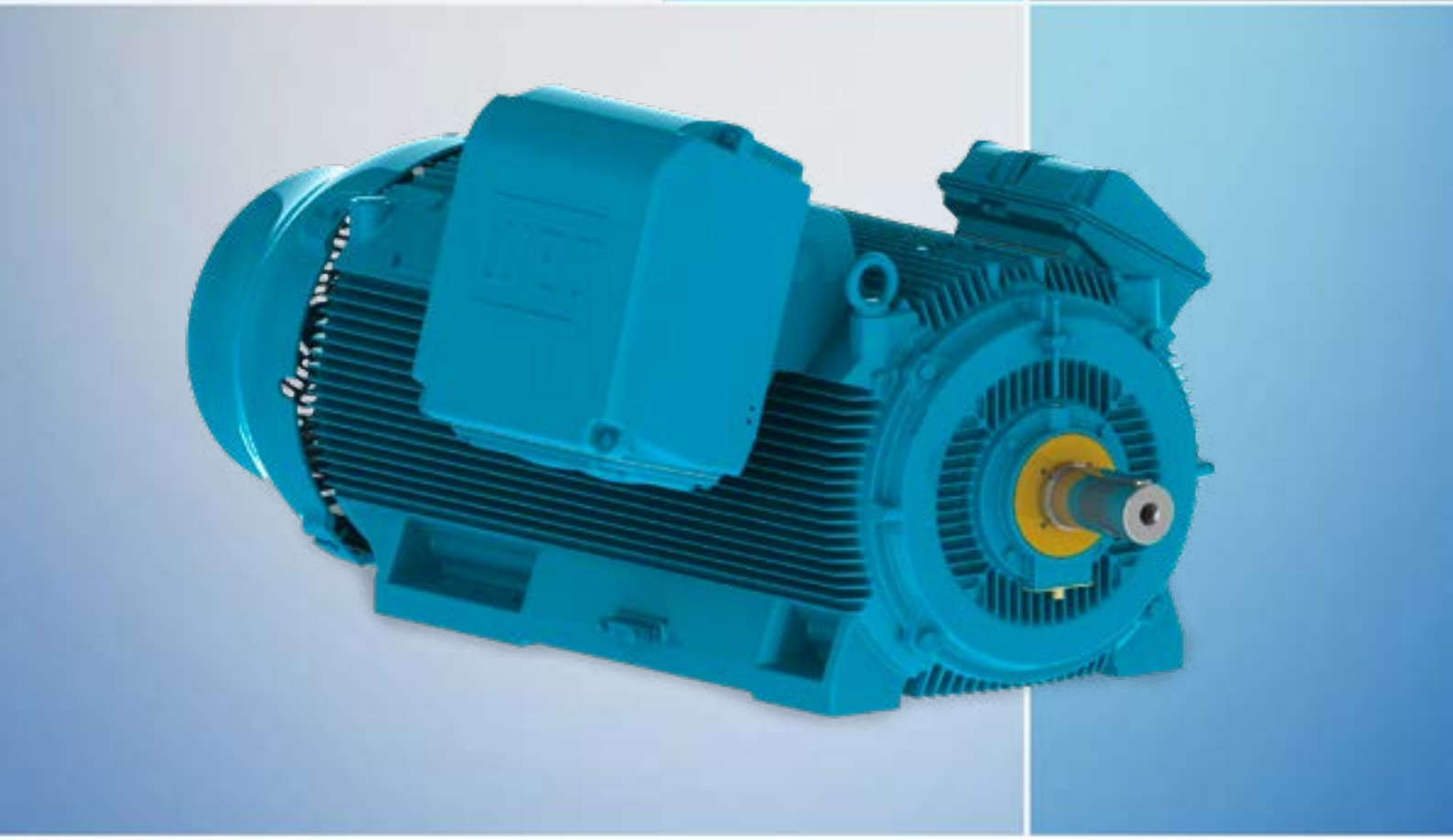
Industrial Motors
Commercial & Appliance Motors
Automation
Digital & Systems
Energy
Transmisssion & Distribution
Coatings

HGF

Three-phase Induction Motor

Technical Catalogue
Asian Market



Driving efficiency and sustainability

HGF
Three-phase Induction Motor

The HGF line is differentiated by its high performance combined with low maintenance costs. This product line is ideal for operating in the toughest applications, which require increased strength and durability of motors.

With the project updating in all aspects, the HGF motors present excellent performance levels, with one of the best rated output x frame size ratio available in the market.

Output x poles x frame size (6,000 V - 50 Hz)

Output x poles x frame size (6,000 V - 60 Hz)

Notes: Only 450 seats are available for 2-pole motors, 500,560 and 630 seats require advance consultation. Larger output power needs to be consulted in advance.

Product overview

Standard features

- Rated output: 75 kW up to 2800 kW
- Poles: 2, 4, 6, 8, 10 and 12
- Frame sizes: IEC 315 to 630 (NEMA 5006/7/8T to 9606/10)
- Frequency: 50 or 60 Hz
- Voltage: 380 V up to 10,000 V
- Service factor: 1.00
- Insulation class: F (DT 80 K)
- Degree of protection: IP55
- Mounting: B3 (F-1)
- Cooling method: TEFC – Totally enclosed fan cooled – IC411
- Enclosure material: FC-200 cast iron
- Fan covers: FC-200 cast iron for frames up to 400 (6806/7/8T) or steel for frames 450 (7006/10) and above
- Thermal protection:
  - Windings: PT-100 3 wire, 2 per phase
  - Bearings: PT-100 3 wire, 1 per bearing
- Bearings:
  - Grease lubricated ball bearings for frames up to 500 (8006/10)
  - Grease lubricated roller bearings for frame 560 (8806/10) 4, 6, 8, 10 and 12 pole.
- Insulated non-drive endshield bearing
- Bearing seals:
  - For grease lubricated bearings:
- Labyrinth seal
  - For oil lubricated bearings and sleeve bearings: Mechanical seal
- Vibration: Grade A (IEC)
- Balance: With half key
- Shaft locking device for bearings protection
- Nameplate: AISI 304 stainless steel (laser inscribed)
- Drain: Automatic rubber plug
- Space heater
- Color: RAL 5009 (Blue)

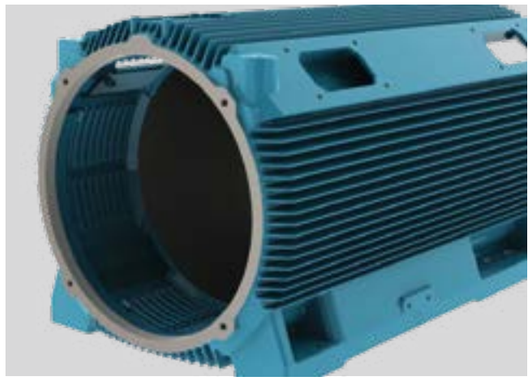
Optional features

- Suitable for VFD application
- Encoder: Dynapar HS35(Other models under inquiry)
- Degree of protection: IP55W or higher
- Mounting: Other mounting configurations
- Cooling method: TEBC – Totally enclosed blower cooled – IC416
- Fans: FC-200 cast iron
- Surrounding muffler
- Drip cover for shaft down applications
- Terminal boxes: Steel welded terminal boxes
- Second terminal box: For “Y” connection with accessible neutral terminal
- Cable gland: Plastic, brass or stainless steel threaded.
- Thermal protection: Bimetallic thermal protection, thermistor (PTC) or calibrated PT-100 for alarm or tripping, at windings or bearings
- Thermometer on bearings with gauge with/without contacts
- Bearings:
  - Oil lubricated bearings.
  - Sleeve bearings for all frame sizes
  - Insulating brush kit for drive end shaft for VFD applications
  - Bearings designed for vertical mounting normal or high thrust applications
- Insulated drive endshield bearing
- Vibration: Grade B (IEC)
- Suitable for vibration detector SPM
- Balance: Special balance levels
- Voltage surge protection: Lightning arrestors and capacitors
- Stainless steel screws
- Internal epoxy coating (tropicalization)

Other features available under request

- Voltage: 11,000 V to 13,800 V
- Service factor: 1.15 or 1.25
- Insulation class: F (105 K), H (80 K, 105 K or 125 K)
- Independent hydraulic oil circulation system for sleeve bearing
- CT for differential and integral protection
- Power factor correction capacitors
- Signal transducer
- Special shaft dimensions
- Tacogenerator
- Non-reverse ratchet
- Base: rail, sliding base, extended feet, rebuilt feet, anchorage plate

Features and benefits



Frame

With the optimization of the frame's structural design, the intent was the best equation between mechanical rigidity and thermal dissipation possible for enclosures, thereby reducing motor vibration and increasing lifetime.
The HGF motor frames consist of a single piece of high strength cast iron. External and internal fins, in conjunction with the fan and fan cover, provide the maximum heat dissipation possible for a self-ventilated motor, thus enabling increased levels of rated power per frame size and avoiding the overheating of the motor.
The gray cast iron FC-200 produced by WEG foundries is the material recommended by the Standards for explosion proof motors and it provides the HGF motors with higher strength and durability.

