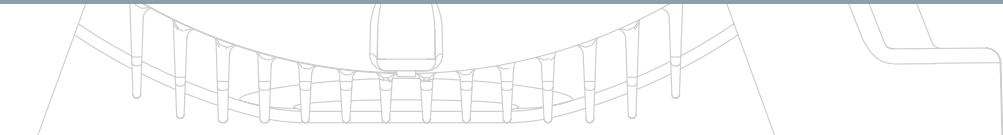
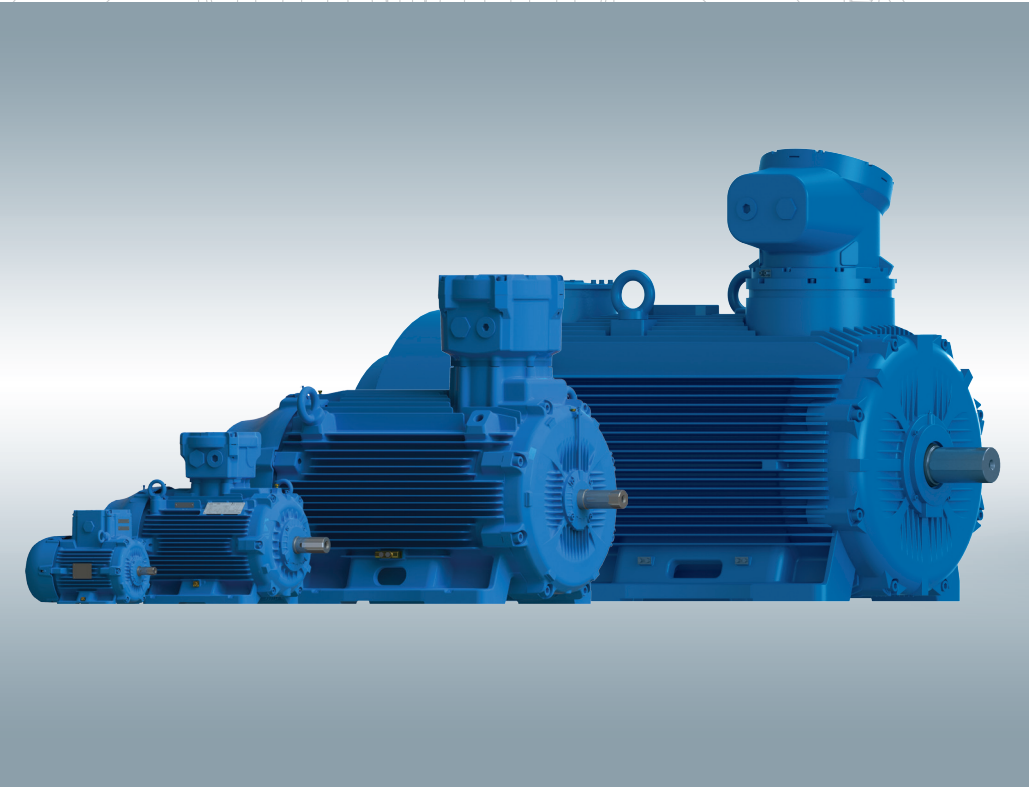
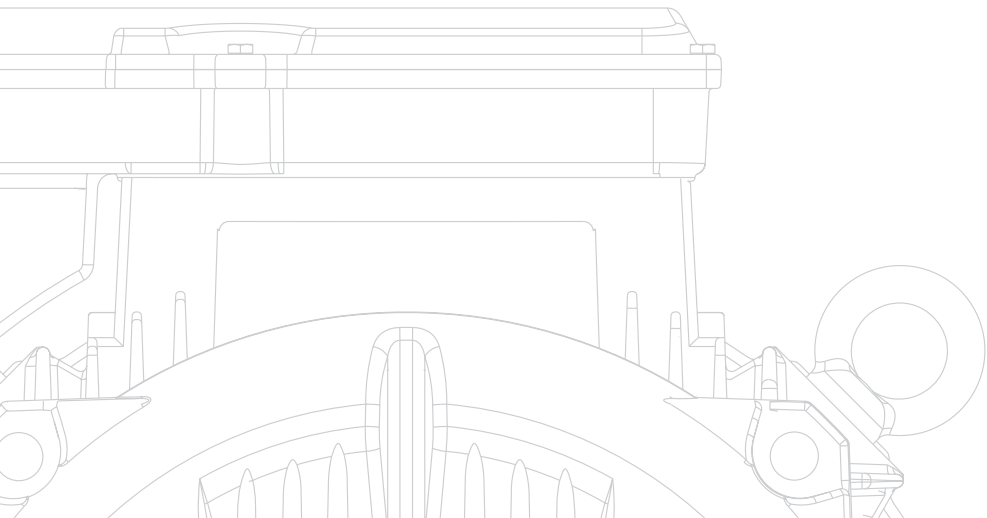


W22Xd

LV - Flameproof Motor

Technical Catalogue
European Market





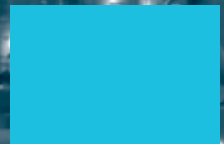
W22Xd

The New Generation of Flameproof Motors

The W22Xd line represents what is most modern in driving equipment for explosive atmosphere environments.

As a result of intense research and development, WEG launches its new flameproof motor line, the W22Xd. Incorporating the same innovative concepts of the W22 general purpose motors, the W22Xd line is an evolution in the market of classified area products offering high efficiency levels, energy saving, low operational costs, extended lifetime, low maintenance and assured safety!

Learn more about the W22Xd line including the benefits and advantages for your plant.



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1. Technical Information

1.1. Explosive Atmospheres

A potentially explosive atmosphere is composed by air with mixtures of gases, vapours, mists or dusts, which might be ignited under certain operating conditions.

Equipment and protective systems intended for use in potentially explosive atmospheres cover a quite large range of products, including equipment used on fixed offshore platforms, in petrochemical plants, mines, flour mills and other areas where a potentially explosive atmosphere may arise.



WEG has a long experience in the design and manufacturing of motors which fully comply with the ATEX Directive 94/9/EC and the IECEx Scheme for Equipment Certification Program. WEG motors are manufactured to meet special application requirements and severe duties in Hazardous Areas.

1.2. Standards and Classification of Explosive Atmospheres

1.2.1. ATEX Directives

The ATEX Directives were adopted by the European Union (UE) to simplify the free trade between the member states by aligning the technical and legal requirements for products intended for use in potentially explosive atmospheres.

There are two main Directives, sharing the responsibilities between the Manufacturer and the End User:

- The ATEX Manufacturers Directive 94/9/EC, also known as ATEX 95, places the responsibilities on the manufacturers: It specifies the Essential Health and Safety Requirements that must be met by the equipment intended to be used in potentially explosive atmospheres. In order to meet the ATEX Directive, products must comply with the Essential Requirements of this Directive and follow a Conformity Assessment Procedure. This assessment procedure involves obtaining the EC Type Examination certificate for products (requires the involvement of a Notified Body except for category 3 products), the Production Quality Assurance (assessed by a Notified Body that issues the QAN - Quality Assessment Notification according with EN 13980 and periodically makes the audits) and an internal control of production (where the manufacturer carries out the necessary work to guarantee that the products are in compliance with the ATEX Directive). The ATEX product markings can be easily recognized by the symbol  that indicates the explosion protection and by the  mark that certifies the conformity with this Directive.
- The need to reduce the incidence of explosions and flash fires at work is prompted by both humanitarian and economic considerations and has led to the adoption by the European Parliament and the Council of the ATEX Directive 1999/92/EC, also known as ATEX 137, that lays down the minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres. The humanitarian considerations are obvious: explosions and fires can cause severe injuries

and deaths. The economic considerations are contained in every study into the true costs of accidents, which all show that improved risk management (health and safety) can substantially increase company profits. This latter being particularly true where potential explosions are concerned. The Directive 1999/92/EC classifies the environment into zones and outlines which category of equipment can be used in each zone. This Directive concentrates on the duties of the End User whose responsibilities are mainly:

- The assessment of risks
- Preparation of an Explosion Protection Document
- The provision of suitable warning signs for areas where explosive atmospheres may occur.

The safety of an installation in a Hazardous Area is the result of co-operation between the equipment manufacturer, the installer and the end user.

The ATEX Directives define Equipment Category, Zone and Group as follows:

Equipment intended for use in mines Group I		
Level of safety	Remain functional, even in the event of rare incidents related to equipment with an explosive atmosphere present.	Intended to be de-energized in the event of an explosive atmosphere
Equipment category	M1	M2

Table 1 - Group I equipment

Equipment intended for use in surface industry Group II						
Zone	0	20	1	21	2	22
Type of explosive atmosphere	G Gas	D Dust	G Gas	D Dust	G Gas	D Dust
Likelihood of an explosive atmosphere	Always present		Occasionally present		Infrequently and only for a short period	
Equipment category	1		2		3	

Table 2 - Group II equipment

1.2.2. IECEx Scheme

The objective of the IECEx System is to facilitate international trade in equipment and services for use in explosive atmospheres, while maintaining the required level of safety. IECEx System is accepted in many countries and aims to be the world approval system for electrical equipment to be installed in potentially explosive atmospheres.

The IECEx System is based on the use of International Standards, such as IEC. These Standards are dedicated to the highly specialised fields associated with the use of equipment, named Ex equipment and installations in areas where a potential risk of fire or explosion may exist.

The administration of the IECEx System is governed by the IECEx Rules which are available for free in the IECEx website (<http://www.iecex.com>). Operational Documents supplement the Rules of Procedure and are for use within the IECEx System and Schemes.

The IECEx International Certification System comprises four different Schemes:

- The IECEx Certified Equipment Scheme
- The IECEx Certified Service Facilities Scheme
- The IECEx Conformity Mark Licensing System
- The IECEx Certified Persons Scheme

WEG has achieved the certification of the W22Xd range within the IECEx Certified Equipment Scheme and IECEx Conformity Mark Licensing System.

The IECEx Certified Equipment Scheme

To achieve IECEx Product Certification is mandatory to involve an ExCB (IECEx Approved Certification Body) to test the products and samples according to the IEC Standards and issue the ExTR (IECEx Test Report).

It is also mandatory to comply with the Quality Management System (that must be previously assessed and in conformity with ISO 9001).

The IECEx Quality Assessment Report (QAR) is a document that presents the results of an on-site assessment of a manufacturer's quality management system by an ExCB, to the requirements of the IECEx Certified Equipment Scheme, more specific within the IECEx OD 005.

Upon satisfactory completion of the work, the issuing ExCB shall review and endorse the ExTR and QAR summary report at the IECEx website: <http://www.iecex.com>.

If the review is satisfactory and where the application includes a request to issue an IECEx CoC (Certificate of Conformity), the IECEx CoC shall be issued by the ExCB, in accordance with the relevant IECEx Operational Document. The manufacturer and the ExCB shall each retain a set of the documentation referred to in the certificate, including ExTR and manufacturer's documentation.

ExTRs and/or QARs may be issued on their own without the issuing of an IECEx CoC.

The preservation of IECEx Certificate of Conformity is assured by the ExCB. For that the ExCB shall:

Conduct of surveillance assessments/audits is covered by the QAR process;

Respond to public inquiries regarding the certificate;

Take the necessary action when aware of possible breaches by the applicant, e.g. product not subject to IECEx Certificate of Conformity is being claimed as "IECEx Certified".

The IECEx Conformity Mark Licensing System

The IECEx Conformity Mark, when appearing on or in relation to an Ex Product, indicates that the Ex Product is covered by an IECEx Certificate of Conformity which in turn is listed under the scope of the IECEx Conformity Mark License.

The Mark demonstrates to users and consumers the compliance with the requirements of the relevant IEC Standard(s) without any national differences and/or Essential Differences in Requirements and with other IECEx recognized normative documents, approved by the IECEx Management Committee.

The IECEx Conformity Mark significantly improves WEG's capability to trade its products globally.

Benefits for the Customer

WEG IECEx certified motors are easy to identify because they have the IECEx certificate number on their nameplate and an IECEx Conformity Mark plate with the following design:

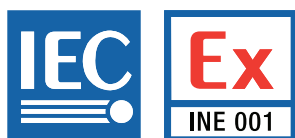


Figure 1 - IECEx conformity mark

The IECEx certificates are issued electronically and are all available on the IECEx website. The access is public and they are printable. Please check WEG's certificates on <http://www.iecex.com>.

1.2.3. Applicable IEC/EN Standards

The implementation of ATEX Directives and IECEx Scheme are supported by the EN (CENELEC) and IEC Standards respectively regarding the enclosure protections of electric motors to be used in potentially explosive atmospheres, as well as the hazardous areas classification criteria, depending on the presence of Gas and/or Combustible Dusts.

Table 3 below, lists the main applicable IEC/EN Standards for the manufacturing of flameproof motors:

IEC/EN 60079-0	Explosive atmospheres Part 0: Equipment - General requirements
IEC/EN 60079-1	Explosive atmospheres Part 1: Equipment protection by flameproof enclosures "d"
IEC/EN 60079-7	Explosive atmospheres Part 7: Equipment protection by increased safety "e"
IEC/EN 60079-10-1	Explosive atmospheres Part 10-1: Classification of areas - Explosive gas atmospheres
IEC/EN 60079-10-2	Explosive atmospheres Part 10-2: Classification of areas - Combustible dust atmospheres
IEC/EN 60079-31	Explosive atmospheres Part 31: Equipment dust ignition protection by enclosure "t"
IEC/EN 60079-14	Explosive atmospheres Part 14: Electrical installations design, selection and erection
IEC/EN 60079-17	Explosive atmospheres Part 17: Electrical installations inspection and maintenance
IEC/EN 60079-19	Explosive atmospheres Part 19: Equipment repair, overhaul and reclamation

Table 3 - Applicable Standards

1.2.4. Zone Classification

The definition of areas according to the presence of an explosive atmosphere is set up in the following Standards: IEC/EN 60079-10-1: Explosive atmospheres - Part 10-1: Classification of areas - Explosive gas atmospheres IEC/EN 60079-10-2: Explosive atmospheres - Part 10-2: Classification of areas - Combustible dust atmospheres.

Hazardous areas are classified into zones based upon the frequency of the occurrence and duration of an explosive atmosphere:



Explosive gas atmospheres	
Zone 0	An area in which an explosive atmosphere is present continuously or for long periods or frequently.
Zone 1	An area in which an explosive atmosphere is likely to occur in normal operation occasionally.
Zone 2	An area in which an explosive atmosphere is likely to occur in normal operation but, if it does occur, will persist for a short period.

Table 4 - Zones classification for gas atmospheres

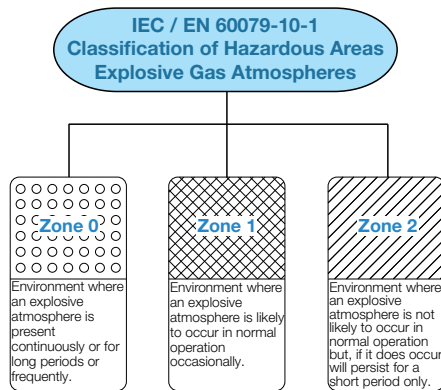


Figure 2 - Zones marking for gas atmospheres

Combustible dust atmospheres	
Zone 20	A place in which an explosive dust atmosphere, in the form of a cloud of dust in air, is present continuously, or for long periods or frequently.
Zone 21	A place in which an explosive dust atmosphere, in the form of a cloud of dust in air, is likely to occur in normal operation occasionally.
Zone 22	A place in which an explosive dust atmosphere, in the form of a cloud of dust in air, is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

Table 5 - Zones classification for dust atmospheres

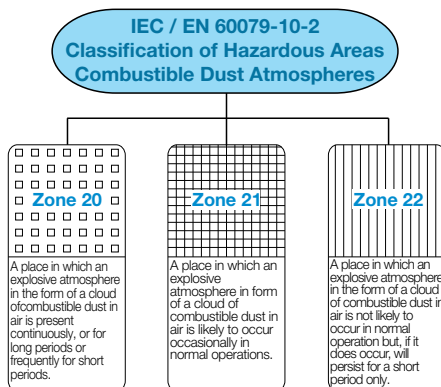


Figure 3 - Zones marking for dust atmospheres

The hazards presented by dusts are as follows:

- The formation of a dust cloud from any source of release, including a layer or accumulation, to form an explosive dust atmosphere;
- The formation of dust layers, which are not likely to form a dust cloud, but might ignite due to self-heating or exposure to hot surfaces or thermal flux and cause a fire hazard or over-heating of equipment. The ignited layer may also act as an ignition source for an explosive atmosphere.

For dust layers, the nature of housekeeping assures an essential control to their thickness. For a “good” level of housekeeping, dust layers are kept to negligible thickness and the consequent risks (occurrence of explosive dust clouds from layers and fire due to layers) have been removed. It is rarely possible with a simple examination of a plant or its design to decide which parts of the plant can be identified according to the three zone definitions. A more detailed approach is therefore necessary and this involves the analysis of the basic possibility of an explosive atmosphere occurring.

Subsequent to the completion of the area classification, a risk assessment may be carried out to evaluate whether the consequences of ignition of an explosive atmosphere requires the use of a higher equipment protection level (EPL) or may justify the use of lower equipment protection level than normally required. The EPL requirements may be recorded, as appropriate, on the area classification documents and drawings to allow proper selection of equipment.

1.2.5. Equipment Grouping and Equipment Protection Level (EPL)

A risk assessment approach for the acceptance of Ex equipment has been introduced in IEC/EN 60079-0 Standard as an alternative method to the current prescriptive and relatively inflexible approach linking equipment to zones. To facilitate this, a system of equipment protection levels has been introduced to clearly indicate the inherent ignition risk of equipment, no matter what type of protection is used. The designation system of these equipment protection levels is as follows:

Group	EPL	Designation
I Electrical equipment intended for use in mines susceptible to firedamp.	Ma	Equipment for installation in a coalmine susceptible to firedamp, having a 'very high' level of protection, which has sufficient security that it is unlikely to become an ignition source in normal operation, during expected malfunctions or during rare malfunctions, even when left energized in the presence of an outbreak of gas.
	Mb	Equipment for installation in a coal mine susceptible to firedamp, having a 'high' level of protection, which has sufficient security that it is unlikely to become a source of ignition in normal operation or during expected malfunctions in the time span between there being an outbreak of gas and the equipment being de-energized.

Table 6 - Equipment Protection Levels (EPL's) for Group I

Group	EPL	Designation
II Electrical equipment intended for use in places with an explosive gas atmosphere other than mines susceptible to firedamp. The Group II is subdivided according to the nature of the explosive gas for which it is intended: • IIA for propane as the typical gas • IIB for ethylene as the typical gas • IIC for hydrogen as the typical gas	Ga	Equipment for explosive gas atmospheres, having a 'very high' level of protection, which is not a source of ignition in normal operation, during expected malfunctions or during rare malfunctions.
	Gb	Equipment for explosive gas atmospheres, having a 'high' level of protection, which is not a source of ignition in normal operation or during expected malfunctions.
	Gc	Equipment for explosive gas atmospheres, having an 'enhanced' level of protection, which is not a source of ignition in normal operation and which may have some additional protection to ensure that it remains inactive as an ignition source in the case of regular expected occurrences (for example failure of a lamp).

Table 7 - Equipment Protection Levels (EPL's) for Group II

Group	EPL	Designation
III Electrical equipment intended for use in places with an explosive dust atmosphere other than mines susceptible to firedamp. The Group III is subdivided according to the nature of the explosive dust for which it is intended: <ul style="list-style-type: none"> • IIIA: combustible flyings • IIIB: non-conductive dust • IIIC: conductive dust 	Da	Equipment for combustible dust atmospheres, having a 'very high' level of protection, which is not a source of ignition in normal operation, during expected malfunctions, or during rare malfunctions.
	Db	Equipment for combustible dust atmospheres, having a 'high' level of protection, which is not a source of ignition in normal operation or during expected malfunctions.
	Dc	Equipment for combustible dust atmospheres, having an 'enhanced' level of protection, which is not a source of ignition in normal operation and which may have some additional protection to ensure that it remains inactive as an ignition source in the case of regular expected occurrences (for example failure of a lamp).

Table 8 - Equipment Protection Levels (EPL's) for Group III

The various levels of protection of equipment must be capable of functioning in conformity with the operational parameters established by the manufacturer to that level of protection.

Protection afforded	Equipment protection level	Performance of protection	Conditions of operation
	Group		
Very high	Ma	Two independent means of protection or safe even when two malfunctions occur independently of each other	Equipment remains functioning when explosive atmosphere present
	Group I		
Very high	Ga	Two independent means of protection or safe even when two malfunctions occur independently of each other	Equipment remains functioning in zones 0, 1 and 2
	Group II		
Very high	Da	Two independent means of protection or safe even when two malfunctions occur independently of each other	Equipment remains functioning in zones 20, 21 and 22
	Group III		
High	Mb	Suitable for normal operation and severe operating conditions	Equipment de-energized when explosive atmosphere present
	Group I		
High	Gb	Suitable for normal operation and frequently occurring disturbances or equipment where malfunctions are normally taken into account	Equipment remains functioning in zones 1 and 2
	Group II		
High	Db	Suitable for normal operation and frequently occurring disturbances or equipment where malfunctions are normally taken into account	Equipment remains functioning in zones 21 and 22
	Group III		
Enhanced	Gc	Suitable for normal operation	Equipment remains functioning in zone 2
	Group II		
Enhanced	Dc	Suitable for normal operation	Equipment remains functioning in zone 22
	Group III		

Table 9 - EPL's vs Operation Conditions

1.2.6. Surface Temperature

IEC/EN 60079-0 Standard defines the limits for electrical equipment surface temperature for Groups I, II and III.

Group I Electrical Equipment

For electrical equipment of Group I, the maximum surface temperature shall not exceed:

- 150 °C on any surface where coal dust can form a layer,
- 450 °C where coal dust is not likely to form a layer (i.e., inside of a dust protected enclosure).

Group II Electrical Equipment

The maximum surface temperature determined shall not exceed:

- The temperature class assigned (see table below), or
- The maximum surface temperature assigned, or
- If appropriate, the ignition temperature of the specific gas for which it is intended.

Temperature class for Group II electrical equipment	Maximum surface temperature °C
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

Table 10 - Temperature classes for Group II

Group III Electrical Equipment

- Maximum surface temperature determined without a dust layer shall not exceed:
 - The maximum surface temperature class assigned;
 - The layer or cloud ignition temperature of the specific combustible dust for which it is intended.
- Maximum surface temperature with respect to dust layers:
 - The maximum surface temperature may also be determined for a given depth of layer, TL, of dust surrounding all sides of the apparatus, unless otherwise specified in the documentation, and marked with the symbol "X" to indicate this specific condition of use.



1.3. Equipment Type of Protection and Selection

1.3.1. TYPE Ex d - Flameproof Enclosure (According to IEC/EN 60079-1 Standard)

It is a type of protection where the parts that can ignite an explosive atmosphere are in enclosures which are capable to withstand a pressure during an internal explosion of an explosive mixture. These enclosures are built to avoid the spreading of the internal combustion to the outside explosive atmosphere. An induction electric motor (of any protection) is not totally sealed, that is, air flows in and out.

While the motor is in operation, it heats up and the internal air gets to a higher pressure compared to the external pressure (air is blown out); when motor is switched-off, the internal pressure decreases, allowing in this way the entrance of air (which in this case is contaminated). The motor surfaces do not need to be totally enclosed to avoid flame propagation.

The minimum opening required to avoid passage of flames depends on the gas or vapour that is present.

Therefore, there will always be flame passages through the motor enclosure. The safety level on an explosion proof motor is on the fact that it must ensure that all flame passages never exceed the standardized dimensions and that the motor is physically suitable to withstand an internal explosion without transmitting it to the external environment. Ex d protection will not allow that an internal explosion propagates to the external environment. To ensure safety to the system, WEG provides a control of the openings and the finishing of joints once these are responsible for the volume of gases exchanged between inside and outside of the motor.

Flame propagation between motor interior and external atmosphere is guaranteed by constructive joints and gaps. Internal pressure that can result of an explosion in the interior of the motor is guaranteed by the enclosure resistance (frame, endshields, internal bearing covers, terminal boxes and some adaptors).

The main characteristics of Ex d motors are as follows:

- Reinforced frame, terminal box and endshields;
- Wider contact surface (interference) between motor components;
- Reduced clearance between motor shaft and bearing cap to avoid transmission of sparks to the external environment;
- All components (frames, endshields, terminal box and terminal box lids) are submitted to overpressure test in factory;
- Guarantee of external surface temperature of the motor in accordance with the correspondent Class of Temperature (e.g. T4 - 135 °C). The tests on WEG prototypes include a full evaluation of the external surface temperatures with motor supplied with electrical limit conditions.

Applications:

- Environments containing flammable gas or vapour continuously, intermittently or periodically in enough amounts to originate explosive or flammable mixtures arising out of repairs or maintenance services;
- The locations defined as Zones 1 and 2, Groups IIA, IIB and IIC are those where the following gases are found present: oil, naphtha, benzene, ammonia, propane, diethyl ether, acetone, alcohol, industrial methane, natural gas, as well as hydrogen and acetylene;

- The main applications including pumps, fans, blowers, crushers, conveyor systems, mills, cranes and other applications located in areas that require explosion proof motors.

1.3.2. TYPE Ex d e - Flameproof Motors with Increased Safety Terminal Box (According to IEC/EN 60079-1 and IEC/EN 60079-7 Standards)

WEG Ex d e motors differ from Ex d motors mainly on the configuration of terminals and terminal box. The terminal box with increased safety terminals prevents against any ignition source that may occur such as sparks, excessive heating, etc.

Motors with flameproof enclosures “d” with Increased Safety terminal boxes “e” can be used also in zone 1. The protection principle of increased safety terminal boxes is acting in the causes that can start an ignition (e.g. sparks, materials overheating, cables movements, etc) and not in preventing that an internal explosion is sustained inside the enclosure (like flameproof enclosures “d”). Most of WEG increased safety terminal boxes have the constructive principles of flameproof enclosures “d” with additional Increased Safety requirements.

The main characteristics of Ex d e motors are:

- Terminal box components as well as connection cables must be firmly fastened (without allowing any movement);
- Special terminal block/bushings to avoid arcs and sparks and higher air and surface distances between conductive parts (clearances and creepages);
- Double grounding must be provided (one on the frame and the other inside the terminal box).

Applications:

Same as described for Ex d motors.

1.3.3. TYPE Ex t - Dust Ignition Protection by Enclosure “t” (According to IEC/EN 60079-31 Standard)

The dust ignition protection by enclosure “t” is a type of protection for explosive dust atmospheres where electrical equipment is provided with an enclosure providing dust ingress protection and a means to limit surface temperatures. This type of protection is divided into three levels of protection, “ta”, “tb” and “tc”. For each type of protection, an equipment protection level (EPL) has been assigned based on the risk of the equipment becoming an ignition source in a hazardous atmosphere.

Dust ignition proof levels of protection	EPL
ta	Da
tb	Db
tc	Dc

Table 11 - EPL's for Ex t enclosures

Besides the thermal endurance and mechanical tests specified in IEC 60079-0 Standard, the motors with this protection shall be subjected to the following tests:

- Thermal test for the determination of maximum surface temperature as described in IEC 60079-0 Standard with the test voltage of $U_n \pm 10\%$.

Alternatively, determination of the maximum surface temperature may be conducted within Zone A (as per IEC 60034-1 Standard). In this case, the equipment shall be marked with "X" in accordance with IEC 60079-0 Standard and the specific condition of use shall include the information that the surface temperature determination was based on operation within Zone A (IEC 60034-1 Standard), typically ± 5% of rated voltage.

- A positive internal pressure of at least:
 - 4 kPa for level of protection "ta" equipment, or
 - 2 kPa for level of protection "tb" and "tc" equipment.

The tests shall be applied to the equipment for at least 60 s. During this test, any breathing or draining device shall be removed and the entry plugged. There shall be no evidence of damage to the enclosure due to the pressure applied.
- After the satisfactory completion of the pressure test, the motors shall satisfy the requirements of ingress protection as shown in the table:

Level of protection	IIIC	IIIB	IIIA
"ta"	IP6X	IP6X	IP6X
"tb"	IP6X	IP6X	IP5X
"tc"	IP6X	IP5X	IP5X

Table 12 - IP levels for Ex t enclosures

Ingress Protection is to be determined in accordance with degree of protection (IP) of enclosures as specified in IEC 60079-0 Standard for level of protection "ta", "tb" and "tc". In the specific case of the level of protection "ta" the level of depression shall be increased to at least 4 kPa for a period of at least 8 hours. Any grease in the joints should be removed before the IP test is performed.

Applications:

- Sugar refining plants
- Breweries
- Cement Plants
- Textiles
- Pharmaceutical
- Chemical
- Food process industries

1.3.4. Selection of Equipment (According to IEC/EN 60079-14 Standard)

To select the appropriate electrical equipment for hazardous areas, the following information is required:

- Classification of the hazardous area including the equipment protection level requirements, where applicable;
- Where applicable, gas, vapour or dust classification in relation to the electrical equipment group or subgroup;
- Temperature class or ignition temperature of the gas or vapour involved;
- Minimum ignition temperature of the combustible dust cloud, minimum ignition temperature of the combustible dust layer and minimum ignition energy of the combustible dust cloud;
- External influences and ambient temperature.

1.3.4.1. Selection According to Zones

Relationship between EPL's and zones is exhibited in table 13.

Zone	Equipment protection level (EPL's)
0	"Ga"
1	"Ga" or "Gb"
2	"Ga", "Gb" or "Gc"
20	"Da"
21	"Da" or "Db"
22	"Da", "Db" or "Dc"

Table 13 - EPL's vs Zones

1.3.4.2. Selection According to Equipment Protection Level

According with IEC/EN Standards, EPL's have been allocated to each type of protection as follows:

EPL	Type of protection	Code	According to
'Ga'	Intrinsically safe	'ia'	IEC 60079-11
	Encapsulation	'ma'	IEC 60079-18
	Two independent types of protection each meeting EPL 'Gb'	-	IEC 60079-26
	Protection of equipment and transmission systems using optical radiation	-	IEC 60079-28
'Gb'	Flameproof enclosures	'db'	IEC 60079-1
	Increased safety	'eb'	IEC 60079-7
	Intrinsically safe	'ib'	IEC 60079-11
	Encapsulation	'mb'	IEC 60079-18
	Oil immersion	'ob'	IEC 60079-6
	Pressurized enclosures	'pxb' or 'pyb'	IEC 60079-2
	Powder filling	'qb'	IEC 60079-5
	Fieldbus intrinsically safe concept (FISCO)	-	IEC 60079-27
'Gc'	Protection of equipment and transmission systems using optical radiation	-	IEC 60079-28
	Intrinsically safe	'ic'	IEC 60079-11
	Encapsulation	'mc'	IEC 60079-18
	Non-sparking	'n' or 'nAc'	IEC 60079-15
	Restricted breathing	'nRc'	IEC 60079-15
	Energy limitation	'nLc'	IEC 60079-15
	Sparking equipment	'nCc'	IEC 60079-15
	Pressurized enclosures	'pzc'	IEC 60079-2
	Fieldbus non-incendive concept (FNICO)	-	IEC 60079-27
	Protection of equipment and transmission systems using optical radiation	-	IEC 60079-28
'Da'	Intrinsically safe	'ia'	IEC 60079-11
	Encapsulation	'ma'	IEC 60079-18
	Protection by enclosure	'ta'	IEC 60079-31
'Db'	Intrinsically safe	'ib'	IEC 60079-11
	Encapsulation	'mb'	IEC 60079-18
	Protection by enclosure	'tb'	IEC 60079-31
	Pressurized enclosures	'pb'	IEC 61241-4

'Dc'	Intrinsically safe	'ic'	IEC 60079-11
	Encapsulation	'mc'	IEC 60079-18
	Protection by enclosure	'tc'	IEC 60079-31
	Pressurized enclosures	'pc'	IEC 61241-4

Table 14 - EPL's vs Types of Protection

1.3.4.3. Selection According to Equipment Grouping

Relationship between gas/vapour or dust subdivision and equipment Group:

Location gas/vapour or dust subdivision	Permitted equipment Group (EPL's)
IIA	II, IIA, IIB or IIC
IIB	II, IIB or IIC
IIC	II or IIC
IIIA	IIIA, IIIB or IIIC
IIIB	IIIB or IIIC
IIIC	IIIC

Table 15 - EPL's vs Equipment Groups

1.3.4.4. Selection According to the Ignition Temperature of the Gas, Vapour or Dust and Ambient Temperature

The electrical equipment shall be so selected that its maximum surface temperature will not reach the ignition temperature of any gas, vapour or dust which may be present.

If the marking of the electrical equipment does not include an ambient temperature range, the equipment is designed to be used within the temperature range -20 °C to +40 °C. If the marking of the electrical equipment includes an ambient temperature range, the equipment is designed to be used within that range.

If the ambient temperature is outside the temperature range or if there is a temperature influence from other factors, e.g. the process temperature or exposure to solar radiation, the effect on the equipment shall be considered and measures taken duly documented.

GROUP I - Underground Coal Mines (methane and coal dust)

Maximum surface temperature *	Conditions
150 °C	Where coal dust can form a layer
450 °C	Where coal dust is not likely to form a layer

* on any surface of the enclosure

Table 16 - Allowable surface temperature for Group I motors

WEG motors are tested under the most adverse rating with 90% of the rated voltage supply (according to IEC/EN 60079-0 Standard), in order to validate the maximum surface temperature.

GROUP II - Gas and Vapours

Temperature class required by the area classification	Ignition temperature of gas or vapour in °C	Allowable temperature classes of equipment
T1	>450	T1 - T6
T2	>300	T2 - T6
T3	>200	T3 - T6
T4	>135	T4 - T6
T5	>100	T5 - T6
T6	>85	T6

Table 17 - Allowable surface temperature for Group II motors

WEG motors are tested under the most adverse rating with 90% of the rated voltage supply, assuring a safety margin of 5K for temperature classes T3 to T6 and 10K for T1 and T2 classes (according to IEC/EN 60079-0 Standard), in order to validate the maximum surface temperature.

GROUP III - Conductive Dust (IIIC)

■ Without dust layers:

Maximum surface temperature of the apparatus shall not exceed the assigned value. For W22Xd motors the standard assigned temperature is T125 °C.

WEG motors are tested under the most adverse rating with 90% of the rated voltage supply (according to IEC/EN 60079-0 Standard), in order to validate the maximum surface temperature.

■ With dust layers:

Maximum surface temperature of the apparatus must be determined for a given depth of dust layer. Please refer to WEG for motor selection in this condition.



1.3.4.5. Summary

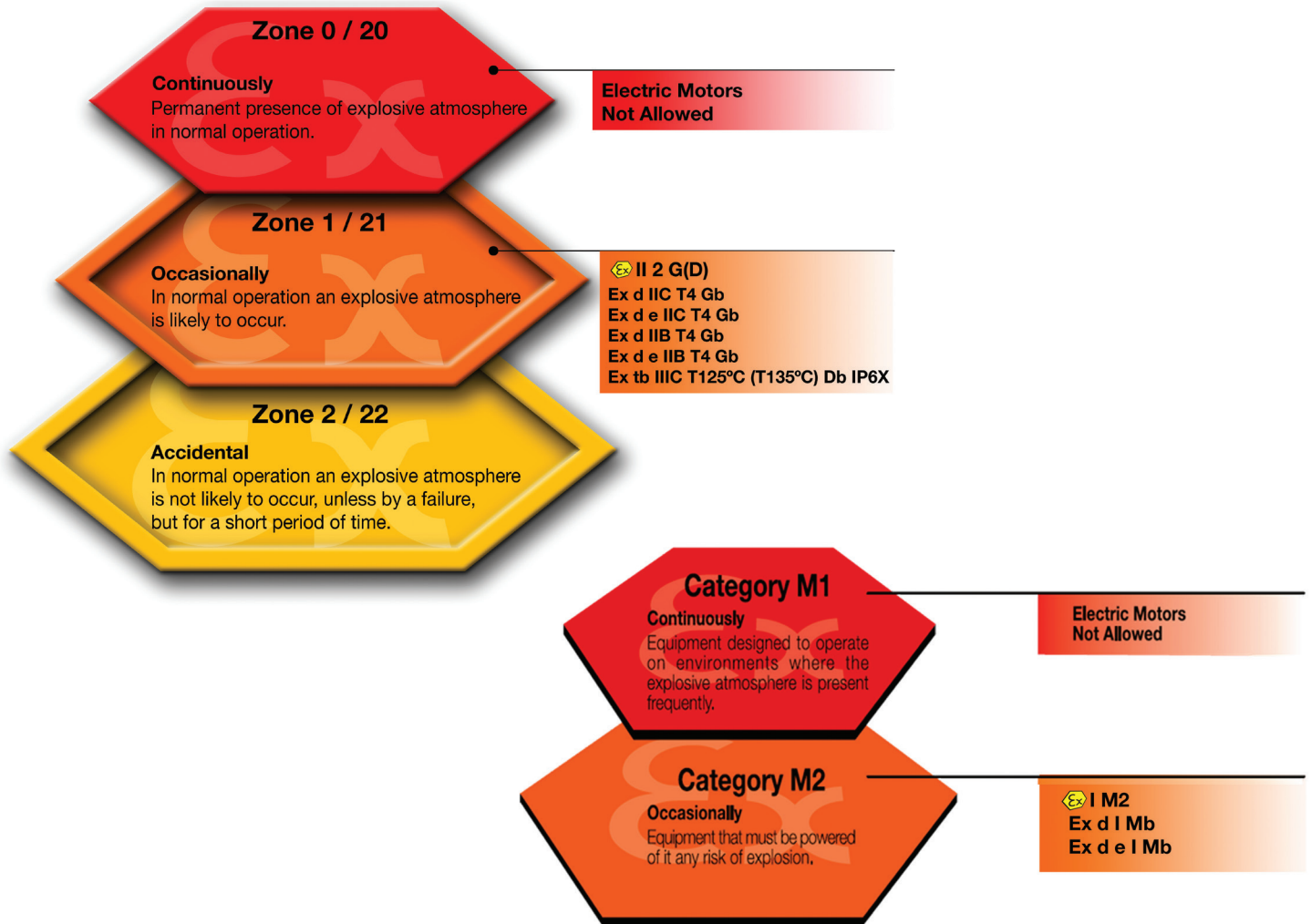


Figure 4 - Zones classification



2. Marking of Equipment

The marking of equipment must follow ATEX Directives and IEC/EN Standards.

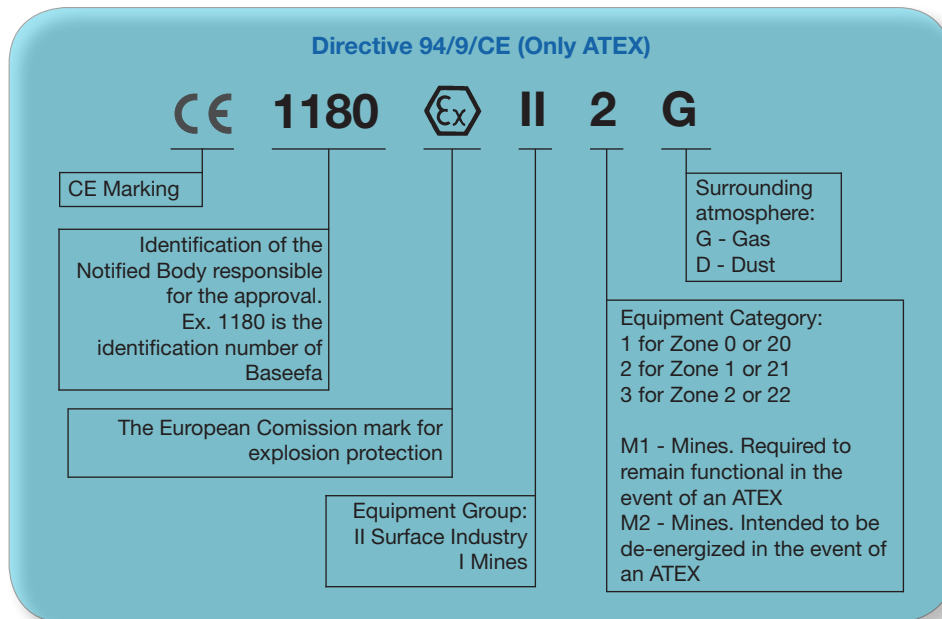


Figure 5 - ATEX marking

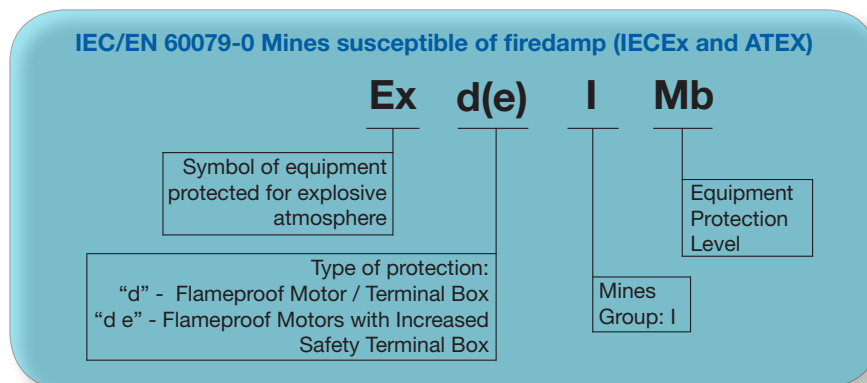


Figure 6 - ATEX / IECEx marking for mines susceptible of firedamp

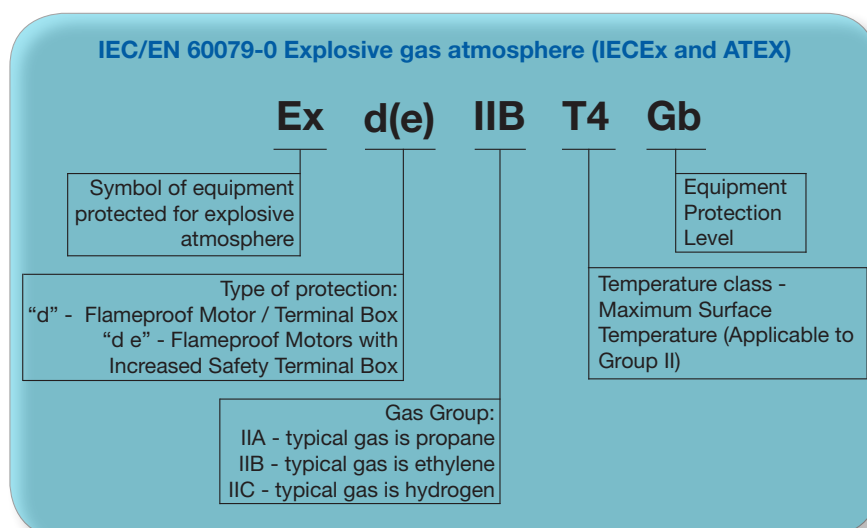


Figure 7 - ATEX / IECEx marking for explosive gas atmosphere

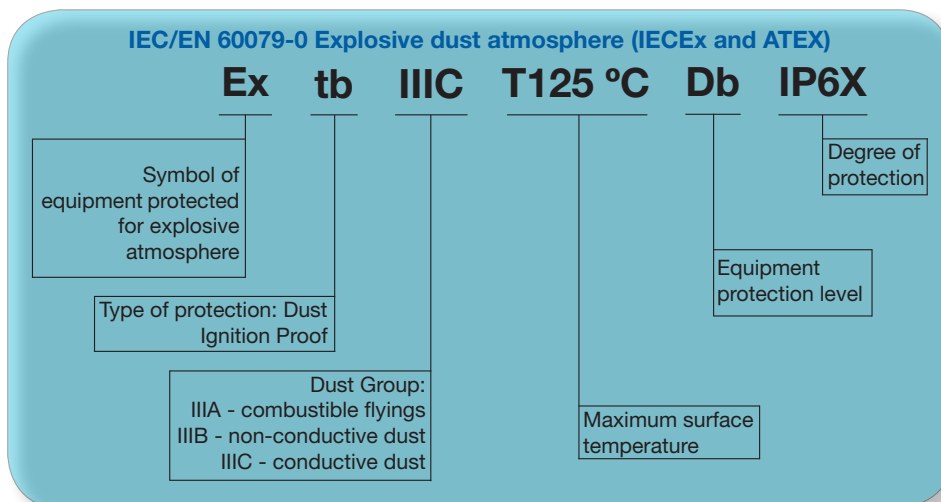


Figure 8 - ATEX / IECEx marking for explosive dust atmosphere

3. Certification Nameplate

The W22Xd product range marking is given in an additional nameplate. Depending on the Certification Authority (Baseefa or INERIS), one of the following layouts will be applied:

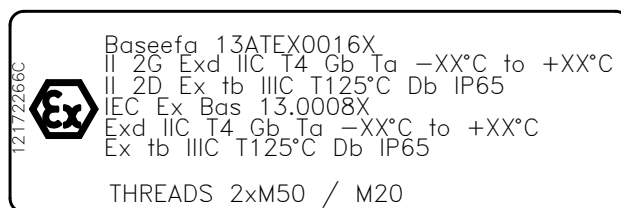


Figure 9 – ATEX / IECEx certification nameplates - Baseefa certified products

For Baseefa certified products the certification nameplate includes the product material number and the terminal box threaded cable entries. In this case the CE Marking is stamped in the main nameplate.

For INERIS certified products the certification nameplate includes the CE Marking. In this case the terminal box threaded cable entries are stamped on additional plates placed near the corresponding entries and the product material number is stamped on the main nameplate.



