60Hz			
		Rated speed	Rated current	Efficiency	Power power	Rated speed	Rated current	Efficiency	Power factor
	P_n kW	N_n min^{-1}	I_n A	η 4/4	Cos φ 4/4	N_n min^{-1}	I_n A	η 4/4	Cos φ 4/4
2 poles									
LSN 80 L	0.75	2900	1.55	82.3	0.81	3505	1.4	83.3	0.80
LSN 80 LG	1.1	2895	2.1	86.2	0.84	3505	1.9	87.0	0.83
LSN 90 SL	1.5	2900	2.9	86.1	0.83	3510	2.65	86.9	0.82
LSN 90 LU	2.2	2905	4.1	87.3	0.85	3505	3.7	88.2	0.85
LSN 100 L	3	2940	5.5	88.7	0.86	3545	4.9	88.7	0.87
LSN 112 MG	4	2930	6.95	89.7	0.89	3535	6.25	90.0	0.89
LSN 132 S	5.5	2930	9.8	89.8	0.87	3540	8.75	90.7	0.87
LSN 132 SM	7.5	2945	13.4	91.5	0.85	3550	12	92.1	0.85
LSN 132 M	9	2950	16.4	91.9	0.83	3558	14.4	92.4	0.85
LSN 160 MP	11	2945	19.6	91.8	0.85	3550	17.4	92.2	0.86
LSN 160 M	15	2950	25.4	92.2	0.89	3550	22.9	92.4	0.89
LSN 160 L	18.5	2954	32.2	92.9	0.86	3558	28.6	93.4	0.87
LSN 180 MR	22	2958	38.1	93.5	0.86	3564	33.8	94.0	0.87
LSN 200 LR	30	2954	50	93.8	0.89	3556	44.5	94.0	0.90
LSN 200 L	37	2950	62	94.2	0.88	3552	56.2	93.9	0.88
LSN 225 MR	45	2962	79.5	94.9	0.83	3566	69.8	95.2	0.85
LSN 250 ME	55	2978	92.2	94.7	0.87	3575	83	94.3	0.88
LSN 280 SC**	75	2974	123	95.5	0.89	3574	110	95.3	0.90
LSN 280 MC**	90	2972	147	95.5	0.89	3574	133	95.5	0.89

** motors proposed in self-certification only

4 poles									
LSN 80 LG	0.75	1452	1.6	83.7	0.78	1758	1.45	85.1	0.77
LSN 90 SL	1.1	1454	2.25	85.4	0.79	1760	2.05	86.6	0.78
LSN 90 LU	1.5	1456	3.2	85.7	0.76	1760	2.85	87.2	0.76
LSN 100 L	1.8	1458	3.75	86.8	0.79	1762	3.35	88.2	0.76
LSN 100 LR	2.2	1456	4.6	87.3	0.76	1760	4.15	88.4	0.76
LSN 100 LG	3	1466	6	89.2	0.78	1770	5.25	90.5	0.79
LSN 112 MU	4	1460	7.8	89.0	0.80	1764	7.05	90.3	0.79
LSN 132 SM	5.5	1466	10.3	90.6	0.82	1770	9.2	91.7	0.82
LSN 132 MU	7.5	1462	13.5	90.9	0.85	1766	12.1	91.8	0.85
LSN 160 MR	9	1466	16.7	91.3	0.84	1768	14.9	92.2	0.82
LSN 160 M	11	1470	19.6	91.7	0.85	1774	17.6	92.5	0.85
LSN 160 LUR	15	1472	26.6	92.4	0.85	1774	24	93.2	0.84
LSN 180 M	18.5	1474	32.9	93.0	0.84	1774	29.5	93.6	0.84
LSN 180 LUR	22	1474	40.5	93.2	0.81	1770	36.3	93.8	0.81
LSN 200 LU	30	1478	54.1	94.1	0.82	1778	48	94.5	0.83
LSN 225 SR	37	1482	69.4	93.9	0.79	1782	61.4	94.5	0.80
LSN 225 MG	45	1488	82.5	94.9	0.80	1788	73.4	95.0	0.81
LSN 250 ME	55	1486	98.4	94.9	0.82	1786	88.1	95.4	0.82
LSN 280 SD**	75	1486	135	95.1	0.81	1788	120	95.5	0.82
LSN 280 MD**	90	1488	165	95.5	0.79	1788	147	95.8	0.80

** motors proposed in self-certification only

6 poles									
LSN 90 SL	0.75	956	1.95	79.7	0.68	-	-	-	-
LSN 90 LU	1.1	960	2.8	81.9	0.67	-	-	-	-
LSN 100 LG	1.5	970	3.65	83.7	0.68	-	-	-	-
LSN 112 MU	2.2	970	5.4	84.3	0.67	-	-	-	-
LSN 132 SM	3	974	6.75	87.7	0.71	-	-	-	-
LSN 132 M	4	974	9.05	87.7	0.70	-	-	-	-
LSN 132 MU	5.5	968	11.5	88.6	0.75	-	-	-	-
LSN 160 MU	7.5	980	15.9	97.7	0.73	-	-	-	-
LSN 180 L	11	984	22.4	91.4	0.75	-	-	-	-
LSN 180 LUR	15	982	30.8	91.6	0.74	-	-	-	-
LSN 200 L	18.5	982	35.3	92.3	0.79	-	-	-	-
LSN 200 LU	22	984	42.2	92.7	0.74	-	-	-	-
LSN 225 MG	30	986	53.9	93.3	0.83	-	-	-	-
LSN 250 ME	37	988	65.9	94.1	0.83	-	-	-	-
LSN 280 SC**	45	986	78.4	94.0	0.85	-	-	-	-
LSN 280 MD**	55	988	96.1	94.8	0.84	-	-	-	-

** motors proposed in self-certification only

** available March 2021*

ATEX GAS motors - Zone 2
LSN series - Aluminium - IE3
Electrical characteristics - Drive-powered

IEC Ex INE 004 *

Type	400V 50Hz				% Rated torque M_n at					400V 87Hz Δ[1]				Maximum mechanical speed[2]
	Rated power P_n kW	Rated speed N_n min^{-1}	Rated current I_n A	Power factor Cos φ 4/4	10Hz	17Hz	25Hz	50Hz	87Hz	Rated power P_n kW	Rated speed N_n min^{-1}	Rated current I_n A	Power factor Cos φ 4/4	
2 poles														
LSN 80 L	0.75	2875	1.7	0.85	2.3	2.5	2.5	2.5	1.4	1.31	5006	2.9	0.85	13500
LSN 80 LG	1.1	2865	2.4	0.87	3.4	3.7	3.7	3.7	2.1	1.91	4997	4.1	0.87	11700
LSN 90 SL	1.5	2880	3.3	0.86	4.6	5	5	5	2.8	2.61	5006	5.5	0.86	11700
LSN 90 LU	2.2	2875	4.6	0.88	6.7	7.3	7.3	7.3	4.1	3.83	5014	7.9	0.88	11700
LSN 100 LG	3	2870	6.2	0.88	9.3	10	10	10	5.7	5.22	4997	10.7	0.86	9900
LSN 112 MG	4	2905	7.9	0.91	12.2	13.1	13.1	13.1	7.5	6.96	5058	13.8	0.89	9900
LSN 132 S	5.5	2910	11	0.90	16.7	18	18	18	10.3	9.57	5066	19	0.87	6700
LSN 132 SM	7.5	2925	15	0.88	22.7	24.4	24.4	24.4	13.9	13.05	5084	25.6	0.86	6700
LSN 132 M	9	2935	17.8	0.87	27.2	29.2	29.2	29.2	16.6	15.66	5101	30.5	0.86	6700
LSN 160 MP	11	2930	21.8	0.88	33.2	35.7	35.7	35.7	20.4	19.14	5092	37.1	0.86	6700
LSN 160 M	15	2935	28.8	0.90	40.7	48.6	48.6	48.6	27.7	26.1	5101	49.9	0.88	6000
LSN 160 L	18.5	2945	35	0.89	53	60	60	60	34.2	62.19	5110	61	0.88	6000
LSN 180 MR	22	2940	41.5	0.90	56.3	67.6	71.2	71.2	40.6	38.28	5110	72.5	0.88	5670
LSN 200 LR	30	2935	56.2	0.90	76.9	92.4	97.3	97.3	80.8	-	-	-	-	4500
LSN 200 L	37	2930	69.9	0.89	89.3	108	120	120	99.6	-	-	-	-	4500
LSN 225 MR	45	2952	86	0.87	107.9	130.5	145	145	120.4	-	-	-	-	4320
LSN 250 ME	55	2940	103	0.89	132.4	160.2	178	178	147.7	-	-	-	-	4320
LSN 280 SC**	75	2964	136	0.90	179.3	216.9	241	241	200	-	-	-	-	4050
LSN 280 MC**	90	2968	163	0.9	241.9	289	289	289	239.9	-	-	-	-	4050

** motors proposed in self-certification only

4 poles														
LSN 80 LG	0.75	1440	1.7	0.83	4.6	5	5	5	2.8	1.31	2511	3	0.83	11700
LSN 90 SL	1.1	1445	2.5	0.84	6.7	7.3	7.3	7.3	4.1	1.91	2511	4.2	0.84	11700
LSN 90 LU	1.5	1445	3.5	0.82	9.2	9.9	9.9	9.9	5.6	2.61	2515	5.8	0.79	11700
LSN 100 LR	2.2	1445	4.9	0.81	13.4	14.4	14.4	14.4	8.2	3.83	2518	8.3	0.79	9900
LSN 100 LG	3	1456	6.4	0.83	16.4	19.6	19.6	19.6	11.2	5.22	2529	11.1	0.81	9900
LSN 112 MU	4	1452	8.5	0.85	21.9	26.2	26.2	26.2	14.9	6.96	2525	14.6	0.80	9900
LSN 132 SM	5.5	1456	11.3	0.86	33.4	35.9	35.9	35.9	20.5	9.57	2532	19.1	0.85	6700
LSN 132 MU	7.5	1450	15	0.88	45.7	49.1	49.1	49.1	28.0	13.05	2525	25.9	0.86	6700
LSN 160 MR	9	1458	18.2	0.86	54.6	58.7	58.7	58.7	33.5	15.66	2536	31	0.85	6000
LSN 160 M	11	1462	21.7	0.88	60.0	71.7	71.7	71.7	40.9	19.14	2539	37.6	0.85	6000
LSN 160 LUR	15	1464	29.6	0.87	81.7	97.6	97.6	97.6	55.6	26.1	2543	50.8	0.85	5670
LSN 180 M	18.5	1466	36.4	0.87	94.9	120	120	120	68.4	32.19	2543	63.2	0.85	5670
LSN 180 LUR	22	1466	44.1	0.85	113.0	143	143	143	81.5	38.28	2546	75.9	0.83	4500
LSN 200 LU	30	1472	59.1	0.85	144.3	194	194	194	110.6	52.2	2557	102.9	0.84	4500
LSN 225 SR	37	1476	74.5	0.83	177.8	239	239	239	136.2	64.38	2584	127	0.81	4320
LSN 225 MG	45	1480	89	0.84	229.3	290	290	290	165.3	78.3	2570	152.9	0.83	4050
LSN 250 ME	55	1482	107	0.85	279.8	354	354	354	201.8	95.7	2570	187.9	0.83	4050
LSN 280 SD**	75	1484	147	0.84	381.0	482	482	482	274.7	-	-	-	-	3420
LSN 280 MD**	90	1482	177	0.83	457.7	579	579	579	330	-	-	-	-	3420

** motors proposed in self-certification only

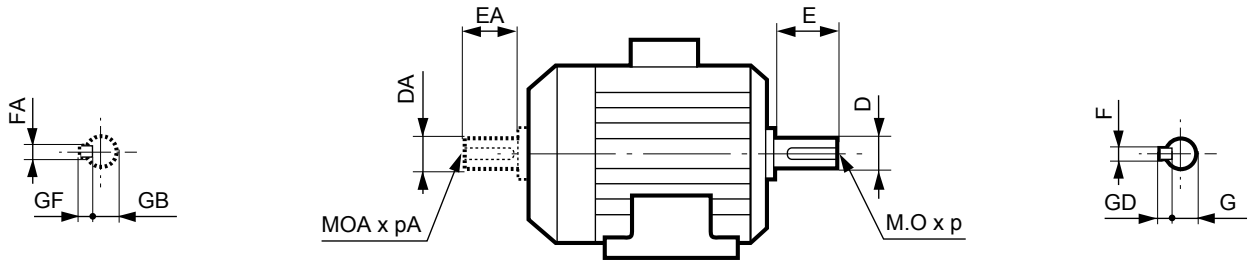
6 poles														
LSN 90 SL	0.75	945	2.1	0.75	7	7.6	7.6	7.6	4.3	1.31	1645	3.4	0.75	11700
LSN 90 LU	1.1	950	2.9	0.74	10.2	11	11	11	6.3	1.91	1656	4.7	0.71	11700
LSN 100 LG	1.5	962	3.9	0.73	13.1	14.8	14.8	14.8	8.4	2.61	1673	6.6	0.72	9900
LSN 112 MU	2.2	960	5.7	0.73	19.2	21.7	21.7	21.7	12.4	3.83	1673	9.6	0.70	9900
LSN 132 SM	3	968	7.2	0.77	27.4	29.5	29.5	29.5	16.8	5.22	1684	12	0.73	6700
LSN 132 M	4	968	9.6	0.76	36.6	39.3	39.3	39.3	22.4	6.96	1684	16.2	0.73	6700
LSN 132 MU	5.5	960	12.6	0.79	50.6	54.4	54.4	54.4	31	9.57	1673	21.3	0.76	6700
LSN 160 MU	7.5	974	18.7	0.79	68.1	73.2	73.2	73.2	41.7	13.05	1694	28.4	0.76	6700
LSN 180 L	11	980	23.9	0.79	89.6	107	107	107	61	19.14	1701	40.8	0.77	5670
LSN 180 LUR	15	976	32.4	0.79	122.2	146	146	146	83.2	26.1	1697	55.7	0.77	4500
LSN 200 L	18.5	976	38.9	0.82	150.7	180	180	180	102.6	32.19	1697	66.5	0.80	4500
LSN 200 LU	22	978	45	0.79	179.1	214	214	214	186.2	38.28	1697	80.6	0.77	4500
LSN 225 MG	30	984	58.9	0.86	243.6	291	291	291	165.9	52.2	1708	101.9	0.84	4050
LSN 250 ME	37	984	71.1	0.87	299.7	358	358	358	204.1	64.38	1708	124.4	0.85	4050
LSN 280 SC**	45	982	86.9	0.87	365.8	437	437	437	249.1	-	-	-	-	3420
LSN 280 MD**	55	984	105	0.87	446.1	533	533	533	303.8	-	-	-	-	3420

** motors proposed in self-certification only

** available March 2021*

ATEX GAS motors - Zone 2
LSN series - Aluminium
Mechanical characteristics - Shaft end

Dimensions in millimetres

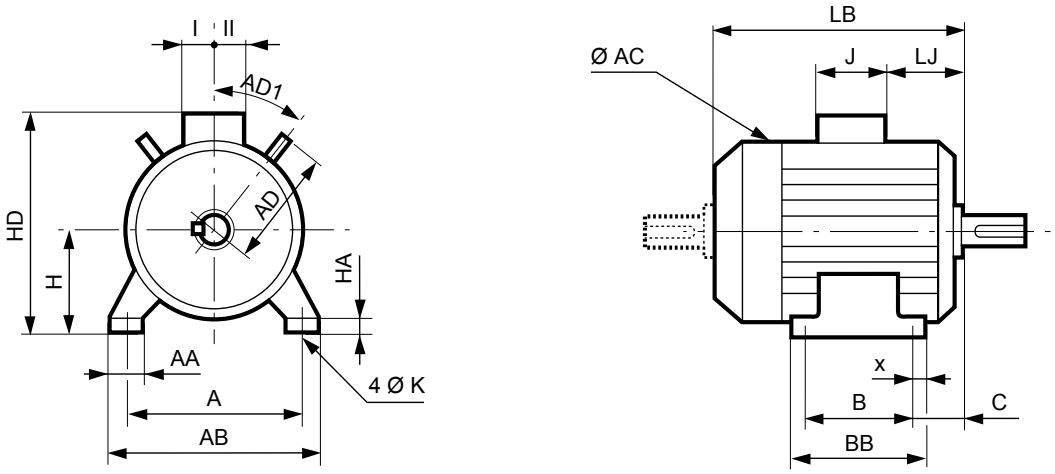


Type	Main shaft end																		
	4 and 6 poles									2 poles									
	F	GD	D	G	E	O	p	L	LO	F	GD	D	G	E	O	p	L	LO
LSN 80 L/LG	6	6	19j6	15.5	40	M6	16	30	6	6	6	19j6	15.5	40	M6	16	30	6
LSN 90 L/LU/SL	8	7	24j6	20	50	M8	19	40	6	8	7	24j6	20	50	M8	19	40	6
LSN 100 L/LG/LR	8	7	28j6	24	60	M10	22	50	6	8	7	28j6	24	60	M10	22	50	6
LSN 112 MG/MU	8	7	28j6	24	60	M10	22	50	6	-	-	-	-	-	-	-	-	-
LSN 132 M/MU/S/SM/SU	10	8	38k6	33	80	M12	28	63	10	10	8	38k6	33	80	M12	28	63	10
LSN 160 L/LUR/M/MP/MR/MU	12	8	42k6	37	110	M16	36	100	6	12	8	42k6	37	110	M16	36	100	6
LSN 180 L/LR/LUR/M/ MR /MT	14	9	48k6	42.5	110	M16	36	98	12	14	9	48k6	42.5	110	M16	36	98	12
LSN 200 L/LR/LU	16	10	55m6	49	110	M20	42	97	13	16	10	55m6	49	110	M20	42	97	13
LSN 225 MG/MR	18	11	60m6	53	140	M20	42	126	14	16	10	55m6	49	110	M20	42	97	13
LSN 225 SR/ST	18	11	60m6	53	140	M20	42	126	14	-	-	-	-	-	-	-	-	-
LSN 250 ME	18	11	65m6	58	140	M20	42	126	14	18	11	60m6	53	140	M20	42	126	14
LSN 280 MC/MD/SC	20	12	75m6	67.5	140	M20	42	125	15	18	11	65m6	58	140	M20	42	126	14
LSN 280 SD	20	12	75m6	67.5	140	M20	42	125	15	-	-	-	-	-	-	-	-	-

Type	Secondary shaft ends																	
	4 and 6 poles									2 poles								
	FA	GF	DA	GB	EA	OA	pA	L'	LO'	FA	GF	DA	GB	EA	OA	pA	L'	LO'
LSN 80 L/LG	5	5	14j6	11	30	M5	15	25	3.5	5	5	14j6	11	30	M5	15	25	3.5
LSN 90 L/LU/SL	6	6	19j6	15.5	40	M6	16	30	6	6	6	19j6	15.5	40	M6	16	30	6
LSN 100 L/LG/LR	8	7	24j6	20	50	M8	19	40	6	8	7	24j6	20	50	M8	19	40	6
LSN 112 MG/MU	8	7	24j6	20	50	M8	19	40	6	8	7	24j6	20	50	M8	19	40	6
LSN 132 M/MU/S/SM/SU	8	7	28k6	24	60	M10	22	50	6	8	7	28k6	24	60	M10	22	50	6
LSN 160 MP/MR	10	8	38k6	33	80	M12	28	63	10	10	8	38k6	33	80	M12	28	63	10
LSN 160 L/LUR/M/MU	12	8	42k6	37	110	M16	36	100	6	12	8	42k6	37	110	M16	36	100	6
LSN 180 L/LR/LUR/M/MT	14	9	48k6	42.5	110	M16	36	97	13	14	9	48k6	42.5	110	M16	36	97	13
LSN 180 MR	-	-	-	-	-	-	-	-	-	14	9	48k6	42.5	110	M16	36	97	13
LSN 200 L/LR/LU	16	10	55m6	49	110	M20	42	97	13	16	10	55m6	49	110	M20	42	97	13
LSN 225 MG/MR	18	11	60m6	53	140	M20	42	126	14	16	10	55m6	49	110	M20	42	97	13
LSN 225 SR/ST	18	11	60m6	53	140	M20	42	126	14	-	-	-	-	-	-	-	-	-
LSN 250 ME	18	11	60m6	53	140	M20	42	126	14	18	11	60m6	53	140	M20	42	126	14
LSN 280 MC/MD/SC	18	11	65m6	58	140	M20	42	126	14	18	11	65m6	58	140	M20	42	126	14
LSN 280 SD	18	11	65m6	58	140	M20	42	126	14	-	-	-	-	-	-	-	-	-

ATEX GAS motors - Zone 2
LSN series - Aluminium - Mechanical characteristics
Foot mounted IM 1001 (IMB3)

Dimensions in millimetres

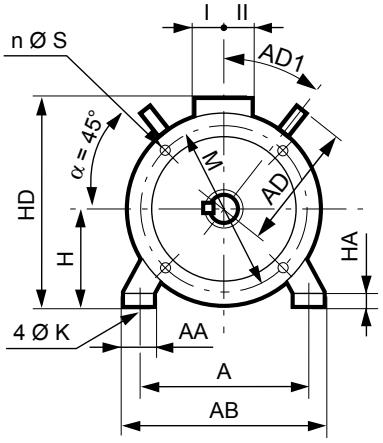


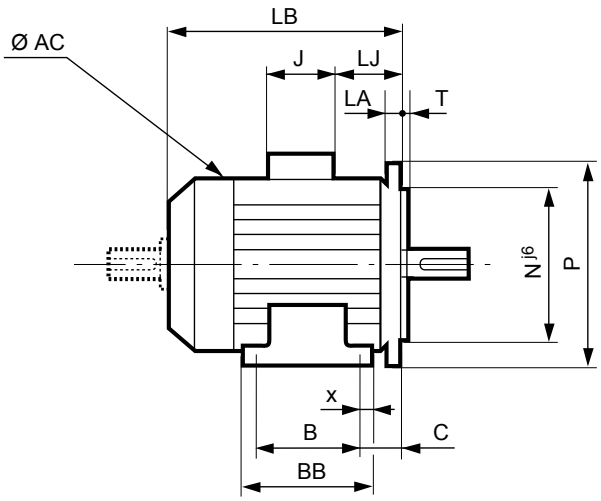
Type	Main dimensions																		
	A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1
LSN 80 L	125	157	100	120	50	10	29	9	10	80	170	159	212	5.5	126	63	63	-	-
LSN 80 LG	125	157	100	125	50	14	31	9	10	80	189	169	242	5.5	126	63	63	-	-
LSN 90 L	140	172	125	164	56	28	39	10	11	90	189	179	246	5.5	126	63	63	-	-
LSN 90 LU	140	172	125	164	56	28	39	10	11	90	189	179	266	5.5	126	63	63	-	-
LSN 90 SL	140	172	100	164	56	28	39	10	11	90	189	179	246	5.5	126	63	63	-	-
LSN 100 L	160	196	140	165	53	12	40	12	13	100	200	194	290	6.5	126	63	63	118	45
LSN 100 LG	160	196	140	168	53	13	40	12	14	100	227	203	299	5.5	126	63	63	130	45
LSN 100 LR	160	196	140	165	63	12	40	12	13	100	200	194	318	6.5	126	63	63	118	45
LSN 112 MG	190	219	140	168	60	14	52	12	13.5	112	231	215	300	5.5	126	63	63	130	45
LSN 112 MU	190	219	140	168	60	14	52	12	13.5	112	231	215	322	5.5	126	63	63	130	45
LSN 132 M	216	250	178	208	89	15	50	12	15	132	272	253	385	17	126	63	63	140	45
LSN 132 MU	216	250	178	208	89	15	50	12	15	132	272	253	412	17	126	63	63	140	45
LSN 132 S	216	250	140	170	89	15	42	12	16	132	227	235	351	32.5	126	63	63	130	45
LSN 132 SM	216	250	140	208	89	15	50	12	15	132	272	254	385	17	126	63	63	140	45
LSN 132 SU	216	250	140	170	89	15	42	12	16	132	227	235	383	32.5	126	63	63	130	45
LSN 160 L	254	294	254	294	108	20	60	14.5	25	160	324	297	495	47	126	63	63	186	45
LSN 160 LUR	254	294	254	294	108	20	60	14.5	25	160	324	297	510	47	126	63	63	186	45
LSN 160 M	254	294	210	294	108	20	60	14.5	25	160	324	297	495	47	126	63	63	186	45
LSN 160 MP	254	294	210	294	108	20	64	14	25	160	272	281	468	58.5	126	63	63	156	45
LSN 160 MR	254	294	210	294	108	20	64	14	25	160	272	281	495	58.5	126	63	63	156	45
LSN 160 MU	254	294	210	294	108	20	60	14.5	25	160	324	297	510	47	126	63	63	186	45
LSN 180 L	279	339	279	329	121	25	86	14.5	25	180	350	345	552	27	259	115	151	225	45
LSN 180 LR	279	324	279	321	121	20	79	14.5	29	180	317	317	520	54	186	112	98	177	45
LSN 180 LUR	279	339	279	329	121	25	86	14.5	25	180	350	345	614	27	259	115	151	225	45
LSN 180 M	279	339	241	291	121	25	86	14.5	25	180	350	345	552	27	259	115	151	225	45
LSN 180 MR	279	324	279	321	121	20	79	14.5	29	180	317	317	520	54	186	112	98	177	45
LSN 180 MT	279	324	241	321	121	20	79	14.5	29	180	317	317	495	54	186	112	98	177	45
LSN 200 L	318	391	305	375	133	35	103	18.5	33	200	390	385	620.5	77.5	186	112	98	-	-
LSN 200 LR	318	378	305	365	133	30	108	18.5	30	200	350	365	620	70	186	112	98	225	45
LSN 200 LU	318	391	305	375	133	35	103	18.5	33	200	390	385	669.5	77.5	186	112	98	-	-
LSN 225 MG	356	420	311	375	149	30	65	18.5	33	225	479	451	810	68	292	151	181	283	45
LSN 225 MR	356	434	311	385	149	50	126	18.5	32	225	390	410	676	61	231	119	141	-	-
LSN 225 SR	356	434	286	385	149	50	126	18.5	32	225	390	410	676	61	231	119	141	-	-
LSN 225 ST	356	434	286	385	149	50	126	18.5	32	225	390	410	627	61	231	119	141	-	-
LSN 250 ME	406	470	349	420	168	35	90	24	35	250	479	476	810	68	292	151	181	283	45
LSN 280 MC	457	520	419	478	190	35	90	24	35	280	479	506	810	68	292	151	181	283	45
LSN 280 MD	457	520	419	478	190	35	90	24	35	280	479	506	870	68	292	151	181	283	45
LSN 280 SC	457	520	368	478	190	35	90	24	35	280	479	506	810	68	292	151	181	283	45
LSN 280 SD	457	520	368	478	190	35	90	24	35	280	479	506	870	68	292	151	181	283	45

** AC: housing diameter without lifting rings*

ATEX GAS motors - Zone 2
LSN series - Aluminium - Mechanical characteristics
Foot and flange mounted IM 2001 (IM B35)

Dimensions in millimetres



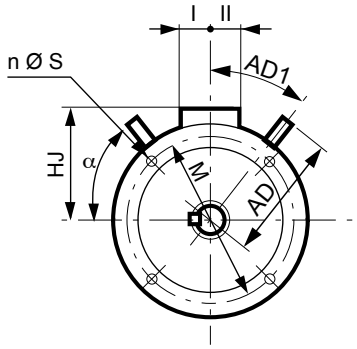


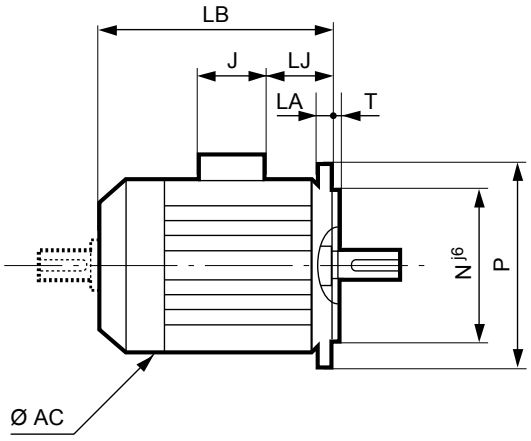
Type	Main dimensions																			
	A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1	Symb
LSN 80 LG	125	157	100	125	50	14	31	9	10	80	189	169	242	5.5	126	63	63	-	-	FF165
LSN 90 L	140	172	125	164	56	28	39	10	11	90	189	179	246	5.5	126	63	63	-	-	FF165
LSN 90 LU	140	172	125	164	56	28	39	10	11	90	189	179	266	5.5	126	63	63	-	-	FF165
LSN 90 SL	140	172	100	164	56	28	39	10	11	90	189	179	246	5.5	126	63	63	-	-	FF165
LSN 100 L	160	196	140	165	53	12	40	12	13	100	200	194	290	6.5	126	63	63	118	45	FF215
LSN 100 LG	160	196	140	168	53	13	40	12	14	100	227	203	299	5.5	126	63	63	130	45	FF215
LSN 100 LR	160	196	140	165	63	12	40	12	13	100	200	194	318	6.5	126	63	63	118	45	FF215
LSN 112 MG	190	219	140	168	60	14	52	12	13.5	112	231	215	300	5.5	126	63	63	130	45	FF215
LSN 112 MU	190	219	140	168	60	14	52	12	13.5	112	231	215	322	5.5	126	63	63	130	45	FF215
LSN 132 M	216	250	178	208	89	15	50	12	15	132	272	253	385	17	126	63	63	140	45	FF265
LSN 132 MU	216	250	178	208	89	15	50	12	15	132	272	253	412	17	126	63	63	140	45	FF265
LSN 132 S	216	250	140	170	89	15	42	12	16	132	227	235	351	32.5	126	63	63	130	45	FF265
LSN 132 SM	216	250	140	208	89	15	50	12	15	132	272	254	385	17	126	63	63	140	45	FF265
LSN 132 SU	216	250	140	170	89	15	42	12	16	132	227	235	383	32.5	126	63	63	130	45	FF265
LSN 160 L	254	294	254	294	108	20	60	14.5	25	160	324	297	495	47	126	63	63	186	45	FF300
LSN 160 LUR	254	294	254	294	108	20	60	14.5	25	160	324	297	510	47	126	63	63	186	45	FF300
LSN 160 M	254	294	210	294	108	20	60	14.5	25	160	324	297	495	47	126	63	63	186	45	FF300
LSN 160 MP	254	294	210	294	108	20	64	14	25	160	272	281	468	58.5	126	63	63	156	45	FF300
LSN 160 MR	254	294	210	294	108	20	64	14	25	160	272	281	495	58.5	126	63	63	156	45	FF300
LSN 160 MU	254	294	210	294	108	20	60	14.5	25	160	324	297	510	47	126	63	63	186	45	FF300
LSN 180 L	279	339	279	329	121	25	86	14.5	25	180	350	345	552	27	259	115	151	225	45	FF300
LSN 180 LR	279	324	279	321	121	20	79	14.5	29	180	317	317	520	54	186	112	98	177	45	FF300
LSN 180 LUR	279	339	279	329	121	25	86	14.5	25	180	350	345	614	27	259	115	151	225	45	FF300
LSN 180 M	279	339	241	291	121	25	86	14.5	25	180	350	345	552	27	259	115	151	225	45	FF300
LSN 180 MR	279	324	279	321	121	20	79	14.5	29	180	317	317	520	54	186	112	98	177	45	FF300
LSN 180 MT	279	324	241	321	121	20	79	14.5	29	180	317	317	495	54	186	112	98	177	45	FF300
LSN 200 L	318	391	305	375	133	35	103	18.5	33	200	390	385	620.5	77.5	186	112	98	-	-	FF350
LSN 200 LR	318	378	305	365	133	30	108	18.5	30	200	350	365	620	70	186	112	98	225	45	FF350
LSN 200 LU	318	391	305	375	133	35	103	18.5	33	200	390	385	669.5	77.5	186	112	98	-	-	FF350
LSN 225 MG	356	420	311	375	149	30	65	18.5	33	225	479	451	810	68	292	151	181	283	45	FF400
LSN 225 MR	356	434	311	385	149	50	126	18.5	32	225	390	410	676	61	231	119	141	-	-	FF400
LSN 225 SR	356	434	286	385	149	50	126	18.5	32	225	390	410	676	61	231	119	141	-	-	FF400
LSN 225 ST	356	434	286	385	149	50	126	18.5	32	225	390	410	627	61	231	119	141	-	-	FF400
LSN 250 ME	406	470	349	420	168	35	90	24	35	250	479	476	810	68	292	151	181	283	45	FF500
LSN 280 MC	457	520	419	478	190	35	90	24	35	280	479	506	810	68	292	151	181	283	45	FF500
LSN 280 MD	457	520	419	478	190	35	90	24	35	280	479	506	870	68	292	151	181	283	45	FF500
LSN 280 SC	457	520	368	478	190	35	90	24	35	280	479	506	810	68	292	151	181	283	45	FF500
LSN 280 SD	457	520	368	478	190	35	90	24	35	280	479	506	870	68	292	151	181	283	45	FF500

** AC: housing diameter without lifting rings*

ATEX GAS motors - Zone 2
LSN series - Aluminium - Mechanical characteristics
Flange mounted IM 3001 (IM B5) - IM 3011 (IM V1)

Dimensions in millimetres





Type	Main dimensions						
	AC*	HJ	LJ	I	II	AD	AD1
LSN 80 L	170	148	5.5	63	63	-	-
LSN 80 LG	189	158	5.5	63	63	-	-
LSN 90 L	189	158	5.5	63	63	-	-
LSN 90 LU	189	158	5.5	63	63	-	-
LSN 90 SL	189	158	5.5	63	63	-	-
LSN 100 L	200	163	6.5	63	63	118	45
LSN 100 LG	227	172	5.5	63	63	130	45
LSN 100 LR	200	163	6.5	63	63	118	45
LSN 112 MG	231	172	5.5	63	63	130	45
LSN 112 MU	231	172	5.5	63	63	130	45
LSN 132 M	272	190	17	63	63	140	45
LSN 132 MU	272	190	17	63	63	140	45
LSN 132 S	227	172	32.5	63	63	130	45
LSN 132 SM	272	191	17	63	63	140	45
LSN 132 SU	227	172	32.5	63	63	130	45
LSN 160 L	324	221	47	63	63	186	45
LSN 160 LUR	324	221	47	63	63	186	45
LSN 160 M	324	221	47	63	63	186	45
LSN 160 MP	272	190	58.5	63	63	156	45
LSN 160 MR	272	190	58.5	63	63	156	45
LSN 160 MU	324	221	47	63	63	186	45
LSN 180 L	350	296	27	115	151	225	45
LSN 180 LR	317	248	54	112	98	177	45
LSN 180 LUR	350	296	27	115	151	225	45
LSN 180 M	350	296	27	115	151	225	45
LSN 180 MR	317	248	54	112	98	177	45
LSN 180 MT	317	248	54	112	98	177	45
LSN 200 L	390	276	77.5	112	98	-	-
LSN 200 LR	350	256	70	112	98	225	45
LSN 200 LU	390	276	77.5	112	98	-	-
LSN 225 MG	479	405	68	151	181	283	45
LSN 225 MR	390	310	61	119	141	-	-
LSN 225 SR	390	310	61	119	141	-	-
LSN 225 ST	390	310	61	119	141	-	-
LSN 250 ME	479	405	68	151	181	283	45
LSN 280 MC	479	405	68	151	181	283	45
LSN 280 MD	479	405	68	151	181	283	45
LSN 280 SC	479	405	68	151	181	283	45
LSN 280 SD	479	405	68	151	181	283	45

IEC symbol	Flange dimensions							
	M	N	D	T	n	α°	S	LA
FF165	165	130	200	3.5	4	45	12	10
FF165	165	130	200	3.5	4	45	12	10
FF165	165	130	200	3.5	4	45	12	10
FF165	165	130	200	3.5	4	45	12	10
FF165	165	130	200	3.5	4	45	12	10
FF215	215	180	250	4	4	45	14.5	12
FF215	215	180	250	4	4	45	14.5	13
FF215	215	180	250	4	4	45	14.5	12
FF215	215	180	250	4	4	45	14.5	13
FF215	215	180	250	4	4	45	14.5	13
FF265	265	230	300	4	4	45	14.5	14
FF265	265	230	300	4	4	45	14.5	14
FF265	265	230	300	4	4	45	14.5	14
FF265	265	230	300	4	4	45	14.5	14
FF265	265	230	300	4	4	45	14.5	14
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	14
FF300	300	250	350	5	4	45	18.5	14
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF350	350	300	400	5	4	45	18.5	15
FF350	350	300	400	5	4	45	18.5	15
FF350	350	300	400	5	4	45	18.5	15
FF400	400	350	450	5	8	22.5	18.5	16
FF400	400	350	450	5	8	22.5	18.5	16
FF400	400	350	450	5	8	22.5	18.5	16
FF400	400	350	450	5	8	22.5	18.5	16
FF500	500	450	550	5	8	22.5	18.5	22
FF500	500	450	550	5	8	22.5	18.5	22
FF500	500	450	550	5	8	22.5	18.5	22
FF500	500	450	550	5	8	22.5	18.5	22
FF500	500	450	550	5	8	22.5	18.5	22

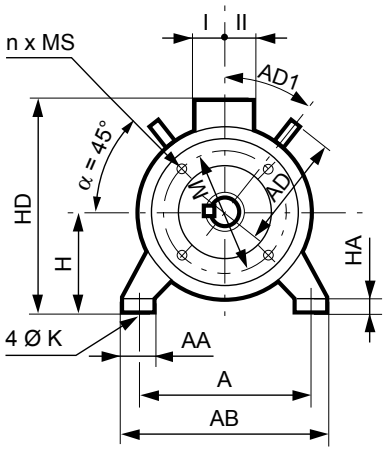
** AC: housing diameter without lifting rings*

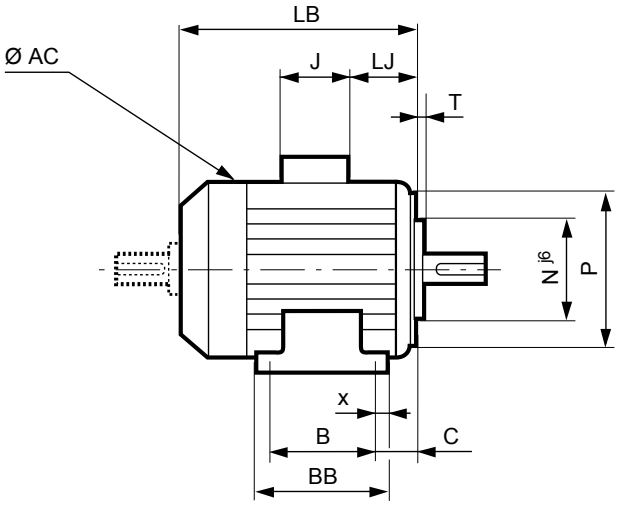
For frame sizes ≥ 250 mm for IM 3001 use, please contact us.

Dimensions of shaft extensions identical to those for foot mounted motors.

ATEX GAS motors - Zone 2
LSN series - Aluminium - Mechanical characteristics
Foot and face mounted IM 2101 (IM B34)

Dimensions in millimetres



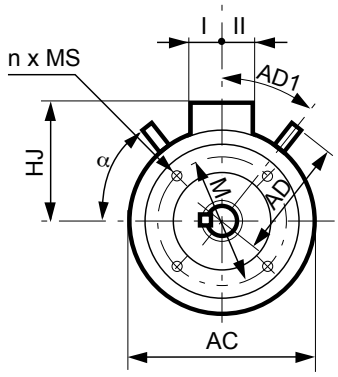


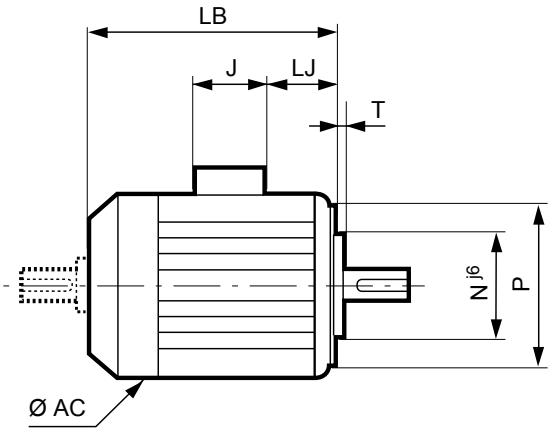
Type	Main dimensions																			
	A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1	Symb
LSN 80 L	125	157	100	120	50	10	29	9	10	80	170	159	212	5.5	126	63	63	-	-	FT100
LSN 80 LG	125	157	100	125	50	14	31	9	10	80	189	169	242	5.5	126	63	63	-	-	FT100
LSN 90 L	140	172	125	164	56	28	39	10	11	90	189	179	246	5.5	126	63	63	-	-	FT115
LSN 90 LU	140	172	125	164	56	28	39	10	11	90	189	179	266	5.5	126	63	63	-	-	FT115
LSN 90 SL	140	172	100	164	56	28	39	10	11	90	189	179	246	5.5	126	63	63	-	-	FT115
LSN 100 L	160	196	140	165	53	12	40	12	13	100	200	194	290	6.5	126	63	63	118	45	FT130
LSN 100 LG	160	196	140	168	53	13	40	12	14	100	227	203	299	5.5	126	63	63	130	45	FT130
LSN 100 LR	160	196	140	165	63	12	40	12	13	100	200	194	318	6.5	126	63	63	118	45	FT130
LSN 112 MG	190	219	140	168	60	14	52	12	13.5	112	231	215	300	5.5	126	63	63	130	45	FT130
LSN 112 MU	190	219	140	168	60	14	52	12	13.5	112	231	215	322	5.5	126	63	63	130	45	FT130
LSN 132 M	216	250	178	208	89	15	50	12	15	132	272	253	385	17	126	63	63	140	45	FT165
LSN 132 MU	216	250	178	208	89	15	50	12	15	132	272	253	412	17	126	63	63	140	45	FT165
LSN 132 S	216	250	140	170	89	15	42	12	16	132	227	235	351	32.5	126	63	63	130	45	FT165
LSN 132 SM	216	250	140	208	89	15	50	12	15	132	272	254	385	17	126	63	63	140	45	FT165
LSN 132 SU	216	250	140	170	89	15	42	12	16	132	227	235	383	32.5	126	63	63	130	45	FT165
LSN 160 MP	254	294	210	294	108	20	64	14	25	160	272	281	468	58.5	126	63	63	156	45	FT215
LSN 160 MR	254	294	210	294	108	20	64	14	25	160	272	281	495	58.5	126	63	63	156	45	FT215

** AC: housing diameter without lifting rings*

ATEX GAS motors - Zone 2
LSN series - Aluminium - Mechanical characteristics
Face mounted IM 3601 (IM B14)

Dimensions in millimetres





Type	Main dimensions								
	AC*	LB	HJ	LJ	J	I	II	AD	AD1
LSN 80 L	170	212	148	5.5	126	63	63	-	-
LSN 80 LG	189	242	158	5.5	126	63	63	-	-
LSN 90 L	189	246	158	5.5	126	63	63	-	-
LSN 90 LU	189	266	158	5.5	126	63	63	-	-
LSN 90 SL	189	246	158	5.5	126	63	63	-	-
LSN 100 L	200	290	163	6.5	126	63	63	118	45
LSN 100 LG	227	299	172	5.5	126	63	63	130	45
LSN 100 LR	200	318	163	6.5	126	63	63	118	45
LSN 112 MG	231	300	172	5.5	126	63	63	130	45
LSN 112 MU	231	322	172	5.5	126	63	63	130	45
LSN 132 M	272	385	190	17	126	63	63	140	45
LSN 132 MU	272	412	190	17	126	63	63	140	45
LSN 132 S	227	351	172	32.5	126	63	63	130	45
LSN 132 SM	272	385	191	17	126	63	63	140	45
LSN 132 SU	227	383	172	32.5	126	63	63	130	45
LSN 160 MP	272	468	190	58.5	126	63	63	156	45
LSN 160 MR	272	495	190	58.5	126	63	63	156	45

Type	Flange dimensions						
	M	N	D	T	n	α°	S
FT100	100	80	120	3	4	45	M6
FT100	100	80	120	3	4	45	M6
FT115	115	95	140	3	4	45	M8
FT115	115	95	140	3	4	45	M8
FT115	115	95	140	3	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT165	165	130	200	3.5	4	45	M10
FT165	165	130	200	3.5	4	45	M10
FT165	165	130	200	3.5	4	45	M10
FT165	165	130	200	3.5	4	45	M10
FT165	165	130	200	3.5	4	45	M10
FT215	215	180	250	4	4	45	M12
FT215	215	180	250	4	4	45	M12

** AC: housing diameter without lifting rings*

ATEX GAS motors - Zone 2
LSN series - Aluminium - Mechanical characteristics
Bearings and lubrication

PERMANENTLY GREASED BEARINGS

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

Series	Type	Polarity	Permanently greased bearing types		Bearing service life as a function of rotation speed								
					3000 min-1			1500 min-1			1000 min-1		
			N.D.E.	D.E.	25°C	40°C	55°C	25°C	40°C	55°C	25°C	40°C	55°C
LSN	80 L	2	6203 CN	6204 C3	≥ 40000	≥ 40000	25000	-	-	-	-	-	-
	80 LG	2; 4	6204 C3	6205 C3	≥ 40000	≥ 40000	24000	≥ 40000	≥ 40000	31000	-	-	-
	90 SL/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 M	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 SM/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/MU	6	6210 C3	6309 C3	-	-	-	-	-	-	≥ 40000	≥ 40000	27000
	160 L	2; 4; 6			≥ 40000	30000	15000	≥ 40000	≥ 40000	23000			
	160 LUR	4; 6	6210 C3	6310 C3	-	-	-	≥ 40000	≥ 40000	23000	≥ 40000	≥ 40000	27000
	180 MT	2; 4			≥ 40000	30000	15000				-	-	-
	180 M	4	6212 C3	6310 C3	-	-	-	≥ 40000	≥ 40000	24900	-	-	-
	180 L	6						-	-	-	≥ 40000	≥ 40000	28000
	180 LR	4	6210 C3	6310 C3	-	-	-	≥ 40000	≥ 40000	23000	-	-	-
	180 LUR	4; 6	6312 C3	6310 C3	-	-	-	≥ 40000	≥ 40000	22000	≥ 40000	≥ 40000	27000
	200 L	2; 6	6214 C3	6312 C3	≥ 40000	25000	12500	-	-	-	≥ 40000	≥ 40000	27000
	200 LR	2; 4; 6	6312 C3	6312 C3	≥ 40000	25000	12500	≥ 40000	≥ 40000	22000	≥ 40000	≥ 40000	27000
	200 LU	4; 6			-	-	-						
	225 ST	4	6214 C3	6313 C3	-	-	-	≥ 40000	≥ 40000	21000	-	-	-
	225 MT	2			≥ 40000	22000	11000	-	-	-			
	225 SR	4	6312 C3	6313 C3	-	-	-	≥ 40000	≥ 40000	21000	-	-	-
	225 MR	2; 4; 6			≥ 40000	22000	11000				≥ 40000	≥ 40000	26000
	225 MG	4; 6	6216 C3	6314 C3	-	-	-	≥ 40000	≥ 40000	20000	≥ 40000	≥ 40000	25000

ATEX GAS motors - Zone 2
LSN series - Aluminium - Mechanical characteristics
Bearings and lubrication

BEARINGS WITH GREASE NIPPLES

For open bearing assemblies of frame size ≥ 160 mm fitted with grease nipples, the table below indicates, depending on the type of motor, the lubrication intervals to be respected at 25°C, 40°C and 55°C for a machine installed with a horizontal shaft.

The table below is valid for motors lubricated with Polyrex EM103 grease used as standard.

CONSTRUCTION AND SPECIAL ATMOSPHERES

For a machine installed with a vertical shaft, the lubrication intervals are approximately 80% of the values shown in the table below.

NB: The quality and quantity of grease along with the lubrication interval are indicated on the machine nameplate.

In the case of special fitting arrangements (motors with roller bearing at the front or other mountings), machines with frame size ≥ 160 mm are fitted with grease nipple bearings.

The instructions required for bearing housing maintenance are shown on the machine nameplate.

Series	Type	Polarity	Bearing type for bearing housings with grease nipples		Quantity of grease	Lubrication intervals in hours								
						3000 min^{-1}			1500 min^{-1}			1000 min^{-1}		
			N.D.E.	D.E.	g	25°C	40°C	55°C	25°C	40°C	55°C	25°C	40°C	55°C
LSN	160 M/MU*	2; 4; 6	6210 C3	6309 C3	13	22200	11100	5550	32400	16200	8100	39800	19900	9950
	160 L*													
	180 MR*	2	6210 C3	6310 C3	15	19600	9800	4900	-	-	-	-	-	-
	180 MT*	2; 4							30400	15200	7600			
	180 LR*	4				-	-	-						
	180 LUR*	4; 6	6312 C3	6310 C3	20	-	-	-	26800	13400	6700	35000	17500	8750
	180 M*	4	6212 C3	6310 C3	15	-	-	-	29200	14600	7300	-	-	-
	180 L*	6							-	-	-	37200	18600	9300
	200 LR*	2; 4; 6	6312 C3	6312 C3	20	15200	7600	3800	26800	13400	6700	35000	17500	8750
	200 LU*	4; 6				-	-	-						
	200 L*	2; 6	6214 C3	6312 C3	20	14600	7300	3650	-	-	-	34600	17300	8650
	225 ST*	4	6214 C3	6313 C3	25	-	-	-	25200	12600	6300	-	-	-
	225 MT*	2				10600	5300	2650	-	-	-			
	225 SR/MR*	2; 4; 6	6312 C3	6313 C3	25	13400	6700	3350	25200	12600	6300	33600	16800	8400
	225 MG*	4; 6	6216 C3	6314 C3	25	-	-	-	23600	11800	5900	32200	16100	8050
	250 ME	4; 6	6216 C3	6314 C3	25	-	-	-	23600	11800	5900	32200	16100	8050
	280 SC/MC	2				11800	5900	2950	-	-	-	-	-	-
	280 SC	6	6216 C3	6316 C3	35	-	-	-	-	-	-	32200	16100	8050
	280 SD/MD	4; 6	6218 C3	6316 C3	35	-	-	-	20800	10400	5200	29600	14800	7400

** bearing housings with grease nipples on request*

CONSTRUCTION AND SPECIAL ATMOSPHERES

For a machine installed with a vertical shaft, the lubrication intervals are approximately 80% of the values shown in the tables above.