Terminal box

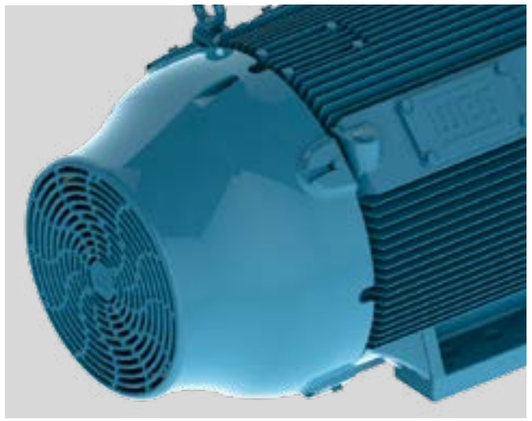
The main and accessories terminals are supplied inside two different terminal boxes. Through its oversized dimensions and versatility, the motors will offer easy connection, and can be supplied according to the customer's preference, with flying leads, terminal pins or screws (for high voltage motors), etc. Terminal boxes can be rotated in 90°.
Under demand, the motors can be supplied with steel constructed terminal boxes, and, with a second main terminal box for Y connection with accessible neutral.

Sleeve bearings

Motors may be fitted with sleeve bearings as an optional feature in direct coupling applications. Sleeve bearings require less maintenance due to the fact that the lubrication intervals are up to three times longer than the lubrication intervals of conventional bearings, and specially because they present a lifetime similar or longer than that the motor itself.
The sleeve bearings are also outstanding for their very low operating noise level and for supporting higher speed levels when compared to conventional bearings.

Fan cover

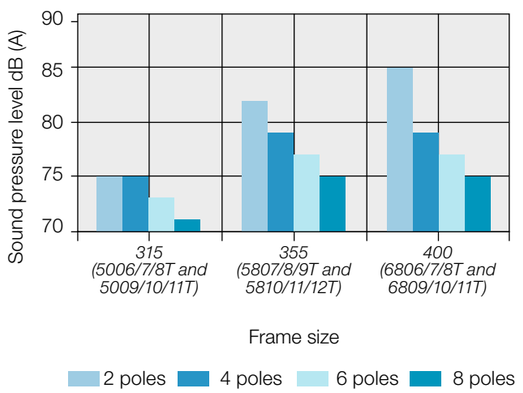
The fan cover was designed to direct airflow over the entire frame with minimal recirculation in the motor interior, allowing maximum heat exchange and resulting in a cooler motor.
This innovation in the cooling system offers lower noise levels, with reductions of up to 7 dB(A), in addition to the higher mechanical strength and optimal air flow.
Additional noise supressors are available as special feature.



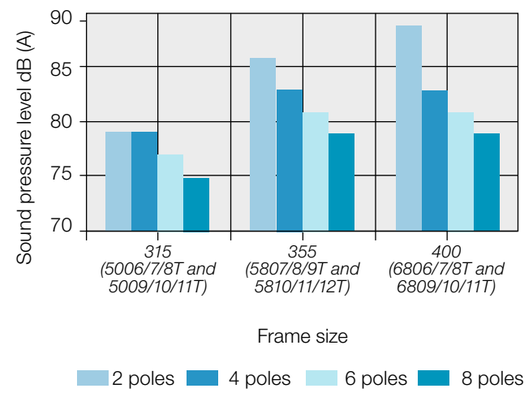
Sound pressure level

The design of the ventilation system of the HGF line provides mechanical strength and optimum air flow, allowing reductions in the sound pressure level of up to 7 dB (A), thus increasing the reliability and longevity of the motor. The tables below show the sound pressure levels for frames sizes 315 to 400.

Sound pressure level dB (A) - 50 Hz



Sound pressure level dB (A) - 60 Hz



Dedicated HGF Lines

The HGF motors can be adapted to the most different needs. The HGF line also utilizes product families (according to relevant standards, ABNT, IEC or NEMA) to suit specific needs and applications, always considering the best solution for the customer.

HGF General Purpose Line

One of the greatest benefits offered by the HGF motors is the flexibility. Due to its production process, WEG can tailor-make these motors according to customer specifications. This makes the HGF the ideal product ***drop-in replacement*** motors in any kind of application. This versatility is exemplified by the availability of several mounting configuration and characteristics such as special built bases (rails, sliding base, anchorage plate, etc).
This flexibility on mounting allows the construction of these motors in higher degrees of protection, up to IP66W. This degree of protection is suitable for the most aggressive environments, such as ***Siderurgy Industries*** applications, where SO_2 gases, vapors, solid contaminating agents, high humidity, alkalis, and solvent drips are constantly present.
HGF motors can be designed to be driven by frequency inverters, offering the maximum in control and precision, two decisive items for the ***Sugar and Ethanol Industry***. Special applications such as cane shredders and grinders require speed variation in tough conditions. HGF motors meet this requirements, with higher degrees of protections available and high starting torques. These motors are also used and sugar mills and alcohol distilleries for fans, exhausters and centrifugal pumps. Hazardous locations can also be served with our ***Ex-nA HGF Line.***
Precision and reliability are also essential in the ***Pulp and Paper Industry***. In the coiling machine, for example, one of the most fragile applications, an accurate speed control and mechanical strength are demanded. As this is a critical part of the process, the HGF motors are widely used on it, offering low maintenance and outstanding performance levels. For the several other motor applications in this industry, the motors can be supplied with special painting plans and stainless steel screws, resulting in longer lifetimes in the aggressive and corrosive ambient conditions present in the industries.

NEMA HGF Vertical Line
Low or High Thrust Applications

Vertical motors are used in all kinds of industries and applications. The application can be highlighted in the ***Water and Wastewater Industry***, where HGF motors are applied to large vertical pumps, mixers, agitators, cooling towers, etc.
Through sophisticated tools for finite elements calculation, WEG has designed the new HGF motors for applications with high thrust, making them ideal for vertical applications.
To ensure that each motor has an excellent thermal and airflow performance, tests were performed to determinate the most favorable design which maintains lower bearing temperatures. The result is a simple assembly that meets the rigid requirements of high thrust vertical application.

HGF Mining Line

A constant concern of the ***Mining industry*** is to reduce operating costs, through lower energy consumption and low maintenance thus increasing product quality. With this is mind, WEG has developed the HGF Mining line, a motor with optimized performance, designed to operate in severe environments. The design has electromechanically differentiated features that ensure durability, strength and robustness in all stages of the process, from material extraction to transportation and processing equipment.

Main line features

- Internal anticorrosive coating
- Seal on joints: Permatex
- Painting plan: 214P for severe environments
- Degree of protection: IP66W

IEC Non-Sparking (Ex nA) HGF Line
NEMA Class I Division 2 HGF Line

This line was developed for hazardous areas where explosive atmospheres may occur (as standard: an explosive atmosphere will probably not be present under normal operating conditions and, if any, this will be for short periods of time, that is, an explosive atmosphere may be present accidentally).
This type of protection is applied to electrical equipment which does not cause ignition of an explosive atmosphere under normal operating conditions.
The IEC Ex nA HGF motors have been certified by BASEEFA, according to ATEX Directive 94/9/EC and are protected for operation in hazardous areas classified as Zone 2, Group II, Temperature Class T3.
HGF NEMA motors meet the requirements of the standard NEC referring to hazardous areas classified as Class I Division 2, Groups B, C and D, Temperature Code T3. Optionally, these motors can be designed to operate in areas classified as Class II, Groups F and G. HGF NEMA motors are CSA certified.
Widely used in ***Oil & Gas Industry, Pulp & Paper Industry, Sugar & Ethanol Industry,*** etc.