Figure 10 – ATEX certification nameplate – INERIS certified products

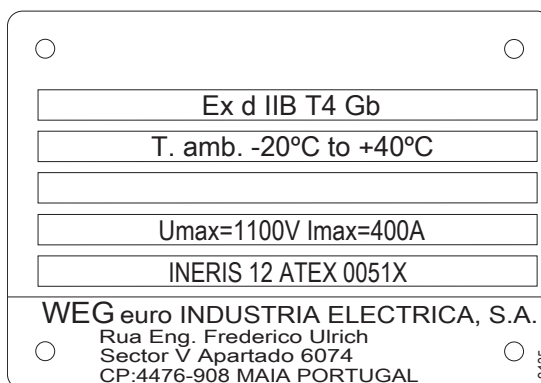


Figure 11- IECEx certification nameplate – INERIS certified products

4. Construction Standards

W22Xd motors meet the requirements and regulations of the latest version of the following Standards:

IEC 60034-1	Rotating electrical machines - part 1: rating and performance
IEC 60034-5	Rotating electrical machines - part 5: degrees of protection provided by the integral design of rotating electrical machines (IP code) - classification
IEC 60034-6	Rotating electrical machines - part 6: methods of cooling (IC code)
IEC 60034-7	Rotating electrical machines - part 7: classification of types of constructions, mounting arrangements and terminal box position (IM code)
IEC 60034-8	Rotating electrical machines. Part 8: terminal markings and direction of rotation
IEC 60034-9	Rotating electrical machines - part 9: noise limits
IEC 60034-11	Rotating electrical machines. Part 11: thermal protection
IEC 60034-12	Rotating electrical machines. Part 12: starting performance of single-speed three-phase cage induction motors
IEC 60034-14	Rotating electrical machines - part 14: mechanical vibration of certain machines with shaft heights 56 mm and higher - measurement, evaluation and limits of vibration
IEC 60034-17	Rotating electrical machines - part 17: cage induction motors when fed from converters - application guide
IEC 60034-25	Rotating electrical machines - part 25: guide for the design and performance of cage induction motors specifically designed for converter supply

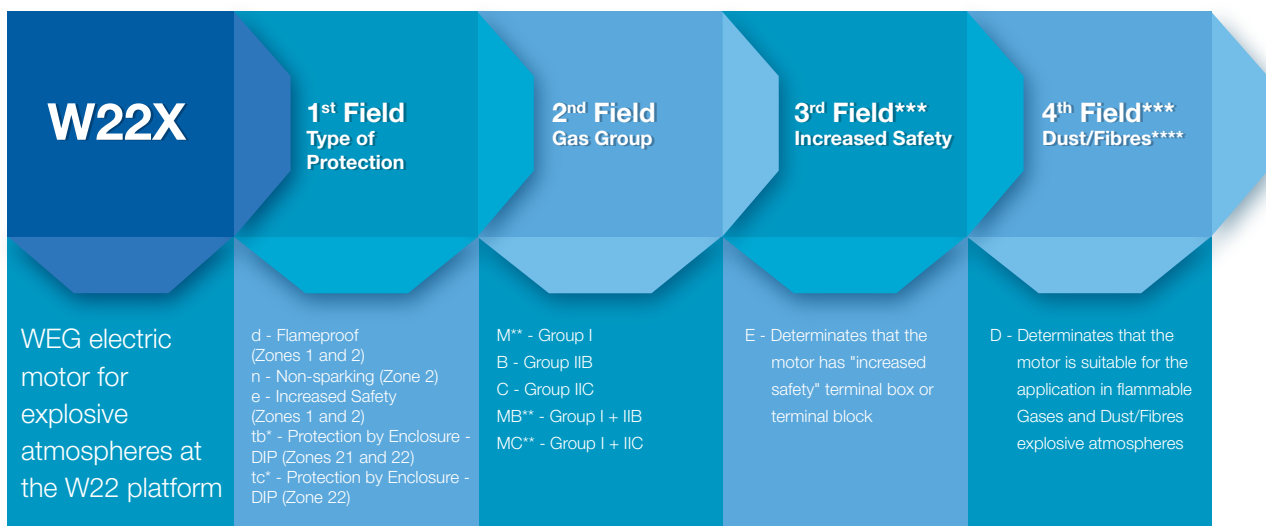
IEC 60034-30	Rotating electrical machines - part 30: efficiency classes of single-speed, three-phase, cage-induction motors (ie-code)
IEC 60072-1	Dimensions and output series for rotating electrical machines - part 1: frame numbers 56 to 400 and flange numbers 55 to 1080
IEC 60529	Degrees of protection provided by enclosures (IP code)
IEC 62262	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)
IEC TS 60034-31	Rotating electrical machines - part 31: selection of energy-efficient motors including variable speed applications - application guide
IEC 60079-0	Electrical apparatus for explosive gas atmospheres - part 0: general requirements
IEC 60079-1	Explosive atmospheres - part 1: equipment protection by flameproof enclosures 'd'
IEC 60079-7	Electrical apparatus for explosive gas atmospheres - part 7: increased safety 'e'
IEC 60079-31	Explosive atmospheres - part 31: equipment dust ignition protection by enclosure 't'
IEC 60079-26	Explosive atmospheres - part 26: equipment with equipment protection level (EPL) Ga

Table 18 - General construction Standards

5. New Commercial Terminology for WEG Explosive Atmosphere Motors

Aiming at characterizing WEG explosive atmosphere motors in the W22 platform as a single range of products and simplifying their identification, the company has adopted a new commercial terminology system for these motors. This terminology standardizes the designation for WEG explosive atmosphere motors globally and clearly identifies the classified area for which the motor was designed.

The new commercial terminology stipulates the following:



Example:

W22X: WEG motor for explosive atmospheres at the W22 platform	n: non-sparking motor (Zone 2)	C: for IIC Group	D: suitable also to operate in Zone 22 classified areas	= W22XnCD
	d: flameproof motor (Zones 1 and 2)	B: for IIB Group	E: with increased safety terminal block	= W22XdBE

* The types of protection "tb" and "tc" do not allow additional terminologies.
 ** The "M" gas group is applicable only to motors with type of protection "d".
 *** The 3rd and 4th fields may or not be used, depending on the nature of the referred equipment.
 If the 3rd field is not applicable to a certain motor, the 4th field can be used on its location if applicable.
 **** In case of motors with "d" type of protection, the designation means protection for Zones 1 + 21, while for motor with type of protection "n" the designation means protection for Zones 2+22.

Figure 12 - Representation of the new commercial terminology for WEG Explosive Atmosphere motors.

6. Efficiency Levels

The efficiency ratings of the W22Xd motors follow the levels given in the IEC 60034-30 standard. The EuP-Directive 2005/32/EC establishes the Ecodesign requirements for electric motors and defined High Efficiency (IE2) as the minimum efficiency level in Europe as of 16th June 2011.

Whilst the Directive does not specifically apply to hazardous area motors, WEG feels that since the introduction of the ATEX Legislation there has been an increase in demand for these products. Consequently, WEG launched the W22Xd line with the IE2 efficiency level as standard for IEC motors.

In figure 13 the efficiency levels of W22Xd motors at 50 Hz can be compared with the minimum levels established by IEC 60034-30 Standard.

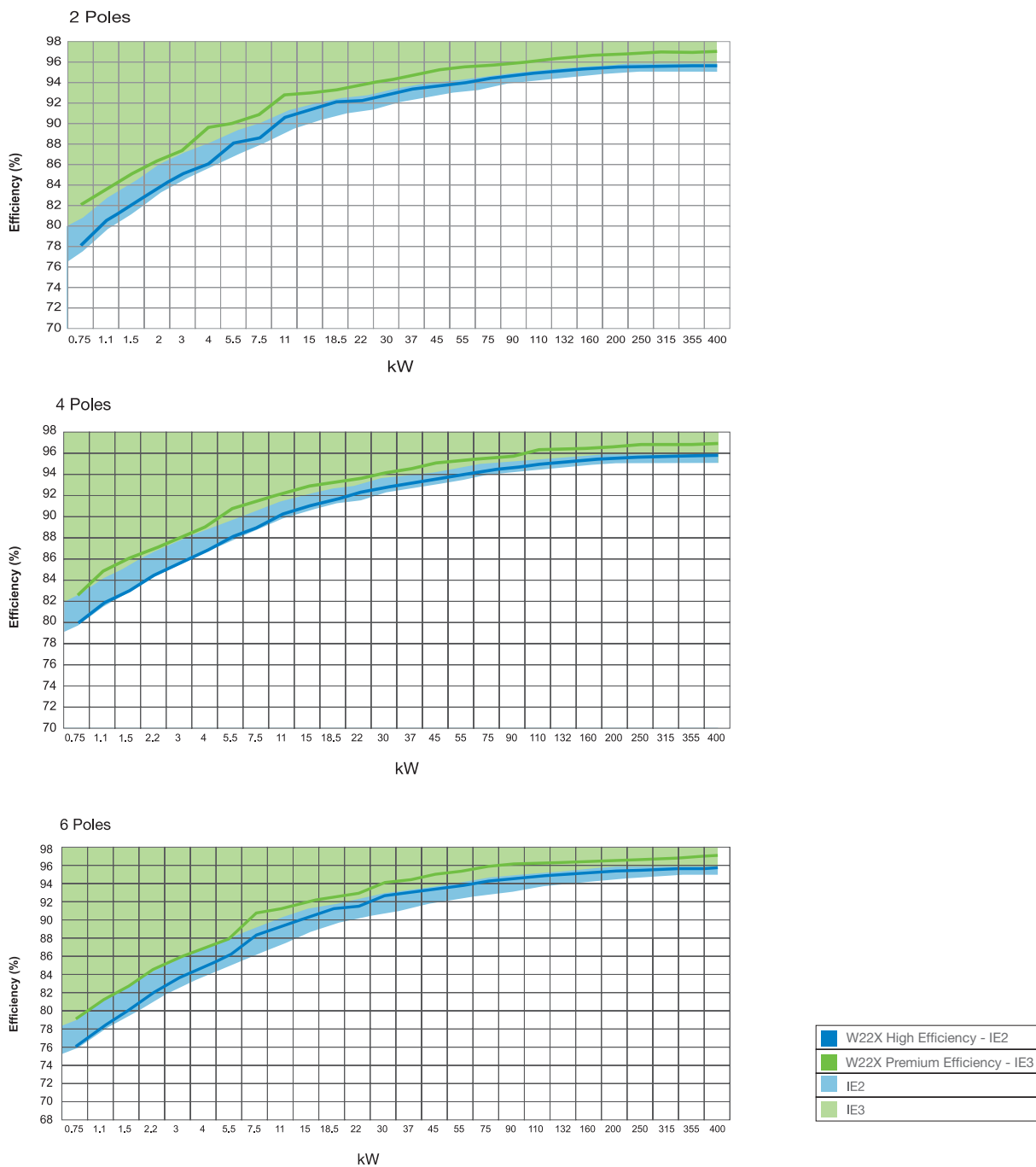


Figure 13 - Efficiency levels

For all efficiency levels the W22Xd motors exceed the minimum figures required by the Standards. They are fully tested and have their efficiency figures declared in accordance with IEC 60034-2-1: 2007 Standards with stray load losses directly determined by summation of losses.

Premium Efficiency motors have the output versus frame ratio as per the applicable parts of the IEC Standards 60034 and 60072, allowing replacement of existing EFF2 and EFF1 motors with Premium Efficiency units. Another characteristic of the electrical design of the W22Xd line is that it was conceived so that its efficiency remains practically constant in the 75% to 100% load range. Therefore, even when the motor does not run at full load its efficiency is not considerably affected (see figure 14), resulting in high levels of energy efficiency.

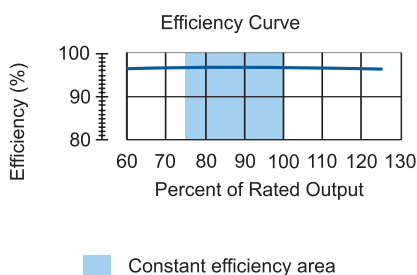


Figure 14 - Typical efficiency curve of W22Xd line

7. Construction Details

The information included in this document refers to standard construction features and the most common variations for W22Xd motors in low voltage for general applications in IEC frame sizes from 71 to 500K/H. W22Xd motors for special and/or customized applications are available on request. For more information, please contact your WEG office or distributor.

7.1. Frame

The W22Xd frame (figure 15) is manufactured in FC-200 (EN GJL 200) cast iron to provide high levels of mechanical strength to cater for the most critical applications. The cooling fins are designed to minimize the accumulation of liquids and dust over the motor.

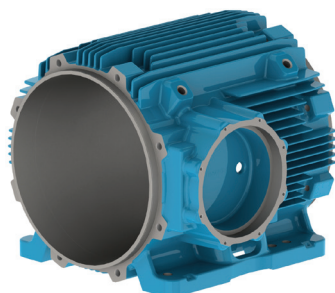


Figure 15 - W22Xd Frame

The motor feet are completely solid for better mechanical strength (figure 16), allowing easier alignment and installation.

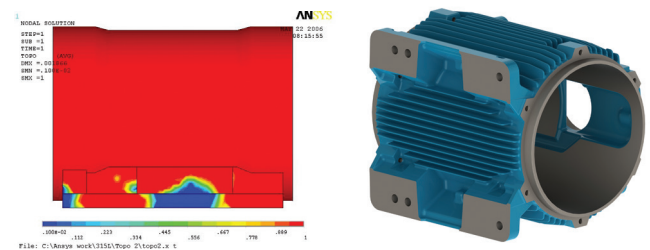


Figure 16 - Solid Feet

The solid and integrated feet still have provisions for dowel pins making the alignment of motors easier when removed for maintenance from their mounting base. Also aiming at an easy installation, jacking screws provisions are available on motor feet.

7.2. Eyebolts

Eyebolts are supplied as standard for all range. The position of the eyebolts is shown in the table 19:

Number of eyebolts	Description
1	Frames 90 to 200* Motors with feet and with side mounted terminal box.
2	Frames 71 to 200 Motors with feet and with top mounted terminal box.
2	Frames 90 to 200* Motors without feet. These motors have four threaded holes, two in the upper part of the frame and two in the lower part of the frame.
2	Frames 225 to 355M/L Motors with feet and with side or top mounted terminal box. These motors have four threaded holes in the upper part of the frame for fastening of the eyebolts (figure 17).
2	Frames 225 to 355M/L Motors without feet. These motors have eight threaded holes, four in the upper part of the frame and four in the lower part of the frame.
2	Frames 355A/B to 500K/H Motors with feet and with side or top mounted terminal box. These motors have two threaded holes in the upper part of the frame for fastening of the eyebolts (figure 17).
2	Frames 355A/B to 500K/H Motors without feet. These motors have four threaded holes, two for vertical mounting and two for horizontal mounting.

*71 and 80 frames are available only in top mounted versions

Table 19 - Eyebolts

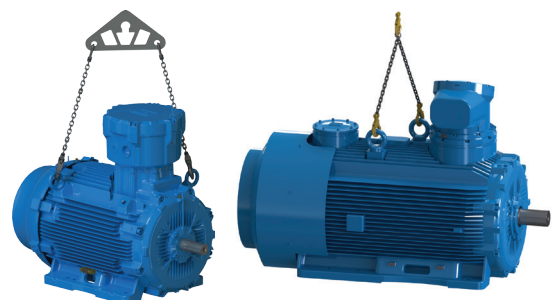


Figure 17 - Examples of horizontal mounted motors

7.3. Points for Vibration Monitoring

To allow easy maintenance, specifically for vibration check, the 160 to 355M/L frames are designed with flat areas on both ends for better placement of the accelerometer (figure 18). These areas are available both in vertical and horizontal planes.

Besides these areas on the frame, all W22Xd motors are supplied with flat areas on the endshields for easier installation of accelerometers. Motors from frame size 160 to 500 are supplied with M8 threaded nipples as standard.

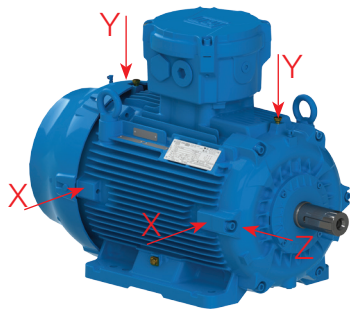


Figure 18 - Flat surfaces for vibration monitoring on the rear and front sides

7.4. Earth Terminals

Frames from 71 to 355M/L are provided with two earth terminals, one located inside the terminal box and another placed on motor feet (see figures 19 to 22).

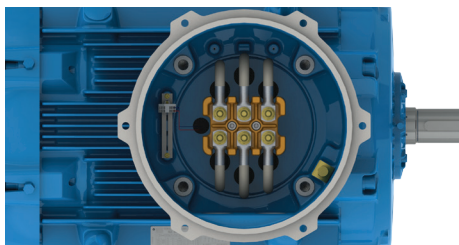


Figure 19 – Earth terminal in the terminal box for frames 71 to 355M/L

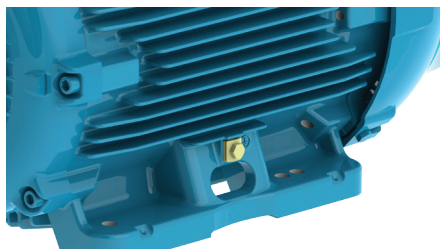


Figure 20 – Earth terminal on the motor feet for frames 71 to 355M/L

Frames from 355A/B to 500K/H are provided with four earth terminals, two located inside the terminal box and two placed on motor feet (see figures 19 to 22).

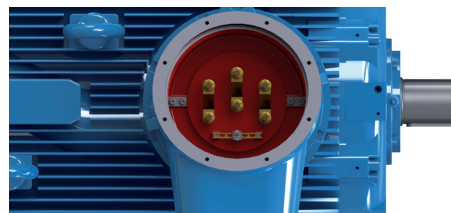


Figure 21 – Earth terminals in the terminal box for frames 355A/B to 500K/H

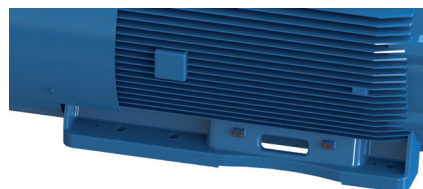


Figure 22 – Earth terminals on the motor feet for frames 355A/B to 500K/H

7.5. Main Terminal Box

The terminal box of W22Xd motors is made of FC-200 (EN GJL 200) cast iron, which is the same material used to produce the frame and endshields. For frame sizes 71 to 132S/M the terminal box is incorporated in the motor frame (see figure 23). For frames 160M/L and above, the terminal box is assembled in the motor frame (see figure 24).

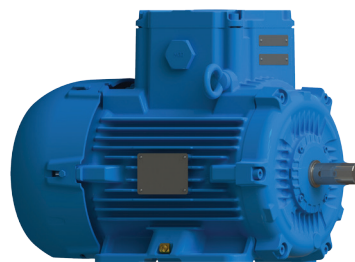


Figure 23 - W22Xd main terminal box incorporated in the motor frame (for frames 71 to 132S/M)

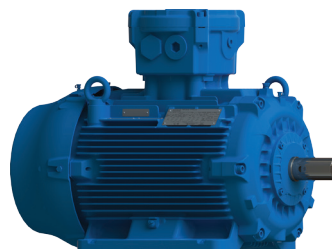


Figure 24 - W22Xd main terminal box for frames 160M/L and above

For the frame size range 71 to 250S/M the terminal box position is centralized on the motor frame. For frame sizes 280S/M to 500K/H the terminal box is positioned towards the drive end of the motor, close to the drive shaft end. This arrangement allows improvement of the airflow over the cooling fins, thus reducing motor operating temperatures.

W22Xd main terminal boxes are supplied with metric threaded holes in order to allow the main and auxiliary cable entries. The sizes and quantities of holes are detailed in Section 20 - Construction features. The main metric threaded holes are supplied with threaded plugs in order to maintain the degree of protection during transport and storage. When supplied with two main cable entries, one is fitted with a certified thread plug, according to the type of protection, EPL and degree of protection indicated on nameplate.

The cable entries used must be fitted with components (such as cable glands and conduits) that meet the applicable Standards and regulations for each country.

Motor power supply leads are marked in accordance with IEC 60034-8 Standard.

For frame sizes 71 to 355M/L the leads are connected to a terminal block made from a polyester based resin BMC (Bulk Moulding Compound), duly reinforced with fibre glass (see figure 25).

For frame sizes 355A/B to 500K/H the leads are connected to individual conductor bushings (see figure 26).

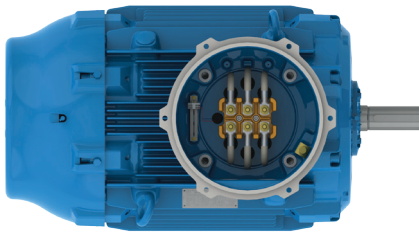


Figure 25 – Terminal box fitted with BMC terminal block (frames 71 to 355M/L)

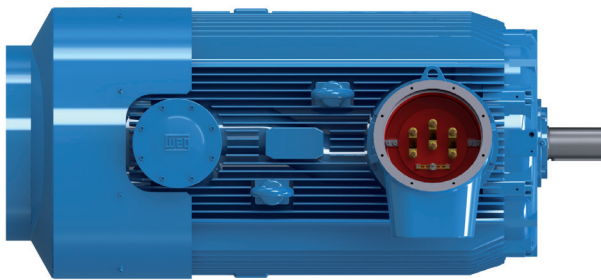


Figure 26 – Terminal box fitted with individual conductor bushings (frames 355A/B to 500K/H)

Motors in frame sizes 90S/L to 500K/H can be supplied in the “Ex de” version, which means that, besides the flameproof protection, the motor is fitted with an increased safety terminal box (see figure 27 and 28). Increased safety terminal boxes are manufactured with specific increased safety components, and its interior insulation and leakage distances are according to the IEC 60079-7 Standard.

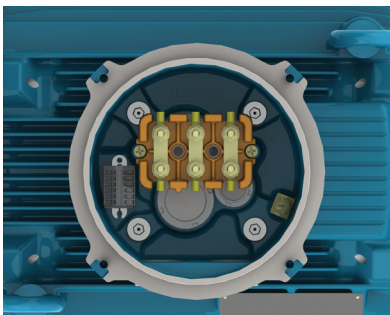


Figure 27 - Terminal box fitted with Ex de protection terminal block for frame sizes 90S/L to 355M/L

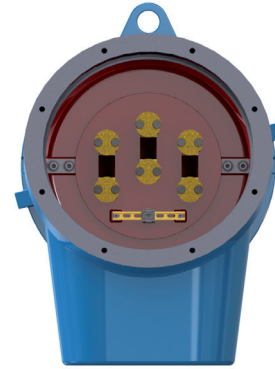


Figure 28 – Terminal box fitted with Ex de protection terminal block for frame sizes 355A/B to 500K/H

Accessories terminals may be assembled inside the main terminal box or in a separate accessory terminal box (see item 6.6). As standard, the main terminal box is fitted with two M20 x 1.5 threaded holes for fitting cable glands for the incoming connection leads. These threaded holes are located in the main terminal box on the opposite side of the driving end and are also fitted with certified threaded plugs. In the item 22 of this catalogue it is possible to check the quantity of connectors that may be assembled inside the main and accessory terminal boxes.

7.6. Auxiliary Terminal Box

As an optional feature, W22Xd motors from frame size 90S/L and above can be supplied with auxiliary terminal box for accessories cables connection.

The cable entries of the auxiliary terminal box are supplied with two threaded plugs to maintain the degree of protection during transport and storage. As standard, one is fitted with a certified threaded plug, according to the type of protection, EPL and degree of protection indicated on nameplate.

The cable entries used must be fitted with components (such as cable glands and conduits) that meet the applicable Standards and regulations for each country.



Figure 29 - Accessory terminal box attached to power terminal box for frame sizes 90S/L to 355A/B



Figure 30 – Accessory terminal box for frame sizes 355A/B to 500K/H

7.7. Endshields

The drive end endshield (figure 31) is designed with fins for better thermal heat dissipation, and to ensure low bearing operating temperatures, resulting in extended lubrication intervals. Furthermore, in order to avoid any loss of airflow through the fins, contributing to better thermal exchange, the endshield fastening screws are strategically placed.

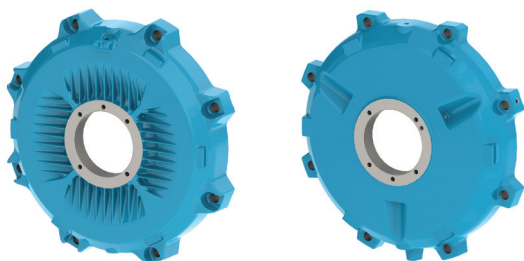


Figure 31 - Drive and non-drive endshields

All the housings of the fixing bolts were carefully designed in order to protect the bolts against accidental impacts and water accumulation. This ensures the motor explosion proof protection, as long as no accidental damage affects the position of the component and compromises the flame path.



Figure 32 - Fixing bolts housings

7.8. Drains

On maintenance procedures, the inspection intervals depend on the motor type, application and installation conditions. At these inspections, it is recommended the removal of the condensed water from the inside of the motor. In order to ease this process, optionally W22Xd can be supplied with holes fitted sintered flameproof-type drain plugs, in accordance with figure 33. These plugs allow the automatic drainage of the condensed water.

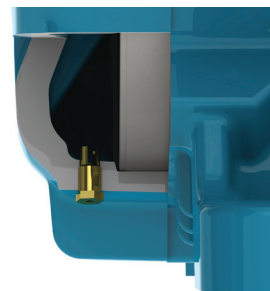


Figure 33 – Detail of the sintered flameproof drain plug

7.9. Fan Cover

The fan covers are made of FC-200 (EM GJL 200) cast iron for frames 71 to 355M/L (see figure 34). For frames 355A/B to 500K/H, the fan covers are made of steel. They have an aerodynamic design, which results in a significant reduction in noise level and optimized airflow between frame fins for heat exchange improvement.



Figure 34 - Cast iron fan cover

Motors for vertical shaft down applications can be supplied with a drip cover over the fan cover, protecting the motor against the ingress of contaminant agents that may affect the cooling system, mainly for outdoor applications.

7.10. Main Nameplate

The main nameplate shows the construction and performance characteristics of the motor. Just to remember, hazardous area certification and product marking are given in an additional Certification Nameplate (see chapter 3).

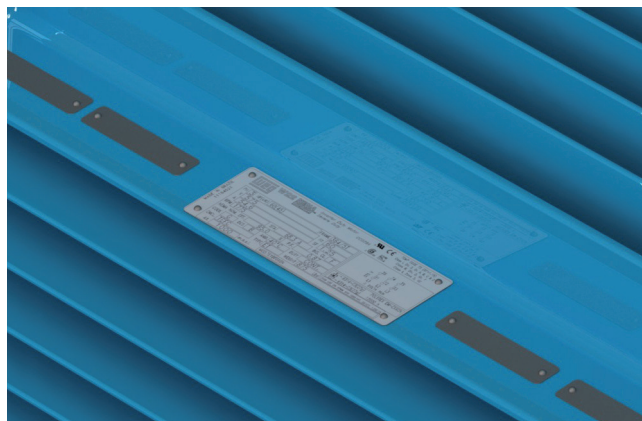


Figure 35 – Representation of a W22Xd motor with the main nameplate, certification nameplate, PTC Thermistor nameplate and Space Heater nameplate

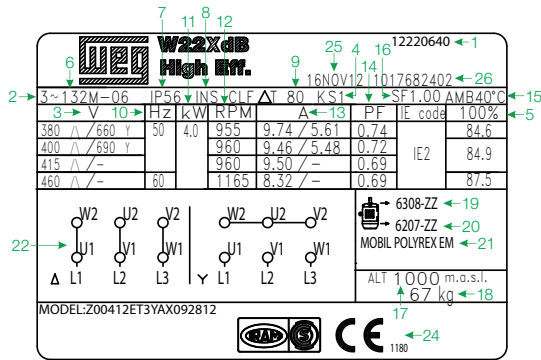


Figure 36 - Nameplate layout for frames 71 to 132M/L

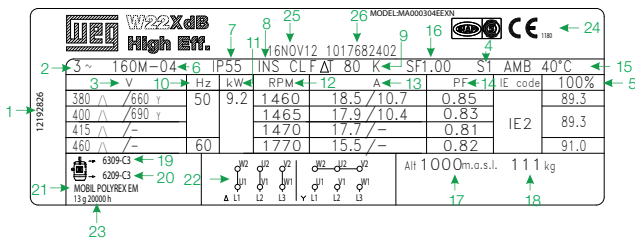


Figure 37 - Nameplate layout for frames 160M/L to 500K/H

- 1 - Motor code
- 2 - Three phase
- 3 - Rated operating voltage
- 4 - Service duty
- 5 - Efficiency
- 6 - Frame size
- 7 - Degree of protection
- 8 - Insulation class
- 9 - Temperature rise
- 10 - Frequency
- 11 - Motor rated power
- 12 - Full load speed (rpm)
- 13 - Rated operating current
- 14 - Power factor
- 15 - Ambient temperature
- 16 - Service factor
- 17 - Altitude
- 18 - Motor weight
- 19 - Drive end bearing specification
- 20 - Non-drive end bearing specification
- 21 - Type of Grease
- 22 - Connection diagram
- 23 - Lubrication intervals in hours and amount of grease
- 24 - Additional certification labels
- 25 - Manufacturing date
- 26 - Serial number

7.11 Accessories Nameplates

W22Xd motors are still supplied with additional nameplates to identify the availability of accessories or, upon customer's request, specific TAG codes/numbers. As W22Xd motors for the European Market are supplied with PTC Thermistors for disconnection and Space Heaters to avoid water condensation, the motors are supplied with additional nameplates (figures 38 and 39) identifying them.



Figure 38 - PTC Thermistor nameplate



Figure 39 - Space Heater nameplate

8. Cooling System and Noise Level/ Vibration Level/Impact Resistance

8.1. Cooling System

The W22Xd standard motors are totally enclosed fan cooled (TEFC - IC411), as per IEC 60034-6 Standard (figure 40). Non-ventilated versions (TENV - IC410), air over (TEAO - IC418) and with forced ventilation (TEBC - IC416) are available on request. More information about IC416 option can be found in Section 19 - Application with Variable Speed Drives.

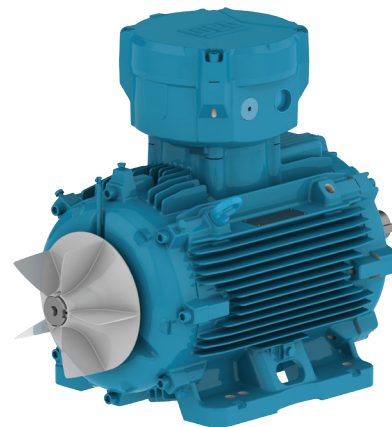


Figure 40 - Cooling system

The cooling system (fan, non drive end shield and fan cover) is designed to minimize the noise level and improve thermal efficiency (figure 41).

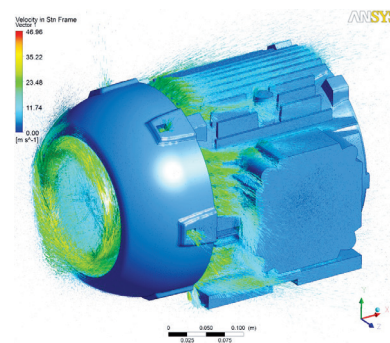


Figure 41 - Cooling system operation

W22Xd motors in frames 71 to 500K/H are fitted with bidirectional fans, except for 2-pole motors in frame sizes 450 and 500 frames which are unidirectional. Fan construction materials are listed in Chapter 17. Construction Features.

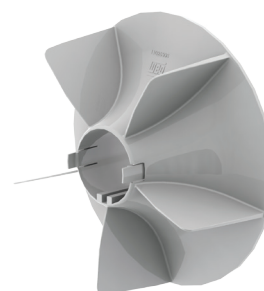


Figure 42 - W22Xd fan

8.2. Noise Levels

W22Xd motors comply with IEC 60034-9 Standard and the corresponding sound pressure levels. Tables 20 and 21 show sound pressure levels in dB(A) which are obtained upon tests at 50 Hz and 60 Hz.

IEC 50 Hz				
Frame	Sound pressure level - dB(A) at 1 meter			
	2 Poles	4 Poles	6 Poles	8 Poles
71	56	43	43	41
80	59	44	43	42
90	64/62*	49	45	43
100	67	53	44	50
112	64	56	48	46
132	68/67*	60/56*	52	48
160	67	61	56	51
180	67	61	56	51
200	72/69*	65/63*	60	53
225	75/74*	66/63*	61	56
250	75/74*	66/64*	61	56
280	77	69	65	59
315S/M	77	71	67	61
315 L	78	74/73*	68	61
355M/L	80	76/74*	73	70
355A/B	80	76	69	65
400L/J	80	80	75	74
400G	80	80	75	74
450K/H	80	80	76	75
500K/H	85	80	80	80

* Applicable to IE3 Premium Efficiency Motors

Table 20 - Sound pressure levels for 50 Hz motors

IEC 60 Hz				
Frame	Sound pressure level - dB(A) at 1 meter			
	2 Poles	4 Poles	6 Poles	8 Poles
71	60	47	47	45
80	62	48	47	46
90	68	51	49	47
100	71	54	48	54
112	69	58	52	50
132	72	61	55	52
160	72	64	59	54
180	72	64	59	54
200	76/74*	68/66*	62	56
225	80/79*	70/67*	64	60
250	80/79*	70/68*	64	60
280	81	73	69	63
315S/M	81	75	70	64
315L	82	79/77*	71	64
355M/L	84	81/78*	77	75
355A/B	84	80	73	69
400L/J	84	80	79	78
400G	84	84	79	78
450K/H	84	84	80	79
500K/H	86**	84	84	84

* Applicable to IE3 Premium Efficiency Motors

** Sleeve bearings only

Table 21 - Sound pressure levels for 60 Hz motors

The noise level figures shown in tables 20 and 21 are measured at 1 metre, overall level and no load condition. Under load the IEC 60034-9 Standard indicates an increase of the sound pressure levels as shown in table 22.

Frame (mm)	2 poles	4 poles	6 poles	8 poles
90 ≤ H ≤ 160	2	5	7	8
180 ≤ H ≤ 200	2	4	6	7
225 ≤ H ≤ 280	2	3	6	7
H = 315	2	3	5	6
H ≥ 355	2	2	4	5

Table 22 - Maximum expected increase of sound pressure level at load condition

Note:

These figures refer to operating frequencies of 50 Hz and 60 Hz. The global noise level can be reduced up to 2 dB (A) with the installation of a drip cover.

8.3. Vibration Levels

Vibration of an electrical machine is closely related to its assembly on the application and, thus, it is generally desirable to perform vibration measurements under installation and operational conditions. Nevertheless, to allow evaluation of the vibration generated by the electrical machine itself in a way to reproduce the tests and to obtain comparative measurements, it is necessary to perform such measurements with the machine uncoupled, under controlled test conditions. The test conditions and vibration limits described here are those found in IEC 60034-14 Standard.

W22Xd motors are dynamically balanced with half key and the standard version meets the vibration levels of Grade A (without special vibration requirements) described in IEC 60034-14 Standard. As an option, motors can be supplied in conformance with vibration of Grade B. The RMS speed and vibration levels in mm/s of Grades A and B are shown in table 23.

Vibration	Frame	56 ≤ H ≤ 132	132 < H ≤ 280	H > 280
	Assembly	Vibration speed RMS (mm/s)	Vibration speed RMS (mm/s)	Vibration speed RMS (mm/s)
Grade A	Free suspension	1.6	2.2	2.8
Grade B	Free suspension	0.7	1.1	1.8

Table 23 - Speed and vibration levels

8.4. Impact Resistance

Flameproof motors shall comply with an impact resistance test in accordance with IEC/EN 60079-0 Standard. This test does not have a direct correlation with the IEC/EN 62262 Standard - Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code).

In a general way, Group I motors, must withstand an external impact of 20 joules and Group II and III motors must withstand an external impact of 7 joules.

9. Shaft

The shaft of W22Xd standard motors is made of AISI 1040/45 steel, in frames IEC 71 to 315S/M, and in AISI 4140 steel for frames 315L to 500K/H.

Shafts are supplied with an open profile key way, with a threaded centre hole and have dimensions shown in Section 23 - Mechanical Features. W22Xd motors can be supplied with a second shaft end as per dimensions also shown in Section 23 - Mechanical Features. Information about maximum allowable radial and axial loads on the second shaft end is available on request. As an option, W22Xd motors can be supplied with stainless steel shafts (AISI 316 and AISI 420) for highly corrosive environments.

Note:

2 pole motors might have restrictions concerning the use of stainless steel shafts. For these cases, please contact your WEG nearest office.

Motors for vertical shaft up applications can be supplied with a slinger centrifugal shaft seal, protecting the motor against the ingress of contaminant agents (mainly liquids) through the shaft that might affect the bearing and overall motor operation.

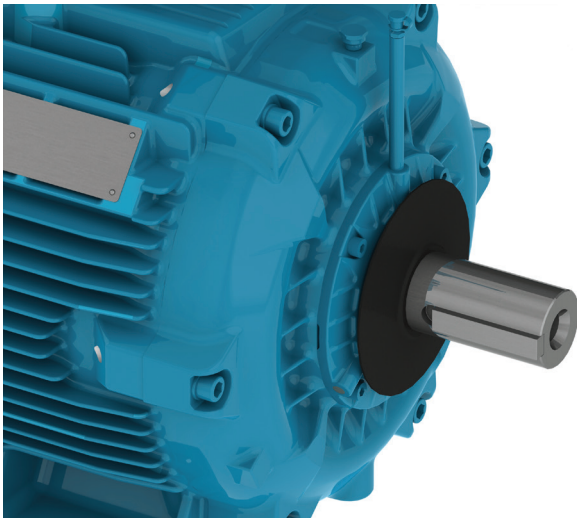


Figure 43 - W22Xd motor fitted with slinger centrifugal seal

10. Bearings

W22Xd motors are supplied with deep groove ball bearings as standard (figure 44), except for 2 pole motors in frame sizes 450 and 500, that commonly supplied with NU roller bearings.

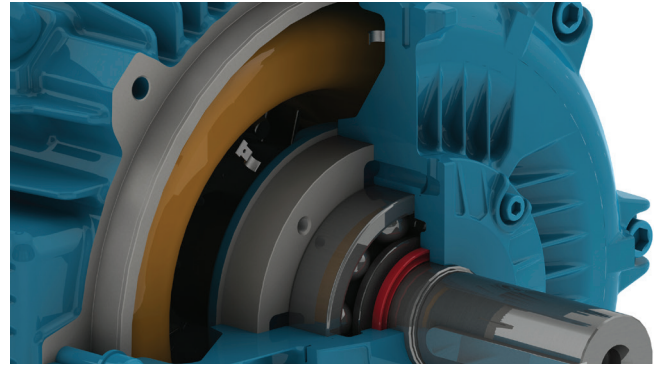


Figure 44 - Bearing view

Optionally, W22Xd motors can be supplied with other types of bearings, such as NU roller bearings, angular contact bearings, etc., where high radial or axial loads may occur. The nominal bearing life L10h is 20,000 or 40,000 hours in conformance with maximum radial and axial loads as described in tables 24 to 28. When direct coupled to the load (without axial or radial thrusts), the L10h bearing life is 40,000 hours.

W22Xd motors in frame sizes up to 132M/L are supplied with double shielded bearings (ZZ). For frames sizes 160M/L and above, the motors are provided with open bearings (unsealed).

Motors in frame sizes up to 132M/L are supplied with Normal clearance bearings, while for frame sizes 160M/L and above C3 clearance bearings are supplied as standard.

In standard configuration, with ball bearings, the drive end bearing is axially locked. To compensate for any axial movement the motors are fitted with pre-load washers for frames 71 to 200 and with pre-load springs for frames 225 to 500.

When provided with roller bearings, the non-drive end bearing is locked and the axial movement is compensated by the axial play of the drive end roller bearing. For minimum and maximum admissible radial loads for roller bearings, please contact WEG.

Bearings lifetime depends on the type and size of the bearing, the radial and axial mechanical loads is submitted to, operating conditions (environment, temperature), rotational speed and grease life. Therefore, bearing lifetime is closely related to its correct use, maintenance and lubrication. Respecting the quantity of grease and lubrication intervals allows bearings to reach the lifetime given. W22Xd motors in IEC frames 160M/L and above are provided as standard with grease fittings in each endshield to allow the relubrication of the bearings. The quantity of grease and lubrication intervals are stamped in the motor nameplate. The lubrication interval is shown in tables 29 and 30. It is important to emphasize that excessive lubrication, i.e. a quantity of grease greater than that recommended on the motor nameplate, can result in the increase of bearing temperatures leading to reduced operating hours.

Notes:

1. L10 lifetime means that at least 90% of the bearings submitted to the maximum indicated loads will reach the

number of hours indicated. The maximum admissible radial and axial loads for the standard configuration are shown in tables 24 to 28. The maximum indicated radial load values consider no external axial loads. The maximum indicated axial load values consider no external radial loads. For combined axial and radial loads or higher load values, please contact your nearest WEG Office.

2. The radial force value (Fr) usually results from information recommended on catalogues of pulley/belts manufacturers. When this information is not available, the force Fr, under operation, can be calculated based on the output power, on coupling design characteristics with pulleys and belts and on the type of application. So we have:

$$Fr = \frac{19,1 \cdot 10^6 \cdot P_n}{n_n \cdot dp} \cdot ka \text{ (N)}$$

Where:

Fr is the radial force caused by pulley and belt coupling [N];

Pn is the motor rated power [kW];

nn is the motor rated speed per minute [rpm];

dp is the pitch diameter of the driven pulley [mm];

ka is a factor that depends on belt tension and type of application (table 24).

Groups and basic types of application	ka Factor of the application	
	V Belts	Plane Belts
1 (Fans and Blowers. Centrifugal Pumps. Winding machines. Compressors. Machine tools) with outputs up to 30 HP (22 kW) .	2.0	3.1
2 (Fans and Blowers, Centrifugal Pumps, Winding machines, Compressors, Machine tools) with outputs higher than 30 HP (22 kW), Mixers, Plungers, Printer Machines.	2.4	3.3
3 Presses, vibrating screens, Piston and screw compressor, pulverisers, helicoidal conveyors, woodworking machines, Textile machines, Kneading machines, Ceramic machines, Pulp and paper industrial grinders.	2.7	3.4
4 Overhead cranes, Hammer mills, Metal laminators, Conveyors, Gyrotory Crushers, Jaw Crusher, Cone Crushers, Cage Mills, Ball Mills, Rubber Mixers, Mining machines, Shredders.	3.0	3.7

Table 24 - ka factor

Important:

1 - Special applications

Motor operation under adverse operating conditions, such as higher ambient temperatures and altitudes or abnormal axial/radial loads, may require specific lubrication measures and alternative relubrication intervals to those indicated in the tables provided within this technical catalogue.

2 - Roller bearings

Roller bearings require a minimum radial load in order to ensure correct operation. They are not recommended for direct coupling arrangements, or for use on 2 pole motors (2 bearing arrangements).

3 - Frequency inverter driven motors

Bearing life may be reduced when a motor is driven by a frequency drive at speeds above nominal. Speed itself is one of the factors taken into consideration when determining motor bearing life.

4 - Motors with modified mounting configurations

For motors supplied with horizontal mounting but working vertically, lubrication intervals must be reduced by half.

5 - Figures for radial thrusts

The figures given in the tables below for radial thrusts take into consideration the point upon which the load is applied, either at the centre of the shaft (L/2) or at the end of the shaft (L), figure 45.