NB: The quality and quantity of grease along with the lubrication interval are indicated on the machine nameplate.

In the case of special fitting arrangements (motors with roller bearing at the front or other mountings), machines with frame size ≥ 160 mm are fitted with grease nipple bearings.
The instructions required for bearing housing maintenance are shown on the machine nameplate.

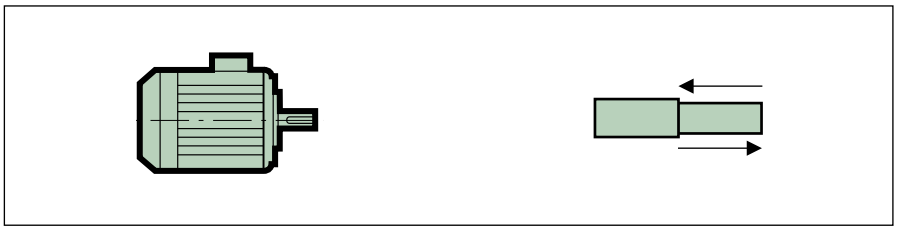
STANDARD BEARING MOUNTING PRINCIPLE

LSN series		Horizontal shaft	Vertical shaft	
			Shaft end down	Shaft end up
Foot mounted motors	Mounting arrangements	B3	V5	V6
	standard fitting	Front bearing: - Front stop for types ≤ 160 MP/MR/LR - locked for types ≥ 160 M/MU/L/LUR	Front bearing locked	Front bearing locked
Flange mounted motors (or feet and flange)	Mounting arrangements	B5 / B35 / B14 / B34	V1 / V15 / V18 / V58	V3 / V36 / V19 / V69
	standard fitting	Front bearing locked	Front bearing locked	Front bearing locked

ATEX GAS motors - Zone 2
LSN series-- Aluminium
Mechanical characteristics - Axial loads

Horizontal motor

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



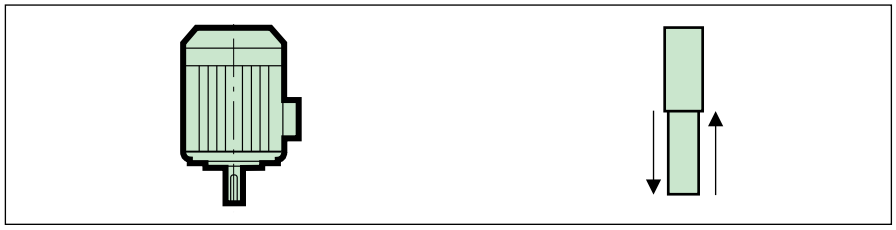
Series	Type	Polarity	Permissible axial load (daN) on the main drive shaft for standard fitting of bearings											
			IM B3 / B6 IM B7 / B8 IM B5 / B35 IM B14 / B34											
			3000 min-1				1500 min-1				1000 min-1			
			→ 25,000 hours	→ 40,000 hours	← 25,000 hours	← 40,000 hours	→ 25,000 hours	→ 40,000 hours	← 25,000 hours	← 40,000 hours	→ 25,000 hours	→ 40,000 hours	← 25,000 hours	← 40,000 hours
LSN	80 L	2	30	21	(60)	(51)	-	-	-	-	-	-	-	-
	80 LG	2; 4	28	19	(68)	(59)	48	34	(88)	(74)	-	-	-	-
	90 SL/L	2; 4; 6	29	23	(69)	(56)	45	32	(85)	(72)	56	40	(96)	(80)
	90 LU	2; 4; 6	22	13	(72)	(63)	38	25	(88)	(75)	47	32	(97)	(82)
	100 L	2; 6	42	28	(92)	(78)	-	-	-	-	78	57	(128)	(107)
	100 LR	4	-	-	-	-	58	39	(108)	(90)	-	-	-	-
	100 LG	4; 6	-	-	-	-	55	38	(105)	(88)	75	53	(125)	(103)
	112 M	2	38	25	(88)	(75)	-	-	-	-	-	-	-	-
	112 MG	2; 6	37	24	(87)	(74)	-	-	-	-	126	104	(76)	(54)
	112 MU	4; 6	-	-	-	-	54	36	(114)	(96)	66	45	(126)	(105)
	132 S	2; 6	69	49	(129)	(109)	-	-	-	-	124	93	(184)	(153)
	132 SU	2; 4	65	46	(125)	(106)	99	73	(159)	(133)	-	-	-	-
	132 SM/M	2; 4; 6	101	74	(171)	(144)	148	111	(218)	(181)	178	134	(248)	(204)
	132 MU	4; 6	-	-	-	-	139	103	(219)	(183)	168	124	(248)	(204)
	160 MP	2	140	104	(220)	(184)	-	-	-	-	-	-	-	-
	160 MR	2; 4	131	95	(221)	(185)	193	145	(283)	(235)	-	-	-	-
	160 M	2; 4; 6	132	96	232	196	187	140	287	240	235	179	335	279
	160 MU	6	-	-	-	-	-	-	-	-	219	164	319	264
	160 L	2; 4; 6	128	96	228	196	183	136	283	236	231	175	331	275
	160 LUR	4; 6	-	-	-	-	213	159	313	259	257	193	357	293
	180 M	4	-	-	-	-	228	174	291	237	-	-	-	-
	180 MR	2	156	115	256	215	-	-	-	-	-	-	-	-
	180 MT	2; 4	159	118	259	218	214	160	314	260	-	-	-	-
	180 L	6	-	-	-	-	-	-	-	-	265	201	328	264
	180 LR	4	-	-	-	-	203	150	303	250	-	-	-	-
	180 LUR	4; 6	-	-	-	-	224	170	287	233	224	162	287	225
	200 L	2; 6	244	190	310	256	-	-	-	-	362	278	428	344
	200 LR	2; 4; 6	244	191	307	254	312	241	375	304	341	258	404	321
	200 LU	4; 6	-	-	-	-	316	245	379	308	327	245	390	308
	225 SG	4	-	-	-	-	411	321	481	391	-	-	-	-
	225 SR	4	-	-	-	-	350	271	420	341	-	-	-	-
	225 ST	4	-	-	-	-	372	292	438	358	-	-	-	-
	225 MG	4; 6	-	-	-	-	407	317	477	387	535	426	605	496
	225 MR	2; 4; 6	280	220	343	283	358	278	421	341	409	315	472	378
	225 MT	2	281	221	347	287	-	-	-	-	-	-	-	-
	250 ME	4; 6	-	-	-	-	400	311	470	381	471	365	541	435
	280 SC	2; 6	303	236	373	306	-	-	-	-	461	355	531	425
	280 SD	4	-	-	-	-	454	349	542	437	-	-	-	-
	280 MC	2	300	233	370	303	-	-	-	-	-	-	-	-
	280 MD	4; 6	-	-	-	-	446	342	534	430	524	401	612	489

( ): permissible axial loads with Front bearing locked

ATEX GAS motors - Zone 2
LSN series - Aluminium
Mechanical characteristics - Axial loads

Vertical motor
Shaft end downwards

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



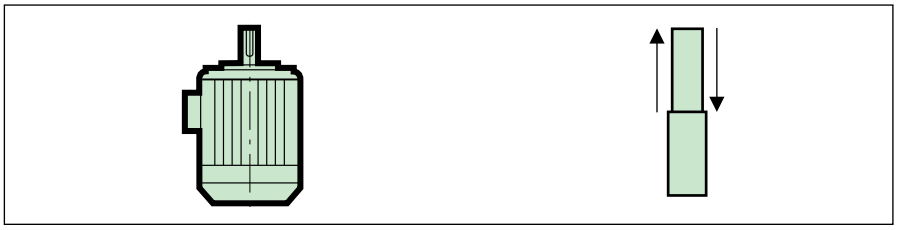
Series	Type	Polarity	Permissible axial load (daN) on the main drive shaft for standard fitting of bearings IM V5 IM V1 / V15 IM V18 / V58											
			3000 min-1 ↓		3000 min-1 ↑		1500 min-1 ↓		1500 min-1 ↑		1000 min-1 ↓		1000 min-1 ↑	
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours
LSN	80 L	2	29	20	(63)	(54)	-	-	-	-	-	-	-	-
	80 LG	2; 4	26	16	(72)	(62)	45	32	(93)	(78)	-	-	-	-
	90 SL/L	2; 4; 6	26	16	(73)	(63)	42	28	(91)	(78)	53	37	(101)	(86)
	90 LU	2; 4; 6	19	9	(77)	(67)	33	20	(95)	(82)	43	28	(105)	(89)
	100 L	2; 6	38	24	(98)	(85)	-	-	-	-	73	52	(137)	(115)
	100 LR	4	-	-	-	-	52	34	(117)	(99)	-	-	-	-
	100 LG	4; 6	-	-	-	-	48	31	(116)	(99)	68	46	(137)	(115)
	112 M	2	35	21	(95)	(81)	-	-	-	-	-	-	-	-
	112 MG	2; 6	31	18	(98)	(85)	-	-	-	-	68	47	(138)	(116)
	112 MU	4; 6	-	-	-	-	45	28	(128)	(110)	57	36	(140)	(119)
	132 S	2; 6	61	41	(142)	(122)	-	-	-	-	115	84	(200)	(169)
	132 SU	2; 4	57	37	(139)	(120)	90	63	(176)	(149)	-	-	-	-
	132 SM/M	2; 4; 6	90	62	(189)	(161)	137	100	(237)	(200)	165	121	(270)	(226)
	132 MU	4; 6	-	-	-	-	125	89	(242)	(206)	152	108	(273)	(230)
	160 MP	2	126	90	(243)	(207)	-	-	-	-	-	-	-	-
	160 MR	2; 4	115	80	(246)	(210)	175	127	(311)	(264)	-	-	-	-
	160 M	2; 4; 6	111	75	264	229	164	117	326	278	210	154	375	319
	160 MU	6	-	-	-	-	-	-	-	-	189	133	375	319
	160 L	2; 4; 6	106	70	263	228	160	113	322	274	208	151	371	314
	160 LUR	4; 6	-	-	-	-	186	131	363	309	227	162	417	352
	180 M	4	-	-	-	-	187	132	361	306	-	-	-	-
	180 MR	2	131	90	296	255	-	-	-	-	-	-	-	-
	180 MT	2; 4	136	95	295	254	189	134	360	305	-	-	-	-
	180 L	6	-	-	-	-	-	-	-	-	226	161	398	334
	180 LR	4	-	-	-	-	177	122	355	300	-	-	-	-
	180 LUR	4; 6	-	-	-	-	187	132	355	300	183	120	377	314
	200 L	2; 6	194	139	384	330	-	-	-	-	308	223	524	439
	200 LR	2; 4; 6	209	154	360	306	275	203	445	373	299	215	496	412
	200 LU	4; 6	-	-	-	-	262	190	471	398	269	186	505	422
	225 SG	4	-	-	-	-	335	244	616	524	-	-	-	-
	225 SR	4	-	-	-	-	294	213	520	439	-	-	-	-
	225 ST	4	-	-	-	-	322	241	519	438	-	-	-	-
	225 MG	4; 6	-	-	-	-	324	232	621	530	456	345	749	638
	225 MR	2; 4; 6	234	173	413	352	302	221	520	439	348	253	587	492
	225 MT	2	240	179	410	349	-	-	-	-	-	-	-	-
	250 ME	4; 6	-	-	-	-	305	214	632	541	378	270	712	604
	280 SC	2; 6	233	165	488	420	-	-	-	-	348	240	728	621
	280 SD	4	-	-	-	-	340	233	738	632	-	-	-	-
	280 MC	2	221	153	496	428	-	-	-	-	-	-	-	-
	280 MD	4; 6	-	-	-	-	319	213	745	639	391	265	853	728

( ): permissible axial loads with Front bearing locked

ATEX GAS motors - Zone 2
LSN series - Aluminium
Mechanical characteristics - Axial loads

Vertical motor
Shaft end upwards

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



Permissible axial load (daN) on the main drive shaft for standard fitting of bearings

IM V6
IM V3 / V36
IM V19 / V69

Series	Type	Polarity	3000 min-1 ↓ 25,000 hours	3000 min-1 ↓ 40,000 hours	3000 min-1 ↑ 25,000 hours	3000 min-1 ↑ 40,000 hours	1500 min-1 ↓ 25,000 hours	1500 min-1 ↓ 40,000 hours	1500 min-1 ↑ 25,000 hours	1500 min-1 ↑ 40,000 hours	1000 min-1 ↓ 25,000 hours	1000 min-1 ↓ 40,000 hours	1000 min-1 ↑ 25,000 hours	1000 min-1 ↑ 40,000 hours
LSN	80 L	2	(59)	(50)	33	24	-	-	-	-	-	-	-	-
	80 LG	2; 4	(66)	(56)	32	22	(85)	(71)	53	39	-	-	-	-
	90 SL/L	2; 4; 6	(66)	(56)	33	23	(82)	(68)	51	38	(93)	(77)	61	46
	90 LU	2; 4; 6	(69)	(59)	27	18	(83)	(70)	45	32	(93)	(77)	54	39
	100 L	2; 6	(88)	(74)	48	35	-	-	-	-	(123)	(102)	87	65
	100 LR	4	-	-	-	-	(102)	(84)	67	49	-	-	-	-
	100 LG	4; 6	-	-	-	-	(98)	(81)	67		(118)	(96)	87	66
	112 M	2	(84)	(71)	45	31	-	-	-	-	-	-	-	-
	112 MG	2; 6	(81)	(68)	48	35	-	-	-	-	(118)	(97)	88	66
	112 MU	4; 6	-	-	-	-	(105)	(88)	68	50	(117)	(96)	80	60
	132 S	2; 6	(121)	(101)	82	62	-	-	-	-	(175)	(143)	140	109
	132 SU	2; 4	(117)	(97)	79	60	(150)	(123)	116	89	-	-	-	-
	132 SM/M	2; 4; 6	(160)	(132)	119	91	(207)	(170)	167	130	(235)	(191)	200	156
	132 MU	4; 6	-	-	-	-	(206)	(169)	163	126	(232)	(188)	193	150
	160 MP	2	(206)	(170)	163	127	-	-	-	-	-	-	-	-
	160 MR	2; 4	(205)	(170)	156	120	(265)	(217)	222	174	-	-	-	-
	160 M	2; 4; 6	211	175	164	129	264	217	226	178	310	254	275	219
	160 MU	6	-	-	-	-	-	-	-	-	289	233	275	219
	160 L	2; 4; 6	206	170	163	128	260	213	222	174	308	251	271	214
	160 LUR	4; 6	-	-	-	-	286	231	263	209	327	262	317	252
	180 M	4	-	-	-	-	250	195	298	243	-	-	-	-
	180 MR	2	231	190	196	155	-	-	-	-	-	-	-	-
	180 MT	2; 4	236	195	195	154	289	234	260	205	-	-	-	-
	180 L	6	-	-	-	-	-	-	-	-	289	224	335	271
	180 LR	4	-	-	-	-	277	222	255	200	-	-	-	-
	180 LUR	4; 6	-	-	-	-	250	195	292	237	246	183	314	251
	200 L	2; 6	260	205	318	264	-	-	-	-	374	289	458	373
	200 LR	2; 4; 6	272	217	297	243	338	266	382	310	362	278	433	349
	200 LU	4; 6	-	-	-	-	325	253	408	335	332	249	442	359
	225 SG	4	-	-	-	-	405	314	546	454	-	-	-	-
	225 SR	4	-	-	-	-	364	283	450	369	-	-	-	-
	225 ST	4	-	-	-	-	388	307	453	372	-	-	-	-
	225 MG	4; 6	-	-	-	-	394	302	551	460	526	415	679	568
	225 MR	2; 4; 6	297	236	350	289	365	284	457	376	411	316	524	429
	225 MT	2	306	245	344	283	-	-	-	-	-	-	-	-
	250 ME	4; 6	-	-	-	-	375	284	562	471	448	340	642	534
	280 SC	2; 6	303	235	418	350	-	-	-	-	418	310	658	551
	280 SD	4	-	-	-	-	428	321	650	544	-	-	-	-
	280 MC	2	291	223	426	358	-	-	-	-	-	-	-	-
	280 MD	4; 6	-	-	-	-	407	301	657	551	479	353	765	640

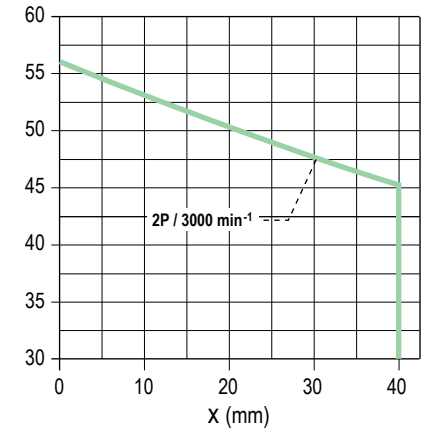
( ): permissible axial loads with Front bearing locked

ATEX GAS motors - Zone 2
LSN series - Aluminium
Mechanical characteristics - Radial loads

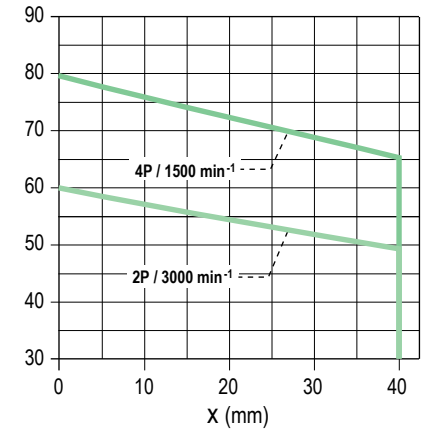
STANDARD FITTING ARRANGEMENT

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

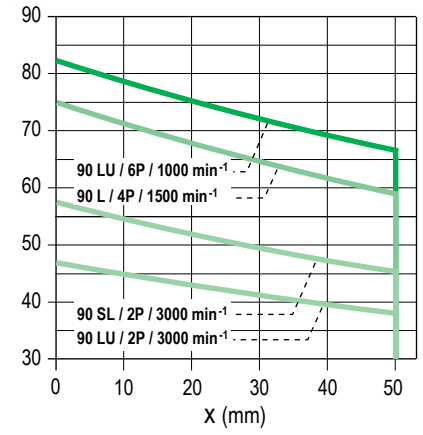
LSN 80 L



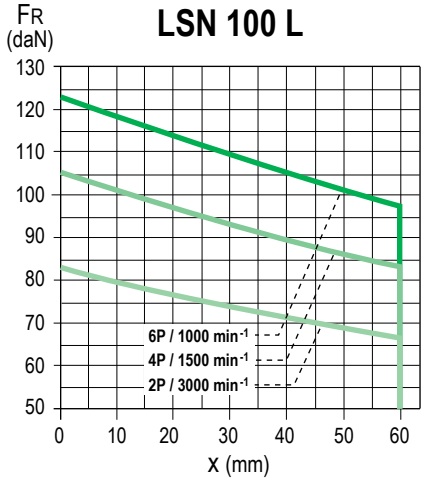
LSN 80 LG



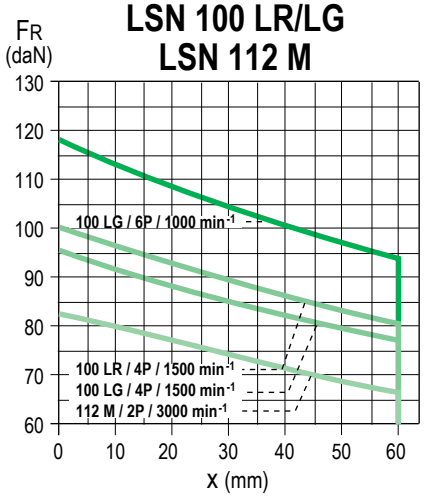
LSN 90 SL/L/LU



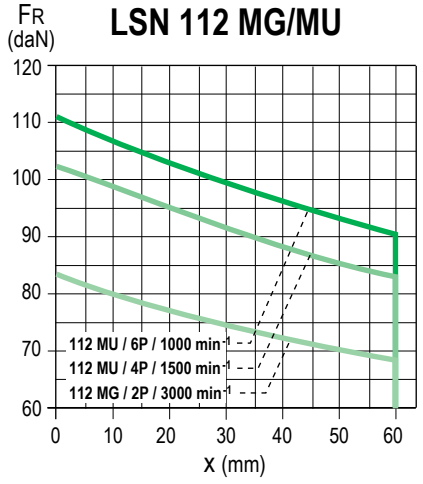
LSN 100 L



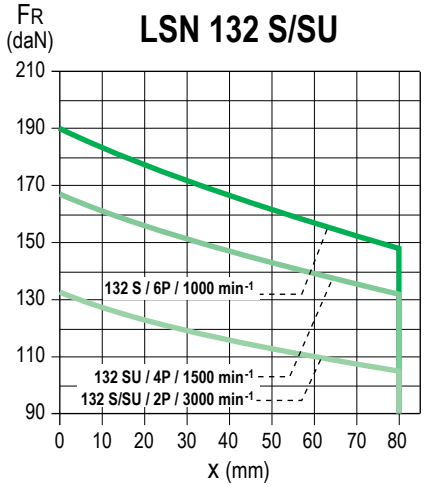
LSN 100 LR/LG
LSN 112 M



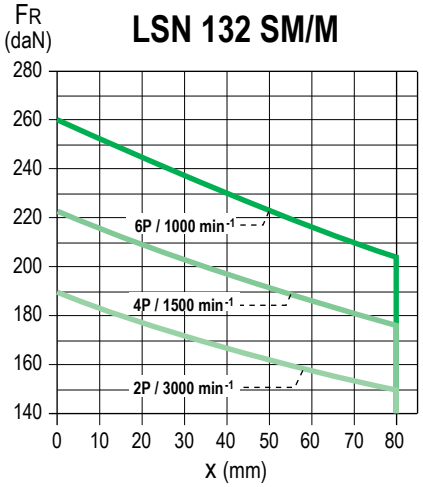
LSN 112 MG/MU



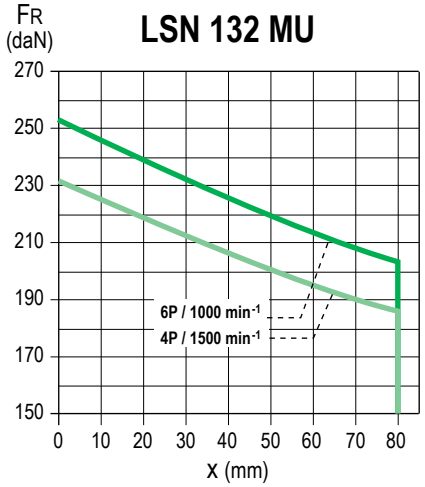
LSN 132 S/SU



LSN 132 SM/M



LSN 132 MU

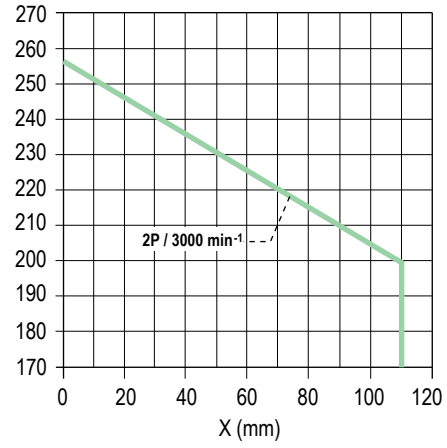


ATEX GAS motors - Zone 2
LSN series - Aluminium
Mechanical characteristics - Radial loads

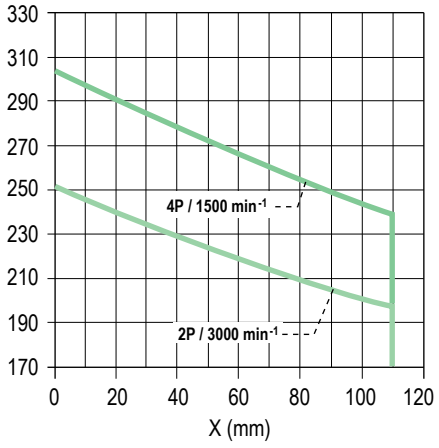
STANDARD FITTING ARRANGEMENT

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

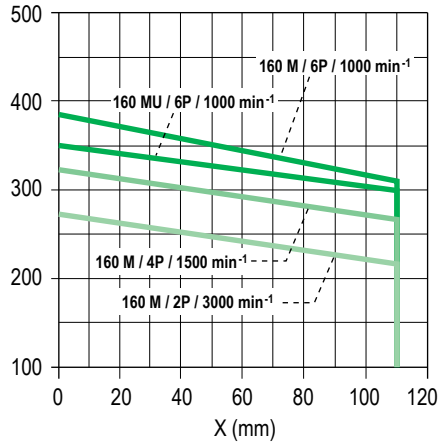
LSN 160 MP



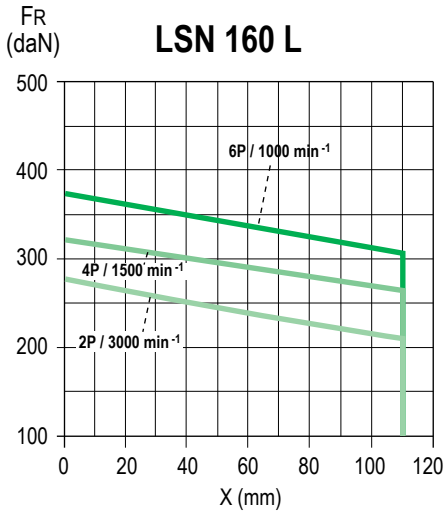
LSN 160 MR



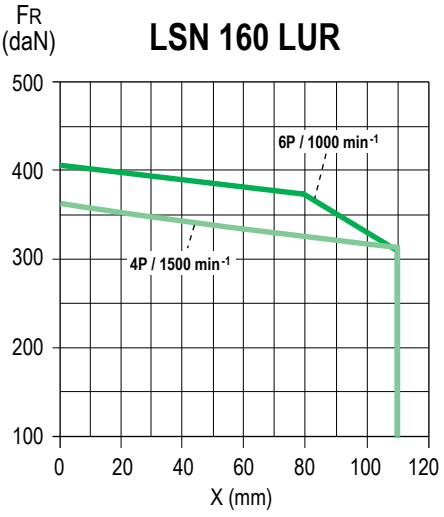
LSN 160 M/MU



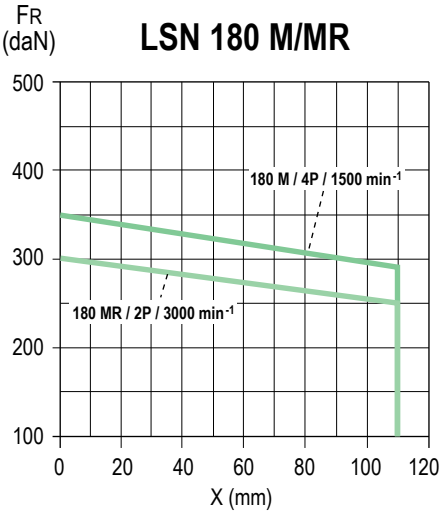
LSN 160 L



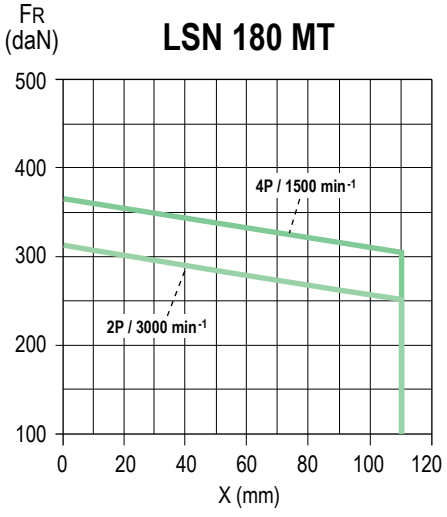
LSN 160 LUR



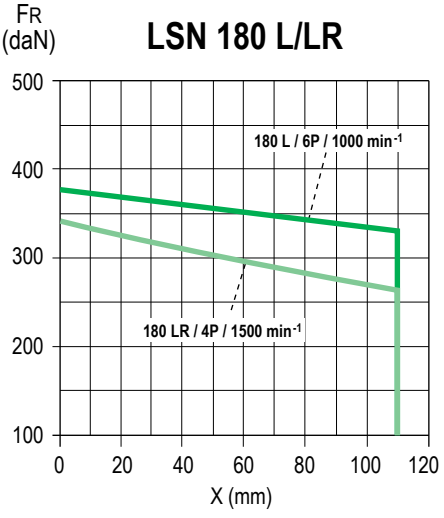
LSN 180 M/MR



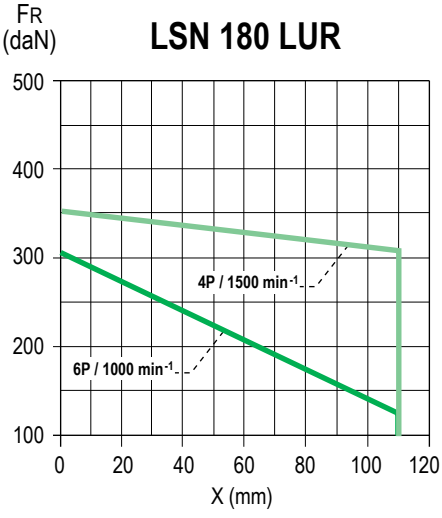
LSN 180 MT



LSN 180 L/LR



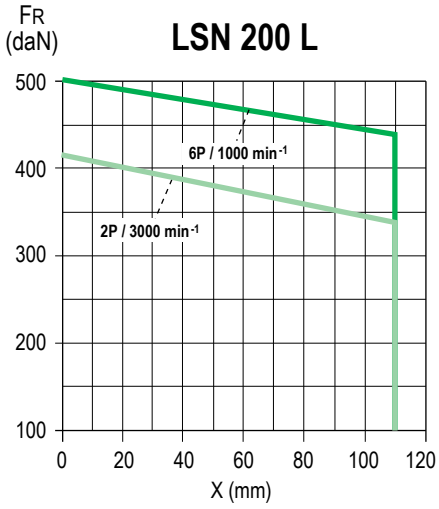
LSN 180 LUR

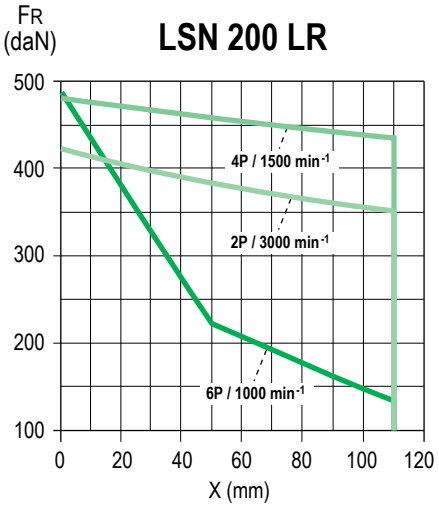


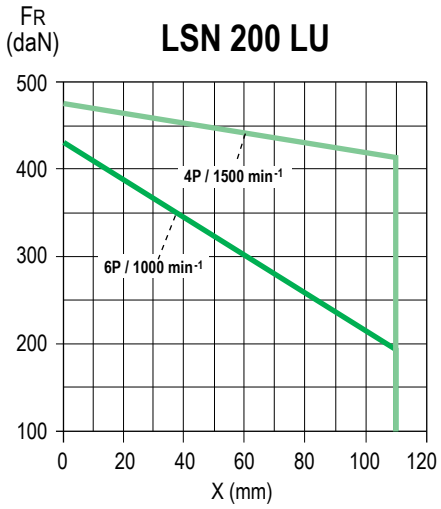
ATEX GAS motors - Zone 2
LSN series - Aluminium
Mechanical characteristics - Radial loads

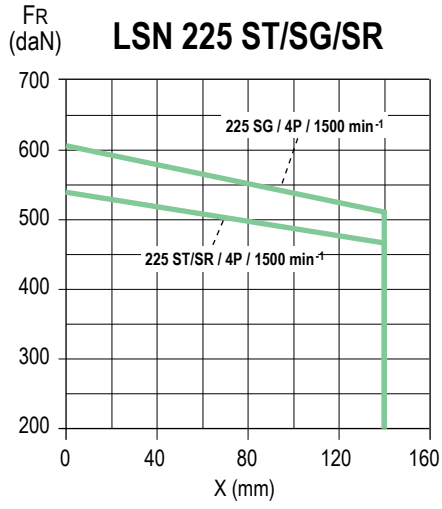
STANDARD FITTING ARRANGEMENT

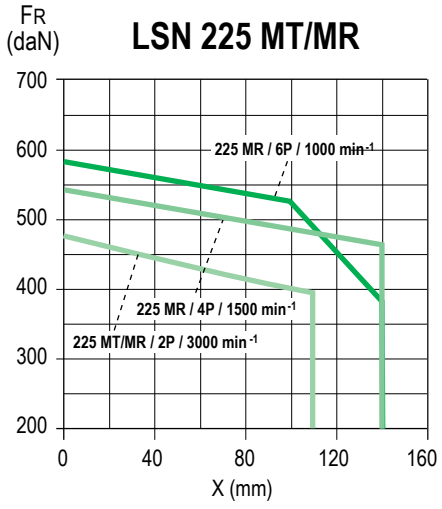
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder

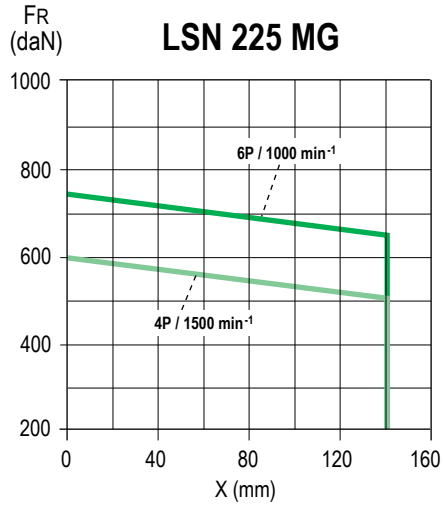








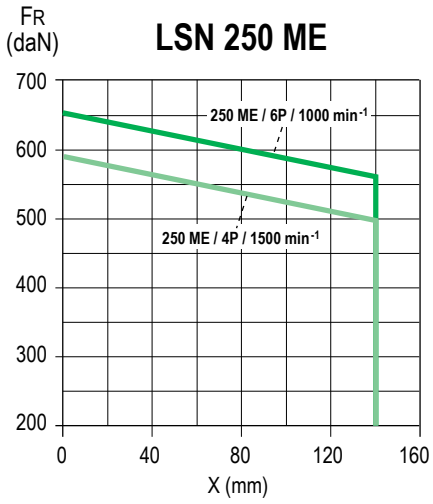


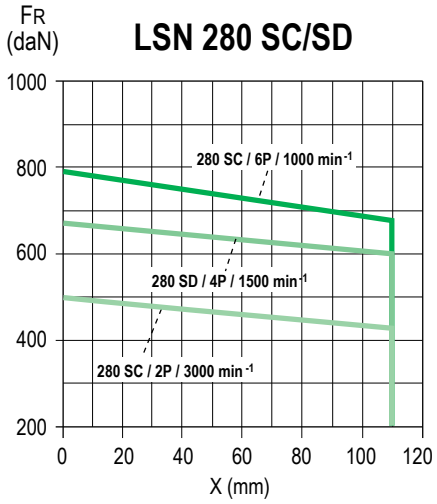


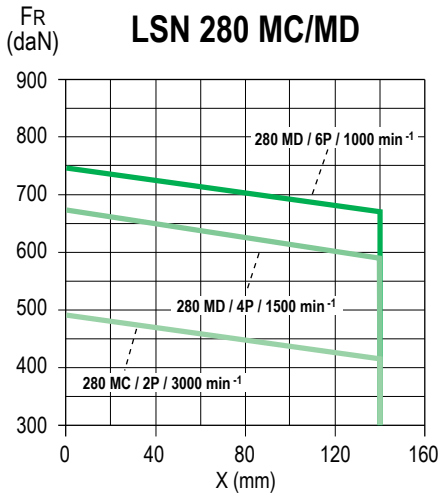
ATEX GAS motors - Zone 2
LSN series - Aluminium
Mechanical characteristics - Radial loads

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







ATEX GAS motors - Zone 2
LSN series - Aluminium
Mechanical characteristics - Radial loads

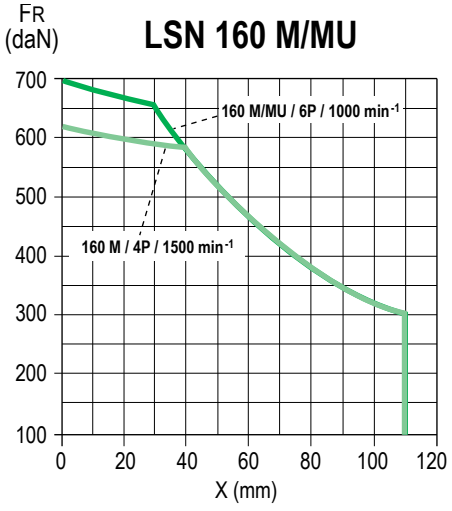
SPECIAL FITTING ARRANGEMENT

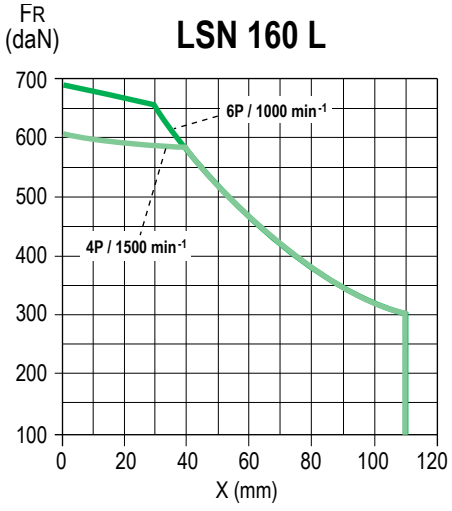
Type of drive end roller bearings

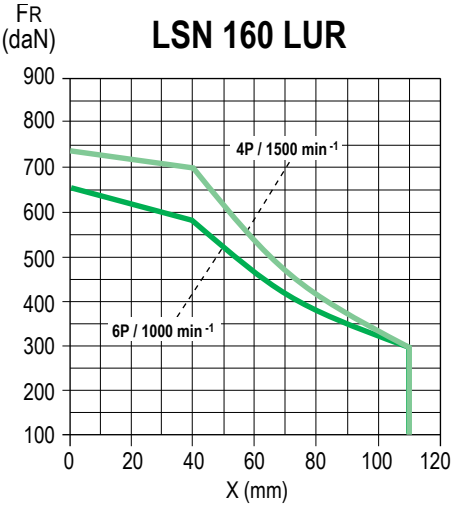
Series	Type	Polarity	Rear bearing (N.D.E.)	Front Bearing (D.E.)
LSN	160 M/MU	4; 6	6210 C3	NU 309
	160 L			
	180 MT	4	6210 C3	NU 310
	180 LR			
	180 LUR	4; 6	6312 C3	NU 310
	180 M	4	6212 C3	NU 310
	180 L	6		
	200 L	6	6214 C3	NU 312
	200 LR	4; 6	6312 C3	NU 312
	200 LU			
	225 ST	4	6214 C3	NU 313
	225 SR/MR	4; 6	6312 C3	NU 313
	225 SG	4	6216 C3	NU 314
	225 MG	4; 6		
	250 ME	4; 6	6216 C3	NU 314
	280 SC	6	6216 C3	NU 316
	280 SD/MD	4; 6	6218 C3	NU 316

SPECIAL FITTING ARRANGEMENT

Permissible radial load on main shaft extension with a bearing life L_{10h} of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder





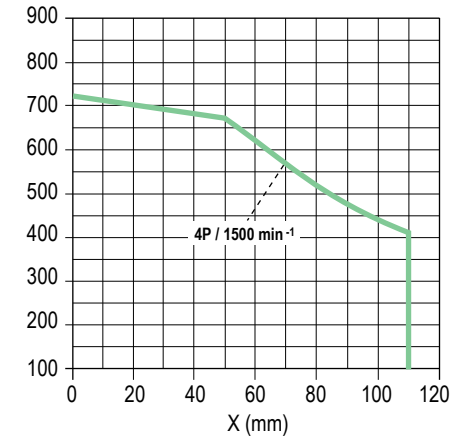


ATEX GAS motors - Zone 2
LSN series - Aluminium
Mechanical characteristics - Radial loads

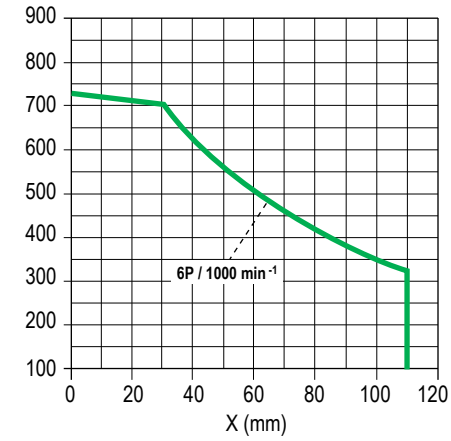
SPECIAL FITTING ARRANGEMENT

Permissible radial load on main shaft extension with a bearing life L_{10h} of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder

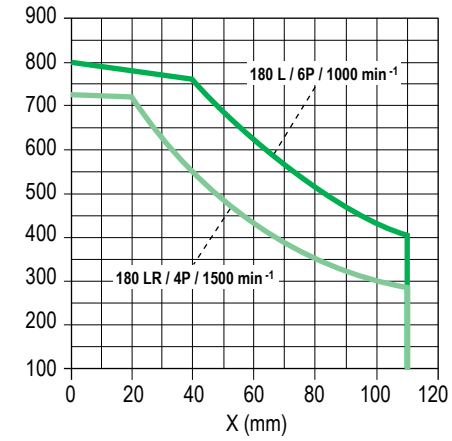
LSN 180 M



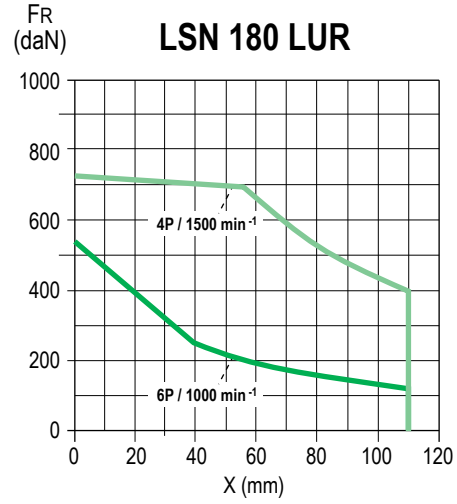
LSN 180 MT



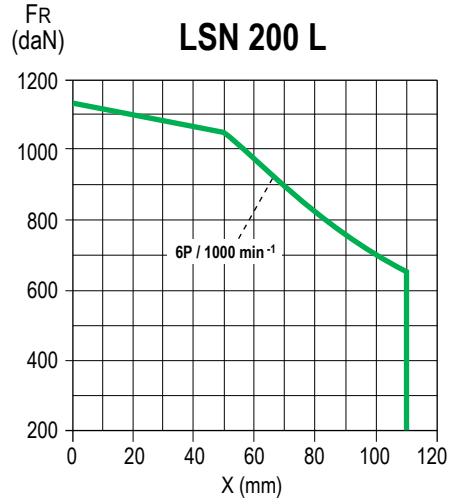
LSN 180 L/LR



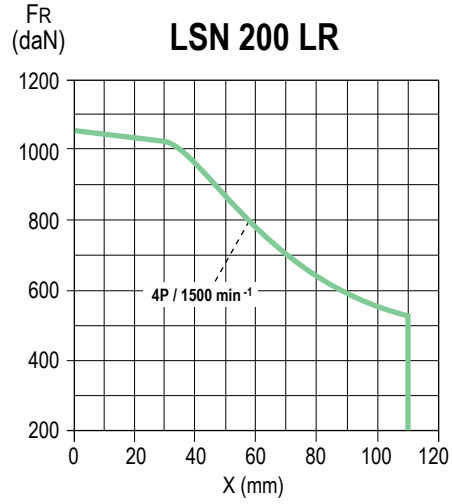
LSN 180 LUR



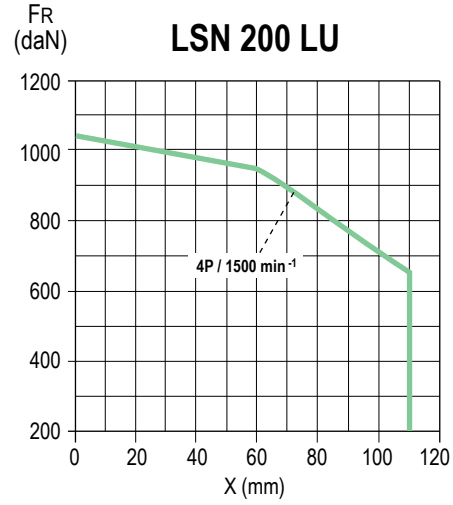
LSN 200 L



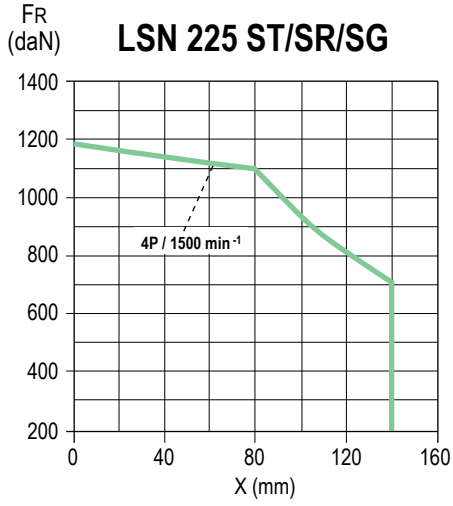
LSN 200 LR



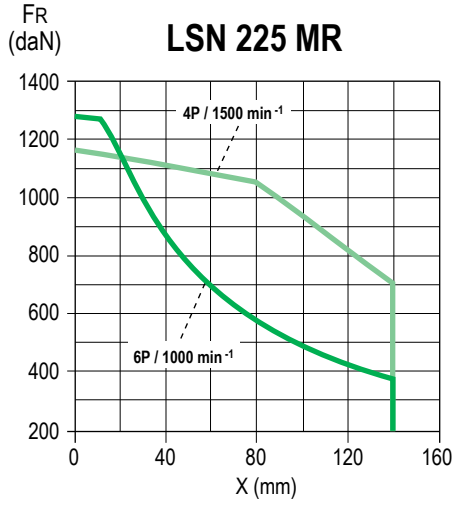
LSN 200 LU



LSN 225 ST/SR/SG



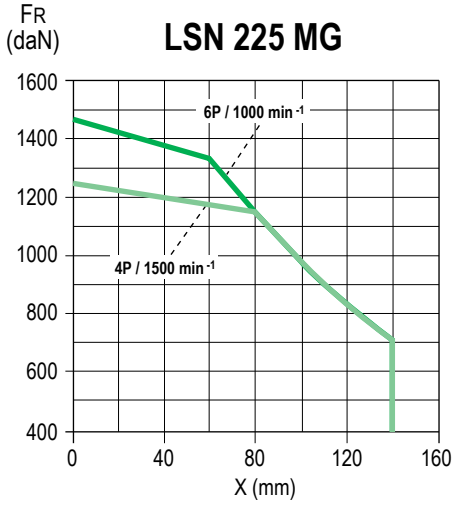
LSN 225 MR

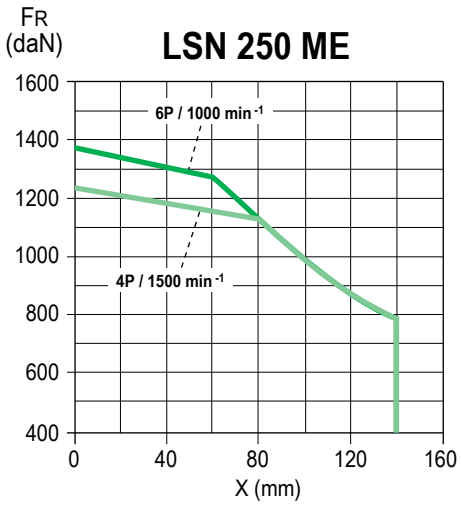


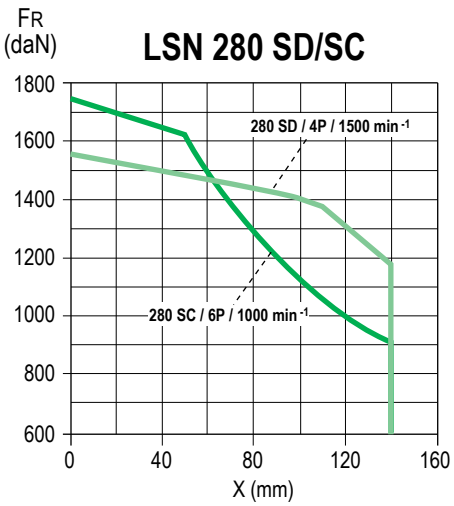
ATEX GAS motors - Zone 2
LSN series - Aluminium
Mechanical characteristics - Radial loads

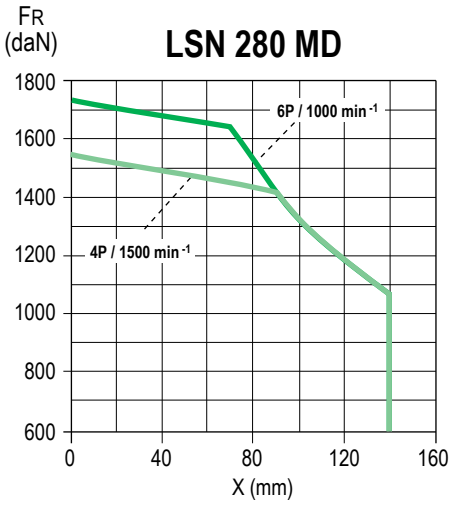
SPECIAL FITTING ARRANGEMENT

Permissible radial load on main shaft extension with a bearing life L_{10h} of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder









ATEX GAS motors - Zone 2
LSN series - Aluminium
Mechanical characteristics- Terminal box connections

INDICATION OF CABLE GLAND SIZE AND TYPE FOR 400 V RATED SUPPLY VOLTAGE IF DRILLINGS REQUIRED WITHOUT DETAILS OF DIAMETERS

Series	Type	Polarity	Terminal box material	Power + auxiliaries	
				Number of holes	Hole diameter*
LSN	80	2; 4; 6	Aluminium alloy	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			
	180	2; 4; 6		3	2 x M40 + 1 x M16
	200	2; 4; 6			
	225	2; 4; 6			2 x M50 + 1 x M16
	250 ME	4; 6			2 x M63 + 1 x M16
	280	2; 4; 6			

** As an option, both ISO M25 holes 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 6 terminals complying with standard NFC 51 120, with the terminal markings complying with IEC 60034-8 (or NF EN 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 shaft end.