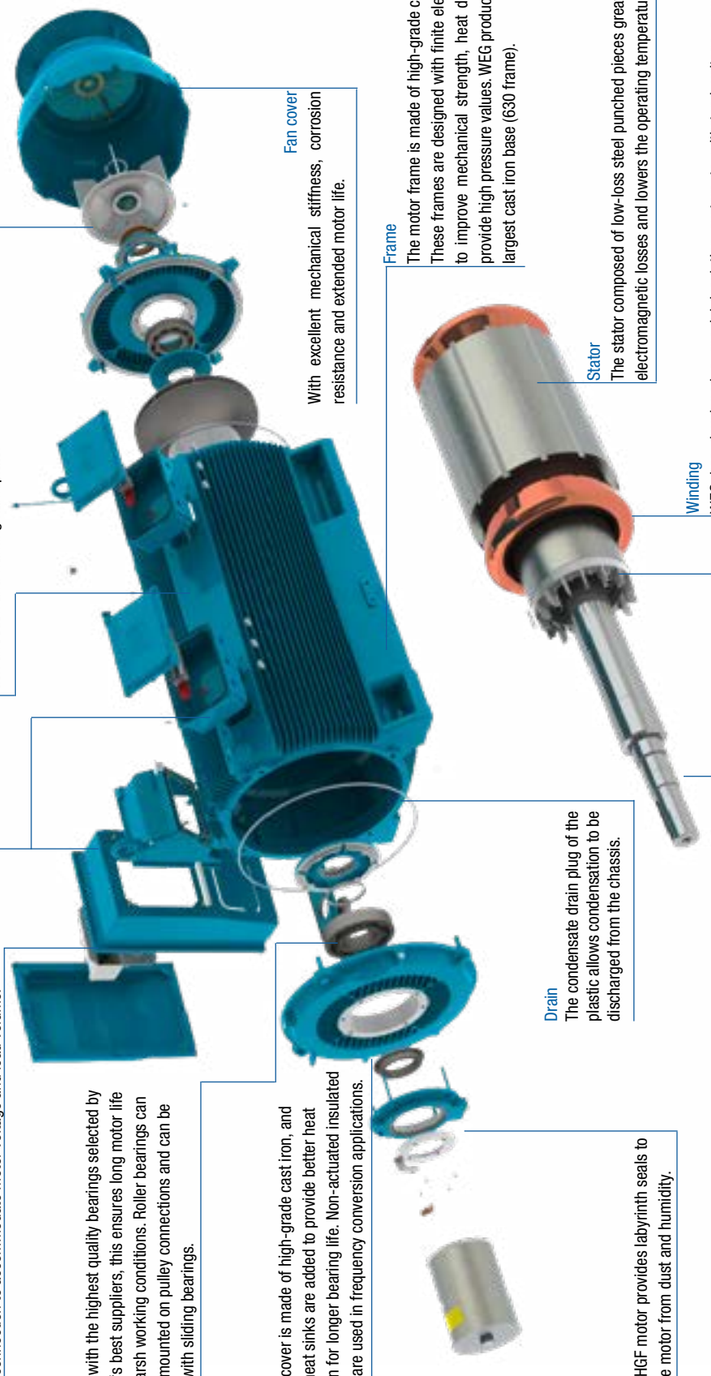
HGF API 541 Line

The American Petroleum Institute, known as API, is the leading trade association for the U.S. segment of Petroleum and Natural Gas, representing approximately 400 industries involved in production, refining, distribution and various other aspects of the oil industry.
The HGF API 541 Line was specifically developed to meet the standard determined by the API, called the API 541, for electric motors which will operate in the environments of ***Oil & Gas Industry***.
The HGF API 541 line strictly complies with the requirements of the standard, widely used in petrochemical industries not only in America but around the world, and is highly utilized in the Middle East, the largest world oil producing region.

Main line features

- Available according to IEC and NEMA;
- Available for 50°C ambient temperature (mainly for Middle East Region);
- Copper rotor;
- Sleeve bearings;
- Maximum Is/In of 6.5 times;
- Non-sparking aluminum fan with maximum copper composition of 0.2%;
- Closed threaded metallic drain plug;
- Stainless steel screws.

HGF - Motor Structure Drawing



Nameplate
Our 316 grade stainless steel nameplate contains a complete and permanent record of all motor data for future reference. This includes the motor serial number, electrical data and bearing lubrication information.

Auxiliary nameplate
The motor also includes accessories, space heater, rotation direction and warning nameplate.

Fan
WEG's fan and fan hood design helps provide low noise electric motors. Our fan is designed to ensure a low motor temperature rise, thus minimizing winding losses and improving motor efficiency.

Fan cover
With excellent mechanical stiffness, corrosion resistance and extended motor life.

Frame
The motor frame is made of high-grade cast iron. These frames are designed with finite element analysis to improve mechanical strength, heat dissipation and provide high pressure values. WEG produces the world's largest cast iron base (630 frame).

Stator
The stator composed of low-loss steel punched pieces greatly reduces electromagnetic losses and lowers the operating temperature.

Winding
WEG has developed a special insulation system to withstand voltage surges and transients in modern applications. In addition, all low-voltage motors are equipped with voltage resistant lines and insulation suitable for frequency conversion applications.

Rotor
Our die-cast aluminum rotor has lower inertia, higher starting torque, excellent mechanical rigidity, lower rotor temperature and higher speed performance. The thermochemically treated low electrical loss magnetic steel lamination produces high operating efficiency and enhanced reliability. Copper bar rotors are also available.

Terminal block
The main and auxiliary junction boxes are made with enough space for the main power supply and auxiliary leads. It can rotate at 90° intervals and has one or more threaded cable entry points (except when installing surge capacitors or lightning guards). The high pressure main junction box is equipped with pressure relief device.

Terminal
Provide a connection to accommodate motor voltage and lead volume.

Bearing
Equipped with the highest quality bearings selected by the world's best suppliers, this ensures long motor life even in harsh working conditions. Roller bearings can be easily mounted on pulley connections and can be provided with sliding bearings.

Cover
The WEG cover is made of high-grade cast iron, and external heat sinks are added to provide better heat dissipation for longer bearing life. Non-actuated insulated end caps are used in frequency conversion applications.

Drain
The condensate drain plug of the plastic allows condensation to be discharged from the chassis.

Seal
The WEG HGF motor provides labyrinth seals to protect the motor from dust and humidity.

Shaft
WEG HGF motor shafts provide high mechanical strength, prevent load flexure, and minimize fatigue, thus achieving superior performance.

Contents

1. Introduction

HGF series motors are compact and simple in structure and stable in performance. They are widely used in various occasions such as industrial manufacturing and processing.

Frame is equipped with external heat sinks to maximize heat dissipation and extend the service life of the motor.

HGF series motors are designed according to the IEC 60034-1 standard. The mechanical design is based on the IEC 60072 standard.

The cooling system is composed of an inner fan and an outer fan to ensure that the heat inside the motor is evenly distributed, so that the motor has good performance.

HGF series motors are asynchronous squirrel cage motors. The rotor material is aluminum or copper (HGF API 541). The frame number is from IEC 315C/D/E to 630. The voltage can be from low voltage to medium voltage 6.6kV. The high voltage can range from above 6.6kV to 11kV.

HGF series motors are flexible in design to meet variable torque and constant torque load requirements, and are suitable for different user needs, such as fans, pumps, mills, compressors, etc.

HGF series motors can be operated at -20°C to +40°C. At the same time, WEG can also design and provide HGF series motors according to customers' special environmental temperature requirements.

2. Classification

HGF series motors are named according to the following rules:
IEC: Motors with frame size 400 have two length casings, each casing has 3 sets of foot holes, respectively:
HGF 400L/A/B and HGF 400C/D/E
The length of the case with frame size 450 and above is unique. Each case has 5 foot holes (L/A/B/C/D) of different lengths. These enclosures are represented as:
HGF450, HGF500, HGF560, HGF630

3. Standard

HGF series motors meet the requirements and specifications of the latest version of the following standards:

STANDARD	TITLE
IEC Market (other than Brazil)	
IEC EN 60034-1	Rotating electrical machines, rating and performance
IEC 60034-2	Rotating electrical machines, Methods for determining losses and efficiency
IEC 60072-1 and 2	Dimensions and output series for rotating electrical machines
IEC EN 60034-8	Terminal markings and direction of rotation for rotating electrical machines
IEC EN 60034-7	Rotating electrical machines, Symbols for types of construction and erection
IEC 60034-11	Built-in thermal protection
IEC EN 60034-6	Rotating electrical machines, methods of cooling
IEC EN 60034-5	Rotating electrical machines, degrees of protection
IEC 60034-14	Rotating electrical machines, mechanical vibrations
IEC EN 60034-9	Rotating electrical machines, noise limits (1kW up to 5500kW)
IEC EN 60034-12	Rotating electrical machines, starting performance of induction cage motors up to 660V, 50Hz
IEC 60038	IEC standard voltages
Brazilian Market	
NBR 17094-1	Electric Rotating Machines - Induction Motors - Part 1: AC
NBR 5383-1	Rotating Electrical Machines - Part 1 Three-Phase Induction Motors – Test
NBR 15367	Rotating Electrical Machines - Induction Motors - Marking Cables and Terminals Rotation Direction
NBR15623-1	Rotating Electrical Machines - Dimensions and power series for rotating electrical - standardization - Part 1: Appointment of carcasses between 56-400 and between flanges and flanges between 55-1080
NBR15623-2	Rotating Electrical Machines - Dimensions and power series for rotating electrical - standardization - Part 2: Appointment of carcasses between 355-1000 and between flanges and flanges between 1180-2360
NBR 7565	Rotating Electrical Machines - Noise Limits
NBR IEC 60034-5	Rotating Electrical Machines - Degrees of protection provided by nclosures
NBR 5031	Rotating Electrical Machines - Classification of Mounts and Mounting Positions
NEMA Markets	
NEMA MG1	Motors and Generators
Non-Sparking Motors	
–	Brazil
ABNT NBR IEC 60079-0	Explosive Atmospheres Part 0: equipment – General Requirements
–	Electrical Equipment for Explosive Atmospheres – Part 15: Construction, testing and marking of electrical apparatus with type of protection "n"
–	ABNT NBR IEC 60079-15
IEC (other than Brazil)	
IEC 60079-0	Electrical Apparatus for Explosive Gas Atmospheres–Part 0:General Requirements
IEC 60079-15	Electrical Apparatus for Explosive Gas Atmospheres–Part 15: Type of Protection "N"
API 541 Motors	
API 541	Form-wound squirrel cage induction motors – 500 horsepower and larger