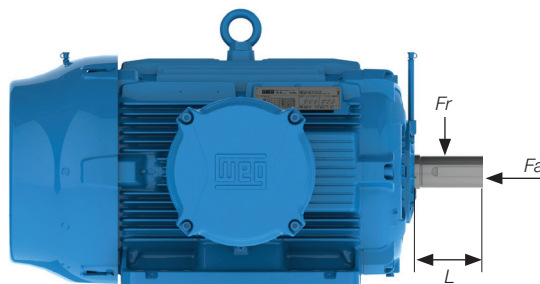


Figure 45 - Radial and axial thrust on motor shaft

10.1. Permissible Loads

Radial Thrust - Ball Bearings

Maximum permissible radial thrust - 50 Hz - Fr in (kN) 20,000 hours								
Frame	2 poles		4 poles		6 poles		8 poles	
	L	L/2	L	L/2	L	L/2	L	L/2
71	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5
80	0.6	0.6	0.6	0.6	0.7	0.8	0.8	0.9
90	0.6	0.6	0.6	0.6	0.7	0.8	0.8	0.9
100	0.8	0.9	0.7	0.8	0.9	1.0	1.2	1.3
112	1.1	1.1	1.1	1.2	1.4	1.5	1.6	1.7
132	1.6	1.8	1.7	1.9	2.1	2.3	2.4	2.6
160	2.3	2.6	2.5	2.8	2.6	3.2	2.6	3.8
180	3.2	3.5	3.6	3.9	4.0	4.4	4.2	5.1
200	3.8	4.1	4.1	4.5	4.5	4.9	5.3	5.8
225	5.1	5.5	4.4	5.9	5	7	5.4	7.7
250	4.7	5.1	5	5.4	6.1	6.7	5.3	7.4
280	4.4	4.8	5.2	5.6	5.7	6.1	6.6	7.8
315	2.8	3	4.2	4.5	4.6	5	4.7	5.1
315L	2.3	4.2	5.6	6	6.7	7.2	6.9	7.4
355M/L	4.8	5.1	8.4	9.1	8.9	9.6	10.6	11.6
355A/B	2.3	2.4	2.4	2.5	2.4	2.5	3.3	3.7
400L/J	1.3	1.5	2.3	2.5	3.0	3.0	3.4	3.7
400G	Available under request							
450K/H								
500K/H								

Table 25 - Maximum permissible radial thrusts for ball bearings

Radial Thrust - Ball Bearings

Maximum permissible radial thrust - 50 Hz - Fr in (kN) 40,000 hours								
Frame	2 poles		4 poles		6 poles		8 poles	
	L	L/2	L	L/2	L	L/2	L	L/2
71	0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.3
80	0.4	0.5	0.4	0.4	0.5	0.6	0.6	0.6
90	0.4	0.4	0.3	0.4	0.5	0.5	0.6	0.6
100	0.6	0.6	0.5	0.5	0.6	0.7	0.8	0.9
112	0.8	0.8	0.7	0.8	1.0	1.1	1.2	1.3
132	1.3	1.4	1.3	1.4	1.6	1.7	1.8	2
160	1.8	2.0	1.9	2.1	2.1	2.3	2.6	2.9
180	2.5	2.7	2.6	2.9	2.9	3.2	3.4	3.8

Maximum permissible radial thrust - 50 Hz - Fr in (kN) 40,000 hours								
Frame	2 poles		4 poles		6 poles		8 poles	
	L	L/2	L	L/2	L	L/2	L	L/2
200	2.9	3.2	3.0	3.3	3.3	3.5	3.9	4.3
225	3.9	4.2	3.9	4.3	4.7	5.2	5.2	5.7
250	3.5	3.9	3.5	3.8	4.4	4.8	4.9	5.4
280	3.3	3.5	3.5	3.8	3.7	4.0	5.1	5.5
315	2.8	3.0	4.2	4.5	4.6	5.0	4.7	5.1
315L	2.3	2.9	3.4	3.7	4.2	4.5	4.2	4.5
355M/L	3.3	3.5	5.7	6.2	5.8	6.3	7.2	7.8
355A/B	1.8	1.9	1.9	2.0	1.9	2.0	2.6	2.8
400L/J	1.0	1.2	1.8	2.0	2.4	2.6	2.7	2.9
400G	Available under request							
450K/H								
500K/H								

Table 26 - Maximum permissible radial thrusts for ball bearings

Axial Thrust - Ball Bearings

Maximum permissible axial thrust - 50 Hz - Fa in (kN) - 20,000 hours							
Frame	Poles	Horizontal		Vertical with shaft upwards		Vertical with shaft downwards	
		Pushing	Pulling	Pushing	Pulling	Pushing	Pulling
71	2	0.5	0.2	0.4	0.2	0.5	0.2
	4	0.5	0.3	0.5	0.3	0.5	0.3
	6	0.6	0.4	0.6	0.4	0.6	0.3
	8	0.7	0.4	0.7	0.5	0.7	0.4
80	2	0.7	0.5	0.7	0.5	0.7	0.4
	4	0.8	0.6	0.8	0.6	0.9	0.5
	6	1.0	0.7	1.0	0.8	1.1	0.7
	8	1.1	0.9	1.1	0.9	1.2	0.8
90	2	0.8	0.4	0.7	0.5	0.8	0.4
	4	0.9	0.5	0.8	0.6	0.9	0.5
	6	1.1	0.7	1.0	0.8	1.1	0.7
	8	1.2	0.9	1.1	0.9	1.3	0.8
100	2	1.0	0.6	1.0	0.7	1.1	0.6
	4	1.2	0.8	1.1	0.9	1.3	0.7
	6	1.4	1.0	1.3	1.1	1.5	0.9
	8	1.6	1.2	1.5	1.3	1.7	1.1
112	2	1.3	0.8	1.3	1.0	1.5	0.8
	4	1.6	1.1	1.5	1.2	1.7	1.0
	6	1.9	1.4	1.8	1.6	2.1	1.3
	8	2.1	1.6	2.0	1.8	2.3	1.5
132	2	2.0	1.5	1.9	1.7	2.2	1.3
	4	2.4	1.8	2.2	2.1	2.7	1.6
	6	2.9	2.3	2.6	2.6	3.2	2.1
	8	3.2	2.7	3.0	3.0	3.6	2.4
160	2	2.4	1.7	2.2	2.1	2.8	1.5
	4	2.9	2.2	2.6	2.7	3.4	1.9
	6	3.4	2.7	3.0	3.3	4.1	2.3
	8	4.0	3.3	3.6	3.9	4.6	2.9
180	2	3.2	2.3	2.8	2.9	3.8	1.9
	4	3.9	3.0	3.4	3.7	4.6	2.5
	6	4.4	3.5	3.9	4.5	5.4	3.0
	8	5.1	4.2	4.6	5.1	6.0	3.7
200	2	3.6	2.6	3.1	3.4	4.4	2.1
	4	4.3	3.3	3.7	4.4	5.4	2.7
	6	5.0	4.0	4.3	5.2	6.2	3.3
	8	5.8	4.8	5.1	5.9	6.9	4.1
225	2	5.2	4.4	4.5	5.4	6.2	3.7
	4	6.3	5.5	5.3	6.9	7.7	4.6
	6	7.5	6.7	6.4	8.3	9.1	5.6
	8	8.4	7.6	7.3	9.2	10.0	6.6

Maximum permissible axial thrust - 50 Hz - Fa in (kN) - 20,000 hours							
Frame	Poles	Horizontal		Vertical with shaft upwards		Vertical with shaft downwards	
		Pushing	Pulling	Pushing	Pulling	Pushing	Pulling
250	2	5.0	4.2	4.1	5.6	6.4	3.3
	4	6.0	5.3	4.8	7.1	7.9	4.0
	6	7.3	6.5	5.8	8.7	9.5	5.0
	8	8.2	7.4	6.8	9.6	10.4	6.0
280	2	4.8	4.0	3.3	6.4	7.1	2.5
	4	6.5	5.7	4.3	9.1	9.9	3.5
	6	7.5	6.7	4.9	10.6	11.4	4.1
	8	8.9	8.1	6.8	11.4	12.2	6.0
315	2	3.3	2.6	1.0	6.0	6.8	0.2
	4	5.5	4.7	2.4	9.2	10.0	1.6
	6	6.3	5.5	2.4	11.3	12.1	1.6
	8	6.9	6.2	2.8	12.2	13.0	2.0
315L	2	4.5	3.7	1.7	7.8	8.6	0.9
	4	7.2	6.5	3.6	11.8	12.6	2.9
	6	8.6	7.8	4.1	14.7	15.5	3.3
	8	9.5	8.7	4.8	15.8	16.6	4.0
355M/L	2	5.2	4.4	1.8	9.3	10.1	1.1
	4	9.5	8.7	4.8	15.5	16.3	4.1
	6	10.7	10.0	5.3	18.0	18.7	4.6
	8	12.5	11.7	7.0	20.0	20.8	6.2
355A/B	2	1.6	1.6	4.2	5.2	5.2	4.2
	4	4.1	4.1	3.1	13.4	13.4	3.1
	6	4.9	4.9	3.3	14.9	14.9	3.3
	8	5.0	5.0	5.3	16.5	16.5	5.3
400L/J	2	2.8	2.8	7.6	2.8	2.8	7.6
	4	4.6	4.6	6.7	11.5	11.5	6.7
	6	4.7	4.7	7.9	14.2	14.2	7.9
	8	5.1	5.1	9.3	15.2	15.2	9.3
400G	2	Available under request		12.6	1.9	Available under request	
	4			11.8	5.4		
	6			14.9	6.8		
	8			18.3	5.0		
450K/H	4	Available under request		18.3	8.8	Available under request	
	6			18.3	7.9		
	8			31.2	3.8		
	8			27.3	2.5		
500K/H	4	Available under request		32.3	2.5	Available under request	
	6			33.4	2.5		
	8			33.4	2.5		
	8			33.4	2.5		

Table 27 - Maximum permissible axial thrusts for ball bearings

Axial Thrust - Ball Bearings

Maximum permissible axial thrust - 50 Hz - Fa in (kN) - 40,000 hours							
Frame	Poles	Horizontal		Vertical with shaft upwards		Vertical with shaft downwards	
		Pushing	Pulling	Pushing	Pulling	Pushing	Pulling
71	2	0.4	0.1	0.4	0.1	0.4	0.1
	4	0.4	0.2	0.4	0.2	0.4	0.1
	6	0.5	0.2	0.4	0.2	0.5	0.2
80	2	0.6	0.3	0.5	0.3	0.6	0.3
	4	0.6	0.4	0.6	0.4	0.7	0.3
	6	0.8	0.5	0.7	0.5	0.8	0.5
90	2	0.6	0.3	0.6	0.3	0.7	0.2
	4	0.6	0.3	0.6	0.4	0.7	0.3
	6	0.8	0.5	0.7	0.6	0.9	0.4
100	2	0.8	0.4	0.8	0.5	0.9	0.4
	4	0.9	0.5	0.8	0.6	1.0	0.4
	6	1.0	0.6	1.0	0.8	1.2	0.6
112	2	1.0	0.5	1.0	0.7	1.2	0.5
	4	1.2	0.7	1.1	0.9	1.4	0.6
	6	1.4	0.9	1.3	1.1	1.6	0.8
132	2	1.6	1.0	1.4	1.2	1.8	0.8
	4	1.8	1.2	1.6	1.5	2.1	1.0
	6	2.1	1.6	1.9	1.9	2.4	1.4
160	2	1.9	1.2	1.6	1.5	2.2	0.9
	4	2.2	1.4	1.9	1.9	2.6	1.1
	6	2.5	1.8	2.1	2.4	3.1	1.4
180	2	2.4	1.5	2.0	2.1	3.0	1.1
	4	2.8	1.9	2.4	2.7	3.6	1.5
	6	3.2	2.3	2.6	3.3	4.2	1.7
200	2	2.7	1.7	2.2	2.5	3.5	1.2
	4	3.2	2.2	2.5	3.2	4.2	1.5
	6	3.6	2.6	2.9	3.8	4.8	1.9
225	2	3.9	3.1	3.2	4.2	5.0	2.4
	4	4.6	3.9	3.7	5.3	6.0	2.9
	6	5.5	4.8	4.5	6.4	7.2	3.7
250	2	3.8	3.0	2.8	4.4	5.2	2.0
	4	4.4	3.6	3.2	5.5	6.3	2.4
	6	5.4	4.6	3.9	6.8	7.6	3.1
280	2	3.6	2.8	2.0	5.1	5.9	1.3
	4	4.7	3.9	2.4	7.2	8.0	1.6
	6	5.3	4.6	2.7	8.4	9.2	1.9
315	2	3.3	2.6	1.0	6.0	6.8	0.2
	4	5.5	4.7	2.4	9.2	10.0	1.6
	6	6.3	5.5	2.4	11.3	12.1	1.6
315L	2	3.3	2.5	0.5	6.6	Available under request	
	4	5.1	4.3	1.4	9.6	10.3	0.7
	6	6.1	5.3	1.5	12.1	12.8	0.7

Maximum permissible axial thrust - 50 Hz - Fa in (kN) - 40,000 hours							
Frame	Poles	Horizontal		Vertical with shaft upwards		Vertical with shaft downwards	
		Pushing	Pulling	Pushing	Pulling	Pushing	Pulling
355M/L	2	3.8	3.0	0.4	7.9	Available under request	
	4	6.8	6.0	2.0	12.8	13.5	1.3
	6	7.6	6.8	2.1	14.7	15.5	1.4
	8	8.9	8.2	3.3	16.4	17.1	2.6
355A/B	2	1.3	1.3	1.3	4.1	4.1	3.3
	4	3.2	3.2	2.5	10.6	10.6	2.5
	6	3.9	3.9	2.6	11.8	11.8	2.6
	8	4.0	4.0	4.2	13.1	13.1	4.2
400L/J	2	2.2	2.2	6	2.2	2.2	6
	4	3.6	3.6	5.3	9.1	9.1	5.3
	6	3.7	3.7	6.3	11.3	11.3	6.3
	8	4.1	4.1	7.4	12.1	12.1	7.4
400G	2	Available under request		10	1.5	Available under request	
	4			9.4	4.3		
	6			11.8	5.4		
	8			14.5	4.0		
450K/H	4	Available under request		14.5	7.0	Available under request	
	6			14.5	6.3		
	8			24.8	3.0		
500K/H	4	Available under request		21.7	2.0	Available under request	
	6			25.6	2.0		
	8			26.5	2.0		

Table 28 - Maximum permissible axial thrusts for ball bearings



10.2. Lubrication Intervals

Lubrication Intervals for Ball Bearings (40 °C - Rated Speed)

Lubrication intervals (hours)				
Frame	Poles	Bearing	50 Hz	60 Hz
160	2	6309	22,000	20,000
	4		25,000	25,000
	6			
	8			
180	2	6311	17,000	14,000
	4		25,000	25,000
	6			
	8			
200	2	6312	15,000	12,000
	4		25,000	25,000
	6			
	8			
225	2	6314	5,000	4,000
	4		14,000	12,000
	6		20,000	17,000
	8		24,000	20,000
250	2	6314	5,000	4,000
	4		14,000	12,000
	6		20,000	17,000
	8		24,000	20,000
280	2	6314	5,000	4,000
	4	6316	13,000	10,000
	6		18,000	16,000
	8		20,000	20,000
315	2	6314	5,000	4,000
	4	6319	11,000	8,000
	6		16,000	13,000
	8		20,000	17,000
355	2	6314	5,000	4,000
		6316	4,000	On request
	4	6322	9,000	6,000
	6		13,000	11,000
8	19,000		14,000	
400	2	6318	2,500	1,600
	4	6324	5,400	3,900
	6		9,100	7,400
	8		11,900	8,000
450	2	6318	2,500	1,600
	4	6326	4,700	3,400
	6		8,400	6,700
	8		11,200	7,300
500	2	NU220+6020	1,000	NA
	4	6328	4,200	2,900
	6		7,700	6,000
	8		10,500	6,600

Table 29 - Lubrication intervals for ball bearings
Note: the amount of grease is indicated on the nameplate

Lubrication Intervals for Roller Bearings (40 °C - rated speed)

Lubrication intervals (hours)				
Frame	Poles	Bearing	50 Hz	60 Hz
160	4	NU309	25,000	25,000
	6			
	8			
180	4	NU311	25,000	25,000
	6			
	8			
200	4	NU312	25,000	21,000
	6			25,000
	8			
225	4	NU314	11,000	9,000
	6		16,000	13,000
	8		20,000	19,000

Lubrication intervals (hours)				
Frame	Poles	Bearing	50 Hz	60 Hz
250	4	NU314	11,000	9,000
	6		16,000	13,000
	8		20,000	19,000
280	4	NU316	9,000	7,000
	6		14,000	12,000
	8		19,000	17,000
315	4	NU319	7,000	5,000
	6		12,000	9,000
	8		17,000	15,000
355	4	NU322	5,000	4,000
	6		9,000	7,000
	8		14,000	13,000
400	4	NU324	2,400	1,500
	6		5,400	3,900
	8		8,000	6,300
450	4	NU326	2,000	1,200
	6		4,700	3,400
	8		7,300	5,600
500	4	NU328	1,700	1,000
	6		4,200	2,900
	8		6,600	5,000

Table 30 - Lubrication intervals for roller bearings
Note: the amount of grease is indicated on the nameplate

10.3. Bearing Monitoring

On request, W22Xd motors can be equipped with bearing temperature detectors which monitor bearing operating conditions. The most commonly used accessory is the Pt-100 temperature detector for continuous monitoring of bearing operating temperature.

This type of monitoring is extremely important considering the effect of temperature on the grease and bearing lives, particularly on motors equipped with regreasing facilities.

11. Grease

W22Xd motors are supplied as standard with Polyrex® EM grease supplied by Exxon Mobil.

The Mobil Polyrex EM grease has a polyurea thickener and a mineral oil thus being compatible with greases that contain:

- Lithium based thickener, lithium-based complex thickener, polyurea thickener and refined mineral oil;
- Corrosion and oxidation inhibitors.

In general terms, greases with the same type of thickener are compatible to each other. However, depending on the proportion of the mixture they might be incompatible. In those cases, it is not recommended to mix different types of greases without contacting the supplier or WEG beforehand.

12. Mounting Forms

Motors are supplied, as standard, in the B3T configuration, with the terminal box on top.

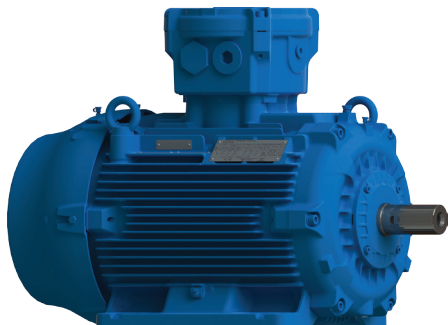


Figure 46 - B3T mounting

The mounting configuration for the W22Xd motor lines are in accordance with IEC 60034-7 Standard. Standard mounting forms and their variations are shown in table 31. After the designation, a characteristic letter is used to define the terminal box position. So, the mounting code IM B3 can be seen in WEG documents as detailed below (without IM code).
 B3L - terminal box on left hand side of the motor frame
 B3T - terminal box on top of the motor frame
 B3R - terminal box on right hand side of the motor frame

Note:

The terminal box position is defined viewing the motor from the shaft end.

Basic mountings	Other type of mounting				
IM B3	IM V5	IM V6	IM B6	IM B7	IM B8
IM 1001	IM 1011	IM 1031	IM 1051	IM 1061	IM 1071
IM B35	IM V15	IM V36	- *)	- *)	- *)
IM 2001	IM 2011	IM 2031	IM 2051	IM 2061	IM 2071
IM B34	IM V17	IM V37	- *)	- *)	- *)
IM 2101	IM 2111	IM 2131	IM 2151	IM 2161	IM 2171
IM B5	IM V1	IM V3			
IM 3001	IM 3011	IM 3031			
IM B14	IM V18	IM V19			
IM 3601	IM 3611	IM 3631			

Table 31 - Mounting configurations

* Non-defined mountings by IEC 60034-7 Standard

Important:

1. The mountings IM B34 and IM B14 with C-DIN flange, in Accordance with DIN EN 50347 Standard are limited to frame size 132; C flange in accordance with NEMA MG 1 Part 4 Standard is available for frames 71 to 355M/L.
2. For vertical shaft down motors the fitting of a drip cover is recommended to prevent the ingress of small objects into the fan cover. The increase in total length of the motor with drip cover is shown in the Section 26 - Drip Cover Data.
3. For vertical shaft up motors installed in environments containing liquids, the use of a slinger is recommended to prevent the ingress of liquid into the motor through the shaft, as detailed on Section 8 - Shaft, 9 - Bearings and 10- Grease.

13. Degree of Protection

As per IEC 60034-5 Standard, the degree of protection of a rotating electrical machine consists of the letters IP (ingress protection), followed by two characteristic numerals, with the following meaning:

- a) First characteristic numeral: indicates the degree of protection provided by the enclosure to persons and to the parts of the machine inside the enclosure.
- b) Second characteristic numeral: indicates the degree of protection provided by the enclosure with respect to harmful effects due to ingress of water.

W22Xd motors are supplied with degrees of protection in conformance with IEC 60034-5 Standard. As standard, they are IP56, which means:

- a) First characteristic numeral 5: Protected against contacts with or approach to live or moving parts inside the enclosure. Ingress of dust is not totally prevented but dust does not enter in sufficient quantity to interfere with satisfactory operation of the machine.
- b) Second characteristic numeral 6: Water from heavy seas or water projected in powerful jets shall not enter the machine in harmful quantities.

14. Sealing System

The sealing system applied to the shaft of W22Xd motors in frames 71 to 355M/L is Lip Seal.

For frames 355A/B to 500K/H the sealing system can be either Lip Seal, WSeal®, W3 Seal® or Labyrinth Seal, depending on the number of poles and frame size.

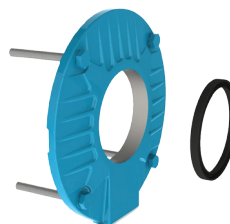


Figure 47 - Lip Seal

Alternatively, W22Xd motors can be supplied with other sealing systems, for example, taconite labyrinth, InproSeal, WSeal® and the WEG exclusive W3 Seal®, among others (see Section 21 - Optional Features).

15. Painting



Figure 48 - WEG Coatings

W22Xd motors in frames 71 to 500K/H are supplied as standard with WEG internal painting plan 202P. This painting plan has a minimum resistance to the salt spray test of 480 hours in accordance with ISO 12944-6 Standard and meet the “C3 Medium” (corrosive category) and High durability criteria of the ISO 12944 Standards.

It is recommended for motors installed in interior production environments with high humidity and some air pollution or exterior urban and industrial areas, with moderate sulfur dioxide and marine areas with low salinity.

The primary surface preparation by abrasive blasting method as a minimum is always grade Sa 2 ½ according to DIN EN ISO 12944-4 and DIN EN ISO 8501-1 Standards.

Note:

The standard painting plan is not recommended for direct exposure to acid steam, alkalis, solvents and high salinity environments.

Alternative painting plans are available on request, which are suitable to guarantee additional protection in aggressive environments, either sheltered or non-sheltered (see Section 21 – Optional Features).

15.1. Internal Tropical Treatment

The integrity of the insulation system is the primary consideration when determining the lifetime of an electric motor. High humidity can result in premature deterioration of the insulation system, therefore for any ambient temperature with relative humidity above 95%, it is recommended to coat all internal components of the motor with an epoxy painting, also known as tropicalization.

16. Voltage/Frequency

According to the IEC 60034-1 Standard, the combination of voltage and frequency variations are classified as Zone A or Zone B, as per figure 49.

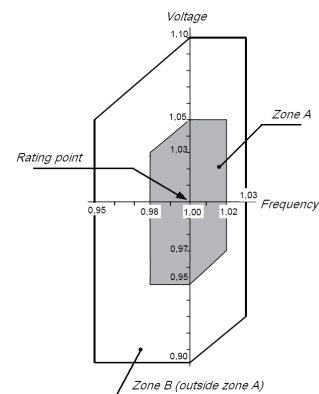


Figure 49 - Rated voltage and frequency limits for electric motors

IEC 60034-1 Standard states that the motor must be suitable to perform its main function (supply torque) continuously at Zone A. However, this motor may not fully meet its performance characteristics due to power supply voltage and frequency variation, which can result in temperature rise above the rated value.

The motor must also be suitable to perform its main function (supply torque) at Zone B. However, the performance characteristic changes will be greater than those operating at Zone A. The temperature rise will also be higher than that of rated voltage and frequency and that operating at Zone A. Prolonged operation near Zone B boundary is not recommended.



17. Overload Capacity

As per IEC 60034-1 Standard, motors having rated output not exceeding 315 kW and rated voltages not exceeding 1 kV shall be capable of withstanding a current equal to 1,5 times the rated current for not less than 2 min.

18. Ambient/Insulation

Unless otherwise specified, the rated power outputs shown in the electrical data tables within this catalogue refer to continuous duty operation S1, as per IEC 60034-1 Standard and under the following conditions:

- With ambient temperatures ranging from -20 °C to +40 °C
- With altitudes up to 1,000 metres above sea level (m.a.s.l.)

However, these motors can be supplied for application in extreme conditions, such as: ambient temperatures from -55 °C to +80 °C and/or altitudes up to 5,000 m.a.s.l.. For operating temperatures higher than +40 °C and/or altitudes above 1,000 m.a.s.l., the derating factors indicated in table 32 shall be applied to the nominal motor power rating in order to calculate the derated available output (Pmax).

Pmax = Pnom x derating factor

T (°C)	Altitude (m)									
	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	
10							0.97	0.92	0.88	
15						0.98	0.94	0.90	0.86	
20					1.00	0.95	0.91	0.87	0.83	
25				1.00	0.95	0.93	0.89	0.85	0.81	
30			1.00	0.96	0.92	0.90	0.86	0.82	0.78	
35		1.00	0.95	0.93	0.90	0.88	0.84	0.80	0.75	
40	1.00	0.97	0.94	0.90	0.86	0.82	0.80	0.76	0.71	
45	0.95	0.92	0.90	0.88	0.85	0.81	0.78	0.74	0.69	
50	0.92	0.90	0.87	0.85	0.82	0.80	0.77	0.72	0.67	
55	0.88	0.85	0.83	0.81	0.78	0.76	0.73	0.70	0.65	
60	0.83	0.82	0.80	0.77	0.75	0.73	0.70	0.67	0.62	
65	0.79	0.76	0.74	0.72	0.70	0.68	0.66	0.62	0.58	
70	0.74	0.71	0.69	0.67	0.66	0.64	0.62	0.58	0.53	
75	0.70	0.68	0.66	0.64	0.62	0.60	0.58	0.53	0.49	
80	0.65	0.64	0.62	0.60	0.58	0.56	0.55	0.48	0.44	

Table 32 - Derating factors for altitude and ambient temperature

W22Xd motors are supplied with class F insulation (unless otherwise specified).

Bearing lubrication intervals will change under operating conditions other than 40 °C maximum ambient temperature and 1,000 m.a.s.l.. Contact WEG for more information. All W22Xd motors are wound with the WISE® insulation system which consists of enameled copper wire meeting temperatures up to 200 °C and impregnated with solvent free resin. The WISE® system also allows motor operation with variable speed drives (see Section 19 - Application with Variable Speed Drives).

18.1. Space Heaters

W22Xd motors are supplied as standard with space heaters, whose use is recommended in two situations:

- Motors installed in environments with relative air humidity up to 95%, in which the motor may remain idle for periods longer than 24 hours;
- Motors installed in environments with relative air humidity higher than 95%, regardless of the operating schedule. It should be highlighted that in this situation it is strongly recommended that an epoxy paint or alkyd resin known as Internal Tropical Treatment is applied in the internal components of the motor. More information can be obtained in item 10.3.1.

The standard supply voltage for the space heaters supplied with the W22Xd motors is 220-240 V Under request, 110-127 V and 380-480 V space heaters are available.

The number and power rating of space heaters fitted depends on the size of the motor as indicated in table 33 below:

Frame	Quantities	Total Power rated (W)
71 and 80	1	7.5
90 and 100	1	11
112	2	22
132 and 160	2	30
180 and 200	2	38
225 and 250	2	56
280 and 315	2	140
355	2	174
400	2	300
450	2	400
500	2	500

Table 33 - Quantity and Power of space heaters

19. Motor Protections

Protections available for W22Xd can be classified as follows:

- Based on operating temperature
- Based on operating current.

In Section 20 - Construction Features, it is possible to identify the type of protections available for the W22Xd line.

19.1. Protection Based on Operating Temperature

Continuous duty motors must be protected from overload either by a device integrated in the motor or via an independent protection system, usually a thermal relay with rated current.

Pt-100



Figure 50 - Pt-100

These are resistance temperature detectors (RTD's) with operating principle based on the properties that some materials vary the electric resistance with the variation in temperature (usually platinum, nickel or copper). They are also fitted with calibrated resistances that vary linearly with temperature, allowing continuous reading of motor operating temperature through a monitoring display, with high precision rate and response sensitivity.

The same detector can serve as alarm (with operation above the regular operating temperature) and trip (usually set up for the maximum temperature of the insulation class).

Thermistor (PTC)



Figure 51 - Thermistor (PTC)

These are thermal protectors consisting of semiconductor detectors with sudden variation of the resistance when reaching a certain temperature.

PTC is considered a thermistor with the resistance increasing drastically to a well defined temperature figure. This sudden resistance variation blocks the PTC current, causing the output relay to operate, and the main circuit to switch-off. The thermistors are of small dimensions, do not wear and have quicker response if compared to other protections, although they do not allow continuous monitoring of motor operating temperature.

Together with their electronic circuits, these thermistors provide full protection against overheating caused by overload, under or overvoltage or frequent reversing operations.

Where thermistor protection is required to provide both alarm and trip operation, it is necessary for each phase of the motor winding to be equipped with two sets of appropriately rated thermistors.

WEG has a product called RPW which is an electronic relay intended specifically to read the PTC signal and operate its

output relay. For more information on this product go to the website www.weg.net.

There are also other types of thermal protections such as Pt-1000, KTY, Thermocouples and Bimetallic Protections.

Contact your local WEG office for more information.

19.2. Protection Based on Operating Current

Overloads are processes that usually make the temperature increase gradually. The thermal protections described in item 18.1 are quite suitable for overloads protection.

To protect motors against short-circuit currents we recommend the use of fuses. This type of protection depends directly on the current and it is highly effective in cases of locked rotor.

WEG supplies fuses in versions D and NH. For more information on this product go to the website www.weg.net.

20. Application with Variable Speed Drives

20.1 Considerations Regarding the Motor Insulation System

W22Xd motors stator windings are supplied with Class F insulation system and they can be DOL started or by Variable Speed Drives (VSD). Optionally the motor can also be supplied with Class H insulation system.

They incorporate the WEG exclusive WISE® insulation system - WEG Insulation System Evolution - which provides superior electrical insulating properties to the insulation system. The motors are manufactured in accordance with the standard voltages for each market, as shown below and they can be driven by Variable Speed Drives (VSD), considering the criteria stated in Table 34.

Standard rated voltages	
220-240/380-415 V (50 Hz) - Up to frame size 100L*	
380-415/660-690 V (50 Hz) - Remaining frames*	
440-460 V (60 Hz) - All frames*	

Motor rated voltage	Voltage spikes at motor terminals (phase-phase)	dV/dt* at motor terminals (phase-phase)	Rise time*	Minimum time between successive pulses
$V_{rated} \leq 460 \text{ V}$	$\leq 1,600 \text{ V}$	$\leq 5,200 \text{ V}/\mu\text{s}$		
$460 \text{ V} < V_{rated} \leq 575 \text{ V}$	$\leq 1,800 \text{ V}$	$\leq 6,500 \text{ V}/\mu\text{s}$	$\geq 0.1 \mu\text{s}$	$\geq 6 \mu\text{s}$
$575 \text{ V} < V_{rated} \leq 690 \text{ V}$	$\leq 2,200 \text{ V}$	$\leq 7,800 \text{ V}/\mu\text{s}$		

dV/dt and Rise time definition according to NEMA Std. MG1 - Part 30

* Frame sizes 355A/B to 500K/H are wound for single voltages

Table 34 - Limit conditions of the LV insulation systems without application of output filter

Notes:

1. The maximum recommended switching frequency should not exceed 5 kHz. Higher switching frequencies can accelerate the degradation of the motor insulation system and damage the motor bearings.
2. If one of the Table 34 conditions is not followed accordingly (including the switching frequency) an output filter (load reactor or dV/dt filter) need to be installed on the VSD output.
3. W22Xd motors in frame sizes up to 355 (included) with rated voltage higher than 575 V, which did not have any indication of operation by VSD in the Purchase Order, are able to withstand the electrical limits set in the table 34 for rated voltage up to 575 V. If such conditions are not fully met, output filters must be installed.
4. W22Xd motors in frame sizes 400L/J and above with rated voltage higher than 460 V, which did not have any indication of operation by VSD in the Purchase Order, are able to withstand the electrical limits set in the table 34 for rated voltage up to 460 V. If such conditions are not fully met, output filters must be installed.
5. General purpose motors of the dual voltage type, for example 380/660 V and 400/690 V, which did not have any indication of operation by VSD in the Purchase Order, are able to be driven by a VSD in the higher voltage only if the limits set in the table 34 for rated voltage up to 460 V are fully met in the application. Otherwise, filters must be installed at the VSD output.

20.2 Influence of the VSD on the Motor Temperature

Induction motors driven by frequency inverters may present a higher temperature rise than when supplied with sinusoidal voltage. This temperature rise is result from two combined factors: the loss increase resulting from the PWM harmonics supplied by the VSD and the reduction of the ventilation performance experienced by self-ventilated motors when operating at low frequencies. There are basically the following solutions to avoid excessive overheating of the motor with VSD applications:

- Torque derating (oversizing of the self-ventilated motor frame size);
- Blower cooling (use of an independent ventilation system);
- Optimal Flux Solution® (exclusive WEG solution).

Torque Derating Criteria

In order to keep the temperature rise of WEG induction motors within acceptable levels, when driven by VSD, the load restrictions as specified in Figure 51 (for operation under constant flux condition) or in Figure 52 (for operation under optimal flux condition) must be met.

Notes:

1. The derating curves below are related to the temperature rise of the motor windings only and do not concern the motor insulation rating. Theses curves define only the torque limitation for motors driven by VSD, but they do not establish temperature allowance.
2. The speed regulation/accuracy depends on the used VSD type and its correct setting.
3. Torque derating is usually required when the motor drives constant torque loads. For squared torque loads, no torque derating is normally required.
4. Upon request, W22Xd motors of frame sizes from 90S/L to

355M/L can be blower cooled (independent cooling system). In such case, the motor can supply constant rated torque from the lower operating frequency up to 50 Hz with any type of load without exceeding the temperature rise limits of insulation materials. W22Xd motors of frame sizes from 355A/B to 500K/H can also be blower cooled (independent cooling system). In such case, the derating curve indicated on figure 51 must be applied.

5. For operation above rated speed (nameplate), mechanical concerns (speed limits for safe operation) must be also considered. Please refer to the maximum limits for safe operation specified in Table 38.

Constant Flux Condition

Applicable when the motor is supplied by any commercial drive operating with any control scheme other than the Optimal Flux® available in WEG drives.

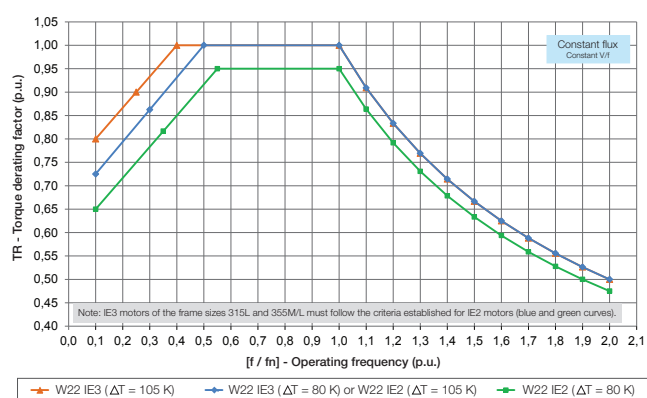


Figure 52 - Derating curve for constant flux condition

Limited by	Apply this equation
$0.10 \leq f/fn < 0.25$	$TR = (f/fn) + 0.50$
$0.25 \leq f/fn < 0.50$	$TR = 0.40(f/fn) + 0.65$
$0.50 \leq f/fn < 0.83$	$TR = 0.30(f/fn) + 0.70$
$0.83 \leq f/fn \leq 1.0$	$TR = 0.95$
$f/fn > 1.0$	$TR = 0.95/(f/fn)$

Table 35 - Equation for torque definition at constant flux condition

Optimal Flux® Operation

The study of the composition of the overall motor losses and its relation to operation parameters such as the frequency, the magnetic flux, the current, and the speed variation led to the determination of an optimal magnetic flux value for each operating frequency (speed). The incorporation of this solution in the CFW09 and CFW11 control algorithms allows a continuous minimization of the motor losses throughout the speed range, which is automatically made by the VSD.

The Optimal Flux® Solution has been specially developed for low frequency applications with constant torque loads and it should neither be used with variable torque loads nor when the operating range includes points above the base (rated) frequency. The Optimal Flux® Solution can be only applied under the following conditions:

- The motor meets at least IE3 efficiency class;
- The motor is fed by a WEG drive (CFW11 or CFW-09 from version 2.40 or higher);
- Sensorless vector control type is used.

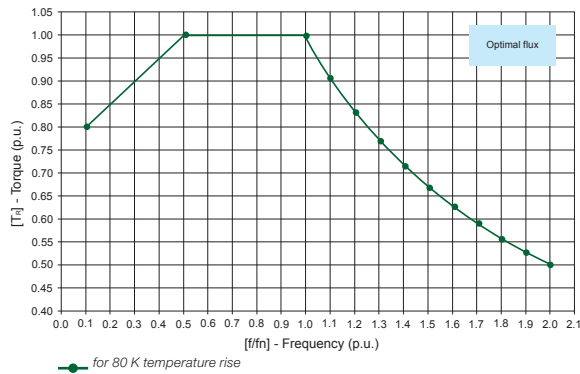


Figure 53 - Derating curve for Optimal Flux® condition

Limited by	Apply this equation
$0.1 \leq f/f_n < 0.50$	$TR = 0.5(f/f_n) + 0.75$
$0.50 \leq f/f_n \leq 1.0$	Constant torque
$f/f_n > 1.0$	$TR = 1/(f/f_n) = f_n/f$

Table 36 - Equation for torque definition at Optimal Flux® condition

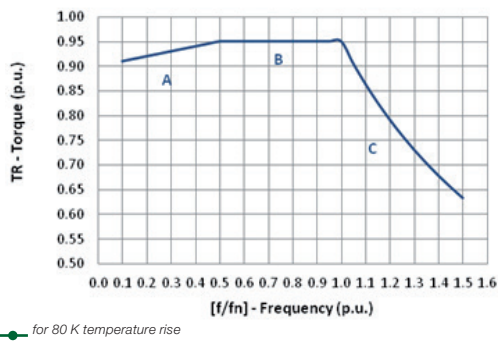


Figure 54 - Derating curve for motors fed by VSD (Blower Cooling - IC416)

Limited by	Apply this equation
$0.1 \leq f/f_n < 0.50$	$TR = 0.1(f/f_n) + 0.9$
$0.50 \leq f/f_n \leq 1.0$	$TR = 0.95$
$f/f_n > 1.0$	$TR = 0.95/(f/f_n)$

Table 37 - Equation for blower cooling

Frame	TEFC-motors			
	2 poles (rpm)	4 poles (rpm)	6 poles (rpm)	8 poles (rpm)
71	7,200	3,600	2,400	2,400
80	7,200	3,600	2,400	2,400
90	7,200	3,600	2,400	2,400
100	7,200	3,600	2,400	2,400
112	7,200	3,600	2,400	2,400
132	5,400	3,600	2,400	2,400
160	5,400	3,600	2,400	7,200
180	5,400	2,700	2,400	5,400

Frame	TEFC-motors			
	2 poles (rpm)	4 poles (rpm)	6 poles (rpm)	8 poles (rpm)
200	4,500	2,700	2,400	5,400
225	3,600	2,700	2,400	5,400
250	3,600	2,700	2,400	5,400
280	3,600	2,700	2,400	4,500
315S/M	3,600	2,700	1,800	3,600
315 L	3,600	2,250	1,800	3,600
355M/L	3,600	1,800	1,800	3,600
355A/B	3,780	2,250	2,000	1,500
400L/J	3,600	2,250	2,000	1,500
400G	3,600	2,250	2,000	1,500
450K/H	0/R	2,100	2,000	1,500
500K/H	0/R	1,950	2,000	1,500

Table 38 - Maximum safe operating speeds (rpm) for standard motors driven by VSD

Notes:

1. The values specified in Table 38 are related to mechanical limitations. For operation above the nameplate speed, the electrical limitations (motor torque capability) must be also considered.
2. The limits specified in Table 38 are in accordance with the NEMA MG 1 - Part 30.
3. The allowed overspeed value is 10% above the limits specified in Table 38 (not exceeding 2 minutes in duration) except when the maximum safe operating speed is the same as the synchronous speed at 60 Hz - in such case, please contact WEG.
4. Operation above nameplate speed may require special accurate motor balancing.
5. Bearing life will be affected by the duration that the motor is operated at various speeds.
6. For speeds and ratings not covered by the Table 38, please contact WEG.
7. Maximum safe operating speeds indicated in Table 38 are for bearings arrangement. For sleeve bearings please refer to us.

Supplementary Information!

For more information on the application of induction motors driven by Variable Speed Drives (VSD) see our website (www.weg.net) and download the Technical Guide - Induction Motors Fed by PWM Frequency Inverters.



20.3 Considerations about Bearing Currents

Motors up to frame size 280S/M generally do not require special measures for the operations by VSD. However from frame size 315S/M upwards additional measures should be taken in order to avoid harmful bearing currents. This protection can be made by the combined use of an insulated bearing or a shaft grounding ring mounted at the DE or NDE endshield.

WEG adopts criteria given by the table 39 for W22Xd motors:

Frame	Standard	Optional
71 - 200M/L	Standard bearing	-
225S/M - 355M/L	Standard bearing	Non-drive end insulated bearing + drive end shaft grounding ring
355A/B - 400G	Non-drive end insulated bearing	Non-drive end insulated bearing + drive end shaft grounding ring
450K/H - 500K/H	Non-drive end insulated bearing + drive end shaft grounding ring	Drive and non-drive end insulated bearings + drive and non-drive end shaft grounding rings

Table 39 - Bearings protection for VSD driven motors

Important:

When ordering a motor destined for VSD operation, always mention this at the purchase order. Motors supplied by factory for VSD operation receives, besides the considerations about bearing currents, a dedicated nameplate detailing the application criteria.

20.4 Forced Ventilation Kit

For those cases where an independent cooling system is required, the W22Xd motors can be supplied with a forced ventilation kit, as shown in figure 55.

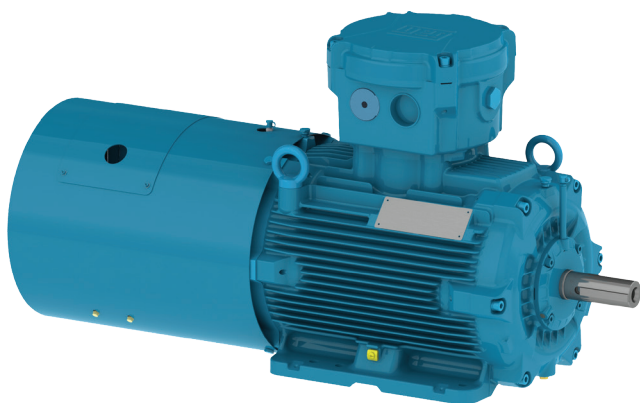


Figure 55 - Forced ventilation kit for W22Xd motors

This forced ventilation kit is available as an optional feature. For more information about the forced ventilation kit, such as electrical and mechanical features (including dimensions) please contact WEG.

21. Construction Features

Frame			71	80	90S/L	100L	112M	132S/M	160M/L	180M/L
			Certification							
Nameplate marking			Ex II 2G Ex d IIB T4 Gb							
			Mechanical features							
Mounting			B3T							
Frame	Material		Cast iron FC-200 (EN G.JL 200)							
Degree of protection			IP56							
Grounding			Double grounding (one inside the terminal box and one on motor feet)							
Cooling method			Totally enclosed fan cooled - IC411							
Fan	Material	2P	Polypropylene							
		4 - 12P	Polypropylene							
Fan cover	Material		Cast iron FC-200 (EN G.JL 200)							
Endshields			Cast iron FC-200 (EN G.JL 200)							
Drain			Without drain							
Bearings	Clearance D.E.		ZZ - Normal						C3	
	Clearance N.D.E.		ZZ - Normal						C3	
	Locking		Without bearing cap and with preload washer at non-drive end			DE locating bearing with bearing cap and with preload washer at non-drive end				
	Drive end side	2P	6202	6204	6205	6206	6207	6308	6309	6311
		4 - 12P								
Non-drive end side	2P	6202	6203	6204	6205	6206	6207	6308	6309	
	4 - 12P									
Bearing seal			Nitrilic Rubber Oil Seal							
Joints sealing			Lumomoly							
Lubrication	Type of grease		Polyrex® EM (Exxon Mobil)							
	Lubrication features		Without grease fittings						With grease fittings	
Terminal block			With terminal block							
Terminal box	Material		Cast Iron FC-200 (EN G.JL 200)							
Accessory terminal box			Without accessory terminal box							
Leads inlet	Main	Size	M25 x 1.5	M25 x 1.5	M25 x 1.5	M32 x 1.5	M32 x 1.5	M32 x 1.5	2 x M40 x 1.5	2 x M40 x 1.5
	Main plug		Threaded plastic plug						One threaded plastic plug + one certified threaded plug	
	Accessory	Side	2 x M20 x 1.5 (one in each side of the terminal box)							
	Accessory plug		Certified threaded plugs supplied on both accessory holes							
Shaft	Material		AISI 1040/45							
	Threaded hole	2P 4 - 12P	M5	M6	M8	M10	M10	M12	M16	M16
Key	Type		A							
Vibration			Grade A							
Provisions for vibration sensor (SPM nipples)			Without						With	
Balance			With half key							
Nameplate	Material		Stainless steel AISI 304							
Painting	Type		202P (meets "C3 High" performance criteria indicated in ISO 12944-2 Standard in regards to "Corrosivity Category" and 500 hours as minimum neutral salt-spray resistance as per ISO 7253 Standard)							
	Color		High Efficiency - IE2: RAL 5009 Premium Efficiency - IE3: RAL 6002							
			Electrical features							
Design			N							
Voltage			220-240/380-415/440-460 V				380-415/660-690/440-460 V			
Winding	Impregnation		Immersion (dip and baked)							
	Insulation class		F (DT 80K)							
Service factor			1.00							
Rotor			Aluminium die cast							
Thermal protector			Thermistor PTC, one per phase for tripping at 150 °C							
Space heaters			220-240 V							

Frame		200M/L	225S/M	250S/M	280S/M	315S/M	315L	355M/L	
Certification									
Nameplate marking		Ex II 2G Ex d IIB T4 Gb							
Mechanical features									
Mounting		B3T							
Frame	Material	Cast iron FC-200 (EN GJL 200)							
Degree of protection		IP56							
Grounding		Double grounding (one inside the terminal box and one on motor feet)							
Cooling method		Totally enclosed fan cooled - IC411							
Fan	Material	2P	Polypropylene						
		4 - 12P	Polypropylene				Aluminium		
Fan cover	Material	Cast iron FC-200 (EN GJL 200)							
Endshields		Cast iron FC-200 (EN GJL 200)							
Drain		Without drain							
Bearings	Clearance D.E.		C3						
	Clearance N.D.E.		C3						
	Locking		DE locating bearing with bearing cap and with preload washer at non-drive end		Locked on drive end with internal and external bearing cap and with preload springs on non-drive end side				
	Drive end side	2P	6312	6314	6314	6314	6314	6314	6316
		4 - 12P				6316	6319	6319	6322
	Non-drive end side	2P	6212	6314	6314	6314	6314	6314	6314
4 - 12P		6316				6316	6316	6319	
Bearing seal		Nitrilic rubber oil seal	Viton oil seal						
Joints sealing		Lumomoly							
Lubrication	Type of grease	Polyrex® EM (Exxon mobil)							
	Lubrication features		With grease fittings						
Terminal block		With terminal block							
Terminal box	Material	Cast iron FC-200 (EN GJL 200)							
Accessory terminal box		Without accessory terminal box							
Leads inlet	Main	Size	2 x M50 x 1.5	2 x M50 x 1.5	2 x M63 x 1.5	2 x M63 x 1.5	2 x M63 x 1.5	2 x M63 x 1.5	2 x M80 x 2
	Main plug		One threaded plastic plug + one certified threaded plug						
	Accessory	Side	2 x M20 x 1.5 (one in each side of the terminal box)						
	Accessory plug		Certified threaded plugs supplied on both accessory holes						
Shaft	Material	AISI 1040/45					AISI 4140		
	Threaded hole	2P	M20	M20	M20	M20	M20	M20	M20
4 - 12P								M24	
Key	Type	A	B						
Vibration		Grade A							
Provisions for vibration sensor (SPM nipples)		With							
Balance		With half key							
Nameplate	Material	Stainless steel AISI 304							
Painting	Type	202P (meets "C3 High" performance criteria indicated in ISO 12944-2 Standard in regards to "Corrosivity Category" and 500 hours as minimum neutral salt-spray resistance as per ISO 7253 Standard)							
	Color	High Efficiency - IE2: RAL 5009 Premium Efficiency - IE3: RAL 6002							
Electrical features									
Design		N							
Voltage		380-415/660-690/460 V							
Winding	Impregnation	Immersion (dip and baked)	Continuous resing flow						
	Insulation class		F (DT 80K)						
Service factor		1.00							
Rotor		Aluminium die cast							
Thermal protector		Thermistor PTC, one per phase for tripping at 150 °C							
Space heaters		220-240 V							

Frame			355A/B	400L/J	400G	450K/H	500K/H					
			General features									
Nameplate markings			ATEX									
Certification marking			Ex d(e) IIB T4 Gb/ Ex d(e) IIIC T4 Gb/ Ex d(e) I Mb / Ex tb IIIC T125 °C Db IP6X (associated with IIB or IIC)									
Ambient temperature			-20 °C up to +40 °C									
			Mechanical features									
Mounting			B3T									
Frame	Material		Cast iron FC-200 (EN GJL 200)									
Degree of protection			IP56 - Ex d(e) IIB/IIC T4 Gb IP65 - Ex tb IIIC T125 °C Db IP6X IP66 - Ex d(e) I Mb									
Grounding			Double grounding in the frame + Double grounding in terminal box (internal and external)									
Cooling method			Totally enclosed fan cooled - IC411									
Fan	Material	2P	Cast iron			Aluminium (Ex d(e) IIB/IIC T4 Gb / Ex tb IIIC T125 °C Db IP6X) Cast iron (Ex d(e) I Mb)						
		4 - 8P	Cast iron			Steel						
Fan cover	Material		Steel									
Endshields	Material		Cast iron FC-200 (EN GJL 200)									
Drain			Without drain									
Clearance D.E			C3									
Clearance N.D.E			C3									
Bearings	Locating bearing configuration	2P	DE bearing locked with inner and outer bearing caps and fitted with pre-load springs in the NDE bearing Ball and roller bearings arrangement: DE and NDE bearings locked with inner and outer bearing caps									
		4 - 8P										
	Drive end	2P						6316	6318	6318	6318	NU220+6020
		4 - 8P						6322	6324	6324	6326 ⁽¹⁾	6328 ⁽²⁾
Non-drive end	2P	6316	6318	6318 (50 Hz) / NU218 (60 Hz)		NU218	NU220					
	4 - 8P	6319	6324	6324	6326 ⁽¹⁾	6328 ⁽²⁾						
Bearing seal	2P		W3Seal - Ex d(e) IIB/IIC T4 Gb / Ex d(e) I Mb Labyrinth Seal - Ex tb IIIC T125 °C Db IP6X									
	4 - 8P		Nitrilic rubber Oil Seal - Ex d(e) IIB/IIC T4 Gb Labyrinth Seal - Ex tb IIIC T125 °C Db IP6X W3Seal - Ex d(e) I Mb									
Lubrication	Type of grease		Polyrex EM (Exxon Mobil)									
	Grease fitting		With grease fittings in DE and NDE bearings									
Sleeve Bearings ⁽³⁾	Axial float		6 mm (±3 mm)									
	Locating bearing configuration		Located DE bearing									
	2P		11 - 110			9 - 80						
	4 - 8P		11 - 110			11 - 125						
Main cables connection			I ≤ 545 A: 6 x conductor bushings M12 (plus conductor clamps for Ex e terminal boxes execution) 545 A < I ≤ 690 A: 6 x conductor bushings M16 (plus conductor clamps for Ex e terminal boxes execution) 690 A < I ≤ 1,090 A: 6 x conductor bushings M20 (plus conductor clamps for Ex e terminal boxes execution) 1,090 A < I ≤ 1,385 A: 12 x conductor bushings M16 (plus conductor clamps for Ex e terminal boxes execution) 1,385 A < I ≤ 1,900 A: 12 x conductor bushings M20 (plus conductor clamps for Ex e terminal boxes execution)									
Terminal box	Material		Cast iron FC-200 (EN GJL 200)									
Auxiliary terminal box			Without auxiliary terminal box									
Leads inlet	Main		I ≤ 900 A: 2 x M63 x 1,5 900 < I ≤ 1,900 A: 4 x M63 x 1,5									
	Main plug(s)		1 x plastic plug (other entrances with nickel plated brass certified plugs)									
	Accessory		2 x M20 x 1,5									
	Accessory plug(s)		2 x nickel plated brass certified plugs									
Joint seal			Without (only machined surfaces)									
Joints anti-corrosion protection			Polyrex EM (Exxon Mobil)									
Bolts class	Enclosure parts		12.9 - Ex d(e) IIB/IIC T4 Gb / Ex tb IIIC T125 °C Db IP6X A4-80 - Ex d(e) I Mb									
	Other parts		8.8 - Ex d(e) IIB/IIC T4 Gb / Ex tb IIIC T125 °C Db IP6X A4-80 - Ex d(e) I Mb									
Shaft (& keys)	Material											
	Threaded hole	2P	DS M20	DS M20	DS M20	DS M20	DS M24					
		4 - 8P	DS M24	DS M24	DS M24	DS M24	DS M24					
Vibration			Grade A									
Provision for vibration sensors (SPM nipples)			With (1 x hole M8 on D.E. and N.D.E. shield for vertical reading)									
Balance			With half key									
Nameplate	Material		Stainless steel AISI 304									

Frame		355A/B	400L/J	400G	450K/H	500K/H
Painting	Plan	202P (meets "C3 High" performance criteria indicated in ISO 12944-2 Standard in regards to "Corrosivity Category" and 500 hours as minimum neutral salt-spray resistance as per ISO 7253 Standard)				
	Colour	Ex d(e) IIB T4 Gb / Ex d(e) IIC T4 Gb / Ex tb IIIC T125 °C Db IP6X: High Efficiency - IE2: RAL 5009 Premium Efficiency - IE3: RAL 6002 Ex d(e) I Mb: High Efficiency - IE2: RAL 2003 Premium Efficiency - IE3: RAL 2003				
Tropical treatment		Alkyd resin based varnish painting in rotor, windings, frame (internal), endshields (internal), terminal boxes (internal) and bearing caps (internals)				
Electrical features						
Voltage						
Frequency						
Winding	Copper wire	Voltage ≤ Δ 460 V - Class 200 enamel polyester+polyamide-imide grade 2 Voltage > Δ 460V - Class 200 enamel polyester+polyamide-imide grade 3		Class 200 enamel polyester+polyamide-imide grade 3		
	Insulation materials	Nomex - Mylar - Nomex		Depending of voltage level and type of motor can be used different insulation materials as: Nomex - Mylar - Nomex / Nomex 410 / Nomex impregnated / Mica impregnated		
	Impregnation	Continuous resin flow / immersion				
	Stator cables	Copper with silicone insulation				
Insulation class		F (DT 80K)				
Service factor		1.00				
Rotor		Aluminium die cast		Copper		
Thermal protector	Stator winding	Thermistor PTC, 1 per phase (triple set) for tripping at 155 °C, connected in main terminal box.				
	Bearings	Without				
Space heaters	Use	Standard, connected in main terminal box				
	Voltage	220 - 240 V				
	Power	174 W	300 W	300 W	400 W	500 W

Notes: (1) - For the higher outputs the standard bearings arrangement is: Drive end: NU326+6326 / Non-drive end: NU326
 (2) - For the higher outputs the standard bearings arrangement is: Drive end: NU328+6328 / Non-drive end: NU328
 (3) - As optional for Ex d(e) IIB T4 Gb / Ex d(e) I Mb motors. Please always refer to us for 2 pole motors frame 400G and above.