If any two of the phases are changed over, the motor will run in the opposite 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 terminal blocks 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 supply		
		230/400 V connection		400 V drive connection
		Polarity	Terminals	Terminals
LSN	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
	280 SC	2	M12	M10
		4	M12	M8
		6	M10	M8
	280 MC	2	M12	M10
		6	M10	M8
	280 MD	4	M12	M10

ATEX GAS motors - Zone 2
LSN series - Aluminium
Optional equipment

Mechanical adaptations	Frame size
DE and NDE bearings with 1 machining, for vibration sensor in position 12H, 12H-3H, or 12H-3H-9H	≥ 132
Different FF flanges from IEC	All
Different FT flanges from IEC	≤ 132
DE roller bearing	≥ 160: 4p & +
Insulated DE or NDE bearing	≥ 280
2nd standard catalogue NDE shaft end	All
2nd special NDE shaft end	All
Conical shaft	All
Shaft with special keying	All
Keyed cylindrical NDE shaft (secondary shaft end) as per IEC	All
Stainless-steel shaft	All
Class B balancing	All
F type (full key) or N type (no key) balancing	All
Stainless steel fan cover	All
Steel fan cover + drip cover	All
Steel fan cover + anti-clogging	All
Metal fan	All
Stainless steel nameplate	All
Stainless-steel fastenings	All
Three-phase axial forced ventilation - IC 416 A	All
Incremental encoder / 1024 or 4096 pts / 5v or 11/30 V	All
Positioning holes (jacking screws)	≥ 250
Radial seal for motor in vertical position with shaft end upwards	All
Drain holes for operation in vertical position	All

Electrical adaptations	Frame size
Terminal board with anti-rotation system as standard	All
Special voltages (excluding variable speed)	All
Definition for Id/In ≤ 7.5	All
Insulation class H	All
Main box in position B or D	All
Auxiliary boxes	≥ 160
Plastic PE	All
ATEX brass PE for unshielded cable	All
ATEX brass PE for shielded cable	All
ATEX brass PE auxiliary for unshielded cable	All
ATEX brass PE auxiliary for shielded cable	All
Flying lead via 1 metre single-core cable 6 + 1	All
Cable entry on the left as seen from the shaft end	All
Preparation for NPT cable glands	All

Protections	Frame size
Winding PTC thermistor probe (triple probe)	All
Winding PT 100 probe (1 per phase)	All
Endshield PTC thermistor probe (triple probe)	≥ 160
Endshield PT 100 probe (per probe)	≥ 160
Endshield thermocouple	≥ 160
Space heaters when stopped (220-230 V)	All
Reinforced winding insulation system for variable speed drive power supply	All

Finish	Frame size
VIK version (see page 23)	All
IP 65	All
Definition for gas + dust motor, Ex tc IIIB / IIIC T125°C Dc	All
IP 56 stopped with fan (IC 411)	All
C3H, C4M, C4H, C5-IL or C5-IM paint	All
Other paint shades	All
Operating temperature: -55°C < T° < -20°C	All
Complete tropicalization (stator + rotor)	All

ATEX GAS motors - Zone 2
LSN series - Aluminium
Optional equipment - Non-standard flanges

Optionally, Nidec 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.

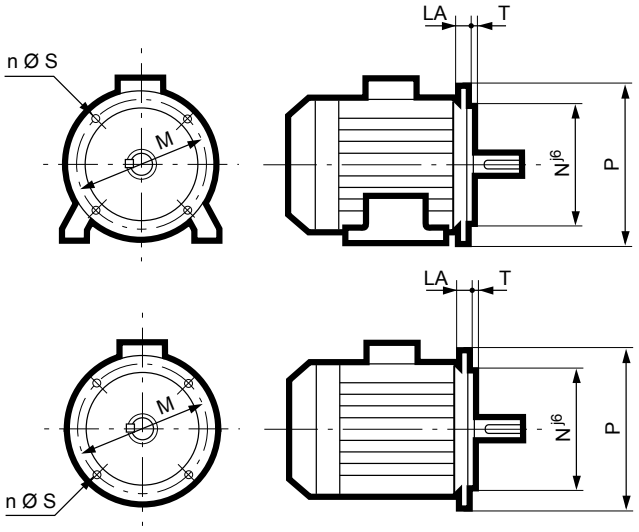
The tables below give the flange and faceplate dimensions and also indicate flange/motor compatibility.
The bearing and shaft end for each frame size remain standard.

Dimensions in millimetres

(FF) FLANGE MOUNTED

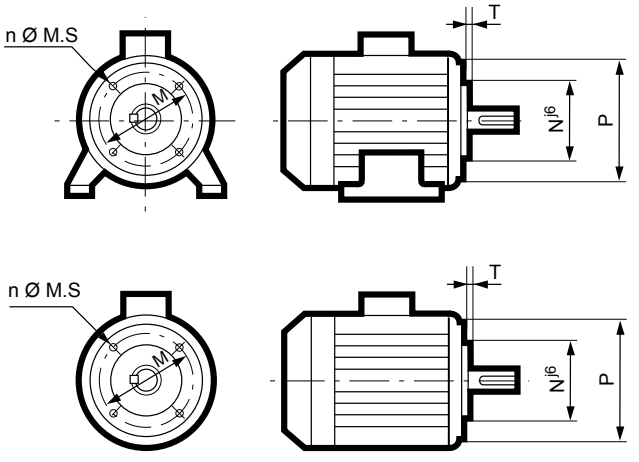
Symbol IEC	Flange dimensions						
	M	N	D	T	n	S	LA
FF 115	115	95	140	3	4	10	10
FF 130	130	110	160	3.5	4	10	10
FF 165	165	130	200	3.5	4	12	10
FF 215	215	180	250	4	4	15	12
FF 265	265	230	300	4	4	15	14
FF 300	300	250	350	5	4	18.5	14
FF 350	350	300	400	5	4	18.5	15
FF 400	400	350	450	5	8	18.5	16
FF 500	500	450	550	5	8	18.5	18**

** Tolerance N js6*
*** shaft length = 22 for frame size ≥ 280*



(FT) FACE MOUNTED

Symbol IEC	Flange dimensions					
	M	N	D	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



ATEX GAS motors - Zone 2
LSN series - Aluminium
Optional equipment

MODIFIED FLANGES

Motor type		Flange type / Fastening forms	(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
LSN	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										◆	●	◆											

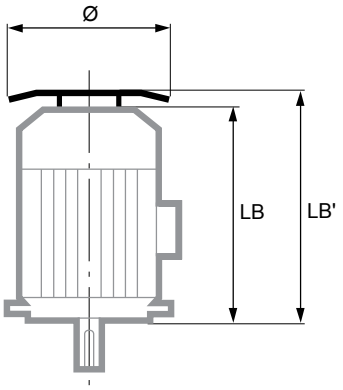
● Standard ■ Modified shaft ◆ Adaptable without shaft modifications

(1) Dimension C need not comply with IEC 60072

Dimensions in millimetres

DRIP COVER FOR OPERATION IN VERTICAL POSITION SHAFT END DOWNWARDS

Series	Motor type	LB'	Ø
LSN	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/LU	LB + 36.5	350
	225	LB + 36.5	350
	250 ME	LB + 55	420
	280	LB + 55	420



ATEX GAS motors - Zone 2
LSN series - Aluminium
Optional equipment

SPACE HEATERS

Series	Type	Power (W)
LSN	80 L/LG	10
	90 to 160 MP/LR	25
	160 M/L à 225 ST/MT/MR	52
	250 ME/MF	84
	280 SC/SU/MC/MD	84

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

ATEX GAS motors - Zone 2
LSN series - Aluminium
Handling - Position of lifting rings

LIFTING THE MOTOR ONLY

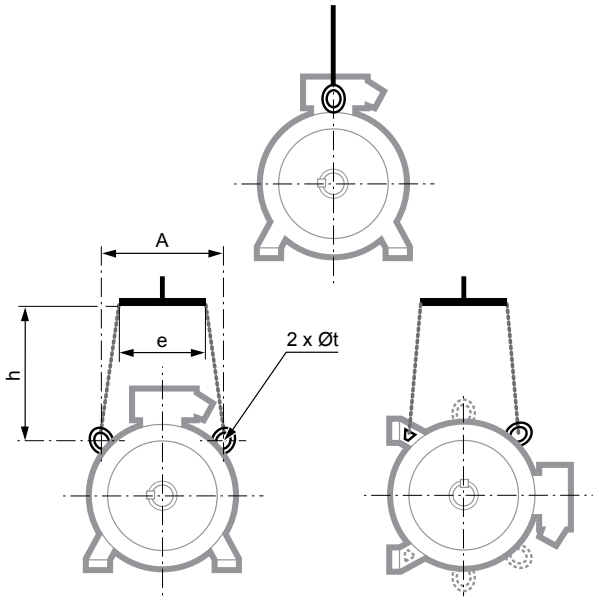
(not coupled to the machine)

The regulations stipulate that in excess of 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.

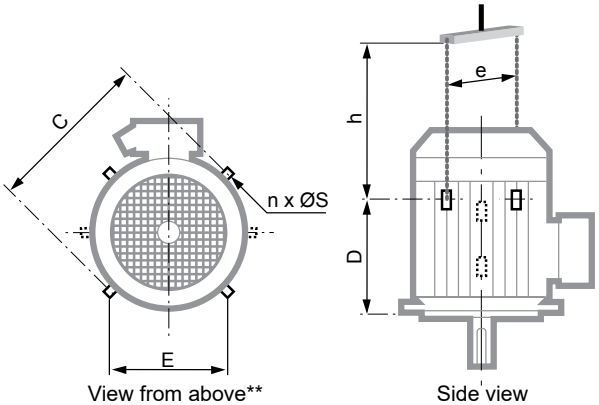
To prevent any damage to the motor during handling (for example: switching the motor from horizontal to vertical), it is essential to follow these instructions.

HORIZONTAL POSITION



Series	Type	Horizontal position			
		A	min. e	min. h	Øt
LSN	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

VERTICAL POSITION



Series	Type	Vertical position						
		C	E	D	n**	ØS	min. e*	min. h
LSN	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 ME	500	400	502	4	30	500	500
	280 SC/SD/MC/MD	500	400	502	4	30	500	500

** 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°.

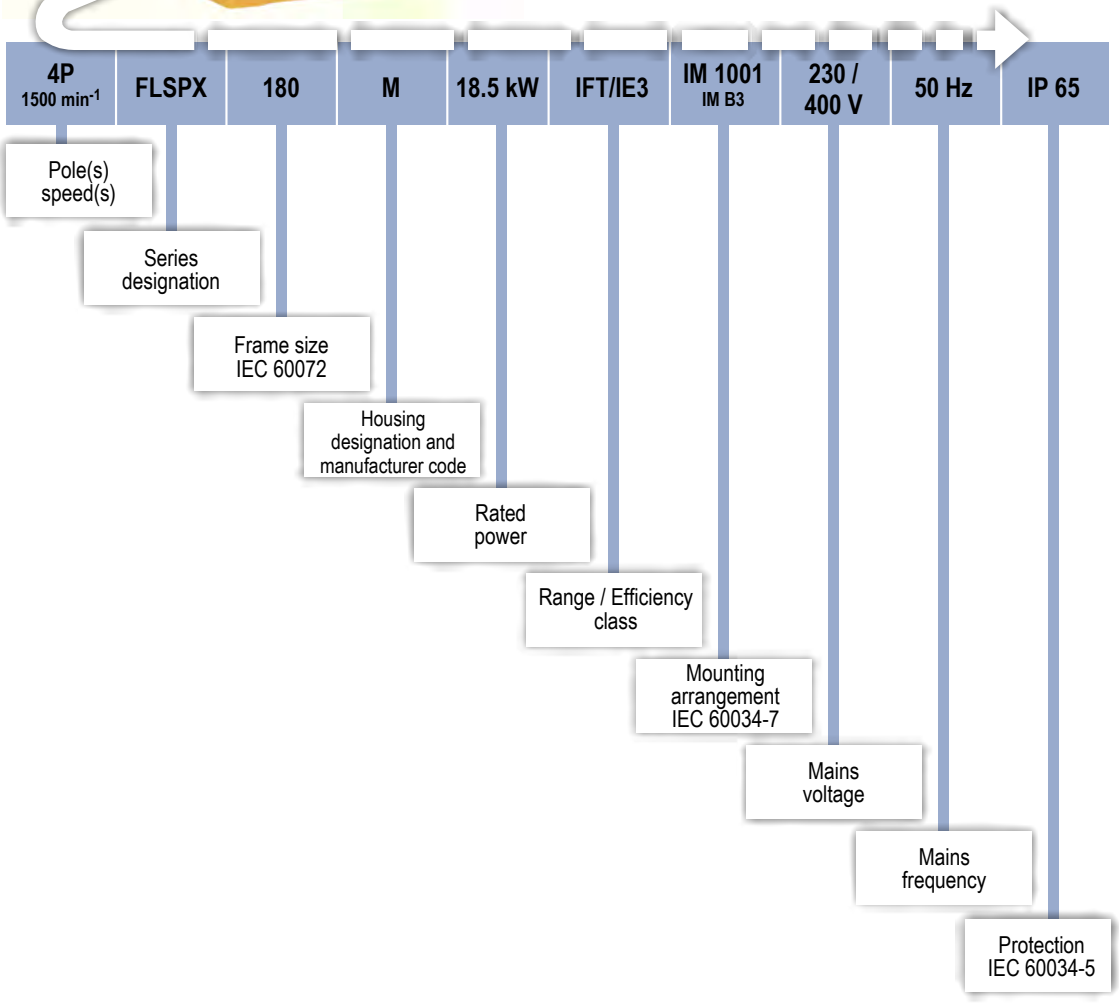
Separate ring ≤ 25 kg
Built-in ring > 25 kg

ATEX DUST motors - Zone 21
FLSPX series - Cast iron
General information - Designation

ATEX DUST motors - Zone 21	FLSPX series
	II 2 D Ex tb III C T125°C Db
	Premium Efficiency
	IE3 cast iron on mains IE3 cast iron on drive

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.



ATEX DUST motors - Zone 22
FLSES series - Cast iron
General information - Designation

ATEX DUST motors - Zone 22	FLSES series
	II 3 D Ex tc III B T125°C Dc
	Premium Efficiency
	IE3 cast iron on mains
	IE3 cast iron on drive

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	FLSES	180	M	18.5 kW	IFT/IE3	IM 1001 IM B3	230 / 400 V	50 Hz	IP 65
Pole(s) 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

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
General information - Identification and marking

NAMEPLATES

The nameplate identifies the motors, indicates the main performance and shows compatibility of the motor concerned with the main standards and regulations concerning them.
All motors in this catalogue with power between 0.75 and 400 kW are fitted with two information plates: one indicating the motor's performance when supplied from the mains, and the other the motor's performance when supplied from a drive.

DEFINITION OF SYMBOLS USED ON NAMEPLATES

CE **Legal mark indicating the conformity of equipment with the requirements of European Directives**

SPECIAL MARKING (ATEX)

: protection marking against explosive risks

II 2D or II 3D : ATEX marking
Ex tb or tc : "dust" protection mode
IIIB or IIIC : "dust" equipment group
T125°C : max. surface temperature
Db or Dc : "dust" EPL level
0080 : INERIS Notified Body
INERIS 00ATEX0004X* : CE type examination certificate No.
* IECExINE10.0012X: IECEx certificate No.

Zone	Type	ATEX marking	Marking of type of dust protection	Protection rating
21	**FLSPX**	II 2 D	Ex tb IIIC T125°C Db	IP65
22	**FLSES** Non-conductive dusts	II 3 D	Ex tc IIIB T125°C Dc	IP55

MAINS SUPPLY PLATE

MOT 3 ~ : three-phase AC motor
FLSPX : series
112 : frame size
MU : housing symbol
T : impregnation index

Motor no.

456789 : motor serial number
G : month of production
12 : year of production
001 : batch number
IE3 : efficiency class
88.6% : efficiency at 4/4 load

kg : weight
IP65 : protection rating
IK08 : shock resistance
I cl.F : insulation class F
40°C : max. 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. Drive end bearing
NDE : non drive end. Bearing side opposite the drive
g : amount of grease at each regreasing (in g)
h : regreasing interval (hours)
A : vibration level
H : balancing mode

DRIVE SUPPLY PLATE

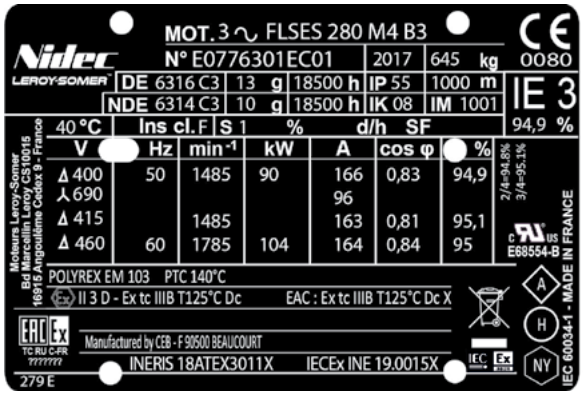
Inverter settings : required values for setting the frequency inverter
Motor performance : torque available on the motor shaft in % rated torque at the plate frequencies
Min. Fsw (kHz) : minimum switching frequency acceptable for the motor
Nmax (min^{-1}) : maximum mechanical speed acceptable for the motor

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
General information - Identification and marking

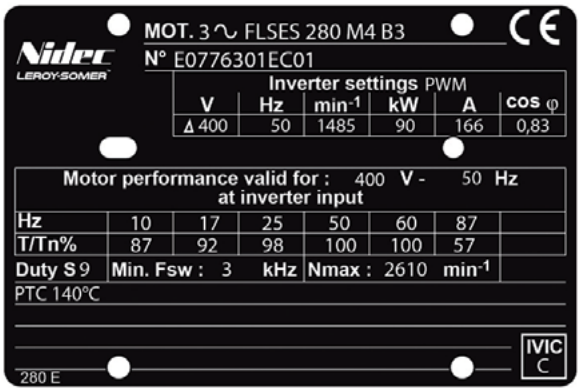
INFORMATION PLATES CAST IRON MOTORS

FLSPX Zone 21 and FLSES Zone 22

Mains supply plate



Drive supply plate



ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
General information - Description

Combustible dust is dangerous because it can form potentially explosive atmospheres when dispersed in the air.
Furthermore, a layer of combustible dust can ignite and act as a source of ignition in an explosive atmosphere.
Explosive dust atmospheres can be found in many industries, such as agriculture, chemicals, plastics and food and drink related industries.

FLSPX and FLSES cast iron motors are designed to prevent any explosion due to dust:
- The ingress of dust into the motor is prevented by the IP protection, either IP55 (dustproof for FLSES motors) or IP65 (dustproof for FLSPX).
- The maximum surface temperature outside the engine must not exceed the temperature class for which the motor is certified.
- No sparks must reach the outside of the motor enclosure.

These motors are certified to comply with Directive 2014/34/EU and the IECEx system regulations.
For zone 22 FLSES motors, Nidec Leroy-Somer also provides self-certification with a Declaration of Conformity.

Designations	Materials	Comments
Finned housing	Cast iron	- lifting rings for frame size ≥ 90 - ground 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 - plate assemblies - semi-enclosed slots - class F insulation - 1 set of PTC sensors in the windings from FLSPX 80 to FLSPX 355 and from FLSES 80 zone 22 to FLSES 355 zone 22
Rotor	Insulated low-carbon magnetic steel laminations Aluminium	- inclined cage bars - rotor cage pressure die-cast in aluminum (or alloys for special applications) or copper-soldered - assembly by hot shrinking on the shaft or by keying for soldered rotor - class A rotor balanced dynamically, 1/2 key
Shaft	Steel	- for frame size ≤ 132: closed keyway - for frame size ≥ 160: open keyway
End shields	Cast iron	
Bearings and lubrication		- protected ball bearings, permanently greased for frame size 80 to 225 - protected ball bearings, regreasable for frame size 250 to 450 - preloaded bearings at the rear up to 315 S, at the front from 315 M
Labyrinth seal **Lip seals**	Technopolymer or steel Synthetic rubber	- labyrinth seal at front for foot mounted motors with frame size ≤ 132 - front gasket for foot and face mounted motors or fastening flanges with frame size ≤ 132 - gasket at front and rear for frame sizes 160 to 250 included - decompression grooves for 280 M to 355 LD - labyrinth seal at front and rear for frame sizes ≥ 355 LK
Fan	antistatic thermoplastic or aluminium up to and including 280 Metallic from 315 S	- bi-directional: straight blades
Fan cover	Steel plate	- fitted, on request, with a drip cover for operation in vertical position, shaft end downwards
Terminal box	Body and cover in cast iron for all frame sizes	- IP 55 or IP 65 - fitted with a terminal 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 160 to 355, drilled cable gland support plate with plugs (FLSPX) or undrilled (FLSES) (optional flared feed and cable gland) - 1 ground terminal in each terminal box

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron - IE3
Electrical characteristics - Mains supply

Type		Rated power	Rated torque	Starting torque/ Rated torque	Maximum torque/ Rated torque	Starting current/ Rated current	Moment of inertia	Weight	Noise	400V 50Hz							
										Rated speed	Rated current	Efficiency IEC 60034-2-1 2007			Power factor		
		P_n kW	M_n N.m	M_d/M_n	M_m/M_n	I_d/I_n	J kg.m²	IM B3 kg	LP db(A)	N_n min⁻¹	I_n A	η 4/4	η 3/4	η 2/4	Cos φ 4/4	Cos φ 3/4	Cos φ 2/4
2 poles																	
	80 L	0.75	2.5	2.8	3.6	7	0.00095	16.2	59	2885	1.6	82.6	82.7	80.5	0.82	0.75	0.62
	80 LG	1.1	3.7	2.41	3.11	6.82	0.00201	22.5	59	2885	2.2	85.6	86.6	85.9	0.85	0.79	0.68
	90 SL	1.5	5	2.88	2.98	7	0.00223	24	68	2890	3	85.1	86.1	85.4	0.85	0.79	0.68
	90 LU	2.2	7.3	3.38	3.23	8.05	0.00292	28.2	70	2895	4.3	87.0	88.2	88.1	0.86	0.80	0.70
	100 L	3	9.9	3.2	3.6	8.03	0.00364	35.2	66	2895	5.8	87.1	88.1	87.8	0.86	0.81	0.70
	112 MG	4	13.1	2.1	2.95	7.34	0.00941	44.8	66	2920	7.3	88.5	89.5	89.4	0.89	0.85	0.77
	132 SM	5.5	17.9	2	2.8	6.39	0.00974	69.3	67	2935	10.3	90.0	90.8	90.4	0.86	0.82	0.73
	132 SM	7.5	24.4	2.05	2.9	6.95	0.01102	74.6	67	2940	13.8	91.2	92.0	91.8	0.86	0.82	0.75
	160 M	11	35.6	3.34	3.04	8.25	0.0712	120	68	2950	19.9	91.9	92.4	92.0	0.87	0.83	0.75
	160 M	15	48.6	2.9	2.9	7.25	0.0551	133	68	2950	26.7	92.4	93.1	93.1	0.88	0.85	0.79
	160 LUR	18.5	59.9	2.85	2.75	7.4	0.0626	135	69	2950	32.9	92.5	93.2	93.2	0.88	0.86	0.79
	180 MUR	22	71.2	3	3.4	8.05	0.1012	195	74	2952	38	93.6	94.1	93.8	0.89	0.87	0.81
FLSPX	**200 LU**	30	97.1	2.1	3.05	7.25	0.1186	210	71	2950	53.1	93.9	94.3	94.0	0.87	0.84	0.77
FLSES	**200 LU**	37	120	2.05	3.35	6.95	0.1388	230	75	2945	64.5	94.0	94.6	94.5	0.88	0.86	0.80
	225 MR	45	145	2.27	3.07	7.17	0.1597	254	71	2956	81.8	94.4	94.7	94.4	0.84	0.80	0.70
	250 M	55	177	2.1	3.2	7.65	0.3356	378	78	2968	95.3	94.5	94.6	93.7	0.88	0.85	0.79
	280 S	75	241	2.1	2.7	7	0.48	565	79	2966	126	94.7	95.0	94.7	0.91	0.89	0.85
	280 M	90	290	2.2	2.8	7.4	0.57	615	80	2967	151.1	95.1	95.4	95.1	0.90	0.89	0.85
	315 S	110	353	2.1	2.6	6.7	1.17	940	82	2975	185	95.7	95.7	95.1	0.90	0.89	0.85
	315 M	132	424	2.1	2.5	6.7	1.25	1015	82	2975	221	95.8	95.9	95.3	0.90	0.89	0.84
	315 LA	160	514	2	2.9	6.59	1.34	1088	82	2975	268.6	95.9	95.9	95.3	0.90	0.89	0.84
	315 LB	200	643	2.1	2.9	6.88	1.45	1150	82	2973	334.8	96.2	96.4	95.8	0.90	0.88	0.84
	355 LA	250	802	2.2	2.9	6.8	3.02	1590	83	2978	428.2	95.9	95.9	95.1	0.88	0.86	0.80
	355 LB	315	1008	2.6	3	7.76	3.62	1740	84	2983	539.5	96.2	96.2	96.0	0.88	0.86	0.82
	355 LC	355	1137	2.8	2.7	7.09	3.64	1740	84	2981	610.8	96.2	96.3	96.0	0.87	0.86	0.82
	355 LD	400	1284	1.9	2.75	6.99	3.70	1770	84	2986	667.9	97.0	97.0	96.8	0.89	0.88	0.86

For power > 400 kW, please contact us.

4 poles																	
	80 LG	0.75	5	2.18	3.12	6.41	0.00335	22	57	1452	1.7	83.8	84.4	83.1	0.79	0.71	0.58
	90 SL	1.1	7.3	2.38	3.18	7.52	0.00418	24.6	48	1450	2.3	84.9	85.8	85.0	0.81	0.74	0.61
	90 LU	1.5	9.9	2.84	3.54	7.21	0.00524	28.2	51	1454	3.3	85.4	85.8	84.1	0.78	0.70	0.56
	100 LR	2.2	14.5	3.45	3.85	8.09	0.00676	36.4	49	1452	4.7	86.9	87.4	86.2	0.78	0.70	0.57
	100 LG	3	19.6	2.45	3.25	7.22	0.01152	42.2	50	1462	6	88.7	89.3	88.7	0.82	0.76	0.64
	112 MU	4	26.2	2.7	3.1	7.05	0.01429	49	50	1458	8.1	88.8	89.5	88.9	0.80	0.75	0.64
	132 SM	5.5	35.9	2.85	3.65	8.35	0.02286	70.9	60	1462	10.5	90.1	90.7	90.2	0.84	0.78	0.67
	132 MR	7.5	49.1	2.8	3.4	8.45	0.03313	89.4	61	1460	13.8	90.6	91.5	91.3	0.86	0.81	0.71
	160 M	11	71.7	2.25	2.85	7.6	0.0712	115	59	1466	20.1	91.7	92.7	92.8	0.86	0.82	0.73
	160 LUR	15	97.4	2.3	3.2	8.04	0.0954	140	58	1470	27.2	92.3	93.0	92.9	0.86	0.82	0.72
	180 M	18.5	120	3.05	3.35	8.05	0.1333	165	67	1470	34.1	92.8	93.5	93.4	0.84	0.80	0.71
	180 LUR	22	143	3.3	3.3	7.88	0.1555	190	68	1470	41.3	93.0	93.6	93.4	0.83	0.79	0.69
FLSPX	**200 LU**	30	194	3.05	2.9	7.25	0.2035	250	64	1474	54.9	93.9	94.4	94.2	0.84	0.80	0.70
FLSES	**225 S**	37	238	2	2.65	6.75	0.5753	355	65	1484	67.5	94.0	94.4	94.1	0.84	0.80	0.71
	225 M	45	289	2.11	2.71	6.68	0.6482	380	64	1486	84.4	94.9	95.2	94.9	0.81	0.76	0.66
	250 MR	55	354	2.05	2.45	6.9	0.7701	440	67	1482	101	94.8	95.2	95.1	0.83	0.79	0.70
	280 S	75	482	2.4	2.8	7.5	0.85	595	74	1484	137	95.0	95.2	94.9	0.83	0.79	0.69
	280 M	90	579	2.7	2.7	7.89	0.98	645	74	1483	165.5	95.2	95.6	95.0	0.83	0.78	0.68
	315 S	110	707	2.1	2.7	7.1	1.84	930	74	1486	196	95.5	95.6	95.0	0.85	0.81	0.73
	315 M	132	848	2.8	2.8	6.8	2.09	985	74	1487	234	95.8	95.8	95.4	0.85	0.82	0.76
	315 LA	160	1030	2.3	2.5	6.44	2.35	1045	74	1484	277	95.9	96.1	95.9	0.87	0.85	0.78
	315 LB	200	1287	2.7	3	7.19	2.86	1245	75	1486	354.6	96.1	96.3	95.8	0.85	0.81	0.72
	355 LA	250	1604	2.6	3.1	7.46	4.90	1445	80	1488	438.1	96.2	96.2	94.6	0.86	0.82	0.71
	355 LAL	280	1798	2.3	2.9	7.3	5.80	1560	80	1489	483.3	96.1	96.2	95.7	0.87	0.84	0.74
	355 LB	315	2028	2.4	2.9	7.5	6.56	1720	80	1488	549	96.2	96.5	96.1	0.86	0.83	0.76
	355 LC	355	2280	2.5	2.9	7.5	6.56	1720	80	1487	629	96.2	96.2	95.7	0.85	0.81	0.72
	355 LD	400	2402	1.69	3.21	8.3	6.60	1750	80	1491	652.1	96.5	96.3	95.6	0.86	0.82	0.74

For power > 400 kW, please contact us.

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron - IE3
Electrical characteristics - Mains supply

Type		Rated power	Rated torque	Starting torque/ Rated torque	Maximum torque/ Rated torque	Starting current/ Rated current	Moment of inertia	Weight	Noise	400V 50Hz							
										Rated speed	Rated current	Efficiency IEC 60034-2-1 2007			Power factor		
		P_n kW	M_n N.m	M_d/M_n	M_m/M_n	I_d/I_n	J kg.m²	IM B3 kg	LP db(A)	N_n min⁻¹	I_n A	η 4/4	η 3/4	η 2/4	Cos φ 4/4	Cos φ 3/4	Cos φ 2/4
6 poles																	
FLSPX FLSES	**90 SL**	0.75	7.6	1.84	2.29	4.47	0.00378	24.2	40	950	1.9	79.1	80.1	78.3	0.72	0.63	0.49
	90 LU	1.1	11	2.25	2.55	4.71	0.00519	29.3	57	954	2.8	81.7	82.3	80.3	0.71	0.62	0.48
	100 LG	1.5	14.8	2.35	2.8	5.64	0.01523	41.3	47	966	3.6	83.8	84.4	82.9	0.72	0.63	0.50
	112 MU	2.2	21.7	2.25	2.75	5.56	0.01899	49	45	968	5.4	84.5	85.1	83.5	0.70	0.62	0.49
	132 SM	3	29.5	2.65	3.05	6.4	0.02528	65	50	972	6.8	87.3	87.7	86.3	0.73	0.66	0.53
	132 M	4	39.4	2.4	2.9	6.27	0.03027	72.7	54	970	9.2	87.3	87.7	86.3	0.72	0.65	0.53
	132 MU	5.5	54.4	2.65	2.8	6.36	0.03699	87	55	966	11.7	88.3	89.0	88.7	0.77	0.71	0.59
	160 MU	7.5	73.2	2	3.05	6.45	0.1295	117	57	978	17.4	89.5	88.7	88.3	0.77	0.67	0.57
	180 L	11	107	2.95	3.8	8.2	0.2048	170	61	982	22.6	91.0	91.3	90.3	0.77	0.70	0.58
	180 LUR	15	146	3.25	2.75	7.45	0.2530	202	60	978	31.9	91.3	91.6	90.9	0.74	0.68	0.56
	200 LU	18.5	181	2.45	3	7.02	0.2588	210	60	978	36.5	91.8	92.5	92.3	0.80	0.75	0.64
	200 LU	22	214	2.8	3.55	7.35	0.2588	245	62	980	44.6	92.5	92.9	92.5	0.77	0.72	0.61
	225 M	30	291	2.2	2.45	6.55	0.8802	342	65	986	55.3	93.2	93.7	93.4	0.84	0.80	0.71
	250 M	37	358	2.45	2.65	6.95	0.9142	397	64	986	68.1	93.5	94.0	93.7	0.84	0.80	0.71
	280 S	45	436	2.9	3.1	7.5	1.08	555	70	986	82	94.0	94.3	93.9	0.84	0.80	0.70
	280 M	55	533	2.9	3.1	7.3	1.28	605	70	986	100	94.3	94.5	94.1	0.84	0.79	0.69
	315 S	75	727	2	2.09	6.98	2.50	965	70	991	137.3	94.9	95.2	94.8	0.83	0.80	0.73
	315 M	90	867	2.7	2	7	2.96	1035	69	991	165	95.0	95.3	95.0	0.83	0.80	0.72
	315 LA	110	1066	2.8	2.2	6.6	3.44	1150	69	989	204.1	95.4	95.8	95.5	0.81	0.79	0.71
	315 LB	132	1276	3.1	2.3	6.88	3.77	1165	67	992	247.6	95.7	95.9	95.5	0.80	0.76	0.67
	355 LA	160	1545	2	2.9	7.28	8.02	1520	76	993	283.8	96.0	96.0	95.3	0.85	0.81	0.73
	355 LB	200	1930	1.9	2.7	7.06	9.84	1750	76	993	347.1	96.0	96.2	95.8	0.87	0.84	0.77
	355 LC	250	2404	2.2	1.95	7.6	10.44	1800	76	993	455.4	96.2	96.1	95.4	0.82	0.78	0.67

** For power > 250 kW, please contact us.*

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron - IE3
Electrical characteristics - Mains supply

Type		Rated power	415V 50Hz				460V 60Hz			
			Rated speed	Rated current	Efficiency	Power factor	Rated speed	Rated current	Efficiency	Power factor
		P_n kW	N_n min^{-1}	I_n A	η 4/4	Cos φ 4/4	N_n min^{-1}	I_n A	η 4/4	Cos φ 4/4
2 poles										
	80 L	0.75	2895	1.6	83.0	0.79	3505	1.4	83.7	0.79
	80 LG	1.1	2895	2.2	85.9	0.83	3505	2	84.8	0.83
	90 SL	1.5	2900	3	85.3	0.83	3505	2.7	86.1	0.83
	90 LU	2.2	2905	4.1	87.5	0.85	3510	3.7	88.2	0.85
	100 L	3	2910	5.6	87.5	0.85	3515	5.1	88.3	0.85
	112 MG	4	2930	7.2	88.9	0.88	3535	6.4	89.9	0.88
	132 SM	5.5	2940	9.9	90.5	0.85	3545	9	90.8	0.85
	132 SM	7.5	2945	13.5	91.5	0.85	3550	12	92.2	0.85
	160 M	11	2954	19.4	92.4	0.85	3554	17.3	92.4	0.86
	160 M	15	2956	25.7	92.7	0.87	3556	23	93.2	0.88
	160 LUR	18.5	2952	31.8	92.7	0.87	3558	28.4	93.2	0.87
	180 MUR	22	2958	37.1	93.8	0.88	3560	33.1	93.8	0.88
FLSPX	**200 LU**	30	2954	51.7	94.0	0.86	3554	46.4	94.0	0.87
FLSES	**200 LU**	37	2950	62.8	94.3	0.87	3552	56.3	94.2	0.88
	225 MR	45	2960	80.7	94.4	0.82	3564	70.6	95.1	0.84
	250 M	55	2972	87.2	94.6	0.87	3574	83.3	94.3	0.88
	280 S	75	2968	122	95.2	0.90	3566	110	94.1	0.91
	280 M	90	2971	146	95.3	0.90	3567	132	95.0	0.90
	315 S	110	2977	177.6	95.7	0.90	3575	161	95.0	0.90
	315 M	132	2976	213.8	96.0	0.90	3575	193	95.4	0.90
	315 LA	160	2976	259.4	96.1	0.89	3575	233	95.8	0.90
	315 LB	200	2974	323.3	96.5	0.89	3575	291	95.8	0.90
	355 LA	250	2982	413.7	96.1	0.88	3578	372	95.8	0.88
	355 LB	315	2985	524.2	96.1	0.87	3583	469	95.8	0.88
	355 LC	355	2983	596.9	96.2	0.86	3581	535	95.8	0.87
	355 LD	400	2988	646.1	97.2	0.89	3589	585	96.5	0.89

For power > 400 kW, please contact us.

4 poles										
	80 LG	0.75	1454	1.6	84.0	0.78	1762	1.5	85.7	0.76
	90 SL	1.1	1454	2.3	84.9	0.79	1758	2.1	86.5	0.78
	90 LU	1.5	1456	3.2	85.6	0.76	1762	2.9	86.9	0.75
	100 LR	2.2	1456	4.7	87.0	0.76	1762	4.1	88.3	0.76
	100 LG	3	1462	6	88.8	0.79	1768	5.2	89.9	0.80
	112 MU	4	1462	8.1	89.4	0.78	1764	7.7	85.5	0.77
	132 SM	5.5	1466	10.3	90.2	0.82	1768	9.2	91.7	0.82
	132 MR	7.5	1464	13.5	91.0	0.85	1768	12.1	92.0	0.85
	160 M	11	1468	19.5	92.2	0.85	1772	17.5	92.9	0.85
	160 LUR	15	1474	26.8	92.6	0.84	1774	23.8	93.4	0.85
	180 M	18.5	1472	33.5	93.0	0.83	1774	29.9	93.6	0.83
	180 LUR	22	1474	40.2	93.2	0.82	1776	35.9	93.7	0.82
FLSPX	**200 LU**	30	1476	53.7	94.2	0.82	1780	48.3	94.5	0.83
FLSES	**225 S**	37	1486	65.7	94.5	0.83	1786	59.4	94.5	0.83
	225 M	45	1486	82.5	95.0	0.80	1788	74.1	95.3	0.80
	250 MR	55	1484	98.4	95.0	0.82	1784	88.2	95.4	0.82
	280 S	75	1486	132.6	94.8	0.83	1784	117	95.4	0.84
	280 M	90	1487	163.1	94.9	0.81	1785	141	95.4	0.84
	315 S	110	1487	193.5	95.3	0.83	1786	172	95.8	0.84
	315 M	132	1487	229	95.7	0.84	1787	203	96.0	0.85
	315 LA	160	1486	276.1	96.0	0.84	1784	245.6	96.2	0.85
	315 LB	200	1487	345.4	95.9	0.84	1786	307	96.2	0.85
	355 LA	250	1490	425.8	96.1	0.85	1788	379	96.2	0.86
	355 LAL	280	1488	471.7	96.0	0.86	1787	420	96.2	0.87
	355 LB	315	1488	530	96.2	0.86	1787	472	96.2	0.87
	355 LC	355	1488	624.1	95.9	0.83	1786	532	96.2	0.87
	355 LD	400	1492	645	96.3	0.84	1792	573.2	96.2	0.85

For power > 400 kW, please contact us.

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron - IE3
Electrical characteristics - Mains supply

Type		Rated power	415V 50Hz				460V 60Hz			
			Rated speed	Rated current	Efficiency	Power power	Rated speed	Rated current	Efficiency	Power factor
		P_n kW	N_n min^{-1}	I_n A	η 4/4	Cos φ 4/4	N_n min^{-1}	I_n A	η 4/4	Cos φ 4/4
6 poles										
FLSPX FLSES	**90 SL**	0.75	956	1.9	79.4	0.69	1160	1.7	82.5	0.67
	90 LU	1.1	958	2.8	81.7	0.68	-	-	-	-
	100 LG	1.5	970	3.6	84.1	0.69	-	-	-	-
	112 MU	2.2	972	6.75	86.8	0.71	-	-	-	-
	132 SM	3	974	9.15	87.0	0.70	-	-	-	-
	132 M	4	972	11.5	88.5	0.75	-	-	-	-
	132 MU	5.5	970	11.7	88.5	0.74	-	-	-	-
	160 MU	7.5	980	17.1	89.6	0.74	-	-	-	-
	180 L	11	984	22.3	91.2	0.75	-	-	-	-
	180 LUR	15	982	31.7	91.4	0.72	-	-	-	-
	200 LU	18.5	980	36	92.1	0.78	-	-	-	-
	200 LU	22	984	42.2	92.7	0.74	-	-	-	-
	225 M	30	986	53.9	93.3	0.83	-	-	-	-
	250 M	37	986	66.5	93.7	0.83	-	-	-	-
	280 S	45	987	80.9	94.1	0.82	1186	70.3	94.5	0.85
	280 M	55	988	99	94.3	0.82	1186	87	94.5	0.84
	315 S	75	992	134.4	94.7	0.82	1190	122	95.0	0.81
	315 M	90	992	161	95.0	0.82	1191	145	95.0	0.82
	315 LA	110	992	198.9	95.5	0.81	1191	176	95.8	0.82
	315 LB	132	991	243.1	95.7	0.79	1190	217	95.8	0.80
	355 LA	160	994	276.2	96.0	0.84	1193	247	95.8	0.85
	355 LB	200	994	338.6	96.0	0.86	1193	312	95.8	0.84
	355 LC	250	994	454	95.9	0.80	1193	405	95.8	0.81

For power > 250 kW, please contact us.

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron - IE3
Electrical characteristics - Drive-powered

Type		400V 50Hz				% Rated torque M_n at					400V 87Hz Δ[1]				Maximum mechanical speed[2]
		Rated power	Rated speed	Rated current	Power factor	10Hz	17Hz	25Hz	50Hz	87Hz	Rated power	Rated speed	Rated current	Power factor	
		P_n kW	N_n min^{-1}	I_n A	Cos φ 4/4						P_n kW	N_n min^{-1}	I_n A	Cos φ 4/4	
2 poles															
	80 L	0.75	2815	1.75	0.88	2.33	2.5	2.5	2.5	1.43	1.31	4928	3.13	0.88	13500
	80 L	1.1	2825	2.5	0.87	3.27	3.7	3.7	3.7	2.11	1.91	4936	4.56	0.87	13500
	90 SL	1.5	2830	3.3	0.89	4.19	5	5	5	2.85	2.61	4945	5.99	0.89	11700
	90 L	2.2	2855	4.8	0.85	5.81	7.35	7.35	7.35	4.19	3.83	4945	8.85	0.85	11700
	100 L	3	2830	6.35	0.89	8.45	10.1	10.1	10.1	5.76	5.22	4945	11.44	0.87	9900
	112 MG	4	2910	8.15	0.88	12.18	13.1	13.1	13.1	7.47	6.96	5066	14.65	0.86	9900
	132 SM	5.5	2910	11.1	0.87	15.07	18	18	18	10.26	9.57	5066	20.55	0.86	6700
	132 SM	7.5	2920	15.1	0.86	20.42	24.4	24.4	24.4	13.91	13.05	5058	28.24	0.87	6700
	132 M	9	2925	18.2	0.87	24.52	29.3	29.3	29.3	16.7	15.66	5066	33.06	0.86	6700
	160 M	11	2940	21.5	0.88	28.14	35.6	35.6	35.6	20.29	19.14	5110	39.14	0.86	6030
	160 M	15	2930	29	0.90	38.42	48.6	48.6	48.6	27.7	26.1	5101	52.36	0.89	6030
	160 L	18.5	2935	35.6	0.90	47.59	57.19	60.2	60.2	34.31	32.19	5084	65.05	0.89	5670
FLSPX	**180 M**	22	2925	73.6	0.90	53.20	67.93	71.5	71.5	59.35	36.27	5092	74.34	0.88	5670
FLSES	**200 LU**	30	2945	56.9	0.88	72.24	87.39	97.1	97.1	80.59	-	-	-	-	4500
	200 LU	37	2935	69.4	0.89	89.28	108	120	120	99.6	-	-	-	-	4500
	225 MR	45	2940	84.7	0.89	108.62	131.4	146	146	121.18	-	-	-	-	4320
	250 M	55	2966	102	0.89	131.69	159.3	177	177	146.91	-	-	-	-	4050
	280 S	75	2950	142	0.91	200	212.1	224.1	224.1	-	-	-	-	-	3600
	280 M	90	2952	170	0.91	246.5	252.3	261	261	-	-	-	-	-	3600
	315S	110	2966	207	0.90	353	353	353	353	-	-	-	-	-	3600
	315 M	132	2966	249.3	0.90	402.8	411.3	424	424	-	-	-	-	-	3600
	315 LA	160	2967	299.7	0.90	488.3	498.6	514	514	-	-	-	-	-	3600
	315 LB	200	2965	373.6	0.90	540.1	553	572.3	572.3	-	-	-	-	-	3600
	355 LA	250	2969	477	0.89	721.8	753.9	786	786	-	-	-	-	-	3600
	355 LB	315	2974	599.3	0.88	836.6	836.6	846.7	846.7	-	-	-	-	-	3600
	355 LC	355	2972	672.7	0.89	932.3	932.3	932.3	932.3	-	-	-	-	-	3600
	355 LD	400	2987	744.3	0.90	1065.7	1091.4	1129.9	1129.9	-	-	-	-	-	3600

For power > 400 kW, please contact us.

4 poles															
	80 LG	0.75	1435	1.8	0.82	4.14	4.95	4.95	4.95	2.82	1.31	2503	3.31	0.82	11700
	90 SL	1.1	1430	2.5	0.84	6.11	7.3	7.3	7.3	4.16	1.91	2494	4.56	0.84	11700
	90 L	1.5	1430	3.45	0.84	8.33	9.95	9.95	9.95	5.67	2.61	2494	6.17	0.84	9900
	100 L	2.2	1435	4.8	0.85	12.14	14.5	14.5	14.5	8.27	3.83	2503	8.85	0.82	9900
	100 LG	3	1445	6.4	0.86	16.49	19.7	19.7	19.7	11.23	5.22	2511	11.53	0.83	9900
	112 MU	4	1440	8.5	0.86	22.01	26.3	26.3	26.3	14.99	6.96	2511	15.64	0.84	9900
	132 SM	5.5	1450	11.5	0.86	30.13	36	36	36	20.52	9.57	2525	20.91	0.83	6700
	132 M	7.5	1445	15.6	0.87	41.26	49.3	49.3	49.3	28.1	13.05	2518	27.88	0.85	6700
	132 M	9	1450	18.5	0.86	49.47	59.1	59.1	59.1	33.69	15.66	2518	33.6	0.83	6700
	160 M	11	1464	22.3	0.86	49.94	71.6	71.6	71.6	40.81	19.14	2543	40.21	0.84	6030
	160 L	15	1458	30	0.87	68.36	98	98	98	55.86	26.1	2532	54.5	0.85	6030
	180 MT	18.5	1460	37.2	0.86	84.4	121	121	121	68.97	31.73	2536	66.23	0.84	6030
	180 L	22	1462	44.2	0.86	106.39	143	143	143	81.51	38.28	2539	80.42	0.84	6030
FLSPX	**200 LU**	30	1466	59.8	0.85	136.01	185.25	195	195	111.15	52.2	2546	109.54	0.83	4500
FLSES	**225 SR**	37	1466	73.5	0.85	167.4	228	240	240	136.8	64.38	2546	134.92	0.83	4320
	225 M	45	1484	89.1	0.83	228.45	289	289	289	164.73	78.3	2570	161.73	0.84	4050
	250 MR	55	1480	108	0.84	279.84	354	354	354	201.78	95.7	2567	198.36	0.83	4050
	280 S	75	1478	150.4	0.86	424.2	453.1	482	482	274.7	-	-	-	-	2160
	280 M	90	1479	181.4	0.85	503.7	532.7	567.4	573.2	326.7	-	-	-	-	2160
	315 S	110	1484	215.6	0.87	692.9	699.9	707	707	403	-	-	-	-	2160
	315 M	132	1482	256.2	0.88	814.1	831	848	848	483.4	-	-	-	-	2160
	315 LA	160	1479	309.6	0.88	896.1	947.6	1009.4	1009.4	575.4	-	-	-	-	2160
	315 LB	200	1480	386.8	0.87	1042.4	1081.1	1119.7	1119.7	638.2	-	-	-	-	2160
	355 LA	250	1482	479.2	0.88	1347.4	1443.6	1539.8	1539.8	877.7	-	-	-	-	2160
	355 LAL	280	1487	541.8	0.87	1510.3	1546.3	1546.3	1600.2	912.1	-	-	-	-	2160
	355 LB	315	1486	602.6	0.88	1622.4	1683.2	1764.4	1764.4	1005.7	-	-	-	-	2160
	355 LC	355	1483	681.9	0.88	1892.4	1915.2	1938.0	1938.0	1104.7	-	-	-	-	2160
	355 LD	400	2562	729.9	0.86	2138	2229	2306	2562	1510	-	-	-	-	2160

For power > 400 kW, please contact us.