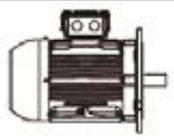
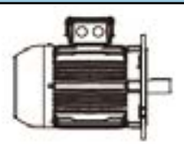
Table 1-Standards that must be observed in motor design

4. Structural details

The information described here is the standard installation method and the most commonly used HGF series models. According to user requirements, special purpose and/or customized motors can also be provided.

4.1 Shell protection

According to the IEC60034-6 standard, the standard HGF motor is a totally enclosed self-fan cooling (IC 411) motor.
According to the IEC60034-7 standard, the HGF motor installation method is IMB3. At the same time, HGF motor can also choose flange installation and vertical installation.

IM B3	IM V5
IM 1001	IM 1011
	
IM B35	IM V15
IM 2001	IM 2011
	
IM B5	IM V1
IM 3001	IM 3011
	

The base and end cover are made of FC-200 cast iron. The heat sink distributed on the outer surface of the base not only enhances the mechanical strength of the base, but also optimizes the heat dissipation effect. The base has integrated motor foot holes, which makes the overall structure of the base more solid. The bottom of the base is equipped with a plastic drain hole. The motor uses different positions of drain holes due to horizontal or vertical installation, as shown in the figure below:

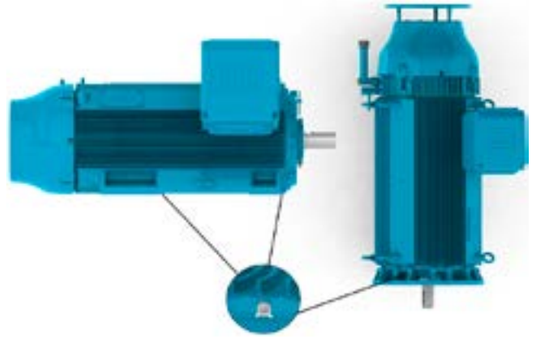


Figure 1-Position of the drain hole of HGF motor installed horizontally and vertically

Fastening bolts and junction box mounting bolts are 8.8 (ISSO 898/1) grade, zinc-plated. API 541 HGF motor is equipped with SAE316 stainless steel fastening bolts and junction box mounting bolts.

4.2 Fan cover

HGF horizontal and vertical mounting motors with frame sizes ranging from IEC 315C/D/E to 400C/D/E and using anti-friction bearings and without forced cooling are equipped with fan covers, as shown in the figure.

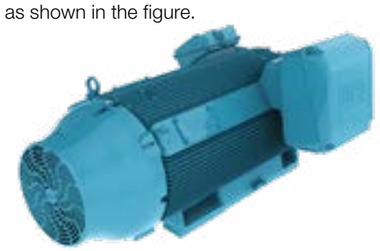


Figure 2-HGF IEC 315L/A/B to 400C/D/E motors

Grounding blocks are installed on the feet on both sides of the motor. A grounding block is also installed in the junction box. Non-sparking explosion-proof motors and API 541 motors are equipped with grounding strips to connect the junction box and the frame, as shown in the figure below.

Figure 3-Grounding strip used for non-sparking explosion-proof and API541 motors

It is recommended to install a drip cover for vertical cast iron fan cover motors for outdoor applications.
HGF motors with frame sizes ranging from 450 to 630 and using sliding bearings are equipped with a steel fan cover, as shown in the figure.

Figure 4-Steel fan cover for motors with sliding bearings

4.3 Terminal box

The main and auxiliary junction boxes of HGF motors are made with enough space to accommodate the main line and wiring. The junction box can be rotated 90°. The high-voltage main junction box is equipped with a pressure relief device.

Figure 5-Standard HGF main junction box

The terminal leads from the winding are introduced into two terminal boxes: a main terminal box for connecting the power supply; an auxiliary terminal box, which contains two parts, which are respectively used for connecting the PT100 and the space heating belt.

Figure 6-The auxiliary junction box

The low-voltage HGF motor provides 6 lead wires, which can be started directly from the grid power supply or using a star-delta start. For ease of installation, all leads are connected to terminal blocks.

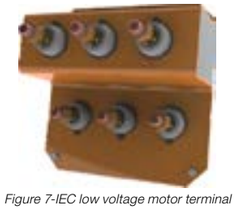


Figure 7-IEC low voltage motor terminal

The high-voltage HGF motor provides 3 lead wires, which can be installed in the terminal pins. If necessary, an additional junction box can be added to the high-voltage motor, which is installed on the opposite side of the main junction box to place the winding star point.

Figure 8-IEC high voltage motor terminal

4.4 Stator winding

In general, standard stator windings have F-class insulation and 80K temperature rise. Low-voltage motors can choose H-class insulation and 80K temperature rise. High-voltage motors use class F insulation, and class H insulation can be used under special requirements. Each phase winding of the standard HGF motor is equipped with 2 PT100s for temperature detection. Each motor is equipped with a space heating system.
The windings of low-voltage motors are wound with scattered wires. For HGF motors with frame sizes from 315C/D/E to 450, the winding insulation dipping paint adopts continuous drip dipping process. High voltage motors use shaped coil windings and are impregnated by a vacuum pressure impregnation (VPI) system.

4.5 Nameplate

In accordance with the requirements of IEC 60034-1, HGF motors provide nameplates with performance data. At the same time provide auxiliary component nameplate. The nameplate is made of SAE 304 stainless steel, and the content of the nameplate is engraved by laser. The motor serial number and production date are marked on the main nameplate. All nameplates are fastened and installed on cast iron parts (such as base or auxiliary junction box cover) by bolts.

4.5.1 Main nameplate

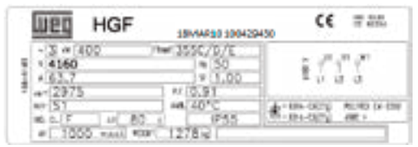


Figure 9-Example of a nameplate-main nameplate

4.5.2 Auxiliary nameplate

A) PT-100

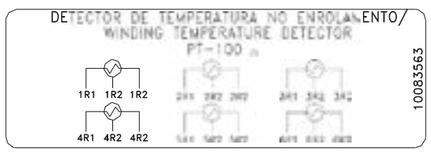


Figure 10-Example nameplate-winding PT-100

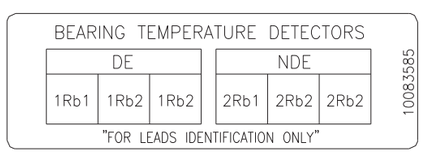


Figure 11-Example nameplate-bearing PT-100

B) Heating tape

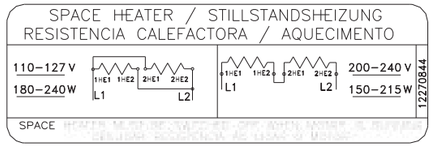


Figure 12-Example of a nameplate-heating tape

4.5.3 Warning nameplate

HGF motors with rated voltage higher than 1kV are equipped with safety nameplate, and the junction box cover is marked with high voltage warning.

Figure 13-Example of Nameplate-High Voltage Warning Nameplate

4.6 Cooling system, noise and vibration levels

4.6.1 Cooling system

According to the IEC 60034-6 standard, the cooling method of HGF motor is totally enclosed self-fan cooling (IC411). HGF motors can also use forced cooling (IC416), fanless self-cooling (no external cooling) (TENV) and fanless self-cooling (with external cooling) (TEAO) and other cooling methods. For more information about IC416, please refer to the “Variable Frequency Drive” section.

4.6.2 Noise level

The motor cooling fan for a 2-pole motor is unidirectional, and the cooling fan for motors with other poles is bidirectional.

The following table shows the measured sound pressure level data of HGF motor running at 50Hz and 60Hz, the unit is dB(A).