22. Optional Features

Frame	71	80	90S/L	100L	112M	132S/M	160M/L	180M/L
Certification								
ATEX certification	S	S	S	S	S	S	S	S
ATEX/IECEX certification	0	0	0	0	0	0	0	0
Mechanical features								
Terminal box								
Additional terminal box	NA	NA	0	0	0	0	0	0
Two additional terminal boxes	NA	NA	NA	NA	NA	NA	NA	NA
Bushing on leads entry	S	S	S	S	S	S	S	S
Epoxy compound on leads entry	NA	NA	NA	NA	NA	NA	NA	NA
Self-extinguishing foam at leads entry	NA	NA	NA	NA	NA	NA	NA	NA
Gland plate (motors supplied without terminal box)	NA	NA	NA	NA	NA	NA	0	0
Terminal box supplied spare	NA	NA	NA	NA	NA	NA	0	0
Terminal block								
BMC terminal block - six-pin	S	S	S	S	S	S	S	S
BMC terminal block - twelve-pin	NA	NA	NA	NA	NA	NA	NA	NA
Increased safety terminal block	NA	NA	0	0	0	0	0	0
Ex d bushing isolator	NA	NA	NA	NA	NA	NA	NA	NA
Ex d e bushing isolator	NA	NA	NA	NA	NA	NA	NA	NA
Connectors for accessory cable connections								
Wago / Phoenix	S	S	S	S	S	S	S	S
Bartec	NA	NA	NA	NA	NA	NA	NA	NA
Cable entries plug								
Plastic threaded plug for mains (1x)	S	S	S	S	S	S	S	S
Brass certified threaded plug for mains (1x)	0	0	0	0	0	0	S	S
Plastic threaded plug for auxiliaries (2x)	NA	NA	NA	NA	NA	NA	NA	NA
Brass certified threaded plug for auxiliaries (2x)	S	S	S	S	S	S	S	S
Flat plastic plug	NA	NA	NA	NA	NA	NA	NA	NA
Nipple in cable entries for dimensions reduction	NA	NA	NA	NA	NA	NA	NA	NA
Cable glands								
Plastic	NA	NA	NA	NA	NA	NA	NA	NA
Brass	NA	NA	NA	NA	NA	NA	NA	NA
Stainless steel	NA	NA	NA	NA	NA	NA	NA	NA
Plastic - Certified (Ex de)	0	0	0	0	0	0	0	0
Brass - Certified	0	0	0	0	0	0	0	0
Flanges								
Stainless steel - Certified	0	0	0	0	0	0	0	0
Flange FF (IEC) or D (NEMA)	0	0	0	0	0	0	0	0
Flange FF (IEC) or D (NEMA) - Larger	0	0	0	0	0	0	0	0
Flange FF (IEC) or D (NEMA) - Smaller	0	0	0	0	0	0	0	0
FF flange for type 2 gearboxes	0	0	0	0	0	0	0	0
C-DIN flange	0	0	0	0	0	0	NA	NA
C-DIN flange - Larger	0	0	0	0	0	0	NA	NA
C-DIN flange - Smaller	0	0	0	0	0	0	NA	NA
C flange	0	0	0	0	0	0	0	0
C flange - Larger	0	0	0	0	0	0	0	0
C flange - Smaller	NA	NA	0	0	0	0	0	0
Cooling method								
TEFC (fan cooled)	S	S	S	S	S	S	S	S
TEAO (air over)	0	0	0	0	0	0	0	0
TEBC (blower cooled)	NA	NA	0	0	0	0	0	0
TENV (non-ventilated)	0	0	0	0	0	0	0	0
ODP (open drip proof)	NA	NA	NA	NA	NA	NA	NA	NA
Fan								
Polypropylene (for 2 poles)	S	S	S	S	S	S	S	S
Polypropylene (for 4 poles and on)	S	S	S	S	S	S	S	S
Conductive plastic (for 2 poles) - Not allowed for Group I machines	0	0	0	0	0	0	0	0
Conductive plastic (for 4 poles and on) - Not allowed for Group I machines	0	0	0	0	0	0	0	0
Aluminium (for 2 poles) - Not allowed for Group I machines	0	0	0	0	0	0	0	0
Aluminium (for 4 poles and on) - Not allowed for Group I machines	0	0	0	0	0	0	0	0
Cast iron	0	0	0	0	0	0	0	0
Bronze - Not allowed for Group I and IIC machines	0	0	0	0	0	0	0	0
Steel (carbon or stainless steel)	NA	NA	NA	NA	NA	NA	NA	NA

Frame	71	80	90S/L	100L	112M	132S/M	160M/L	180M/L
Fan cover								
Carbon steel made	0	0	0	0	0	0	0	0
Stainless steel made	0	0	0	0	0	0	0	0
Cast Iron made	S	S	S	S	S	S	S	S
Drip cover	0	0	0	0	0	0	0	0
Drive end bearing								
Single row deep groove ball bearing	S	S	S	S	S	S	S	S
Single row cylindrical roller bearing NU design	NA	NA	NA	NA	NA	0	0	0
Single row cylindrical roller bearing NJ design	NA	NA	NA	NA	NA	0	0	0
Single row angular contact ball bearing	0	0	0	0	0	0	0	0
Double row angular contact ball bearing	0	0	0	0	0	0	0	0
Double row deep groove ball bearing	0	0	0	0	0	0	0	0
2RS	0	0	0	0	0	0	0	0
2RS-C3	0	0	0	0	0	0	0	0
2RS-C4	0	0	0	0	0	0	0	0
ZZ	S	S	S	S	S	S	0	0
ZZ-C3	0	0	0	0	0	0	0	0
ZZ-C4	0	0	0	0	0	0	0	0
Z	0	0	0	0	0	0	0	0
Z-C3	0	0	0	0	0	0	0	0
Z-C4	0	0	0	0	0	0	0	0
Open	0	0	0	0	0	0	0	0
C3	0	0	0	0	0	0	S	S
C4	0	0	0	0	0	0	0	0
Insulated M/C3	0	0	0	0	0	0	0	0
Non-drive end bearing								
Ball bearing	S	S	S	S	S	S	S	S
2RS	0	0	0	0	0	0	0	0
2RS-C3	0	0	0	0	0	0	0	0
2RS-C4	0	0	0	0	0	0	0	0
ZZ	S	S	S	S	S	S	0	0
ZZ-C3	0	0	0	0	0	0	0	0
ZZ-C4	0	0	0	0	0	0	0	0
Z	0	0	0	0	0	0	0	0
Z-C3	0	0	0	0	0	0	0	0
Z-C4	0	0	0	0	0	0	0	0
Open	0	0	0	0	0	0	0	0
C3	0	0	0	0	0	0	S	S
C4	0	0	0	0	0	0	0	0
Insulated M/C3	0	0	0	0	0	0	0	0
Bearing cap								
Without bearing cap	NA	NA	NA	NA	NA	NA	NA	NA
Bearing cap	NA	NA	S	S	S	S	S	S
Circlip	S	S	NA	NA	NA	NA	NA	NA
Grease type								
Mobil Polyrex EM	S	S	S	S	S	S	S	S
Aeroshell 22	0	0	0	0	0	0	0	0
Aeroshell 7	0	0	0	0	0	0	0	0
Isoflex NBU 15	0	0	0	0	0	0	0	0
Krytox	0	0	0	0	0	0	0	0
Oil mist	NA	NA	NA	NA	NA	NA	NA	NA
Polyrea ester oil (WT/ENS)	0	0	0	0	0	0	0	0
Grease fittings								
Carbon steel grease fittings	NA	NA	0	0	0	0	S	S
Carbon steel grease fittings with extended tube	NA	NA	NA	NA	NA	NA	0	0
Stainless steel grease fittings	NA	NA	0	0	0	0	0	0
Stainless steel grease fittings with extended tube	NA	NA	NA	NA	NA	NA	0	0
Grease outlet								
Grease outlet by plastic slide valve	NA	NA	NA	NA	NA	NA	NA	NA
Grease outlet by rubber slide valve	NA	NA	NA	NA	NA	NA	NA	NA
Grease outlet by plastic plug	NA	NA	0	0	0	0	S	S
Grease outlet by metal plug	NA	NA	0	0	0	0	0	0
Grease outlet through the endshield	NA	NA	0	0	0	0	S	S
Grease outlet through the fan cover	NA	NA	0	0	0	0	0	0

Frame	71	80	90S/L	100L	112M	132S/M	160M/L	180M/L
Drive end bearing seal								
V'Ring	NA	NA	NA	NA	NA	NA	NA	NA
WSeal	NA	NA	NA	NA	NA	NA	NA	NA
Nitrillic rubber lip seal - 2 poles	0	0	0	0	0	0	0	0
Nitrillic rubber lip seal - 4 poles and on	0	0	0	0	0	0	0	0
Nitrillic rubber oil seal - 2 poles	S	S	S	S	S	S	S	S
Nitrillic rubber oil seal - 4 poles and on	S	S	S	S	S	S	S	S
Lip seal for low temperatures - 2 poles	0	0	0	0	0	0	0	0
Lip seal for low temperatures - 4 poles and on	0	0	0	0	0	0	0	0
Oil seal for low temperatures - 2 poles	0	0	0	0	0	0	0	0
Oil seal for low temperatures - 4 poles and on	0	0	0	0	0	0	0	0
Viton lip seal	0	0	0	0	0	0	0	0
Viton oil seal	0	0	0	0	0	0	0	0
Viton oil seal with stainless steel spring	0	0	0	0	0	0	0	0
Taconite labyrinth - 2 poles	NA	NA	0	0	0	0	0	0
Taconite labyrinth - 4 poles and on	NA	NA	0	0	0	0	0	0
W3 Seal	NA	NA	0	0	0	0	0	0
INPRO/SEAL	NA	NA	0	0	0	0	0	0
Non-drive end bearing seal (different from D.E. bearing seal)								
Same of drive end bearing seal	S	S	S	S	S	S	S	S
WSeal	0	0	0	0	0	0	0	0
Nitrillic rubber lip seal - 2 poles	0	0	0	0	0	0	0	0
Nitrillic rubber lip seal - 4 poles and on	0	0	0	0	0	0	0	0
Nitrillic rubber oil seal - 2 poles	S	S	S	S	S	S	S	S
Nitrillic rubber oil seal - 4 poles and on	S	S	S	S	S	S	S	S
Lip seal for low temperatures - 2 poles	0	0	0	0	0	0	0	0
Lip seal for low temperatures - 4 poles and on	0	0	0	0	0	0	0	0
Oil seal for low temperatures - 2 poles	0	0	0	0	0	0	0	0
Oil seal for low temperatures - 4 poles and on	0	0	0	0	0	0	0	0
Viton lip seal	0	0	0	0	0	0	0	0
Viton oil seal	0	0	0	0	0	0	0	0
Viton oil seal with stainless steel spring	0	0	0	0	0	0	0	0
Taconite labyrinth - 2 poles	NA	NA	0	0	0	0	0	0
Taconite labyrinth - 4 poles and on	NA	NA	0	0	0	0	0	0
W3 Seal	NA	NA	0	0	0	0	0	0
INPRO/SEAL	NA	NA	0	0	0	0	0	0
Assembly joints sealing								
Lumomoly	S	S	S	S	S	S	S	S
Loctite 5923 (Permatex)	NA	NA	NA	NA	NA	NA	NA	NA
Molykote DC 33	0	0	0	0	0	0	0	0
Fixing bolts material								
Carbon steel	S	S	S	S	S	S	S	S
Stainless steel AISI 304	0	0	0	0	0	0	0	0
Stainless steel AISI 316	0	0	0	0	0	0	0	0
Fixing bolts sealing								
Lumomoly	0	0	0	0	0	0	0	0
Loctite 5923 (Permatex)	NA	NA	NA	NA	NA	NA	NA	NA
Molykote DC 33	0	0	0	0	0	0	0	0
Shaft material								
AISI 1040/45	S	S	S	S	S	S	S	S
AISI 4140	0	0	0	0	0	0	0	0
Stainless steel AISI 304	NA	NA	NA	NA	NA	NA	NA	NA
Stainless steel AISI 316	0	0	0	0	0	0	0	0
Stainless steel AISI 420	0	0	0	0	0	0	0	0
Shaft slinger seal	0	0	0	0	0	0	0	0
Threaded center hole	S	S	S	S	S	S	S	S
Shaft locking device	NA	NA	NA	NA	NA	0	0	0
Second shaft end	0	0	0	0	0	0	0	0
TS shaft end	NA	NA	NA	NA	NA	NA	NA	NA
Shaft grounding system								
Drive end grounding brush	NA	NA	NA	NA	NA	NA	NA	NA
Non-Drive end grounding brush	NA	NA	NA	NA	NA	NA	NA	NA
DE SGR grounding brush	NA	NA	0	0	0	0	0	NA
NDE SGR grounding brush	NA	NA	0	0	0	0	0	0
Insulated bearing hub (insulated endshield)	NA	NA	NA	NA	NA	NA	NA	NA

Frame	71	80	90S/L	100L	112M	132S/M	160M/L	180M/L
Key								
A Key	S	S	S	S	S	S	S	S
B Key	0	0	0	0	0	0	0	0
C Key	0	0	0	0	0	0	0	0
Direction of rotation								
Both	S	S	S	S	S	S	S	S
Clockwise	0	0	0	0	0	0	0	0
Counterclockwise	0	0	0	0	0	0	0	0
Nameplate with arrow indicating direction of rotation	0	0	0	0	0	0	0	0
Balancing type								
Without bealancing - for 2 poles	S	S	NA	NA	NA	NA	NA	NA
Without bealancing - for 4 poles and on	S	NA	NA	NA	NA	NA	NA	NA
Normal balancing with 1/2 key - for 2 poles	NA	NA	S	S	S	S	S	S
Normal balancing with 1/2 key - for 4 poles and on	NA	S	S	S	S	S	S	S
Normal balancing without key	0	0	0	0	0	0	0	0
Normal balancing with full key	0	0	0	0	0	0	0	0
Special balancing with 1/2 key	0	0	0	0	0	0	0	0
Special balancing without key	0	0	0	0	0	0	0	0
Special balancing with full key	0	0	0	0	0	0	0	0
Reduced balancing with 1/2 key	0	0	0	0	0	0	0	0
Reduced balancing without key	0	0	0	0	0	0	0	0
Reduced balancing with full key	0	0	0	0	0	0	0	0
Vibration level								
Grade A	S	S	S	S	S	S	S	S
Grade B	0	0	0	0	0	0	0	0
Provisions for vibration sensors (SPM nipples)	0	0	0	0	0	0	S	S
Drain								
Rubber drain plug	NA	NA	NA	NA	NA	NA	NA	NA
Open plastic drain plug (automatic)	NA	NA	NA	NA	NA	NA	NA	NA
Closed plastic drain plug	NA	NA	NA	NA	NA	NA	NA	NA
Threaded drain plug (closed)	NA	NA	NA	NA	NA	NA	NA	NA
Stainless steel threaded drain plug (closed)	NA	NA	NA	NA	NA	NA	NA	NA
Threaded T-type drain plug (automatic)	NA	NA	NA	NA	NA	NA	NA	NA
Ex d drain plug	0	0	0	0	0	0	0	0
Without drain	S	S	S	S	S	S	S	S
Degree of protection								
IP21	NA	NA	NA	NA	NA	NA	NA	NA
IP23	NA	NA	NA	NA	NA	NA	NA	NA
IP55	NA	NA	NA	NA	NA	NA	NA	NA
IP56	S	S	S	S	S	S	S	S
IP65	0	0	0	0	0	0	0	0
IP66	0	0	0	0	0	0	0	0
IP55W	NA	NA	NA	NA	NA	NA	NA	NA
IP56W	0	0	0	0	0	0	0	0
IP65W	0	0	0	0	0	0	0	0
IP66W	0	0	0	0	0	0	0	0
Painting plan								
Painting system C3 High according to ISO 12944-5:2007	S	S	S	S	S	S	S	S
Painting system C5 (I or M) Very High according to ISO 12944-5:2007	0	0	0	0	0	0	0	0
Internal epoxy coating (tropicalization)	0	0	0	0	0	0	0	0
Inside painting of terminal box: Munsell 2.5 YR 6/14	0	0	0	0	0	0	0	0
Prepared for brake installation	NA	NA	NA	NA	NA	NA	NA	NA
Supplied with brake	NA	NA	NA	NA	NA	NA	NA	NA
Forced ventilation kit								
Forced ventilation kit	NA	NA	0	0	0	0	0	0
Forced ventilation kit prepared for encoder assembly	NA	NA	0	0	0	0	0	0
Forced ventilation kit voltage								
208-230/460 V	NA	NA	0	0	0	0	0	0
220-240/380-415 V	NA	NA	0	0	0	0	0	0
220/380-440 V	NA	NA	0	0	0	0	0	0
380-415/660 V	NA	NA	0	0	0	0	0	0
525-550 V	NA	NA	0	0	0	0	0	0
575 V	NA	NA	0	0	0	0	0	0

Frame	71	80	90S/L	100L	112M	132S/M	160M/L	180M/L
Encoder								
Encoder	0	0	0	0	0	0	0	0
Additional nameplate for frequency inverter operation								
Additional nameplate for frequency inverter operation	0	0	0	0	0	0	0	0
Other mechanical optional features								
Special foot flatness - 0.127 mm (IEEE 841 specification)	0	0	0	0	0	0	0	0
Dowel pins	NA	NA	NA	NA	NA	NA	0	0
Jacking screws	NA	NA	NA	NA	NA	NA	0	0
Electrical features								
Starting method								
DOL	S	S	S	S	S	S	S	S
Frequency inverter	0	0	0	0	0	0	0	0
Other starting methods	0	0	0	0	0	0	0	0
Maximum ambient temperature								
up to 40 °C	S	S	S	S	S	S	S	S
40.1 to 80 °C	0	0	0	0	0	0	0	0
Minimum ambient temperature								
-20 °C	S	S	S	S	S	S	S	S
-55 to -20 °C	0	0	0	0	0	0	0	0
Voltage								
380 V with 6 leads	0	0	0	0	0	0	0	0
400 V with 6 leads	0	0	0	0	0	0	0	0
415 V with 6 leads	0	0	0	0	0	0	0	0
440 V with 6 leads	0	0	0	0	0	0	0	0
500 V with 6 leads	0	0	0	0	0	0	0	0
690 V with 6 leads	0	0	0	0	0	0	0	0
220/380 V with 6 leads	0	0	0	0	0	0	0	0
230/400 V with 6 leads	0	0	0	0	0	0	0	0
240/415 V with 6 leads	0	0	0	0	0	0	0	0
380/660 V with 6 leads	0	0	0	0	0	0	0	0
400/690 V with 6 leads	0	0	0	0	0	0	0	0
525 - 550 V with 6 leads	0	0	0	0	0	0	0	0
220-240/380-415/440-460 V with 6 leads	S	S	S	S	0	0	0	0
220-240/380-415/440-480 V with 6 leads	0	0	0	0	0	0	0	0
380-415/660/440-460 V with 6 leads	0	0	0	0	S	S	S	S
380-415/660/440-480 V with 6 leads	0	0	0	0	0	0	0	0
Service factor								
1.00	S	S	S	S	S	S	S	S
1.15	0	0	0	0	0	0	0	0
1.25	0	0	0	0	0	0	0	0
Insulation class								
F DT 70K	0	0	0	0	0	0	0	0
F DT 80K	S	S	S	S	S	S	S	S
F DT 105K	0	0	0	0	0	0	0	0
H DT 80K	0	0	0	0	0	0	0	0
H DT 105K	0	0	0	0	0	0	0	0
H DT 125K	NA	NA	NA	NA	NA	NA	NA	NA
Space heaters								
110-127 V	0	0	0	0	0	0	0	0
220-240 V	S	S	S	S	S	S	S	S
110-127 / 220-240 V	NA	NA	NA	NA	NA	NA	NA	NA
380-480 V	0	0	0	0	0	0	0	0
Windings alarm thermal protection								
Bimetalic thermal protector - 130 °C	0	0	0	0	0	0	0	0
Bimetalic thermal protector - 155 °C	0	0	0	0	0	0	0	0
Pt-100 with 2 wires	0	0	0	0	0	0	0	0
Pt-100 with 3 wires	0	0	0	0	0	0	0	0
PTC Thermistor - 110 °C	0	0	0	0	0	0	0	0
PTC Thermistor - 120 °C	0	0	0	0	0	0	0	0
PTC Thermistor - 130 °C	0	0	0	0	0	0	0	0
PTC Thermistor - 140 °C	0	0	0	0	0	0	0	0
PTC Thermistor - 150 °C	0	0	0	0	0	0	0	0
PTC Thermistor - 155 °C	NA	NA	NA	NA	NA	NA	NA	NA
PTC Thermistor - 160 °C	NA	NA	NA	NA	NA	NA	NA	NA
Termocouple	0	0	0	0	0	0	0	0

Frame	71	80	90S/L	100L	112M	132S/M	160M/L	180M/L
Windings tripping thermal protection								
KTY 84-130	0	0	0	0	0	0	0	0
Bimetallic thermal protector - 130 °C	0	0	0	0	0	0	0	0
Bimetallic thermal protector - 155 °C	0	0	0	0	0	0	0	0
Bimetallic thermal protector - 180 °C	NA	NA	NA	NA	NA	NA	NA	NA
Pt-100 with 2 wires	0	0	0	0	0	0	0	0
Pt-100 with 3 wires	0	0	0	0	0	0	0	0
PTC Thermistor - 110 °C	0	0	0	0	0	0	0	0
PTC Thermistor - 120 °C	0	0	0	0	0	0	0	0
PTC Thermistor - 130 °C	0	0	0	0	0	0	0	0
PTC Thermistor - 140 °C	0	0	0	0	0	0	0	0
PTC Thermistor - 150 °C	S	S	S	S	S	S	S	S
PTC Thermistor - 155 °C	NA	NA	NA	NA	NA	NA	NA	NA
PTC Thermistor - 160 °C	NA	NA	NA	NA	NA	NA	NA	NA
PTC Thermistor - 180 °C	NA	NA	NA	NA	NA	NA	NA	NA
Termocouple	0	0	0	0	0	0	0	0
Bearing thermal protection								
Bimetallic thermal protector - drive end	NA	NA	NA	NA	NA	NA	NA	NA
PTC Thermistor - drive end	0	0	0	0	0	0	0	0
Pt-100 with 2 wires - drive end	0	0	0	0	0	0	0	0
Pt-100 with 3 wires - drive end	0	0	0	0	0	0	0	0
Calibrated Pt-100 with 3 wires - drive end	NA	NA	NA	NA	NA	NA	NA	NA
Bimetallic thermal protector - drive and non-drive end	NA	NA	NA	NA	NA	NA	NA	NA
PTC Thermistor - drive and non-drive end	0	0	0	0	0	0	0	0
Pt-100 with 2 wires - drive and non-drive end	0	0	0	0	0	0	0	0
Pt-100 with 3 wires - drive and non-drive end	0	0	0	0	0	0	0	0
Calibrated Pt-100 with 3 wires - drive and non-drive end	NA	NA	NA	NA	NA	NA	NA	NA
Type of winding impregnation								
Immersion (dip and baked) epoxy varnish	0	0	0	0	0	0	0	0
Immersion (dip and baked) polyester varnish	S	S	S	S	S	S	S	S
Double immersion (dip and baked) epoxy varnish	0	0	0	0	0	0	0	0
Double immersion (dip and baked) polyester varnish	0	0	0	0	0	0	0	0
Immersion (dip and baked) silicone varnish	NA	NA	NA	NA	NA	NA	NA	NA
Continuous epoxy resin flow	0	0	0	0	0	0	0	0
Temperature Class								
T1 Temperature class	0	0	0	0	0	0	0	0
T2 Temperature class	0	0	0	0	0	0	0	0
T3 Temperature class	0	0	0	0	0	0	0	0
T4 Temperature class	S	S	S	S	S	S	S	S
T5 Temperature class	0	0	0	0	0	0	0	0
T6 Temperature class	0	0	0	0	0	0	0	0
Design								
A	NA	NA	NA	NA	NA	NA	NA	NA
B	NA	NA	NA	NA	NA	NA	NA	NA
C	NA	NA	NA	NA	NA	NA	NA	NA
D	0	0	0	0	0	0	0	0
N	S	S	S	S	S	S	S	S
H	0	0	0	0	0	0	0	0
Grounding								
Double grounding on frame (one inside the terminal box and one on motor feet)	NA	NA	NA	NA	NA	NA	NA	NA
Double grounding (one inside the terminal box and one on frame)	S	S	S	S	S	S	S	S
Double grounding + additional (one inside the terminal box and two on frame)	0	0	0	0	0	0	0	0
Larger grounding terminal	0	0	0	0	0	0	0	0
Equipotential bonding conductor between terminal box and frame	NA	NA	NA	NA	NA	NA	NA	NA
Special cable length								
1,000 mm length main and grounding cables (supplied without or with loose terminal box)	NA	NA	NA	NA	NA	NA	0	0

Frame	200M/L	225S/M	250S/M	280S/M	315S/M	315L	355M/L
Certification							
ATEX/GOST certification	S	S	S	S	S	S	S
ATEX/IECEX/GOST certification	0	0	0	0	0	0	0
Mechanical features							
Terminal box							
Additional terminal box	0	0	0	0	0	0	0
Two additional terminal boxes	NA	NA	NA	NA	NA	NA	NA
Bushing on leads entry	S	S	S	S	S	S	S
Epoxy compound on leads entry	NA	NA	NA	NA	NA	NA	NA
Self-extinguishing foam at leads entry	NA	NA	NA	NA	NA	NA	NA
Gland plate (motors supplied without terminal box)	0	0	0	0	0	0	0
Terminal box supplied spare	0	0	0	0	0	0	0
Terminal block							
BMC terminal block - six-pin	S	S	S	S	S	S	S
BMC terminal block - twelve-pin	NA	NA	NA	NA	NA	NA	NA
Increased safety terminal block	0	0	0	0	0	0	0
Ex d bushing isolator	NA	NA	NA	NA	NA	NA	NA
Ex d e bushing isolator	NA	NA	NA	NA	NA	NA	NA
Connectors for accessory cable connections							
Wago / Phoenix	S	S	S	S	S	S	S
Bartec	NA	NA	NA	NA	NA	NA	NA
Cable entries plug							
Plastic threaded plug for mains	S	S	S	S	S	S	S
Brass certified threaded plug for mains (1x)	S	S	S	S	S	S	S
Plastic threaded plug for auxiliaries (2x)	NA	NA	NA	NA	NA	NA	NA
Brass certified threaded plug for auxiliaries (2x)	S	S	S	S	S	S	S
Flat plastic plug	NA	NA	NA	NA	NA	NA	NA
Nipple in cable entries for dimensions reduction	0	0	0	0	0	0	0
Cable glands							
Plastic	NA	NA	NA	NA	NA	NA	NA
Brass	NA	NA	NA	NA	NA	NA	NA
Stainless steel	NA	NA	NA	NA	NA	NA	NA
Plastic - Certified (Ex de)	0	0	0	0	0	0	0
Brass - Certified	0	0	0	0	0	0	0
Stainless steel - Certified	0	0	0	0	0	0	0
Flanges							
Flange FF (IEC) or D (NEMA)	0	0	0	0	0	0	0
Flange FF (IEC) or D (NEMA) - Larger	0	0	0	0	0	0	NA
Flange FF (IEC) or D (NEMA) - Smaller	0	0	0	0	0	0	0
FF flange for type 2 gearboxes	0	0	0	0	0	0	0
C-DIN flange	NA	NA	NA	NA	NA	NA	NA
C-DIN flange - Larger	NA	NA	NA	NA	NA	NA	NA
C-DIN flange - Smaller	NA	NA	NA	NA	NA	NA	NA
C flange	0	0	0	0	0	0	0
C flange - Larger	0	0	0	0	NA	NA	NA
C flange - Smaller	0	0	0	0	0	0	0
Cooling method							
TEFC (fan cooled)	S	S	S	S	S	S	S
TEAO (air over)	0	0	0	0	0	0	0
TEBC (blower cooled)	0	0	0	0	0	0	0
TENV (non-ventilated)	0	0	0	0	0	0	0
ODP (open drip proof)	NA	NA	NA	NA	NA	NA	NA
Fan							
Polypropylene (for 2 poles)	S	S	S	S	S	S	S
Polypropylene (for 4 poles and on)	S	S	S	S	S	NA	NA
Conductive plastic (for 2 poles)	0	0	0	0	0	0	0
Conductive plastic (for 4 poles and on)	0	0	0	0	0	NA	NA
Aluminium (for 2 poles)	0	0	0	0	0	0	0
Aluminium (for 4 poles and on)	0	0	0	0	0	S	S
Cast iron	0	0	0	0	0	0	0
Bronze (not allowed for Group I and IIC)	0	0	0	0	0	0	0
Steel (carbon or stainless steel)	NA	NA	NA	NA	NA	NA	NA

Frame	200M/L	225S/M	250S/M	280S/M	315S/M	315L	355M/L
Fan cover							
Carbon steel made	0	0	0	0	0	0	0
Stainless steel made	0	0	0	0	0	0	0
Cast Iron made	S	S	S	S	S	S	S
Drip cover	0	0	0	0	0	0	0
Drive end bearing							
Single row deep groove ball bearing	S	S	S	S	S	S	S
Single row cylindrical roller bearing NU design	0	0	0	0	0	0	0
Single row cylindrical roller bearing NJ design	0	0	0	0	0	0	0
Single row angular contact ball bearing	0	0	0	0	0	0	0
Double row angular contact ball bearing	0	0	0	0	0	0	0
Double row deep groove ball bearing	0	0	0	0	0	0	0
2RS	0	0	0	0	0	0	0
2RS-C3	0	0	0	0	0	0	0
2RS-C4	0	0	0	0	0	0	0
ZZ	0	0	0	0	0	0	0
ZZ-C3	0	0	0	0	0	0	0
ZZ-C4	0	0	0	0	0	0	0
Z	0	0	0	0	0	0	0
Z-C3	0	0	0	0	0	0	0
Z-C4	0	0	0	0	0	0	0
Aberto	0	0	0	0	0	0	0
C3	S	S	S	S	S	S	S
C4	0	0	0	0	0	0	0
Insulated M/C3	0	0	0	0	0	0	0
Non-drive end bearing							
Ball bearing	S	S	S	S	S	S	S
2RS	0	0	0	0	0	0	0
2RS-C3	0	0	0	0	0	0	0
2RS-C4	0	0	0	0	0	0	0
ZZ	0	0	0	0	0	0	0
ZZ-C3	0	0	0	0	0	0	0
ZZ-C4	0	0	0	0	0	0	0
Z	0	0	0	0	0	0	0
Z-C3	0	0	0	0	0	0	0
Z-C4	0	0	0	0	0	0	0
Open	0	0	0	0	0	0	0
C3	S	S	S	S	S	S	S
C4	0	0	0	0	0	0	0
Insulated M/C3	0	0	0	0	0	0	0
Bearing cap							
Without bearing cap	NA	NA	NA	NA	NA	NA	NA
Bearing cap	S	S	S	S	S	S	S
Circlip	NA	NA	NA	NA	NA	NA	NA
Grease							
Mobil Polyrex EM	S	S	S	S	S	S	S
Aeroshell 22	0	0	0	0	0	0	0
Aeroshell 7	0	0	0	0	0	0	0
Isoflex NBU 15	0	0	0	0	0	0	0
Krytox	0	0	0	0	0	0	0
Oil Mist	NA	NA	NA	NA	NA	NA	NA
Polyrea ester oil (WT/ENS)	0	0	0	0	0	0	0
Grease fittings							
Carbon steel grease fittings	S	S	S	S	S	S	S
Carbon steel grease fittings with extended tube	0	0	0	0	0	0	0
Stainless steel grease fittings	0	0	0	0	0	0	0
Stainless steel grease fittings with extended tube	0	0	0	0	0	0	0
Grease outlet							
Grease outlet by plastic slide valve	NA	S	S	S	S	S	S
Grease outlet by rubber slide valve	NA	NA	NA	NA	NA	NA	NA
Grease outlet by plastic plug	S	NA	NA	NA	NA	NA	NA
Grease outlet by metal plug	0	NA	NA	NA	NA	NA	NA
Grease outlet through endshield	S	S	S	S	S	S	S
Grease outlet through the fan cover	0	0	0	0	0	0	0

Frame	200M/L	225S/M	250S/M	280S/M	315S/M	315L	355M/L
Drive end bearing seal							
V'Ring	NA	NA	NA	NA	NA	NA	NA
WSeal	NA	0	0	0	0	0	0
Nitrillic rubber lip seal - 2 poles	0	0	0	0	0	0	0
Nitrillic rubber lip seal - 4 poles and on	0	0	0	NA	NA	NA	NA
Nitrillic rubber oil seal - 2 poles	S	0	0	0	0	0	0
Nitrillic rubber oil seal - 4 poles and on	S	0	0	NA	NA	NA	NA
Lip seal for low temperatures - 2 poles	0	0	0	0	0	0	0
Lip seal for low temperatures - 4 poles and on	0	0	0	NA	NA	NA	NA
Oil seal for low temperatures - 2 poles	0	0	0	0	0	0	0
Oil seal for low temperatures - 4 poles and on	0	0	0	NA	NA	NA	NA
Viton lip seal	0	0	0	0	0	0	0
Viton oil seal	0	S	S	S	S	S	S
Viton oil seal with stainless steel spring	0	0	0	0	0	0	0
Taconite labyrinth - 2 poles	0	0	0	0	0	0	0
Taconite labyrinth - 4 poles and on	0	0	0	0	0	0	0
W3 Seal	0	0	0	0	0	0	0
INPRO/SEAL	0	0	0	0	0	0	0
Non-drive end bearing seal (different from D.E. bearing seal)							
Same of drive end bearing seal	S	S	S	S	S	S	S
WSeal	0	0	0	0	0	0	0
Nitrillic rubber lip seal - 2 poles	0	0	0	0	0	0	0
Nitrillic rubber lip seal - 4 poles and on	0	0	0	NA	NA	NA	NA
Nitrillic rubber oil seal - 2 poles	S	0	0	0	0	0	0
Nitrillic rubber oil seal - 4 poles and on	S	0	0	NA	NA	NA	NA
Lip seal for low temperatures - 2 poles	0	0	0	0	0	0	0
Lip seal for low temperatures - 4 poles and on	0	0	0	NA	NA	NA	NA
Oil seal for low temperatures - 2 poles	0	0	0	0	0	0	0
Oil seal for low temperatures - 4 poles and on	0	0	0	NA	NA	NA	NA
Viton lip seal	0	0	0	0	0	0	0
Viton oil seal	0	S	S	S	S	S	S
Viton oil seal with stainless steel spring	0	0	0	0	0	0	0
Taconite labyrinth - 2 poles	0	0	0	0	0	0	0
Taconite labyrinth - 4 poles and on	0	0	0	0	0	0	0
W3 Seal	0	0	0	0	0	0	0
INPRO/SEAL	0	0	0	0	0	0	0
Assembly joints sealing							
Lumomoly	S	S	S	S	S	S	S
Loctite 5923 (Permatex)	NA	NA	NA	NA	NA	NA	NA
Molykote DC 33	0	0	0	0	0	0	0
Fixing bolts material							
Carbon steel	S	S	S	S	S	S	S
Stainless steel AISI 304	0	0	0	0	0	0	0
Stainless steel AISI 316	0	0	0	0	0	0	0
Fixing bolts sealing							
Lumomoly	0	0	0	0	0	0	0
Loctite 5923 (Permatex)	NA	NA	NA	NA	NA	NA	NA
Molykote DC 33	0	0	0	0	0	0	0
Shaft material							
AISI 1040/45	S	S	S	S	S	0	0
AISI 4140	0	0	0	0	0	S	S
Stainless steel AISI 304	NA	NA	NA	NA	NA	NA	NA
Stainless steel AISI 316	0	0	0	0	0	0	0
Stainless steel AISI 420	0	0	0	0	0	0	0
Shaft slinger seal	0	0	0	0	0	0	0
Threaded center hole	S	S	S	S	S	S	S
Shaft locking device	0	0	0	0	0	0	0
Second shaft end	0	0	0	0	0	0	0
TS shaft end	NA	NA	NA	NA	NA	NA	NA
Shaft grounding system							
Drive end grounding brush	NA	NA	NA	NA	NA	NA	NA
Non-Drive end grounding brush	NA	NA	NA	NA	NA	NA	NA
DE SGR grounding brush	0	0	0	0	0	0	0
NDE SGR grounding brush	0	0	0	0	0	0	0

Frame	200M/L	225S/M	250S/M	280S/M	315S/M	315L	355M/L
Key							
A Key	S	0	0	0	0	0	0
B Key	0	S	S	S	S	S	S
C Key	0	0	0	0	0	0	0
Direction of rotation							
Both	S	S	S	S	S	S	S
Clockwise	0	0	0	0	0	0	0
Counterclockwise	0	0	0	0	0	0	0
Nameplate with arrow indicating direction of rotation	0	0	0	0	0	0	0
Balancing type							
Without bealancing - for 2 poles	NA	NA	NA	NA	NA	NA	NA
Without bealancing - for 4 poles and on	NA	NA	NA	NA	NA	NA	NA
Normal balancing with 1/2 key - for 2 poles	S	S	S	S	S	S	S
Normal balancing with 1/2 key - for 4 poles and on	S	S	S	S	S	S	S
Normal balancing without key	0	0	0	0	0	0	0
Normal balancing with full key	0	0	0	0	0	0	0
Special balancing with 1/2 key	0	0	0	0	0	0	0
Special balancing without key	0	0	0	0	0	0	0
Special balancing with full key	0	0	0	0	0	0	0
Reduced balancing with 1/2 key	0	0	0	0	0	0	0
Reduced balancing without key	0	0	0	0	0	0	0
Reduced balancing with full key	0	0	0	0	0	0	0
Vibration level							
Grade A	S	S	S	S	S	S	S
Grade B	0	0	0	0	0	0	0
Provision for vibration sensors (SPM nipples)	S	S	S	S	S	S	S
Drain							
Rubber drain plug	NA	NA	NA	NA	NA	NA	NA
Open plastic drain plug (automatic)	NA	NA	NA	NA	NA	NA	NA
Closed plastic drain plug	NA	NA	NA	NA	NA	NA	NA
Threaded drain plug	NA	NA	NA	NA	NA	NA	NA
Stainless steel threaded drain plug (closed)	NA	NA	NA	NA	NA	NA	NA
Threaded T-type drain plug (automatic)	NA	NA	NA	NA	NA	NA	NA
Ex d drain plug	0	0	0	0	0	0	0
Without drain	S	S	S	S	S	S	S
Degree of protection							
IP21	NA	NA	NA	NA	NA	NA	NA
IP23	NA	NA	NA	NA	NA	NA	NA
IP55	NA	NA	NA	NA	NA	NA	NA
IP56	S	S	S	S	S	S	S
IP65	0	0	0	0	0	0	0
IP66	0	0	0	0	0	0	0
IP55W	NA	NA	NA	NA	NA	NA	NA
IP56W	0	0	0	0	0	0	0
IP65W	0	0	0	0	0	0	0
IP66W	0	0	0	0	0	0	0
Painting plan							
Painting system C3 High according to ISO 12944-5:2007 Standard	S	S	S	S	S	S	S
Painting system C5 (I or M) Very High according to ISO 12944-5:2007 Standard	0	0	0	0	0	0	0
Internal epoxy coating (tropicalization)	0	0	0	0	0	0	0
Inside painting of terminal box: Munsell 2.5 YR 6/14	0	0	0	0	0	0	0
Prepared for brake installation	NA	NA	NA	NA	NA	NA	NA
Supplied with brake	NA	NA	NA	NA	NA	NA	NA
Forced ventilation kit							
Forced ventilation kit	0	0	0	0	0	0	0
Forced ventilation kit prepared for encoder assembly	0	0	0	0	0	0	0
Forced ventilation kit voltage							
230/460 V	0	0	0	0	0	0	0
220-240/380-415 V	0	0	0	0	0	0	0
220/380-440 V	0	0	0	0	0	0	0
380-415/660 V	0	0	0	0	0	0	0
525-550 V	0	0	0	0	0	0	0

Frame	200M/L	225S/M	250S/M	280S/M	315S/M	315L	355M/L
575 V	0	0	0	0	0	0	0
Encoder							
Encoder	0	0	0	0	0	0	0
Additional nameplate for frequency inverter operation							
Additional nameplate for frequency inverter operation	0	0	0	0	0	0	0
Other mechanical optional features							
Special foot flatness - 0.127 mm (IEEE 841 specification)	0	0	0	0	0	0	0
Dowel pins	0	0	0	0	0	0	0
Jacking screws	0	0	0	0	0	0	0
Electrical features							
Starting method							
DOL	S	S	S	S	S	S	S
Frequency inverter	0	0	0	0	0	0	0
Other starting methods	0	0	0	0	0	0	0
Maximum ambient temperature							
up to 40 °C	S	S	S	S	S	S	S
40.1 to 80 °C	0	0	0	0	0	0	0
Minimum ambient temperature							
-20 °C	S	S	S	S	S	S	S
-55 to -20 °C	0	0	0	0	0	0	0
Voltage							
380 V with 6 leads	0	0	0	0	0	0	0
400 V with 6 leads	0	0	0	0	0	0	0
415 V with 6 leads	0	0	0	0	0	0	0
440 V with 6 leads	0	0	0	0	0	0	0
500 V with 6 leads	0	0	0	0	0	0	0
690 V with 6 leads	0	0	0	0	0	0	0
220/380 V with 6 leads	0	0	0	0	0	0	0
230/400 V with 6 leads	0	0	0	0	0	0	0
240/415 V with 6 leads	0	0	0	0	0	0	0
380/660 V with 6 leads	0	0	0	0	0	0	0
400/690 V with 6 leads	0	0	0	0	0	0	0
525 - 550 V with 6 leads	0	0	0	0	0	0	0
220-240/380-415/440-460 V with 6 leads	0	0	0	0	0	0	0
220-240/380-415/440-480 V with 6 leads	0	0	0	0	0	0	0
380-415/660/440-460 V with 6 leads	S	S	S	S	S	S	S
380-415/660/440-480 V with 6 leads	0	0	0	0	0	0	0
Service factor							
1.00	S	S	S	S	S	S	S
1.15	0	0	0	0	0	0	0
1.25	0	0	0	0	0	0	0
Insulation class							
F DT 70K	0	0	0	0	0	0	0
F DT 80K	S	S	S	S	S	S	S
F DT 105K	0	0	0	0	0	0	0
H DT 80K	0	0	0	0	0	0	0
H DT 105K	0	0	0	0	0	0	0
H DT 125K	NA	NA	NA	NA	NA	NA	NA
Space heaters							
110-127 V	0	0	0	0	0	0	0
220-240 V	S	S	S	S	S	S	S
110-127 / 220-240 V	NA	NA	NA	NA	NA	NA	NA
380-480 V	0	0	0	0	0	0	0
Windings alarm thermal protection							
Bimetallic thermal protector - 130 °C	0	0	0	0	0	0	0
Bimetallic thermal protector - 155 °C	0	0	0	0	0	0	0
Pt-100 with 2 wires	0	0	0	0	0	0	0
Pt-100 with 3 wires	0	0	0	0	0	0	0
PTC Thermistor - 110 °C	0	0	0	0	0	0	0
PTC Thermistor - 120 °C	0	0	0	0	0	0	0
PTC Thermistor - 130 °C	0	0	0	0	0	0	0
PTC Thermistor - 140 °C	0	0	0	0	0	0	0
PTC Thermistor - 150 °C	0	0	0	0	0	0	0
PTC Thermistor - 155 °C	NA	NA	NA	NA	NA	NA	NA
PTC Thermistor - 160 °C	NA	NA	NA	NA	NA	NA	NA
Termocouple	0	0	0	0	0	0	0