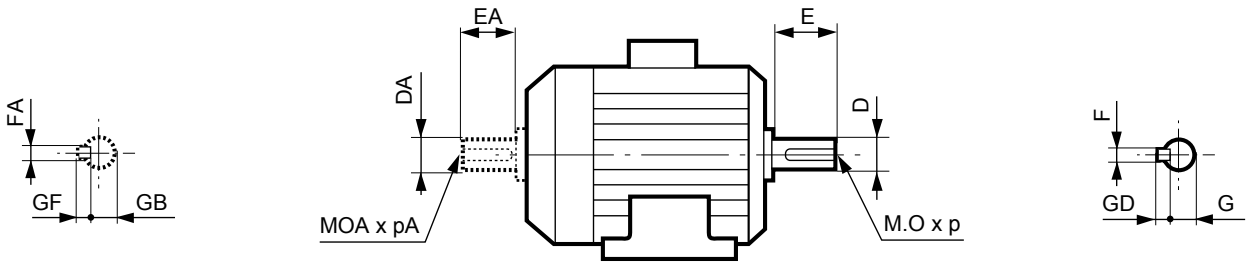
ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron - IE3
Electrical characteristics - Drive-powered

Type		400V 50Hz				% Rated torque M_n at					400V 87Hz Δ[1]				Maximum mechanical speed[2]
		Rated power	Rated speed	Rated current	Power factor	10Hz	17Hz	25Hz	50Hz	87Hz	Rated power	Rated speed	Rated current	Power factor	
		P_n kW	N_n min^{-1}	I_n A	Cos φ 4/4						P_n kW	N_n min^{-1}	I_n A	Cos φ 4/4	
6 poles															
FLSPX FLSES	90 SL	0.75	940	2.1	0.74	5.65	7.6	7.6	7.6	4.33	1.31	1637	3.66	0.70	11700
	90 L	1.1	930	3	0.74	8.33	11.2	11.2	11.2	6.38	1.91	1628	5.36	0.71	11700
	100 LG	1.5	930	3.75	0.71	14.9	14.9	14.9	14.9	8.56	1.5	930	3.75	0.71	9900
	112 MG	2.2	954	5.7	0.75	15.28	20.81	21.9	21.9	12.48	2.2	954	5.70	0.75	9900
	132 SM	3	960	7.25	0.77	24.86	29.7	29.7	29.7	16.93	5.22	1673	13.13	0.74	6700
	132 M	4	954	9.45	0.79	31.38	37.72	39.7	39.7	22.63	6.96	1666	17.07	0.77	6700
	132 M	5.5	960	12.9	0.75	43	51.68	54.4	54.4	31.01	9.57	1673	23.95	0.73	6700
	160 M	7.5	970	17.4	0.77	61.44	73.4	73.4	73.4	41.84	13.05	1690	30.92	0.84	6030
	160 LUR	11	972	24.7	0.79	90.4	108	108	108	61.56	19.14	1687	44.32	0.84	6030
	180 L	15	964	32	0.84	124.71	149	149	149	84.93	26.1	1684	58.26	0.84	6030
	200 LU	18.5	974	39.6	0.81	134.66	181	181	181	103.17	32.19	1694	71.12	0.84	4500
	200 LU	22	968	45.8	0.83	160.7	216	216	216	123.12	38.28	1684	85.42	0.84	4500
	225 M	30	984	58.9	0.86	243.57	291	291	291	165.87	30	984	58.90	0.86	4050
	250 M	37	984	72.2	0.86	299.65	358	358	358	204.06	64.38	1708	131.17	0.85	4050
	280 S	45	983	90.4	0.87	422.9	427.3	436	436	248.5	-	-	-	-	1740
	280 M	55	982	109.5	0.87	490.4	511.7	533	533	303.8	-	-	-	-	1740
	315 S	75	990	154.2	0.84	727	727	727	727	414.4	-	-	-	-	1740
	315 M	90	990	184	0.84	868	867	867	867	494.2	-	-	-	-	1740
	315 LA	110	987	228.7	0.83	1023.4	1044.7	1066	1066	607.6	-	-	-	-	1740
	315 LB	132	989	273.5	0.82	1033.6	1071.8	1110.1	1110.1	632.8	-	-	-	-	1740
	355 LA	160	990	311.6	0.87	1545	1545	1545	1545	880.7	-	-	-	-	1740
	355 LB	200	990	386.1	0.88	1910.7	1910.7	1930	1930	1100.1	-	-	-	-	1740
	355 LC	250	992	486.3	0.87	2283.8	2331.9	2380	2380	1356.6	-	-	-	-	1740

For power > 250 kW, please contact us.

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
Mechanical characteristics - Shaft end

Dimensions in millimetres

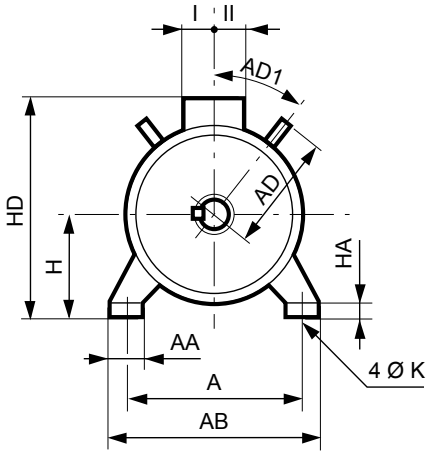


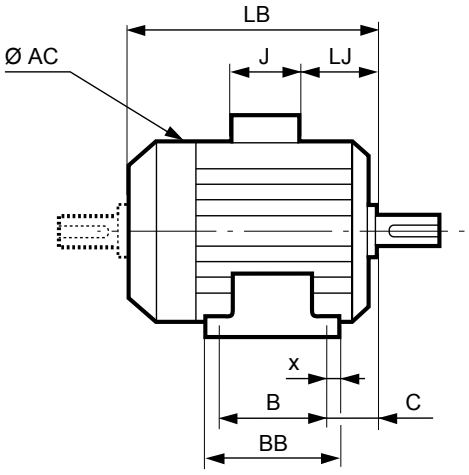
	Type	Main shaft end																	
		4 and 6 poles									2 poles								
		F	GD	D	G	E	O	p	L	LO	F	GD	D	G	E	O	p	L	LO
FLSPX FLSES	80 L/LG	6	6	19j6	15.5	40	M6	16	30	6	6	6	19j6	15.5	40	M6	16	30	6
	90 L/LU/SL	8	7	24j6	20	50	M8	19	40	6	8	7	24j6	20	50	M8	19	40	6
	100 L/LG/LR	8	7	28j6	24	60	M10	22	50	6	8	7	28j6	24	60	M10	22	50	6
	112 MG/MU	8	7	28j6	24	60	M10	22	50	6	8	7	28j6	24	60	M10	22	50	6
	132 M/MR/MU/SM	10	8	38k6	33	80	M12	28	63	10	10	8	38k6	33	80	M12	28	63	10
	160 L/LUR/M/MU	12	8	42k6	37	110	M16	36	90	20	12	8	42k6	37	110	M16	36	90	20
	180 L/LUR/M/MT/MUR	14	9	48k6	42.5	110	M16	36	90	20	14	9	48k6	42.5	110	M16	36	90	20
	200 LU	16	10	55m6	49	110	M20	42	90	20	16	10	55m6	49	110	M20	42	90	20
	225 M/S/SR	18	11	60m6	53	140	M20	42	125	15	-	-	-	-	-	-	-	-	-
	225 MR	-	-	-	-	-	-	-	-	-	16	10	55m6	49	110	M20	42	90	20
	250 M	18	11	65m6	58	140	M20	42	125	15	18	11	60m6	53	140	M20	42	125	15
	250 MR	18	11	65m6	58	140	M20	42	125	15	-	-	-	-	-	-	-	-	-
	280 M/S	20	12	75m6	67.5	140	M20	42	125	15	18	11	65m6	58	140	M20	42	125	15
	315 LA/LB	25	14	90m6	81	170	M24	50	140	30	20	12	70m6	62.5	140	M20	42	125	15
	315 M/S	22	14	80m6	71	170	M20	42	140	30	18	11	65m6	58	140	M20	42	125	15
	355 LA/LAL/LB/LC/LD	28	16	100m6	90	210	M24	50	180	30	22	14	80m6	71	170	M20	42	140	30

	Type	Secondary shaft ends																	
		4 and 6 poles									2 poles								
		F	GD	D	G	E	O	p	L'	LO'	F	GD	D	G	E	O	p	L'	LO'
FLSPX FLSES	80 L	5	5	14j6	11	30	M5	15	25	3.5	5	5	14j6	11	30	M5	15	25	3.5
	80 LG	6	6	19j6	15.5	40	M6	16	30	6	6	6	19j6	15.5	40	M6	16	30	6
	90 L/LU/SL	6	6	19j6	15.5	40	M6	16	30	6	6	6	19j6	15.5	40	M6	16	30	6
	100 L/LG/LR	8	7	24j6	20	50	M8	19	40	6	8	7	24j6	20	50	M8	19	40	6
	112 MG/MU	8	7	24j6	20	50	M8	19	40	6	8	7	24j6	20	50	M8	19	40	6
	132 M/MR/MU/SM	8	7	28k6	24	60	M10	22	50	6	8	7	28k6	24	60	M10	22	50	6
	160 L/LUR/M/MU	12	8	42k6	37	110	M16	36	90	20	12	8	42k6	37	110	M16	36	90	20
	180 L/LUR/M/MT/MUR	14	9	48k6	42.5	110	M16	36	90	20	14	9	48k6	42.5	110	M16	36	90	20
	200 LU	16	10	55m6	49	110	M20	42	90	20	16	10	55m6	49	110	M20	42	90	20
	225 M/S/SR	18	11	60m6	53	140	M20	42	125	15	-	-	-	-	-	-	-	-	-
	225 MR	-	-	-	-	-	-	-	-	-	16	10	55m6	49	110	M20	42	90	20
	250 M	18	11	60m6	53	140	M20	42	125	15	18	11	60m6	53	140	M20	42	125	15
	250 MR	18	11	60m6	53	140	M20	42	125	15	-	-	-	-	-	-	-	-	-
	280 M/S	18	11	60m6	53	140	M20	42	125	15	18	11	60m6	53	140	M20	42	125	15
	315 LA/LB	20	12	70m6	63.5	140	M20	42	125	15	20	12	70m6	63.5	140	M20	42	125	15
	315 M/S	20	12	70m6	63.5	140	M20	42	125	15	18	11	65m6	58	140	M20	42	125	15
	355 LA/LAL/LB/LC/LD	28	16	100m6	90	210	M24	50	180	30	22	14	80m6	71	170	M20	42	140	30

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
Mechanical characteristics - Foot mounted IM 1001 (IMB3)

Dimensions in millimetres



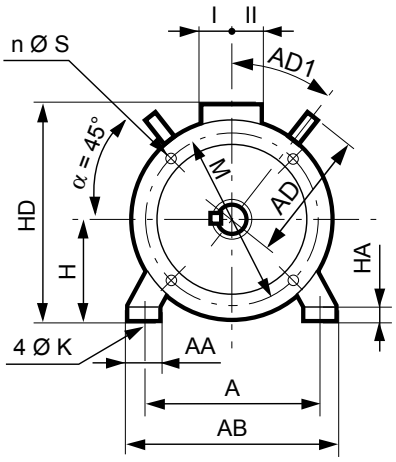


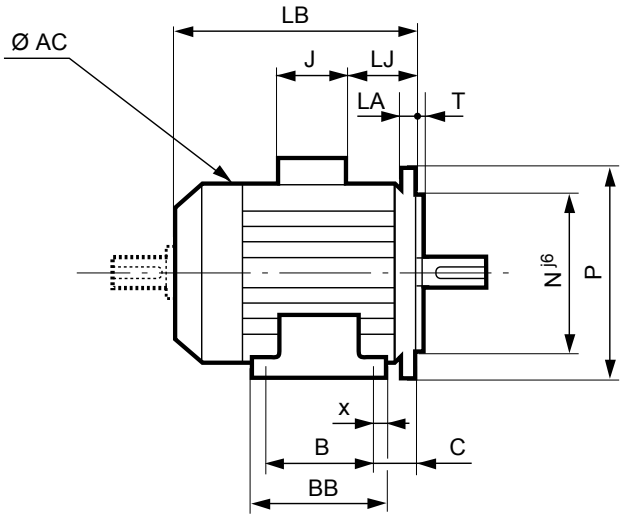
	Type	Main dimensions																		
		A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1
FLSPX FLSES	80 L	125	157	100	130	50	18	34	10	10	80	170	228	212	7	136	68	68	-	-
	80 LG	125	170	100	138	50	22	39	10	10	80	203	238	245	8	136	68	68	135	41
	90 L	140	170	125	162	56	28	33	10	10	90	203	248	239	8	136	68	68	135	41
	90 LU	140	170	125	162	56	28	33	10	10	90	203	248	266	8	136	68	68	135	41
	90 SL	140	170	125	162	56	28	33	10	10	90	203	248	239	8	136	68	68	135	41
	100 L	160	196	140	185	63	29	40	12	13	100	204	258	300	8	136	68	68	135	41
	100 LG	160	196	140	168	53	13	40	12	14	100	227	266	299	0.5	136	68	68	130	45
	100 LR	160	196	140	185	63	29	40	12	13	100	204	258	300	8	136	68	68	135	41
	112 MG	190	230	140	186	60	32	48	12	12	112	230	294	299	8	136	68	68	148	41
	112 MU	190	230	140	186	60	32	48	12	12	112	230	294	299	8	136	68	68	148	41
	132 M	216	255	178	240	89	50	63	12	16	132	270	335	385	22	136	68	68	165	37.5
	132 MR	216	255	178	240	89	50	63	12	16	132	270	335	447	22	136	68	68	165	37.5
	132 MU	216	255	178	240	89	50	63	12	16	132	270	335	447	22	136	68	68	165	37.5
	132 SM	216	255	140	240	89	50	63	12	16	132	270	335	385	22	136	68	68	165	37.5
	160 L	254	294	254	294	108	20	65	14.5	20	160	315	449	495	23	259	115	151	179	45
	160 LUR	254	294	254	294	108	20	65	14.5	20	160	315	449	510	23	259	115	151	179	45
	160 M	254	294	210	294	108	20	65	14.5	20	160	315	449	495	23	259	115	151	179	45
	160 MU	254	294	210	294	108	20	65	14.5	20	160	315	449	510	23	259	115	151	179	45
	180 L	279	330	279	337	121	32	70	14.5	28	180	361	490	552	35.5	259	115	151	190	45
	180 LUR	279	330	279	337	115	32	70	14.5	28	180	361	490	593	35.5	259	115	151	190	45
	180 M	279	330	241	337	121	32	70	14.5	28	180	361	490	552	35.5	259	115	151	190	45
	180 MT	279	330	241	337	121	32	70	14.5	28	180	361	490	537	29.5	259	115	151	190	45
	180 MUR	279	324	241	290	121	24	80	14.5	25	180	328	469	551	29.5	259	115	151	177	45
	200 LU	318	374	305	360	135	28	60	18.5	17	200	399	541	669	42.5	259	115	151	243	45
	225 M	356	426	311	375	149	32	80	18.5	27	225	495	648	779	69.5	352	175	212	270	45
	225 MR	356	426	311	380	144.5	34	70	18.5	17	225	398	566	682	49	259	115	151	243	45
	225 S	356	426	286	375	149	32	80	18.5	27	225	487	661	779	91.5	308	161	208	276	45
	225 SR	356	426	286	380	144.5	34	70	18.5	17	225	398	566	674	44.5	259	115	151	243	45
	250 M	406	476	349	413	168	32	80	24	26	250	495	682	779	91.5	308	161	208	270	45
	250 MR	406	476	349	413	168	32	80	24	27	250	495	673	859	69.5	352	175	212	270	45
	280 M	457	527	419	486	92	33	80	24	30	280	481	717	959	69	352	175	212	303	45
	280 S	457	527	368	486	92	33	80	24	30	280	481	717	959	69	352	175	212	303	45
	315 LA	508	600	508	610	109	58	100	28	35	315	600	857	1177	119	416	217	264	343	45
	315 LB	508	600	508	610	109	58	100	28	35	315	600	847	1177	101	452	219	269	343	45
	315 M	508	600	457	610	109	58	100	28	35	315	600	857	1177	119	416	217	264	343	45
	315 S	508	600	406	610	109	58	100	28	35	315	600	857	1177	119	416	217	264	343	45
	355 LA	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-
	355 LAL	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-
	355 LB	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-
	355 LC	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-
	355 LD	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-

** AC: housing diameter without lifting rings*

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron - Mechanical characteristics
Foot and flange mounted IM 2001 (IM B35)

Dimensions in millimetres



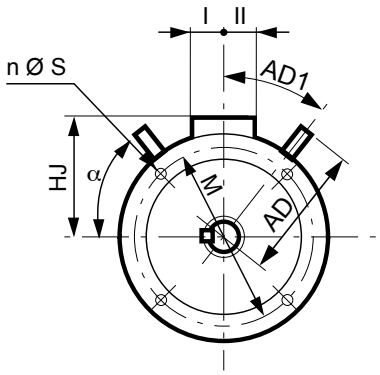


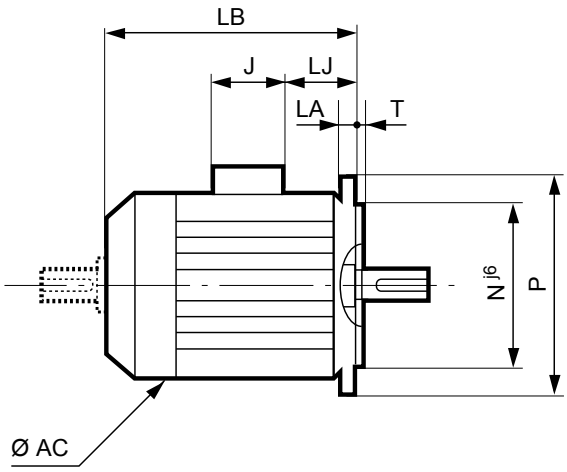
	Type	Main dimensions																			
		A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1	Symb
FLSPX FLSES	80 L	125	157	100	130	50	18	34	10	10	80	170	228	212	7	136	68	68	-	-	FF165
	80 LG	125	170	100	138	50	22	39	10	10	80	203	238	245	8	136	68	68	135	41	FF165
	90 L	140	170	125	162	56	28	33	10	10	90	203	248	239	8	136	68	68	135	41	FF165
	90 LU	140	170	125	162	56	28	33	10	10	90	203	248	266	8	136	68	68	135	41	FF165
	90 SL	140	170	125	162	56	28	33	10	10	90	203	248	239	8	136	68	68	135	41	FF165
	100 L	160	196	140	185	63	29	40	12	13	100	204	258	300	8	136	68	68	135	41	FF215
	100 LG	160	196	140	168	53	13	40	12	14	100	227	266	299	0.5	136	68	68	130	45	FF215
	100 LR	160	196	140	185	63	29	40	12	13	100	204	258	300	8	136	68	68	135	41	FF215
	112 MG	190	230	140	186	60	32	48	12	12	112	230	294	299	8	136	68	68	148	41	FF215
	112 MU	190	230	140	186	60	32	48	12	12	112	230	294	299	8	136	68	68	148	41	FF215
	132 M	216	255	178	240	89	50	63	12	16	132	270	335	385	22	136	68	68	165	37.5	FF265
	132 MR	216	255	178	240	89	50	63	12	16	132	270	335	447	22	136	68	68	165	37.5	FF265
	132 MU	216	255	178	240	89	50	63	12	16	132	270	335	447	22	136	68	68	165	37.5	FF265
	132 SM	216	255	140	240	89	50	63	12	16	132	270	335	385	22	136	68	68	165	37.5	FF265
	160 L	254	294	254	294	108	20	65	14.5	20	160	315	449	495	23	259	115	151	179	45	FF265
	160 LUR	254	294	254	294	108	20	65	14.5	20	160	315	449	510	23	259	115	151	179	45	FF300
	160 M	254	294	210	294	108	20	65	14.5	20	160	315	449	495	23	259	115	151	179	45	FF300
	160 MU	254	294	210	294	108	20	65	14.5	20	160	315	449	510	23	259	115	151	179	45	FF300
	180 L	279	330	279	337	121	32	70	14.5	28	180	361	490	552	35.5	259	115	151	190	45	FF300
	180 LUR	279	330	279	337	115	32	70	14.5	28	180	361	490	593	35.5	259	115	151	190	45	FF300
	180 M	279	330	241	337	121	32	70	14.5	28	180	361	490	552	35.5	259	115	151	190	45	FF300
	180 MT	279	330	241	337	121	32	70	14.5	28	180	361	490	537	29.5	259	115	151	190	45	FF300
	180 MUR	279	324	241	290	121	24	80	14.5	25	180	328	469	551	29.5	259	115	151	177	45	FF300
	200 LU	318	374	305	360	135	28	60	18.5	17	200	399	541	669	42.5	259	115	151	243	45	FF350
	225 M	356	426	311	375	149	32	80	18.5	27	225	495	648	779	69.5	352	175	212	270	45	FF400
	225 MR	356	426	311	380	144.5	34	70	18.5	17	225	398	566	682	49	259	115	151	243	45	FF400
	225 S	356	426	286	375	149	32	80	18.5	27	225	487	661	779	91.5	308	161	208	276	45	FF400
	225 SR	356	426	286	380	144.5	34	70	18.5	17	225	398	566	674	44.5	259	115	151	243	45	FF400
	250 M	406	476	349	413	168	32	80	24	26	250	495	682	779	91.5	308	161	208	270	45	FF500
	250 MR	406	476	349	413	168	32	80	24	27	250	495	673	859	69.5	352	175	212	270	45	FF500
	280 M	457	527	419	486	92	33	80	24	30	280	481	717	959	69	352	175	212	303	45	FF500
	280 S	457	527	368	486	92	33	80	24	30	280	481	717	959	69	352	175	212	303	45	FF500
	315 LA	508	600	508	610	109	58	100	28	35	315	600	857	1177	119	416	217	264	343	45	FF600
	315 LB	508	600	508	610	109	58	100	28	35	315	600	847	1177	101	452	219	269	343	45	FF600
	315 M	508	600	457	610	109	58	100	28	35	315	600	857	1177	119	416	217	264	343	45	FF600
	315 S	508	600	406	610	109	58	100	28	35	315	600	857	1177	119	416	217	264	343	45	FF600
	355 LA	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-	FF740
	355 LAL	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-	FF740
	355 LB	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-	FF740
	355 LC	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-	FF740
	355 LD	610	710	630	756	127	76	100	28	35	355	688	925	1303	121	452	219	269	-	-	FF740

** AC: housing diameter without lifting rings*

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron - Mechanical characteristics
Flange mounted IM 3001 (IM B5) - IM 3011 (IM V1)

Dimensions in millimetres



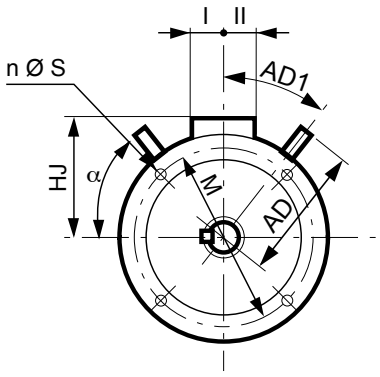


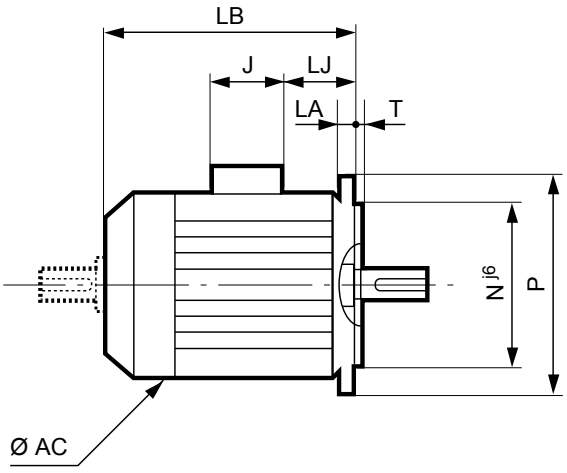
	Type	Main dimensions									IEC symbol	Flange dimensions							
		AC*	LB	HJ	LJ	J	I	II	AD	AD1		M	N	D	T	n	α°	S	LA
FLSPX FLSES	80 L	170	212	148	7	136	68	68	-	-	FF165	165	130	200	3.5	4	45	12	10
	80 LG	203	265	158	28	136	68	68	135	41	FF165	165	130	200	3.5	4	45	12	10
	90 L	203	259	158	28	136	68	68	135	41	FF165	165	130	200	3.5	4	45	12	10
	90 LU	203	286	158	28	136	68	68	135	41	FF165	165	130	200	3.5	4	45	12	10
	90 SL	203	259	158	28	136	68	68	135	41	FF165	165	130	200	3.5	4	45	12	10
	100 L	204	300	158	8	136	68	68	135	41	FF215	215	180	250	4	4	45	14.5	12
	100 LG	235	309	164	10.5	136	68	68	-	-	FF215	215	180	250	4	4	45	14.5	13
	100 LR	204	300	158	8	136	68	68	135	41	FF215	215	180	250	4	4	45	14.5	12
	112 MG	230	309	182	18	136	68	68	148	41	FF215	215	180	250	4	4	45	14.5	13
	112 MU	230	309	182	18	136	68	68	148	41	FF215	215	180	250	4	4	45	14.5	13
	132 M	270	385	203	22	136	68	68	165	37.5	FF265	265	230	300	4	4	45	14.5	14
	132 MR	270	447	203	22	136	68	68	165	37.5	FF265	265	230	300	4	4	45	14.5	14
	132 MU	270	447	203	22	136	68	68	165	37.5	FF265	265	230	300	4	4	45	14.5	14
	132 SM	270	385	203	22	136	68	68	165	37.5	FF265	265	230	300	4	4	45	14.5	14
	160 L	328	495	289	23.5	259	115	151	177	45	FF300	300	250	350	5	4	45	18.5	14
	160 LUR	328	510	289	23.5	259	115	151	177	45	FF300	300	250	350	5	4	45	18.5	14
	160 M	328	495	289	23.5	259	115	151	177	45	FF300	300	250	350	5	4	45	18.5	14
	160 MU	328	510	289	23.5	259	115	151	177	45	FF300	300	250	350	5	4	45	18.5	14
	180 L	361	552	310	35.5	259	115	151	190	45	FF300	300	250	350	5	4	45	18.5	15
	180 LUR	361	593	310	35.5	259	115	151	190	45	FF300	300	250	350	5	4	45	18.5	15
	180 M	361	552	310	35.5	259	115	151	190	45	FF300	300	250	350	5	4	45	18.5	15
	180 MT	361	537	310	29.5	259	115	151	190	45	FF300	300	250	350	5	4	45	18.5	14
	180 MUR	328	551	289	29.5	259	115	151	177	45	FF300	300	250	350	5	4	45	18.5	15
	200 LU	398	671	341	44	259	115	151	243	45	FF350	350	300	400	5	4	45	18.5	15
	225 M	487	779	427	69	352	175	212	276	45	FF400	400	350	450	5	8	22.5	18.5	16
	225 MR	398	675.5	341	48.5	259	115	151	243	45	FF400	400	350	450	5	8	22.5	18.5	16
	225 S	495	779	432	91.5	308	161	208	270	45	FF400	400	350	450	5	8	22.5	18.5	16
	225 SR	398	678.5	341	48.5	259	115	151	243	45	FF400	400	350	450	5	8	22.5	18.5	16
	250 M	495	779	432	91.5	308	161	208	270	45	FF500	500	450	550	5	8	22.5	18.5	18
	250 MR	495	859	427	70.5	352	175	212	270	45	FF500	500	450	550	5	8	22.5	18.5	18
	280 M	481	959	437	69	352	175	212	303	45	FF500	500	450	550	5	8	22.5	18.5	18
	280 S	481	959	437	69	352	175	212	303	45	FF500	500	450	550	5	8	22.5	18.5	18
	315 LA	600	1177	542	119	416	217	264	343	45	FF600	600	550	660	6	8	22.5	24	22
	315 LB	600	1177	532	101	452	219	269	343	45	FF600	600	550	660	6	8	22.5	24	22
	315 M	600	1177	542	119	416	217	264	343	45	FF600	600	550	660	6	8	22.5	24	22
	315 S	600	1177	542	119	416	217	264	343	45	FF600	600	550	660	6	8	22.5	24	22
	355 LA	688	1303	570	121	452	219	269	-	-	FF740	740	680	800	6	8	22.5	24	25
	355 LAL	688	1303	570	121	452	219	269	-	-	FF740	740	680	800	6	8	22.5	24	25
	355 LB	688	1303	570	121	452	219	269	-	-	FF740	740	680	800	6	8	22.5	24	25
	355 LC	688	1303	570	121	452	219	269	-	-	FF740	740	680	800	6	8	22.5	24	25
	355 LD	688	1303	570	121	452	219	269	-	-	FF740	740	680	800	6	8	22.5	24	25

** AC: housing diameter without lifting rings*

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron - Mechanical characteristics
Flange mounted IM 3001 (IM B5) - IM 3011 (IM V1)

Dimensions in millimetres





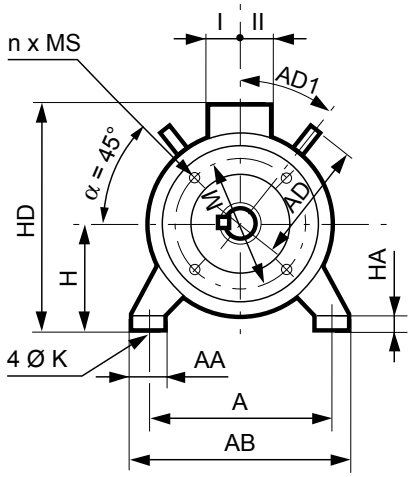
	Type	Main dimensions								
		AC*	LB	HJ	LJ	J	I	II	AD	AD1
FLSPX FLSES	80 L	170	212	148	7	136	68	68	-	-
	80 LG	203	265	158	28	136	68	68	135	41
	90 L	203	259	158	28	136	68	68	135	41
	90 LU	203	286	158	28	136	68	68	135	41
	90 SL	203	259	158	28	136	68	68	135	41
	100 L	204	300	158	8	136	68	68	135	41
	100 LG	235	309	164	10.5	136	68	68	-	-
	100 LR	204	300	158	8	136	68	68	135	41
	112 MG	230	309	182	18	136	68	68	148	41
	112 MU	230	309	182	18	136	68	68	148	41
	132 M	270	385	203	22	136	68	68	165	37.5
	132 MR	270	447	203	22	136	68	68	165	37.5
	132 MU	270	447	203	22	136	68	68	165	37.5
	132 SM	270	385	203	22	136	68	68	165	37.5
	160 L	328	495	289	23.5	259	115	151	177	45
	160 LUR	328	510	289	23.5	259	115	151	177	45
	160 M	328	495	289	23.5	259	115	151	177	45
	160 MU	328	510	289	23.5	259	115	151	177	45
	180 L	361	552	310	35.5	259	115	151	190	45
	180 LUR	361	593	310	35.5	259	115	151	190	45
	180 M	361	552	310	35.5	259	115	151	190	45
	180 MT	361	537	310	29.5	259	115	151	190	45
	180 MUR	328	551	289	29.5	259	115	151	177	45
	200 LU	398	671	341	44	259	115	151	243	45
	225 M	487	779	427	69	352	175	212	276	45
	225 MR	398	675.5	341	48.5	259	115	151	243	45
	225 S	495	779	432	91.5	308	161	208	270	45
	225 SR	398	678.5	341	48.5	259	115	151	243	45
	250 M	495	779	432	91.5	308	161	208	270	45
	250 MR	495	859	427	70.5	352	175	212	270	45
	280 M	481	959	437	69	352	175	212	303	45
	280 S	481	959	437	69	352	175	212	303	45
	315 LA	600	1177	542	119	416	217	264	343	45
	315 LB	600	1177	532	101	452	219	269	343	45
	315 M	600	1177	542	119	416	217	264	343	45
	315 S	600	1177	542	119	416	217	264	343	45
	355 LA	688	1303	570	121	452	219	269	-	-
	355 LAL	688	1303	570	121	452	219	269	-	-
	355 LB	688	1303	570	121	452	219	269	-	-
	355 LC	688	1303	570	121	452	219	269	-	-
	355 LD	688	1303	570	121	452	219	269	-	-

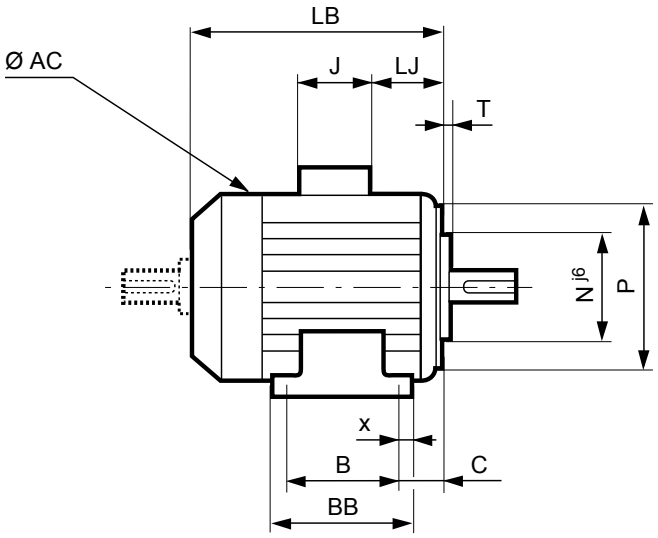
IEC symbol	Flange dimensions							
	M	N	D	T	n	α°	S	LA
FF165	165	130	200	3.5	4	45	12	10
FF165	165	130	200	3.5	4	45	12	10
FF165	165	130	200	3.5	4	45	12	10
FF165	165	130	200	3.5	4	45	12	10
FF165	165	130	200	3.5	4	45	12	10
FF215	215	180	250	4	4	45	14.5	12
FF215	215	180	250	4	4	45	14.5	13
FF215	215	180	250	4	4	45	14.5	12
FF215	215	180	250	4	4	45	14.5	13
FF215	215	180	250	4	4	45	14.5	13
FF265	265	230	300	4	4	45	14.5	14
FF265	265	230	300	4	4	45	14.5	14
FF265	265	230	300	4	4	45	14.5	14
FF265	265	230	300	4	4	45	14.5	14
FF300	300	250	350	5	4	45	18.5	14
FF300	300	250	350	5	4	45	18.5	14
FF300	300	250	350	5	4	45	18.5	14
FF300	300	250	350	5	4	45	18.5	14
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	14
FF300	300	250	350	5	4	45	18.5	15
FF350	350	300	400	5	4	45	18.5	15
FF400	400	350	450	5	8	22.5	18.5	16
FF400	400	350	450	5	8	22.5	18.5	16
FF400	400	350	450	5	8	22.5	18.5	16
FF400	400	350	450	5	8	22.5	18.5	16
FF500	500	450	550	5	8	22.5	18.5	18
FF500	500	450	550	5	8	22.5	18.5	18
FF500	500	450	550	5	8	22.5	18.5	18
FF500	500	450	550	5	8	22.5	18.5	18
FF600	600	550	660	6	8	22.5	24	22
FF600	600	550	660	6	8	22.5	24	22
FF600	600	550	660	6	8	22.5	24	22
FF600	600	550	660	6	8	22.5	24	22
FF740	740	680	800	6	8	22.5	24	25
FF740	740	680	800	6	8	22.5	24	25
FF740	740	680	800	6	8	22.5	24	25
FF740	740	680	800	6	8	22.5	24	25
FF740	740	680	800	6	8	22.5	24	25

** AC: housing diameter without lifting rings*

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron - Mechanical characteristics
Foot and face mounted IM 2101 (IM B34)

Dimensions in millimetres



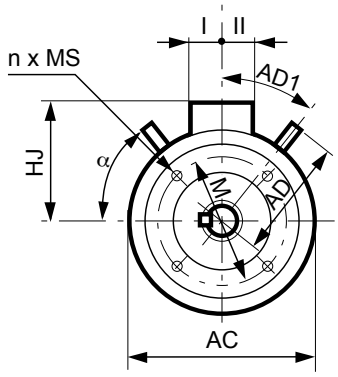


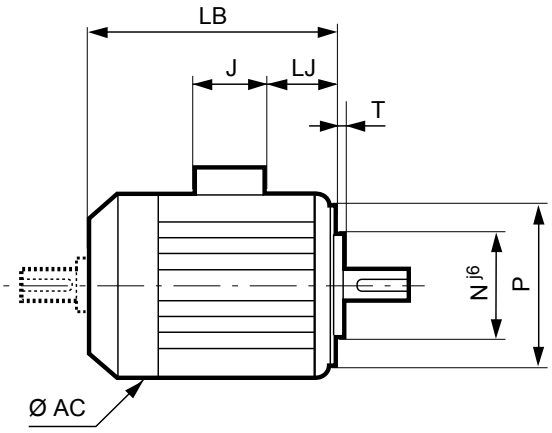
	Type	Main dimensions																			
		A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1	Symb
FLSPX FLSES	80 L	125	157	100	130	50	18	34	10	10	80	170	228	212	7	136	68	68	-	-	FT100
	80 LG	125	170	100	138	50	22	39	10	10	80	203	238	245	8	136	68	68	135	41	FT100
	90 L	140	170	125	162	56	28	33	10	10	90	203	248	239	8	136	68	68	135	41	FT115
	90 LU	140	170	125	162	56	28	33	10	10	90	203	248	266	8	136	68	68	135	41	FT115
	90 SL	140	170	125	162	56	28	33	10	10	90	203	248	239	8	136	68	68	135	41	FT115
	100 L	160	196	140	185	63	29	40	12	13	100	204	258	300	8	136	68	68	135	41	FT130
	100 LG	160	196	140	168	53	13	40	12	14	100	227	266	299	0.5	136	68	68	130	45	FT130
	100 LR	160	196	140	185	63	29	40	12	13	100	204	258	300	8	136	68	68	135	41	FT130
	112 MG	190	230	140	186	60	32	48	12	12	112	230	294	299	8	136	68	68	148	41	FT130
	112 MU	190	230	140	186	60	32	48	12	12	112	230	294	299	8	136	68	68	148	41	FT130
	132 M	216	255	178	240	89	50	63	12	16	132	270	335	385	22	136	68	68	165	37.5	FT165
	132 MR	216	255	178	240	89	50	63	12	16	132	270	335	447	22	136	68	68	165	37.5	FT165
	132 MU	216	255	178	240	89	50	63	12	16	132	270	335	447	22	136	68	68	165	37.5	FT165
	132 SM	216	255	140	240	89	50	63	12	16	132	270	335	385	22	136	68	68	165	37.5	FT165

** AC: housing diameter without lifting rings*

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron - Mechanical characteristics
Face mounted IM 3601 (IM B14)

Dimensions in millimetres





	Type	Main dimensions								
		AC*	LB	HJ	LJ	J	I	II	AD	AD1
FLSPX FLSES	80 L	170	212	148	7	136	68	68	-	-
	80 LG	203	245	158	8	136	68	68	135	41
	90 L	203	239	158	8	136	68	68	135	41
	90 LU	203	266	158	8	136	68	68	135	41
	90 SL	203	239	158	8	136	68	68	135	41
	100 L	204	300	158	8	136	68	68	135	41
	100 LG	235	309	164	10.5	136	68	68	-	-
	100 LR	204	300	158	8	136	68	68	135	41
	112 MG	230	309	182	18	136	68	68	148	41
	112 MU	230	309	182	18	136	68	68	148	41
	132 M	270	385	203	22	136	68	68	165	37.5
	132 MR	270	447	203	22	136	68	68	165	37.5
	132 MU	270	447	203	22	136	68	68	165	37.5
	132 SM	270	385	203	22	136	68	68	165	37.5

IEC symbol	Flange dimensions						
	M	N	D	T	n	α°	S
FT100	100	80	120	3	4	45	M6
FT100	100	80	120	3	4	45	M6
FT115	115	95	140	3	4	45	M8
FT115	115	95	140	3	4	45	M8
FT115	115	95	140	3	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT165	165	130	200	3.5	4	45	M10
FT165	165	130	200	3.5	4	45	M10
FT165	165	130	200	3.5	4	45	M10
FT165	165	130	200	3.5	4	45	M10

** AC: housing diameter without lifting rings*

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Mechanical characteristics
Bearings and lubrication

PERMANENTLY GREASED BEARINGS

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

Series	Type	Polarity	Bearing types Permanently greased		Bearing service life as a function of rotation speed								
					3000 min^{-1}			1500 min^{-1}			1000 min^{-1}		
			N.D.E.	D.E.	25°C	40°C	55°C	25°C	40°C	55°C	25°C	40°C	55°C
FLSPX FLSES	80 L	2	6203 C3	6204 C3	≥ 40000	≥ 40000	25000	-	-	-	-	-	-
	80 LG	4	6204 C3	6205 C3	-	-	-	≥ 40000	≥ 40000	31000	-	-	-
	90 SL/L	2; 4; 6			≥ 40000	≥ 40000	24000				≥ 40000	≥ 40000	34000
	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 LG	4; 6			-	-	-				≥ 40000	≥ 40000	33000
	112 MG	2; 6			≥ 40000	≥ 40000	22000	-	-	-			
	112 MU	4	6206 C3	6206 C3	-	-	-	≥ 40000	≥ 40000	30000	-	-	-
	132 SM/M	2; 4; 6	6207 C3	6308 C3	≥ 40000	≥ 40000	19000	≥ 40000	≥ 40000	25000	≥ 40000	≥ 40000	30000
	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	37800	18900	≥ 40000	≥ 40000	36900	≥ 40000	≥ 40000	20050
	160 MU	6			-	-	-	-	-	-			
	160 LUR	2; 4; 6	6210 C3	6310 C3	≥ 40000	24500	12250	≥ 40000	36400	18200	≥ 40000	≥ 40000	22450
	180 M	2	6212 C3	6310 C3	34000	17000	8500	-	-	-	-	-	-
	180 MT	4	6210 C3	6310 C3	-	-	-	≥ 40000	35500	17750	-	-	-
	180 MUR	2	6312 C3	6310 C3	≥ 40000	22800	11400	-	-	-	-	-	-
	180 L	4; 6	6212 C3	6310 C3	-	-	-	≥ 40000	39500	19750	≥ 40000	≥ 40000	29050
	180 LUR	4; 6	6312 C3	6310 C3	-	-	-	≥ 40000	≥ 40000	22900	≥ 40000	≥ 40000	29900
	200 LU	2; 4; 6	6312 C3	6312 C3	28600	14300	7150	≥ 40000	25400	12700	≥ 40000	33200	16600
	225 S	4	6314 C3	6314 C3	-	-	-	≥ 40000	23700	11850	-	-	-
	225 SR	4	6312 C3	6313 C3	-	-	-	≥ 40000	≥ 40000	21500	-	-	-
	225 M	4; 6	6314 C3	6314 C3	-	-	-	≥ 40000	23700	11850	≥ 40000	25600	12800
	225 MR	2	6312 C3	6313 C3	≥ 40000	22800	11400	-	-	-	-	-	-

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron - Mechanical characteristics
Bearings and lubrication

BEARINGS WITH GREASE NIPPLES

For open bearing assemblies of frame size ≥ 160 mm fitted with grease nipples, the table below indicates, depending on the type of motor, the lubrication intervals to be respected at 25°C, 40°C and 55°C for a machine installed with a horizontal shaft.

The table below is valid for FLSPX and FLSES motors lubricated with Polyrex EM103 grease used as standard.

Series	Type	Polarity	Bearing type for bearing housings with grease nipples		Quantity of grease	Lubrication intervals in hours								
						3000 min^{-1}			1500 min^{-1}			1000 min^{-1}		
			N.D.E.	D.E.	g	25°C	40°C	55°C	25°C	40°C	55°C	25°C	40°C	55°C
FLSPX FLSES	160 M*	2; 4; 6	6210 C3	6309 C3	13	22200	11100	5550	32400	16200	8100	39800	19900	9950
	160 MU	6				-	-	-	-	-	-	23400	11700	5850
	160 LUR*	2; 4; 6	6210 C3	6310 C3	15	19600	9800	4900	30400	15200	7600	38200	19100	6600
	180 M*	2	6212 C3	6310 C3	15	18000	9000	4500	-	-	-	-	-	-
	180 MT*	4	6210 C3	6310 C3	15	-	-	-	30400	15200	7600	-	-	-
	180 MUR*	2	6312 C3	6310 C3	15	10600	5300	2650	-	-	-	-	-	-
	180 L*	4; 6	6212 C3	6310 C3	20	-	-	-	29200	14600	7300	37200	18600	9300
	180 LUR*	4; 6	6312 C3	6310 C3	20	-	-	-	26800	13400	6700	35000	17500	8750
	200 LU*	2; 4; 6	6312 C3	6312 C3	20	15200	7600	3800	26800	13400	6700	35000	17500	8750
	225 S*	4	6314 C3	6314 C3	25	-	-	-	23600	11800	5900	-	-	-
	225 SR*	4	6312 C3	6313 C3	25	-	-	-	25200	12600	6300	-	-	-
	225 M*	4; 6	6314 C3	6314 C3	25	-	-	-	23600	11800	5900	32200	16100	8050
	225 MR*	2	6312 C3	6313 C3	25	13400	6700	3350	-	-	-	-	-	-
	250 M	2; 6	6314 C3	6314 C3	25	10400	5200	2600	-	-	-	32200	16100	8050
	250 MR	4				-	-	-	17800	8900	4450	-	-	-
	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 LA/LB/LC/LD	2	6316 C3	6218 C3	35	7400	3700	1850	-	-	-	-	-	-
	355 LA/LB/LC/LD	4; 6	6316 C3	6322 C3	60	-	-	-	13200	8316	4160	22000	13860	6930

** bearing housings with grease nipples on request*

CONSTRUCTION AND SPECIAL ATMOSPHERES

For a machine installed with a vertical shaft, the lubrication intervals are approximately 80% of the values shown in the tables above.

NB: The quality and quantity of grease along with the lubrication interval are indicated on the machine nameplate.

In the case of special fitting arrangements (motors with roller bearing at the front or other mountings), machines with frame size ≥ 160 mm are fitted with grease nipple bearings.
The instructions required for bearing housing maintenance are shown on the machine nameplate.