Frame	Sound Pressure Levels dB (A) to 50 Hz				
IEC	NEMA	2P	4P	6P	8P
315 C/D/E	5009/10/11T	75	75	73	71
355 C/D/E	5810/11/12T	82	79	77	75
400L/A/B & 400 C/D/E	6806/7/8T & 6809/10/11T	85	79	77	75

Frame	Sound Pressure Levels dB (A) to 60 Hz				
IEC	NEMA	2P	4P	6P	8P
315 C/D/E	5009/10/11T	79	79	77	75
355 C/D/E	5810/11/12T	86	83	81	79
400L/A/B & 400 C/D/E	6806/7/8T & 6809/10/11T	89	83	81	79

The following table shows the measured sound pressure level data of the HGF motor equipped with a steel fan cover when running at 50Hz and 60Hz, the unit is dB(A).

Frame	Sound Pressure Levels dB (A) to 50 Hz				
IEC	NEMA	2P	4P	6P	8P
315 C/D/E	5009/10/11T	75	75	73	71
355 C/D/E	5810/11/12T	82	79	77	75
400L/A/B & 400 C/D/E	6806/7/8T & 6809/10/11T	85	79	77	75
450	7006/10	88	88	85	80
500	8006/10	88	92	85	82
560	8806/10	-	92	88	82
630	9606/10	-	92	92	82

Frame	Sound Pressure Levels dB (A) to 60 Hz				
IEC	NEMA	2P	4P	6P	8P
315 C/D/E	5009/10/11T	79	79	77	75
355 C/D/E	5810/11/12T	86	83	81	79
400L/A/B & 400 C/D/E	6806/7/8T & 6809/10/11T	89	83	81	79
450	7006/10	92	92	88	82
500	8006/10	92	92	88	85
560	8806/10	-	92	92	85
630	9606/10	-	92	92	85

The above sound pressure level data is measured by the motor under no-load conditions. According to the IEC 60034-9 standard, the sound pressure level increment of the motor under full load is shown in the table below.

Shaft Height H(mm)	2 poles	4 poles	6 poles	8 poles
H=315	2	3	5	6
H≥355	2	2	4	5

Note:
1. These values apply to both 50Hz and 60Hz.
2. The sound pressure level is measured under sinusoidal conditions. The sound pressure level increment of the VFD varies with the switching frequency. In any case, the maximum value of the increment shall not exceed 11dB(A).

4.6.3 Vibration level

The vibration level of the motor is closely related to its installation. Therefore, it is recommended to check the vibration level during routine maintenance.

In order to evaluate the vibration of the motor itself, it must be measured according to the test procedure required by the IEC 60034-14 standard when the motor is not connected to other equipment.

The motor vibration intensity allowed by the IEC 60034-14 standard is divided into Class A and Class B, as shown in the following table:

Vibration Level	Mounting	Displacement µm	Velocity mm/s	Acceleration m/s^2
A	Free suspension	45	2.8	4.4
	Rigid mounting	37	2.3	3.6
B	Free suspension	29	1.8	2.8
	Rigid mounting	24	1.5	2.4

Vibration level B is suitable for motors with special vibration requirements.
All rotors have half-keys for dynamic balance, and the standard motors conform to class A (3).
Optional grade B is optional for special requirements.

(3) API 541 motor conforms to vibration level B.

NEMA Vibration level

Synchronous speed [rpm]	Rotational Frenquency [Hz]	Limiting vibration speed zero-peak	
		[pol./s]	[mm/s]
3600	60	0.15	3.8
1800	30	0.15	3.8
1200	20	0.15	3.8
900	15	0.12	3.0
720	12	0.09	2.3
600	10	0.08	2.0

In order to monitor the vibration status, the HGF motor end cover is equipped with 3 M8 threaded holes, which can be used to install vibration sensors. In addition, users can purchase threaded sockets according to their needs. The position of the threaded hole is shown in the figure below.
If necessary, the vibration sensor can be provided with the motor.

Figure 14 - Threaded hole location for vibration monitoring

4.6.4 Axial displacement limit

According to the IEC 60034-14 standard, it is recommended to measure shaft displacement only for motors with a speed exceeding 1200 rpm and a rated power exceeding 1000 kW, equipped with sliding bearings.

The design of the motor is suitable for installing proximity sensors. API541 motors are equipped with this design. For other motor series, please contact WEG.

The sensor reading is affected by mechanical factors and magnetic interference of the shaft, and is generally designated as jitter. The NEMA-MG1 standard stipulates that the runout should be measured at a low speed (100 to 400rpm), because the effect of unbalanced force can be ignored in this case.

Considering electrical and mechanical runout, the vibration of the shaft of a standard motor equipped with sliding bearings shall not exceed the following limits:

Vibration Level	Speed range (rpm)	Maximum displacement relative to the shaft (µm)	Runout (µm) (peak to peak)
A	>1800	65	16
	≤1800	90	23
B	>1800	50	12.5
	≤1800	65	16

According to the NEMA MG1 standard, only non-contact proximity sensors can measure the vibration limit value of the motor shaft. The vibration limit values for standard and special motors are given below. In order to obtain good measurement results, the peak-to-peak value of the shaft jitter should not exceed 6.4µm (peak-to-peak value 0.0005 inches), or 25% of the vibration displacement limit value, whichever is greater.

Standard motor limit value

Considering electrical and mechanical runout, the vibration of the shaft of a standard motor equipped with sliding bearings shall not exceed the following limits:

Synchronous speed (rpm)	Maximum relative shaft displacement (peak to peak)
1801-3600	0.0028" (70µm)
≤1800	0.0035" (90µm)

Special motor limit value

Considering electrical and mechanical runout, the vibration of the shaft of a rigidly mounted special motor equipped with sliding bearings shall not exceed the following limits:

Synchronous speed (rpm)	Maximum relative shaft displacement (peak to peak)
1801-3600	0.0020" (50µm)
1201-1800	0.0028" (70µm)
≤1200	0.0030" (75µm)

4.7 Shafts, bearings and loading

4.7.1 Shafts

The standard motor shaft material is AISI4140, and the size meets the requirements of the IEC60072 standard. In order to facilitate the maintenance of the motor and installation of the coupling, all HGF motor shafts have a threaded center hole (in accordance with DIN332). You can check the corresponding center hole size in the mechanical data part of this sample.

The standard shaft motor is equipped with a B key (other key types under inquiry). To meet the special needs of customers, HGF motors can also be designed with special shaft sizes.

HGF motor can also be designed with double shaft extension. According to application needs, HGF motor can choose other shaft materials. You can check the corresponding biaxial extension dimensions in the mechanical data part of this sample.

4.7.2 Bearings

For HGF motors, when the frame size does not exceed IEC500, use anti-friction open ball bearings with a clearance of C3. When the frame size is IEC560 and 630, one roller bearing and one ball bearing are used at the non-drive end.

The grease-lubricated bearings used in HGF motors are equipped with an efficient grease retaining ring system to achieve high-efficiency lubrication while ensuring a low bearing temperature. The bearing is equipped with a PT100 temperature sensor, which can continuously monitor the bearing temperature during the operation of the motor.

All HGF series motors use bearings with C3 clearance, but bearings with C4 clearance can also be used for special needs.

Figure 15-Ball bearing cap design

Vertical HGF motors have two different bearing configurations: low-thrust standard, driven by the anti-friction ball bearing at the drive end and the angular contact ball bearing at the non-drive end; other high-thrust models are composed of a grease-lubricated ball bearing at the drive end and an oil-lubricated spherical roller thrust bearing at the non-drive end, and an oil bath with natural cooling system is provided.

Figure 16-HGF vertical motor with high thrust load

HGF series motors, grease-lubricated bearings, standard bearing life is 40,000 hours; vertical high-thrust load oil-lubricated bearings, standard bearing life is 12,000 hours. At the same time, HGF motors can calculate different bearing life according to special requirements.

Both the drive end and the non-drive end of the HGF motor can be equipped with sliding bearings. Sliding bearings rarely require maintenance when they are directly connected under harsh operating conditions.

Figure 17-Sliding bearing

Note: According to special requirements, 2-pole and vertical installation (standard thrust) motors with frame size IEC400C/D/E can be provided.

Horizontally mounted motors with high radial load can be equipped with NU series roller bearings, as shown in the following table:

Frame		Poles	Roller bearing
IEC	NEMA		DE
315 C/D/E	5009/10/11T	4-8	NU320
355 C/D/E	5810/11/12T	4-8	NU322
400L/A/B & 400 C/D/E	6806/7/8T & 6809/10/11T	4-8	NU324
450	7006/10	4-8	NU328
500	8006/10	4-8	NU330
560 & 630	8806/10 & 9606/10	Under request	

The standard bearing size can be identified by the frame number in the table below.