Frame	200M/L	225S/M	250S/M	280S/M	315S/M	315L	355M/L
Windings tripping thermal protection							
KTY 84-130	0	0	0	0	0	0	0
Bimetallic thermal protector - 130 °C	0	0	0	0	0	0	0
Bimetallic thermal protector - 155 °C	0	0	0	0	0	0	0
Bimetallic thermal protector - 180 °C	NA	NA	NA	NA	NA	NA	NA
Pt-100 with 2 wires	0	0	0	0	0	0	0
Pt-100 with 3 wires	0	0	0	0	0	0	0
PTC Thermistor - 110 °C	0	0	0	0	0	0	0
PTC Thermistor - 120 °C	0	0	0	0	0	0	0
PTC Thermistor - 130 °C	0	0	0	0	0	0	0
PTC Thermistor - 140 °C	0	0	0	0	0	0	0
PTC Thermistor - 150 °C	S	S	S	S	S	S	S
PTC Thermistor - 155 °C	NA	NA	NA	NA	NA	NA	NA
PTC Thermistor - 160 °C	NA	NA	NA	NA	NA	NA	NA
PTC Thermistor - 180 °C	NA	NA	NA	NA	NA	NA	NA
Termocouple	0	0	0	0	0	0	0
Bearing thermal protection							
Bimetallic thermal protector - drive end	NA	NA	NA	NA	NA	NA	NA
PTC Thermistor - drive end	0	0	0	0	0	0	0
Pt-100 with 2 wires - drive end	0	0	0	0	0	0	0
Pt-100 with 3 wires - drive end	0	0	0	0	0	0	0
Calibrated Pt-100 with 3 wires - drive end	NA	NA	NA	NA	NA	NA	NA
Bimetallic thermal protector - drive and non-drive end	NA	NA	NA	NA	NA	NA	NA
PTC Thermistor - drive and non-drive end	0	0	0	0	0	0	0
Pt-100 with 2 wires - drive and non-drive end	0	0	0	0	0	0	0
Pt-100 with 3 wires - drive and non-drive end	0	0	0	0	0	0	0
Calibrated Pt-100 with 3 wires - drive and non-drive end	NA	NA	NA	NA	NA	NA	NA
Type of winding impregnation							
Immersion (dip and baked) epoxy impregnation	0	NA	NA	NA	NA	NA	NA
Immersion (dip and baked) polyester varnish	S	NA	NA	NA	NA	NA	NA
Double Immersion (dip and baked) epoxy varnish	0	NA	NA	NA	NA	NA	NA
Double Immersion (dip and baked) polyester varnish	0	NA	NA	NA	NA	NA	NA
Immersion (dip and baked) silicone varnish	NA	NA	NA	NA	NA	NA	NA
Continuous epoxy resin flow	0	S	S	S	S	S	S
Temperature class							
T1 Temperature class	0	0	0	0	0	0	0
T2 Temperature class	0	0	0	0	0	0	0
T3 Temperature class	0	0	0	0	0	0	0
T4 Temperature class	S	S	S	S	S	S	S
T5 Temperature class	0	0	0	0	0	0	0
T6 Temperature class	0	0	0	0	0	0	0
Design							
A	NA	NA	NA	NA	NA	NA	NA
B	NA	NA	NA	NA	NA	NA	NA
C	NA	NA	NA	NA	NA	NA	NA
D	0	0	0	0	0	0	0
N	S	S	S	S	S	S	S
H	0	0	0	0	0	0	0
Grounding							
Double grounding on frame (one inside the terminal box and one on motor feet)	NA	NA	NA	NA	NA	NA	NA
Double grounding (one inside the terminal box and one on frame)	S	S	S	S	S	S	S
Double grounding + additional (one inside the terminal box and two on frame)	0	0	0	0	0	0	0
Larger grounding terminal	0	NA	NA	NA	NA	NA	NA
Equipotential bonding conductor between terminal box and frame	NA	NA	NA	NA	NA	NA	NA
Special cable length							
1000 mm length main and grounding cables (supplied without or with loose terminal box)	0	0	0	0	0	0	0

Frame		355AB	400LJ	400G	450KH	500KH
General optional						
Nameplate markings	ATEX	S	S	S	S	S
	IECEX	0	0	0	0	0
	GOST-RTN	0	0	0	0	0
	Belarus Gospromnadzor (GPN)	0	0	0	0	0
	SITIIAS - NEPSI - China	OR	OR	OR	OR	OR
	Inmetro - Brazil	0	0	0	0	0
	CCoE - India	0	0	0	0	0
Ambient temperature (see specific construction features)	- 20 °C up to +40 °C	S	S	S	S	S
	- 40 °C up to +40 °C	0	0	0	0	0
	- 55 °C up to +40 °C	0	0	0	0	0
	- 20 °C up to +50 °C	0	0	0	0	0
	- 20 °C up to +60 °C	0	0	0	0	0
Mechanical optional						
Mounting						
B3L / B3R / B35T / B35L / B35R		0	0	0	0	0
B5T / B5L / B5R		0	0 ⁽¹⁾	0 ⁽¹⁾	0 ⁽¹⁾	0 ⁽¹⁾
V1 / V5 / V15 / V3 / V6 / V36	2P	0	0	0	NA	NA
	4 - 8P	0	0	0	0	0
Frame						
Material	FC-200 (EN GJL 200)	S	S	S	S	S
	FE-400 (EN GJS 400)	0	0	0	0	0
	Steel	0	0	0	0	0
Endshields						
Material	FC-200 (EN GJL 200)	S	S	S	S	S
	FE-400 (EN GJS 400)	0	0	0	0	0
	Steel	0	0	0	0	0
Main terminal box						
Material	FC-200 (EN GJL 200)	S	S	S	S	S
	FE-400 (EN GJS 400)	0	0	0	0	0
	Steel	0	0	0	0	0
Gland plate (for main terminal box)	Ex d	0	0	0	0	0
	Ex de	0	0	0	0	0
External grounding		S	S	S	S	S
Main cables connection						
Twelve conductor bushings		0 ⁽²⁾	0 ⁽²⁾	0 ⁽²⁾	0 ⁽²⁾	0 ⁽²⁾
Auxiliary terminal boxes						
Material	FC-200 (EN GJL 200)	S	S	S	S	S
	FE-400 (EN GJS 400)	0	0	0	0	0
	Steel	0	0	0	0	0
1st Auxiliary terminal box		0	0	0	0	0
2nd Auxiliary terminal box		0	0	0	0	0
3rd Auxiliary terminal box		0	0	0	0	0
Bearing probes terminal boxes		0	0	0	0	0
External grounding		0	0	0	0	0
Cable glands						
Plastic cable gland		NA	NA	NA	NA	NA
Brass cable gland		0	0	0	0	0
Stainless steel cable gland		0	0	0	0	0
Flanges						
Flange FF		0	0	0	0	0
Flange FF (Superior)		0	0	0	0	0
Flange FF (Inferior)		0	0	0	0	0
Double flange FF (DE and NDE)		0	0	0	0	0
Flange C		NA	NA	NA	NA	NA
Fan						
Cast iron		S	S	S	0	0
Aluminium		0 ⁽³⁾	0 ⁽³⁾	0 ⁽³⁾	0 ⁽³⁾	0 ⁽³⁾
Steel		0	0	0	0 ⁽⁴⁾	0 ⁽⁴⁾

Frame		355AB	400LJ	400G	450KH	500KH
Bearing						
Ball bearing (D.E)	2P	S	S	S	S	S ⁽⁶⁾
	4 - 8P	S	S	S	S	S
Roller bearing in D.E (for radial external thrusts)	2P	NA	NA	NA	NA	NA
	4 - 8P	0	0	0	0	0
Ball bearing (N.D.E)	2P	S	S	S	0	NA
	4 - 8P	S	S	S	S	S
Angular contact for vertical motors	2P	S	S	S	NA	NA
	4 - 8P	S	S	S	S	S
Insulated drive end bearing	2 - 8P	0	0	0	0	0
Insulated non drive end bearing	2 - 8P	0	0	0	0	0
Bearing cap						
Without bearing cap		NA	NA	NA	NA	NA
With bearing cap		S	S	S	S	S
Bearing sealing						
IP 55 - V'Ring	2P	NA	NA	NA	NA	NA
	4P - 8P	0	0	0	0	0
IP55 - WSeal	2P - 8P	0	NA	NA	NA	NA
IP56 - Oil Seal	2P	0	NA	NA	NA	NA
	4 - 8P	S	S	S	S	S
IP56 - W3seal	2P	S	S	S	S	S
IP65 - Double lip oil seal	2 - 8P	0	NA	NA	NA	NA
IP65 - Labyrinth	2 - 8P	0 ⁽⁶⁾	0 ⁽⁶⁾	0 ⁽⁶⁾	0 ⁽⁶⁾	0 ⁽⁶⁾
IP66 - W3Seal	2 - 8p	0 ⁽⁷⁾	0 ⁽⁷⁾	0 ⁽⁷⁾	0 ⁽⁷⁾	0 ⁽⁷⁾
V'Ring, Wseal or W3Seal with						
Nitrilic rubber		S	S	S	S	S
Silicone rubber		0	0	0	0	0
PTFE		0	0	0	0	0
Viton		0	0	0	0	0
Oil seal with						
Nitrilic rubber		S	S	S	S	S
PTFE		0	0	0	0	0
Silicone rubber		0	0	0	0	0
Viton		0	0	0	0	0
stainless steel spring		0	0	0	0	0
Other sealing						
Joints sealing and anti-corrosion protection	Polyrex EM	S	S	S	S	S
	Lumomoly PT/04	0	0	0	0	0
	Molykote 33	0	0	0	0	0
Shaft						
AISI 1045 / C 45 E		NA	NA	NA	NA	NA
AISI 4140 / 42CrMo4		S	S	S	S	S
AISI 4337 / 34CrNiMo6		0	0	0	0	0
AISI 1024 / S355J2G3		0	0	0	0	0
AISI 3415 / 15NiCr13		0	0	0	0	0
AISI 4340 / 30CrNiMo8		0	0	0	0	0
AISI 6150H / 50CrV4		0	0	0	0	0
AISI 304 (stainless steel) / X 5 CrNi 18 10		0	0	0	0	0
AISI 316 (stainless steel) / X 5 CrNiMo 17 12 2		0	0	0	0	0
AISI 420 (stainless steel) / X 20 Cr 13		0	0	0	0	0
Locking shaft device (standard for roller and angular contact bearing motors)		0	0	0	0	0
Second shaft end		0	0	0	0	0
Tapped center hole		S	S	S	S	S
Painting plan						
Lubrication						
Exxon Mobil Polyrex EM		S	S	S	S	S
Shell Aeroshell 7		0	0	0	0	0
Shell Aeroshell 22		0	0	0	0	0
Kluberplex BEM 41-132		0	0	0	0	0
Shell Albida RL2		0	0	0	0	0

Frame	355AB	400LJ	400G	450KH	500KH
Grease nipple					
Carbon steel grease nipple	S	S	S	S	S
Stainless steel grease nipple	0	0	0	0	0
Tecalemit nipple	0	0	0	0	0
Balance					
Balance with half key	S	S	S	S	S
Balance with full key	0	0	0	0	0
Vibration					
Grade A	S	S	S	S	S
Grade B	0	0	0	0	0
Vibration monitoring					
Provision for vibration sensors (SPM nipples) (1x hole M8 on D.E. and N.D.E. shield for vertical reading)	S	S	S	S	S
Accelerometers	0	0	0	0	0
Key-Phasor	0	0	0	0	0
Drain					
Certified drain valve in steel (frame mounting)	0	0	0	0	0
Certified drain valve in stainless steel (frame mounting)	0	0	0	0	0
Certified drain valve in steel (terminal boxes mounting)	0	0	0	0	0
Certified drain valve in stainless steel (terminal boxes mounting)	0	0	0	0	0
Other mechanical options					
Drip cover (standard for vertical shaft down applications)	0	0	0	0	0
Sunshade	0	0	0	0	0
Rubber slinger (recommended for vertical shaft up applications)	0	0	0	0	0
Stainless steel hardware (bolts A2-70/A4-70/A2-80/A4-80)	0	0	0	0	0
Grease outlet through the endshield	0	0	0	0	0
Motor without fan (AOM) - IC418	0	0	0	0	0
Flying leads	0	0	0	0	0
Electrical options					
Efficiency levels (applicable to Low Voltage motors)					
IE2	S	S	S	S	S
IE3	0	0	0	0	0
Surface Temperature (Ex d(e) IIB/IIC Gb)					
T4 (135 °C)	S	S	S	S	S
T5 (100 °C)	0	0	0	0	0
Voltage (DOL Supply)					
Δ 400 V / Y 690 V	S	S	S	S	S
Specific voltage (Δ 230 V ≤ V ≤ Y 1,100 V) with 6 or 12 leads	0	0	0	0	0
Frequency					
50 Hz (Bearings application)	S	S	S	S	S
60 Hz (Bearings application)	2P	0	0	0	NA
	4 - 8P	0	0	0	0
60 Hz (Sleeve bearings application) Only for Ex d(e) IIB T4 Gb / Ex d(e) I Mb motors	2P	0	0	NA	0
	4 - 8P	0	0	0	0

Frame		355AB	400LJ	400G	450KH	500KH		
VSD application (mandatory the use of winding thermal probes)⁽⁹⁾								
Voltage	Up to Δ 460 V		S	S	S	S		
	Δ 460 V <V \leq Δ 690 V		0	0	0	0		
Frequency (Bearings application)	Up to 50 Hz	2P	0	0	0	0		
		4 - 8P	0	0	0	0		
	Up to 60 Hz	2P	0	0	0	0 ⁽⁹⁾	NA	
		4 - 8P	0	0	0	0	0	
	Up to 63 Hz	2P	0	NA	NA	NA	NA	
		4 - 8P	0	0	0	0	0	
	Up to 65 Hz	2P	NA	NA	NA	NA	NA	
		4 - 8P	0	0	0	0	0	
	Up to 70 Hz	2P	NA	NA	NA	NA	NA	
		4P	0	0	0	0	NA	
		6 - 8P	0	0	0	0	0	
	Up to 75 Hz	2P	NA	NA	NA	NA	NA	
		4P	0	0	0	NA	NA	
		6 - 8P	0	0	0	0	0	
	Up to 100 Hz	2P	NA	NA	NA	NA	NA	
		4P	NA	NA	NA	NA	NA	
		6 - 8P	0	0	0	0	0	
	Frequency (Sleeve bearings application)	Up to 50 Hz	2P	0	0	0	0	NA
			4 - 8P	0	0	0	0	0
		Up to 60 Hz	2P	0	0	NA	0 ⁽⁹⁾	0 ⁽⁹⁾
			4 - 8P	0	0	0	0	0
		Up to 63 Hz	2P	0	NA	NA	NA	NA
			4 - 8P	0	0	0	0	0
		Up to 65 Hz	2P	NA	NA	NA	NA	NA
4 - 8P			0	0	0	0	0	
Up to 70 Hz		2P	NA	NA	NA	NA	NA	
		4P	0	0	0	0	NA	
		6 - 8P	0	0	0	0	0	
Up to 75 Hz		2P	NA	NA	NA	NA	NA	
		4P	0	0	0	NA	NA	
		6 - 8P	0	0	0	0	0	
Up to 100 Hz ⁽⁹⁾		2P	NA	NA	NA	NA	NA	
		4P	NA	NA	NA	NA	NA	
		6 - 8P	0	0	0	0	0	
Winding thermal protection								
PTC tripping		S	S	S	S	S		
Pt-100 three wires, two per phase		0	0	0	0	0		
Pt-100 two or four wires, one or two per phase		0	0	0	0	0		
Pt-1000 two or four wires, one or two per phase		0	0	0	0	0		
CU-10		0	0	0	0	0		
KTY 84		0	0	0	0	0		
PTC (alarm / trip)		0	0	0	0	0		
Thermostat (NC or NO)		0	0	0	0	0		
Thermocouple (all types)		0	0	0	0	0		
Surge arresters (connected in thermal probes)		0	0	0	0	0		
Temperature transmitter (4-20 mA) in auxiliary terminal box		0	0	0	0	0		
Bearing thermal protection								
Pt-100 three wires, one or two per bearing		0	0	0	0	0		
Pt-100 two or four wires, one or two per bearing		0	0	0	0	0		
Pt-1000 two, three or four wires, one or two per bearing		0	0	0	0	0		
CU-10		0	0	0	0	0		
Ni-120		0	0	0	0	0		
PTC (alarm / trip)		0	0	0	0	0		
Thermostat (NC or NO)		0	0	0	0	0		
Thermocouple (all types)		0	0	0	0	0		
Thermometers		0	0	0	0	0		
Temperature transmitter (4-20 mA) in auxiliary terminal box		0	0	0	0	0		

Frame		355AB	400LJ	400G	450KH	500KH
Space heaters						
Voltage	110-127 V	0	0	0	0	0
	230 V	0	0	0	0	0
	220-240 V	S	S	S	S	S
	110-127 / 220-240 V	0	0	0	0	0
	400 V	0	0	0	0	0
	380-480 V	0	0	0	0	0
Direction of rotation						
Both	2P	S	S	S	0	0
	4 - 8P	S	S	S	S	S
Clockwise rotation direction	2P	0	0	0	S	S
	4 - 8P	0	0	0	0	0
Counter clockwise rotation direction	2 - 8P	0	0	0	0	0
Nameplate with indication of rotation direction		S	S	S	S	S
Service factor						
Service factor 1.00		S	S	S	S	S
Service factor 1.15		0	0	0	0	0
Insulation class						
F		S	S	S	S	S
H		0	0	0	0	0
Forced ventilation kit						
Forced ventilation kit with encoder provision (to be informed auxiliary motor voltage - standard 400 V)	Ex d(e) IIB/IIC T4 Gb Ex tb IIIC T125 °C Db IP6X	0	0	0	0	0
	Ex d(e) I Mb	0	0	0	0	0
Forced ventilation kit without encoder provision (to be informed auxiliary motor voltage - standard 400 V)	Ex d(e) IIB/IIC T4 Gb Ex tb IIIC T125 °C Db IP6X	0	0	0	0	0
	Ex d(e) I Mb	0	0	0	0	0
Other electrical optionals						
Encoder or tacho		0	0	0	0	0
Drive end endshield grounding ring		0	0	0	0	0
Non drive end endshield grounding ring		0	0	0	0	0

Notes:

- (1) Requires additional support adaptor
- (2) Standard for motors with line current higher than 1,090 A
- (3) Not available for Ex d(e) I motors
- (4) Standard for motors 4-8p
- (5) Standard bearing arrangement: DE - NU220 + 6020 / NDE - NU220
- (6) Standard for Ex t IIIC T125 °C Db motors
- (7) Standard for Ex d(e) I Mb motors
- (8) Check also Section 19 - Application with variable speed drives
- (9) Under request

23. Electrical Data

W22Xd - High Efficiency

Exceeds IE2

Output kW HP		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V							Full load current I _n (A)
								Hot	Cold			Rated speed (rpm)	% of full load			Power factor			
													50	75	100	50	75	100	
II poles - 3,000 rpm - 50 Hz																			
0.37	0.5	71	1.25	5.8	2.5	2.6	0.0004	12	26	6.5	56.0	2,830	68.0	70.0	71.0	0.60	0.75	0.84	0.895
0.55	0.75	71	1.89	5.8	2.4	2.4	0.0005	9	20	10.0	56.0	2,780	70.0	72.0	72.0	0.68	0.82	0.88	1.25
0.75	1	80	2.56	6.5	2.8	2.8	0.0008	14	31	12.5	59.0	2,800	76.0	78.5	79.5	0.67	0.80	0.86	1.58
1.1	1.5	80	3.77	6.5	2.8	2.8	0.0009	10	22	14.0	59.0	2,790	78.0	80.0	80.0	0.67	0.79	0.85	2.33
1.5	2	90S/L	5.00	7.0	2.6	2.8	0.0021	7	15	17.5	62.0	2,865	80.0	82.0	82.0	0.63	0.76	0.83	3.18
2.2	3	90S/L	7.40	6.6	3.0	3.0	0.0022	9	20	21.0	62.0	2,840	83.0	83.6	83.6	0.63	0.76	0.83	4.58
3	4	100L	9.95	8.0	2.4	2.8	0.0064	7	15	28.5	67.0	2,880	84.0	85.0	85.0	0.70	0.81	0.86	5.92
4	5.5	112M	13.3	7.0	2.0	2.8	0.0088	10	22	38.0	64.0	2,880	86.0	86.0	86.0	0.73	0.83	0.88	7.63
5.5	7.5	132S/M	18.1	6.8	2.2	3.0	0.0197	17	37	60.0	67.0	2,910	86.5	88.0	88.0	0.68	0.79	0.85	10.6
7.5	10	132S/M	24.6	6.8	2.2	2.9	0.0251	13	29	63.0	67.0	2,910	88.0	88.5	88.5	0.72	0.82	0.87	14.1
9.2	12.5	132S/M	30.2	7.6	2.5	3.2	0.0234	10	22	70.0	67.0	2,915	88.5	89.0	89.0	0.70	0.81	0.86	17.3
11	15	160M/L	35.8	7.0	2.3	3.0	0.0446	13	29	104	67.0	2,935	90.0	90.6	90.5	0.71	0.82	0.86	20.4
15	20	160M/L	48.9	7.0	2.3	3.0	0.0517	9	20	112	67.0	2,930	91.0	91.3	91.3	0.71	0.81	0.86	27.6
18.5	25	160M/L	60.1	7.4	2.4	3.1	0.0625	8	18	124	67.0	2,940	91.3	92.0	92.0	0.70	0.80	0.86	33.7
22	30	180M/L	71.4	7.3	2.2	3.0	0.0975	9	20	164	67.0	2,945	92.0	92.4	92.2	0.76	0.84	0.88	39.1
30	40	200M/L	97.0	6.5	2.4	2.7	0.1625	17	37	226	69.0	2,955	92.5	93.0	92.9	0.75	0.83	0.87	53.6
37	50	200M/L	120	6.8	2.4	2.6	0.1950	16	35	255	69.0	2,950	93.0	93.4	93.3	0.76	0.84	0.87	65.8
45	60	225S/M	145	7.0	2.2	2.8	0.2490	12	26	356	74.0	2,960	93.3	93.6	93.6	0.79	0.86	0.89	78.0
55	75	250S/M	178	7.0	2.2	2.8	0.3736	14	31	413	74.0	2,960	93.6	93.9	93.9	0.79	0.86	0.89	95.0
75	100	280S/M	241	7.0	2.0	2.8	0.8541	28	62	630	77.0	2,975	93.4	94.3	94.3	0.79	0.86	0.89	129
90	125	280S/M	289	7.0	2.0	2.8	0.9386	25	55	653	77.0	2,975	94.0	94.6	94.6	0.79	0.86	0.89	154
110	150	315S/M	353	7.3	2.0	2.9	1.67	24	53	874	77.0	2,980	94.3	94.9	94.9	0.79	0.86	0.89	188
132	175	315S/M	423	7.3	2.0	2.9	1.96	21	46	931	77.0	2,980	94.5	95.1	95.1	0.80	0.87	0.90	223
132	180	315S/M	423	7.3	2.0	2.9	1.96	21	46	931	77.0	2,980	94.5	95.1	95.1	0.80	0.87	0.90	223
150	200	315S/M	481	7.8	2.3	3.1	2.11	20	44	940	77.0	2,980	94.6	95.0	95.0	0.80	0.86	0.89	256
160	220	315S/M	513	7.5	2.2	2.9	2.24	23	51	995	77.0	2,980	94.8	95.3	95.3	0.80	0.87	0.90	269
185	250	315S/M	593	7.6	2.2	3.1	2.46	16	35	1,032	77.0	2,980	94.9	95.5	95.4	0.80	0.86	0.89	314
200	270	315L	641	7.5	2.3	2.8	2.68	21	46	1,175	78.0	2,980	95.0	95.5	95.4	0.82	0.88	0.90	336
220	300	315L	705	7.8	2.4	2.8	2.98	14	31	1,228	78.0	2,980	95.0	95.5	95.5	0.81	0.87	0.90	369
250	340	315L	802	7.8	2.4	2.8	3.42	17	37	1,316	78.0	2,980	95.1	95.6	95.5	0.84	0.89	0.91	415
260	350	315L	834	7.6	2.5	3.0	3.95	18	40	1,400	78.0	2,980	95.0	95.6	95.6	0.84	0.89	0.91	431
280	380	315L	898	7.9	2.3	2.8	4.17	12	26	1,442	78.0	2,980	95.2	95.6	95.6	0.85	0.89	0.91	465
300	400	355M/L	960	8.0	2.5	2.6	5.60	23	51	1,777	80.0	2,985	95.2	95.6	95.6	0.87	0.91	0.92	492
315	430	355M/L	1,008	7.8	2.1	2.6	5.60	23	51	1,777	80.0	2,985	95.2	95.6	95.6	0.87	0.91	0.92	517
330	450	355M/L	1,056	7.0	2.4	2.4	6.03	20	44	1,838	80.0	2,985	95.3	95.6	95.6	0.88	0.90	0.90	554
355	480	355A/B	1,138	7.5	2.5	2.7	6.8	15	24	2,500	80.0	2,980	96.1	96.4	96.3	0.89	0.91	0.91	585
400	540	355A/B	1,282	7.5	2.5	2.7	7.7	15	24	2,700	80.0	2,980	95.8	96.3	96.3	0.89	0.91	0.91	659
450	610	400L/J	1,440	7.5	2.0	3.4	8.0	15	24	3,750	80.0	2,985	95.5	96.6	97.1	0.84	0.89	0.91	735
500	675	400L/J	1,600	7.5	1.9	3.2	8.4	15	24	3,950	80.0	2,985	95.9	96.9	97.3	0.85	0.89	0.91	815
560	755	400G (1)	1,789	7.0	0.9	2.9	17.3	15	24	4,800	80.0	2,990	97.2	97.5	97.5	0.91	0.92	0.92	901
630	850	450K/H (1)	2,014	7.5	0.6	2.6	18.9	13	20	5,800	80.0	2,987	97.3	97.6	97.6	0.84	0.89	0.90	1035
710	960	450K/H (1)(2)	2,270	7.5	0.6	2.6	20.2	13	20	6,000	80.0	2,987	97.5	97.7	97.6	0.84	0.89	0.90	676
800	1,080	450K/H (1)(2)	2,558	7.5	0.7	2.6	21.4	12	17	6,500	80.0	2,987	97.5	97.6	97.6	0.84	0.88	0.90	762
900	1,215	500K/H (1)(2)	2,875	5.5	0.5	1.7	23.2	19	25	8,800	85.0	2,990	96.9	97.3	97.6	0.84	0.88	0.88	877
1,000	1,350	500K/H (1)(2)	3,194	5.5	0.5	1.7	24.2	19	25	9,500	85.0	2,990	97.0	97.4	97.6	0.85	0.88	0.88	974
1,120	1,515	500K/H (1)(2)	3,577	5.5	0.5	1.7	24.2	17	21	9,700	85.0	2,990	97.2	97.5	97.6	0.85	0.88	0.88	1,089

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.

- All values are according to IEC 60034-1 tolerances.

- This data can be changed without prior notice.

Output		Frame	380 V								415 V							
			Rated speed (rpm)	% of full load						Full load current In (A)	Rated speed (rpm)	% of full load						Full load current In (A)
				Efficiency			Power factor					Efficiency			Power factor			
kW	HP		50	75	100	50	75	100		50	75	100	50	75	100			
II poles - 3,000 rpm - 50 Hz																		
0.37	0.5	71	2,805	69.0	70.1	70.3	0.66	0.79	0.87	0.919	2,845	66.9	69.7	71.2	0.57	0.72	0.82	0.882
0.55	0.75	71	2,750	70.8	71.9	71.0	0.73	0.85	0.91	1.29	2,795	68.9	71.7	72.5	0.63	0.79	0.86	1.23
0.75	1	80	2,770	77.7	78.0	78.0	0.66	0.81	0.87	1.68	2,810	75.0	78.5	79.5	0.64	0.77	0.84	1.56
1.1	1.5	80	2,765	78.9	79.2	79.6	0.73	0.83	0.87	2.41	2,805	77.1	80.2	80.2	0.62	0.75	0.82	2.33
1.5	2	90S/L	2,840	80.5	81.6	81.6	0.68	0.79	0.85	3.29	2,880	79.3	81.9	82.5	0.58	0.73	0.81	3.12
2.2	3	90S/L	2,820	83.7	83.5	83.2	0.69	0.80	0.85	4.73	2,855	82.2	83.4	83.9	0.59	0.72	0.80	4.56
3	4	100L	2,865	84.9	85.0	85.0	0.76	0.85	0.88	6.09	2,890	83.1	84.6	85.0	0.66	0.78	0.84	5.85
4	5.5	112M	2,865	86.6	86.0	85.8	0.78	0.87	0.90	7.87	2,890	85.3	85.9	86.3	0.69	0.80	0.86	7.50
5.5	7.5	132S/M	2,900	87.1	88.0	87.6	0.74	0.83	0.88	10.8	2,915	85.6	87.6	88.0	0.63	0.76	0.83	10.5
7.5	10	132S/M	2,900	88.4	88.4	88.1	0.77	0.85	0.89	14.5	2,915	87.3	88.3	88.7	0.67	0.79	0.85	13.8
9.2	12.5	132S/M	2,905	89.1	89.0	89.0	0.75	0.85	0.89	17.6	2,920	87.6	88.6	89.0	0.65	0.77	0.84	17.1
11	15	160M/L	2,930	90.3	90.5	90.1	0.75	0.85	0.88	21.1	2,940	89.6	90.5	90.6	0.67	0.79	0.84	20.1
15	20	160M/L	2,945	91.4	91.3	90.9	0.76	0.84	0.88	28.5	2,935	90.6	91.2	91.4	0.67	0.78	0.84	27.2
18.5	25	160M/L	2,930	91.6	91.9	91.6	0.74	0.83	0.88	34.9	2,945	91.0	91.9	92.2	0.66	0.77	0.84	33.2
22	30	180M/L	2,940	92.2	92.2	91.8	0.79	0.86	0.89	40.9	2,950	91.8	92.4	92.4	0.73	0.82	0.87	38.1
30	40	200M/L	2,950	92.7	92.9	92.6	0.79	0.85	0.88	55.9	2,960	92.3	93.0	93.0	0.71	0.81	0.86	52.2
37	50	200M/L	2,945	93.2	93.3	93.0	0.80	0.86	0.88	68.7	2,955	92.8	93.4	93.5	0.73	0.82	0.86	64.0
45	60	225S/M	2,955	93.4	93.5	93.2	0.83	0.88	0.90	81.5	2,960	93.1	93.6	93.8	0.76	0.84	0.88	75.8
55	75	250S/M	2,955	93.8	93.8	93.6	0.83	0.88	0.90	99.2	2,960	93.3	93.8	94.0	0.75	0.84	0.88	92.5
75	100	280S/M	2,970	93.6	94.3	94.1	0.82	0.88	0.90	135	2,975	93.2	94.2	94.3	0.76	0.84	0.88	126
90	125	280S/M	2,970	94.2	94.6	94.4	0.83	0.88	0.90	161	2,975	93.8	94.5	94.5	0.76	0.84	0.88	151
110	150	315S/M	2,975	94.5	94.9	94.8	0.83	0.88	0.90	196	2,980	94.1	94.8	94.9	0.76	0.84	0.88	183
132	175	315S/M	2,975	94.6	95.1	94.9	0.83	0.89	0.91	232	2,980	94.4	95.1	95.2	0.78	0.86	0.89	217
132	180	315S/M	2,975	94.6	95.1	94.9	0.83	0.89	0.91	232	2,980	94.4	95.1	95.2	0.78	0.86	0.89	217
150	200	315S/M	2,975	94.4	95.0	95.0	0.81	0.88	0.90	267	2,980	94.3	95.0	95.0	0.76	0.84	0.88	250
160	220	315S/M	2,975	94.9	95.2	95.2	0.83	0.89	0.91	281	2,980	94.7	95.3	95.3	0.78	0.86	0.89	262
185	250	315S/M	2,975	95.0	95.5	95.3	0.83	0.88	0.90	328	2,980	94.8	95.5	95.4	0.78	0.85	0.88	307
200	270	315L	2,975	95.0	95.4	95.2	0.85	0.89	0.91	351	2,980	94.9	95.5	95.5	0.80	0.87	0.90	324
220	300	315L	2,975	95.1	95.4	95.3	0.84	0.88	0.91	385	2,980	94.9	95.5	95.6	0.79	0.86	0.89	360
250	340	315L	2,980	95.1	95.5	95.3	0.86	0.90	0.91	438	2,980	95.0	95.6	95.6	0.82	0.88	0.91	400
260	350	315L	2,980	95.0	95.6	95.6	0.86	0.90	0.92	449	2,980	95.0	95.6	95.7	0.82	0.89	0.91	415
280	380	315L	2,975	95.2	95.5	95.4	0.87	0.90	0.91	490	2,980	95.2	95.6	95.7	0.83	0.88	0.91	447
300	400	355M/L	2,980	94.2	95.5	95.4	0.89	0.92	0.92	519	2,985	95.2	95.6	95.7	0.86	0.90	0.92	474
315	430	355M/L	2,980	94.2	95.5	95.4	0.89	0.92	0.92	545	2,985	95.2	95.6	95.7	0.86	0.90	0.92	498
330	450	355M/L	2,980	95.2	95.4	95.4	0.89	0.91	0.91	578	2,985	95.3	95.6	95.7	0.87	0.89	0.89	539
355	480	355A/B	Not available as multi-voltage															
400	540	355A/B																
450	610	400L/J																
500	675	400L/J																
560	755	400G (1)																
630	850	450K/H (1)																
710	960	450K/H (1)(2)																
800	1,080	450K/H (1)(2)																
900	1,215	500K/H (1)(2)																
1,000	1,350	500K/H (1)(2)																
1,120	1,515	500K/H (1)(2)																

(1) Copper rotor (2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.
 - All values are according to IEC 60034-1 tolerances.
 - This data can be changed without prior notice.

Output		Frame	Full load torque (Nm)	Locked rotor current I/In	Locked rotor torque TI/Tn	Break-down torque Tb/Tn	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V						Full load current In (A)	
								Hot	Cold			Rated speed (rpm)	% of full load			Full load current In (A)			
													Efficiency				Power factor		
kW	HP											50	75	100	50	75	100		
II poles - 3,000 rpm - 50 Hz																			
Oversized terminal box																			
710	960	450K/H (1)	2,270	7.5	0.6	2.6	20.2	13	20	6,000	80.0	2,987	97.5	97.7	97.6	0.84	0.89	0.90	1,167
800	1,080	450K/H (1)	2,558	7.5	0.7	2.6	21.4	12	17	6,500	80.0	2,987	97.5	97.6	97.6	0.84	0.88	0.90	1,315
900	1,215	500K/H (1)	2,875	5.5	0.5	1.7	23.2	19	25	8,800	85.0	2,990	96.9	97.3	97.6	0.84	0.88	0.88	1,512
1,000	1,350	500K/H (1)	3,194	5.5	0.5	1.7	24.2	19	25	9,500	85.0	2,990	97.0	97.4	97.6	0.85	0.88	0.88	1,681
1,120	1,515	500K/H (1)	3,577	5.5	0.5	1.7	24.2	17	21	9,700	85.0	2,990	97.2	97.5	97.6	0.85	0.88	0.88	1,882

Output		Frame	Full load torque (Nm)	Locked rotor current I/In	Locked rotor torque TI/Tn	Break-down torque Tb/Tn	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V						Full load current In (A)	
								Hot	Cold			Rated speed (rpm)	% of full load			Full load current In (A)			
													Efficiency				Power factor		
kW	HP											50	75	100	50	75	100		
II poles - 3,000 rpm - 50 Hz																			
Optional frames																			
0.75	1	90S/L	2.51	6.5	2.7	2.8	0.0012	25	55	15.5	62.0	2,850	77.0	79.0	79.0	0.61	0.73	0.80	1.71
1.1	1.5	90S/L	3.71	6.1	2.5	2.6	0.0014	16	35	16.5	62.0	2,835	80.0	80.5	80.5	0.65	0.77	0.83	2.38
2.2	3	100L	7.29	7.5	2.6	3.0	0.0043	15	33	26.5	67.0	2,885	82.5	83.6	83.6	0.66	0.78	0.85	4.47
18.5	25	180M/L	60.1	7.0	2.1	2.9	0.0867	10	22	156	67.0	2,940	91.4	92.0	91.8	0.75	0.84	0.88	33.1
75	100	250S/M	242	7.7	2.7	3.3	0.5038	14	31	460	74.0	2,960	93.5	94.3	94.3	0.78	0.86	0.89	129
110	150	280S/M	353	7.6	2.3	3.0	1.18	21	46	702	77.0	2,975	94.5	94.9	94.9	0.78	0.86	0.89	188
200	270	355M/L	640	7.6	1.9	2.7	3.99	22	48	1,487	80.0	2,985	94.8	95.5	95.5	0.83	0.88	0.90	336
220	300	355M/L	704	7.6	1.8	2.5	4.42	21	46	1,560	80.0	2,985	95.1	95.6	95.5	0.86	0.89	0.90	369
250	340	355M/L	800	7.9	2.2	2.8	4.85	20	44	1,634	80.0	2,985	95.2	95.6	95.6	0.86	0.89	0.91	415
260	350	355M/L	832	7.9	2.2	2.8	4.85	20	44	1,340	80.0	2,985	95.2	95.6	95.6	0.86	0.89	0.91	431
280	380	355M/L	898	7.7	1.9	2.6	5.06	17	37	1,669	80.0	2,980	95.2	95.6	95.6	0.86	0.89	0.91	465
315	425	355A/B	1,009	7.5	2.5	2.7	6.0	15	24	2,300	80.0	2,980	95.9	96.2	96.2	0.88	0.91	0.91	519

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.
 - All values are according to IEC 60034-1 tolerances.
 - This data can be changed without prior notice.

Output		Frame	380 V							415 V								
			Rated speed (rpm)	% of full load						Full load current In (A)	Rated speed (rpm)	% of full load						Full load current In (A)
				Efficiency			Power factor					Efficiency			Power factor			
kW	HP	50	75	100	50	75	100	50	75	100	50	75	100	50	75	100		

11 poles - 3,000 rpm - 50 Hz

Oversized terminal box		
710	960	450K/H (1)
800	1,080	450K/H (1)
900	1,215	500K/H (1)
1,000	1,350	500K/H (1)
1,120	1,515	500K/H (1)

Not available as multi-voltage

Output		Frame	380 V							415 V								
			Rated speed (rpm)	% of full load						Full load current In (A)	Rated speed (rpm)	% of full load						Full load current In (A)
				Efficiency			Power factor					Efficiency			Power factor			
kW	HP	50	75	100	50	75	100	50	75	100	50	75	100	50	75	100		

11 poles - 3,000 rpm - 50 Hz

Optional frames																			
0.75	1	90S/L	2,830	77.8	79.1	78.3	0.66	0.77	0.83	1.75	2,860	76.0	78.7	79.2	0.56	0.70	0.78	1.69	
1.1	1.5	90S/L	2,810	80.7	80.3	79.6	0.70	0.80	0.85	2.47	2,850	79.2	80.4	81.0	0.60	0.74	0.81	2.33	
2.2	3	100L	2,870	83.3	83.8	83.2	0.71	0.82	0.87	4.62	2,895	81.5	83.2	83.6	0.62	0.75	0.82	4.46	
18.5	25	180M/L	2,935	91.6	91.8	91.4	0.78	0.86	0.89	34.6	2,945	91.2	92.0	92.0	0.72	0.82	0.87	32.2	
75	100	250S/M	2,955	93.6	94.2	94.3	0.83	0.89	0.91	133	2,965	93.5	94.4	94.3	0.78	0.86	0.89	124	
110	150	280S/M	2,970	94.7	94.9	94.8	0.82	0.88	0.90	196	2,975	94.3	94.8	94.9	0.75	0.84	0.88	183	
200	270	355M/L	2,980	93.9	95.2	95.5	0.90	0.92	0.92	346	2,985	93.5	95.1	95.6	0.88	0.90	0.91	320	
220	300	355M/L	2,985	95.5	96.2	96.4	0.87	0.91	0.92	377	2,990	95.0	96.0	96.3	0.83	0.89	0.91	349	
250	340	355M/L	2,980	95.5	96.3	96.4	0.89	0.92	0.93	424	2,985	95.4	96.3	96.4	0.86	0.91	0.92	392	
260	350	355M/L	2,980	95.5	96.3	96.4	0.89	0.92	0.93	441	2,985	95.4	96.3	96.4	0.86	0.91	0.92	408	
280	380	355M/L	2,975	95.2	95.5	95.4	0.87	0.90	0.91	490	2,980	95.2	95.6	95.7	0.83	0.88	0.91	447	

Not available as multi-voltage

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.

- All values are according to IEC 60034-1 tolerances.

- This data can be changed without prior notice.

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V						Full load current I _n (A)	
								Hot	Cold			% of full load			Power factor				
												Rated speed (rpm)	50	75	100	50	75		100
IV poles - 1,500 rpm - 50 Hz																			
0.25	0.33	71	1.71	4.5	2.0	2.2	0.0007	68	150	7.0	43.0	1,400	59.0	65.0	66.0	0.49	0.62	0.71	0.770
0.37	0.5	71	2.56	4.3	2.0	2.0	0.0008	48	106	8.0	43.0	1,380	63.0	66.0	68.0	0.50	0.64	0.74	1.06
0.55	0.75	80	3.70	6.0	2.2	2.5	0.0029	18	40	10.5	44.0	1,420	72.0	73.8	74.0	0.60	0.73	0.82	1.31
0.75	1	80	5.08	6.0	2.6	2.9	0.0029	15	33	13.5	44.0	1,410	79.0	79.6	79.8	0.63	0.76	0.83	1.63
1.1	1.5	90S/L	7.25	6.5	2.1	2.6	0.0060	9	20	19.0	49.0	1,450	80.0	81.8	81.8	0.60	0.73	0.81	2.40
1.5	2	90S/L	9.95	6.3	2.0	2.8	0.0055	10	22	22.0	49.0	1,440	81.5	83.0	83.0	0.57	0.72	0.80	3.26
2.2	3	100L	14.7	7.0	3.1	3.2	0.0105	11	24	30.5	53.0	1,435	83.0	84.5	84.5	0.60	0.73	0.81	4.64
3	4	100L	20.2	6.5	3.2	3.3	0.0097	14	31	33.0	53.0	1,420	85.0	85.6	85.6	0.64	0.76	0.82	6.17
4	5.5	112M	26.5	6.6	2.0	2.6	0.0156	13	29	42.0	56.0	1,440	86.0	86.7	86.7	0.64	0.76	0.82	8.12
5.5	7.5	132S/M	36.0	7.3	1.9	3.0	0.0528	8	18	60.0	56.0	1,460	87.5	88.0	88.1	0.68	0.80	0.86	10.5
7.5	10	132S/M	49.3	7.2	2.0	3.0	0.0528	8	18	62.0	56.0	1,455	88.7	89.0	89.0	0.71	0.81	0.86	14.1
9.2	12.5	132S/M	60.4	7.7	2.2	3.2	0.0604	7	15	75.0	56.0	1,455	89.2	89.5	89.5	0.70	0.81	0.86	17.3
11	15	160M/L	71.5	6.4	2.3	2.8	0.1048	10	22	105	61.0	1,470	89.0	90.2	90.2	0.65	0.76	0.83	21.2
15	20	160M/L	97.8	6.2	2.3	2.8	0.1394	10	22	125	61.0	1,465	90.6	91.0	91.0	0.66	0.76	0.83	28.7
18.5	25	180M/L	121	6.6	2.4	2.8	0.1657	14	31	164	61.0	1,465	91.5	91.8	91.6	0.68	0.78	0.83	35.1
22	30	180M/L	143	6.8	2.6	2.9	0.2006	15	33	186	61.0	1,465	92.2	92.5	92.3	0.70	0.80	0.85	40.5
30	40	200M/L	195	6.3	2.2	2.6	0.2906	16	35	222	63.0	1,470	92.6	93.0	92.8	0.68	0.78	0.83	56.2
37	50	225S/M	240	6.6	2.2	2.7	0.4438	12	26	342	63.0	1,475	93.0	93.2	93.2	0.74	0.83	0.86	66.6
45	60	225S/M	292	6.8	2.4	2.7	0.5177	10	22	363	63.0	1,475	93.2	93.7	93.6	0.74	0.83	0.86	80.7
55	75	250S/M	356	6.4	2.2	2.7	0.8118	14	31	444	64.0	1,475	93.6	93.9	94.0	0.75	0.84	0.87	97.1
75	100	280S/M	483	7.2	2.0	2.7	1.64	22	48	639	69.0	1,485	93.8	94.4	94.4	0.74	0.83	0.86	133
90	125	280S/M	579	7.2	2.1	2.7	1.88	20	44	673	69.0	1,485	94.1	94.7	94.7	0.76	0.84	0.87	158
110	150	315S/M	705	6.6	2.0	2.4	2.57	26	57	887	71.0	1,490	94.3	95.0	95.0	0.74	0.83	0.86	194
132	175	315S/M	846	6.6	2.1	2.4	3.12	22	48	953	71.0	1,490	94.6	95.2	95.2	0.76	0.84	0.87	230
132	180	315S/M	846	6.6	2.1	2.4	3.12	22	48	953	71.0	1,490	94.6	95.2	95.2	0.76	0.84	0.87	230
150	200	315S/M	962	6.2	2.2	2.4	3.34	30	66	983	71.0	1,490	95.0	95.4	95.4	0.77	0.84	0.87	261
160	220	315S/M	1,026	6.6	2.2	2.4	3.56	20	44	1,012	71.0	1,490	94.8	95.4	95.4	0.77	0.84	0.87	278
185	250	315S/M	1,186	6.8	2.4	2.4	3.99	18	40	1,114	71.0	1,490	94.9	95.6	95.6	0.75	0.83	0.86	325
200	270	315L	1,283	6.7	2.4	2.4	4.43	17	37	1,216	73.0	1,490	95.0	95.6	95.6	0.77	0.84	0.87	347
200	270	355M/L	1,283	6.3	1.8	2.0	5.94	18	40	1,404	74.0	1,490	95.1	95.6	95.6	0.74	0.81	0.85	355
220	300	315L	1,411	7.0	2.6	2.4	4.89	14	31	1,333	73.0	1,490	95.2	95.7	95.7	0.76	0.84	0.87	381
250	340	315L	1,603	7.0	2.6	2.4	5.44	13	29	1,399	73.0	1,490	95.3	95.7	95.7	0.77	0.85	0.88	428
260	350	355M/L	1,667	6.8	2.1	2.4	7.73	18	40	1,470	74.0	1,490	95.4	95.8	95.8	0.73	0.82	0.85	461
280	380	315L	1,796	7.2	2.6	2.4	6.20	12	26	1,496	73.0	1,490	95.4	95.8	95.8	0.76	0.84	0.87	485
300	400	315L	1,924	7.6	2.5	2.5	6.51	11	24	1,540	73.0	1,490	95.4	95.8	95.8	0.72	0.80	0.85	532
315	430	355M/L	2,020	7.2	2.4	2.4	8.95	14	31	1,643	74.0	1,490	95.5	95.8	95.8	0.74	0.82	0.86	552
330	450	355M/L	2,116	6.8	2.2	2.4	9.84	17	37	1,769	74.0	1,490	95.5	95.8	95.8	0.75	0.83	0.86	578
355	480	355M/L	2,277	6.9	2.4	2.3	10.7	15	33	1,752	74.0	1,490	95.5	95.9	95.8	0.75	0.83	0.86	622
370	500	355M/L	2,373	7.0	2.4	2.4	11.6	15	33	1,971	74.0	1,490	95.5	95.9	95.8	0.75	0.83	0.86	648
400	540	355A/B	2,564	7.5	2.5	2.7	13.2	13	21	3,100	76.0	1,490	95.9	96.4	96.5	0.76	0.83	0.86	696
450	610	355A/B	2,884	7.5	2.5	2.7	14.7	13	21	3,300	76.0	1,490	95.9	96.5	96.5	0.75	0.83	0.86	783
500	675	400L/J	3,205	6.7	1.6	2.6	14.7	15	26	3,800	80.0	1,490	96.4	96.9	97.0	0.79	0.85	0.87	855
560	755	400L/J	3,589	6.8	1.7	2.5	15.8	14	23	3,900	80.0	1,490	96.5	97.0	97.1	0.78	0.85	0.87	957
630	850	400L/J	4,038	7.5	2.1	2.8	16.3	13	19	4,000	80.0	1,490	96.4	96.9	97.1	0.75	0.83	0.87	1,176
710	960	400G (1)(2)	4,542	7.5	2.5	2.4	18.2	11	15	4,900	80.0	1,493	96.5	96.6	97.0	0.80	0.86	0.87	1,704
800	1,080	450K/H (1)(2)	5,117	7.5	1.2	3.0	31.1	12	17	6,200	80.0	1,493	96.8	97.2	97.3	0.80	0.86	0.88	2,782
900	1,215	450K/H (1)(2)	5,757	7.5	1.2	3.0	31.1	12	16	6,400	80.0	1,493	96.8	97.2	97.3	0.78	0.86	0.88	3,880
1,000	1,350	450K/H (1)(2)	6,397	7.5	1.2	3.0	31.9	11	15	6,600	80.0	1,493	97.0	97.3	97.3	0.80	0.86	0.88	5,977
1,120	1,515	500K/H (1)(2)	7,155	7.0	0.7	2.4	62.3	17	30	9,300	80.0	1,495	96.5	97.2	97.5	0.84	0.85	0.88	13,089
1,250	1,690	500K/H (1)(2)	7,985	7.5	0.8	2.6	69.2	17	30	10,300	80.0	1,495	96.5	97.2	97.5	0.84	0.85	0.88	18,219
1,400	1,890	500K/H (1)(2)	8,943	7.5	0.8	2.5	77.9	17	30	11,600	80.0	1,495	96.5	97.2	97.5	0.84	0.85	0.88	26,365

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.