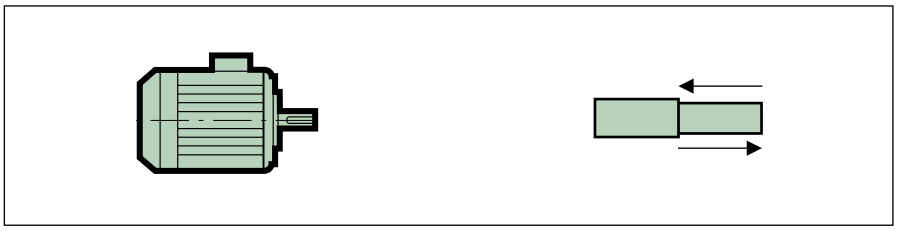
BEARING MOUNTING PRINCIPLE

FLSPX & FLSES series		Horizontal shaft	Vertical shaft	
			Shaft end down	Shaft end up
Foot mounted motors	Mounting arrangements	B3	V5	V6
	standard fitting	The Front bearing is: - at Front stop for frame size ≤ 132 - locked for frame size ≥ 160	The Front bearing is locked	The Front bearing is: - at Front stop for frame size ≤ 90 - locked for frame size ≥ 100
	on request	Front bearing locked for frame size < 132		Front bearing locked for frame size < 90
Flange mounted motors (or feet and flange)	Mounting arrangements	B5 / B35 / B14 / B34	V1 / V15 / V18 / V58	V3 / V36 / V19 / V69
	standard fitting	The Front bearing is locked from 80 to 355 LD	The Front bearing is locked from 80 to 355 LD	The Front bearing is locked from 80 to 355 LD

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
Mechanical characteristics - Axial loads

Horizontal motor

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



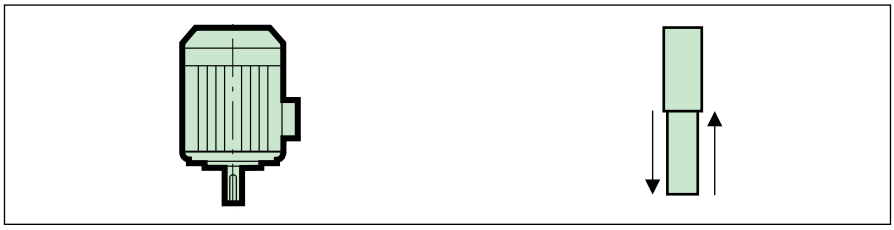
Series	Type	Polarity	Permissible axial load (daN) on the main drive shaft for standard fitting of bearings IM B3 / B6 IM B7 / B8 IM B5 / B35 IM B14 / B34											
			3000 min-1				1500 min-1				1000 min-1			
			→ 25,000 hours	→ 40,000 hours	← 25,000 hours	← 40,000 hours	→ 25,000 hours	→ 40,000 hours	← 25,000 hours	← 40,000 hours	→ 25,000 hours	→ 40,000 hours	← 25,000 hours	← 40,000 hours
FLSPX FLSES	80 L	2	30	21	(60)	(51)	-	-	-	-	-	-	-	-
	80 LG	2; 4	28	19	(68)	(59)	48	34	(88)	(74)	-	-	-	-
	90 SL/L	2; 4; 6	29	23	(69)	(56)	45	32	(85)	(72)	56	40	(96)	(80)
	90 LU	2; 4; 6	22	13	(72)	(63)	38	25	(88)	(75)	47	32	(97)	(82)
	100 L	2; 4	40	26	(90)	(76)	61	43	(111)	(93)	-	-	-	-
	100 LR	4	-	-	-	-	61	43	(111)	(93)	-	-	-	-
	100 LG	4; 6	-	-	-	-	55	38	(105)	(88)	75	53	(125)	(103)
	112 MG	2; 6	37	24	(87)	(74)	-	-	-	-	82	61	(132)	(111)
	112 MU	4; 6	-	-	-	-	54	36	(114)	(96)	66	45	(126)	(105)
	132 SM/M	2; 4; 6	101	74	(171)	(144)	146	109	(216)	(179)	182	138	(252)	(208)
	132 MU	6	-	-	-	-	-	-	-	-	169	126	(249)	(206)
	132 MR	4	-	-	-	-	129	93	(219)	(183)	-	-	-	-
	160 M	2; 4	129	94	229	194	187	140	287	240	234	177	334	277
	160 MU	6	-	-	-	-	-	-	-	-	219	164	319	264
	160 L	2; 4	118	83	218	183	195	148	295	248	-	-	-	-
	160 LUR	2; 4; 6	158	117	258	217	212	158	312	258	257	193	357	293
	180 M	2; 4	189	148	237	196	228	174	291	237	-	-	-	-
	180 MT	4	-	-	-	-	215	161	315	261	-	-	-	-
	180 MUR	2	178	137	241	200	-	-	-	-	-	-	-	-
	180 L	4; 6	-	-	-	-	240	186	288	234	272	208	320	256
	180 LUR	4; 6	-	-	-	-	224	170	287	233	224	162	287	225
	200 LU	2; 4; 6	249	196	312	259	316	245	379	308	327	245	390	308
	225 S	4	-	-	-	-	427	336	490	399	-	-	-	-
	225 SR	4	-	-	-	-	370	290	433	353	-	-	-	-
	225 M	4; 6	-	-	-	-	416	325	496	405	511	402	591	482
	225 MR	2	280	220	343	283	-	-	-	-	-	-	-	-
	250 M	2; 6	308	240	388	320	-	-	-	-	506	400	506	400
	250 MR	4	-	-	-	-	413	322	493	402	-	-	-	-
	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/LD	2	393	333	147	87	-	-	-	-	-	-	-	-
	355 LAL	4	-	-	-	-	876	724	630	478	-	-	-	-
	355 LA/LB/LC/LD	4; 6	-	-	-	-	876	724	630	478	947	764	701	518

( ): permissible axial loads with Front bearing locked

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
Mechanical characteristics - Axial loads

Vertical motor
Shaft end downwards

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



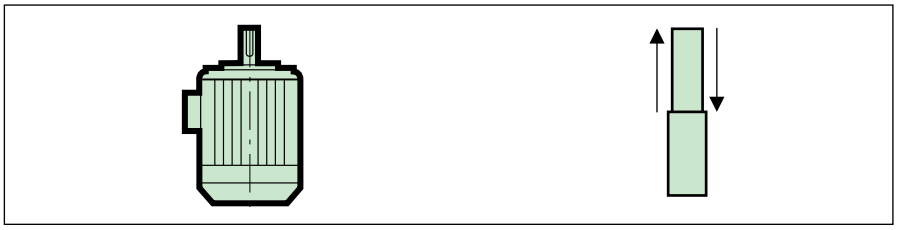
Series	Type	Polarity	Permissible axial load (daN) on the main drive shaft for standard fitting of bearings IM V5 IM V1 / V15 IM V18 / V58											
			3000 min-1 ↓		3000 min-1 ↑		1500 min-1 ↓		1500 min-1 ↑		1000 min-1 ↓		1000 min-1 ↑	
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours
FLSPX FLSES	80 L	2	29	20	(63)	(54)	-	-	-	-	-	-	-	-
	80 LG	2; 4	26	16	(72)	(62)	45	32	(93)	(78)	-	-	-	-
	90 SL/L	2; 4; 6	26	16	(73)	(63)	42	28	(91)	(78)	53	37	(101)	(86)
	90 LU	2; 4; 6	19	9	(77)	(67)	33	20	(95)	(82)	43	28	(105)	(89)
	100 L	2; 4	36	23	(96)	(83)	56	38	(119)	(101)	-	-	-	-
	100 LR	4	-	-	-	-	55	37	(120)	(102)	-	-	-	-
	100 LG	4; 6	-	-	-	-	48	31	(116)	(99)	68	46	(137)	(115)
	112 MG	2; 6	31	18	(98)	(85)	-	-	-	-	75	53	(145)	(123)
	112 MU	4; 6	-	-	-	-	45	28	(128)	(110)	57	36	(140)	(119)
	132 SM/M	2; 4; 6	90	62	(189)	(161)	135	98	(235)	(198)	171	127	(271)	(227)
	132 MU	6	-	-	-	-	-	-	-	-	154	110	(275)	(231)
	132 MR	4					113	77	(245)	(208)				
	160 M	2; 4; 6	107	72	264	229	164	117	325	277	209	152	374	317
	160 MU	6	-	-	-	-	-	-	-	-	189	133	375	319
	160 L	2; 4	94	59	256	221	174	126	331	284	-	-	-	-
	160 LUR	2; 4; 6	133	92	297	256	185	130	362	308	227	162	417	352
	180 M	2; 4	160	119	279	238	187	132	361	306	-	-	-	-
	180 MT	4	-	-	-	-	190	135	361	306	-	-	-	-
	180 MUR	2	144	102	294	252	-	-	-	-	-	-	-	-
	180 L	4; 6	-	-	-	-	206	151	346	291	233	169	391	326
	180 LUR	4; 6	-	-	-	-	187	132	355	300	183	120	377	314
	200 LU	2; 4; 6	207	153	375	320	262	190	471	398	269	186	505	422
	225 S	4	-	-	-	-	351	260	611	520	-	-	-	-
	225 SR	4	-	-	-	-	317	236	520	438	-	-	-	-
	225 M	4; 6	-	-	-	-	333	241	627	535	428	319	723	613
	225 MR	2	234	174	413	352	-	-	-	-	-	-	-	-
	250 M	2; 6	247	179	481	413	-	-	-	-	423	315	647	539
	250 MR	4	-	-	-	-	315	223	639	547	-	-	-	-
	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/LD	2	135	65	524	454	-	-	-	-	-	-	-	-
	355 LAL	4	-	-	-	-	516	350	1123	957	-	-	-	-
	355 LA/LB/LC/LD	4; 6	-	-	-	-	516	350	1123	957	566	364	1328	1126

( ): permissible axial loads with Front bearing locked

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
Mechanical characteristics - Axial loads

Vertical motor
Shaft end upwards

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



Series	Type	Polarity	Permissible axial load (daN) on the main drive shaft for standard fitting of bearings IM V6 IM V3 / V36 IM V19 / V69											
			3000 min-1 ↓		↑		1500 min-1 ↓		↑		1000 min-1 ↓		↑	
			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
FLSPX FLSES	80 L	2	(59)	(50)	33	24	-	-	-	-	-	-	-	-
	80 LG	2; 4	(66)	(56)	32	22	(85)	(71)	53	39	-	-	-	-
	90 SL/L	2; 4; 6	(66)	(56)	33	23	(82)	(68)	51	38	(93)	(77)	61	46
	90 LU	2; 4; 6	(69)	(59)	27	18	(81)	(76)	43	38	(93)	(82)	55	32
	100 L	2	(86)	(72)	46	33	(106)	(88)	69	51	-	-	-	-
	100 LR	4	-	-	-	-	(105)	(87)	70	52	-	-	-	-
	100 LG	4; 6	-	-	-	-	(98)	(81)	67	49	(118)	(96)	87	66
	112 MG	2; 6	(81)	(68)	48	35	-	-	-	-	(125)	(103)	95	73
	112 MU	4; 6	-	-	-	-	(105)	(88)	68	50	(117)	(96)	80	60
	132 SM/M	2; 4; 6	(159)	(132)	120	91	(205)	(168)	165	128	(249)	(205)	179	135
	132 MU	6	-	-	-	-	-	-	-	-	(234)	(190)	195	151
	132 MR	4	-	-	-	-	(203)	(167)	155	118	-	-	-	-
	160 M	2; 4; 6	207	172	164	129	264	217	225	177	309	252	274	217
	160 MU	6	-	-	-	-	-	-	-	-	289	233	275	219
	160 L	2; 4	194	159	156	121	274	226	231	184	-	-	-	-
	160 LUR	2; 4; 6	233	192	197	156	285	230	262	208	327	262	317	252
	180 M	2; 4	208	167	231	190	250	195	298	243	-	-	-	-
	180 MT	4	-	-	-	-	290	235	261	206	-	-	-	-
	180 MUR	2	207	165	231	189	-	-	-	-	-	-	-	-
	180 L	4; 6	-	-	-	-	254	199	298	243	281	217	343	278
	180 LUR	4; 6	-	-	-	-	250	195	292	237	246	183	314	251
	200 LU	2; 4; 6	270	216	312	257	325	253	408	335	332	249	442	359
	225 S	4	-	-	-	-	414	323	548	457	-	-	-	-
	225 SR	4	-	-	-	-	380	299	457	375	-	-	-	-
	225 M	4; 6	-	-	-	-	413	321	547	455	508	399	643	533
	225 MR	2	297	237	350	289	-	-	-	-	-	-	-	-
	250 M	2; 6	327	259	401	333	-	-	-	-	423	315	647	539
	250 MR	4	-	-	-	-	395	303	559	467	-	-	-	-
	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 LA/LB/LC/LD	2	135	65	524	454	-	-	-	-	-	-	-	-
	355 LA/LB/LC/LD	4; 6	-	-	-	-	516	350	1123	957	566	364	1328	1126

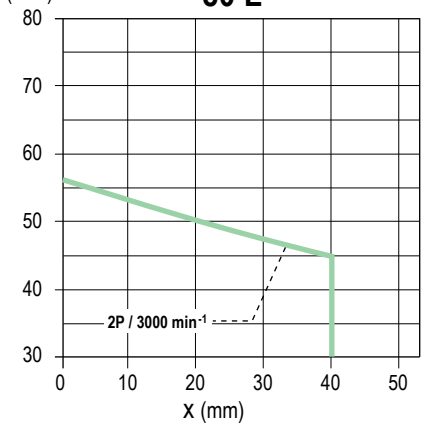
( ): permissible axial loads with Front bearing locked

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
Mechanical characteristics - Radial loads

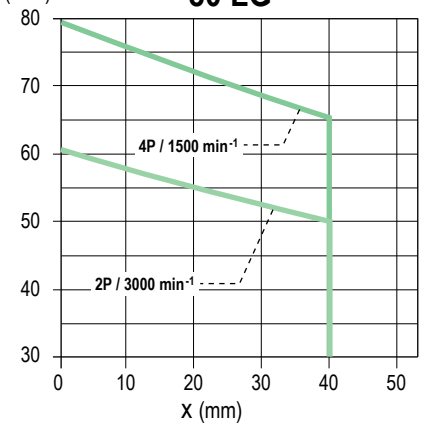
STANDARD FITTING ARRANGEMENT

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

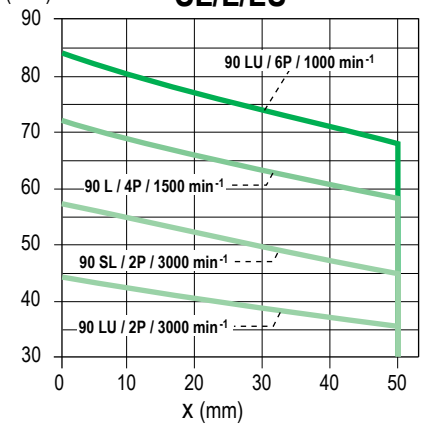
FLSPX / FLSES 80 L



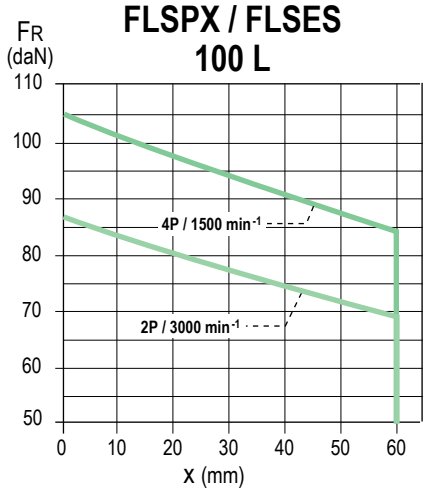
FLSPX / FLSES 80 LG



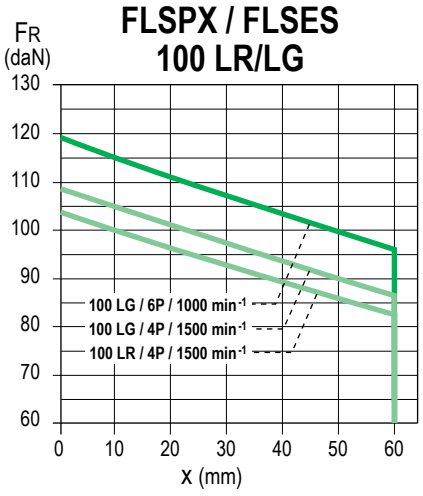
FLSPX / FLSES 90 SL/L/LU



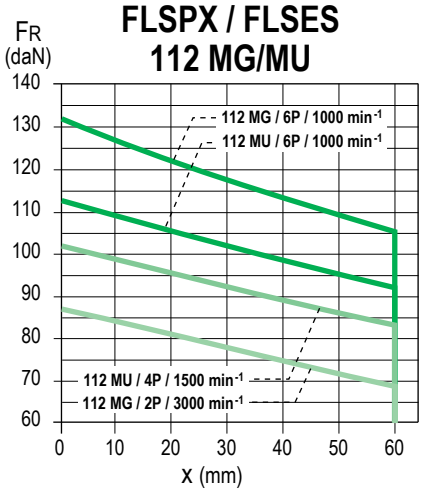
FLSPX / FLSES 100 L



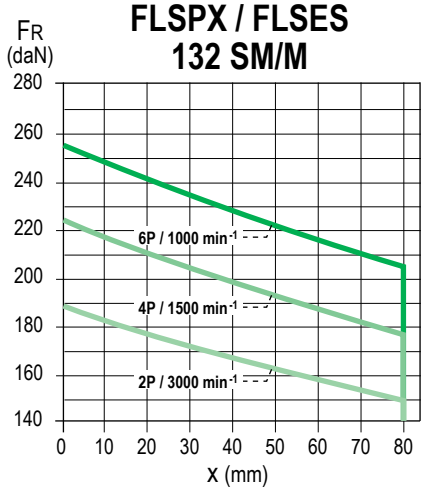
FLSPX / FLSES 100 LR/LG



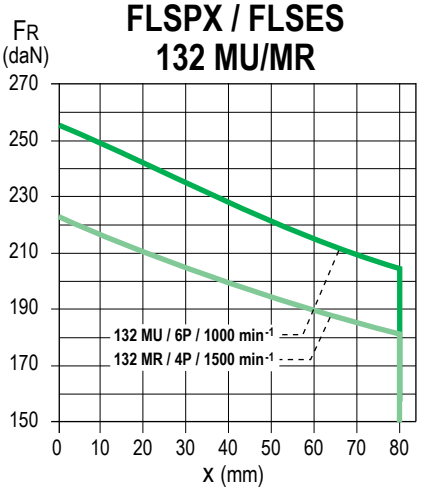
FLSPX / FLSES 112 MG/MU



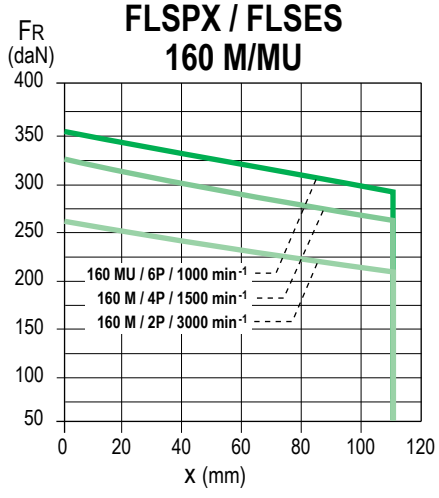
FLSPX / FLSES 132 SM/M



FLSPX / FLSES 132 MU/MR



FLSPX / FLSES 160 M/MU

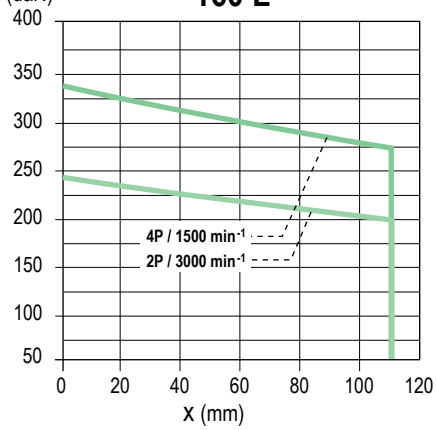


ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
Mechanical characteristics - Radial loads

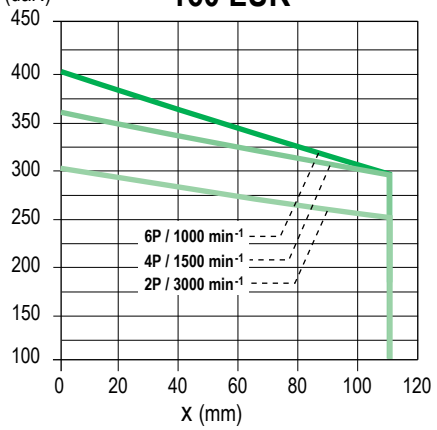
STANDARD FITTING ARRANGEMENT

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

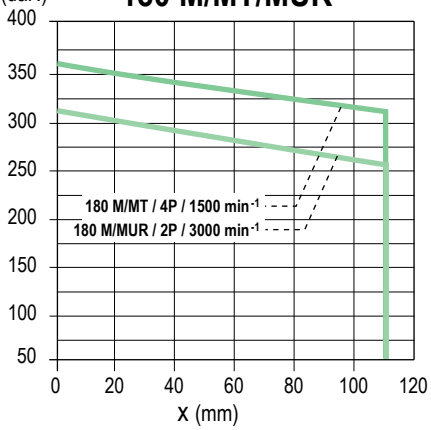
FLSPX / FLSES 160 L



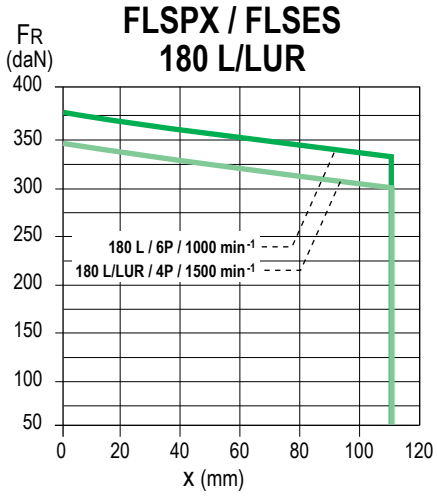
FLSPX / FLSES 160 LUR



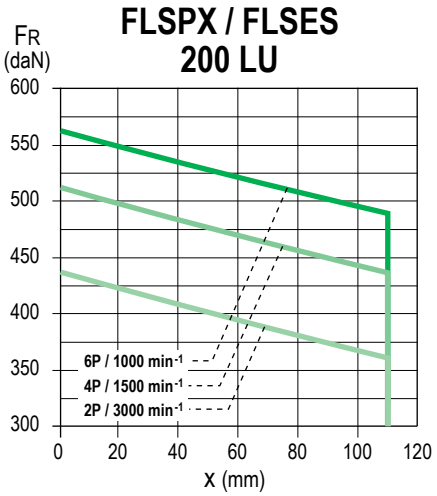
FLSPX / FLSES 180 M/MT/MUR



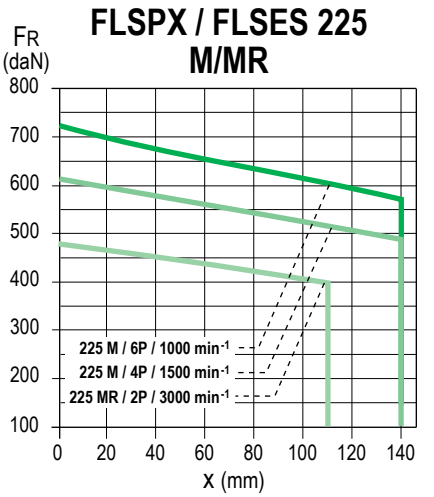
FLSPX / FLSES 180 L/LUR



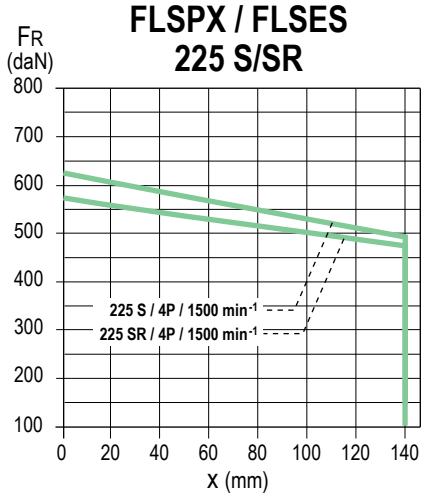
FLSPX / FLSES 200 LU



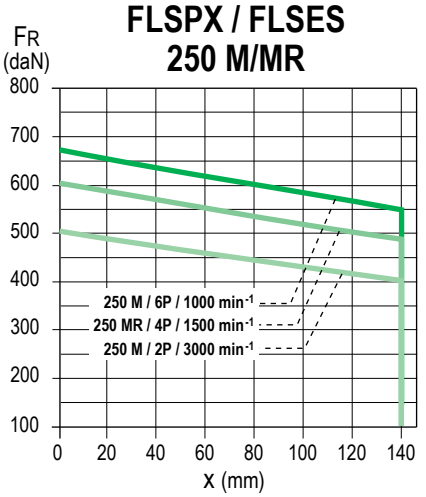
FLSPX / FLSES 225 M/MR



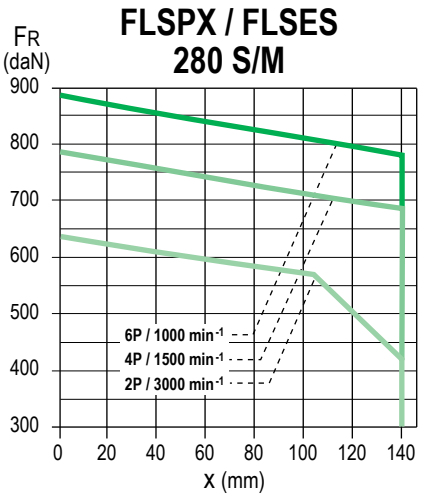
FLSPX / FLSES 225 S/SR



FLSPX / FLSES 250 M/MR



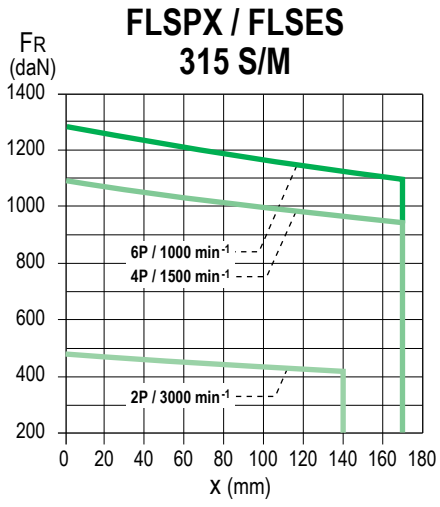
FLSPX / FLSES 280 S/M

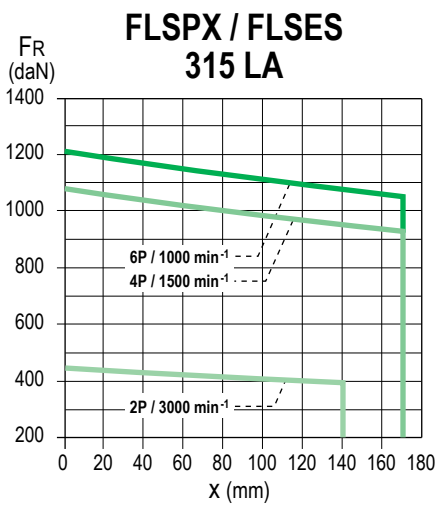


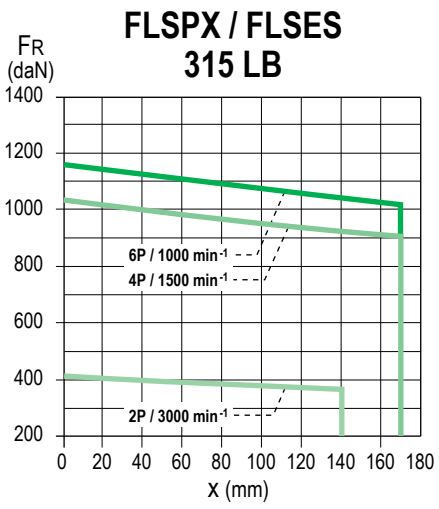
ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
Mechanical characteristics - Radial loads

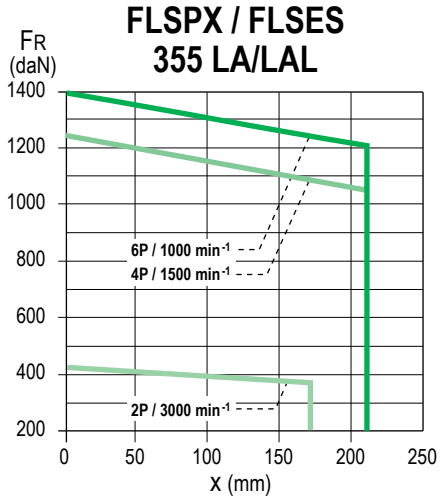
STANDARD FITTING ARRANGEMENT

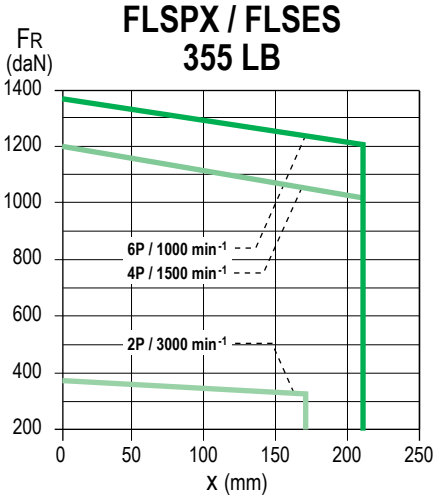
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder

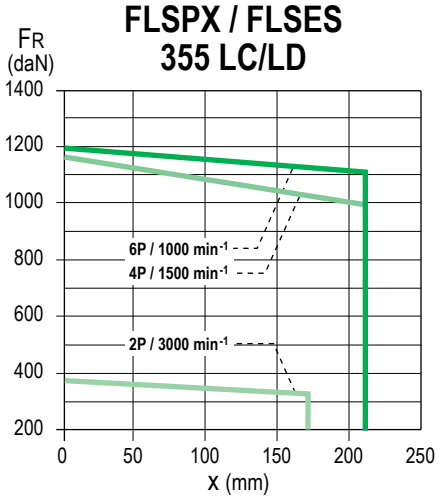












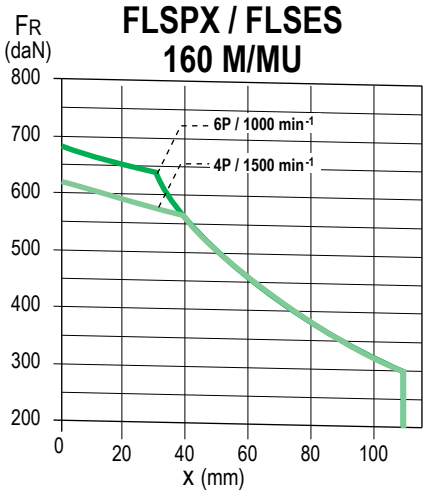
ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
Mechanical characteristics - Radial loads

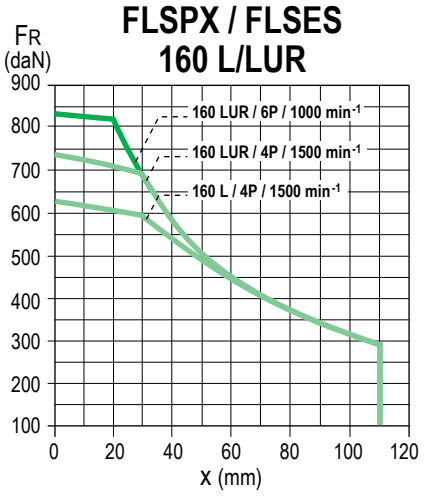
SPECIAL FITTING ARRANGEMENT

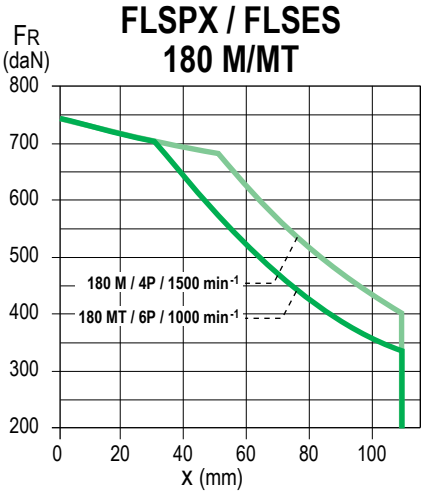
Type of drive end roller bearings

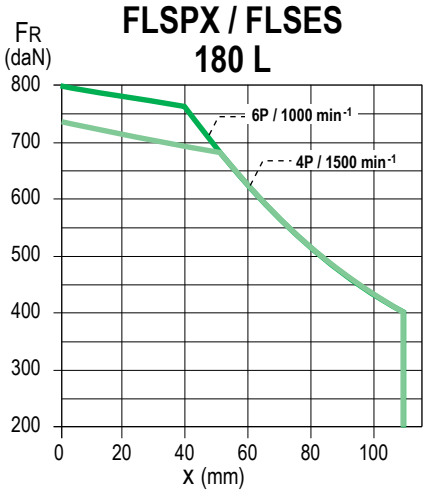
Series	Type	Polarity	Rear bearing (N.D.E.)	Front Bearing (D.E.)
FLSPX FLSES	160 M/MU	4; 6	6210 C3	NU 309
	160 L	4		
	160 LUR	6	6210 C3	NU 310
	180 MT	4		
	180 M	4	6212 C3	NU 310
	180 L	4; 6	6312 C3	NU 310
	180 LUR			
	200 LU	4; 6	6312 C3	NU 312
	225 S	4	6314 C3	NU 314
	225 SR	4	6312 C3	NU 313
	225 M	4; 6	6314 C3	NU 314
	225 MR	2	6312 C3	NU 313
	250 M	6	6314 C3	NU 314
	250 MR	4		
	280 S/M	4; 6	6314 C3	NU 316
	315 S/M/L	4; 6	6316 C3	NU 320
	355 L	4; 6	6316 C3	NU 322

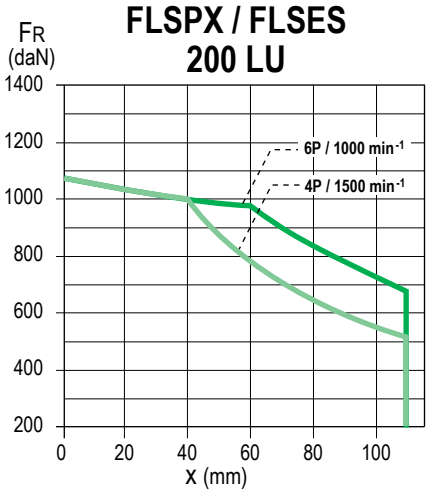
Permissible radial load on main shaft extension with a bearing life L_{10h} of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder

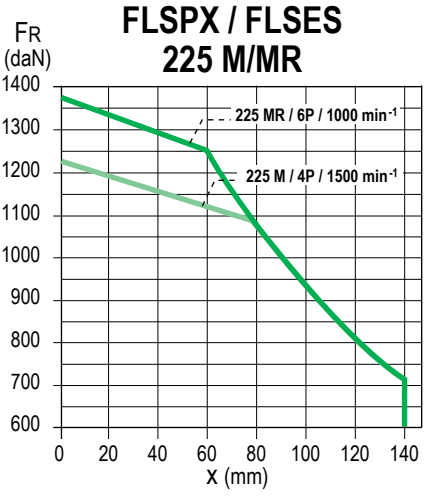










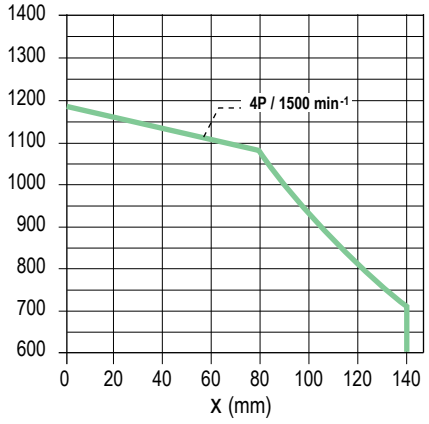


ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
Mechanical characteristics - Radial loads

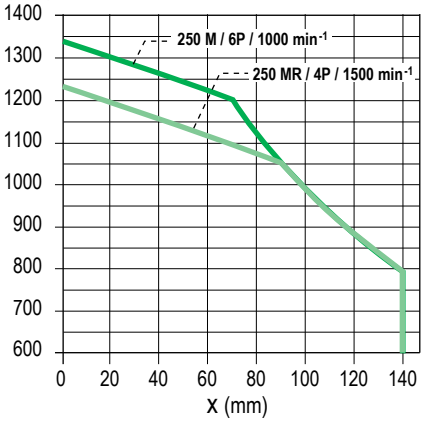
SPECIAL FITTING ARRANGEMENT (DRIVE-END ROLLER BEARINGS)

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

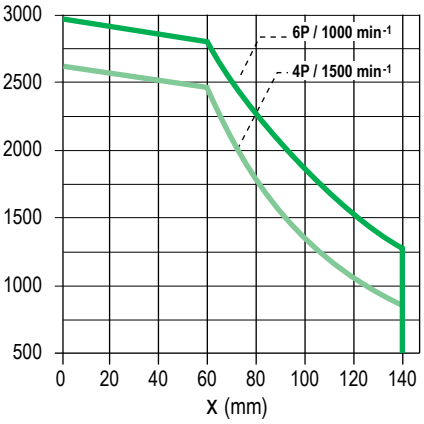
FLSPX / FLSES 225 SR/S



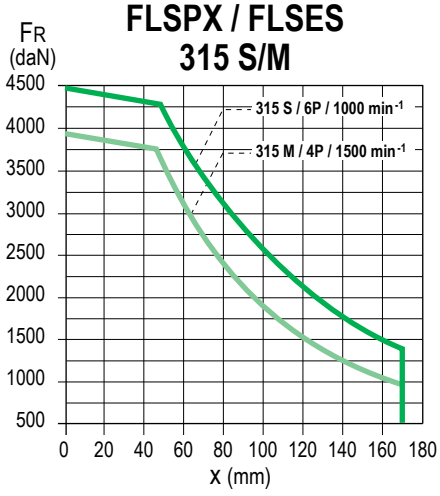
FLSPX / FLSES 250 M/MR



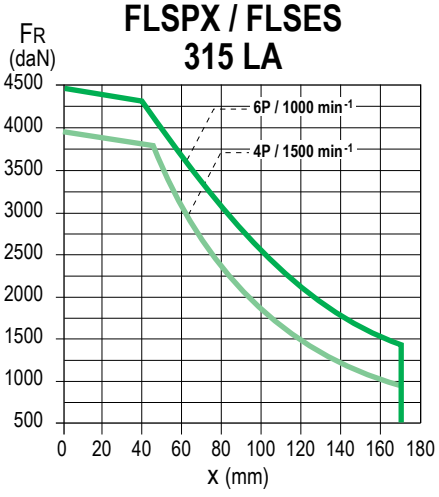
FLSPX / FLSES 280 S/M



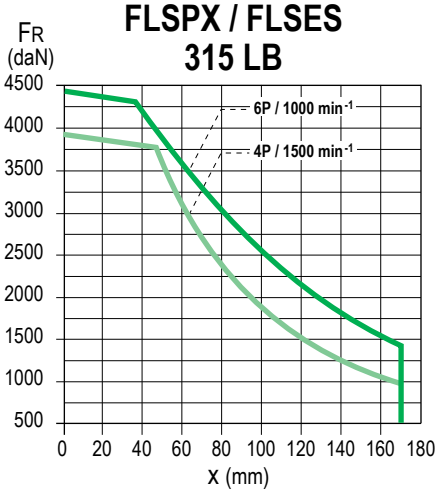
FLSPX / FLSES 315 S/M



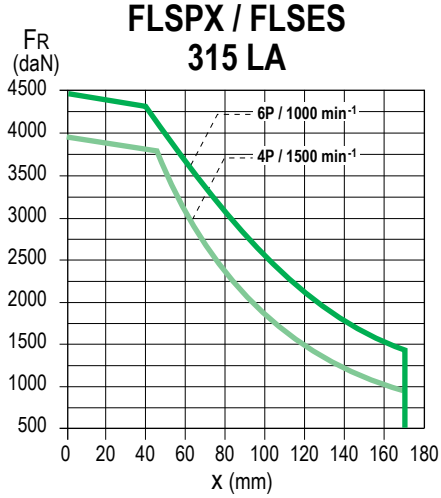
FLSPX / FLSES 315 LA



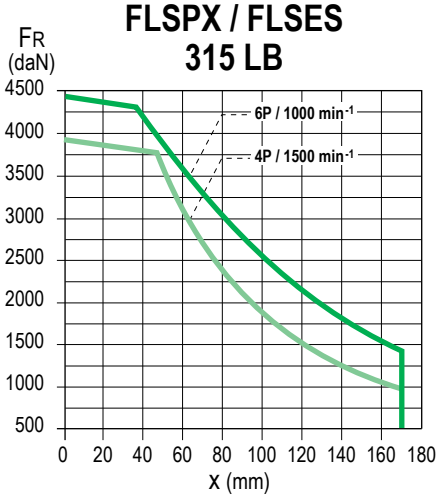
FLSPX / FLSES 315 LB



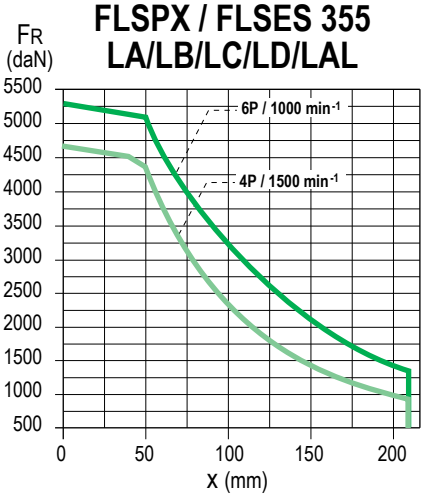
FLSPX / FLSES 315 LA



FLSPX / FLSES 315 LB



FLSPX / FLSES 355 LA/LB/LC/LD/LAL



ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
Mechanical characteristics - Radial loads

INDICATION OF CABLE GLAND SIZE AND TYPE FOR 400 V RATED SUPPLY VOLTAGE IF DRILLINGS REQUIRED WITHOUT DETAILS OF DIAMETERS

Series	Type	Polarity	Power + auxiliaries	
			Number of holes	Hole diameter
FLSPX	80	2; 4; 6	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		
	180 MUR	2; 4; 6	3	2M40 + 1M16
	180 M/L/LUR	2; 4; 6		
	200	2; 4; 6		
	225 SR/MR	2; 4; 6		2M50 + 1M16
	225 M	2; 4; 6		
	250	2; 4; 6		
	280	2; 4; 6	1 (2 if auxiliaries)	ISO M63 x 1.5 (1M63 + 1M16)
	315	2; 4; 6		ISO M75 x 1.5 (1M75 + 1M16)
	355	2; 4; 6		

Series	Type	Polarity	Power + auxiliaries	
			Number of holes	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 support 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 are fitted with a 6-terminal safety block, with the terminal markings complying with or 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 shaft end.

If any two of the phases are changed over, the motor will run in the opposite 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 terminal blocks 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 supply		
		230/400 V connection		400 V drive connection
		Polarity	Terminals	Terminals
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

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
Optional equipment

Mechanical adaptations	Frame size
DE and NDE bearings with 1 machining, for vibration sensor in position 12H, 12H-3H, or 12H-3H-9H	≥ 132
Different FF flanges from IEC	All
Different FT flanges from IEC	≤ 132
DE roller bearing	≥ 160: 4p & +
Angular contact bearing	All
Insulated DE or NDE bearing	≥ 280
2nd standard catalogue NDE shaft end	All
2nd special NDE shaft end	All
Conical shaft	All
Smooth shaft without keying	All
Shaft with special keying	All
Keyed cylindrical NDE shaft (secondary shaft end) as per IEC	All
Stainless-steel shaft	All
Class B balancing	All
F type (full key) or N type (no key) balancing	All
Stainless steel fan cover	All
Steel fan cover + drip cover	All
Steel fan cover + anti-clogging	All
Metal fan	All
Stainless steel nameplate	All
Stainless-steel fastenings	All
Three-phase axial forced ventilation - IC 416 A	≥ 160
Incremental encoder / 1024 or 4096 pts / 5v or 11/30 V	All
Positioning holes (jacking screws)	≥ 250
Radial seal for motor in vertical position with shaft end upwards	All
Drain holes for operation in vertical position	All

Electrical adaptations	Frame size
Terminal board with anti-rotation system as standard	All
Special voltages (excluding variable speed)	All
Insulation class H	All
Main box in position B or D	All
Auxiliary boxes	≥ 160
Plastic PE	All
ATEX brass PE for unshielded cable for FLSPX zone 21	All
ATEX brass PE for shielded cable for FLSPX zone 21	All
ATEX brass PE auxiliary for unshielded cable for FLSPX zone 21	All
ATEX brass PE auxiliary for shielded cable for FLSPX zone 21	All
Flying lead via 6 + 1 multicore cable	All
Cable entry on the left as seen from the shaft end	All
Preparation for NPT cable glands	All

Protections	Frame size
Standard winding PTC thermistor probe (triple probe)	All
Winding PT 100 probe (1 per phase)	All
Endshield PTC thermistor probe (triple probe)	≥ 160
Endshield PT 100 probe (per probe)	≥ 160
Endshield thermocouple	≥ 160
Space heaters when stopped (220-230 V)	All
Reinforced winding insulation system for variable speed drive power supply	All

Finish	Frame size
IP 65 for FLSES motors Zone 22	All
IP 56 stopped with fan (IC 411) for FLSES motors Zone 22	All
C3H, C4M, C4H, C5-IL or C5-IM paint	All
Other paint shades	All
Operating temperature: -55°C < T° < -20°C	All
Complete tropicalization (stator + rotor)	All

ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
Optional equipment

NON-STANDARD FLANGES

Optionally, Nidec 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.

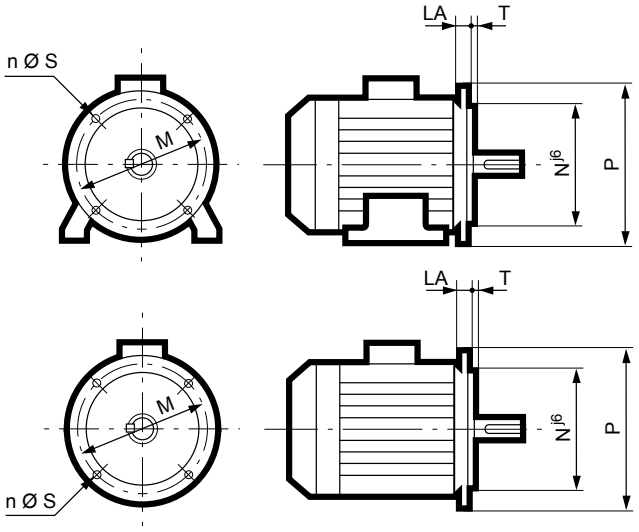
The tables below give the flange and faceplate dimensions and also indicate flange/motor compatibility.
The bearing and shaft end for each frame size remain standard.

Dimensions in millimetres

(FF) Flange mounted

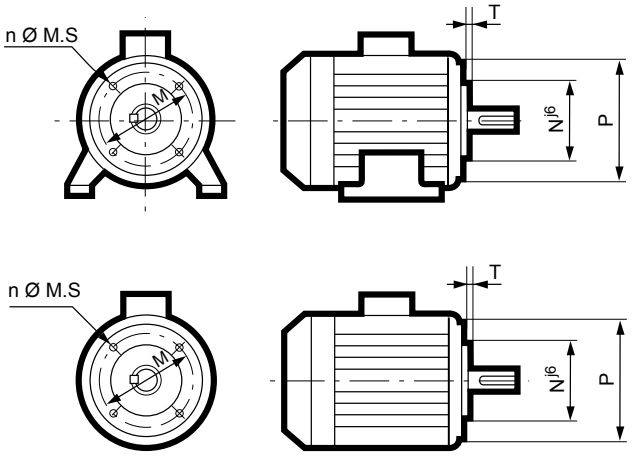
Symbol IEC	Flange dimensions						
	M	N	D	T	n	S	LA
FF 115	115	95	140	3	4	10	10
FF 130	130	110	160	3.5	4	10	10
FF 165	165	130	200	3.5	4	12	10
FF 215	215	180	250	4	4	15	12
FF 265	265	230	300	4	4	15	14
FF 300	300	250	350	5	4	18.5	14
FF 350	350	300	400	5	4	18.5	15
FF 400	400	350	450	5	8	18.5	16
FF 500	500	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

** Tolerance N js6*
*** shaft length = 22 for frame size ≥ 280*



(FT) Face mounted

Symbol IEC	Flange dimensions					
	M	N	D	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



ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
Optional equipment

MODIFIED FLANGES

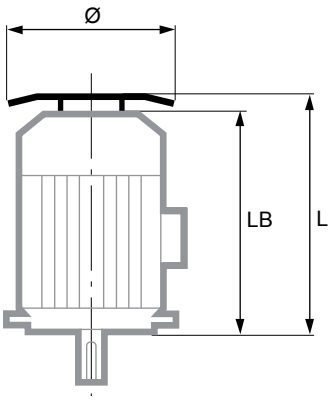
Motor type		Forms of fastenings \ Flange type	(FF) Flange mounted												(FT) Face mounted								
			FF 115	FF 130	FF 165	FF 215	FF 265	FF 300	FF 350	FF 400	FF 500	FF 600	FF 740	FF 940	FT 65	FT 75	FT 85	FT 100	FT 115	FT 130	FT 165	FT 215	FT 265
FLSPX FLSES	80 L/LG	all	■	■	●	◆											◆	●	◆	◆	◆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

● Standard ■ Modified shaft ◆ Adaptable without shaft modifications ❍ Please contact us

DRIP COVER FOR OPERATION IN VERTICAL POSITION, SHAFT END DOWNWARDS

Dimensions in millimetres

Motor type		LB'	Ø
FLSPX FLSES	80	LB + 20	145
	90	LB + 20	185
	100	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	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/MR	LB + 130	420
	280	LB + 130	420
	315	LB + 118	620
	355 L	LB + 112	710



ATEX DUST motors - Zones 21 & 22
FLSPX & FLSES series - Cast iron
Optional equipment

SPACE HEATERS

Series	Type	Power (W)
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*

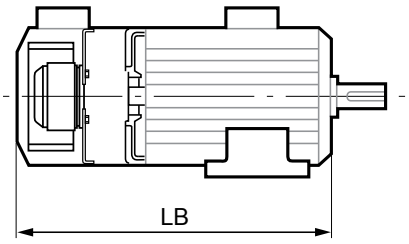
The space heaters use 200/240 V single-phase, 50 or 60 Hz.
** Power increase possible subject to quote.*

BRAKE MOTORS, 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;
- holding brakes for maintaining the rotor in the stop position without needing to leave the motor switched on;
- emergency stop brakes to immobilise loads in case of failure of the motor torque control or loss of power supply.

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

FLSPX & FLSES	LB dimensions with forced ventilation	
	Foot or face mounted motor	Flange mounted motor
80 L	317	
80 LG	331	353
90 S		
90 L		
90 LU		
100 L	373	
112 MG	412	
112 MU		
132 S	458	
132 MR		
132 M		
132 MU		
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/LD/LAL	1668	



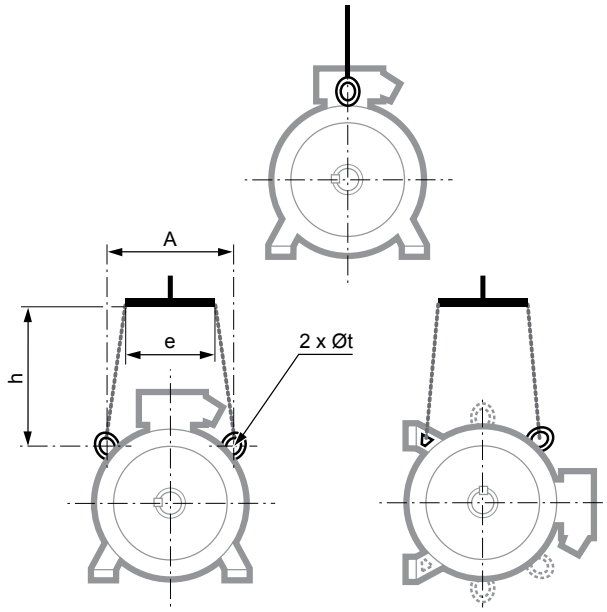
LIFTING THE MOTOR ONLY
(not coupled to the machine)

The regulations stipulate that in excess of 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.

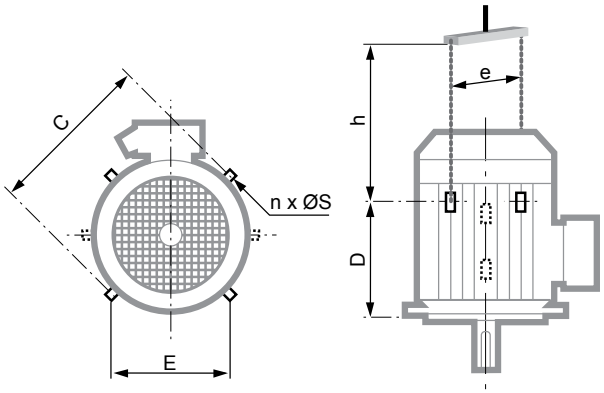
To prevent any damage to the motor during handling (for example: switching the motor from horizontal to vertical), it is essential to follow these instructions.