	Frame		Poles	Rolamento/Mancal		
	IEC	NEMA		D.E. bearing	N.D.E. bearing	N.D.E. bearing (API line)
Horizontal mounting	315C/D/E	5009/10/11T	2	6314 C3	6314 C3	6314 C3
			4-8	6320 C3	6316 C3	6320 C3
	355C/D/E	5810/11/12T	2	6314 C3	6314 C3	6314 C3
			4-8	6322 C3	6319 C3	6322 C3
	400L/A/B, 400C/D/E	6806/7/8T, 6809/10/11T	2	6315 C3	6315 C3	6315 C3
			4-8	6324 C3	6319 C3	On request
	450	7006/10	2*	6220 C3	6220 C3	
			4-8	6328 C3	6322 C3	
	500	8006/10	4-8	6330 C3	6324 C3	
	560	8806/10	4-8	On request		
	630	9606/10	4-8			
Vertical mounting Normal thrust	315C/D/E	5009/10/11T	2	6314 C3	7314 C3	-
			4-8	6320 C3	7316 C3	-
	355C/D/E	5807/8/9T & 5810/11/12T	2	6314 C3	7314 C3	-
			4-8	6322 C3	7319 C3	-
	400L/A/B, 400C/D/E	6806/7/8T & 6809/10/11T	4-8	6324 C3	7319 C3	-
	450	7006/10	4-8	6328 C3	7322 C3	-
	500	8006/10	4-8	6330 C3	7324 C3	-
Vertical mounting High thrust	315C/D/E	5009/10/11T	4-8	6320 C3	29320	-
	355C/D/E	5810/11/12T	4-8	6322 C3	29320	-
	400L/A/B, 400C/D/E	6806/7/8T, 6809/10/11T	4-8	6324 C3	29320	-
	450	7006/10	4-8	6328 C3	29320	-
Horizontal mounting with sleeve bearings	315C/D/E	5009/10/11T	2	9-80	9-80	9-80
			4-8	9-80	9-80	9-80
	355C/D/E	5810/11/12T	2	9-80	9-80	9-80
			4-8	9-100	9-100	9-100
	400L/A/B, 400C/D/E	6806/7/8T, 6809/10/11T	2	9-80	9-80	9-80
			4-8	11-110	11-110	11-110
	450	7006/10	2	9-80	9-80	On request
			4-8	11-125	11-110	11-125
	500	8006/10	4-8	11-125	11-125	11-125
	560	8806/10	4-8	On request		
	630	9606/10	4-8			

4.7.2.1 Axial bearing configuration

HGF motor with frame size no more than IEC500 shall be used as its standard configuration. When the motor is installed horizontally, the drive end of the motor shall be equipped with anti-friction ball bearing and the end shall be positioned in an axial direction. When the motor is mounted vertically or when roller bearings are used, the motor is positioned axially without driving end.
Vertical motor, if the motor will not bear any axial thrust, you can choose to position the drive end bearing.
HGF motors with seat IEC560 and 630 have special configuration. For more information, please contact the WEG office nearby.

4.7.2.2 Transportation lock

HGF motors are equipped with mechanical locking device to avoid bearing damage caused by transportation. Any motor must use this device during transportation.

Figure 18-Shaft locking device-rolling bearing

Figure 19-Shaft locking device-sliding bearing

4.7.2.3 Insulation cover

HGF motor with frame size of IEC355 and above, non-driving end is equipped with insulating end cover to avoid bearing damage caused by shaft current. At the same time, HGF motors with frame sizes from 315 to 355C/D/E can also choose insulating end caps.

Figure 20 – Insulation cover

All motors for variable frequency applications must be equipped with grounded carbon brushes on the drive end and insulated end caps on the non-drive end. Therefore, if the motor is a variable frequency application, it must be stated in the quotation or order.

For API541 motors, both bearings should be insulated and the drive end should be connected to a ground strap.

For vertical-mounted motors with high axial thrust or motors with sliding bearings, the non-driving end bearing needs to be insulated.

4.7.3 Lubrication

4.7.3.1 Lubricated - rolling bearings

The life of the bearing depends on the type and size of the bearing, the axial and radial thrust exerted on the bearing, the environment (temperature and cleanliness), speed and grease life. Therefore, the life of the bearing is closely related to its correct use, maintenance and lubrication. Pay attention to the amount of grease added and the lubrication cycle, so that the bearing can reach its design life. Excessive grease will cause additional bearing temperature rise during operation.

The HGF motor is equipped with a grease nozzle on the end cover. The amount of grease and lubrication cycle are specified on the motor nameplate.

The 2-pole motor with frame size 450 (NEMA7006/10) is equipped with an automatic grease adding device.
The table below shows the standard greases and their main lubricating properties.

Frame		Poles	Lubricant	Lubricant specification
IEC	NEMA			
315 C/D/E	5009/10/11T	2-8	Mobil Polyrex EM	Grease with mineral oil, polyurea-based thickener, ISSO VG 115
355 C/D/E	5810/11/12T	2-8		
400L/A/B & 400 C/D/E	6806/7/8T & 6809/10/11T	2-8		
450	7006/10	4-8		
500	8006/10	4-8		
560	8806/10	4-8		
630	9606/10	4-8		

As stated in the corresponding motor manual, other compatible greases can also be used.
If lubricating grease not recommended by WEG is used, the warranty promised by WEG will automatically become invalid.

The lubrication cycle shown in the table below is calculated considering the ambient temperature of 40°C and the bearing life of 40,000 hours.
Important note: Abnormal conditions (such as: ambient temperature, altitude, axial or radial load have special requirements) will cause a different lubrication cycle than listed here.

	Frame		Poles	D.E. bearing	Grease (g)	50Hz	60Hz	N.D.E. bearing	Grease (g)	50Hz	60Hz
	IEC	NEMA				(h)	(h)			(h)	(h)
Horizontal mounting - ball bearings	315C/D/E	5009/10/11T	2	6314	27	3100	2100	6314	27	3100	2100
			4-8	6320	50	4500	4500	6316	34	4500	4500
	355C/D/E	5810/11/12T	2	6314	27	3100	2100	6314	27	3100	2100
			4-8	6322	60	4500	4500	6319	45	4500	4500
	400L/A/B& 400C/D/E	6806/7/8T& 6809/10/11T	2	6315	30	2700	1800	6315	30	2700	1800
			4-8	6324	72	4500	4500	6319	45	4500	4500
	450	7006/10	2	6220	31	2500	-	6220	31	3000	-
			4	6328	93	4500	3300	6322	60	4500	4500
			6-8				4500				
	500	8006/10	4	6330	104	4200	2800	6324	72	4500	4500
			6-8			4500	4500				
	560	8806/10	4	On request							
			6								
	630	9606/10	8								
			4								
			8								
Vertical mounting - ball bearings	315C/D/E	5009/10/11T	2	6314	27	1700	1200	7314	27	1700	1200
			4	6320	50	4200	3200	7316	34	4500	4500
			6-8			4500	4500			4500	4500
	355C/D/E	5810/11/12T	2	6314	27	1700	1200	7314	27	1700	1200
			4	6322	60	3600	2700	7319	45	4500	3600
			6-8			4500	4500			4500	4500
	400L/A/B & 400C/D/E	6806/7/8 & 6809/10/11T	4	6324	72	3200	2300	7319	45	4500	3600
			6			4500	4300			4500	4500
			8			4500	4500			4500	4500
	450	7006/10	4	6328	93	2400	1700	7322	60	3500	2700
			6			4100	3500			4500	4500
			8			4500	4500			4500	4500
	500	8006/10	4	6330	104	2100	1300	7324	72	3100	2200
			6			3800	3100			4500	4200
			8			4500	4200			4500	4500
Horizontal mounting - roller bearings	315C/D/E	5009/10/11T	4	NU320	50	4300	2900	6316	34	4500	4500
			6-8			4500	4500				
	355C/D/E	5810/11/12T	4	NU322	60	3500	2200	6319	45	4500	4500
			6-8			4500	4500				
	400L/A/B & 400C/D/E	6806/7/8T & 6809/10/11T	4	NU324	72	2900	1800	6319	45	4500	4500
			6-8			4500	4500				
	450	7006/10	4	NU328	93	2000	1400	6322	60	4500	4500
			6			4500	3200				
			8			4500	4500				
	500	8006/10	4	NU330	104	1700	1000	6324	72	4500	4500
			6			4100	2900				
			8			4500	4500				

4.7.3.2 Lubrication - Vertical installation of high axial thrust

Bearing vertical motor to withstand higher axial thrust, resulting in higher bearing temperature, the need for oil lubrication, in order to ensure the appropriate oil film and heat dissipation.WEG motor standard non - drive end bearings are designed for oil bath lubrication systems.
The following table gives information on the type of lubricant used on the bearing and the specific lubrication period when axial loads are taken into account.Grease - lubricated drive end bearings follow the same recommendation as in the above item as they only have radial guidance function.