- All values are according to IEC 60034-1 tolerances.

- This data can be changed without prior notice.

Output		Frame	380 V									415 V						
			Rated speed (rpm)	% of full load						Full load current In (A)	Rated speed (rpm)	% of full load						Full load current In (A)
				Efficiency			Power factor					Efficiency			Power factor			
kW	HP		50	75	100	50	75	100		50	75	100	50	75	100			
IV poles - 1,500 rpm - 50 Hz																		
0.25	0.33	71	1,380	60.0	65.0	65.0	0.53	0.66	0.74	0.790	1,410	57.8	64.5	66.5	0.46	0.59	0.69	0.758
0.37	0.5	71	1,360	64.8	66.5	67.4	0.55	0.68	0.78	1.07	1,390	61.2	64.9	67.9	0.46	0.60	0.71	1.07
0.55	0.75	80	1,410	73.0	73.1	73.3	0.65	0.77	0.85	1.34	1,425	70.7	73.8	74.1	0.56	0.70	0.80	1.29
0.75	1	80	1,400	80.1	79.6	79.8	0.68	0.80	0.86	1.66	1,415	77.9	79.2	80.1	0.60	0.73	0.81	1.61
1.1	1.5	90S/L	1,440	80.9	81.5	81.5	0.65	0.76	0.83	2.47	1,455	79.2	81.5	82.1	0.56	0.70	0.79	2.36
1.5	2	90S/L	1,430	82.8	83.2	82.8	0.63	0.77	0.83	3.32	1,445	80.1	82.3	83.1	0.53	0.68	0.78	3.22
2.2	3	100L	1,425	83.5	84.3	84.3	0.65	0.77	0.83	4.78	1,440	82.3	84.5	84.9	0.56	0.71	0.79	4.56
3	4	100L	1,410	85.6	85.4	85.5	0.68	0.79	0.84	6.35	1,425	84.3	85.5	86.0	0.59	0.73	0.80	6.07
4	5.5	112M	1,435	86.5	86.6	86.6	0.69	0.80	0.84	8.35	1,445	85.3	86.6	87.0	0.60	0.73	0.80	8.00
5.5	7.5	132S/M	1,455	88.1	87.7	87.7	0.73	0.83	0.88	10.8	1,460	87.0	87.9	88.3	0.65	0.77	0.84	10.3
7.5	10	132S/M	1,450	89.0	88.7	88.7	0.75	0.83	0.87	14.8	1,460	88.3	89.0	89.4	0.67	0.78	0.84	13.9
9.2	12.5	132S/M	1,450	89.6	89.4	89.3	0.75	0.83	0.88	17.8	1,455	88.7	89.5	89.8	0.66	0.78	0.85	16.8
11	15	160M/L	1,465	89.5	90.2	89.8	0.69	0.79	0.85	21.9	1,470	88.5	90.0	90.3	0.61	0.73	0.81	20.9
15	20	160M/L	1,460	91.0	90.9	90.6	0.70	0.79	0.85	29.6	1,470	90.2	90.9	91.2	0.63	0.73	0.81	28.2
18.5	25	180M/L	1,460	91.8	91.7	91.2	0.72	0.81	0.85	36.3	1,470	91.1	91.7	91.7	0.50	0.75	0.81	34.7
22	30	180M/L	1,460	92.5	92.4	91.9	0.74	0.83	0.87	41.8	1,465	91.8	92.4	92.4	0.66	0.77	0.83	39.9
30	40	200M/L	1,465	92.9	92.9	92.4	0.72	0.81	0.85	58.0	1,470	92.3	92.9	92.9	0.65	0.76	0.81	55.5
37	50	225S/M	1,470	93.2	93.1	92.8	0.78	0.86	0.87	69.6	1,475	92.7	93.1	93.3	0.70	0.81	0.85	64.9
45	60	225S/M	1,470	93.5	93.6	93.2	0.78	0.86	0.88	83.4	1,475	92.9	93.6	93.7	0.70	0.81	0.84	79.5
55	75	250S/M	1,470	93.8	93.8	93.7	0.79	0.86	0.88	101	1,475	93.3	93.9	94.1	0.72	0.82	0.86	94.6
75	100	280S/M	1,480	94.2	94.5	94.2	0.78	0.86	0.87	139	1,485	93.5	94.3	94.4	0.71	0.81	0.85	130
90	125	280S/M	1,480	94.4	94.7	94.5	0.80	0.86	0.88	164	1,485	93.8	94.6	94.7	0.73	0.82	0.86	154
110	150	315S/M	1,490	94.6	94.9	94.9	0.78	0.86	0.88	200	1,490	93.9	94.8	95.0	0.70	0.81	0.84	192
132	175	315S/M	1,485	94.8	95.2	95.0	0.79	0.86	0.88	240	1,490	94.4	95.1	95.2	0.73	0.82	0.86	224
132	180	315S/M	1,485	94.8	95.2	95.0	0.79	0.86	0.88	240	1,490	94.4	95.1	95.2	0.73	0.82	0.86	224
150	200	315S/M	1,490	95.2	95.4	95.2	0.80	0.85	0.88	272	1,490	94.8	95.4	95.4	0.75	0.83	0.86	254
160	220	315S/M	1,485	95.0	95.4	95.2	0.80	0.86	0.88	290	1,490	94.6	95.3	95.4	0.74	0.82	0.86	271
185	250	315S/M	1,485	95.1	95.6	95.5	0.79	0.85	0.87	338	1,490	94.7	95.5	95.6	0.72	0.81	0.85	317
200	270	315L	1,485	95.1	95.5	95.4	0.80	0.86	0.88	362	1,490	94.8	95.6	95.7	0.74	0.82	0.86	338
200	270	355M/L	1,490	95.3	95.5	95.5	0.78	0.83	0.86	370	1,490	94.9	95.5	95.6	0.71	0.79	0.84	346
220	300	315L	1,490	95.4	95.7	95.6	0.80	0.86	0.88	397	1,490	95.0	95.6	95.7	0.73	0.82	0.86	372
250	340	315L	1,490	95.5	95.9	95.8	0.80	0.87	0.89	445	1,490	95.1	95.8	95.9	0.74	0.83	0.87	417
260	350	355M/L	1,490	95.6	95.7	95.7	0.77	0.84	0.86	480	1,490	94.2	95.7	95.8	0.70	0.80	0.84	449
280	380	315L	1,490	95.6	95.8	95.8	0.79	0.86	0.88	505	1,490	95.2	95.7	95.8	0.73	0.82	0.86	473
300	400	315L	1,490	95.6	95.8	95.8	0.76	0.82	0.86	553	1,490	95.2	95.7	95.8	0.69	0.78	0.84	519
315	430	355M/L	1490	95.6	95.7	95.7	0.77	0.84	0.87	575	1490	95.3	95.7	95.8	0.71	0.80	0.85	538
330	450	355M/L	1,485	95.5	95.7	95.7	0.74	0.79	0.85	616	1,490	95.3	95.7	95.8	0.72	0.81	0.85	564
355	480	355M/L	1,490	95.6	95.7	95.7	0.78	0.85	0.87	648	1,490	95.4	95.8	95.8	0.72	0.81	0.85	607
370	500	355M/L	1,490	95.1	95.5	95.7	0.78	0.85	0.87	675	1,490	95.0	95.7	95.9	0.72	0.81	0.85	631
400	540	355A/B	Not available as multi-voltage															
450	610	355A/B																
500	675	400L/J																
560	755	400L/J																
630	850	400L/J																
710	960	400G (1)(2)																
800	1,080	450K/H (1)(2)																
900	1,215	450K/H (1)(2)																
1,000	1,350	450K/H (1)(2)																
1,120	1,515	500K/H (1)(2)																
1,250	1,690	500K/H (1)(2)																
1,400	1,890	500K/H (1)(2)																

(1) Copper rotor (2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.
 - All values are according to IEC 60034-1 tolerances.
 - This data can be changed without prior notice.

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V						Full load current I _n (A)		
								Hot	Cold			Rated speed (rpm)	% of full load			50	75		100	
													Efficiency		Power factor					
kW	HP																			

IV poles - 1,500 rpm - 50 Hz

Oversized terminal box

710	960	400G (1)	4,542	7.5	2.5	2.4	18.2	11	15	4,900	80.0	1,493	96.5	96.6	97.0	0.80	0.86	0.87	1,214
800	1,080	450K/H (1)	5,117	7.5	1.2	3.0	31.1	12	17	6,200	80.0	1,493	96.8	97.2	97.3	0.80	0.86	0.88	1,349
900	1,215	450K/H (1)	5,757	7.5	1.2	3.0	31.1	12	16	6,400	80.0	1,493	96.8	97.2	97.3	0.78	0.86	0.88	1,517
1,000	1,350	450K/H (1)	6,397	7.5	1.2	3.0	31.9	11	15	6,600	80.0	1,493	97.0	97.3	97.3	0.80	0.86	0.88	1,686
1,120	1,515	500K/H (1)	7,155	7.0	0.7	2.4	62.3	17	30	9,300	80.0	1,495	96.5	97.2	97.5	0.84	0.85	0.88	1,884
1,250	1,690	500K/H (1)	7,985	7.5	0.8	2.6	69.2	17	30	10,300	80.0	1,495	96.5	97.2	97.5	0.84	0.85	0.88	2,103

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V						Full load current I _n (A)		
								Hot	Cold			Rated speed (rpm)	% of full load			50	75		100	
													Efficiency		Power factor					
kW	HP																			

IV poles - 1,500 rpm - 50 Hz

Optional frames

0.25	0.33	80	1.68	5.5	2.0	2.5	0,0015	31	68	9.0	44.0	1,420	70.0	74.0	74.0	0.61	0.74	0.81	0,602
0.37	0.5	80	2.49	5.7	2.2	2.7	0,0019	23	51	9.5	44.0	1,420	73.0	75.5	75.5	0.60	0.73	0.81	0,873
0.75	1	90S/L	5.03	5.9	2.2	2.6	0,0038	19	42	17.5	49.0	1,425	78.0	80.0	80.0	0.59	0.72	0.80	1.69
1.5	2	100L	10.1	6.6	2.8	3.0	0,0067	20	44	28.0	53.0	1,425	82.5	83.2	83.2	0.62	0.74	0.81	3.21
2.2	3	112M	14.6	6.3	1.9	2.6	0,0117	23	51	39.0	56.0	1,445	84.5	85.0	85.0	0.63	0.75	0.81	4.61
3	4	112M	19.8	7.0	2.2	2.8	0,0143	18	40	40.0	56.0	1,450	86.5	87.5	87.7	0.60	0.72	0.79	6.25
4	5.5	132S/M	26.3	7.2	1.9	3.0	0,0341	14	31	60.0	56.0	1,455	87.0	87.2	87.2	0.68	0.80	0.85	7.79
7.5	10	160M/L	48.9	6.1	2.1	2.7	0,0769	15	33	93.0	61.0	1,465	88.0	89.2	89.0	0.65	0.77	0.83	14.7
9.2	12.5	160M/L	60.0	6.0	2.0	2.6	0,0838	13	29	96.0	61.0	1,465	88.5	89.5	89.3	0.66	0.77	0.83	17.9
15	20	180M/L	97.8	6.6	2.4	2.9	0,1401	14	31	152	61.0	1,465	90.8	91.5	91.3	0.66	0.77	0.83	28.6
75	100	250S/M	486	7.2	2.4	2.9	1.05	10	22	496	64.0	1,475	94.0	94.3	94.4	0.74	0.84	0.88	130
90	125	315S/M	577	6.4	2.1	2.4	2.23	25	55	795	74.0	1,490	94.2	94.8	94.8	0.73	0.82	0.85	161
110	150	280S/M	708	7.6	2.4	2.9	2.27	18	40	735	69.0	1,485	94.3	95.0	95.0	0.75	0.83	0.87	192
185	250	355M/L	1,186	6.5	2.1	2.3	5.94	18	40	1,350	74.0	1,490	95.0	95.4	95.4	0.73	0.81	0.84	333
220	300	355M/L	1,411	6.4	2.0	2.2	6.48	18	40	1,441	74.0	1,490	95.3	95.7	95.7	0.73	0.81	0.85	390
250	340	355M/L	1,603	6.8	2.1	2.4	7.19	18	40	1,470	74.0	1,490	95.4	95.8	95.8	0.73	0.82	0.85	443
280	380	355M/L	1,796	6.6	2.1	2.4	8.05	14	31	1,510	74.0	1,490	95.5	95.8	95.8	0.74	0.82	0.85	496
300	400	355M/L	1,924	7.2	2.2	2.4	8.59	18	40	1,510	74.0	1,490	95.5	95.8	95.8	0.74	0.82	0.85	532
315	425	355A/B	2,019	7.5	2.5	2.7	11.6	13	21	2,700	76.0	1,490	95.9	96.5	96.5	0.77	0.84	0.86	548
355	480	355A/B	2,275	7.5	2.5	2.7	11.6	13	21	2,900	76.0	1,490	96.0	96.5	96.5	0.75	0.83	0.86	617

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.

- All values are according to IEC 60034-1 tolerances.

- This data can be changed without prior notice.

Output		Frame	380 V							415 V								
			Rated speed (rpm)	% of full load						Full load current In (A)	Rated speed (rpm)	% of full load						Full load current In (A)
				Efficiency			Power factor					Efficiency			Power factor			
kW	HP		50	75	100	50	75	100		50	75	100	50	75	100			

IV poles - 1,500 rpm - 50 Hz

Oversized terminal box

710	960	400G (1)(2)	Not available as multi-voltage													
800	1,080	450K/H (1)(2)														
900	1,215	450K/H (1)(2)														
1,000	1,350	450K/H (1)(2)														
1,120	1,515	500K/H (1)(2)														
1,250	1,690	500K/H (1)(2)														

Output		Frame	380 V							415 V								
			Rated speed (rpm)	% of full load						Full load current In (A)	Rated speed (rpm)	% of full load						Full load current In (A)
				Efficiency			Power factor					Efficiency			Power factor			
kW	HP		50	75	100	50	75	100		50	75	100	50	75	100			

IV poles - 1,500 rpm - 50 Hz

Optional frames

0.25	0.33	80	1,410	71.0	74.0	73.2	0.65	0.77	0.84	0.618	1,425	69.1	73.7	74.4	0.58	0.71	0.79	0,592
0.37	0.5	80	1,410	74.1	75.6	74.8	0.65	0.77	0.84	0.895	1,425	71.7	75.1	75.8	0.57	0.70	0.79	0,860
0.75	1	90S/L	1,415	79.1	79.9	79.6	0.64	0.76	0.83	1.72	1,430	76.9	79.6	80.4	0.55	0.69	0.78	1.66
1.5	2	100L	1,415	82.9	82.9	82.2	0.66	0.77	0.83	3.34	1,430	81.9	83.2	83.7	0.58	0.71	0.79	3.16
2.2	3	112M	1,440	85.0	84.8	84.3	0.67	0.78	0.83	4.78	1,450	83.9	84.9	85.4	0.59	0.72	0.79	4.54
3	4	112M	1,445	86.6	87.5	87.7	0.65	0.77	0.82	6.34	1,455	86.8	87.7	87.9	0.57	0.70	0.78	6.09
4	5.5	132S/M	1,450	87.5	87.1	86.6	0.72	0.83	0.86	8.16	1,459	86.4	87.1	87.4	0.65	0.77	0.83	7.67
7.5	10	160M/L	1,460	88.5	89.1	88.7	0.69	0.80	0.85	15.1	1,470	87.5	89.0	89.1	0.61	0.74	0.81	14.5
9.2	12.5	160M/L	1,460	89.0	89.5	89.3	0.70	0.80	0.85	18.4	1,470	88.0	89.4	89.3	0.62	0.74	0.81	17.7
15	20	180M/L	1,460	91.3	91.5	91.0	0.71	0.80	0.85	29.5	1,470	90.4	91.4	91.4	0.63	0.74	0.81	28.2
75	100	250S/M	1,470	94.3	94.3	94.1	0.78	0.87	0.90	135	1,475	93.7	94.2	94.5	0.71	0.82	0.87	127
90	125	315S/M	1,490	94.2	94.8	94.8	0.75	0.84	0.86	168	1,490	93.9	94.7	94.8	0.71	0.81	0.84	157
110	150	280S/M	1,480	94.6	95.1	94.9	0.79	0.85	0.88	200	1,485	94.0	94.9	95.0	0.72	0.81	0.86	187
185	250	355M/L	1,490	95.2	95.8	95.7	0.78	0.85	0.87	338	1,490	94.8	95.7	95.8	0.72	0.81	0.85	316
220	300	355M/L	1,490	95.5	95.6	95.6	0.77	0.83	0.86	407	1,490	95.0	95.6	95.7	0.70	0.79	0.84	381
250	340	355M/L	1,490	95.6	95.7	95.7	0.77	0.84	0.86	462	1,490	94.2	95.7	95.8	0.70	0.80	0.84	432
280	380	355M/L	1,490	95.6	95.7	95.7	0.77	0.84	0.86	517	1,490	95.3	95.7	95.8	0.71	0.80	0.84	484
300	400	355M/L	1,490	95.6	95.6	95.7	0.78	0.84	0.88	541	1,490	95.3	95.7	95.8	0.71	0.80	0.84	519
315	425	355A/B	Not available as multi-voltage															
355	480	355A/B																

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.

- All values are according to IEC 60034-1 tolerances.

- This data can be changed without prior notice.

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	Rated speed (rpm)	400 V						Full load current I _n (A)
								Hot	Cold				% of full load			Power factor			
													Efficiency		100	Power factor		100	
kW	HP											50	75	100	50	75	100		
VI poles - 1,000 rpm - 50 Hz																			
0.18	0.25	71	1.93	3.2	2.0	2.0	0.0008	96	211	9.5	43.0	890	52.0	58.0	59.0	0.40	0.51	0.61	0.722
0.25	0.33	71	2.78	3.2	1.9	2.1	0.0008	70	154	11.5	43.0	860	53.0	60.0	61.0	0.37	0.48	0.58	1.02
0.37	0.5	80	3.88	3.9	1.8	2.0	0.0022	27	59	10.5	43.0	910	63.0	67.0	67.0	0.51	0.66	0.76	1.05
0.55	0.75	80	5.77	4.1	2.0	2.2	0.0030	21	46	14.0	43.0	910	65.0	71.0	71.0	0.50	0.65	0.75	1.49
0.75	1	90S/L	7.75	4.5	2.0	2.1	0.0052	23	51	19.0	45.0	925	74.5	76.0	76.0	0.51	0.64	0.73	1.95
1.1	1.5	90S/L	11.4	4.7	2.3	2.2	0.0060	17	37	23.0	45.0	925	76.0	78.1	78.1	0.50	0.63	0.73	2.78
1.5	2	100L	15.3	5.0	2.0	2.4	0.0110	23	51	28.5	44.0	940	79.5	80.0	80.0	0.51	0.64	0.73	3.71
2.2	3	112M	22.0	7.1	3.5	3.9	0.0257	17	37	38.0	52.0	955	80.8	82.7	83.5	0.41	0.54	0.64	5.94
3	4	132S/M	29.9	5.7	2.0	2.4	0.0359	31	68	61.0	52.0	960	82.5	83.6	83.6	0.50	0.63	0.71	7.30
4	5.5	132S/M	39.8	6.0	2.1	2.5	0.0453	21	46	68.0	52.0	960	84.0	84.8	84.8	0.51	0.64	0.72	9.46
5.5	7.5	132S/M	54.7	6.4	2.2	2.7	0.0604	19	42	72.0	52.0	960	85.5	86.1	86.1	0.51	0.64	0.72	12.8
7.5	10	160M/L	73.9	5.8	2.0	2.6	0.1229	17	37	113	56.0	970	88.3	88.7	88.3	0.64	0.76	0.82	15.0
9.2	12.5	160M/L	90.6	6.0	2.2	2.6	0.1492	14	31	127	56.0	970	88.5	88.9	88.6	0.64	0.76	0.82	18.3
11	15	160M/L	108	6.0	2.3	2.7	0.1664	13	29	136	56.0	970	89.0	89.5	89.2	0.62	0.74	0.81	22.0
15	20	180M/L	148	7.0	2.4	3.0	0.2565	7	15	174	56.0	970	90.3	90.5	90.3	0.70	0.81	0.86	27.9
18.5	25	200M/L	181	5.7	2.1	2.5	0.3517	15	33	214	60.0	975	91.0	91.4	91.2	0.67	0.77	0.82	35.7
22	30	200M/L	216	6.0	2.2	2.7	0.4037	14	31	225	60.0	975	91.4	91.7	91.5	0.65	0.76	0.82	42.3
30	40	225S/M	291	6.8	2.1	2.5	0.7192	12	26	359	63.0	985	92.6	92.7	92.6	0.71	0.81	0.86	54.4
37	50	250S/M	359	6.7	2.2	2.5	1.10	16	35	438	64.0	985	93.0	93.2	93.0	0.73	0.82	0.86	66.8
45	60	280S/M	437	6.2	2.0	2.5	2.02	26	57	596	65.0	985	93.4	93.6	93.4	0.68	0.78	0.82	84.8
55	75	280S/M	534	6.2	2.0	2.4	2.36	22	48	629	65.0	985	93.6	93.9	93.8	0.68	0.79	0.83	102
75	100	315S/M	724	6.2	1.9	2.2	3.83	23	51	837	67.0	990	94.0	94.3	94.2	0.69	0.79	0.83	138
90	125	315S/M	869	6.0	1.9	2.1	4.54	22	48	893	67.0	990	94.4	94.6	94.5	0.72	0.80	0.84	164
110	150	315S/M	1,062	6.1	2.0	2.2	5.45	20	44	966	67.0	990	94.5	94.9	94.8	0.72	0.80	0.84	199
132	175	315S/M	1,274	6.4	2.2	2.4	6.35	17	37	1,036	67.0	990	94.6	95.0	95.0	0.71	0.80	0.84	239
150	200	355M/L	1,440	5.6	1.8	2.0	7.41	38	84	1,340	73.0	995	94.2	94.5	95.0	0.64	0.74	0.79	288
160	220	315L	1,544	6.6	2.2	2.4	7.61	14	31	1,228	68.0	990	94.8	95.2	95.2	0.70	0.80	0.84	289
185	250	315L	1,786	6.9	2.3	2.4	8.86	12	26	1,358	68.0	990	95.0	95.4	95.4	0.69	0.79	0.83	337
200	270	315L	1,930	7.0	2.4	2.5	10.1	12	26	1,488	68.0	990	95.1	95.4	95.4	0.69	0.79	0.83	365
220	300	315L	2,123	6.8	2.3	2.3	11.0	14	31	1,621	68.0	990	95.2	95.5	95.5	0.69	0.79	0.83	401
250	340	355M/L	2,413	6.0	2.1	2.2	13.9	34	75	1,789	73.0	990	95.3	95.5	95.5	0.66	0.76	0.81	466
260	350	355M/L	2,509	6.0	2.1	2.2	12.7	34	75	1,789	73.0	990	95.3	95.5	95.5	0.66	0.76	0.81	485
280	380	355M/L	2,702	6.2	2.2	2.2	13.9	27	59	1,884	73.0	990	95.4	95.6	95.6	0.64	0.75	0.80	528
300	400	355M/L	2,895	6.2	2.2	2.2	14.3	30	66	1,900	73.0	990	95.4	95.7	95.6	0.63	0.74	0.79	573
315	425	355A/B	3,039	5.6	1.9	2.6	17.1	20	28	2,650	73.0	990	95.5	95.9	95.8	0.69	0.79	0.82	579
355	480	355A/B	3,424	5.6	1.9	2.6	18.9	20	28	2,850	73.0	990	95.6	95.9	95.8	0.70	0.79	0.82	652
400	540	400L/J	3,843	7.0	2.3	2.5	21.4	16	22	3,900	75.0	994	95.4	96.2	96.5	0.73	0.81	0.84	712
450	610	400L/J	4,319	7.0	2.4	2.5	24.0	14	22	4,100	75.0	995	95.2	96.2	96.5	0.71	0.80	0.84	801
500	675	400L/J	4,804	7.0	2.4	2.5	28.1	14	22	4,300	75.0	994	95.7	96.4	96.6	0.77	0.83	0.84	889
560	755	400G (1)	5,375	6.5	1.9	3.0	31.2	12	17	4,850	75.0	995	96.5	97.0	97.0	0.80	0.83	0.84	992
630	850	450K/H (1)	6,047	7.5	0.9	3.6	55.7	17	31	6,500	76.0	995	96.2	96.7	96.9	0.76	0.85	0.88	1,066
710	960	450K/H (1)(2)	6,815	7.5	0.9	3.6	58.3	17	31	6,700	76.0	995	96.6	97.0	97.0	0.80	0.86	0.88	696
800	1,080	500K/H (1)(2)	7,678	5.5	0.8	2.2	100	17	30	9,500	80.0	995	96.5	97.0	97.2	0.80	0.84	0.86	801
900	1,215	500K/H (1)(2)	8,638	5.5	0.8	2.2	100	17	30	10,400	80.0	995	96.5	97.0	97.2	0.80	0.84	0.86	901
1,000	1,350	500K/H (1)(2)	9,598	5.5	0.8	2.2	113	17	30	11,700	80.0	995	96.5	97.0	97.2	0.80	0.84	0.86	1,001

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.
 - All values are according to IEC 60034-1 tolerances.
 - This data can be changed without prior notice.

Output		Frame	380 V									415 V								
			Rated speed (rpm)	% of full load						Full load current In (A)	Rated speed (rpm)	% of full load						Full load current In (A)		
				Efficiency			Power factor					Efficiency			Power factor					
kW	HP		50	75	100	50	75	100		50	75	100	50	75	100					
VI poles - 1,000 rpm - 50 Hz																				
0.18	0.25	71	875	54.2	59.0	58.7	0.43	0.55	0.65	0.717	900	50.1	56.8	58.6	0.38	0.48	0.58	0.737		
0.25	0.33	71	845	56.3	61.9	61.5	0.41	0.52	0.62	0.996	865	50.1	57.8	59.7	0.35	0.45	0.54	1.08		
0.37	0.5	80	895	65.2	67.7	66.0	0.56	0.70	0.80	1.06	915	60.5	65.9	67.1	0.48	0.62	0.73	1.05		
0.55	0.75	80	900	67.5	71.8	70.2	0.55	0.69	0.79	1.51	915	62.5	69.6	70.9	0.47	0.61	0.72	1.50		
0.75	1	90S/L	915	75.8	75.9	75.9	0.55	0.68	0.76	1.98	930	73.2	75.6	76.4	0.48	0.61	0.71	1.92		
1.1	1.5	90S/L	915	77.9	78.5	78.5	0.55	0.67	0.77	2.76	930	74.3	77.3	78.1	0.46	0.59	0.70	2.80		
1.5	2	100L	930	80.7	80.1	79.8	0.55	0.69	0.76	3.76	945	78.3	79.7	80.3	0.48	0.61	0.70	3.71		
2.2	3	112M	950	82.0	83.1	84.2	0.46	0.60	0.68	5.84	960	79.8	83.2	84.4	0.38	0.50	0.60	6.04		
3	4	132S/M	955	83.4	83.8	83.3	0.54	0.67	0.74	7.39	960	81.4	83.1	83.6	0.46	0.59	0.68	7.34		
4	5.5	132S/M	955	84.9	85.0	84.6	0.55	0.68	0.74	9.71	960	83.0	84.4	84.9	0.47	0.61	0.69	9.50		
5.5	7.5	132S/M	955	86.4	86.3	86.0	0.56	0.68	0.75	13.0	965	84.6	85.7	86.2	0.47	0.61	0.69	12.9		
7.5	10	160M/L	965	88.7	88.6	87.7	0.68	0.79	0.84	15.5	970	87.8	88.6	88.5	0.61	0.73	0.80	14.7		
9.2	12.5	160M/L	965	88.9	88.8	88.1	0.68	0.79	0.84	18.9	970	88.0	88.8	88.8	0.61	0.73	0.80	18.0		
11	15	160M/L	965	89.6	89.5	88.8	0.66	0.77	0.83	22.7	970	88.4	89.3	89.3	0.59	0.71	0.79	21.7		
15	20	180M/L	965	90.6	90.4	89.7	0.74	0.84	0.88	28.9	970	89.9	90.5	90.6	0.67	0.79	0.85	27.1		
18.5	25	200M/L	970	91.5	91.4	90.8	0.71	0.80	0.84	36.9	975	90.5	91.2	91.3	0.63	0.74	0.80	35.2		
22	30	200M/L	970	92.0	91.8	91.2	0.70	0.79	0.84	43.6	975	90.8	91.5	91.6	0.61	0.73	0.80	41.8		
30	40	225S/M	980	92.8	92.5	92.1	0.75	0.83	0.87	56.9	985	92.2	92.6	92.7	0.68	0.79	0.84	53.6		
37	50	250S/M	980	93.2	93.0	92.6	0.77	0.84	0.87	69.8	985	92.7	93.2	93.2	0.70	0.80	0.85	65.0		
45	60	280S/M	980	93.7	93.6	93.1	0.72	0.81	0.84	87.4	985	93.1	93.5	93.5	0.65	0.76	0.80	83.7		
55	75	280S/M	980	93.8	93.8	93.5	0.72	0.82	0.85	105	985	93.3	93.6	93.9	0.65	0.77	0.82	99.4		
75	100	315S/M	990	94.3	94.3	94.0	0.73	0.82	0.84	144	990	93.7	94.2	94.2	0.66	0.77	0.81	137		
90	125	315S/M	990	94.6	94.5	94.2	0.76	0.82	0.85	171	990	94.2	94.5	94.6	0.69	0.78	0.83	159		
110	150	315S/M	990	94.7	94.9	94.5	0.76	0.82	0.85	208	990	94.2	94.8	94.9	0.69	0.78	0.83	194		
132	175	315S/M	990	94.9	95.0	94.8	0.75	0.83	0.85	249	990	94.3	94.9	95.0	0.68	0.78	0.83	233		
150	200	355M/L	990	94.5	94.8	94.8	0.69	0.77	0.82	293	995	93.8	94.4	95.0	0.61	0.71	0.76	289		
160	220	315L	990	95.0	95.2	95.0	0.74	0.82	0.85	301	990	94.5	95.1	95.2	0.67	0.78	0.83	282		
185	250	315L	990	95.2	95.4	95.2	0.73	0.82	0.84	351	990	94.7	95.3	95.4	0.66	0.77	0.81	333		
200	270	315L	990	95.3	95.4	95.2	0.73	0.82	0.85	376	990	94.8	95.3	95.4	0.66	0.77	0.82	356		
220	300	315L	985	95.3	95.4	95.2	0.73	0.81	0.84	418	990	95.0	95.5	95.6	0.66	0.77	0.82	390		
250	340	355M/L	990	95.5	95.5	95.4	0.70	0.79	0.83	480	990	95.1	95.4	95.5	0.62	0.73	0.79	461		
260	350	355M/L	990	95.5	95.5	95.4	0.70	0.79	0.83	499	990	95.1	95.4	95.5	0.62	0.73	0.79	479		
280	380	355M/L	990	95.6	95.6	95.5	0.68	0.78	0.82	543	990	95.2	95.5	95.6	0.61	0.72	0.78	522		
300	400	355M/L	990	95.7	95.7	95.5	0.65	0.75	0.80	597	995	95.2	95.6	95.6	0.60	0.70	0.77	567		
315	425	355A/B	Not available as multi-voltage																	
355	480	355A/B																		
400	540	400L/J																		
450	610	400L/J																		
500	675	400L/J																		
560	755	400G (1)																		
630	850	450K/H (1)																		
710	960	450K/H (1)(2)																		
800	1,080	500K/H (1)(2)																		
900	1,215	500K/H (1)(2)																		
1,000	1,350	500K/H (1)(2)																		

(1) Copper rotor (2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.
 - All values are according to IEC 60034-1 tolerances.
 - This data can be changed without prior notice.

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	Rated speed (rpm)	400 V						Full load current I _n (A)
								% of full load					Efficiency			Power factor			
								Hot	Cold				50	75	100	50	75	100	

VI poles - 1,000 rpm - 50 Hz

Oversized terminal box

710	960	450K/H (1)	6,815	7.5	0.9	3.6	58.3	17	31	6,700	76.0	995	96.6	97.0	97.0	0.80	0.86	0.88	1,201
800	1,080	500K/H (1)	7,678	5.5	0.8	2.2	100	17	30	9,500	80.0	995	96.5	97.0	97.2	0.80	0.84	0.86	1,381
900	1,215	500K/H (1)	8,638	5.5	0.8	2.2	100	17	30	10,400	80.0	995	96.5	97.0	97.2	0.80	0.84	0.86	1,555
1,000	1,350	500K/H (1)	9,598	5.5	0.8	2.2	113	17	30	11,700	80.0	995	96.5	97.0	97.2	0.80	0.84	0.86	1,727

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	Rated speed (rpm)	400 V						Full load current I _n (A)
								% of full load					Efficiency			Power factor			
								Hot	Cold				50	75	100	50	75	100	

VI poles - 1,000 rpm - 50 Hz

Optional frames

0.25	0.33	80	2.62	3.9	1.8	2.0	0.0022	27	59	10.5	43.0	910	63.0	67.0	67.0	0.51	0.66	0.76	0.709
1.1	1.5	100L	11.1	5.2	2.4	2.6	0.0093	21	46	26.0	44.0	945	75.5	78.1	78.1	0.49	0.63	0.72	2.82
1.5	2	112M	14.9	7.5	3.5	3.9	0.0224	0	0	36.5	52.0	960	80.5	82.5	83.4	0.42	0.54	0.63	4.12
5.5	7.5	160M/L	54.2	6.0	2.1	2.6	0.1053	19	42	106	56.0	970	87.5	88.0	87.5	0.63	0.75	0.81	11.2
45	60	250S/M	437	6.4	2.1	2.3	1.29	15	33	466	64.0	985	93.4	93.5	93.4	0.76	0.84	0.87	79.9
75	100	280S/M	724	6.4	2.0	2.4	3.03	17	37	702	65.0	990	93.9	94.3	94.2	0.69	0.79	0.84	137
150	200	315L	1,448	6.1	2.1	2.4	7.43	22	48	400	68.0	990	94.6	95.0	95.0	0.69	0.79	0.83	275
160	220	355M/L	1,544	5.9	1.8	2.0	8.34	34	75	1,453	73.0	990	94.9	95.3	95.3	0.65	0.75	0.80	303
185	250	355M/L	1,786	5.7	1.9	2.0	9.24	32	70	1,521	73.0	990	95.1	95.4	95.4	0.65	0.75	0.80	350
200	270	355M/L	1,930	6.5	2.1	2.3	10.9	28	62	1,643	73.0	990	95.1	95.5	95.5	0.64	0.75	0.80	378
220	300	355M/L	2,123	6.0	2.0	2.1	11.8	32	70	1,795	73.0	990	95.3	95.5	95.5	0.65	0.75	0.80	416
280	380	355A/B	2,701	5.6	1.9	2.6	15.0	20	34	2,450	73.0	990	95.4	95.8	95.7	0.69	0.79	0.82	515

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.

- All values are according to IEC 60034-1 tolerances.

- This data can be changed without prior notice.

Output		Frame	380 V							415 V								
			Rated speed (rpm)	% of full load						Full load current In (A)	Rated speed (rpm)	% of full load						Full load current In (A)
				Efficiency			Power factor					Efficiency			Power factor			
kW	HP	50	75	100	50	75	100	50	75	100	50	75	100	50	75	100		

VI poles - 1,000 rpm - 50 Hz

Oversized terminal box

710	960	450K/H (1)	Not available as multi-voltage													
800	1,080	500K/H (1)														
900	1,215	500K/H (1)														
1,000	1,350	500K/H (1)														

Output		Frame	380 V							415 V								
			Rated speed (rpm)	% of full load						Full load current In (A)	Rated speed (rpm)	% of full load						Full load current In (A)
				Efficiency			Power factor					Efficiency			Power factor			
kW	HP	50	75	100	50	75	100	50	75	100	50	75	100	50	75	100		

VI poles - 1,000 rpm - 50 Hz

Optional frames

0.25	0.33	80	895	65.2	67.7	66.0	0.56	0.70	0.80	0.719	915	60.5	65.9	67.1	0.48	0.62	0.73	0.710
1.1	1.5	100L	945	76.5	78.1	78.1	0.52	0.65	0.74	2.89	956	75.5	78.1	78.1	0.44	0.58	0.67	2.92
1.5	2	112M	945	81.7	82.9	84.0	0.46	0.59	0.68	3.99	965	79.5	82.8	84.1	0.39	0.51	0.60	4.14
5.5	7.5	160M/L	965	87.9	87.9	86.9	0.67	0.78	0.83	11.6	970	87.0	87.9	87.8	0.60	0.73	0.79	11.0
45	60	250S/M	980	93.4	93.2	92.8	0.79	0.86	0.88	83.7	985	93.3	93.6	93.7	0.73	0.82	0.86	77.7
75	100	280S/M	985	94.1	94.2	93.9	0.73	0.82	0.85	143	990	93.7	94.2	94.3	0.66	0.77	0.83	133
150	200	315L	990	94.7	95.0	95.0	0.71	0.80	0.84	286	990	94.6	95.0	95.0	0.65	0.76	0.82	268
160	220	355M/L	990	94.5	95.9	96.0	0.70	0.80	0.82	309	990	93.9	95.8	96.0	0.60	0.74	0.80	290
185	250	355M/L	990	94.4	95.5	95.7	0.70	0.79	0.82	358	990	94.0	95.5	95.8	0.60	0.71	0.78	344
200	270	355M/L	990	95.0	95.6	95.7	0.70	0.79	0.82	387	990	94.4	95.4	95.7	0.62	0.73	0.79	368
220	300	355M/L	990	94.2	95.4	95.7	0.72	0.80	0.82	426	995	93.4	95.0	95.8	0.62	0.74	0.79	404
280	380	355A/B	Not available as multi-voltage															

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.

- All values are according to IEC 60034-1 tolerances.

- This data can be changed without prior notice.

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	Rated speed (rpm)	400 V						Full load current I _n (A)
								Hot	Cold				% of full load			Power factor			
													50	75	100	50	75	100	
kW	HP																		
VIII poles - 750 rpm - 50 Hz																			
0.12	0.16	71	1.76	2.3	1.9	2.0	0.0008	172	378	9.5	41.0	650	40.0	48.0	50.0	0.35	0.43	0.52	0.666
0.18	0.25	80	2.57	3.1	1.9	2.1	0.0024	48	106	11.5	42.0	670	47.0	53.0	55.0	0.44	0.55	0.65	0.727
0.25	0.33	80	3.57	3.2	1.9	2.1	0.0029	42	92	13.5	42.0	670	49.0	55.0	57.0	0.43	0.55	0.66	0.959
0.37	0.5	90S/L	5.12	3.5	1.8	2.0	0.0055	37	81	18.0	43.0	690	56.0	62.0	62.0	0.41	0.52	0.62	1.39
0.55	0.75	90S/L	7.67	3.5	1.9	2.0	0.0055	31	68	22.0	43.0	685	61.0	64.0	64.0	0.44	0.56	0.66	1.88
0.75	1	100L	10.1	4.6	2.0	2.4	0.0110	42	92	28.5	50.0	710	71.0	74.0	74.0	0.40	0.52	0.62	2.36
1.1	1.5	100L	14.9	4.6	2.1	2.3	0.0127	29	64	30.5	50.0	705	71.0	75.0	75.0	0.40	0.53	0.62	3.41
1.5	2	112M	20.5	4.7	2.4	2.3	0.0202	29	64	39.0	46.0	700	77.0	79.0	79.0	0.44	0.57	0.67	4.09
2.2	3	132S/M	30.0	5.5	2.2	2.4	0.0592	25	55	62.0	48.0	700	81.0	81.5	81.0	0.52	0.65	0.72	5.44
3	4	132S/M	41.0	5.5	2.3	2.4	0.0740	19	42	66.0	48.0	700	82.0	82.5	82.0	0.54	0.66	0.73	7.23
4	5.5	160M/L	52.7	4.7	2.0	2.2	0.1053	29	64	107	51.0	725	84.0	85.0	85.0	0.52	0.65	0.72	9.43
5.5	7.5	160M/L	72.5	4.7	2.0	2.2	0.1404	21	46	120	51.0	725	85.0	86.0	85.5	0.52	0.65	0.73	12.7
7.5	10	160M/L	98.8	4.9	2.2	2.3	0.1756	22	48	139	51.0	725	86.0	87.0	87.0	0.52	0.65	0.73	17.0
9.2	12.5	180M/L	121	6.0	2.0	2.5	0.2033	11	24	156	51.0	725	88.0	88.0	87.5	0.63	0.75	0.82	18.5
11	15	180M/L	145	6.0	2.1	2.4	0.2439	11	24	175	51.0	725	88.0	88.5	88.0	0.67	0.77	0.83	21.7
15	20	200M/L	196	4.9	1.9	2.0	0.4220	30	66	226	56.0	730	90.0	90.5	90.0	0.58	0.70	0.76	31.7
18.5	25	225S/M	241	6.3	2.0	2.4	0.6183	17	37	339	56.0	735	91.5	91.9	91.7	0.65	0.77	0.82	35.5
22	30	225S/M	286	6.1	2.0	2.4	0.7203	16	35	358	56.0	735	91.7	92.0	92.0	0.67	0.78	0.81	42.6
30	40	250S/M	390	6.6	2.1	2.7	1.06	13	29	433	56.0	735	92.0	92.4	92.3	0.68	0.79	0.83	56.5
37	50	280S/M	478	5.6	1.8	2.1	2.26	26	57	614	59.0	740	93.0	93.5	93.5	0.64	0.74	0.80	71.4
45	60	280S/M	581	5.8	1.9	2.1	2.71	23	51	660	59.0	740	93.4	93.8	93.8	0.64	0.74	0.80	86.6
55	75	315S/M	710	5.8	1.8	2.1	4.03	32	70	851	62.0	740	93.7	94.2	94.2	0.66	0.76	0.80	105
75	100	315S/M	968	5.9	1.8	2.1	5.31	30	66	951	62.0	740	94.1	94.5	94.6	0.68	0.77	0.81	141
90	125	315S/M	1,162	6.0	1.9	2.1	6.22	26	57	1,020	62.0	740	94.4	94.7	94.7	0.68	0.77	0.81	169
110	150	315L	1,420	6.0	1.9	2.1	7.84	28	62	1,244	68.0	740	94.6	94.8	94.8	0.67	0.76	0.80	209
132	175	315L	1,704	6.3	2.0	2.3	9.30	20	44	1,352	68.0	740	94.8	95.1	95.1	0.64	0.75	0.80	250
150	200	355M/L	1,924	7.2	1.8	2.5	14.3	36	79	440	70.0	745	94.5	95.0	95.4	0.62	0.73	0.79	287
160	220	355M/L	2,052	6.0	1.5	2.3	14.4	54	119	1,616	70.0	745	95.2	95.6	95.6	0.63	0.74	0.80	302
185	250	355M/L	2,373	6.1	1.5	2.3	16.5	48	106	1,691	70.0	745	95.2	95.6	95.6	0.62	0.72	0.78	358
200	270	355M/L	2,565	6.3	1.6	2.3	18.4	48	106	1,765	70.0	745	95.3	95.6	95.6	0.63	0.74	0.80	377
220	300	355M/L	2,822	6.3	1.5	2.3	19.9	48	106	1,875	70.0	745	95.4	95.7	95.7	0.63	0.74	0.79	420
250	340	355A/B	3,213	6.5	1.2	2.5	25.1	20	39	2,850	65.0	743	95.5	96.0	96.2	0.67	0.76	0.80	469
280	380	400L/J	3,589	7.0	2.8	2.8	25.7	15	24	3,900	74.0	745	95.6	96.5	96.7	0.68	0.77	0.82	510
315	425	400L/J	4,038	7.0	2.8	2.8	25.7	15	24	4,100	74.0	745	95.6	96.5	96.7	0.68	0.77	0.82	573
355	480	400L/J	4,551	7.0	2.9	2.9	28.8	14	23	4,300	74.0	745	94.9	95.8	96.1	0.66	0.76	0.81	658
400	540	400L/J	5,128	7.0	3.1	3.1	31.7	13	20	4,400	74.0	745	95.2	95.9	96.1	0.67	0.76	0.81	742
450	610	400L/J (1)	5,761	7.5	3.4	3.4	37.7	11	15	4,550	74.0	746	95.6	96.3	96.5	0.68	0.78	0.82	821
500	675	400G (1)	6,418	6.0	1.8	2.7	44.4	14	22	5,000	74.0	744	95.6	96.3	96.5	0.70	0.79	0.82	912
560	755	450K/H (1)	7,179	6.5	1.4	2.5	76.8	13	21	6,600	75.0	745	95.0	96.0	96.3	0.74	0.80	0.82	1,024
630	850	450K/H (1)(2)	8,076	6.5	1.4	2.5	80.5	13	20	6,900	75.0	745	95.0	96.0	96.3	0.74	0.80	0.82	668
710	960	500K/H (1)(2)	9,077	6.0	0.8	2.1	111	17	30	10,500	80.0	747	96.0	96.5	97.0	0.74	0.80	0.82	747
800	1,080	500K/H (1)(2)	10,228	6.0	0.9	2.1	124	17	30	11,800	80.0	747	96.0	96.5	97.0	0.74	0.80	0.82	842

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.