HORIZONTAL POSITION



Type		Horizontal position			
		A	min. e	min. h	Øt
FLSPX FLSES	100	152	200	150	22
	100	145	200	150	22
	112	145	200	150	22
	132	180	200	150	25
	160	200	260	150	14
	180 M/MUR/L/LUR	200	260	150	14
	200 LU	270	260	150	14
	225 SR/MR	270	260	150	14
	225 S/M	360	380	200	30
	250 M/MR	360	380	200	30
	280	360	380	500	30
	315 S/M/LA/LB	440	400	500	60
	355	545	500	500	60

VERTICAL POSITION



View from above** Side view

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

Type		Vertical position						
		C	E	D	n**	ØS	min. e*	min. h
FLSPX FLSES	160 M/MU	320	200	230	2	14	320	350
	180 M/MUR/L/LUR*	320	200	230	2	14	320	270
	200 LU	410	300	295	2	14	410	450
	225 SR/MR	410	300	295	2	14	410	450
	225 S/M	480	360	405	4	30	540	350
	250 M/MR	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
	315 S/M/LA/LB	620	-	715	2	35	650	550
	355	760	-	750	2	35	800	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.*

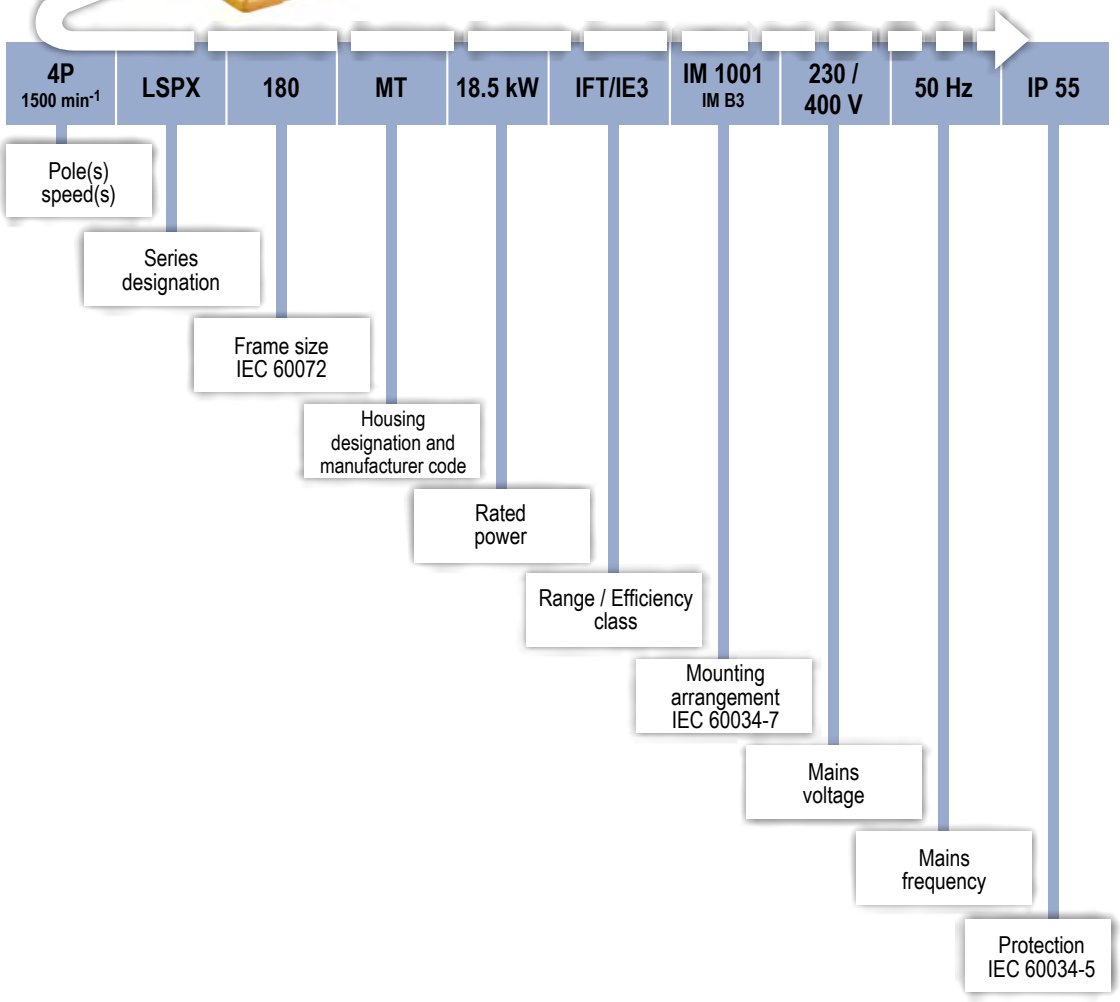
*** If n = 2, the lifting rings form an angle of 90° with respect to the terminal box. If n = 4, this angle becomes 45°.*

ATEX DUST motors - Zone 21
LSPX series - Aluminium
General information - Designation

ATEX DUST motors - Zone 21	LSPX series
	Ex II 2 D Ex tb III C T125°C Db
	Premium Efficiency
	IE3 aluminium on mains IE3 aluminium on drive

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.



ATEX DUST motors - Zone 22
LSES series - Aluminium
General information - Designation

ATEX DUST motors - Zone 22	LSES series
	II 3 D Ex tc III B T125°C Dc
	Premium Efficiency
	IE3 aluminium on mains
	IE3 aluminium on drive

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

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

4P 1500 min^{-1}	LSES	180	MT	18.5 kW	IFT/IE3	IM 1001 IM B3	230 / 400 V	50 Hz	IP 55
Pole(s) 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

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
General information - Identification and marking

NAMEPLATES

The nameplate identifies the motors, indicates the main performance and shows compatibility of the motor concerned with the main standards and regulations concerning them.
All motors in this catalogue with power between 0.75 and 200 kW are fitted with two information plates: one indicating the motor's performance when supplied from the mains, and the other the motor's performance when supplied from a drive.

DEFINITION OF SYMBOLS USED ON NAMEPLATES

CE **Legal mark indicating the conformity of equipment with the requirements of European Directives**

SPECIAL MARKING (ATEX)

: protection marking against explosive risks
II 2D or II 3D : ATEX marking
Ex tb or tc : "dust" protection mode
IIIB or IIIC : "dust" equipment group
T125°C : max. surface temperature
Db or Dc : "dust" EPL level
0080 : INERIS Notified Body
INERIS 00ATEX0003X : CE type examination certificate No.

Zone	Type	ATEX marking	Marking of type of dust protection	Protection rating
21	**LSPX**	II 2 D	Ex tb IIIC T125°C Db	IP65
22	**LSES** Non-conductive dusts	II 3 D	Ex tc IIIB T125°C Dc	IP55

MAINS SUPPLY PLATE

MOT 3 ~ : three-phase AC motor
LSPX : series
160 : frame size
L : housing symbol
T : impregnation index

Motor no.

0123456 : motor serial number
G : month of production
12 : year of production
001 : batch number
IE3 : efficiency class
92.4% : efficiency at 4/4 load

kg : weight
IP65 : protection rating
IK08 : shock resistance
I cl.F : insulation class F
40°C : max. 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

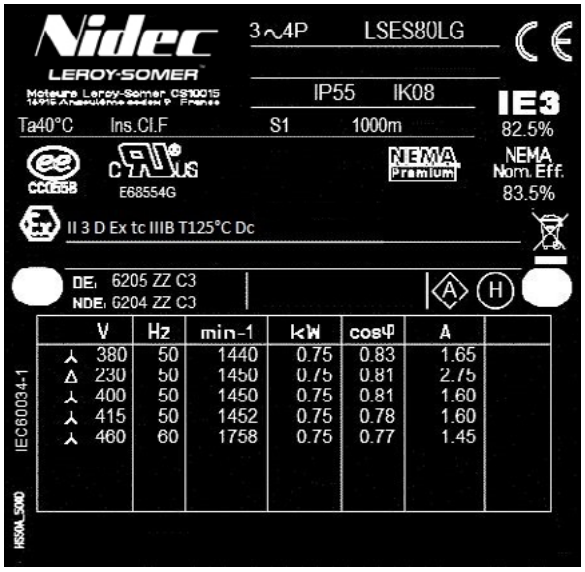
DE : drive end
Drive end bearing
NDE : non drive end
Bearing side opposite the drive
g : amount of grease at each regreasing (in g)
h : regreasing interval (hours)
A : vibration level
H : balancing mode

DRIVE SUPPLY PLATE

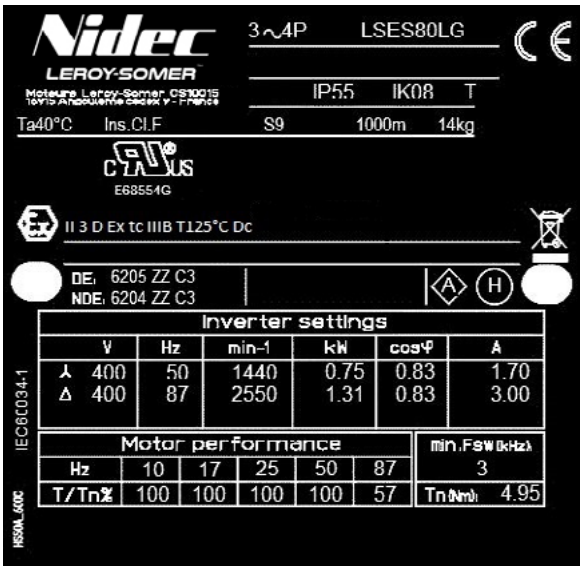
Inverter settings : required values for setting the frequency inverter
Motor performance : torque available on the motor shaft in % rated torque at the plate frequencies
Min. Fsw (kHz) : minimum switching frequency acceptable for the motor
Nmax (min^{-1}) : maximum mechanical speed acceptable for the motor

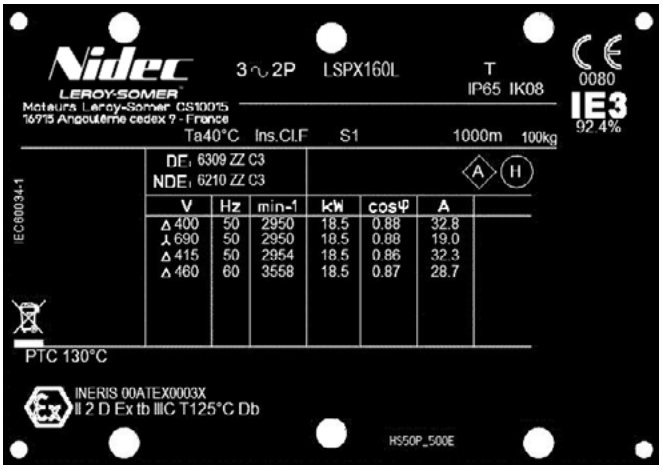
INFORMATION PLATES CAST IRON MOTORS
LSPX Zone 21 and LSES Zone 22

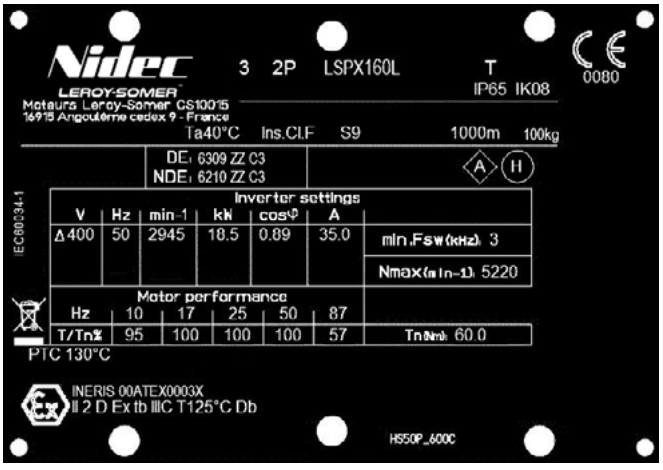
Mains supply plate



Drive supply plate







ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
General information - Description

Combustible dust is dangerous because it can form potentially explosive atmospheres when dispersed in the air.
Furthermore, a layer of combustible dust can ignite and act as a source of ignition in an explosive atmosphere.
Explosive dust atmospheres can be found in many industries, such as agriculture, chemicals, plastics and food and drink related industries.

LSPX and LSES motors with an aluminium casing are designed to prevent any explosion due to dust:

- The ingress of dust into the motor is prevented by the IP protection, either IP55 (dustproof for LSES motors) or IP65 (dustproof for LSPX).
- The maximum surface temperature outside the engine must not exceed the temperature class for which the motor is certified.
- No sparks must reach the outside of the motor enclosure.

These motors are certified to comply with Directive 2014/34/EU.
For zone 22 LSES motors, Nidec Leroy-Somer also provides self-certification with a Declaration of Conformity.

Designations	Materials	Comments
Finned housing	Aluminium alloy	- with integral or screwed feet, or without feet - 4 or 6 securing holes for housings with feet - lifting rings for frame size ≥ 100 - ground 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 - 1 set of PTC sensors in the windings from LSPX 80 to LSPX 315 and from LSES 80 zone 22 to LSES 315 zone 22
Rotor	Insulated low-carbon magnetic steel laminations Aluminium	- inclined cage bars - rotor cage pressure die-cast in aluminum (or alloy for special applications) - assembly by hot shrinking on the 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 centre hole • open keyway
End shields	Cast iron	- 80 - 90 front and rear bearings - 100 to 315 front and rear bearings
Bearings and lubrication		- protected ball bearings, permanently greased for frame size 80 to 225 - protected ball bearings, regreasable for frame size 250 to 315 - bearings preloaded at rear
Labyrinth seal **Lip seals**	Technopolymer or steel Synthetic rubber	- gasket or deflector at the front for all face mounted motors - gasket, deflector seal for foot mounted motor
Fan	antistatic thermoplastic or aluminium	- bi-directional: straight blades
Fan cover	Composite material or steel plate	- fitted, on request, with a drip cover for operation in vertical position, shaft end downwards (steel plate cover)
Terminal box	Composite material or aluminium alloy	- IP 55 or IP 65 - directional, 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 gland (cable gland as an option) - 1 ground terminal in each terminal box - fastening system consisting of a cover with captive screws

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium- IE3
Electrical characteristics - Mains supply

Type		Rated power	Rated torque	Starting torque/ Rated torque	Maximum torque/ Rated torque	Starting current/ Rated current	Moment of inertia	Weight	Noise	400V 50Hz							
										Rated speed	Rated current	Efficiency IEC 60034-2-1 2007			Power factor		
		P_n kW	M_n N.m	M_d/M_n	M_m/M_n	I_d/I_n	J kg.m²	IM B3 kg	LP db(A)	N_n min⁻¹	I_n A	η 4/4	η 3/4	η 2/4	Cos φ 4/4	Cos φ 3/4	Cos φ 2/4
2 poles																	
	80 L	0.75	2.5	3.44	3.44	7.75	0.00095	9.9	58	2890	1.6	82.4	82.4	80.2	0.83	0.76	0.64
	80 LG	1.1	3.7	2.62	3.22	7	0.00223	14.1	64	2885	2.2	85.6	86.9	86.7	0.85	0.80	0.69
	90 SL	1.5	5	2.92	3.22	7.47	0.00223	15.6	64	2890	3	85.3	86.3	85.5	0.84	0.78	0.67
	90 L	1.8	6	3.08	3.37	7.42	0.00292	15.6	67	2900	3.8	85.6	86.3	85.6	0.81	0.74	0.61
	90 LU	2.2	7.3	3.08	3.38	7.91	0.00292	20.4	67	2895	4.3	86.9	88.1	87.8	0.86	0.80	0.69
	100 L	3	10	3.53	3.43	8.34	0.00364	24.6	67	2885	5.8	87.1	88.3	88.0	0.86	0.81	0.71
	112 MG	4	13.1	2	2.9	7.1	0.00941	32.7	71	2920	7.2	89.0	90.1	90.1	0.90	0.86	0.78
	132 S	5.5	18	2.3	3.05	7.54	0.01116	39.2	63	2925	10.1	89.4	90.5	90.5	0.88	0.84	0.75
	132 SM	7.5	24.4	2.1	2.9	6.8	0.01102	55.7	67	2935	13.8	91.2	92.1	92.1	0.86	0.83	0.74
	132 M	9	29.2	2.15	3.25	7.65	0.01203	59.3	67	2945	16.7	91.7	92.4	92.2	0.85	0.81	0.72
	160 MP	11	35.7	1.9	2.9	6.95	0.0139	70	72	2940	19.9	91.5	92.3	92.1	0.87	0.83	0.74
LSPX*	**160 M**	15	48.6	2.3	2.75	7.86	0.0490	95	69	2945	26.5	91.9	92.6	92.6	0.89	0.87	0.81
LSES	**160 L**	18.5	59.9	2.8	3.15	7.6	0.0551	100	68	2950	32.8	92.6	93.3	93.2	0.88	0.84	0.76
	180 MR	22	71.1	3.15	3.15	8.67	0.0628	105	69	2954	38.7	93.2	93.9	94.0	0.88	0.85	0.77
	200 LR	30	97.3	2.6	3.05	7.65	0.1106	170	73	2945	51.5	93.5	94.2	94.4	0.90	0.88	0.83
	200 L	37	120	2	3.05	7.08	0.2492	201	73	2945	63.9	93.9	94.5	94.4	0.89	0.87	0.81
	225 MR	45	145	2.67	3.42	7.88	0.1597	227	76	2962	79.7	94.8	95.1	94.7	0.86	0.82	0.73
	250 MZ	55	178	2.45	3.45	7.9	0.1754	234	72	2954	97.5	94.7	95.2	95.2	0.86	0.82	0.74
	280 SC	75	241	2.3	3.3	8.05	0.4092	350	79	2970	126	95.2	95.5	95.1	0.90	0.88	0.82
	280 MC	90	289	2.5	3.6	8.5	0.4760	382	80	2972	151	95.5	95.8	95.5	0.90	0.87	0.82
	315 SN	110	354	2.55	3.1	8	0.5343	452	79	2968	185	95.5	95.9	95.8	0.90	0.88	0.84
	315 MP	132	423	2.25	3.2	7.73	0.5784	660	80	2978	226	96.0	96.0	95.4	0.88	0.86	0.81
	315 MP	160	513	2.2	3.3	7.7	1.2646	705	80	2978	274	95.8	95.9	94.3	0.88	0.86	0.80
	315 MP	200	642	2.15	3.5	7.8	1.3841	768	80	2974	342	96.0	96.2	95.9	0.88	0.86	0.80

** For power > 200 kW, please contact us.*

4 poles																	
	80 LG	0.75	5	2.18	2.92	6.38	0.00335	13.6	48	1450	1.6	83.6	84.3	83.0	0.81	0.73	0.59
	90 SL	1.1	7.3	2.44	3.18	6.91	0.00418	16.2	45	1450	2.3	84.8	85.7	85.0	0.81	0.74	0.61
	90 LU	1.5	9.9	2.89	3.69	7.66	0.00524	20.4	51	1452	3.2	85.6	86.2	85.1	0.79	0.70	0.57
	100 L	1.8	11.8	2.41	2.73	6.42	0.00561	23.7	48	1456	3.8	86.6	87.3	86.1	0.79	0.71	0.57
	100 LR	2.2	14.4	3.2	3.75	7.87	0.00676	25.8	47	1454	4.7	87.1	87.7	86.7	0.78	0.70	0.57
	100 LG	3	19.6	2.45	3.25	7.22	0.01152	31	55	1464	6	89.2	89.9	89.9	0.81	0.74	0.61
	112 MU	4	26.2	2.7	3.1	7.23	0.01312	34.4	54	1456	7.9	88.9	89.8	89.6	0.82	0.77	0.65
	132 SM	5.5	35.9	2.8	3.6	8.39	0.02286	52	59	1462	10.5	90.3	91.0	90.6	0.84	0.77	0.65
	132 MU	7.5	49.1	2.95	3.35	8.12	0.02965	62.6	61	1458	13.8	90.4	91.5	91.9	0.87	0.82	0.73
	160 MR	9	58.7	3.1	3.65	8.69	0.03574	77.8	62	1464	17	91.0	91.8	91.7	0.84	0.78	0.67
	160 M	11	71.7	2.25	3.05	7.36	0.0712	93	59	1466	20.2	91.4	92.4	92.6	0.86	0.82	0.73
LSPX*	**160 LUR**	15	97.6	2.55	3.45	8.47	0.0954	100	58	1468	27.3	92.1	92.9	93.0	0.86	0.82	0.72
LSES	**180 M**	18.5	120	2.95	2.85	7.76	0.1333	130	68	1468	33.9	92.8	93.6	93.5	0.85	0.81	0.72
	180 LUR	22	143	3.25	3.15	8.16	0.1555	155	68	1470	41.1	93.0	93.4	93.3	0.83	0.79	0.69
	200 LU	30	194	3	2.8	7.31	0.2704	225	63	1476	55	93.7	94.3	94.1	0.84	0.79	0.70
	225 SR	37	239	3.25	3.15	7.95	0.2897	236	63	1480	70.2	93.9	94.2	93.8	0.81	0.76	0.65
	225 MG	45	289	2.31	2.86	7.25	0.6573	318	70	1486	83.6	94.8	95.0	94.5	0.82	0.77	0.66
	250 ME	55	354	2.3	2.7	7.3	0.7793	350	69	1484	101	94.7	95.1	95.0	0.83	0.79	0.70
	280 SD	75	482	2.45	3.2	8.08	0.9595	428	69	1486	139	95.0	95.2	94.9	0.82	0.78	0.69
	280 MD	90	579	2.6	3.45	8.35	1.0799	470	68	1484	168	95.5	95.7	95.4	0.81	0.76	0.65
	315 SP	110	707	3.1	2.85	7.57	2.4322	690	76	1486	200	95.6	95.6	94.9	0.83	0.78	0.69
	315 MP	132	847	3.05	2.75	7.24	3.2230	740	76	1488	237	95.9	96.0	95.5	0.84	0.80	0.70
	315 MP	160	1030	2.55	2.8	7.2	3.2230	740	76	1486	291	95.8	95.7	95.2	0.83	0.78	0.67
	315 MR	200	1290	2.95	2.9	7.38	3.2324	820	76	1486	362	96.0	96.0	95.5	0.83	0.79	0.68

** For power > 200 kW, please contact us.*

6 poles																	
	90 SL	0.75	7.5	1.87	2.32	4.25	0.00378	16	56	952	2	79.2	80.0	79.1	0.71	0.62	0.48
	90 LU	1.1	11	2.35	2.7	4.75	0.00519	21.5	56	956	2.8	81.9	82.3	80.3	0.70	0.61	0.47
	100 LG	1.5	14.8	2.35	2.8	5.64	0.01523	30	43	966	3.6	83.8	84.4	82.9	0.72	0.63	0.50
	112 MU	2.2	21.7	2.3	2.75	5.44	0.01899	37	46	966	5.4	84.3	84.8	83.5	0.70	0.61	0.49
	132 SM	3	29.5	2.75	3.15	6.6	0.02528	48	50	972	6.8	87.5	88.0	86.9	0.73	0.65	0.53
	132 M	4	39.3	2.65	2.9	6.38	0.03027	54	56	972	9.1	87.4	88.1	87.1	0.73	0.65	0.53
	132 MU	5.5	54.4	2.6	2.85	6.4	0.03699	63.1	57	966	11.7	88.1	89.2	89.1	0.77	0.70	0.58
	160 MU	7.5	73.2	2	3.05	6.93	0.1295	82	58	978	16.1	89.6	89.7	88.4	0.75	0.67	0.54
	180 L	11	107	3.05	3.45	8.65	0.2048	130	62	982	22.6	91.1	91.3	90.3	0.77	0.70	0.57
LSPX*	**180 LUR**	15	146	3.05	3.15	8.42	0.2530	150	63	980	30.7	91.5	91.9	91.3	0.77	0.70	0.58
LSES	**200 L**	18.5	180	2.2	2.85	7.07	0.3300	200	61	980	36.2	92.1	92.8	92.6	0.80	0.75	0.66
	200 LU	22	214	2.8	3.55	7.35	0.3901	236	62	980	44.6	92.5	93.0	92.5	0.77	0.71	0.61
	225 MG	30	291	2.25	2.45	6.6	0.7222	284	64	986	55.3	93.3	93.7	93.3	0.84	0.80	0.70
	250 ME	37	358	2.35	2.8	7.07	0.9234	310	64	986	66.9	93.9	94.4	94.3	0.85	0.81	0.72
	280 SC	45	437	2.2	2.45	6.62	1.1279	377	64	984	80.4	93.9	94.5	94.5	0.86	0.83	0.74
	280 MD	55	533	2.8	3	7.66	1.3995	444	59	986	98.6	94.7	95.2	95.0	0.85	0.81	0.72
	315 SP	75	723	2.95	2.55	7.5	2.8937	630	71	990	146	94.9	95.0	94.2	0.78	0.73	0.61
	315 MP	90	868	3.05	2.65	7.8	3.4127	700	75	990	171	95.2	95.1	94.4	0.79	0.74	0.64
	315 MR	110	1060	2.95	2.1	7.45	3.0776	770	72	990	208	95.4	95.6	95.1	0.80	0.76	0.66
	315 MR	132	1270	2.7	2.15	7.16	4.6331	860	76	990	249	95.5	95.7	95.3	0.80	0.75	0.65

** For power > 132 kW, please contact us.*

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium- IE3
Electrical characteristics - Mains supply

Type		Rated power	415V 50Hz				460V 60Hz			
			Rated speed	Rated current	Efficiency	Power factor	Rated speed	Rated current	Efficiency	Power factor
		P_n kW	N_n min^{-1}	I_n A	η 4/4	Cos φ 4/4	N_n min^{-1}	I_n A	η 4/4	Cos φ 4/4
2 poles										
	80 L	0.75	2900	1.6	82.3	0.81	3505	1.4	83.3	0.80
	80 LG	1.1	2895	2.1	86.2	0.84	3505	1.9	87.0	0.83
	90 SL	1.5	2900	2.9	86.1	0.83	3510	2.7	86.9	0.82
	90 L	1.8	2910	3.8	85.7	0.78	3515	3.3	86.9	0.82
	90 LU	2.2	2905	4.1	87.3	0.85	3505	3.7	88.2	0.85
	100 L	3	2900	5.7	87.6	0.84	3505	5.1	87.6	0.85
	112 MG	4	2930	7	89.7	0.89	3535	6.3	90.0	0.89
	132 S	5.5	2930	9.8	89.8	0.87	3540	8.8	90.7	0.87
	132 SM	7.5	2945	13.4	91.5	0.85	3550	12	92.1	0.85
	132 M	9	2950	16.4	91.9	0.83	3558	14.4	92.4	0.85
	160 MP	11	2945	19.6	91.8	0.85	3552	17.4	92.2	0.86
LSPX*	**160 M**	15	2950	25.4	92.2	0.89	3550	22.9	92.4	0.89
LSES	**160 L**	18.5	2954	32.2	92.9	0.86	3558	28.6	93.4	0.87
	180 MR	22	2958	38.1	93.5	0.86	3564	33.8	94.0	0.87
	200 LR	30	2954	50	93.8	0.89	3556	44.5	94.0	0.90
	200 L	37	2950	62	94.2	0.88	3552	56.2	93.9	0.88
	225 MR	45	2962	80	94.9	0.83	3566	69.8	95.2	0.85
	250 MZ	55	2958	96	94.9	0.84	3564	84.2	95.3	0.86
	280 SC	75	2974	123	95.5	0.89	3574	110	95.3	0.90
	280 MC	90	2972	147	95.5	0.89	3574	133	95.5	0.89
	315 SN	110	2970	179	95.6	0.89	3574	160	95.8	0.90
	315 MP	132	2984	220	96.0	0.87	3580	197	95.9	0.88
	315 MP	160	2978	264	96.2	0.88	3580	236	95.9	0.89
	315 MP	200	2980	328	96.1	0.86	3580	297	96.1	0.88

** For power > 200 kW, please contact us.*

4 poles										
	80 LG	0.75	1452	1.6	83.7	0.78	1758	1.5	85.1	0.77
	90 SL	1.1	1454	2.3	85.4	0.79	1760	2.1	86.6	0.78
	90 LU	1.5	1456	3.2	85.7	0.76	1760	2.9	87.2	0.76
	100 L	1.8	1458	3.8	86.8	0.79	1762	3.4	88.2	0.76
	100 LR	2.2	1456	4.6	87.3	0.76	1760	4.2	88.4	0.76
	100 LG	3	1466	6	89.2	0.78	1770	5.3	90.5	0.79
	112 MU	4	1460	7.8	89.0	0.80	1764	7.1	90.3	0.79
	132 SM	5.5	1466	10.3	90.6	0.82	1770	9.2	91.7	0.82
	132 MU	7.5	1462	13.5	90.9	0.85	1766	12.1	91.8	0.85
	160 MR	9	1466	16.7	91.3	0.84	1768	14.9	92.2	0.82
	160 M	11	1470	19.6	91.7	0.85	1774	17.6	92.5	0.85
LSPX*	**160 LUR**	15	1472	26.6	92.4	0.85	1774	24	93.2	0.84
LSES	**180 M**	18.5	1474	32.9	93.0	0.84	1774	29.5	93.6	0.84
	180 LUR	22	1474	40.5	93.2	0.81	1770	36.3	93.8	0.81
	200 LU	30	1478	54.1	94.1	0.82	1778	48	94.5	0.83
	225 SR	37	1482	69.4	93.9	0.79	1782	61.4	94.5	0.80
	225 MG	45	1488	82.5	94.9	0.80	1788	73.4	95.0	0.81
	250 ME	55	1486	98.4	94.9	0.82	1786	88.1	95.4	0.82
	280 SD	75	1486	135	95.1	0.81	1788	120	95.5	0.82
	280 MD	90	1488	165	95.5	0.79	1788	147	95.8	0.80
	315 SP	110	1488	195	95.7	0.82	1788	173	95.9	0.83
	315 MP	132	1488	233	95.9	0.82	1790	207	96.2	0.83
	315 MP	160	1488	289	95.8	0.80	1790	255	96.2	0.82
	315 MR	200	1488	358	96.0	0.81	1790	314	96.3	0.84

** For power > 200 kW, please contact us.*

6 poles										
	90 SL	0.75	956	2	79.7	0.68	1162	1.7	82.6	0.67
	90 LU	1.1	960	2.8	81.9	0.67	-	-	-	-
	100 LG	1.5	970	3.7	83.7	0.68	-	-	-	-
	112 MU	2.2	970	5.4	84.3	0.67	-	-	-	-
	132 SM	3	974	6.8	87.7	0.71	-	-	-	-
	132 M	4	974	9.1	87.7	0.70	-	-	-	-
	132 MU	5.5	968	11.5	88.6	0.75	-	-	-	-
	160 MU	7.5	980	15.9	97.7	0.73	-	-	-	-
	180 L	11	984	22.4	91.4	0.75	1182	20.1	91.7	0.75
LSPX*	**180 LUR**	15	982	30.8	91.6	0.74	1184	27.2	92.4	0.75
LSES	**200 L**	18.5	982	35.3	92.3	0.79	-	-	-	-
	200 LU	22	984	42.2	92.7	0.74	-	-	-	-
	225 MG	30	986	53.9	93.3	0.83	1186	53.9	93.4	0.85
	250 ME	37	988	65.9	94.1	0.83	-	-	-	-
	280 SC	45	986	78.4	94.0	0.85	1186	78.4	94.5	0.87
	280 MD	55	988	96.1	94.8	0.84	1190	85.3	95.2	0.85
	315 SP	75	992	144	95.1	0.76	1192	131	95.2	0.79
	315 MP	90	992	169	95.1	0.78	1192	150	95.0	0.78
	315 MR	110	992	205	95.7	0.78	1192	182	95.8	0.79
	315 MR	132	990	247	95.5	0.78	1192	219	95.8	0.79

** For power > 132 kW, please contact us.*

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium- IE3
Electrical characteristics - Drive-powered

Type		400V 50Hz				% Rated torque M_n at					400V 87Hz Δ[1]				Maximum mechanical speed[2]
		Rated power	Rated speed	Rated current	Power factor	10Hz	17Hz	25Hz	50Hz	87Hz	Rated power	Rated speed	Rated current	Power factor	
		P_n kW	N_n min^{-1}	I_n A	Cos φ 4/4						P_n kW	N_n min^{-1}	I_n A	Cos φ 4/4	
2 poles															
LSPX* LSES	**80 L**	0.75	2890	1.65	0.83	2.25	2.5	2.5	2.5	1.44	1.31	5006	2.88	0.85	13500
	80 LG	1.1	2885	2.35	0.85	3.1	3.65	3.65	3.65	2.1	1.91	4997	4.06	0.87	11700
	90 SL	1.5	2890	3.15	0.85	4.21	4.95	4.95	4.95	2.84	2.61	5006	5.5	0.86	11700
	90 LU	2.2	2895	4.5	0.86	6.16	7.25	7.25	7.25	4.17	3.83	5014	7.87	0.88	11700
	100 L	3	2870	6.2	0.88	9.25	9.95	9.95	9.95	5.67	5.22	4997	10.67	0.86	9900
	112 MG	4	2905	7.9	0.91	12.18	13.1	13.1	13.1	7.47	6.96	5058	13.8	0.89	9900
	132 S	5.5	2910	11	0.90	16.74	18	18	18	10.26	9.57	5066	18.96	0.87	6700
	132 SM	7.5	2925	15	0.88	22.7	24.4	24.4	24.4	13.91	13.05	5084	25.56	0.86	6700
	132 M	9	2935	17.8	0.87	27.16	29.2	29.2	29.2	16.64	15.66	5101	30.47	0.86	6700
	160 MP	11	2930	21.8	0.88	33.2	35.7	35.7	35.7	20.35	19.14	5092	37.08	0.86	6700
	160 M	15	2935	28.8	0.90	40.7	48.6	48.6	48.6	27.7	26.1	5101	49.94	0.88	6000
	160 L	18.5	2945	35	0.89	53	60	60	60	34.2	32.19	5110	60.95	0.88	6000
	180 MR	22	2940	41.5	0.90	56.3	67.64	71.2	71.2	40.6	38.28	5110	72.46	0.88	5670
	200 LR	30	2935	56.2	0.90	76.9	92.44	97.3	97.3	80.76	-	-	-	-	4500
	200 L	37	2930	69.9	0.89	89.3	108	120	120	99.6	-	-	-	-	4500
	225 MR	45	2952	86	0.87	107.9	130.5	145	145	120.35	-	-	-	-	4320
	250 MZ	55	2940	103	0.89	132.43	160.2	178	178	147.74	-	-	-	-	4320
	280 SC	75	2964	136	0.90	179.3	216.9	241	241	200	-	-	-	-	4050
	280 MC	90	2968	163	0.90	241.9	289	289	289	239.9	-	-	-	-	4050
	315 SN	110	2962	197	0.91	263.38	318.6	354	354	293.8	-	-	-	-	3600
	315 MP	132	2974	242	0.89	314.71	380.7	423	423	351.1	-	-	-	-	3600
	315 MP	160	2974	292	0.90	381.67	461.7	513	513	425.8	-	-	-	-	3600
	315 MP	200	2968	320	0.89	421.85	567	567	567	567	-	-	-	-	3600

** For power > 200 kW, please contact us.*

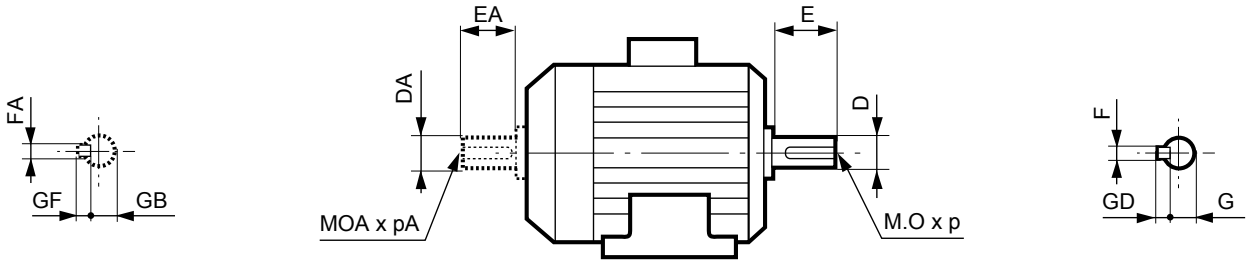
4 poles															
LSPX* LSES	**80 LG**	0.75	1450	1.7	0.80	4.46	4.95	4.95	4.95	2.84	1.31	2511	2.96	0.83	11700
	90 SL	1.1	1450	2.43	0.81	6.53	7.25	7.25	7.25	4.17	1.91	2511	4.23	0.84	11700
	90 LU	1.5	1452	3.31	0.79	8.87	9.85	9.85	9.85	5.66	2.61	2515	5.76	0.79	11700
	100 LR	2.2	1445	4.9	0.81	13.39	14.4	14.4	14.4	8.21	3.83	2518	8.3	0.79	9900
	100 LG	3	1456	6.4	0.83	16.41	19.6	19.6	19.6	11.17	5.22	2529	11.09	0.81	9900
	112 MU	4	1452	8.45	0.85	21.93	26.2	26.2	26.2	14.93	6.96	2525	14.56	0.80	9900
	132 SM	5.5	1456	11.3	0.86	33.39	35.9	35.9	35.9	20.46	9.57	2532	19.13	0.85	6700
	132 MU	7.5	1450	15	0.88	45.66	49.1	49.1	49.1	27.99	13.05	2525	25.9	0.86	6700
	160 MR	9	1458	18.2	0.86	54.6	58.7	58.7	58.7	33.46	15.66	2536	30.98	0.85	6000
	160 M	11	1462	21.7	0.88	60	71.7	71.7	71.7	40.87	19.14	2539	37.58	0.85	6000
	160 LUR	15	1464	29.6	0.87	81.7	97.6	97.6	97.6	55.63	26.1	2543	50.79	0.85	5670
	180 M	18.5	1466	36.4	0.87	94.86	120	120	120	68.4	32.19	2543	63.15	0.85	5670
	180 LUR	22	1466	44.1	0.85	113	143	143	143	81.51	38.28	2546	75.85	0.83	4500
	200 LU	30	1472	59.1	0.85	144.34	194	194	194	110.6	52.2	2557	102.93	0.84	4500
	225 SR	37	1476	74.5	0.83	177.82	239	239	239	136.23	64.38	2584	126.97	0.81	4320
	225 MG	45	1480	89	0.84	229.25	290	290	290	165.3	78.3	2570	152.88	0.83	4050
	250 ME	55	1482	107	0.85	279.84	354	354	354	201.78	95.7	2570	187.92	0.83	4050
	280 SD	75	1484	147	0.84	381	482	482	482	274.74	-	-	-	-	3420
	280 MD	90	1482	177	0.83	457.7	579	579	579	330	-	-	-	-	3420
	315 SP	110	1486	212	0.85	624.63	707	707	707	403	-	-	-	-	2700
	315 MP	132	1486	253	0.85	748.32	847	847	847	482.8	-	-	-	-	2700
	315 MP	160	1484	309	0.85	814.22	1030	1030	1030	587.1	-	-	-	-	2700
	315 MR	200	1484	383	0.85	1019.75	1290	1290	1290	735.3	-	-	-	-	2700

** For power > 200 kW, please contact us.*

6 poles															
LSPX* LSES	**90 SL**	0.75	950	1.9	0.72	7.55	7.55	7.55	7.55	4.34	1.31	1645	3.39	0.75	11700
	90 LU	1.1	956	2.75	0.71	11	11	11	11	6.32	1.91	1656	4.74	0.71	11700
	100 LG	1.5	962	3.85	0.73	13.1	14.8	14.8	14.8	8.44	2.61	1673	6.6	0.72	9900
	112 MU	2.2	960	5.65	0.73	19.17	21.7	21.7	21.7	12.37	3.83	1673	9.57	0.70	9900
	132 SM	3	968	7.15	0.77	27.44	29.5	29.5	29.5	16.82	5.22	1684	12.02	0.73	6700
	132 M	4	968	9.55	0.76	36.55	39.3	39.3	39.3	22.4	6.96	1684	16.17	0.73	6700
	132 MU	5.5	960	12.6	0.79	50.59	54.4	54.4	54.4	31	9.57	1673	21.33	0.76	6700
	160 MU	7.5	974	18.7	0.79	68.1	73.2	73.2	73.2	41.72	13.05	1694	28.44	0.76	6700
	180 L	11	980	23.9	0.79	89.56	107	107	107	61	19.14	1701	40.8	0.77	5670
	180 LUR	15	976	32.4	0.79	122.2	146	146	146	83.22	26.1	1697	55.7	0.77	4500
	200 L	18.5	976	38.9	0.82	150.66	180	180	180	102.6	32.19	1697	66.53	0.80	4500
	200 LU	22	978	45	0.79	179.12	214	214	214	186.18	38.28	1697	80.59	0.77	4500
	225 MG	30	984	58.9	0.86	243.57	291	291	291	165.87	52.2	1708	101.92	0.84	4050
	250 ME	37	984	71.1	0.87	299.65	358	358	358	204.06	64.38	1708	124.43	0.85	4050
	280 SC	45	982	86.9	0.87	365.77	437	437	437	249.09	-	-	-	-	3420
	280 MD	55	984	105	0.87	446.12	533	533	533	303.81	-	-	-	-	3420
	315 SP	75	990	155	0.80	605.15	723	723	723	412.11	-	-	-	-	2700
	315 MP	90	990	183	0.81	726.52	868	868	868	494.76	-	-	-	-	2700
	315 MR	110	988	221	0.82	887.22	1060	1060	1060	604.2	-	-	-	-	2700
	315 MR	132	990	268	0.81	1062.99	1270	1270	1270	723.9	-	-	-	-	2700

** For power > 132 kW, please contact us.*

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Mechanical characteristics - Shaft ends

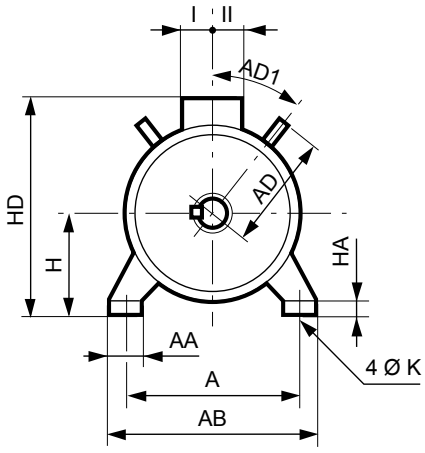


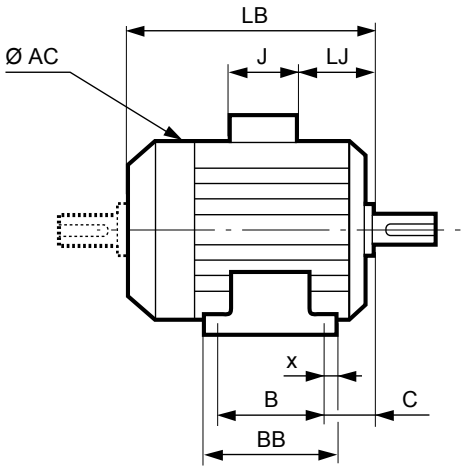
Series	Type	Main shaft end																		
		4 and 6 poles									2 poles									
		F	GD	D	G	E	O	p	L	LO	F	GD	D	G	E	O	p	L	LO
LSPX LSES	80 L/LG	6	6	19j6	15.5	40	M6	16	30	6	6	6	19j6	15.5	40	M6	16	30	6
	90 L/LU/SL	8	7	24j6	20	50	M8	19	40	6	8	7	24j6	20	50	M8	19	40	6
	100 L/LG/LR	8	7	28j6	24	60	M10	22	50	6	8	7	28j6	24	60	M10	22	50	6
	112 M/MG/MU	8	7	28j6	24	60	M10	22	50	6	8	7	28j6	24	60	M10	22	50	6
	132 M/MU/S/SM/SU	10	8	38k6	33	80	M12	28	63	10	10	8	38k6	33	80	M12	28	63	10
	160 L/LUR/M/MP/MR/MU	12	8	42k6	37	110	M16	36	100	6	12	8	42k6	37	110	M16	36	100	6
	180 L/LR/LUR/M/MR/MT	14	9	48k6	42.5	110	M16	36	98	12	14	9	48k6	42.5	110	M16	36	98	12
	200 L/LR/LU	16	10	55m6	49	110	M20	42	97	13	16	10	55m6	49	110	M20	42	97	13
	225 MR/MT	-	-	-	-	-	-	-	-	-	16	10	55m6	49	110	M20	42	97	13
	225 MG/MR/SR/ST	18	11	60m6	53	140	M20	42	126	14	-	-	-	-	-	-	-	-	-
	250 ME	18	11	65m6	58	140	M20	42	126	14	18	11	60m6	53	140	M20	42	126	14
	250 MZ	-	-	-	-	-	-	-	-	-	18	11	60m6	53	140	M20	42	126	14
	280 MC/MD/SC	20	12	75m6	67.5	140	M20	42	125	15	18	11	65m6	58	140	M20	42	126	14
	280 SD	20	12	75m6	67.5	140	M20	42	125	15	-	-	-	-	-	-	-	-	-
	315 MP/MR/SN/SP	22	14	80m6	71	170	M20	42	140	15	18	11	65m6	58	140	M20	42	126	14

Series	Type	Secondary shaft ends																	
		4 and 6 poles									2 poles								
		FA	GF	DA	GB	EA	OA	pA	L'	LO'	FA	GF	DA	GB	EA	OA	Pa	L'	LO'
LSPX LSES	80 L/LG	5	5	14j6	11	30	M5	15	25	3.5	5	5	14j6	11	30	M5	15	25	3.5
	90 L/LU/SL	6	6	19j6	15.5	40	M6	16	30	6	6	6	19j6	15.5	40	M6	16	30	6
	100 L/LG/LR	8	7	24j6	20	50	M8	19	40	6	8	7	24j6	20	50	M8	19	40	6
	112 MG/MU	8	7	24j6	20	50	M8	19	40	6	8	7	24j6	20	50	M8	19	40	6
	132 M/MU/S/SM/SU	8	7	28k6	24	60	M10	22	50	6	8	7	28k6	24	60	M10	22	50	6
	160 MP/MR	10	8	38k6	33	80	M12	28	63	10	10	8	38k6	33	80	M12	28	63	10
	160 L/LUR/M/MU	12	8	42k6	37	110	M16	36	100	6	12	8	42k6	37	110	M16	36	100	6
	180 L/LR/LUR/M/MR/MT	14	9	48k6	42.5	110	M16	36	97	13	14	9	48k6	42.5	110	M16	36	97	13
	200 L/LR/LU	16	10	55m6	49	110	M20	42	97	13	16	10	55m6	49	110	M20	42	97	13
	225 MG/MR	18	11	60m6	53	140	M20	42	126	14	16	10	55m6	49	110	M20	42	97	13
	225 MT	-	-	-	-	-	-	-	-	-	16	10	55m6	49	110	M20	42	97	13
	225 SR/ST	18	11	60m6	53	140	M20	42	126	14	-	-	-	-	-	-	-	-	-
	250 ME	18	11	60m6	53	140	M20	42	126	14	18	11	60m6	53	140	M20	42	126	14
	250 MZ	-	-	-	-	-	-	-	-	-	18	11	60m6	53	140	M20	42	126	14
	280 MC/MD/SC	18	11	65m6	58	140	M20	42	126	14	18	11	65m6	58	140	M20	42	126	14
	280 SD	18	11	65m6	58	140	M20	42	126	14	-	-	-	-	-	-	-	-	-
	315 SN	18	11	75m6	58	140	M20	42	125	15	18	11	65m6	58	140	M20	42	125	14
	315 MP/MR/SP	22	14	80m6	71	170	M20	42	140	30	18	11	65m6	58	140	M20	42	126	14

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Mechanical characteristics
Foot mounted IM 1001 (IMB3)