Frame		Poles	D.E. bearing	Relubrication interval		N.D.E. bearing	Quantity of oil (L)	Relubrication interval for 50Hz and 60Hz	Lubricant	Lubricant specification
				50Hz	60Hz					
IEC	NEMA			(h)	(h)					
315C/D/E	5009/10/11T	4	6320	4200	3200	29230	20	8000	FUCHS Renolin DTA 40 / Mobil SHC 629	Mineral oil ISO VG150 with defoaming and anti-oxidant
		6		4500	4500					
		8								
355C/D/E	5810/11/12T	4	6322	3600	2700	29230	26			
		6		4500	4500					
		8								
400L/A/B & 400C/D/E	6806/7/8 & 6809/10/11T	4	6324	3200	2300	29230	27			
		6		4500	4300					
		8		4500	4500					
450	7006/10	4	6328	2400	1700	29230	45			
		6		4100	3500					
		8		4500	4500					

4.7.3.3 Lubricated plain bearings

HGF motor can be selected using sliding bearings. When the motor is used correctly and the recommended lubricant is used, sliding bearings require less maintenance, a longer lubrication period, and a longer bearing life. The table below shows available base Numbers, lubricating oil type and lubricating oil dosage information, and recommended lubrication cycles.

	Poles	Frame		Bearings	50 & 60 Hz	Oil Qty (L)	Lub.	Lubricant spec.
		IEC	NEMA		(h)			
Sleeve Bearings	2	315C/D/E	5009/10/11T	9-80	8000	2.8	FUCHS Renolin DTA 10	Mineral oil ISO VG32 with antifoaming and antioxidant
		355C/D/E	5810/11/12T					
		400L/A/B & 400C/D/E	6806/7/8 & 6809/10/11T					
		450	7006/10					
	4,6 & 8	315C/D/E	5009/10/11T	9-90	8000	2.8	FUCHS Renolin DTA 15	Mineral oil ISO VG46 with antifoaming and antioxidant
		355C/D/E	5810/11/12T	9-100				
		400L/A/B & 400C/D/E	6806/7/8 & 6809/10/11T	11-110		4.7		
		450	7006/10	11-125				
		500	8006/10					

4.7.4 Maximum available shaft load

The following table shows the maximum available radial and axial loads in standard configurations. This table takes into account the bearing's service life of 40,000 hours. The maximum radial load values in the table below assume no axial load on the motor. In addition, the maximum axial load value assumes no radial load on the motor. For bearing service life when the motor is under both axial and radial loads, please contact WEG.

When determining the maximum load, the following considerations should be taken into account:
1. Normal operating conditions;
2. AISI material axis;
3.2 Pole motor: parabolic torque load (such as fan, supercharger, centrifugal pump, centrifugal compressor, mixer, etc.);
4. Non-2-pole motor: constant torque load (reciprocating compressor, elevator, crane, reciprocating pump, conveyor belt, etc.);
5. If you have any questions about load torque requirements, please contact the NEAREST WEG office;
6. These values take into account the friction resistant ball bearings and the standard for horizontal mounting motors of the frame size up to IEC500.

4.7.4.1 Radial load

The maximum load shown in the table below takes into account the load applied by the shaft overhang (L) and half of the shaft overhang (L/ 2).

Figure 21 - Radial load at shaft end

50Hz-Fr (Kn)									
Frame		2P		4P		6P		8P	
IEC	NEMA	L/2	L	L/2	L	L/2	L	L/2	L
315C/D/E	5009/10/11T	2	2	6	5	6	6	7	7
355C/D/E	5810/11/12T	1	1	5	5	7	6	7	7
400L/A/B & 400C/D/E	6806/7/8 & 6809/10/11T	-		6	5	7	7	8	8
450	7006/10			7	7	9	8	9	9
500	8006/10			8	7	9	9	10	9

60Hz-Fr (Kn)									
Frame		2P		4P		6P		8P	
IEC	NEMA	L/2	L	L/2	L	L/2	L	L/2	L
315C/D/E	5009/10/11T	2	2	5	5	6	5	7	6
355C/D/E	5810/11/12T	1	1	5	4	6	4	7	6
400L/A/B & 400C/D/E	6806/7/8 & 6809/10/11T	-		5	5	6	6	8	6
450	7006/10			7	6	8	8	9	9
500	8006/10			7	6	9	8	10	10

Maximum radial load of rolling bearing Is assumed to be no axial load of motor (50&60Hz)

50Hz-Fr (Kn)							
Frame		4P		6P		8P	
IEC	NEMA	L/2	L	L/2	L	L/2	L
315C/D/E	5009/10/11T	25	12	25	12	25	12
355C/D/E	5810/11/12T	28	14	18	7	17	7
400L/A/B & 400C/D/E	6806/7/8 & 6809/10/11T	32	16	20	8	17	8
450	7006/10	35	23	35	23	25	10
500	8006/10	33	21	38	14	37	14
560	8806/10	27	25	29	27	29	26
630	9606/10	14	7	14	7	20	10

60Hz-Fr (Kn)							
Frame		4P		6P		8P	
IEC	NEMA	L/2	L	L/2	L	L/2	L
315C/D/E	5009/10/11T	25	12	25	12	25	12
355C/D/E	5810/11/12T	30	15	20	8	19	7
400L/A/B & 400C/D/E	6806/7/8 & 6809/10/11T	32	16	23	12	19	8
450	7006/10	33	22	24	9	24	9
500	8006/10	26	17	21	17	21	17
560	8806/10	24	23	26	25	26	24
630	9606/10	28	18	22	11	36	18

Maximum radial load value of roller bearing assume no axial load of motor (50&60Hz)

Note:
1. Roller bearings require minimum radial load for normal operation. Direct connections are not recommended.
2. Application analysis of 50 Hz motor with output higher than 590kW 4P, 515kW6P and 400KW8P.
3. Application analysis of 60 Hz motor with output higher than 700KW 4P, 560kW6P and 480kW8P.

4.7.4.2 Axial thrusting - Horizontal mounting

The following table lists the maximum axial thrust (kN) for horizontal mounting of motor shaft ends.

Maximum Axial Thrust in the Shaft End			
Frame		Poles	Horizontal mounting Horizontal mounting (Ball bearings) Pulling or Pushing
IEC	NEMA		(Kn)
315C/D/E	5009/10/11T	2	2
		4	5
		6	6
		8	7
355C/D/E	5810/11/12T	2	1,7
		4	6
		6	7
		8	7,5
400L/A/B & 400C/D/E	6806/7/8 & 6809/10/11T	2	1,7
		4	6
		6	7
		8	7,5
450	7006/10	2	1
		4	5
		6	6
		8	7
500	8006/10	4	5
		6	6
		8	7

4.7.4.3 Axial thrusting - vertical installation

HGF vertical mounting motors can be divided into two types: normal thrust and high thrust. This classification is based on the maximum available axial load at the motor shaft end.

4.7.4.3.1 Normal thrusting

Under normal thrust conditions, the angular contact ball bearing is installed at the non-drive end, and the maximum axial thrust can be borne is shown in the following table

Maximum Axial Thrust in the Shaft End				
Frame		Poles	Pulling (kN)	Momentaneous pushing (kN)
IEC	NEMA			
315C/D/E	5009/10/11T	2	*	*
		4	8	5
		6	8	5
		8	8	6
355C/D/E	5810/11/12T	2	*	*
		4	9	6
		6	9	7
		8	9	7
400L/A/B & 400C/D/E	6806/7/8 & 6809/10/11T	2	*	*
		4	10	7
		6	10	7,5
		8	10	7,5
450	7006/10	2	*	*
		4	8	7
		6	8	7
		8	8	7
500	8006/10	4	6	5
		6	6	5
		8	6	5

*Consult WEG

4.7.4.3.2 High thrusting

High-axial thrust bearings can be used for motors with speeds up to 1800 RPM (4-60Hz). Oil bath lubrication system is simple and robust. The non - drive - end bearings lubricated in this way have good heat dissipation performance and low bearing temperature under adverse service conditions. For this application, the standard bearing life is 12,000 hours. In this case, anti-rotation ratchet system can be optional. The table below shows the maximum allowable axial thrust for each frame size.