- All values are according to IEC 60034-1 tolerances.

- This data can be changed without prior notice.

Output		Frame	380 V								415 V							
			Rated speed (rpm)	% of full load						Full load current In (A)	Rated speed (rpm)	% of full load						Full load current In (A)
				Efficiency			Power factor					Efficiency			Power factor			
kW	HP		50	75	100	50	75	100		50	75	100	50	75	100			
VIII poles - 750 rpm - 50 Hz																		
0.12	0.16	71	635	42.9	50.1	50.8	0.37	0.47	0.56	0.641	655	37.1	45.7	48.8	0.34	0.41	0.49	0.698
0.18	0.25	80	660	49.3	54.4	54.9	0.47	0.59	0.69	0.722	675	45.0	51.8	54.5	0.42	0.53	0.62	0.741
0.25	0.33	80	660	51.1	56.2	56.8	0.47	0.59	0.70	0.955	675	47.0	53.8	56.8	0.42	0.53	0.63	0.972
0.37	0.5	90S/L	680	59.5	63.8	62.4	0.44	0.56	0.67	1.34	695	53.1	59.9	60.9	0.39	0.49	0.59	1.43
0.55	0.75	90S/L	675	63.3	65.1	63.5	0.47	0.61	0.70	1.88	690	58.5	62.8	63.9	0.41	0.53	0.63	1.90
0.75	1	100L	705	73.0	75.0	73.9	0.44	0.57	0.65	2.37	715	69.2	73.0	73.7	0.38	0.49	0.59	2.40
1.1	1.5	100L	700	73.6	76.2	74.9	0.45	0.57	0.66	3.38	705	68.8	73.6	74.5	0.37	0.49	0.59	3.48
1.5	2	112M	695	78.8	79.6	78.5	0.49	0.61	0.70	4.15	705	75.3	78.2	78.9	0.41	0.53	0.63	4.20
2.2	3	132S/M	695	81.8	81.5	79.9	0.57	0.69	0.75	5.58	705	80.1	81.4	81.4	0.49	0.62	0.70	5.37
3	4	132S/M	690	82.7	82.4	80.8	0.58	0.70	0.75	7.52	705	81.1	82.4	82.5	0.50	0.63	0.71	7.13
4	5.5	160M/L	720	84.8	85.0	84.4	0.56	0.68	0.74	9.73	730	83.2	84.7	85.2	0.49	0.62	0.70	9.33
5.5	7.5	160M/L	720	85.8	86.0	84.9	0.56	0.68	0.75	13.1	725	84.2	85.7	85.7	0.49	0.62	0.71	12.6
7.5	10	160M/L	720	86.8	87.2	86.6	0.56	0.69	0.76	17.3	725	85.1	86.7	87.1	0.49	0.62	0.71	16.9
9.2	12.5	180M/L	720	88.5	87.9	86.8	0.67	0.78	0.84	19.2	725	87.4	87.9	87.8	0.59	0.72	0.80	18.2
11	15	180M/L	720	88.4	88.3	87.2	0.71	0.80	0.85	22.5	725	87.5	88.5	88.4	0.64	0.75	0.81	21.4
15	20	200M/L	725	90.5	90.4	89.4	0.62	0.73	0.78	32.7	730	89.4	90.4	90.2	0.55	0.67	0.74	31.3
18.5	25	225S/M	730	91.8	91.8	91.2	0.69	0.80	0.84	36.7	735	91.1	91.9	91.9	0.62	0.74	0.80	35.0
22	30	225S/M	730	91.9	91.8	91.4	0.70	0.81	0.83	44.1	735	91.4	92.0	92.2	0.64	0.76	0.80	41.5
30	40	250S/M	730	92.3	92.3	91.8	0.73	0.82	0.85	58.4	735	91.6	92.3	92.5	0.64	0.76	0.81	55.7
37	50	280S/M	735	93.3	93.4	93.1	0.68	0.77	0.82	73.6	740	92.6	93.4	93.6	0.61	0.72	0.78	70.5
45	60	280S/M	735	93.3	93.9	94.0	0.66	0.77	0.81	89.8	740	92.5	93.5	94.1	0.58	0.70	0.77	86.4
55	75	315S/M	740	94.0	94.2	93.9	0.70	0.79	0.82	109	740	93.3	94.1	94.3	0.62	0.73	0.78	104
75	100	315S/M	740	94.4	94.5	94.3	0.72	0.80	0.82	147	740	93.8	94.4	94.7	0.64	0.75	0.80	138
90	125	315S/M	740	94.7	94.7	94.4	0.72	0.80	0.82	177	740	94.1	94.6	94.8	0.64	0.75	0.80	165
110	150	315L	740	94.8	94.7	94.5	0.71	0.79	0.81	218	740	94.3	94.7	94.9	0.64	0.74	0.79	204
132	175	315L	740	94.6	95.2	95.1	0.68	0.78	0.82	257	740	94.5	95.0	95.1	0.61	0.72	0.78	248
150	200	355M/L	745	94.5	95.2	95.4	0.64	0.75	0.79	302	745	94.5	95.2	95.4	0.57	0.69	0.75	292
160	220	355M/L	745	95.6	95.7	95.6	0.68	0.78	0.82	310	745	94.8	95.4	95.6	0.59	0.71	0.78	299
185	250	355M/L	745	95.6	95.8	95.6	0.67	0.76	0.81	363	745	94.7	95.3	95.4	0.57	0.68	0.75	360
200	270	355M/L	745	95.7	95.7	95.6	0.68	0.78	0.83	383	745	94.9	95.4	95.5	0.59	0.71	0.78	374
220	300	355M/L	745	95.8	95.9	95.7	0.68	0.78	0.81	431	745	95.0	95.5	95.6	0.59	0.71	0.77	416
250	340	355A/B																
280	380	400L/J																
315	425	400L/J																
355	480	400L/J																
400	540	400L/J																
450	610	400L/J (1)																
500	675	400G (1)																
560	755	450K/H (1)																
630	850	450K/H (1)(2)																
710	960	500K/H (1)(2)																
800	1,080	500K/H (1)(2)																

Not available as multi-voltage

(1) Copper rotor (2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.
 - All values are according to IEC 60034-1 tolerances.
 - This data can be changed without prior notice.

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V						Full load current I _n (A)	
								Hot	Cold			Rated speed (rpm)	% of full load			Full load current I _n (A)			
													Efficiency				Power factor		
kW	HP												50	75	100	50	75	100	

VIII poles - 750 rpm - 50 Hz

Oversized terminal box

630	850	450K/H (2)	8,076	6.5	1.4	2.5	80.5	13	20	6,900	75.0	745	95.0	96.0	96.3	0.74	0.80	0.82	1,152
710	960	500K/H (2)	9,077	6.0	0.8	2.1	111	17	30	10,500	80.0	747	96.0	96.5	97.0	0.74	0.80	0.82	1,288
800	1,080	500K/H (2)	10,228	6.0	0.9	2.1	124	17	30	11,800	80.0	747	96.0	96.5	97.0	0.74	0.80	0.82	1,452

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V						Full load current I _n (A)	
								Hot	Cold			Rated speed (rpm)	% of full load			Full load current I _n (A)			
													Efficiency				Power factor		
kW	HP												50	75	100	50	75	100	

VIII poles - 750 rpm - 50 Hz

Optional frames

37	50	250S/M	484	7.5	2.1	2.6	1.66	12	26	570	56.0	730	92.5	93.0	93.0	0.66	0.77	0.82	70.0
55	75	280S/M	710	5.8	2.0	2.1	3.16	24	53	710	59.0	740	93.7	94.2	94.1	0.64	0.75	0.80	105
110	150	355M/L	1,411	6.4	1.3	2.1	10.4	48	106	1,379	70.0	745	94.6	95.2	95.2	0.63	0.74	0.79	211
132	175	355M/L	1,693	6.5	1.3	2.0	12.6	50	110	1,473	70.0	745	95.0	95.5	95.4	0.64	0.75	0.80	250
200	270	355A/B	2,571	6.3	1.1	2.3	21.7	20	39	2,650	65.0	743	95.3	95.6	95.6	0.68	0.77	0.80	379

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.

- All values are according to IEC 60034-1 tolerances.

- This data can be changed without prior notice.

Output		Frame	380 V								415 V							
			Rated speed (rpm)	% of full load						Full load current In (A)	Rated speed (rpm)	% of full load						Full load current In (A)
				Efficiency			Power factor					Efficiency			Power factor			
kW	HP	50	75	100	50	75	100	50	75	100	50	75	100	50	75	100		

VIII poles - 750 rpm - 50 Hz

Oversized terminal box

630	850	450K/H (1)(2)	Not available as multi-voltage													
710	960	500K/H (1)(2)														
800	1,080	500K/H (1)(2)														

Output		Frame	380 V								415 V							
			Rated speed (rpm)	% of full load						Full load current In (A)	Rated speed (rpm)	% of full load						Full load current In (A)
				Efficiency			Power factor					Efficiency			Power factor			
kW	HP	50	75	100	50	75	100	50	75	100	50	75	100	50	75	100		

VIII poles - 750 rpm - 50 Hz

Optional frames

37	50	250S/M	730	92.7	92.9	92.9	0.70	0.79	0.83	72.9	735	92.5	93.1	93.1	0.64	0.75	0.81	68.3
55	75	280S/M	740	94.0	94.1	93.7	0.68	0.78	0.82	109	740	93.4	94.1	94.3	0.60	0.72	0.78	104
110	150	355M/L	740	94.0	95.2	95.1	0.65	0.76	0.81	217	745	93.0	95.2	95.2	0.59	0.77	0.77	209
132	175	355M/L	740	94.5	95.4	95.3	0.66	0.75	0.81	260	745	93.5	95.4	95.4	0.60	0.71	0.77	250
200	270	355A/B	Not available as multi-voltage															

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.

- All values are according to IEC 60034-1 tolerances.

- This data can be changed without prior notice.

W22Xd - Premium Efficiency

Exceeds IE3

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V						Full load current I _n (A)	
								Hot	Cold			Rated speed (rpm)	% of full load			Power factor			
													50	75	100	50	75		100

II poles - 3,000 rpm - 50 Hz

0.37	0.5	71	1.27	6.3	2.5	2.5	0.0005	12	26	8.5	56	2,790	73.0	74.5	74.5	0.66	0.79	0.85	0.843
0.55	0.75	71	1.90	5.9	3	3	0.0005	18	40	10.0	56	2,770	75.0	76.0	76.0	0.68	0.81	0.86	1.21
0.75	1	80	2.54	7.5	3.5	3.5	0.0008	25	55	15.0	59	2,825	80.0	82.0	81.0	0.63	0.76	0.82	1.63
1.1	1.5	80	3.71	7.4	3.6	3.6	0.0009	23	51	17.0	59	2,830	81.0	83.5	83.0	0.63	0.76	0.82	2.33
1.5	2	90S/L	4.99	7.6	3.3	3.3	0.0020	15	33	20.0	62	2,875	83.0	85.0	84.5	0.64	0.76	0.83	3.09
2.2	3	90S/L	7.32	7.5	3.4	3.5	0.0026	12	26	25.0	62	2,870	86.0	86.5	86.3	0.65	0.77	0.83	4.43
3	4	100L	9.85	8.5	3.4	3.4	0.0064	15	33	34.0	67	2,910	85.5	87.3	87.3	0.69	0.81	0.86	5.77
4	5.5	112M	13.2	7.7	2.9	3.5	0.0080	22	48	43.0	64	2,900	88.1	89.1	88.4	0.69	0.80	0.86	7.59
5.5	7.5	132S/M	17.9	7.9	2.4	3.5	0.0180	16	35	70.0	67	2,930	86.9	88.7	89.4	0.66	0.78	0.84	10.6
7.5	10	132S/M	24.5	8.8	2.7	3.6	0.0234	10	22	76.0	67	2,930	88.5	89.8	90.3	0.68	0.80	0.85	14.1
9.2	12.5	132S/M	30.0	8.5	2.9	3.3	0.0306	16	35	83.0	67	2,930	90.4	91.1	90.7	0.75	0.84	0.88	16.6
11	15	160M/L	35.7	8.0	2.6	3.4	0.0482	12	26	130	67	2,945	90.3	91.4	91.4	0.71	0.82	0.87	20.0
15	20	160M/L	48.7	8.3	2.8	3.5	0.0551	8	18	138	67	2,945	90.9	91.8	92.1	0.67	0.79	0.85	27.7
18.5	25	160M/L	60.0	8.6	3.1	3.7	0.0663	6	13	145	67	2,945	91.5	92.3	92.6	0.69	0.80	0.85	33.9
22	30	180M/L	71.3	8.3	2.7	3.6	0.0968	6	13	180	67	2,950	92.3	93.0	92.9	0.69	0.80	0.86	39.7
30	40	200M/L	96.8	7.7	3	3	0.1703	16	35	270	69	2,960	92.2	93.2	93.5	0.69	0.80	0.85	54.5
37	50	200M/L	119	7.7	3.1	3	0.1881	13	29	285	69	2,960	92.6	93.4	93.8	0.69	0.79	0.84	67.8
45	60	225S/M	145	7.7	2.4	3.1	0.2861	13	29	420	74	2,960	94.2	94.5	94.2	0.78	0.86	0.89	77.5
55	75	250S/M	178	7.8	2.7	3.3	0.3736	19	42	500	74	2,960	93.6	94.4	94.4	0.77	0.85	0.88	95.6
75	100	280S/M	241	7.5	2	3.1	0.9386	36	79	690	77	2,975	93.7	94.8	94.9	0.78	0.85	0.88	130
90	125	280S/M	289	7.6	2.2	3.1	1.12	27	59	720	77	2,975	94.3	95.2	95.2	0.81	0.87	0.90	152
110	150	315S/M	353	7.5	1.9	3	1.66	38	84	940	77	2,975	94.3	95.3	95.4	0.78	0.85	0.88	189
132	175	315S/M	423	7.6	2.1	3.1	1.96	34	75	970	77	2,980	94.5	95.4	95.6	0.78	0.86	0.89	224
150	200	315S/M	481	7.5	2.3	3.1	2.18	20	44	1,030	77	2,980	95.0	95.6	95.6	0.80	0.86	0.89	254
160	220	315S/M	513	7.4	2	2.9	2.24	28	62	1,060	77	2,980	95.1	95.8	95.8	0.79	0.86	0.89	271
185	250	315S/M	593	7.6	2.3	3.1	2.46	22	48	1,090	77	2,980	95.4	96.0	95.8	0.79	0.86	0.89	313
200	270	315L	642	7.6	2.3	2.9	2.68	23	51	1,150	78	2,975	95.7	96.2	96.0	0.82	0.88	0.90	334
220	300	315L	705	8.5	2.7	3.3	3.13	23	51	1,210	78	2,980	95.9	96.5	96.0	0.81	0.88	0.90	368
250	340	315L	802	7.8	2.7	2.9	3.57	21	46	1,260	78	2,980	96.3	96.7	96.0	0.85	0.90	0.91	413
260	350	315L	834	7.8	2.7	2.9	3.57	21	46	1,260	78	2,980	96.3	96.7	96.0	0.85	0.90	0.91	430
280	380	315L	896	7.5	2.5	2.7	4.17	20	44	1,510	78	2,985	95.4	95.8	96.0	0.84	0.89	0.91	463
300	400	355M/L	960	8.0	2.5	2.9	5.58	22	48	1,890	80	2,985	95.4	95.8	96.0	0.84	0.89	0.91	496
315	430	355M/L	1,010	7.7	2.1	2.5	6.01	18	40	1,960	80	2,980	96.4	96.8	96.0	0.87	0.90	0.91	520
330	450	355M/L	1,058	7.7	2.3	2.5	6.01	28	62	1,960	80	2,980	95.2	95.8	96.0	0.87	0.90	0.91	545
355	480	355A/B	1,138	7.5	2.5	2.7	6.8	15	24	2,500	80.0	2,980	96.1	96.4	96.3	0.89	0.91	0.91	585
400	540	355A/B	1,282	7.5	2.5	2.7	7.7	15	24	2,700	80.0	2,980	95.8	96.3	96.3	0.89	0.91	0.91	659
450	610	400L/J	1,440	7.5	2.0	3.4	8.0	15	24	3,750	80.0	2,985	95.5	96.6	97.1	0.84	0.89	0.91	735
500	675	400L/J	1,600	7.5	1.9	3.2	8.4	15	24	3,950	80.0	2,985	95.9	96.9	97.3	0.85	0.89	0.91	815
560	755	400G (1)	1,789	7.0	0.9	2.9	17.3	15	24	4,800	80.0	2,990	97.2	97.5	97.5	0.91	0.92	0.92	901
630	850	450K/H (1)	2,014	7.5	0.6	2.6	18.9	13	20	5,800	80.0	2,987	97.3	97.6	97.6	0.84	0.89	0.90	1,035
710	960	450K/H (1)(2)	2,270	7.5	0.6	2.6	20.2	13	20	6,000	80.0	2,987	97.5	97.7	97.6	0.84	0.89	0.90	676
800	1,080	450K/H (1)(2)	2,558	7.5	0.7	2.6	21.4	12	17	6,500	80.0	2,987	97.5	97.6	97.6	0.84	0.88	0.90	762
900	1,215	500K/H (1)(2)	2,875	5.5	0.5	1.7	23.2	19	35	8,800	85.0	2,990	96.9	97.3	97.6	0.84	0.88	0.88	877
1,000	1,350	500K/H (1)(2)	3,194	5.5	0.5	1.7	24.2	19	35	9,500	85.0	2,990	97.0	97.4	97.6	0.85	0.88	0.88	974
1,120	1,515	500K/H (1)(2)	3,577	5.5	0.5	1.7	24.2	17	31	9,700	85.0	2,990	97.2	97.5	97.6	0.85	0.88	0.88	1,089

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.

- All values are according to IEC 60034-1 tolerances.

- This data can be changed without prior notice.

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V						Full load current I _n (A)	
								Hot	Cold			Rated speed (rpm)	% of full load			Power factor			
													50	75	100	50	75		100
kW	HP																		

11 poles - 3,000 rpm - 50 Hz

Oversized terminal box																			
710	960	450K/H (1)	2,270	7.5	0.6	2.6	20.2	13	20	6,000	80.0	2,987	97.5	97.7	97.6	0.84	0.89	0.90	1,167
800	1,080	450K/H (1)	2,558	7.5	0.7	2.6	21.4	12	17	6,500	80.0	2,987	97.5	97.6	97.6	0.84	0.88	0.90	1,315
900	1,215	500K/H (1)	2,875	5.5	0.5	1.7	23.2	19	35	8,800	85.0	2,990	96.9	97.3	97.6	0.84	0.88	0.88	1,512
1,000	1,350	500K/H (1)	3,194	5.5	0.5	1.7	24.2	19	35	9,500	85.0	2,990	97.0	97.4	97.6	0.85	0.88	0.88	1,681
1,120	1,515	500K/H (1)	3,577	5.5	0.5	1.7	24.2	17	31	9,700	85.0	2,990	97.2	97.5	97.6	0.85	0.88	0.88	1,882

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V						Full load current I _n (A)	
								Hot	Cold			Rated speed (rpm)	% of full load			Power factor			
													50	75	100	50	75		100
kW	HP																		

11 poles - 3,000 rpm - 50 Hz

Optional frames																			
0.75	1	90S/L	2.47	8.2	3.3	3.4	0.0015	24	53	19.0	62	2,900	79.0	82.5	81.5	0.63	0.75	0.82	1.62
1.1	1.5	90S/L	3.65	7.8	3.3	3.3	0.0018	19	42	19.5	62	2,880	82.0	84.2	83.5	0.63	0.75	0.82	2.32
2.2	3	100L	7.22	8.5	3.2	3.3	0.0059	22	48	33.0	67	2,910	85.0	86.6	86.6	0.71	0.82	0.87	4.21
4	5.5	132S/M	13.0	7.5	2.3	3.1	0.0180	24	53	64.0	67	2,930	86.9	88.7	88.6	0.73	0.82	0.87	7.49
11	15	132S/M	35.9	8.2	2.7	3	0.0306	11	24	86.0	67	2,925	90.6	91.1	91.3	0.75	0.85	0.89	19.5
18.5	25	180M/L	60.0	7.6	2.3	3.1	0.0973	11	24	173	67	2,945	91.5	92.0	92.6	0.77	0.85	0.88	32.8
75	100	250S/M	242	7.6	3	2.8	0.5132	11	24	530	74	2,965	95.0	95.3	94.9	0.83	0.87	0.89	128
110	150	280S/M	353	7.5	2.1	3	1.33	20	44	762	77	2,975	95.0	95.5	95.4	0.80	0.87	0.89	187
200	270	355M/L	640	7.6	2.3	2.9	4.31	30	66	1,640	80	2,985	95.0	95.6	96.0	0.84	0.88	0.90	334
220	300	355M/L	704	7.9	2.2	2.9	4.52	35	77	1,680	80	2,985	95.0	95.6	96.0	0.84	0.88	0.90	368
250	340	355M/L	800	7.7	2.4	2.7	4.93	30	66	1,770	80	2,985	95.0	95.6	96.0	0.85	0.89	0.91	413
260	350	355M/L	832	7.7	2.4	2.7	4.93	30	66	1,770	80	2,985	95.0	95.6	96.0	0.85	0.89	0.91	430
280	380	355M/L	896	8.4	2.3	2.9	5.17	25	55	1,800	80	2,985	95.4	95.8	96.0	0.82	0.88	0.90	468
315	425	355A/B	1,009	7.5	2.5	2.7	6.0	15	24	2,300	80.0	2,980	95.9	96.2	96.2	0.88	0.91	0.91	519

(1) Copper rotor (2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.
 - All values are according to IEC 60034-1 tolerances.
 - This data can be changed without prior notice.

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V						Full load current I _n (A)	
								Hot	Cold			% of full load			Efficiency	Power factor			
												50	75	100		50	75		100
kW	HP	Rated speed (rpm)																	
IV poles - 1,500 rpm - 50 Hz																			
0.25	0.33	71	1.74	4.8	2.1	2.3	0.0008	30	66	9.0	43	1,370	66.0	69.0	69.5	0.52	0.65	0.74	0.702
0.37	0.5	71	2.58	4.8	2.6	2.6	0.0008	30	66	10.5	43	1,370	69.0	72.0	72.0	0.51	0.64	0.73	1.02
0.55	0.75	80	3.70	6.6	2.9	3.2	0.0025	20	44	13.5	44	1,420	77.0	79.0	79.5	0.61	0.74	0.80	1.25
0.75	1	80	5.05	6.7	3	3.3	0.0032	18	40	15.5	44	1,420	80.0	82.0	82.5	0.59	0.72	0.81	1.62
1.1	1.5	90S/L	7.22	7.6	2.5	3.3	0.0055	15	33	21.0	49	1,455	83.0	84.5	84.5	0.59	0.72	0.80	2.35
1.5	2	90S/L	9.88	7.4	2.6	3.4	0.0066	13	29	24.5	49	1,450	84.0	86.0	85.5	0.58	0.72	0.80	3.17
2.2	3	100L	14.6	7.4	3.2	3.5	0.0090	18	40	34.0	53	1,435	86.5	87.0	87.0	0.60	0.73	0.80	4.56
3	4	100L	19.9	7.8	3.5	3.7	0.0120	15	33	39.0	53	1,440	87.0	88.0	88.0	0.60	0.73	0.80	6.15
4	5.5	112M	26.4	7.0	2.3	3.1	0.0182	15	33	47.0	56	1,450	88.7	89.1	88.8	0.62	0.74	0.81	8.03
5.5	7.5	132S/M	36.0	8.2	2.2	3.3	0.0453	10	22	67.0	56	1,460	89.7	90.2	89.7	0.67	0.79	0.85	10.4
7.5	10	132S/M	49.1	8.3	2.4	3.5	0.0566	7	15	70.0	56	1,460	90.5	90.8	90.6	0.69	0.80	0.86	13.9
9.2	12.5	160M/L	59.6	7.2	2.5	3	0.1118	16	35	120	61	1,475	90.0	91.4	91.3	0.66	0.77	0.83	17.5
11	15	160M/L	71.5	7.5	2.8	3.2	0.1191	11	24	130	61	1,470	91.1	91.8	91.6	0.65	0.77	0.83	20.9
15	20	160M/L	97.8	7.2	2.8	3.1	0.1534	8	18	145	61	1,465	92.2	92.5	92.3	0.67	0.78	0.84	27.9
18.5	25	180M/L	120	7.4	3	3.2	0.1740	13	29	192	61	1,470	92.2	92.8	92.8	0.64	0.76	0.82	35.1
22	30	180M/L	143	7.3	3.4	3.4	0.2097	11	24	208	61	1,470	92.3	93.0	93.2	0.66	0.77	0.83	41.0
30	40	200M/L	194	7.5	2.8	3.1	0.3202	12	26	285	63	1,480	92.9	93.6	93.7	0.63	0.75	0.81	57.1
37	50	225S/M	239	7.7	2.8	3.3	0.5177	13	29	410	63	1,480	93.4	94.0	94.1	0.70	0.80	0.85	66.8
45	60	225S/M	292	7.5	2.8	3.1	0.6143	12	26	440	63	1,475	93.9	94.3	94.4	0.71	0.81	0.85	80.9
55	75	250S/M	355	7.5	2.8	3	0.9412	14	31	530	64	1,480	94.3	94.7	94.7	0.69	0.80	0.85	98.6
75	100	280S/M	483	7.5	2.3	3.1	1.94	31	68	820	69	1,485	94.5	95.1	95.2	0.72	0.82	0.85	134
90	125	280S/M	579	7.0	2.2	2.7	2.17	31	68	880	69	1,485	94.9	95.4	95.4	0.75	0.83	0.86	158
110	150	315S/M	705	7.4	2.2	2.6	2.89	33	73	1,080	71	1,490	94.7	95.5	95.6	0.74	0.82	0.86	193
132	175	315S/M	846	7.5	2.3	2.7	3.44	30	66	1,120	71	1,490	95.1	95.7	95.8	0.74	0.82	0.86	231
150	200	315S/M	962	7.8	2.7	2.9	3.77	27	59	1,180	71	1,490	95.4	95.8	95.9	0.71	0.81	0.85	266
160	220	315S/M	1,026	7.7	2.6	2.7	3.99	28	62	1,220	71	1,490	95.2	95.9	96.0	0.74	0.82	0.86	280
185	250	315S/M	1,186	7.8	2.7	2.9	4.42	25	55	1,280	71	1,490	95.5	96.1	96.0	0.71	0.80	0.85	327
200	270	315L	1,287	7.1	2.4	2.4	4.75	21	46	1,400	73	1,485	96.0	96.3	96.0	0.78	0.85	0.87	346
220	300	315L	1,411	7.8	2.3	2.6	5.30	16	35	1,480	73	1,490	96.1	96.6	96.2	0.74	0.83	0.86	384
250	340	315L	1,603	7.7	2.3	2.7	7.70	23	51	1,520	73	1,490	95.9	96.4	96.2	0.74	0.82	0.86	436
280	380	315L	1,796	7.0	2.5	2.7	6.31	15	33	1,560	73	1,490	95.8	96.0	96.2	0.76	0.84	0.87	483
300	400	315L	1,924	7.6	2.7	3	6.54	12	26	1,590	73	1,490	95.8	96.0	96.2	0.74	0.82	0.86	523
300	400	355M/L	1,924	6.9	2.3	2.3	8.95	20	44	1,880	74	1,490	95.8	96.0	96.2	0.76	0.84	0.87	517
315	430	355M/L	2,020	7.5	2.3	2.6	9.47	23	51	1,910	74	1,490	96.3	96.7	96.3	0.75	0.83	0.86	549
330	450	355M/L	2,116	7.1	2.6	2.4	10.7	20	44	1,940	74	1,490	95.8	96.0	96.2	0.71	0.82	0.85	583
355	480	355M/L	2,277	7.2	2.4	2.5	11.6	15	33	2,000	74	1,490	96.5	96.8	96.5	0.74	0.83	0.86	617
400	540	355A/B	2,564	7.5	2.5	2.7	13.2	23	31	3,100	76.0	1,490	95.9	96.4	96.5	0.76	0.83	0.86	696
450	610	355A/B	2,884	7.5	2.5	2.7	14.7	23	31	3,300	76.0	1,490	95.9	96.5	96.5	0.75	0.83	0.86	783
500	675	400L/J	3,205	6.7	1.6	2.6	14.7	25	36	3,800	80.0	1,490	96.4	96.9	97.0	0.79	0.85	0.87	855
560	755	400L/J	3,589	6.8	1.7	2.5	15.8	24	33	3,900	80.0	1,490	96.5	97.0	97.1	0.78	0.85	0.87	957
630	850	400L/J	4,038	7.5	2.1	2.8	16.3	23	29	4,000	80.0	1,490	96.4	96.9	97.1	0.75	0.83	0.87	1,076
710	960	400G (1)(2)	4,542	7.5	2.5	2.4	18.2	21	25	4,900	80.0	1,493	96.5	96.6	97.0	0.80	0.86	0.87	704
800	1,080	450K/H (1)(2)	5,117	7.5	1.2	3.0	31.1	22	27	6,200	80.0	1,493	96.8	97.2	97.3	0.80	0.86	0.88	782
900	1,215	450K/H (1)(2)	5,757	7.5	1.2	3.0	31.1	22	26	6,400	80.0	1,493	96.8	97.2	97.3	0.78	0.86	0.88	880
1,000	1,350	450K/H (1)(2)	6,397	7.5	1.2	3.0	31.9	21	25	6,600	80.0	1,493	97.0	97.3	97.3	0.80	0.86	0.88	977
1,120	1,515	500K/H (1)(2)	7,155	7.0	0.7	2.4	62.3	27	35	9,300	80.0	1,495	96.5	97.2	97.5	0.84	0.85	0.88	1,089
1,250	1,690	500K/H (1)(2)	7,985	7.5	0.8	2.6	69.2	27	35	10,300	80.0	1,495	96.5	97.2	97.5	0.84	0.85	0.88	1,219
1,400	1,890	500K/H (1)(2)	8,943	7.5	0.8	2.5	77.9	27	35	11,600	80.0	1,495	96.5	97.2	97.5	0.84	0.85	0.88	1,365

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.

- All values are according to IEC 60034-1 tolerances.

- This data can be changed without prior notice.

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	Rated speed (rpm)	400 V						Full load current I _n (A)
								Hot	Cold				% of full load			Power factor			
													Efficiency			Power factor			
kW	HP	50			75			100											

IV poles - 1,500 rpm - 50 Hz

Oversized terminal box

710	960	400G (1)	4,542	7.5	2.5	2.4	18.2	11	5	4,900	80.0	1,493	96.5	96.6	97.0	0.80	0.86	0.87	1,214
800	1,080	450K/H (1)	5,117	7.5	1.2	3.0	31.1	12	17	6,200	80.0	1,493	96.8	97.2	97.3	0.80	0.86	0.88	1,349
900	1,215	450K/H (1)	5,757	7.5	1.2	3.0	31.1	12	16	6,400	80.0	1,493	96.8	97.2	97.3	0.78	0.86	0.88	1,517
1,000	1,350	450K/H (1)	6,397	7.5	1.2	3.0	31.9	11	15	6,600	80.0	1,493	97.0	97.3	97.3	0.80	0.86	0.88	1,686
1,120	1,515	500K/H (1)	7,155	7.0	0.7	2.4	62.3	17	30	9,300	80.0	1,495	96.5	97.2	97.5	0.84	0.85	0.88	1,884
1,250	1,690	500K/H (1)	7,985	7.5	0.8	2.6	69.2	17	30	10,300	80.0	1,495	96.5	97.2	97.5	0.84	0.85	0.88	2,103

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	Rated speed (rpm)	400 V						Full load current I _n (A)
								Hot	Cold				% of full load			Power factor			
													Efficiency			Power factor			
kW	HP	50			75			100											

IV poles - 1,500 rpm - 50 Hz

Optional frames

0.75	1	90S/L	4.93	7.8	2.4	3.3	0.0049	21	46	20.0	49	1,455	82.5	84.0	84.5	0.60	0.73	0.80	1.60
1.5	2	100L	9.95	7.7	3.1	3.4	0.0082	25	55	32.0	53	1,440	86.0	87.0	87.0	0.61	0.73	0.80	3.11
2.2	3	112M	14.5	6.8	2	3	0.0143	31	68	43.0	56	1,450	87.5	88.2	88.2	0.62	0.74	0.81	4.44
3	4	112M	19.7	7.1	2.3	3.1	0.0169	25	55	45.0	56	1,455	88.5	89.1	89.1	0.62	0.74	0.81	6.00
4	5.5	132S/M	26.0	8.5	2.4	3.7	0.0528	6	13	64.0	56	1,470	86.0	87.8	88.8	0.61	0.74	0.82	7.93
15	20	180M/L	97.5	7.0	2.5	3	0.1744	23	51	180	61	1,470	91.9	92.5	92.3	0.66	0.77	0.83	28.3
37	50	200M/L	239	7.0	2.6	3	0.3994	14	31	304	63	1,480	93.3	94.0	94.5	0.64	0.76	0.82	68.9
75	100	250S/M	484	7.8	2.8	3.3	1.22	8	18	560	64	1,480	95.0	95.5	95.2	0.73	0.83	0.87	131
90	125	315S/M	577	7.8	2.7	3.1	2.66	30	66	950	71	1,490	94.5	95.0	95.4	0.67	0.78	0.84	162
110	150	280S/M	708	7.6	2.4	2.8	3.25	24	53	940	69	1,485	95.4	95.8	95.6	0.74	0.83	0.87	191
185	250	355M/L	1,186	7.7	2.7	2.8	6.80	27	59	1,570	74	1,490	94.8	95.8	95.8	0.69	0.79	0.83	336
200	270	355M/L	1,283	7.6	2.3	2.5	7.01	22	48	1,600	74	1,490	95.9	96.5	96.2	0.72	0.81	0.85	353
220	300	355M/L	1,411	7.4	2.2	2.5	7.52	20	44	1,660	74	1,490	96.0	96.6	96.2	0.72	0.80	0.85	388
250	340	355M/L	1,603	7.3	2.3	2.4	8.59	16	35	1,730	74	1,490	96.2	96.6	96.2	0.73	0.82	0.85	441
315	425	355A/B	2,019	7.5	2.5	2.7	11.6	13	21	2,700	76.0	1,490	96.3	96.7	96.3	0.75	0.83	0.86	549
355	480	355A/B	2,275	7.5	2.5	2.7	11.6	13	21	2,900	76.0	1,490	96.5	96.8	96.5	0.74	0.83	0.86	617

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.
 - All values are according to IEC 60034-1 tolerances.
 - This data can be changed without prior notice.

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	Rated speed (rpm)	400 V						Full load current I _n (A)
								Hot	Cold				% of full load			Power factor			
													Efficiency			Power factor			
kW	HP											50	75	100	50	75	100		
VI poles - 1,000 rpm - 50 Hz																			
0.18	0.25	71	1.91	3.2	2.0	2.1	0.0009	30	66	12.5	43	900	56.0	62.0	62.0	0.40	0.51	0.60	0.698
0.25	0.33	71	2.71	3.2	2	2	0.0008	30	66	12.5	43	880	60.0	64.0	64.0	0.39	0.51	0.60	0.940
0.37	0.5	80	3.82	4.5	1.9	2.1	0.0025	25	55	13.5	43	925	66.0	69.5	69.5	0.51	0.65	0.75	1.02
0.55	0.75	80	5.68	4.8	2.2	2.2	0.0034	19	42	15.5	43	925	68.0	72.5	73.0	0.50	0.64	0.75	1.45
0.75	1	90S/L	7.62	5.2	2.5	2.8	0.0060	31	68	24.0	45	940	76.5	79.0	79.0	0.49	0.62	0.71	1.93
1.1	1.5	100L	11.1	4.9	2	2.4	0.0110	32	70	30.0	44	945	80.5	81.0	81.0	0.51	0.65	0.73	2.69
1.5	2	100L	15.1	5.5	2.3	2.8	0.0143	31	68	34.0	44	950	81.5	82.5	82.5	0.49	0.62	0.71	3.70
2.2	3	112M	22.1	6.0	2.5	2.6	0.0257	26	57	44.0	48	950	83.0	84.5	84.5	0.53	0.64	0.72	5.22
3	4	132S/M	29.7	5.8	1.8	2.6	0.0416	40	88	69.0	53	965	86.0	87.3	86.0	0.53	0.66	0.73	6.90
4	5.5	132S/M	39.6	6.1	1.9	2.7	0.0492	25	55	73.0	53	965	86.4	87.6	87.1	0.53	0.66	0.73	9.08
5.5	7.5	132S/M	54.5	7.0	2.5	2.8	0.0755	26	57	80.0	53	965	86.5	88.0	88.2	0.50	0.64	0.72	12.5
7.5	10	160M/L	73.5	6.3	2.2	2.7	0.1404	16	35	135	56	975	88.5	89.3	89.3	0.64	0.76	0.82	14.8
9.2	12.5	160M/L	90.2	6.5	2.3	2.9	0.1756	18	40	145	56	975	90.0	90.6	90.0	0.64	0.75	0.81	18.2
11	15	160M/L	108	7.1	2.8	3.2	0.1931	12	26	153	56	975	89.0	90.1	90.5	0.60	0.73	0.80	21.9
15	20	180M/L	147	7.7	2.6	3.2	0.2970	8	18	203	56	975	91.5	91.5	91.4	0.71	0.82	0.86	27.5
18.5	25	200M/L	180	6.3	2.4	2.8	0.3510	16	35	236	60	980	91.0	91.7	91.9	0.63	0.75	0.81	35.9
22	30	200M/L	214	6.4	2.4	2.8	0.4212	15	33	252	60	980	91.4	92.0	92.4	0.64	0.76	0.81	42.4
30	40	225S/M	291	7.5	2.4	2.8	0.8194	15	33	420	63	985	93.0	93.4	93.1	0.69	0.80	0.84	55.4
37	50	250S/M	359	7.2	2.4	2.7	1.24	30	66	490	64	985	93.7	93.9	93.5	0.72	0.81	0.85	67.2
45	60	280S/M	437	6.4	2.1	2.7	2.35	25	55	660	65	985	93.9	94.3	93.9	0.67	0.77	0.82	84.4
55	75	280S/M	534	6.8	2.3	2.8	2.69	24	53	710	65	985	94.2	94.7	94.3	0.66	0.77	0.82	103
75	100	315S/M	724	6.3	2	2.5	4.35	39	86	1,070	67	990	94.6	95.1	94.9	0.67	0.77	0.82	139
90	125	315S/M	869	6.4	2.2	2.5	5.42	35	77	1,130	67	990	95.1	95.5	95.1	0.68	0.78	0.83	165
110	150	315S/M	1,062	6.2	2.1	2.4	6.15	31	68	1,170	67	990	95.4	95.6	95.3	0.70	0.80	0.83	201
132	175	315S/M	1,274	7.2	2.6	2.7	7.23	25	55	1,250	67	990	95.4	95.8	95.6	0.67	0.77	0.82	243
150	200	315L	1,448	7.1	2.5	2.8	9.40	25	55	1,430	68	990	95.7	96.1	95.7	0.67	0.78	0.83	273
160	220	315L	1,544	7.5	2.7	2.8	8.68	22	48	1,470	68	990	95.6	96.0	95.8	0.67	0.77	0.82	294
185	250	315L	1,786	7.1	2.4	2.6	9.22	20	44	1,500	68	990	95.0	95.8	95.8	0.65	0.76	0.81	344
200	270	355M/L	1,930	6.1	2	2.1	10.4	41	90	1,870	73	990	95.5	96.0	95.9	0.66	0.76	0.80	376
220	300	355M/L	2,113	6.5	2	2.1	12.5	36	79	1,970	73	995	95.5	96.1	96.0	0.64	0.75	0.80	413
250	340	355M/L	2,401	6.5	2.1	2.2	13.9	38	84	2,050	73	995	95.5	96.1	96.0	0.64	0.75	0.80	470
280	380	355M/L	2,689	5.5	1.9	2.2	15.0	38	84	2,100	73	995	95.1	95.1	96.0	0.64	0.75	0.80	526
300	400	355M/L	2,895	5.8	1.9	2	15.0	25	55	2,150	73	990	95.8	96.0	96.0	0.63	0.74	0.80	564
315	430	355M/L	3,040	6.1	2.1	2.1	15.0	25	55	2,200	73	990	95.2	95.8	95.8	0.66	0.76	0.80	593
355	480	355A/B	3,424	5.6	1.9	2.6	18.9	20	38	2,850	73.0	990	95.6	95.9	95.8	0.70	0.79	0.82	652
400	540	400L/J	3,843	7.0	2.3	2.5	21.4	16	27	3,900	75.0	994	95.4	96.2	96.5	0.73	0.81	0.84	712
450	610	400L/J	4,319	7.0	2.4	2.5	24.0	14	22	4,100	75.0	995	95.2	96.2	96.5	0.71	0.80	0.84	801
500	675	400L/J	4,804	7.0	2.4	2.5	28.1	14	22	4,300	75.0	994	95.7	96.4	96.6	0.77	0.83	0.84	889
560	755	400G (1)	5,375	6.5	1.9	3.0	31.2	12	17	4,850	75.0	995	96.5	97.0	97.0	0.80	0.83	0.84	992
630	850	450K/H (1)	6,047	7.5	0.9	3.6	55.7	17	31	6,500	76.0	995	96.2	96.7	96.9	0.76	0.85	0.88	1,066
710	960	450K/H (1)(2)	6,815	7.5	0.9	3.6	58.3	17	31	6,700	76.0	995	96.6	97.0	97.0	0.80	0.86	0.88	696
800	1,080	500K/H (1)(2)	7,678	5.5	0.8	2.2	100	17	30	9,500	80.0	995	96.5	97.0	97.2	0.80	0.84	0.86	801
900	1,215	500K/H (1)(2)	8,638	5.5	0.8	2.2	100	17	30	10,400	80.0	995	96.5	97.0	97.2	0.80	0.84	0.86	901
1,000	1,350	500K/H (1)(2)	9,598	5.5	0.8	2.2	113	17	30	11,700	80.0	995	96.5	97.0	97.2	0.80	0.84	0.86	1,001

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.
 - All values are according to IEC 60034-1 tolerances.
 - This data can be changed without prior notice.

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V						Full load current I _n (A)		
								Hot	Cold			Rated speed (rpm)	% of full load			Efficiency	Power factor			
													50	75	100		50		75	100
kW	HP																			

VI poles - 1,000 rpm - 50 Hz

Oversized terminal box																			
710	960	450K/H (1)	6,815	7.5	0.9	3.6	58.3	17	31	6,700	76.0	995	96.6	97.0	97.0	0.80	0.86	0.88	1,201
800	1,080	500K/H (1)	7,678	5.5	0.8	2.2	100	17	30	9,500	80.0	995	96.5	97.0	97.2	0.80	0.84	0.86	1,381
900	1,215	500K/H (1)	8,638	5.5	0.8	2.2	100	17	30	10,400	80.0	995	96.5	97.0	97.2	0.80	0.84	0.86	1,555
1,000	1,350	500K/H (1)	9,598	5.5	0.8	2.2	113	17	30	11,700	80.0	995	96.5	97.0	97.2	0.80	0.84	0.86	1,727

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V						Full load current I _n (A)		
								Hot	Cold			Rated speed (rpm)	% of full load			Efficiency	Power factor			
													50	75	100		50		75	100
kW	HP																			

VI poles - 1,000 rpm - 50 Hz

Optional frames																			
0.25	0.33	80	2.57	4.1	1.9	2.0	0.0024	25	55	13.0	43	930	68.0	68.6	68.6	0.50	0.63	0.74	0.711
1.1	1.5	112M	11.0	5.9	2.3	2.8	0.0220	28	62	42.0	48	955	84.0	85.0	85.0	0.52	0.64	0.72	2.59
1.5	2	112M	14.9	6.0	2.1	2.8	0.0202	28	62	44.0	48	960	84.5	85.5	85.5	0.51	0.63	0.71	3.57
2.2	3	132S/M	21.7	5.7	1.8	2.7	0.0491	30	66	66.0	52	970	86.0	87.5	87.5	0.52	0.64	0.72	5.04
45	60	250S/M	439	7.7	2.8	2.8	1.43	18	40	520	64	980	92.4	93.9	93.9	0.76	0.84	0.87	79.5
75	100	280S/M	724	7.7	3	3.5	4.48	8	18	760	65	990	94.8	95.3	94.9	0.63	0.75	0.80	143
150	200	315S/M	1,448	7.1	2.5	2.8	9.40	25	55	1,390	67	990	95.7	96.1	95.7	0.67	0.78	0.83	273
160	220	355M/L	1,544	6.5	1.9	2.1	8.80	33	73	1,700	73	990	94.9	95.6	95.8	0.63	0.74	0.79	305
185	250	355M/L	1,786	6.6	2	2.2	9.26	34	75	1,780	73	990	94.9	95.6	95.8	0.64	0.74	0.79	353
280	380	355A/B	2,701	5.6	1.9	2.6	15.0	20	38	2,450	73.0	990	95.5	95.8	96.0	0.64	0.75	0.80	526
315	425	355A/B	3,039	5.6	1.9	2.6	17.1	20	38	2,650	73.0	990	95.5	95.9	95.8	0.69	0.79	0.82	579

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.
 - All values are according to IEC 60034-1 tolerances.
 - This data can be changed without prior notice.