Dimensions in millimetres



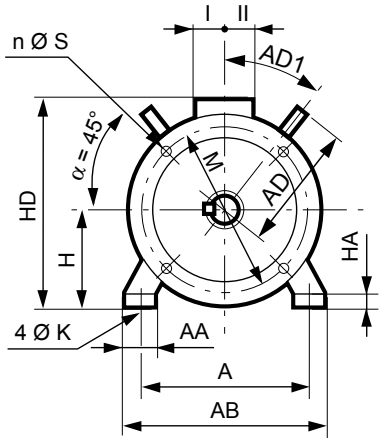


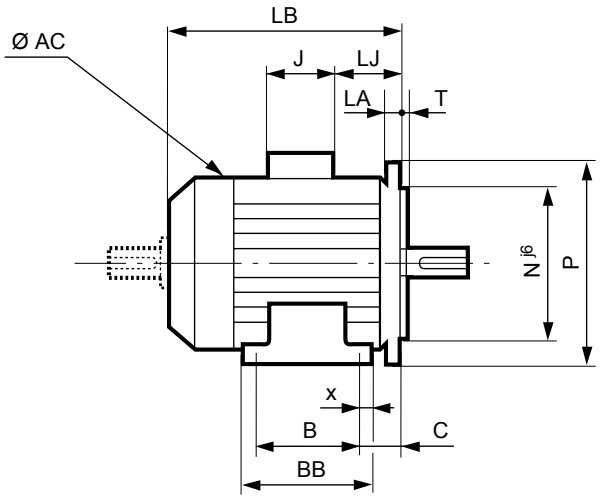
Series	Type	Main dimensions																		
		A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1
LSPX LSES	80 L	125	157	100	120	50	10	29	9	10	80	170	228	215	5.5	126	63	63	-	-
	80 LG	125	157	100	125	50	14	31	9	10	80	189	238	247	5.5	126	63	63	-	-
	90 L	140	172	125	164	56	28	39	10	11	90	189	248	245	5.5	126	63	63	-	-
	90 LU	140	172	125	164	56	28	39	10	11	90	189	248	276	5.5	126	63	63	-	-
	90 SL	140	172	100	164	56	28	39	10	11	90	189	248	245	5.5	126	63	63	-	-
	100 L	160	196	140	165	63	12	40	12	13	100	200	263	290	6.5	126	63	63	118	45
	100 LG	160	196	140	168	53	13	40	12	14	100	227	272	305	5.5	126	63	63	130	45
	100 LR	160	196	140	165	63	12	40	12	13	100	200	263	309	6.5	126	63	63	118	45
	112 M	190	220	140	165	70	13	44	12	14	112	200	275	290	6.5	126	63	63	118	45
	112 MG	190	219	140	168	60	14	52	12	13.5	112	231	284	305	5.5	126	63	63	130	45
	112 MU	190	219	140	168	60	14	52	12	13.5	112	231	284	322	5.5	126	63	63	130	45
	132 M	216	250	178	208	89	15	50	12	15	132	272	322	385	17	126	63	63	140	45
	132 MU	216	250	178	208	89	15	50	12	15	132	272	322	412	17	126	63	63	140	45
	132 S	216	250	140	170	89	15	42	12	16	132	227	304	351	32.5	126	63	63	130	45
	132 SM	216	250	140	208	89	15	50	12	15	132	272	323	385	17	126	63	63	140	45
	132 SU	216	250	140	170	89	15	42	12	16	132	227	304	383	32.5	126	63	63	130	45
	160 L	254	294	254	294	108	20	60	14.5	25	160	324	381	495	47	126	63	63	186	45
	160 LUR	254	294	254	294	108	20	60	14.5	25	160	324	381	510	47	126	63	63	186	45
	160 M	254	294	210	294	108	20	60	14.5	25	160	324	381	495	47	126	63	63	186	45
	160 MP	254	294	210	294	108	20	64	14	25	160	272	350	468	58.5	126	63	63	156	45
	160 MR	254	294	210	294	108	20	64	14	25	160	272	350	495	58.5	126	63	63	156	45
	160 MU	254	294	210	294	108	20	60	14.5	25	160	324	381	510	47	126	63	63	186	45
	180 L	279	339	279	329	121	25	86	14.5	25	180	350	476	552	27	259	115	151	225	45
	180 LR	279	324	279	321	121	20	79	14.5	29	180	317	468	520	17	259	115	151	177	45
	180 LUR	279	339	279	329	121	25	86	14.5	25	180	350	476	614	27	259	115	151	225	45
	180 M	279	339	241	291	121	25	86	14.5	25	180	350	476	552	27	259	115	151	225	45
	180 MR	279	324	279	321	121	20	79	14.5	29	180	317	448	520	17	259	115	151	177	45
	180 MT	279	324	241	321	121	20	79	14.5	29	180	317	468	495	17	259	115	151	177	45
	200 L	318	391	305	375	133	35	103	18.5	33	200	390	516	620.5	40.5	259	115	151	-	-
	200 LR	318	378	305	365	133	30	108	18.5	30	200	350	496	620	33	259	115	151	225	45
	200 LU	318	391	305	375	133	35	103	18.5	33	200	390	516	669.5	40.5	259	115	151	-	-
	225 MG	356	420	311	375	149	30	65	18.5	33	225	479	626	810	60	308	161	208	283	45
	225 MR	356	434	311	385	149	50	126	18.5	32	225	390	541	676	47	259	115	151	-	-
	225 MT	356	434	311	385	149	50	126	18.5	32	225	390	541	627	47	259	115	151	-	-
	225 SR	356	434	286	385	149	50	126	18.5	32	225	390	541	676	47	259	115	151	-	-
	225 ST	356	434	286	385	149	50	126	18.5	32	225	390	541	627	47	259	115	151	-	-
	250 ME	406	470	349	420	168	35	90	24	35	250	479	651	810	60	308	161	208	283	45
	250 MZ	406	475	349	448	168	70	149	24	39	250	390	566	676	47	259	115	151	-	-
	280 MC	457	520	419	478	190	35	90	24	35	280	479	681	810	60	308	161	208	283	45
	280 MD	457	520	419	478	190	35	90	24	35	280	479	681	870	60	308	161	208	283	45
	280 SC	457	520	368	478	190	35	90	24	35	280	479	681	810	60	308	161	208	283	45
	280 SD	457	520	368	478	190	35	90	24	35	280	479	681	870	60	308	161	208	283	45
	315 MP	508	594	457	537	216	40	114	28	70	315	586	777	947	117	308	161	208	340	45
	315 MR	508	594	457	537	216	40	114	28	70	315	586	777	1017	117	308	161	208	340	45
	315 SN	508	599	406	537	214	40	140	28	50	315	479	716	868	58	308	161	208	283	45
	315 SP	508	594	406	534	216	38	115	28	71	315	586	777	947	117	308	161	208	335	45

** AC: housing diameter without lifting rings*

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Mechanical characteristics
Foot and flange mounted IM 2001 (IM B35)

Dimensions in millimetres



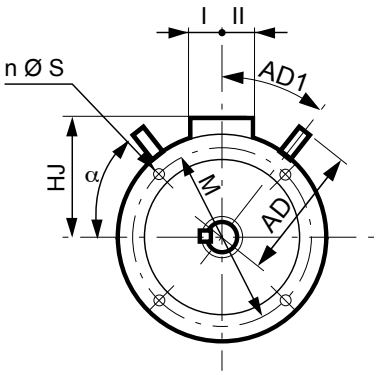


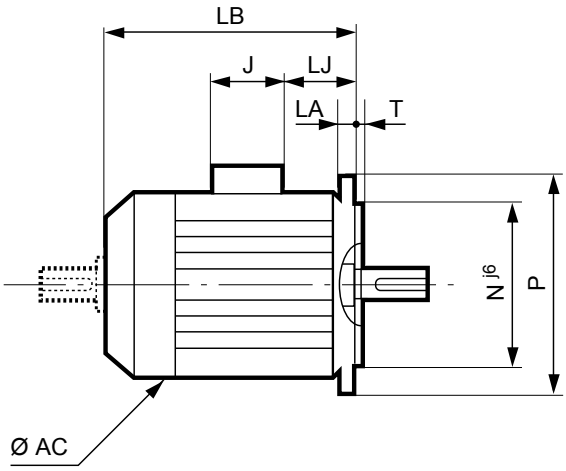
Series	Type	Main dimensions																			
		A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1	Symb
	80 L	125	157	100	120	50	10	29	9	10	80	170	228	215	5.5	126	63	63	-	-	FF165
	80 LG	125	157	100	125	50	14	31	9	10	80	189	238	247	5.5	126	63	63	-	-	FF165
	90 L	140	172	125	164	56	28	39	10	11	90	189	248	245	5.5	126	63	63	-	-	FF165
	90 LU	140	172	125	164	56	28	39	10	11	90	189	248	276	5.5	126	63	63	-	-	FF165
	90 SL	140	172	100	164	56	28	39	10	11	90	189	248	245	5.5	126	63	63	-	-	FF165
	100 L	160	196	140	165	63	12	40	12	13	100	200	263	290	6.5	126	63	63	118	45	FF215
	100 LG	160	196	140	168	53	13	40	12	14	100	227	272	305	5.5	126	63	63	130	45	FF215
	100 LR	160	196	140	165	63	12	40	12	13	100	200	263	309	6.5	126	63	63	118	45	FF215
	112 M	190	220	140	165	70	13	44	12	14	112	200	275	290	6.5	126	63	63	118	45	FF215
	112 MG	190	219	140	168	60	14	52	12	13.5	112	231	284	305	5.5	126	63	63	130	45	FF215
	112 MU	190	219	140	168	60	14	52	12	13.5	112	231	284	322	5.5	126	63	63	130	45	FF215
	132 M	216	250	178	208	89	15	50	12	15	132	272	322	385	17	126	63	63	140	45	FF265
	132 MU	216	250	178	208	89	15	50	12	15	132	272	322	412	17	126	63	63	140	45	FF265
	132 S	216	250	140	170	89	15	42	12	16	132	227	304	351	32.5	126	63	63	130	45	FF265
	132 SM	216	250	140	208	89	15	50	12	15	132	272	323	385	17	126	63	63	140	45	FF265
	132 SU	216	250	140	170	89	15	42	12	16	132	227	304	383	32.5	126	63	63	130	45	FF265
	160 L	254	294	254	294	108	20	60	14.5	25	160	324	381	495	47	126	63	63	186	45	FF300
	160 LUR	254	294	254	294	108	20	60	14.5	25	160	324	381	510	47	126	63	63	186	45	FF300
	160 M	254	294	210	294	108	20	60	14.5	25	160	324	381	495	47	126	63	63	186	45	FF300
	160 MP	254	294	210	294	108	20	64	14	25	160	272	350	468	58.5	126	63	63	156	45	FF300
	160 MR	254	294	210	294	108	20	64	14	25	160	272	350	495	58.5	126	63	63	156	45	FF300
	160 MU	254	294	210	294	108	20	60	14.5	25	160	324	381	510	47	126	63	63	186	45	FF300
LSPX LSES	180 L	279	339	279	329	121	25	86	14.5	25	180	350	476	552	27	259	115	151	225	45	FF300
	180 LR	279	324	279	321	121	20	79	14.5	29	180	317	468	520	17	259	115	151	177	45	FF300
	180 LUR	279	339	279	329	121	25	86	14.5	25	180	350	476	614	27	259	115	151	225	45	FF300
	180 M	279	339	241	291	121	25	86	14.5	25	180	350	476	552	27	259	115	151	225	45	FF300
	180 MR	279	324	279	321	121	20	79	14.5	29	180	317	448	520	17	259	115	151	177	45	FF300
	180 MT	279	324	241	321	121	20	79	14.5	29	180	317	468	495	17	259	115	151	177	45	FF300
	200 L	318	391	305	375	133	35	103	18.5	33	200	390	516	620.5	40.5	259	115	151	-	-	FF350
	200 LR	318	378	305	365	133	30	108	18.5	30	200	350	496	620	33	259	115	151	225	45	FF350
	200 LU	318	391	305	375	133	35	103	18.5	33	200	390	516	669.5	40.5	259	115	151	-	-	FF350
	225 MG	356	420	311	375	149	30	65	18.5	33	225	479	626	810	60	308	161	208	283	45	FF400
	225 MR	356	434	311	385	149	50	126	18.5	32	225	390	541	676	47	259	115	151	-	-	FF400
	225 MT	356	434	311	385	149	50	126	18.5	32	225	390	541	627	47	259	115	151	-	-	FF400
	225 SR	356	434	286	385	149	50	126	18.5	32	225	390	541	676	47	259	115	151			FF400
	225 ST	356	434	286	385	149	50	126	18.5	32	225	390	541	627	47	259	115	151	-	-	FF400
	250 ME	406	470	349	420	168	35	90	24	35	250	479	651	810	60	308	161	208	283	45	FF500
	250 MZ	406	475	349	448	168	70	149	24	39	250	390	566	676	47	259	115	151	-	-	FF500
	280 MC	457	520	419	478	190	35	90	24	35	280	479	681	810	60	308	161	208	283	45	FF500
	280 MD	457	520	419	478	190	35	90	24	35	280	479	681	870	60	308	161	208	283	45	FF500
	280 SC	457	520	368	478	190	35	90	24	35	280	479	681	810	60	308	161	208	283	45	FF500
	280 SD	457	520	368	478	190	35	90	24	35	280	479	681	870	60	308	161	208	283	45	FF500
	315 MP	508	594	457	537	216	40	114	28	70	315	586	777	947	117	308	161	208	340	45	FF600
	315 MR	508	594	457	537	216	40	114	28	70	315	586	777	1017	117	308	161	208	340	45	FF600
	315 SN	508	599	406	537	214	40	140	28	50	315	479	716	868	58	308	161	208	283	45	FF600
	315 SP	508	594	406	534	216	38	115	28	71	315	586	777	947	117	308	161	208	335	45	FF600

** AC: housing diameter without lifting rings*

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium - Mechanical characteristics
Flange mounted IM 3001 (IM B5) - IM 3011 (IM V1)

Dimensions in millimetres





Series	Type	Main dimensions								
		AC*	LB	HJ	LJ	J	I	II	AD	AD1
	80 L	170	215	146	5.5	126	63	63	-	-
	80 LG	189	267	156	25.5	126	63	63	-	-
	90 L	189	265	156	25.5	126	63	63	-	-
	90 LU	189	296	156	25.5	126	63	63	-	-
	90 SL	189	265	156	25.5	126	63	63	-	-
	100 L	200	290	161	5.5	126	63	63	-	-
	100 LG	235	315	170	15.5	126	63	63	-	-
	100 LR	200	309	161	5.5	126	63	63	-	-
	112 M	200	290	161	5.5	126	63	63	-	-
	112 MG	235	315	170	15.5	126	63	63	-	-
	112 MU	235	332	170	15.5	126	63	63	-	-
	132 M	272	385	191	17	126	63	63	140	45
	132 MU	272	412	191	17	126	63	63	140	45
	132 S	227	351	173	32.5	126	63	63	130	45
	132 SM	272	385	191	17	126	63	63	140	45
	132 SU	227	383	173	32.5	126	63	63	130	45
	160 L	312	495	221	47	126	63	63	186	45
	160 LUR	312	510	221	47	126	63	63	186	45
	160 M	312	495	221	48	126	63	63	186	45
	160 MP	272	468	191	58	126	63	63	156	45
	160 MR	272	495	191	58	126	63	63	156	45
	160 MU	312	510	221	48	126	63	63	186	45
LSPX	180 L	350	552	296	27	259	115	151	225	45
LSES	180 LR	312	520	288	17	259	115	151	186	45
	180 LUR	350	614	296	27	259	115	151	225	45
	180 M	350	552	296	27	259	115	151	225	45
	180 MR	312	520	268	17	259	115	151	186	45
	180 MT	312	495	288	17	259	115	151	186	45
	200 L	390	620.5	316	40.5	259	115	151	-	-
	200 LR	350	620	296	33	259	115	151	225	45
	200 LU	390	669.5	316	40.5	259	115	151	-	-
	225 MG	479	810	401	60	308	161	208	283	45
	225 MR	390	676	316	47	259	115	151	-	-
	225 MT	390	627	316	47	259	115	151	-	-
	225 SR	390	676	316	47	259	115	151	-	-
	225 ST	390	627	316	47	259	115	151	-	-
	250 ME	479	810	401	60	308	161	208	283	45
	250 MZ	390	676	316	47	259	115	151	-	-
	280 MC	479	810	401	60	308	161	208	283	45
	280 MD	479	870	401	60	308	161	208	283	45
	280 SC	479	810	401	60	308	161	208	283	45
	280 SD	479	870	401	60	308	161	208	283	45
	315 MP	586	947	462	117	308	161	208	340	45
	315 MR	586	1017	462	117	308	161	208	340	45
	315 SN	479	870	401	60	308	161	208	283	45
	315 SP	586	947	462	117	308	161	208	340	45

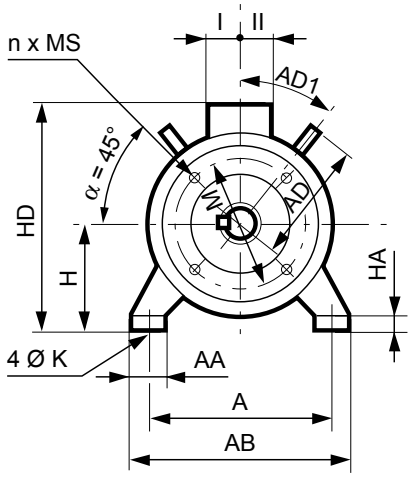
** AC: housing diameter without lifting rings*

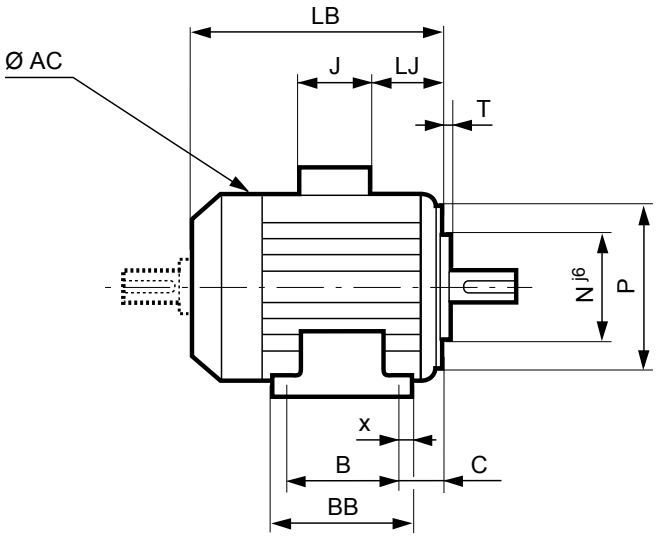
IEC symbol	Flange dimensions							
	M	N	D	T	n	α°	S	LA
FF165	165	130	200	3.5	4	45	12	10
FF165	165	130	200	3.5	4	45	12	10
FF165	165	130	200	3.5	4	45	12	10
FF165	165	130	200	3.5	4	45	12	10
FF165	165	130	200	3.5	4	45	12	10
FF215	215	180	250	4	4	45	14.5	12
FF215	215	180	250	4	4	45	14.5	13
FF215	215	180	250	4	4	45	14.5	12
FF215	215	180	250	4	4	45	14.5	12
FF215	215	180	250	4	4	45	14.5	13
FF215	215	180	250	4	4	45	14.5	13
FF265	265	230	300	4	4	45	14.5	14
FF265	265	230	300	4	4	45	14.5	14
FF265	265	230	300	4	4	45	14.5	14
FF265	265	230	300	4	4	45	14.5	14
FF265	265	230	300	4	4	45	14.5	14
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	14
FF300	300	250	350	5	4	45	18.5	14
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF300	300	250	350	5	4	45	18.5	15
FF350	350	300	400	5	4	45	18.5	15
FF350	350	300	400	5	4	45	18.5	15
FF400	400	350	450	5	8	22.5	18.5	16
FF400	400	350	450	5	8	22.5	18.5	16
FF400	400	350	450	5	8	22.5	18.5	16
FF400	400	350	450	5	8	22.5	18.5	16
FF400	400	350	450	5	8	22.5	18.5	16
FF500	500	450	550	5	8	22.5	18.5	22
FF500	500	450	550	5	8	22.5	18.5	18
FF500	500	450	550	5	8	22.5	18.5	22
FF500	500	450	550	5	8	22.5	18.5	22
FF500	500	450	550	5	8	22.5	18.5	22
FF500	500	450	550	5	8	22.5	18.5	22
FF600	600	550	660	6	8	22.5	24	22
FF600	600	550	660	6	8	22.5	24	22
FF600	600	550	660	6	8	22.5	24	22
FF600	600	550	660	6	8	22.5	24	22

For frame sizes ≥ 250 mm for IM 301 use, please contact us. Dimensions of shaft ends identical to those for foot mounted motors.

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium - Mechanical characteristics
Foot and face mounted IM 2101 (IM B34)

Dimensions in millimetres



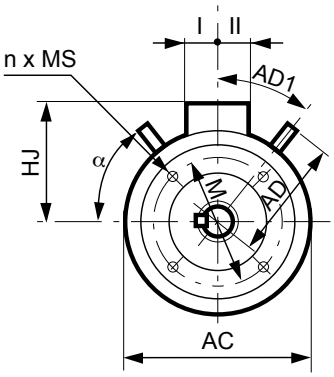


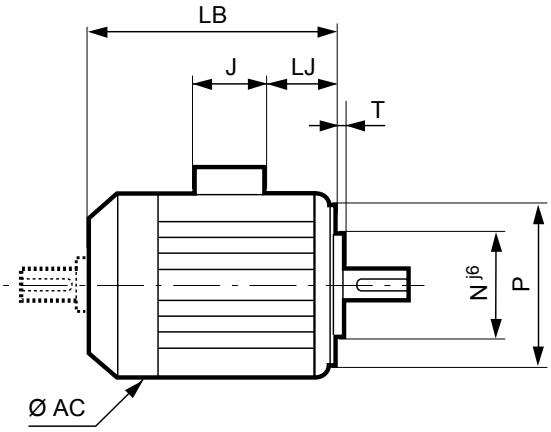
Series	Type	Main dimensions																			
		A	AB	B	BB	C	x	AA	K	HA	H	AC*	HD	LB	LJ	J	I	II	AD	AD1	Symb
LSPX LSES	80 L	125	157	100	120	50	10	29	9	10	80	170	228	215	5.5	126	63	63	-	-	FT100
	80 LG	125	157	100	125	50	14	31	9	10	80	189	238	247	5.5	126	63	63	-	-	FT100
	90 L	140	172	125	164	56	28	39	10	11	90	189	248	245	5.5	126	63	63	-	-	FT115
	90 LU	140	172	125	164	56	28	39	10	11	90	189	248	276	5.5	126	63	63	-	-	FT115
	90 SL	140	172	100	164	56	28	39	10	11	90	189	248	245	5.5	126	63	63	-	-	FT115
	100 L	160	196	140	165	63	12	40	12	13	100	200	263	290	6.5	126	63	63	118	45	FT130
	100 LG	160	196	140	168	53	13	40	12	14	100	227	272	305	5.5	126	63	63	130	45	FT130
	100 LR	160	196	140	165	63	12	40	12	13	100	200	263	309	6.5	126	63	63	118	45	FT130
	112 M	190	220	140	165	70	13	44	12	14	112	200	275	290	6.5	126	63	63	118	45	FT130
	112 MG	190	219	140	168	60	14	52	12	13.5	112	231	284	305	5.5	126	63	63	130	45	FT130
	112 MU	190	219	140	168	60	14	52	12	13.5	112	231	284	322	5.5	126	63	63	130	45	FT130
	132 M	216	250	178	208	89	15	50	12	15	132	272	322	385	17	126	63	63	140	45	FT165
	132 MU	216	250	178	208	89	15	50	12	15	132	272	322	412	17	126	63	63	140	45	FT165
	132 S	216	250	140	170	89	15	42	12	16	132	227	304	351	32.5	126	63	63	130	45	FT165
	132 SM	216	250	140	208	89	15	50	12	15	132	272	323	385	17	126	63	63	140	45	FT165
	132 SU	216	250	140	170	89	15	42	12	16	132	227	304	383	32.5	126	63	63	130	45	FT165
	160 MP	254	294	210	294	108	20	64	14	25	160	272	350	468	58.5	126	63	63	156	45	FT215
	160 MR	254	294	210	294	108	20	64	14	25	160	272	350	495	58.5	126	63	63	156	45	FT215

** AC: housing diameter without lifting rings*

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium - Mechanical characteristics
Face mounted IM 3601 (IM B14)

Dimensions in millimetres





Series	Type	Main dimensions								
		AC*	LB	HJ	LJ	J	I	II	AD	AD1
LSPX LSES	80 L	170	215	146	5.5	126	63	63	-	-
	80 LG	189	247	156	5.5	126	63	63	-	-
	90 L	189	245	156	5.5	126	63	63	-	-
	90 LU	189	276	156	5.5	126	63	63	-	-
	90 SL	189	245	156	5.5	126	63	63	-	-
	100 L	200	290	161	5.5	126	63	63	-	-
	100 LG	235	305	170	5.5	126	63	63	-	-
	100 LR	200	309	161	5.5	126	63	63	-	-
	112 M	200	290	161	5.5	126	63	63	-	-
	112 MG	235	315	170	15.5	126	63	63	-	-
	112 MU	235	332	170	15.5	126	63	63	-	-
	132 M	272	385	191	17	126	63	63	140	45
	132 MU	272	412	191	17	126	63	63	140	45
	132 S	227	351	173	32.5	126	63	63	130	45
	132 SM	272	385	191	17	126	63	63	140	45
	132 SU	227	383	173	32.5	126	63	63	130	45
	160 MP	272	468	191	58	126	63	63	156	45
	160 MR	272	495	191	58	126	63	63	156	45

IEC symbol	Flange dimensions						
	M	N	D	T	n	α°	S
FT100	100	80	120	3	4	45	M6
FT100	100	80	120	3	4	45	M6
FT115	115	95	140	3	4	45	M8
FT115	115	95	140	3	4	45	M8
FT115	115	95	140	3	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT130	130	110	160	3.5	4	45	M8
FT165	165	130	200	3.5	4	45	M10
FT165	165	130	200	3.5	4	45	M10
FT165	165	130	200	3.5	4	45	M10
FT165	165	130	200	3.5	4	45	M10
FT165	165	130	200	3.5	4	45	M10
FT215	215	180	250	4	4	45	M12
FT215	215	180	250	4	4	45	M12

** AC: housing diameter without lifting rings*

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium - Mechanical characteristics
Bearings and lubrication

PERMANENTLY GREASED BEARINGS

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

Series	Type	Polarity	Bearing types Permanently greased		Bearing service life as a function of rotation speed								
					3000 min^{-1}			1500 min^{-1}			1000 min^{-1}		
			N.D.E.	D.E.	25°C	40°C	55°C	25°C	40°C	55°C	25°C	40°C	55°C
LSPX LSES	80 L	2	6203 CN	6204 C3	≥ 40000	≥ 40000	25000	-	-	-	-	-	-
	80 LG	2; 4	6204 C3	6205 C3	≥ 40000	≥ 40000	24000	≥ 40000	≥ 40000	31000	-	-	-
	90 SL/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 M	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 SM/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/MU	6	6210 C3	6309 C3	-	-	-	-	-	-	≥ 40000	≥ 40000	27000
	160 L	2; 4; 6			≥ 40000	30000	15000	≥ 40000	≥ 40000	23000			
	160 LUR	4; 6	6210 C3	6310 C3	-	-	-	≥ 40000	≥ 40000	23000	≥ 40000	≥ 40000	27000
	180 MT	2; 4			≥ 40000	30000	15000				-	-	-
	180 M	4	6212 C3	6310 C3	-	-	-	≥ 40000	≥ 40000	24900	-	-	-
	180 L	6						-	-	-	≥ 40000	≥ 40000	28000
	180 LR	4	6210 C3	6310 C3	-	-	-	≥ 40000	≥ 40000	23000	-	-	-
	180 LUR	4; 6	6312 C3	6310 C3	-	-	-	≥ 40000	≥ 40000	22000	≥ 40000	≥ 40000	27000
	200 L	2; 6	6214 C3	6312 C3	≥ 40000	25000	12500	-	-	-	≥ 40000	≥ 40000	27000
	200 LR	2; 4; 6	6312 C3	6312 C3	≥ 40000	25000	12500	≥ 40000	≥ 40000	22000	≥ 40000	≥ 40000	27000
	200 LU	4; 6			-	-	-						
	225 ST	4	6214 C3	6313 C3	-	-	-	≥ 40000	≥ 40000	21000	-	-	-
	225 MT	2			≥ 40000	22000	11000	-	-	-			
	225 SR	4	6312 C3	6313 C3	-	-	-	≥ 40000	≥ 40000	21000	-	-	-
	225 MR	2; 4; 6			≥ 40000	22000	11000				≥ 40000	≥ 40000	26000
	225 MG	4; 6	6216 C3	6314 C3	-	-	-	≥ 40000	≥ 40000	20000	≥ 40000	≥ 40000	25000

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Mechanical characteristics - Bearings and lubrication

BEARINGS WITH GREASE NIPPLES

For open bearing assemblies fitted with grease nipples, the table opposite indicates, depending on the type of motor, the lubrication intervals to be respected at 25°C, 40°C and 55°C for a machine installed with a horizontal shaft.

The table below is valid for LSPX and LSES motors lubricated with Polyrex EM103 grease used as standard.

Series	Type	Polarity	Bearing type for bearing housings with grease nipples		Quantity of grease	Lubrication intervals in hours								
						3000 min^{-1}			1500 min^{-1}			1000 min^{-1}		
			N.D.E.	D.E.	g	25°C	40°C	55°C	25°C	40°C	55°C	25°C	40°C	55°C
LSPX LSES	160 M/MU*	2; 4; 6	6210 C3	6309 C3	13	22200	11100	5550	32400	16200	8100	39800	19900	9950
	160 L*													
	180 MR*	2	6210 C3	6310 C3	15	19600	9800	4900	-	-	-	-	-	-
	180 MT*	2; 4							30400	15200	7600			
	180 LR*	4				-	-	-						
	180 LUR*	4; 6	6312 C3	6310 C3	20	-	-	-	26800	13400	6700	35000	17500	8750
	180 M*	4	6212 C3	6310 C3	15	-	-	-	29200	14600	7300	-	-	-
	180 L*	6							-	-	-	37200	18600	9300
	200 LR*	2; 4; 6	6312 C3	6312 C3	20	15200	7600	3800	26800	13400	6700	35000	17500	8750
	200 LU*	4; 6				-	-	-						
	200 L*	2; 6	6214 C3	6312 C3	20	14600	7300	3650	-	-	-	34600	17300	8650
	225 ST*	4	6214 C3	6313 C3	25	-	-	-	25200	12600	6300	-	-	-
	225 MT*	2				10600	5300	2650	-	-	-			
	225 SR/MR*	2; 4; 6	6312 C3	6313 C3	25	13400	6700	3350	25200	12600	6300	33600	16800	8400
	225 MG*	4; 6	6216 C3	6314 C3	25	-	-	-	23600	11800	5900	32200	16100	8050
	250 MZ	2	6312 C3	6313 C3	25	13400	6700	3350	-	-	-	-	-	-
	250 ME	4; 6	6216 C3	6314 C3	25	-	-	-	23600	11800	5900	32200	16100	8050
	280 SC/MC	2				11800	5900	2950	-	-	-	-	-	-
	280 SC	6	6216 C3	6316 C3	35	-	-	-	-	-	-	32200	16100	8050
	280 SD/MD	4; 6	6218 C3	6316 C3	35	-	-	-	20800	10400	5200	29600	14800	7400
	315 SN	2	6216 C3	6316 C3	35	5600	2800	1400	-	-	-	-	-	-
	315 MP	2	6317 C3	6317 C3	40	5200	2600	1300	-	-	-	-	-	-
	315 SP	4	6317 C3	6320 C3	50	-	-	-	15800	7900	3950	-	-	-
	315 MP/MR	4; 6										21200	10600	5300

** bearing housings with grease nipples on request*

CONSTRUCTION AND SPECIAL ATMOSPHERES

For a machine installed with a vertical shaft, the lubrication intervals are approximately 80% of the values shown in the table below.

NB: The quality and quantity of grease along with the lubrication interval are indicated on the machine nameplate.

In the case of special fitting arrangements (motors with roller bearing at the front or other mountings), machines with frame size ≥ 160 mm are fitted with grease nipple bearings.

The instructions required for bearing housing maintenance are shown on the machine nameplate.

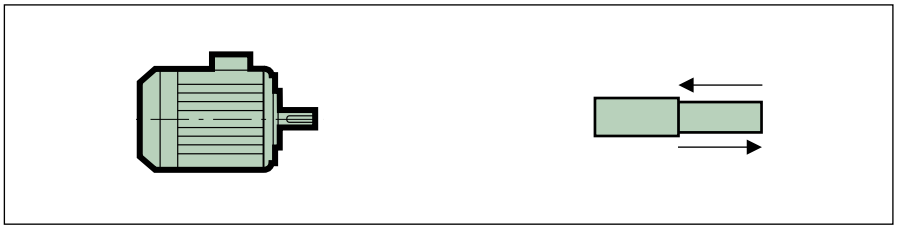
BEARING MOUNTING PRINCIPLE

LSPX / LSES series		Horizontal shaft	Vertical shaft	
			Shaft end down	Shaft end up
Foot mounted motors	Mounting arrangements	B3	V5	V6
	standard fitting	Front bearing: - Front stop for types ≤ 160 MP/MR/LR - locked for types ≥ 160 M/MU/L/LUR	Front bearing locked	Front bearing locked
Flange mounted motors (or feet and flange)	Mounting arrangements	B5 / B35 / B14 / B34	V1 / V15 / V18 / V58	V3 / V36 / V19 / V69
	standard fitting	Front bearing locked	Front bearing locked	Front bearing locked

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Mechanical characteristics - Axial loads

Horizontal motor

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



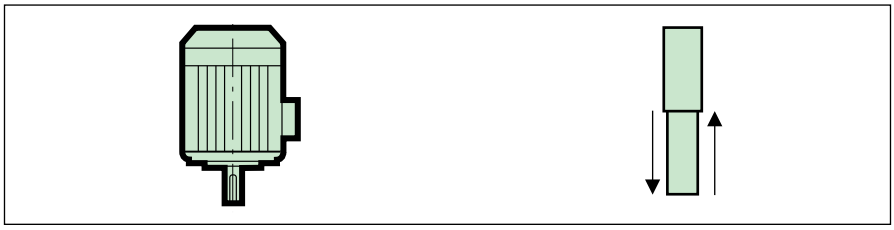
Series	Type	Polarity	Permissible axial load (daN) on the main drive shaft for standard fitting of bearings IM B3 / B6 IM B7 / B8 IM B5 / B35 IM B14 / B34											
			3000 min-1				1500 min-1				1000 min-1			
			→ 25,000 hours	→ 40,000 hours	← 25,000 hours	← 40,000 hours	→ 25,000 hours	→ 40,000 hours	← 25,000 hours	← 40,000 hours	→ 25,000 hours	→ 40,000 hours	← 25,000 hours	← 40,000 hours
LSPX LSES	80 L	2	30	21	(60)	(51)	-	-	-	-	-	-	-	-
	80 LG	2; 4	28	19	(68)	(59)	48	34	(88)	(74)	-	-	-	-
	90 SL/L	2; 4; 6	29	23	(69)	(56)	45	32	(85)	(72)	56	40	(96)	(80)
	90 LU	2; 4; 6	22	13	(72)	(63)	38	25	(88)	(75)	47	32	(97)	(82)
	100 L	2; 6	42	28	(92)	(78)	-	-	-	-	78	57	(128)	(107)
	100 LR	4	-	-	-	-	58	39	(108)	(90)	-	-	-	-
	100 LG	4; 6	-	-	-	-	55	38	(105)	(88)	75	53	(125)	(103)
	112 M	2	38	25	(88)	(75)	-	-	-	-	-	-	-	-
	112 MG	2; 6	37	24	(87)	(74)	-	-	-	-	126	104	(76)	(54)
	112 MU	4; 6	-	-	-	-	54	36	(114)	(96)	66	45	(126)	(105)
	132 S	2; 6	69	49	(129)	(109)	-	-	-	-	124	93	(184)	(153)
	132 SU	2; 4	65	46	(125)	(106)	99	73	(159)	(133)	-	-	-	-
	132 SM/M	2; 4; 6	101	74	(171)	(144)	148	111	(218)	(181)	178	134	(248)	(204)
	132 MU	4; 6	-	-	-	-	139	103	(219)	(183)	168	124	(248)	(204)
	160 MP	2	140	104	(220)	(184)	-	-	-	-	-	-	-	-
	160 MR	2; 4	131	95	(221)	(185)	193	145	(283)	(235)	-	-	-	-
	160 M	2; 4; 6	132	96	232	196	187	140	287	240	235	179	335	279
	160 MU	6	-	-	-	-	-	-	-	-	219	164	319	264
	160 L	2; 4; 6	128	96	228	196	183	136	283	236	231	175	331	275
	160 LUR	4; 6	-	-	-	-	213	159	313	259	257	193	357	293
	180 M	4	-	-	-	-	228	174	291	237	-	-	-	-
	180 MR	2	156	115	256	215	-	-	-	-	-	-	-	-
	180 MT	2; 4	159	118	259	218	214	160	314	260	-	-	-	-
	180 L	6	-	-	-	-	-	-	-	-	265	201	328	264
	180 LR	4	-	-	-	-	203	150	303	250	-	-	-	-
	180 LUR	4; 6	-	-	-	-	224	170	287	233	224	162	287	225
	200 L	2; 6	244	190	310	256	-	-	-	-	362	278	428	344
	200 LR	2; 4; 6	244	191	307	254	312	241	375	304	341	258	404	321
	200 LU	4; 6	-	-	-	-	316	245	379	308	327	245	390	308
	225 SG	4	-	-	-	-	411	321	481	391	-	-	-	-
	225 SR	4	-	-	-	-	350	271	420	341	-	-	-	-
	225 ST	4	-	-	-	-	372	292	438	358	-	-	-	-
	225 MG	4; 6	-	-	-	-	407	317	477	387	535	426	605	496
	225 MR	2; 4; 6	280	220	343	283	358	278	421	341	409	315	472	378
	225 MT	2	281	221	347	287	-	-	-	-	-	-	-	-
	250 ME	4; 6	-	-	-	-	400	311	470	381	471	365	541	435
	250 MZ	2	277	217	340	280	-	-	-	-	-	-	-	-
	280 SC	2; 6	303	236	373	306	-	-	-	-	461	355	531	425
	280 SD	4	-	-	-	-	454	349	542	437	-	-	-	-
	280 MC	2	300	233	370	303	-	-	-	-	-	-	-	-
	280 MD	4; 6	-	-	-	-	446	342	534	430	524	401	612	489
	315 SN	2	357	279	427	349	-	-	-	-	-	-	-	-
	315 SP	4; 6	-	-	-	-	814	671	634	491	950	780	770	600
	315 MP	2; 4; 6	487	405	307	225	768	628	588	448	917	749	737	569
	315 MR	4; 6	-	-	-	-	770	630	590	450	864	699	684	519

( ): permissible axial loads with Front bearing locked

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Mechanical characteristics - Axial loads

Vertical motor
Shaft end downwards

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



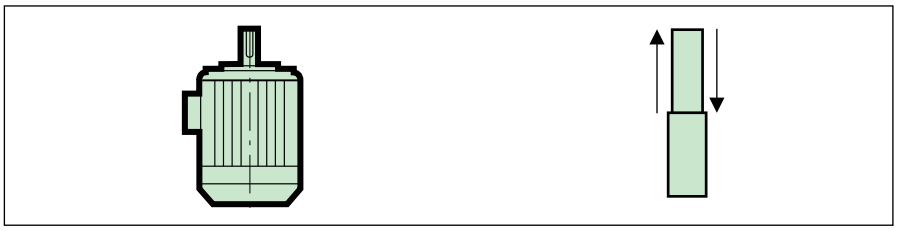
Series	Type	Polarity	Permissible axial load (daN) on the main drive shaft for standard fitting of bearings											
			IM V5 / IM V1 / V15 / IM V18 / V58											
			3000 min-1				1500 min-1				1000 min-1			
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours
LS / LSES	80 L	2	29	20	(63)	(54)	-	-	-	-	-	-	-	-
	80 LG	2; 4	26	16	(72)	(62)	45	32	(93)	(78)	-	-	-	-
	90 SL/L	2; 4; 6	26	16	(73)	(63)	42	28	(91)	(78)	53	37	(101)	(86)
	90 LU	2; 4; 6	19	9	(77)	(67)	33	20	(95)	(82)	43	28	(105)	(89)
	100 L	2; 6	38	24	(98)	(85)	-	-	-	-	73	52	(137)	(115)
	100 LR	4	-	-	-	-	52	34	(117)	(99)	-	-	-	-
	100 LG	4; 6	-	-	-	-	48	31	(116)	(99)	68	46	(137)	(115)
	112 M	2	35	21	(95)	(81)	-	-	-	-	-	-	-	-
	112 MG	2; 6	31	18	(98)	(85)	-	-	-	-	68	47	(138)	(116)
	112 MU	4; 6	-	-	-	-	45	28	(128)	(110)	57	36	(140)	(119)
	132 S	2; 6	61	41	(142)	(122)	-	-	-	-	115	84	(200)	(169)
	132 SU	2; 4	57	37	(139)	(120)	90	63	(176)	(149)	-	-	-	-
	132 SM/M	2; 4; 6	90	62	(189)	(161)	137	100	(237)	(200)	165	121	(270)	(226)
	132 MU	4; 6	-	-	-	-	125	89	(242)	(206)	152	108	(273)	(230)
	160 MP	2	126	90	(243)	(207)	-	-	-	-	-	-	-	-
	160 MR	2; 4	115	80	(246)	(210)	175	127	(311)	(264)	-	-	-	-
	160 M	2; 4; 6	111	75	264	229	164	117	326	278	210	154	375	319
	160 MU	6	-	-	-	-	-	-	-	-	189	133	375	319
	160 L	2; 4; 6	106	70	263	228	160	113	322	274	208	151	371	314
	160 LUR	4; 6	-	-	-	-	186	131	363	309	227	162	417	352
	180 M	4	-	-	-	-	187	132	361	306	-	-	-	-
	180 MR	2	131	90	296	255	-	-	-	-	-	-	-	-
	180 MT	2; 4	136	95	295	254	189	134	360	305	-	-	-	-
	180 L	6	-	-	-	-	-	-	-	-	226	161	398	334
	180 LR	4	-	-	-	-	177	122	355	300	-	-	-	-
	180 LUR	4; 6	-	-	-	-	187	132	355	300	183	120	377	314
	200 L	2; 6	194	139	384	330	-	-	-	-	308	223	524	439
	200 LR	2; 4; 6	209	154	360	306	275	203	445	373	299	215	496	412
	200 LU	4; 6	-	-	-	-	262	190	471	398	269	186	505	422
	225 SG	4	-	-	-	-	335	244	616	524	-	-	-	-
	225 SR	4	-	-	-	-	294	213	520	439	-	-	-	-
	225 ST	4	-	-	-	-	322	241	519	438	-	-	-	-
	225 MG	4; 6	-	-	-	-	324	232	621	530	456	345	749	638
	225 MR	2; 4; 6	234	173	413	352	302	221	520	439	348	253	587	492
	225 MT	2	240	179	410	349	-	-	-	-	-	-	-	-
	250 ME	4; 6	-	-	-	-	305	214	632	541	378	270	712	604
	250 MZ	2	228	168	417	356	-	-	-	-	-	-	-	-
	280 SC	2; 6	233	165	488	420	-	-	-	-	348	240	728	621
	280 SD	4	-	-	-	-	340	233	738	632	-	-	-	-
	280 MC	2	221	153	496	428	-	-	-	-	-	-	-	-
	280 MD	4; 6	-	-	-	-	319	213	745	639	391	265	853	728
	315 SN	2	268	188	571	491	-	-	-	-	-	-	-	-
	315 SP	4; 6	-	-	-	-	620	475	923	778	748	575	1074	901
	315 MP	2; 4; 6	333	249	541	456	541	397	959	815	695	524	1088	917
	315 MR	4; 6	-	-	-	-	537	393	966	822	591	420	1151	981

( ): permissible axial loads with Front bearing locked

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Mechanical characteristics - Axial loads

Horizontal motor

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



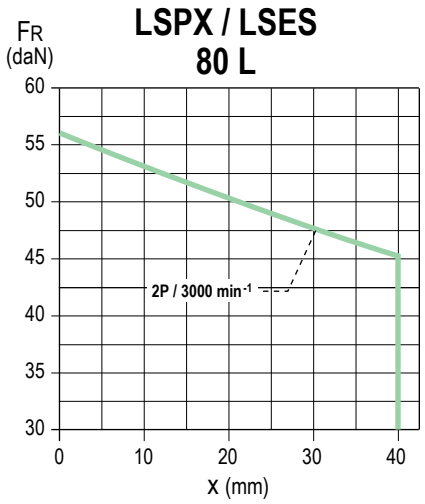
Series	Type	Polarity	Permissible axial load (daN) on the main drive shaft for standard fitting of bearings IM V6 IM V3 / V36 IM V19 / V69											
			3000 min-1				1500 min-1				1000 min-1			
			25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours	25,000 hours	40,000 hours
LS / LSES	80 L	2	(59)	(50)	33	24	-	-	-	-	-	-	-	-
	80 LG	2; 4	(66)	(56)	32	22	(85)	(71)	53	39	-	-	-	-
	90 SL/L	2; 4; 6	(66)	(56)	33	23	(82)	(68)	51	38	(93)	(77)	61	46
	90 LU	2; 4; 6	(69)	(59)	27	18	(83)	(70)	45	32	(93)	(77)	54	39
	100 L	2; 6	(88)	(74)	48	35	-	-	-	-	(123)	(102)	87	65
	100 LR	4	-	-	-	-	(102)	(84)	67	49	-	-	-	-
	100 LG	4; 6	-	-	-	-	(98)	(81)	67	49	(118)	(96)	87	66
	112 M	2	(84)	(71)	45	31	-	-	-	-	-	-	-	-
	112 MG	2; 6	(81)	(68)	48	35	-	-	-	-	(118)	(97)	88	66
	112 MU	4; 6	-	-	-	-	(105)	(88)	68	50	(117)	(96)	80	60
	132 S	2; 6	(121)	(101)	82	62	-	-	-	-	(175)	(143)	140	109
	132 SU	2; 4	(117)	(97)	79	60	(150)	(123)	116	89	-	-	-	-
	132 SM/M	2; 4; 6	(160)	(132)	119	91	(207)	(170)	167	130	(235)	(191)	200	156
	132 MU	4; 6	-	-	-	-	(206)	(169)	163	126	(232)	(188)	193	150
	160 MP	2	(206)	(170)	163	127	-	-	-	-	-	-	-	-
	160 MR	2; 4	(205)	(170)	156	120	(265)	(217)	222	174	-	-	-	-
	160 M	2; 4; 6	211	175	164	129	264	217	226	178	310	254	275	219
	160 MU	6	-	-	-	-	-	-	-	-	289	233	275	219
	160 L	2; 4; 6	206	170	163	128	260	213	222	174	308	251	271	214
	160 LUR	4; 6	-	-	-	-	286	231	263	209	327	262	317	252
	180 M	4	-	-	-	-	250	195	298	243	-	-	-	-
	180 MR	2	231	190	196	155	-	-	-	-	-	-	-	-
	180 MT	2; 4	236	195	195	154	289	234	260	205	-	-	-	-
	180 L	6	-	-	-	-	-	-	-	-	289	224	335	271
	180 LR	4	-	-	-	-	277	222	255	200	-	-	-	-
	180 LUR	4; 6	-	-	-	-	250	195	292	237	246	183	314	251
	200 L	2; 6	260	205	318	264	-	-	-	-	374	289	458	373
	200 LR	2; 4; 6	272	217	297	243	338	266	382	310	362	278	433	349
	200 LU	4; 6	-	-		-	325	253	408	335	332	249	442	359
	225 SG	4	-	-	-	-	405	314	546	454	-	-	-	-
	225 SR	4	-	-	-	-	364	283	450	369	-	-	-	-
	225 ST	4	-	-	-	-	388	307	453	372	-	-	-	-
	225 MG	4; 6	-	-	-	-	394	302	551	460	526	415	679	568
	225 MR	2; 4; 6	297	236	350	289	365	284	457	376	411	316	524	429
	225 MT	2	306	245	344	283	-	-	-	-	-	-	-	-
	250 ME	4; 6	-	-	-	-	375	284	562	471	448	340	642	534
	250 MZ	2	291	231	354	293	-	-	-	-	-	-	-	-
	280 SC	2; 6	303	235	418	350	-	-	-	-	418	310	658	551
	280 SD	4	-	-	-	-	428	321	650	544	-	-	-	-
	280 MC	2	291	223	426	358	-	-	-	-	-	-	-	-
	280 MD	4; 6	-	-	-	-	407	301	657	551	479	353	765	640
	315 SN	2	338	258	501	421	-	-	-	-	-	-	-	-
	315 SP	4; 6	-	-	-	-	440	295	1103	958	568	395	1254	1081
	315 MP	2; 4; 6	153	69	721	636	361	217	1139	995	515	344	1268	1097
	315 MR	4; 6	-	-	-	-	357	213	1146	1002	411	240	1331	1161

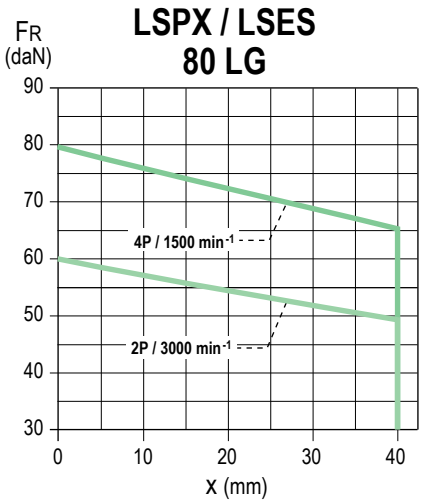
( ): permissible axial loads with Front bearing locked

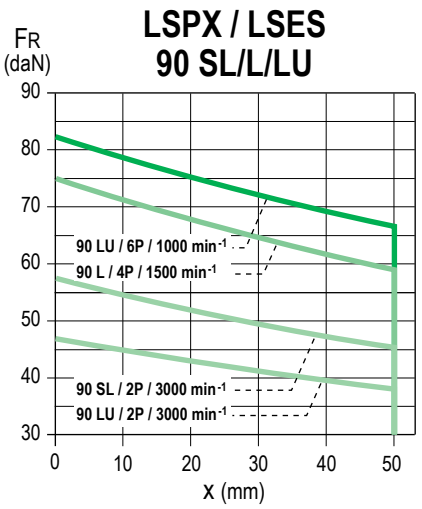
ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Mechanical characteristics - Radial loads

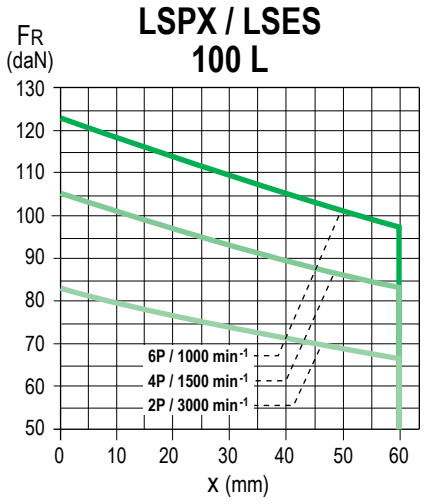
STANDARD FITTING ARRANGEMENT

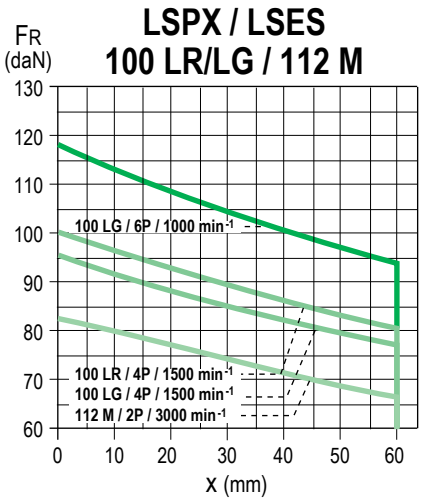
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder

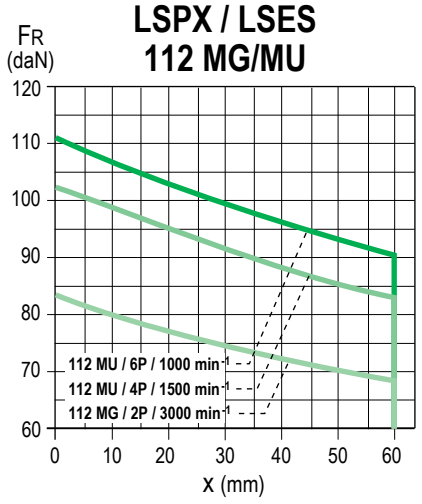


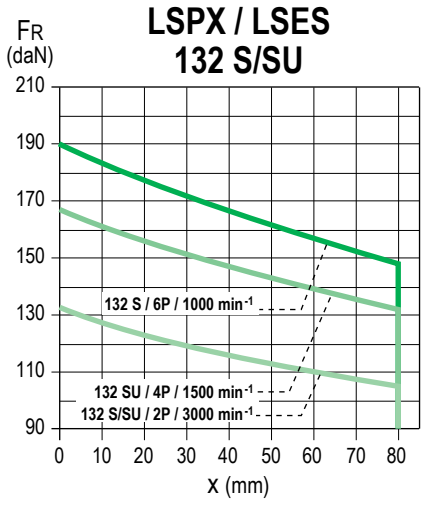


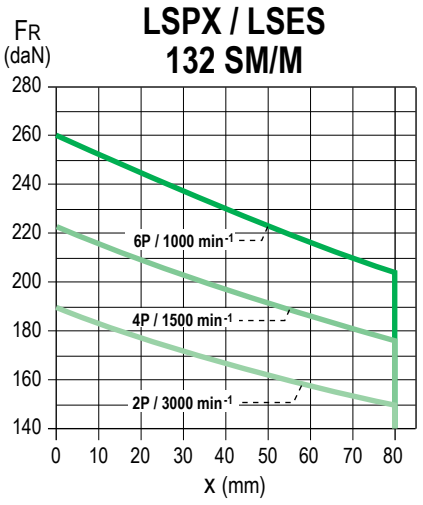


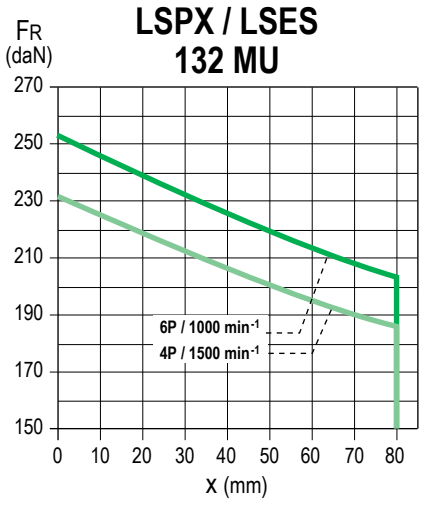








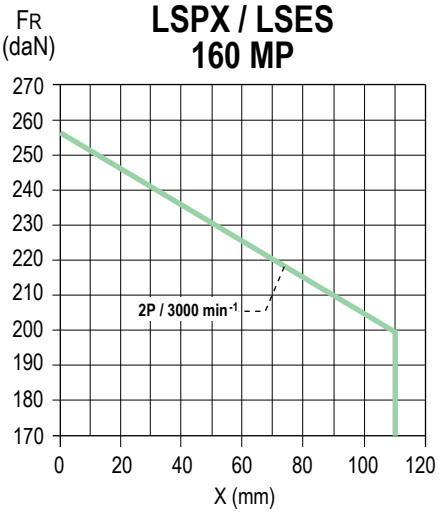


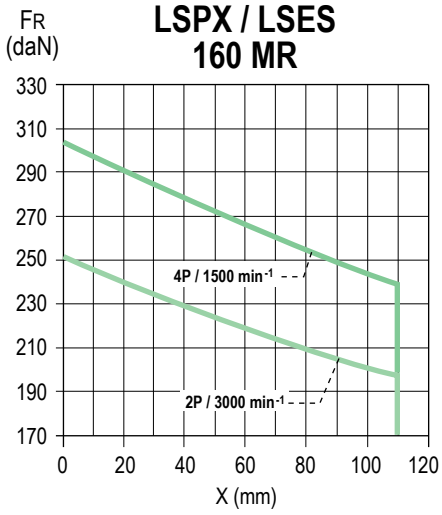


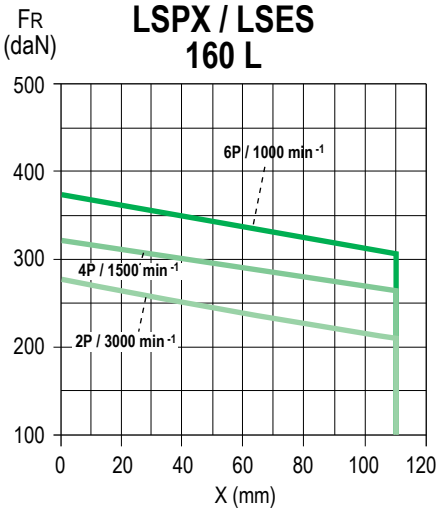
ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Mechanical characteristics - Radial loads

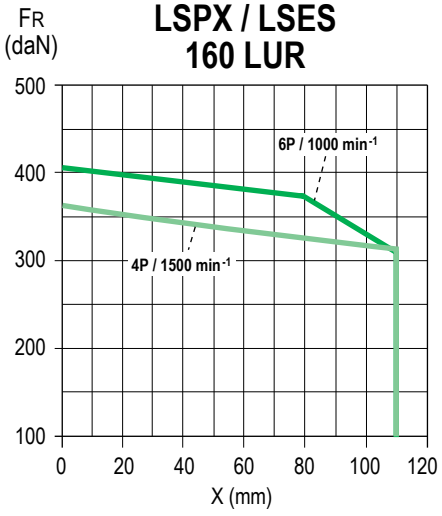
STANDARD FITTING ARRANGEMENT

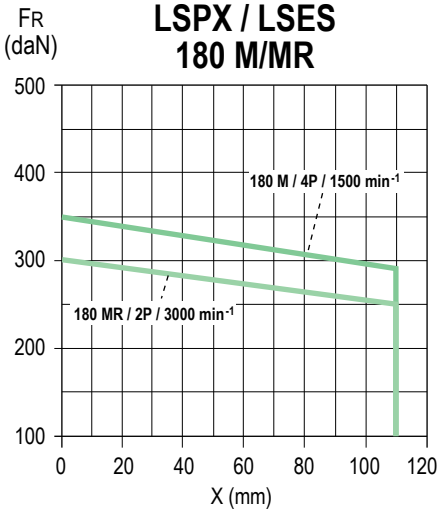
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder

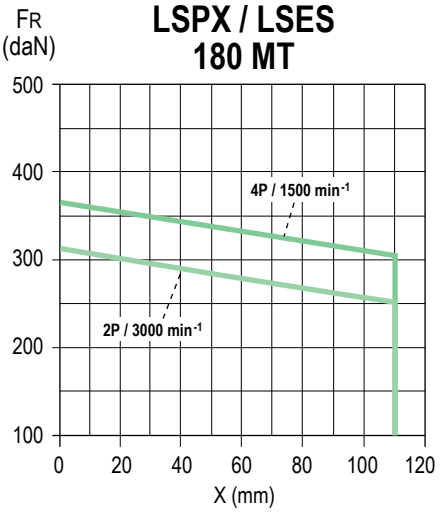


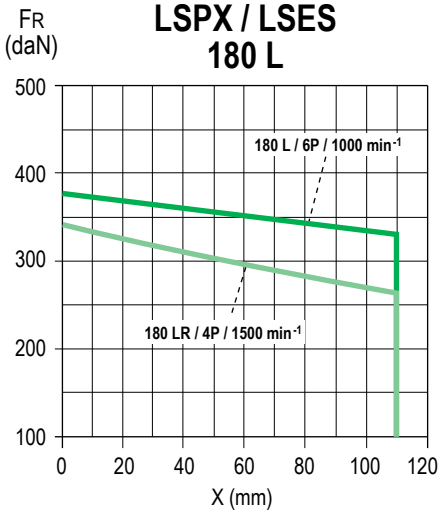


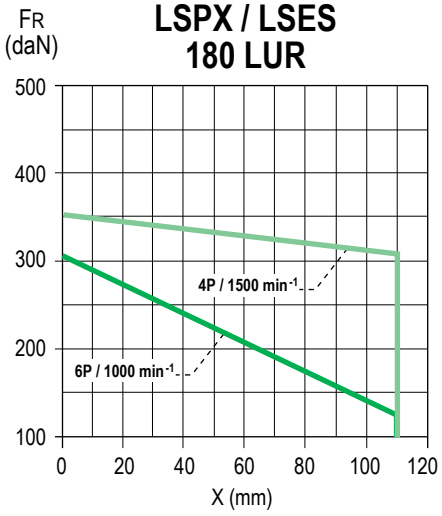










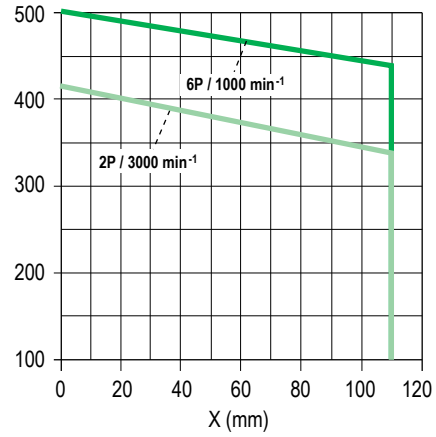


ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Mechanical characteristics - Radial loads

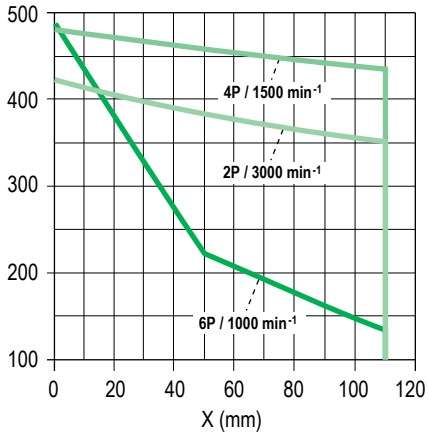
STANDARD FITTING ARRANGEMENT

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

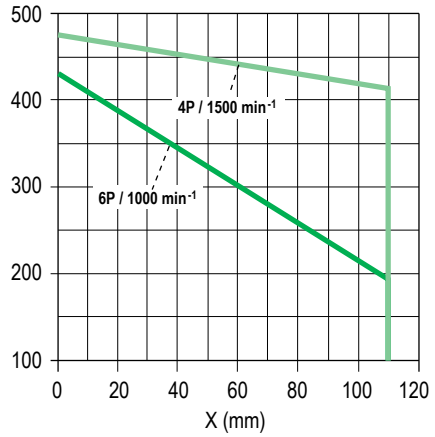
LSPX / LSES 200 L



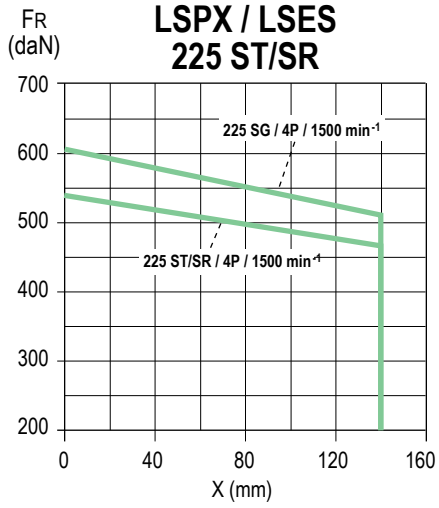
LSPX / LSES 200 LR



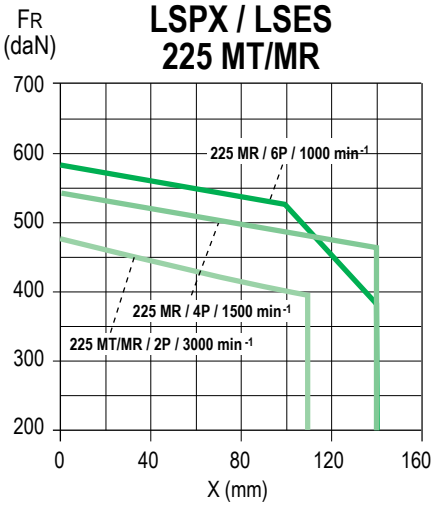
LSPX / LSES 200 LU



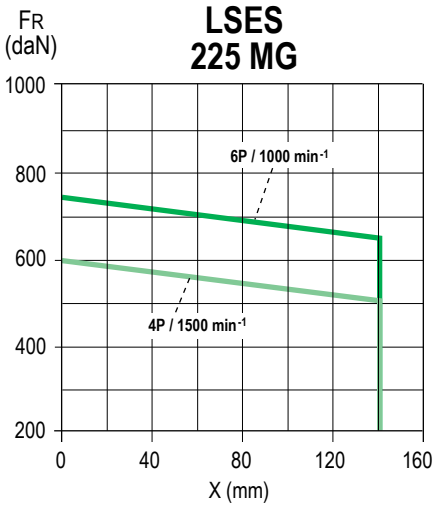
LSPX / LSES 225 ST/SR



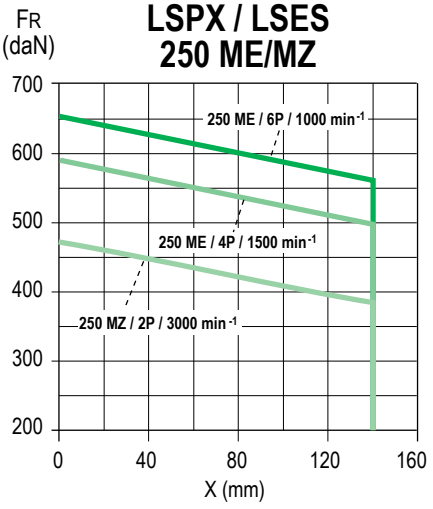
LSPX / LSES 225 MT/MR



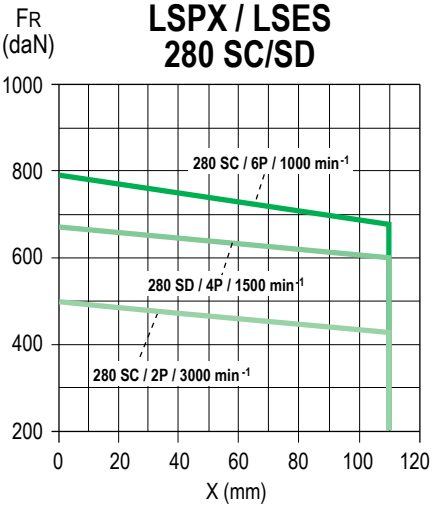
LSES 225 MG



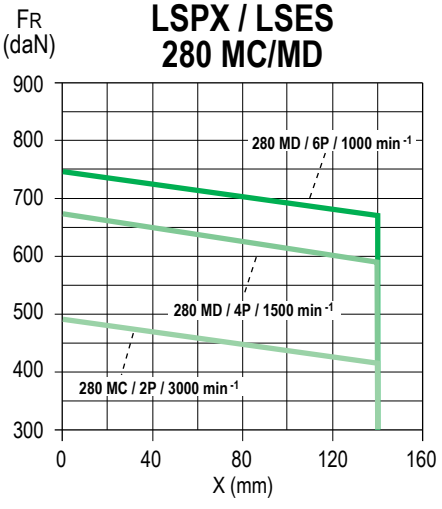
LSPX / LSES 250 ME/MZ



LSPX / LSES 280 SC/SD



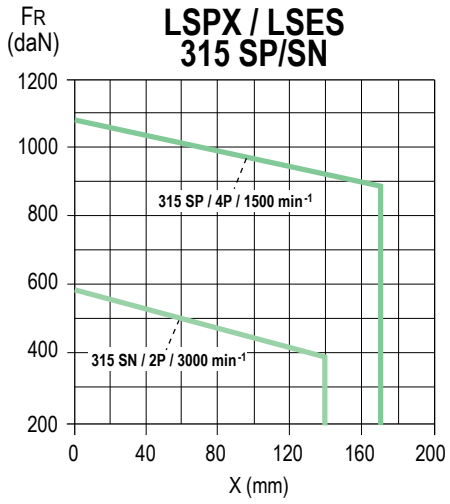
LSPX / LSES 280 MC/MD

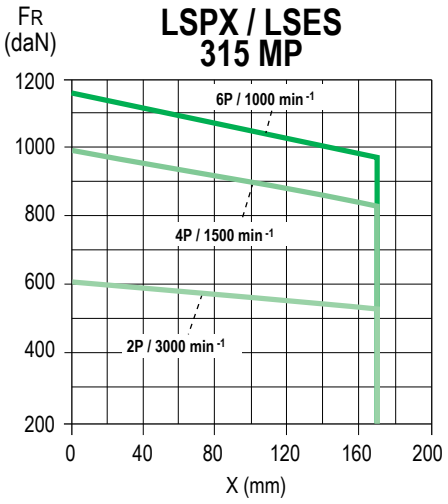


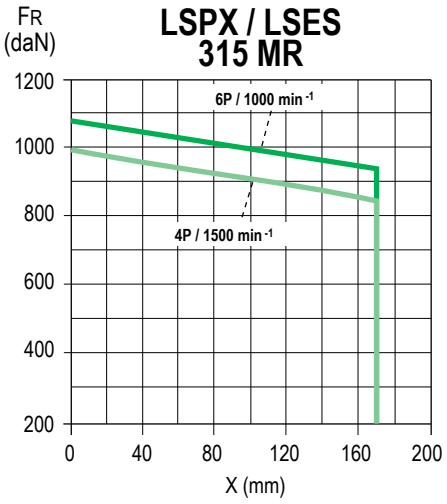
ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Mechanical characteristics - Radial loads

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







ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Mechanical characteristics - Radial loads

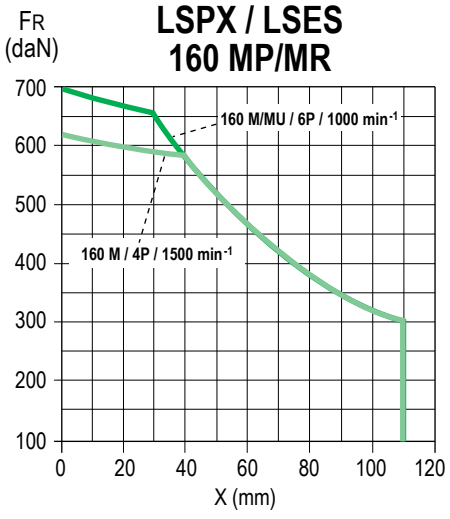
SPECIAL FITTING ARRANGEMENT

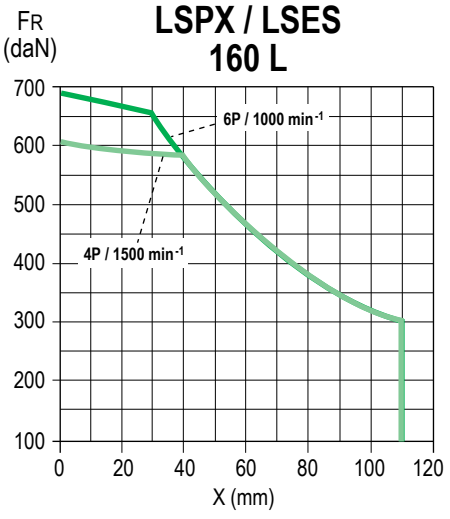
Type of drive end roller bearings

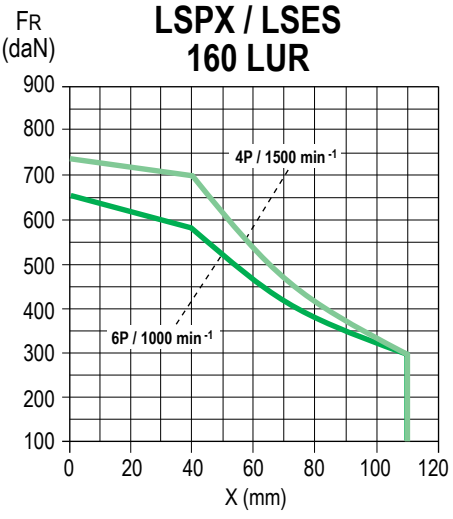
Series	Type	Polarity	Rear bearing (N.D.E.)	Front Bearing (D.E.)
LSPX LSES	160 MP/MR	4; 6	6210 C3	NU 309
	160 L/LUR			
	180 MT/MR	4	6210 C3	NU 310
	180 LR			
	180 LUR	4; 6	6312 C3	NU 310
	180 M	4	6212 C3	NU 310
	180 L	6		
	200 L	6	6214 C3	NU 312
	200 LR	4; 6	6312 C3	NU 312
	200 LU			
	225 ST/MT	4	6214 C3	NU 313
	225 SR/MR	4; 6	6312 C3	NU 313
	225 MG	4; 6		
	250 ME/MZ	4; 6	6216 C3	NU 314
	280 SC/MC	6	6216 C3	NU 316
	280 SD/MD	4; 6	6218 C3	NU 316
	315 SP	4	6317 C3	NU 320
	315 MP/MR	4; 6		

SPECIAL FITTING ARRANGEMENT

Permissible radial load on main shaft extension with a bearing life L_{10h} of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder

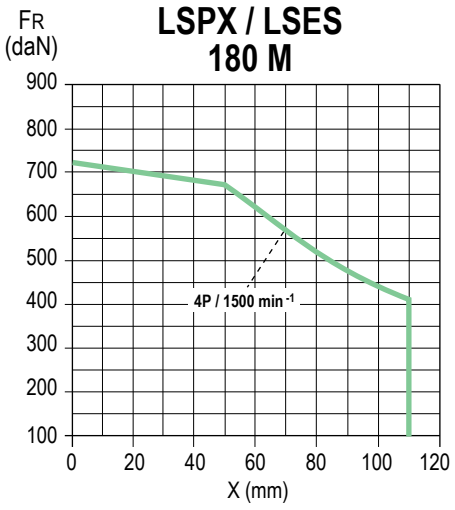


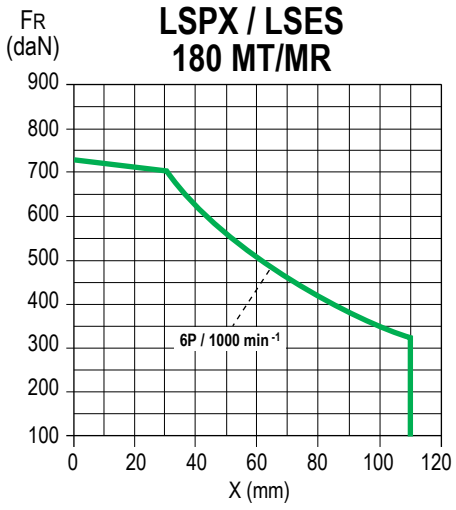


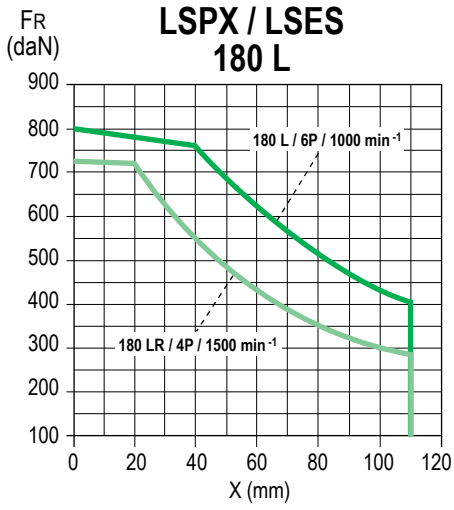


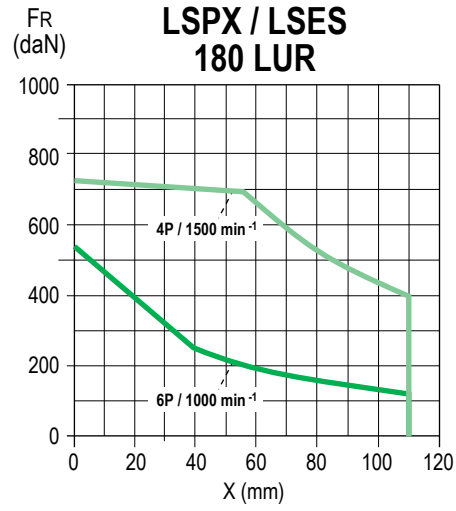
SPECIAL FITTING ARRANGEMENT (DRIVE-END ROLLER BEARINGS)

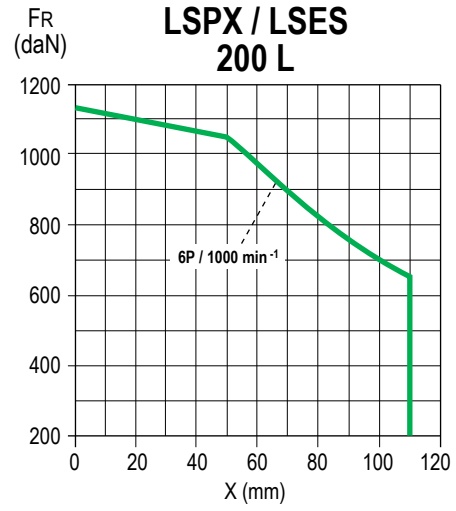
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder

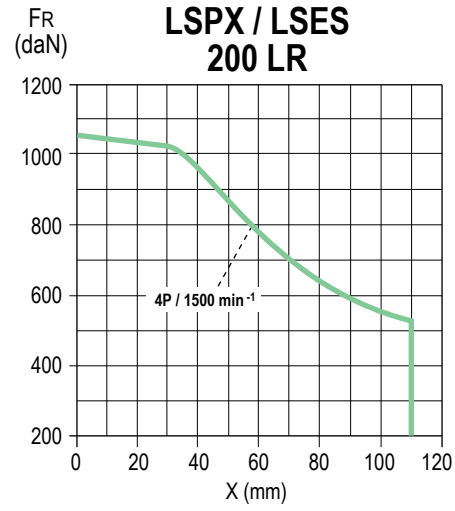


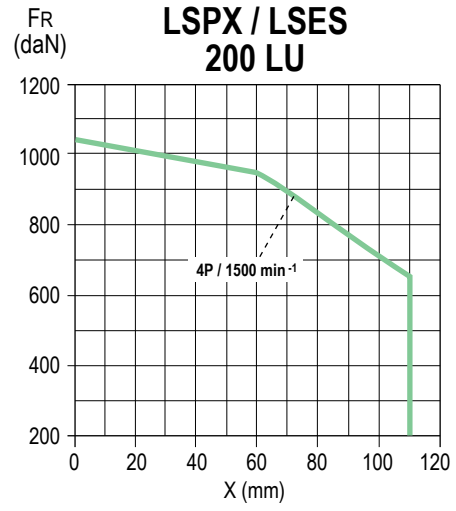


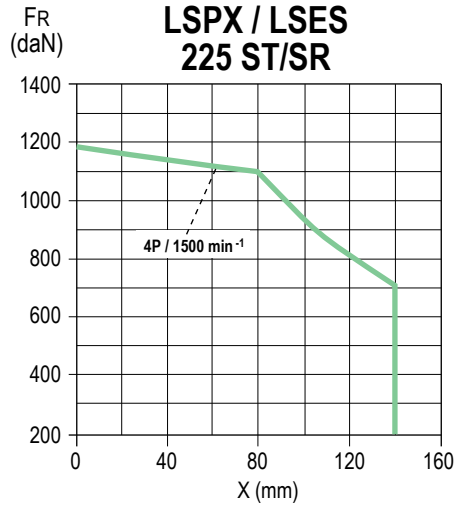


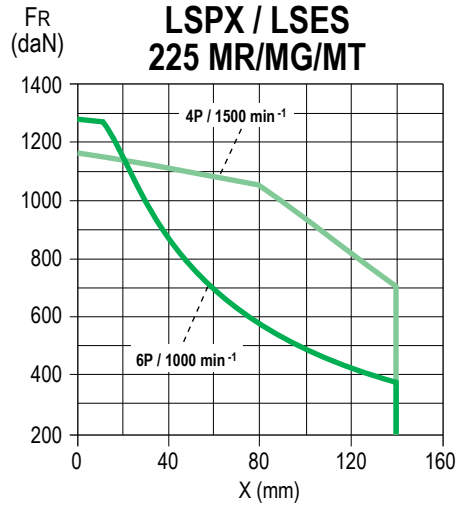








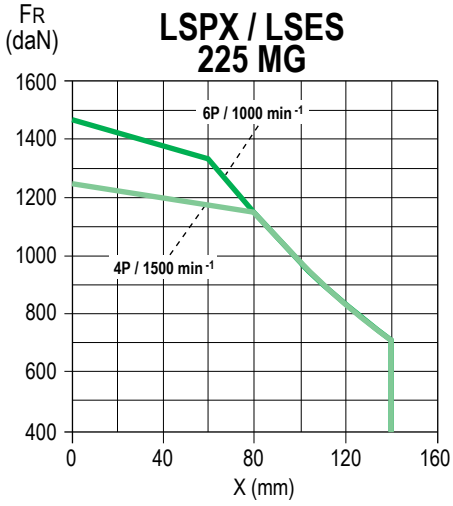


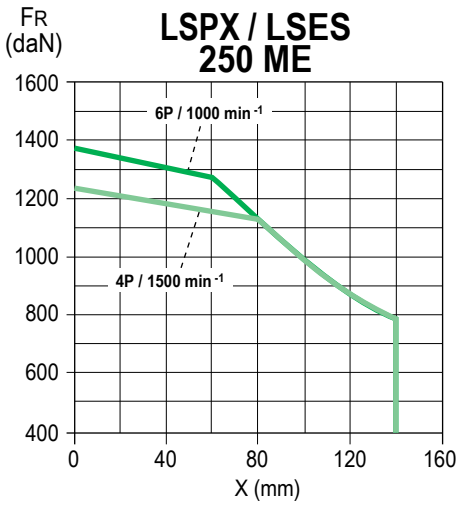


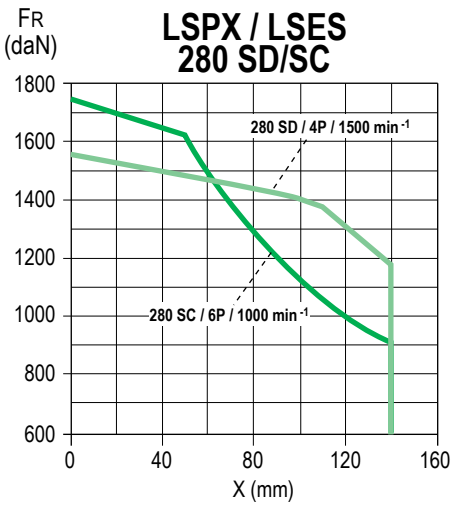
ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Mechanical characteristics - Radial loads

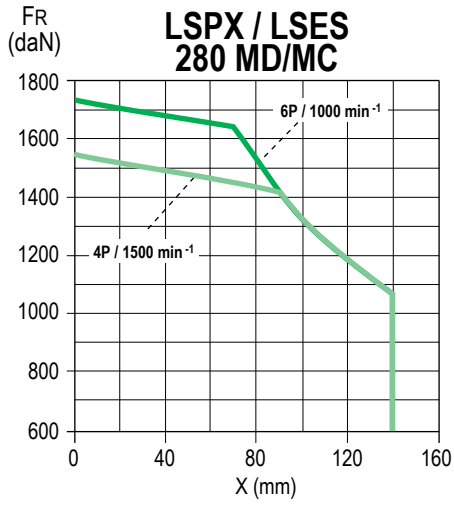
SPECIAL FITTING ARRANGEMENT (DRIVE-END ROLLER BEARINGS)

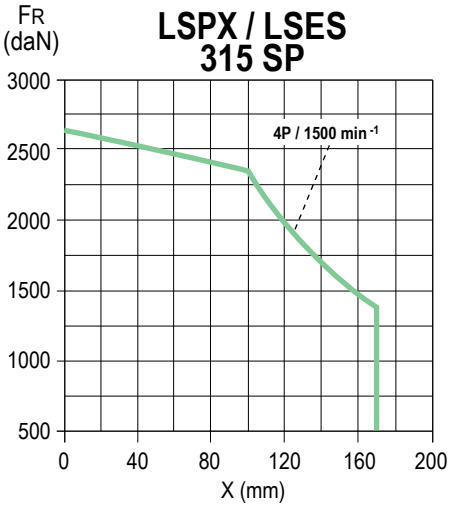
Permissible radial load on main shaft extension with a bearing life L10h of 25,000 hours.
FR: Radial Force
X: distance with respect to the shaft shoulder

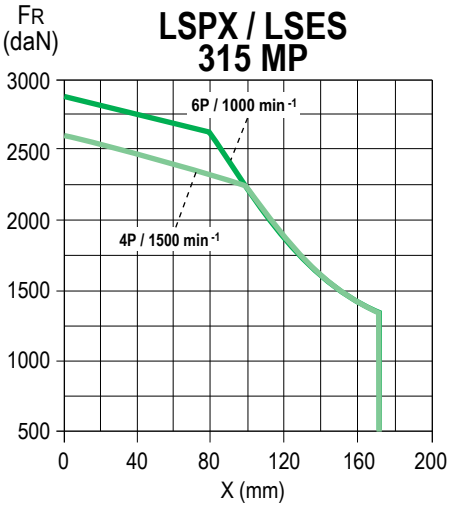


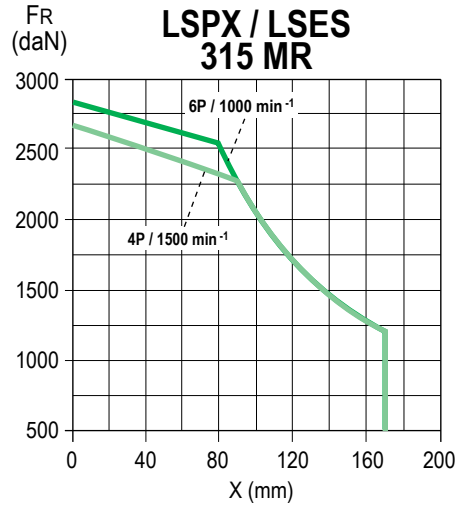












ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Mechanical characteristics Mains connection

INDICATION OF CABLE GLAND SIZE AND TYPE FOR 400 V RATED SUPPLY VOLTAGE IF DRILLINGS REQUIRED WITHOUT DETAILS OF DIAMETERS

Series	Type	Polarity	Terminal box material	Power + auxiliary	
				Number of holes	Hole diameter*
LSPX	80	2; 4; 6	Aluminium alloy	2 (3 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			ISO M25 x 1.5 (1M25 + 1M16)
	160	2; 4; 6			
	180	2; 4; 6	Cast iron	3	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			
LSES	80	2; 4	Plastic	2 (3 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 (1M25 + 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 support plate

** As an option, both ISO M25 holes 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 6 terminals complying with standard NFC 51 120, with the terminal markings complying with IEC 60034-8 (or NF EN 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 shaft end.

If any two of the phases are changed over, the motor will run in the opposite 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 terminal blocks 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	400V mains supply		
		230/400V connection		400 V drive connection
		Polarity	Terminals	Terminals
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

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Optional equipment

Mechanical adaptations	Frame size
DE and NDE bearings with 1 machining, for vibration sensor in position 12H, 12H-3H, or 12H-3H-9H	≥ 132
Different FF flanges from IEC	All
Different FT flanges from IEC	≤ 132
DE roller bearing	≥ 160: 4p & +
Angular contact bearing	All
Insulated DE or NDE bearing	≥ 280
2nd standard catalogue NDE shaft end	All
2nd special NDE shaft end	All
Conical shaft	All
Smooth shaft without keying	All
Shaft with special keying	All
Keyed cylindrical NDE shaft (secondary shaft end) as per IEC	All
Stainless-steel shaft	All
Class B balancing	All
F type (full key) or N type (no key) balancing	All
Stainless steel fan cover	All
Steel fan cover + drip cover	All
Steel fan cover + anti-clogging	All
Metal fan	All
Stainless steel nameplate	All
Stainless-steel fastenings	All
Incremental encoder / 1024 or 4096 pts / 5v or 11/30 V	All
Positioning holes (jacking screws)	≥ 250
Radial seal for motor in vertical position with shaft end upwards	All
Drain holes for operation in vertical position	All

Electrical adaptations	Frame size
Terminal board with anti-rotation system as standard	All
Special voltages (excluding variable speed)	All
Insulation class H	All
Main box in position B or D	All
Auxiliary boxes	≥ 160
Plastic PE	All
ATEX brass PE for unshielded cable for LSPX zone 21	All
ATEX brass PE for shielded cable for LSPX zone 21	All
ATEX brass PE auxiliary for unshielded cable for LSPX zone 21	All
ATEX brass PE auxiliary for shielded cable for LSPX zone 21	All
Flying lead via 6 + 1 multicore cable	All
Cable entry on the left as seen from the shaft end	All
Preparation for NPT cable glands	All

Protections	Frame size
Standard winding PTC thermistor probe (triple probe)	All
Winding PT 100 probe (1 per phase)	All
Endshield PTC thermistor probe (triple probe)	≥ 160
Endshield PT 100 probe (per probe)	≥ 160
Endshield thermocouple	≥ 160
Space heaters when stopped (220-230 V)	All
Reinforced winding insulation system for variable speed drive power supply	All

Finish	Frame size
IP 65 for LSES motors Zone 22	All
IP 56 stopped with fan (IC 411) for LSES motors Zone 22	All
C3H, C4M, C4H, C5-IL or C5-IM paint	All
Other paint shades	All
Operating temperature: -55°C < T° < -20°C	All
Complete tropicalization (stator + rotor)	All

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Optional equipment

NON-STANDARD FLANGES

Optionally, Nidec 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.

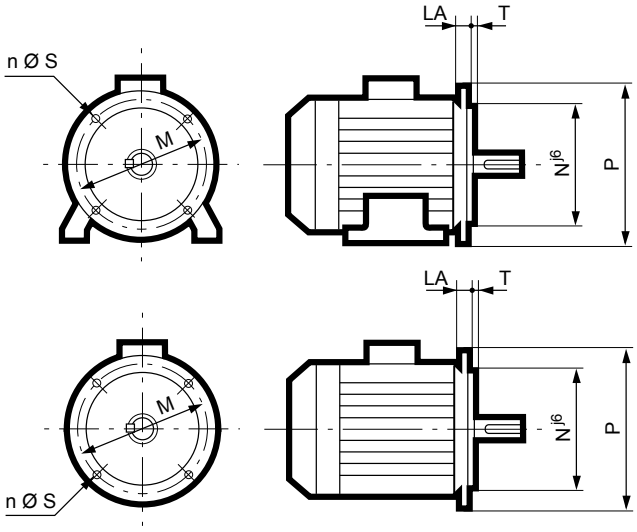
The tables below give the flange and faceplate dimensions and also indicate flange/motor compatibility.
The bearing and shaft end for each frame size remain standard.

Dimensions in millimetres

(FF) Flange mounted

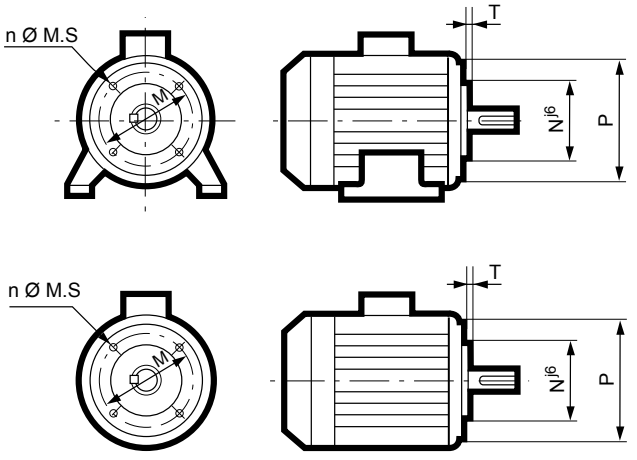
Symbol IEC	Flange dimensions						
	M	N	D	T	n	S	LA
FF 115	115	95	140	3	4	10	10
FF 130	130	110	160	3.5	4	10	10
FF 165	165	130	200	3.5	4	12	10
FF 215	215	180	250	4	4	15	12
FF 265	265	230	300	4	4	15	14
FF 300	300	250	350	5	4	18.5	14
FF 350	350	300	400	5	4	18.5	15
FF 400	400	350	450	5	8	18.5	16
FF 500	500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

** Tolerance N js6*
*** shaft length = 22 for frame size ≥ 280*



(FT) Face mounted

Symbol IEC	Flange dimensions					
	M	N	D	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



ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Mechanical Options

MODIFIED FLANGES

Motor type		Forms of fastenings / 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
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 L/LUR	all						◆	◆	●	◆														
	180	all							●	●	◆	◆(1)													
	200	all									●	◆													
	225	all										●	◆												
	250	all										◆	●												
	280	all										◆	●	◆											
	315	all											◆(1)	●											

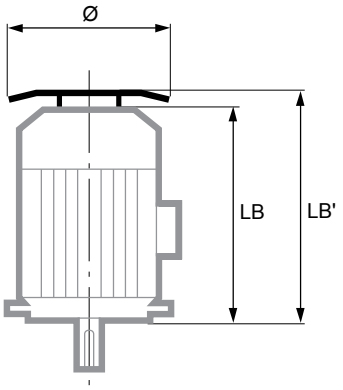
● Standard ■ Modified shaft ◆ Adaptable without shaft modifications

(1) Dimension C need not comply with IEC 60072

DRIP COVER FOR OPERATION IN VERTICAL POSITION SHAFT END DOWNWARDS

Dimensions in millimetres

Series	Motor type	LB'	Ø
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/LUR/M/MR	LB + 36.5	265
	180 L	LB + 36.5	305
	200 LR	LB + 36.5	305
	200 L/LU	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



ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Optional equipment

SPACE HEATERS

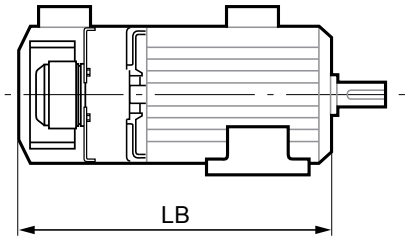
Series	Type	Power (W)
LSPX LSES	80 L/LG	10
	90 to 160 MP/MR	25
	160 L to 225	52
	250 MZ	52
	250 ME	84
	280 SC/SU/MC/MD	84
	315 SN	84
	315 MP/MR	108

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

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 sensors built into the winding.



Series	Type	LB dimensions with forced ventilation	
		Foot or face mounted motor	Flange mounted motor
LSES	160 L/LUR	687	
	160 MP/MR		
	180 MT/MR/M		
	180 LUR	702	
	180 L	741	
	200 LR/LU	796	
	200 L	802	
	225 MR/MG	853.5	
	225 ST/SR	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	

ATEX DUST motors - Zones 21 & 22
LSPX & LSES series - Aluminium
Handling - Position of lifting rings

LIFTING THE MOTOR ONLY

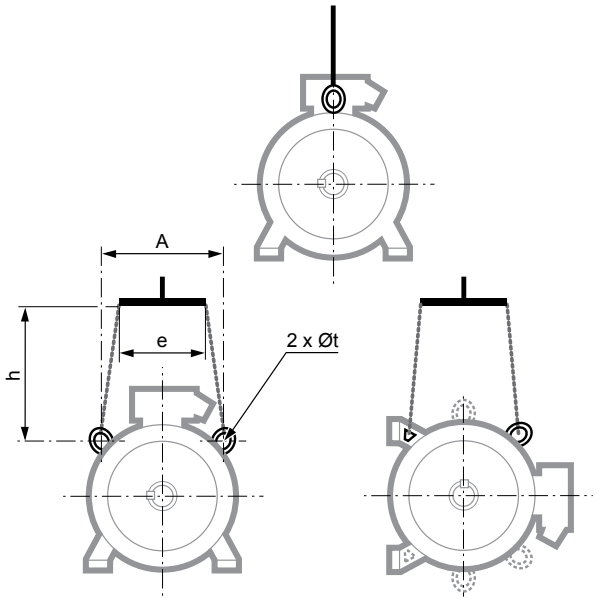
(not coupled to the machine)

The regulations stipulate that in excess of 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.

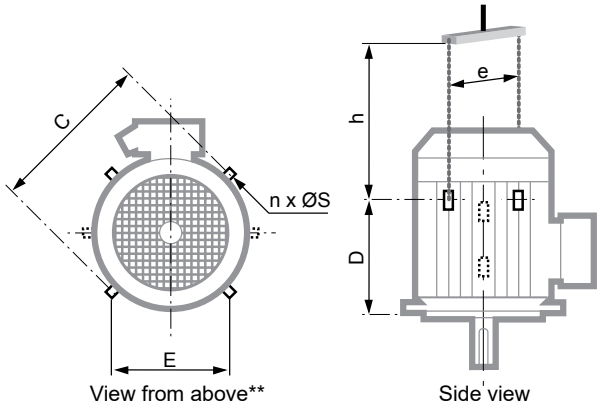
To prevent any damage to the motor during handling (for example: switching the motor from horizontal to vertical), it is essential to follow these instructions.

HORIZONTAL POSITION



Series	Type	Horizontal position			
		A	min. e	min. h	Øt
LSPX LSES	100 L/LR/LG	165	165	150	9
	112 M	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	200	180	110	14
	160 L/LUR	200	180	110	14
	180	200	260	150	14
	200 L/LR/LU	270	260	165	14
	225	270	260	150	14
	250 ME/MZ	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



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

Series	Type	Vertical position						
		C	E	D	n**	ØS	min. e*	min. h
LSPX LSES	160	320	200	230	2	14	320	350
	180 MR/M/T	320	200	230	2	14	320	270
	180 L/LUR	390	265	290	2	14	390	320
	200	410	300	295	2	14	410	450
	225	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 terminal box.*
If n = 4, this angle becomes 45°.

ATEX Gas, Zones 1 and 2 - ATEX Dust, Zones 21 and 22
Appendix
Configurator

The Nidec Leroy-Somer Configurator can be used to select motors most suited to your applications, while also providing their technical specifications and corresponding plans.

Register online at:
http://configurateurls.leroy-somer.com

- Product selection support
- Print-outs of technical specifications
- Print-outs of 2D and 3D CAD files
- The equivalent of 300 catalogues in 15 languages.

Product availability

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 Nidec Leroy-Somer central services all working together.

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

Contact Nidec Leroy-Somer.

Express Availability - Induction motors

FLSD - IFT IE3
Flameproof motors

AVAILABILITY TIMES EX WORKS (FRANCE), IN WORKING DAYS
Orders received, within the maximum quantity limit, by the factory on day D before 12:00 pm Central European Time, will have the following Availability.
For products with options, availability will be that of the longest lead-time item, i.e: the product or its options.
If the order is received after 12:00 pm, 1 working day will be added to the stated lead time.
The maximum quantity is per line of order. Above this maximum quantity, please consult your Sales Office.

D	D + 1	D + 2	D + 5	D + 10	D + 20	Please consult

2 Poles 3000 min⁻¹ — IE3 — 230 V Δ / 400 V Y / 415 V Y - 460 V Y

		Ex db IIB T4						Ex db IIC T4						Ex db eb IIC T4						Ex db eb IIC T4 according to VIK					
	Rated power at 50 Hz	IM 1001 (IM B3)		IM 3001 (IM B5)		IM 3601 (IM B14)		IM 1001 (IM B3)		IM 3001 (IM B5)		IM 3601 (IM B14)		IM 1001 (IM B3)		IM 3001 (IM B5)		IM 3601 (IM B14)		IM 1001 (IM B3)		IM 3001 (IM B5)		IM 3601 (IM B14)	
Type	P_n kW	Code	Max qty	Code	Max qty	Code	Max qty	Code	Max qty	Code	Max qty	Code	Max qty	Code	Max qty	Code	Max qty	Code	Max qty	Code	Max qty	Code	Max qty	Code	Max qty
FLSD 80L	0.75	5129132	1	5129133	1	5129134	1	5129135	1	5129136	1	5129137	1	5129138	1	5129139	1	5129140	1	5129141	1	5129142	1	5129143	1
FLSD 90SL	1.1	5129157	1	5129158	1	5129159	1	5129160	1	5129161	1	5129162	1	5129163	1	5129164	1	5129165	1	5128649	1	5128650	1	5129166	1
FLSD 90SL	1.5	5128666	1	5128667	1	5128668	1	5128669	1	5128670	1	5128671	1	5128672	1	5128673	1	5128674	1	5128675	1	5128676	1	5128677	1
FLSD 90LU	2.2	5128692	1	5128693	1	5128694	1	5128695	1	5128696	1	5128697	1	5128698	1	5128699	1	5128700	1	5128701	1	5128702	1	5128703	1
FLSD 100L	3	5128718	1	5128719	1	5128720	1	5128721	1	5128722	1	5128723	1	5128724	1	5128725	1	5128726	1	5128727	1	5128728	1	5128729	1
FLSD 112MG	4	5128744	1	5128745	1	5128746	1	5128747	1	5128748	1	5128749	1	5128756	1	5128757	1	5128758	1	5129177	1	5129178	1	5129179	1
FLSD 132SM	5.5	5128796	1	5128797	1	5128798	1	5128799	1	5128800	1	5128801	1	5128808	1	5128809	1	5128810	1	5128814	1	5128815	1	5128816	1
FLSD 132SM	7.5	5128848	1	5128849	1	5128850	1	5128851	1	5128852	1	5128853	1	5129187	1	5129188	1	5129189	1	5129193	1	5129194	1	5129195	1
FLSD 132M	9	5129223	1	5129224	1	5129225	1	5129226	1	5129227	1	5129228	1	5129235	1	5129236	1	5129237	1	5128914	1	5128915	1	5128916	1
FLSD 160MA	11	5128920	1	5128921	1			5128922	1	5128923	1			5128924	1	5128925	1			5128926	1	5128927	1		
FLSD 160MB	15	5128928	1	5256766	1			5128929	1	5128930	1			5128931	1	5128932	1			5128933	1	5128934	1		
FLSD 160L	18.5	5128935	1	5256851	1			5128936	1	5128937	1			5128938	1	5128939	1			5128940	1	5128941	1		
FLSD 180M	22	5128942	1	5256852	1			5128943	1	5128944	1			5128945	1	5128946	1			5128947	1	5128948	1		
FLSD 200LA	30	5128949	1	5256853	1			5128950	1	5128951	1			5128952	1	5128953	1			5128954	1	5128955	1		
FLSD 200LB	37	5128956	1	5256854	1			5128957	1	5128958	1			5128959	1	5128960	1			5128961	1	5128962	1		
FLSD 225MR	45	5128963	1	5256855	1			5128964	1	5128965	1			5128966	1	5128967	1			5128968	1	5128969	1		
FLSD 250M	55	5128970	1		1				-		-				-		-				-		-		
FLSD 280S	75	5128971	1		1				-		-				-		-				-		-		
FLSD 280M	90	5128972	1		1				-		-				-		-				-		-		

In standard, motors equipped with PTC 150° C sensor for frame size 80 to 132, and with PTC 140° C sensor for frame size 160 to 280.

LEROY-SOMER™

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