Output		Frame	Full load torque (Nm)	Locked rotor current I _L /I _n	Locked rotor torque T _L /T _n	Break-down torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V						Full load current I _n (A)	
								Hot	Cold			Rated speed (rpm)			% of full load				
												50	75	100	Efficiency		Power factor		
kW	HP																		
VIII poles - 750 rpm - 50 Hz																			
0.12	0.16	71	1.76	2.4	1.8	2.0	0.0009	30	66	12.0	41	650	44.0	50.0	52.5	0.35	0.43	0.50	0.660
0.18	0.25	80	2.53	3.3	2	2.2	0.0029	30	66	14.5	42	680	51.0	57.0	58.5	0.45	0.55	0.65	0.683
0.25	0.33	80	3.51	3.3	2	2.2	0.0034	30	66	15.5	42	680	53.0	58.0	60.0	0.45	0.56	0.66	0.911
0.37	0.5	90S/L	5.12	3.7	2.1	2.4	0.0055	30	66	21.0	43	690	61.0	66.0	66.0	0.41	0.53	0.62	1.31
0.55	0.75	90S/L	7.67	3.6	1.8	2.1	0.0055	29	64	25.0	43	685	63.0	66.5	66.5	0.44	0.57	0.67	1.78
0.75	1	100L	10.1	4.6	1.9	2.3	0.0127	30	66	32.0	50	710	72.5	75.5	75.5	0.41	0.53	0.62	2.31
1.1	1.5	100L	14.9	4.6	2.1	2.4	0.0143	30	66	35.0	50	705	73.0	76.0	76.0	0.41	0.53	0.62	3.37
1.5	2	112M	20.3	5.0	2.5	2.8	0.0238	28	62	46.0	46	705	79.0	80.5	80.7	0.45	0.59	0.68	3.95
2.2	3	132S/M	29.6	6.2	2.3	2.5	0.0690	27	59	74.0	48	710	82.0	82.6	82.8	0.51	0.65	0.72	5.33
3	4	132S/M	40.4	6.4	2.4	2.6	0.0838	21	46	80.0	48	710	82.5	83.5	83.5	0.51	0.64	0.72	7.20
4	5.5	160M/L	52.7	5.0	2.1	2.3	0.1229	34	75	122	51	725	85.0	86.0	86.0	0.52	0.65	0.72	9.32
5.5	7.5	160M/L	72.5	5.0	2.1	2.3	0.1492	28	62	136	51	725	86.0	87.3	87.3	0.52	0.65	0.73	12.5
7.5	10	160M/L	98.2	5.3	2.2	2.5	0.2199	22	48	155	51	730	87.0	88.3	88.5	0.52	0.65	0.73	16.8
9.2	12.5	180M/L	121	6.0	2	2.6	0.2575	15	33	185	51	725	89.0	89.3	89.6	0.63	0.75	0.82	18.1
11	15	180M/L	145	6.5	2.3	2.7	0.2846	12	26	200	51	725	89.5	90.0	90.0	0.55	0.68	0.76	23.2
15	20	200M/L	196	4.9	1.9	2.1	0.4571	34	75	255	56	730	90.0	91.0	90.8	0.56	0.68	0.74	32.2
18.5	25	225S/M	240	6.5	1.7	2.5	0.8219	28	62	400	56	735	91.5	92.0	91.6	0.63	0.75	0.81	36.0
22	30	225S/M	286	6.5	1.8	2.5	0.9574	22	48	430	56	735	91.5	92.3	92.1	0.63	0.75	0.81	42.6
30	40	250S/M	390	7.4	1.9	2.8	1.43	18	40	520	56	735	92.7	93.0	92.8	0.66	0.77	0.83	56.2
37	50	280S/M	478	6.0	1.8	2.3	2.82	32	70	720	59	740	93.2	93.9	93.7	0.63	0.73	0.79	72.1
45	60	280S/M	581	6.0	1.8	2.2	3.49	30	66	790	59	740	93.8	94.0	93.8	0.63	0.73	0.79	87.7
55	75	315S/M	710	6.0	1.7	2.2	5.11	40	88	1,000	62	740	94.0	94.2	94.2	0.65	0.75	0.80	105
75	100	315S/M	968	6.0	1.8	2.2	6.56	40	88	1,120	62	740	94.3	94.7	94.5	0.65	0.75	0.80	143
90	125	315S/M	1,162	6.0	1.9	2.2	7.84	40	88	1,230	62	740	94.6	95.0	94.8	0.65	0.75	0.80	171
110	150	315L	1,420	6.0	1.9	2.2	9.46	35	77	1,500	68	740	95.0	95.1	95.1	0.64	0.74	0.79	211
132	175	355M/L	1,693	6.2	1.3	2.3	14.1	48	106	1,700	70	745	95.0	95.3	95.3	0.64	0.74	0.79	253
150	200	355M/L	1,924	7.2	1.8	2.5	16.5	40	88	1,800	70	745	94.5	95.2	95.5	0.62	0.73	0.79	287
160	220	355M/L	2,052	6.4	1.3	2.3	17.4	56	123	1,870	70	745	95.4	95.6	95.6	0.64	0.75	0.80	302
185	250	355M/L	2,373	6.3	1.3	2.3	18.0	56	123	1,946	70	745	95.5	95.7	95.7	0.64	0.75	0.80	349
200	270	355M/L	2,565	6.2	1.3	2.3	18.9	56	123	2,020	70	745	95.6	95.8	95.8	0.65	0.76	0.80	377
220	300	355M/L	2,822	7.2	1.8	2.5	19.8	30	66	2,100	70	745	94.8	95.6	95.6	0.65	0.76	0.80	415
250	340	355A/B	3,213	6.5	1.2	2.5	25.1	20	39	2,850	65.0	743	94.8	95.4	95.3	0.67	0.76	0.80	473
280	380	400L/J	3,589	7.0	2.8	2.8	25.7	15	24	3,900	74.0	745	95.6	96.5	96.7	0.68	0.77	0.82	510
315	425	400L/J	4,038	7.0	2.8	2.8	25.7	15	24	4,100	74.0	745	95.6	96.5	96.7	0.68	0.77	0.82	573
355	480	400L/J	4,551	7.0	2.9	2.9	28.8	14	23	4,300	74.0	745	94.9	95.8	96.1	0.66	0.76	0.81	658
400	540	400L/J	5,128	7.0	3.1	3.1	31.7	13	20	4,400	74.0	745	95.2	95.9	96.1	0.67	0.76	0.81	742
450	610	400L/J (1)	5,761	7.5	3.4	3.4	37.7	11	15	4,550	74.0	746	95.6	96.3	96.5	0.68	0.78	0.82	821
500	675	400G (1)	6,418	6.0	1.8	2.7	44.4	14	22	5,000	74.0	744	95.6	96.3	96.5	0.70	0.79	0.82	912
560	755	450K/H (1)	7,179	6.5	1.4	2.5	76.8	13	21	6,600	75.0	745	95.0	96.0	96.3	0.74	0.80	0.82	1,024
630	850	450K/H (1)(2)	8,076	6.5	1.4	2.5	80.5	13	20	6,900	75.0	745	95.0	96.0	96.3	0.74	0.80	0.82	668
710	960	500K/H (1)(2)	9,077	6.0	0.8	2.1	111	17	30	10,500	80.0	747	96.0	96.5	97.0	0.74	0.80	0.82	747
800	1,080	500K/H (1)(2)	10,228	6.0	0.9	2.1	124	17	30	11,800	80.0	747	96.0	96.5	97.0	0.74	0.80	0.82	842

(1) Copper rotor

(2) Rated current at 690 V

Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.

- All values are according to IEC 60034-1 tolerances.

- This data can be changed without prior notice.

Output		Frame	Full load torque (Nm)	Locked rotor current I/In	Locked rotor torque TI/Tn	Break-down torque Tb/Tn	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V						Full load current In (A)
								Hot	Cold			Rated speed (rpm)	% of full load			Full load current In (A)		
													Efficiency				Power factor	
kW	HP											50	75	100	50	75	100	

VIII poles - 750 rpm - 50 Hz

Oversized terminal box

630	850	450K/H (1)	8,076	6.5	1.4	2.5	80.5	13	20	6,900	75.0	745	95.0	96.0	96.3	0.74	0.80	0.82	1,152
710	960	500K/H (1)	9,077	6.0	0.8	2.1	111	17	30	10,500	80.0	747	96.0	96.5	97.0	0.74	0.80	0.82	1,288
800	1,080	500K/H (1)	10,228	6.0	0.9	2.1	124	17	30	11,800	80.0	747	96.0	96.5	97.0	0.74	0.80	0.82	1,452

Output		Frame	Full load torque (Nm)	Locked rotor current I/In	Locked rotor torque TI/Tn	Break-down torque Tb/Tn	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	400 V						Full load current In (A)
								Hot	Cold			Rated speed (rpm)	% of full load			Full load current In (A)		
													Efficiency				Power factor	
kW	HP											50	75	100	50	75	100	

VIII poles - 750 rpm - 50 Hz

Optional frames

37	50	250S/M	481	8.5	2.8	3.3	1.61	12	26	588	56	735	93.0	93.4	93.4	0.60	0.72	0.79	72.4
55	75	280S/M	710	7.0	2	2.5	3.38	26	57	870	59	740	94.0	94.1	94.1	0.60	0.71	0.77	110
110	150	315S/M	1,420	6.0	1.9	2.2	9.46	35	77	1,460	62	740	95.0	95.1	95.1	0.64	0.74	0.79	211
110	150	355M/L	1,411	6.2	1.3	2.3	14.0	56	123	1,580	70	745	95.0	95.1	95.1	0.62	0.74	0.79	211
132	175	315L	1,704	6.0	2	2.3	11.3	34	75	1,600	68	740	95.0	95.3	95.3	0.64	0.74	0.79	253
200	270	355A/B	2,571	6.3	1.1	2.3	21.7	20	39	2,650	65.0	743	94.8	95.4	95.3	0.68	0.77	0.80	379

(1) Copper rotor

(2) Rated current at 690 V

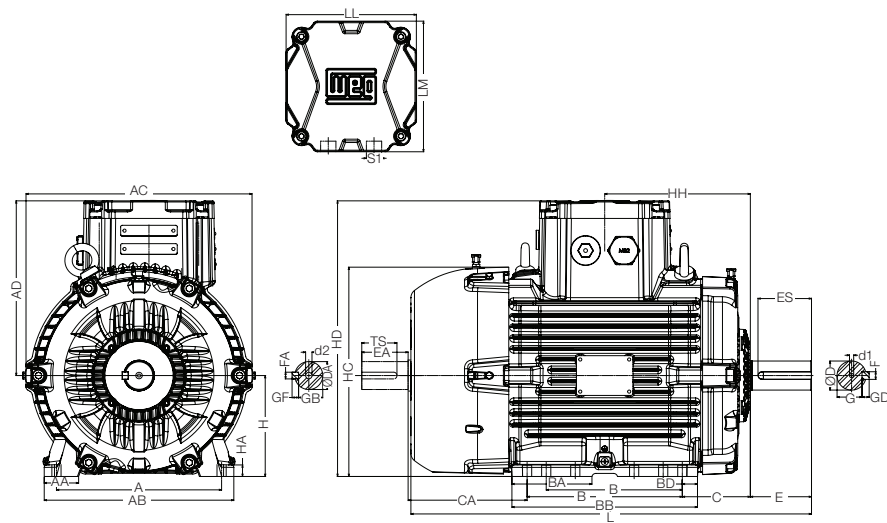
Notes: - The indicated values for sound pressure levels are @ 1 m no load, with 3 dB(A) tolerance.

- All values are according to IEC 60034-1 tolerances.

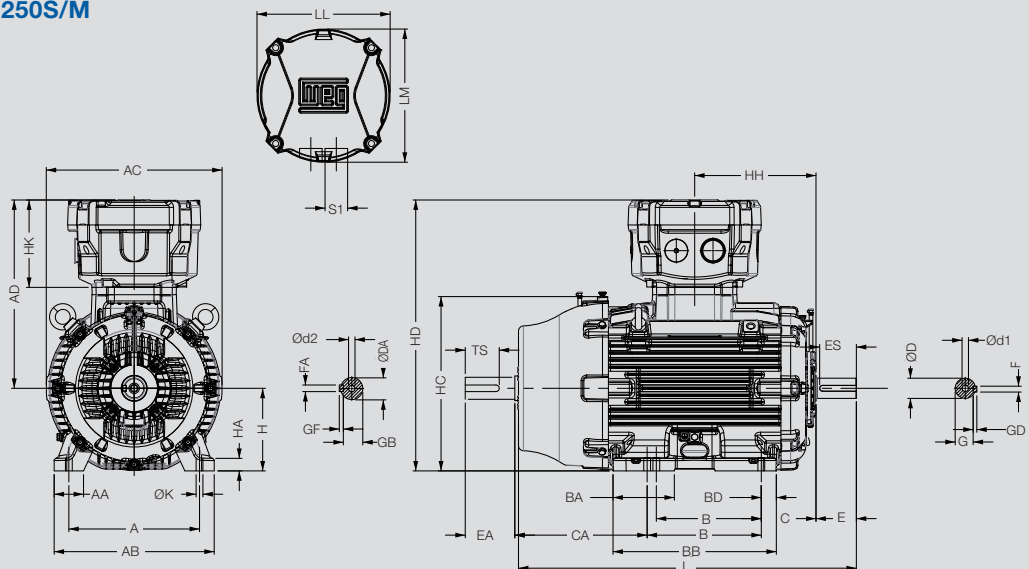
- This data can be changed without prior notice.

24. Mechanical Features

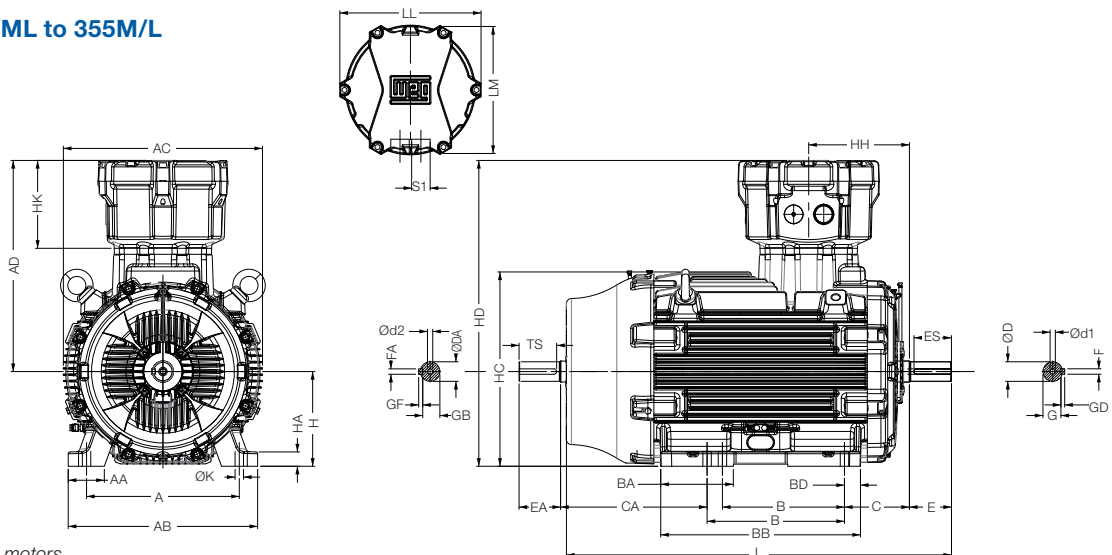
Frames 71 to 132S/M



Frames 160M/L to 250S/M

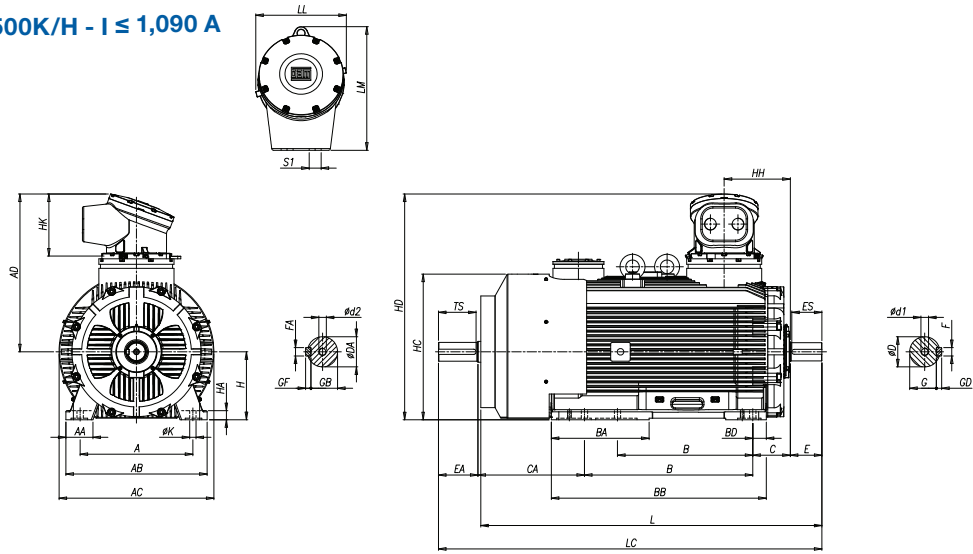


Frames 280S/ML to 355M/L

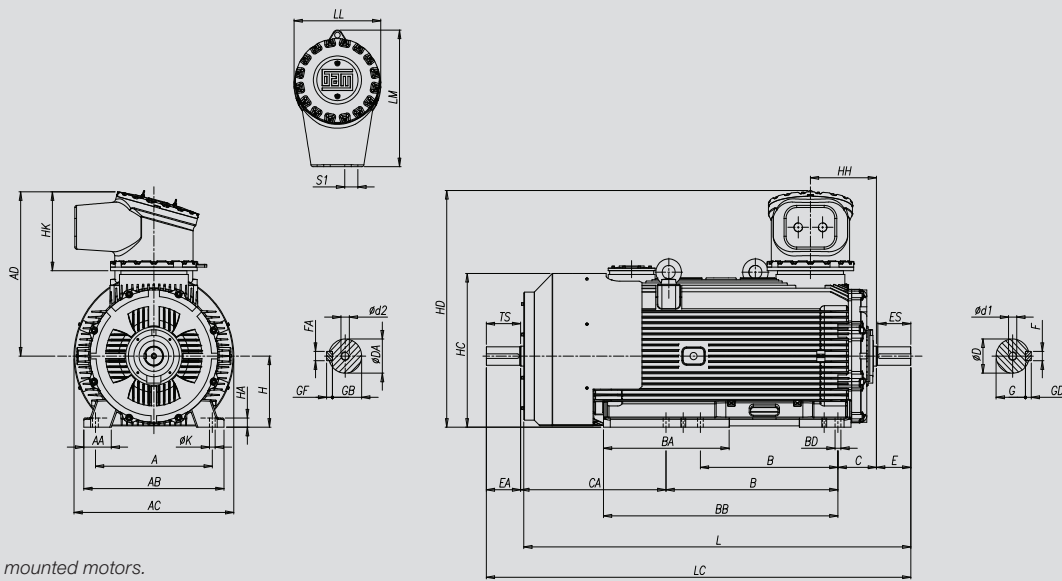


Note: foot mounted motors.

Frames 355A/B to 500K/H - $I \leq 1,090 A$



Frames 355A/B to 500K/H - $1,090 A < I \leq 1,900 A$



Note: foot mounted motors.

Frame size	A	AA	AB	AC	AC (**)	AD	B	BA	BB	BD	C	CA	D	DA	E	EA	ES	F	FA	G	GB	GD	GF	TS
71	112	32	132	163	-	151.5	90/110	48	132	11	45	105	14	11	30	23	22	5	4	11	8.5	5	4	14
80	125	37	149	189	-	132.5	100/121	53	143	-	50	104	19	14	40	30	32	6	-	15.5	11	6	-	18
90S/L	140	38	164	209.5	260	183	100/125	89	183	12	56	156.5	24	16	50	40	40	-	5	20	13	-	5	28
100L	160	46	188	240.5	285	195	140/183	82	211	-	63	135.5	-	22	-	-	-	-	6	24	18.5	7	6	36
112M	190	48	220	260	311	208	140/186	79	214	14	70	145	28	24	60	50	50	-	8	20	20	-	7	-
132S/M	216	45	248	304	353.5	228.5	140/178	1015	243	20	89	179	38	28	80	60	70	10	-	33	24	-	8	45
160M/L	254	68	308	356	353	349.5	210/254	149	350	24.5	108	253.5	42	-	-	-	-	-	8	37	20	8	-	-
180M/L	279	80	350	380	385	369.5	241/279	148	347	25	121	252	48	24	110	-	90	-	16	42.5	20	9	4	36
200M/L	318	86	385	420	430	394.5	267/305	147	407	31	133	283	55	48	-	110	-	-	14	49	42.5	10	9	90
225S/M	689	80	436	479	492.5	513	286/311	160	445	41	149	-	55*	60	110*	-	100*	16*	-	49*	53*	10*	-	53*
250S/M	406	100	506	500	525	533	311/349	176	486	47	168	361	60	60*	140	-	125	18	-	53	58	11	-	58
280S/M	457	100	557	611	665.5	633	368/419	209	570	40	190	396	65*	60*	140	140	125	18*	18	58	53*	11	11	53*
315S/M	508	120	630	663	721	702	406/457	241	664	52	216	469	65*	60*	140*	-	125*	18*	-	58*	53*	11*	-	58
315L	508	120	630	663	721	702	508	241	664	52	216	528	80	65	170	-	160	22	-	71	58	14	-	58
355M/L	610	140	750	744	821.5	762	560/630	237	805	66	254	475	75*	65*	140*	140*	125*	20*	18*	67.5*	53*	11*	11*	53*
355A/B	610	130	730	780	1052	957	710/800	523	1038	-	-	605	100	80	210	170	200	28	22	90	71	16	14	160
400L/J	686	150	810	898	1111	1002	710/900	535	1160	90	280	659	80*	60*	170*	140*	160*	22*	18*	71*	53*	14*	11*	125*
400G	686	150	810	898	1111	1002	1120	420	1400	-	-	679	110	80	210	170	200	28	22	100	71	16	14	160
450K/H	750	180	940	1030	1218	1045	900/1120	650	1430	-	250	705	85*	75*	170*	140*	160*	22*	20*	76*	67.5*	14*	12*	125*
500K/H	850	200	1020	1162	1284	1065	1000/1250	915	1800	95	280	1065	120	100	210	210	200	32	28	109	90	18	16	200
													90*	75*	170*	140*	160*	25*	20*	81*	67.5*	14*	12*	130*
													130	110	250	210	240	32	28	119	100	18	16	200

Frame size	H	HA	HB (**)	HC	HD (**)	HF (**)	HH	HK	K	L	LC	LL	LM	S1	d1	d2	D.E. Bearing	N.D.E. Bearing
71	71	7.5	-	147	-	-	130	-	7	285	313	130	130	-	M5x0.8	A3.15	6202-ZZ	6202-ZZ
80	80	8.6	-	165	-	-	150.5	-	10	310	345	130	130	M25x1.5	M6x1.0	A3.15	6204-ZZ	6203-ZZ
90S/L	90	9.5	39	186.5	218.5	114	185	-	-	382.5	427.5	151	151	-	M8x1.2	A3.15	6205-ZZ	6204-ZZ
100L	100	11	43	206	238.5	116	214.5	-	-	436.5	491.5	151	151	M32x1.5	M10x1.5	A4	6206-ZZ	6205-ZZ
112M	112	11	51	234	276	136	223	-	-	456	511	171	171	-	M12x1.8	A4	6207-ZZ	6206-ZZ
132S/M	132	16	60	273.75	307	145	270.5	-	-	521	586	171	171	-	-	A4	6308-ZZ	6207-ZZ
160M/L	160	22	42.5	326	400	171	258.5	174.5	14.5	715.5	775.5	284	284	2 x M40x1.5	DM16	A4	6309-C3	6308-C3
180M/L	180	28	51.5	362	435	180	278.5	-	-	752	812	284	284	-	DM20	A4	6311-C3	6309-C3
200M/L	200	30	71.5	400	479	200	306.5	-	-	821	941	284	-	-	-	A4	6312-C3	6212-C3
225S/M	225	34	44	475	487	225	330	258	18.5	921*	1071*	-	-	2 x M50x1.5	-	-	6314	6315
250S/M	250	-	-	525	529	250	363	-	-	951	1101	-	-	-	-	-	6314*	6314*
280S/M	280	44	69	525	529	250	363	24	24	1008	1158	362	-	-	-	-	6316	6314
315S/M	-	-	-	644	585	280	320	273	-	1135	1285	-	-	2 x M63x1.5	M20x2.5	-	6314*	6314*
315L	315	48	98.5	705	650.5	315	335	312	28	1282*	1422*	470	-	-	-	-	6316	6314
355M/L	355	53	138.5	805	727	355	339	-	-	1312	1452	-	-	-	-	-	6319	6316
355A/B	355	55	961	765	1550	1176	374	-	-	1391*	1532*	-	-	2 x M80x2	M20x2.5*	2 x M20x2.5	6314*	6314*
400L/J	400	-	-	867	1640	1266	400	450	35	1421	1562	-	-	-	M24x3.0	-	6322	6319
400G	400	58	1051	867	1640	1266	400	-	-	1489*	1639*	483	655	2 x M63x1.5	M20x2.5	-	6318*	6318*
450K/H	450	60	1187	965	1765	1387	-	465	42	1784*	1939*	-	-	-	M24x3	-	6324	6324
500K/H	500	65	1257	1081	1835	1457	-	-	-	1854	2039	-	-	-	M20x2.5	-	6318*	6318*
										1994*	2149*	483	655	-	M24x3	-	6324	6324
										2034	2219	-	-	-	M20x2.5	-	6318*	6318*
										2234*	2389*	-	-	-	M24x3	-	6324	6324
										2274	2459	-	-	-	M20x2.5	-	6318*	6318*
										2230*	2385*	-	-	-	M24x3	-	6326	6326
										2270	2495	-	-	-	M20x2.5	-	NU220+6020*	NU220*
										2750*	2205*	-	-	-	M24x3	-	6328	6328
										2830	3055	-	-	-	-	-	-	-

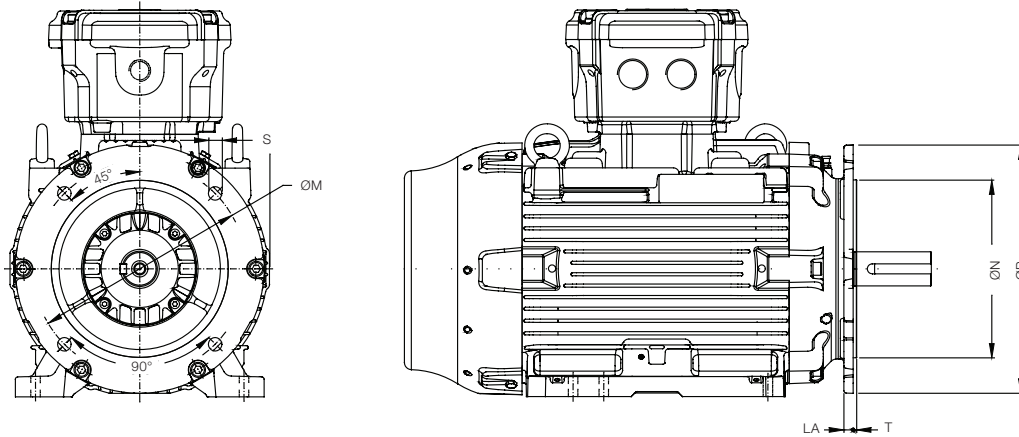
(*)Dimension applicable to 2 pole motors;

(**)Dimensions applicable to side terminal box mounting.

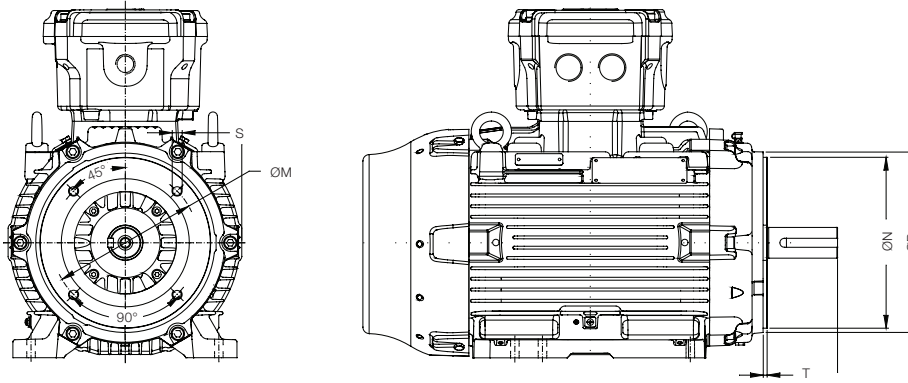
Frame size	AC	AC (**)	AD	HD	HF (**)	HB (**)	HD (**)	HK	LL	LM	S1
Oversized main terminal box: 1,090 A < I ≤ 1,900 A											
355A/B	780	1,296	1,365	1,312	1,220	862	1,720	899	483	655	*
400L/J	898	1,355	1,410	1,402	1,310	952	1,810				
400G											
450K/H	1,030	1,421	1,437	1,492	1,387	1,029	1,887				
500K/H	1,162	1,487	1,457	1,565	1,457	1,099	1,957				

(*)See Section 24 - Terminal Box Drawings;

“FF” Flange



Frame size	Flange	LA	M	N	P	S	T	α	N° of holes
71	FF-165	10	165	130	200	12	3.5	45°	4
80									
90	FF-215	11	215	180	250	15	4		
100									
112	FF-265	12	265	230	300	19	5		
132									
160									
180	FF300	18	300	250	350	19	5		
200			350	300	400				
225	FF-400	18	400	350	450	19	5		
250	FF-500		500	450	550				
280		FF-600	22	600	550	660	24	6	
315	FF-740	22	740	680	800				
355		30							
355	FF-740	30	740	680	800	24	6		
400		28						940	880
450	FF-940	30	1,080	1,000	1,150	28	7		
500									



“C-DIN” Flange

Frame size	Flange	M	N	P	S	T	α	N° of holes
71	C-105	85	70	105	M6	2.5	45°	4
80	C-120	100	80	120		3		
90	C-140	115	95	140	M8	3.5		
100	C-160	130	110	160				
112	C-200	165	130	200	M10			

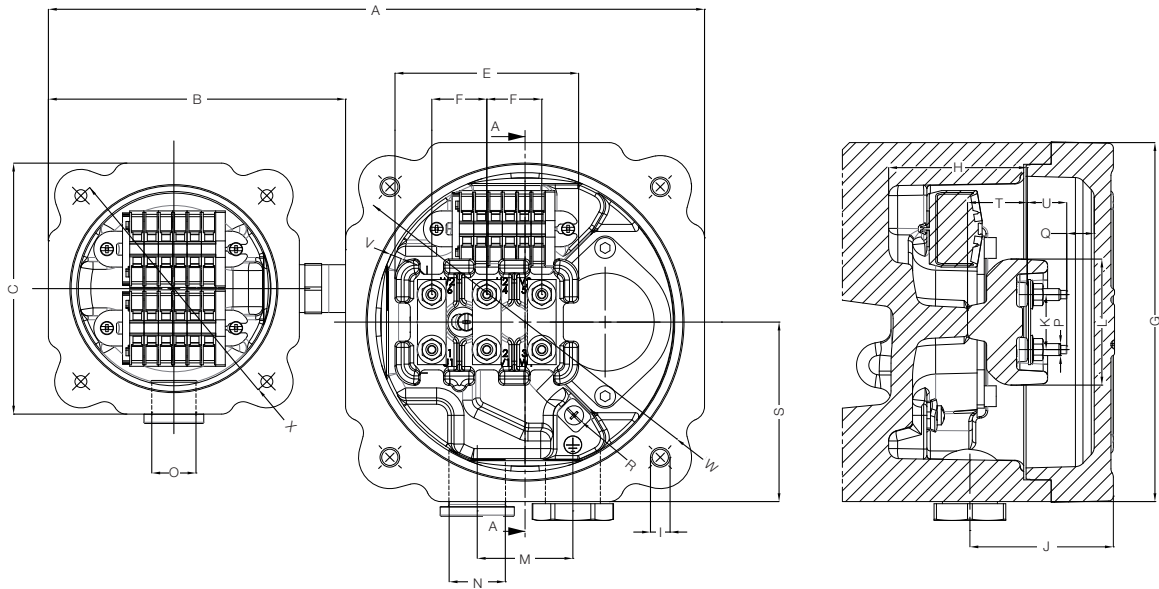
“NEMA C” Flange

Frame size	Flange	M	N	P	S	T	α	N° of holes
71	FC-95	95.2	76.2	143	UNC 1/4"x20	4	45°	4
80					UNC 3/8"x16			
90	FC-149	149.2	114.3	165	UNC 1/2"x13	6.3		
100								
112	FC-184	184.2	215.9	225	UNC 5/8"x11	6.3	22°3'	8
132								
160	FC-228	228.6	266.7	280	455	6.3		
180								
200	FC-279	279.4	317.5	395	455	6.3		
225								
250	FC-355	355.6	406.4	455	UNC 5/8"x11	6.3	22°3'	8
280								
315	FC-368	368.3	419.1	455	UNC 5/8"x11	6.3		
355								

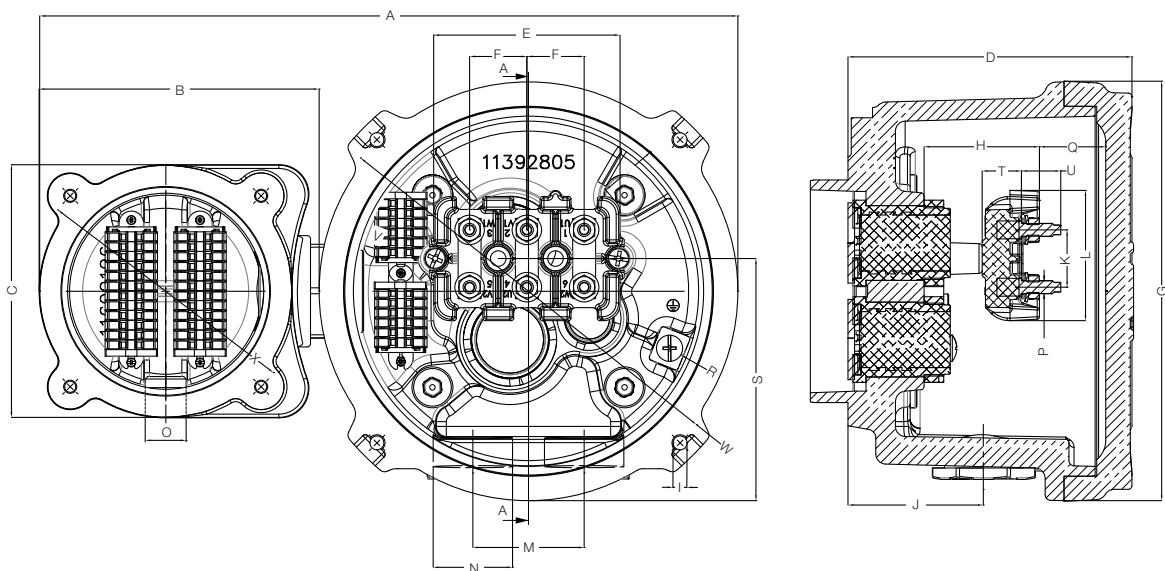


25. Terminal Box Drawings

Frames 71 to 132M/L



Frames 160M/L to 355M/L

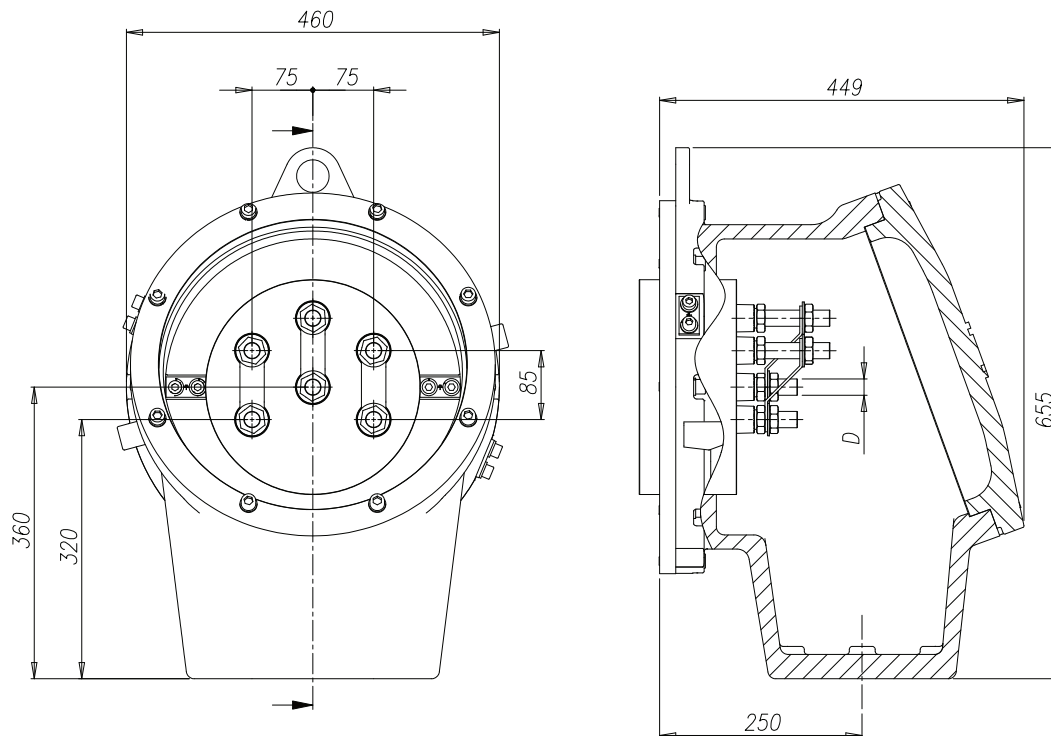


Frame size	A	B	C	D	E	F	G	H	I	J	K	L			
71	247	117	105	-	52	16	129.5	47.5	M6x1.0	49	16	34.5			
80					76	23	150	56.5	M8x1.2	60	23	53			
90	287				114	35	256	70.5		M10x1.5			82.5	35	79.5
100					173.5	156	45	363		129			M16x2.0	100	45
112					237	214	65	432	143	113	65	150			
132	291	214	65	432	143	113	65	150							
160	426.5	171	154	173.5	114	35	256	70.5	M10x1.5	82.5	35	79.5			
180					156	45	363	129	M16x2.0	100	45	111			
200	532	173			237	214	65	432		143	113	65	150		
225					291	214	65	432		143	113	65	150		
250					291	214	65	432	143	113	65	150			
280	624	173	154	237	156	45	363	129	M16x2.0	100	45	111			
315					237	214	65	432		143	113	65	150		
355					291	214	65	432		143	113	65	150		

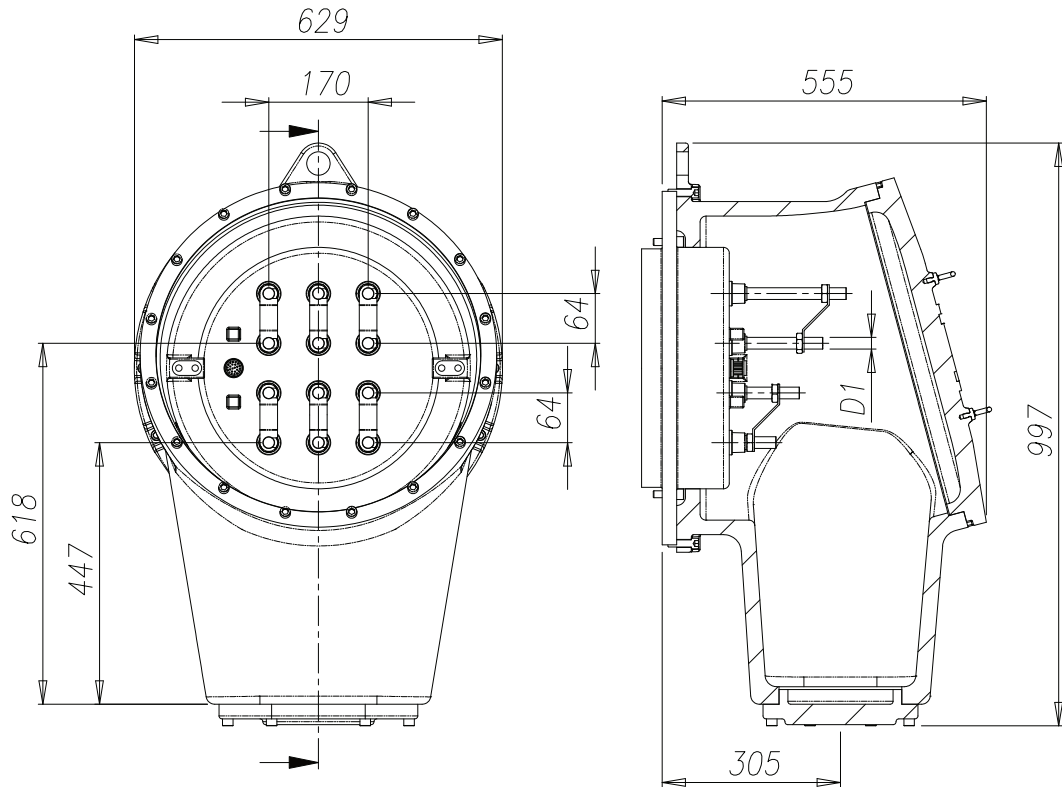
Frame size	M	N	O	P	Q	R	S	T	U	V	W	X		
71	34	M20x1.5	M20x1.5	4	11.5	M6	65	21.5	12	7	140	110		
80	40	M25x1.5		5			M7	75	25.5	16	3.5	160	55	
90		M32x1.5				85		12						92
100	50	M32x1.5		M25.1.5	8	40.5	M8	148	24	24	36	262	165	
112					100	M63x1.5	12	60.5	M15	181	37	40		63.8
132			16				79	M10	213	51	45	98		433
160	68	M50x1.5	8		40.5	M8	148	24	24	36	262			
180			100		M63x1.5	12	60.5	M15	181	37	40	63.8		369
200				16		79	M10	213	51	45	98	433		
225	100	M63x1.5	M25.1.5	12	60.5	M15	181	37	40	63.8	369			
250				16	79	M10	213	51	45	98	433			
280				16	79	M10	213	51	45	98	433			
315	100	M63x1.5		12	60.5	M15	181	37	40	63.8	369			
355				16	79	M10	213	51	45	98	433			

Power Terminal Box

Frames 355A/B to 500K/H – I ≤ 1,090 A



Frames 355A/B to 500K/H – 1,090 A < I ≤ 1,900 A

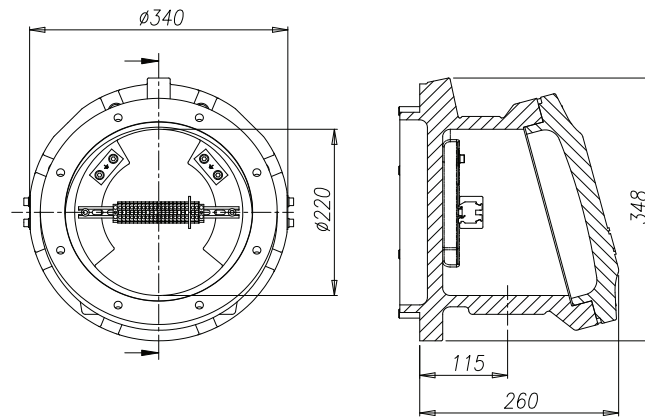


Current level	Entrance holes	Terminal	
		D	D1
I ≤ 545 A	2xM63x1.5	6xM12	-
545 A < I ≤ 690 A		6xM16	
690 A < I ≤ 900 A		6xM20	
900 A < I ≤ 1,090 A	4xM63x1.5	-	12xM16
1,090 A < I ≤ 1,385 A		-	12xM20
1,385 A < I ≤ 1,900 A		-	12xM20



Auxiliary Terminal Box

Frames 355A/B to 500K/H



26. Maximum Number of Auxiliary Connectors

	Frame size		
	71 up to 132	160 up to 200	225 up to 355
Auxiliary connectors inside the main terminal box			
Maximum number of auxiliary connectors	6	6	15
Auxiliary connectors inside the auxiliary terminal box			
Maximum number of auxiliary connectors	12	24	24

Table 40 - Maximum number of allowable auxiliary connectors per frame size

27. Drip Cover Data

The use of a rain drip cover increases the total length of the motor. The additional length can be seen in the table below.

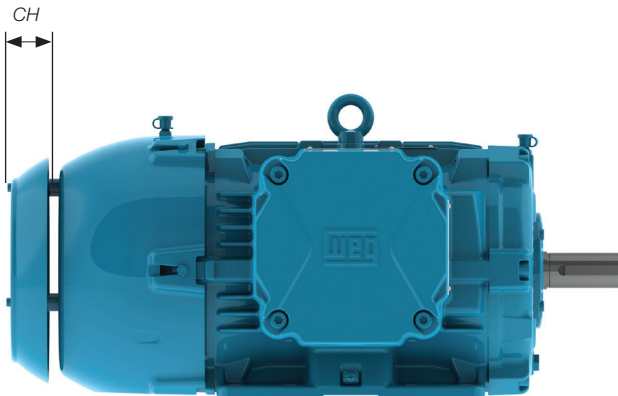


Figure 56 - Motor with drip cover

Frame	Dimension CH [additional motor length (mm)]
71	18
80	
90	
100	
112	28
132	
160	
180	
200	69
225	
250	
280	
315	91
355	
400	
450	
500	130

Table 41 - Drip cover dimension

28. Packaging

W22Xd motors in frames 71 to 132 are packaged in cardboard boxes (see figure 57), following the dimensions given in tables 42 and 43:



Figure 57 - Cardboard box

Top Mounted Terminal Box

Frame	External height (cm)	External width (cm)	External length (cm)	Weight package (kg)
71	32	27	43.2	1.233
80	32	27	43.2	1.233
90	32.5	27	45.5	1.854
100	43	33.5	60	3.0
112	43	33.5	60	3.0

Table 42 - Cardboard box dimensions for top mounted motors

Side Mounted Terminal Box

Frame	External height (cm)	External width (cm)	External length (cm)	Weight package (kg)
71	-	-	-	-
80	-	-	-	-
90	26.5	35	45.5	1.578
100	36	41.3	60	4.3
112	36	41.3	60	4.3

Table 43 - Cardboard box dimensions for side mounted motors

For frames 160 to 355M/L, the motors are packed in wooden crates (see figure 58). All wooden crates have phytosanitary treatment to comply with International Standard ISPM 15. Dimensions are in the following tables.

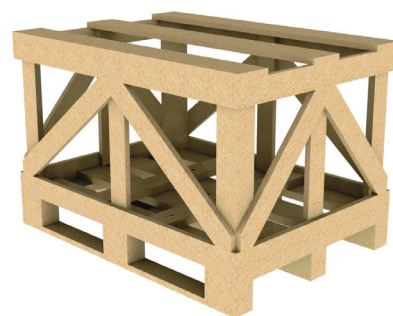


Figure 58 - Wooden crates

Top Mounted Terminal Box

Frame	External height (cm)	External width (cm)	External length (cm)	Weight package (kg)
132	48.2	34.2	64	6.435
160	60.2	40.2	89	9.405
180	64.2	44.2	92	12.760
200	71.2	51.2	108	15.840
225	90	75	115	47.5
250	102	75	125	55.3
280	120	85	140	78.5
315	130	85	155	80.2
315L	135	85	175	91.5
355	152.2	100	180	200
355A/B	170	127	227	84
400L/J	184	180	252	163
400G	184	180	276	170
450K/H	194	192	280	188
500K/H	201	194	336	215

Table 44 - Wooden crate dimensions for top mounted motors

Side Mounted Terminal Box

Frame	External height (cm)	External width (cm)	External length (cm)	Weight package (kg)
132	34.7	49.2	69	7.724
160	40.2	61.2	84	11.550
180	45.2	67.2	92	14.750
200	49.2	73.2	98	17.875
225	78	95	115	50.3
250	78	95	125	59.2
280	90	120	140	78.5
315	95	130	160	85.3
315L	95	130	175	87.5
355	112.2	135	180	206.9
355A/B	194	154	227	92
400L/J	208	201	252	178
400G	208	201	276	185
450K/H	221	211	280	205
500K/H	228	214	336	234

Table 45 - Wooden crate dimensions for side mounted motors

Sea/airworthy packing for shipments worldwide are also available.



Figure 59 - Sea packing

29. Spare Parts

For the first two years it is not necessary to buy spare parts for motors with a continuous duty under normal operation conditions.

If requested, spare parts can be supplied and for this it is necessary to inform WEG the motor serial number.

In the table below the common spare parts are listed.

Common spare parts:
Bearings
Axial or radial seal
Fan
Protections for winding and/or bearings
Grease nipple
Connectors (Auxiliary terminals)
Gasket

Table 46 - Spare parts list

Notes:

1. Constitution of spare parts stock should be decided based upon the importance of the application.
2. According to IEC60079-19, maintenance and repair works must be carried out only by certified personnel.



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For those countries where there is not a WEG own operation, find our local distributor at www.weg.net.



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