Frame		Maximum load for continuous tension						Minimum load	
		1800 RPM		1200 RPM		900 RPM			
IEC	NEMA	kN	lbf	kN	lbf	kN	lbf	kN	lbf
315C/D/E	5009/10/11T	45	10200	59	13200	65	14600	4.23	950
355C/D/E	5810/11/12T	50	11200	57	12800	62	13900	5.34	1200
400L/A/B & 400C/D/E	6806/7/8 & 6809/10/11T	43	9600	51	11300	54	12200	7.56	1700
450	7006/10	42	9400	47	10500	51	11400		

- The maximum instantaneous upward thrust is 30% of the maximum pulling force
- All bearings are self-cooled
- Consult WEG for higher load/speed requirements
- Motor running with lower downward thrust has higher vibration

In order to improve the bearing life (12000h), the actual axial thrust is the maximum axial thrust divided by the corresponding reduction factor, as shown in the table below:

L 10h useful life	Life in years	Adjustment factor
12000	1.4	1.00
18000	2.0	1.15
22000	2.5	1.24
26000	3.0	1.32
35000	4.0	1.47
40000	4.5	1.55
44000	5.0	1.61
53000	6.0	1.72
62000	7.0	1.83
70000	8.0	1.92
75000	8.5	1.98
88000	10.0	2.11
100000	11.4	2.22

When special bearing life or higher axial loads are required, Please contact WEG.

4.8 Installation

The installation of HGF follows the IEC60034-7 standard. The figure below shows the basic and other installation types.

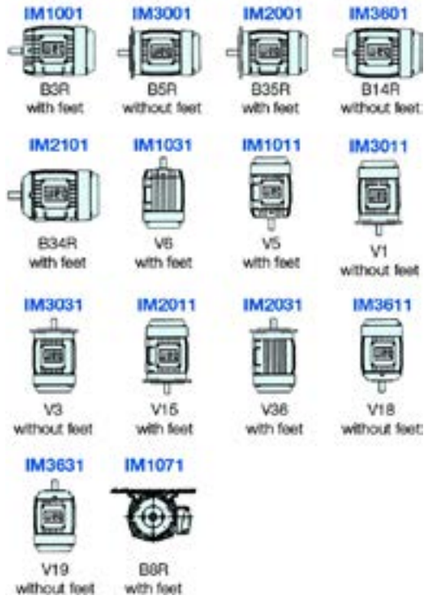


Figure 22 - Installation as defined by IEC60034-7

Use a letter after the name to define the location of the junction box. Therefore, the installation of IM B3 in the WEG document (without IM code) is expressed as (from the motor drive end to the non-drive end):
B3R(E): The main junction box is on the right;
B3L(D): The main junction box is on the left;
B3T: The main junction box is at the top.

NEMA Standard	Europe Standard	WEG standard	HGF NEMA proposal
F-1	B3L	B3D	F-1 / B3R(D)
F-2	B3R	B3E	F-2 / B3L(E)
F-3	B3T	B3T	F-3 / B3T
W-1	B7R	B7E	W-1 / B7L(E)
W-2	B6L	B6D	W-2 / B6R(D)
W-3	B7L	B7D	W-3 / B7R(D)
W-4	B6R	B6E	W-4 / B6L(E)
W-5	V6R	V6E	W-5 / V6L(E)
W-6	V5L	V5D	W-6 / V5R(D)
W-7	V5R	V5E	W-7 / V5L(E)
W-8	V6R	V6D	W-8 / V6L(E)
W-9	B6T	B6T	W-9 / B6T
W-10	B7T	B7T	W-10 / B7T
W-11	V6T	V6T	W-11 / V6T
W-12	V5T	V5T	W-12 / V5T
C-1	B8R	B8E	C-1 / B8L(E)
C-2	B8L	B8D	C-2 / B8R(D)
C-3	B8T	B8T	C-3 / B8T

4.9 Level of protection and painting

4.9.1 Level of protection

HGF motor front and rear end cover installation labyrinth seal. According to IEC60034-5 standard, the motor protection grade reaches IP55. Its implications are as follows:
A) First digit -5 - Dustproof. Prevent contact with or access to live or moving parts in the housing. It is not completely dustproof, but the amount of dust entering into the machine will not interfere with the normal operation of the machine.
B) Second digit - 5 - Anti-spray. Nozzles spray water from all directions to the machine without harmful effects.
The lowest position of the motor stand is provided with a cock drain hole, the specific position depends on its installation position.
Other protection levels
HGF motors can be designed for the following protection levels:
- For better outdoor protection, use an IP55W
- For better water resistance, use IP56
- For better dust protection, use IP65
- For better dust and water resistance, use IP66

4.9.2 Painting

212P Paint scheme for HGF motor (WEG code)

According to ASTMB117/03, the spray scheme is subject to at least 3000 hours of salt spray testing and can be exposed to high humidity indoor and outdoor harsh Marine and industrial Marine environments.The spray scheme is used in the pulp and paper, mining, petrochemical and other industries.It meets Petrobras standard N1735, section 4.

The spraying solution description and other options are described as follows:

212P Paint scheme - standard
Primer: one coat, 75 to 105 m epoxy
Middle: one layer, 100 to 140 m epoxy
Finish: one coat, 70 to 100 m polyurethane paint

Can also choose the following painting plan

212E Painting Scheme (WEG code)
According to ASTMB117/03, the spray scheme is subject to at least 3000 hours of salt spray testing and can be exposed to high humidity, alkali metal and solvent splashing indoors and harsh Marine and industrial Marine environments.Spraying solutions are used in pulp and paper, mining, petrochemical and other industries.It meets Petrobras standard N1735, section 4.
Primer: one layer of 75 to 105 m epoxy paint
Middle: One layer of 100 to 140 m epoxy paint
Finish: One coat of 100 to 140 m epoxy paint

213E Painting Scheme (WEG code)
According to ASTMB117/03, the spray scheme needs to withstand at least 3000 hours of salt spray testing, suitable for indoor and outdoor harsh Marine and industrial Marine environments with high humidity.Spraying solution for offshore oil platform.It satisfies Clause 5.2 of the Petrobras standard N1735.
Primer: one coat, 65 to 90 m ethylsilicate coated
Middle: One layer, 35 to 50 m epoxy
Top coat: one coat, 240 to 340 m polyurethane paint
Tropical protection spray paint
Motor insulation system is the main factor to ensure the service life of motor.High humidity can cause premature degradation of the motor insulation system.When the relative humidity of the operating environment of the motor does not exceed 95%, the insulation system does not require additional protection, but space heater is required to avoid the formation of condensed water inside the motor.When the relative humidity of the motor operating environment exceeds 95%, all components inside the motor are sprayed with epoxy paint (also known as tropical protective paint).

4.10 Voltage/Frequency

According to IEC60034-1 (IEC Market), the fluctuation of voltage and frequency can be divided into Area A and Area B, as shown below.

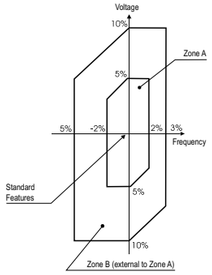


Figure 23 - Motor rated voltage and frequency limits

The motor must be suitable for continuous operation in zone A and achieve its main performance (e.g. torque). However, due to variations in supply voltage and frequency, the motor may not fully achieve all its performance characteristics and may result in a temperature rise exceeding the rated value.
The motor must be suitable for its main function (e.g. torque) in zone B. However, the variation of performance characteristics in zone B will be greater than that in Zone A. The temperature rise will also be higher than the rated condition and the temperature rise in zone A. Long-term use of motor in Zone B is not recommended.

4.11 Ambient X Insulation

The standard HGF motor can be operated at an ambient temperature of -20°C to +40°C and an altitude not exceeding 1000 meters.
In addition, they can also operate at different ambient temperatures and altitudes. The following recommendations must be followed at this time:
a) The ambient temperature is lower than -20°C: contact WEG.
b) The ambient temperature is higher than +40°C: use a derating factor (see the table below).
c) Altitude above 1000 meters: use derating factor (see table below).
d) Ambient temperature and altitude exceed the standard: comprehensive use of derating factors (see the table below).

T (°C)	Altitude [m]								
	1000	1500	2000	2500	3000	3500	4000	4500	5000
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	0.80	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

4.12 Motor protection

During operation, the internal temperature of the motor increases. The temperature rise defined in the design stage is usually limited to level B, which is 80K. According to the IEC60034-1 standard, the ambient temperature considered in the design is 40°C, and the generally used insulation class is Class F (155°C)-see the table below.

Thermal Gap	25°C	155°C material class limit
Hottest - coldest point	10°C	
Temperature Rise	80K	
Ambient temoerature	40°C	

In order to ensure the long service life and safe operation of the motor, it is necessary to avoid overheating of the motor. Therefore, the most common protection device for the motor is the heat sensitive device.
Two three-wire PT100 are standard for each phase winding of HGF motor, and one three-wire PT100 is standard for each bearing.

4.12.1 PT-100

In some materials (such as platinum, nickel, or copper), the resistance changes as the temperature changes. The temperature measuring element is based on this for temperature monitoring. They are also equipped with a calibration resistor that changes linearly with temperature, monitoring the temperature rise of the motor by monitoring the display, with high accuracy and sensitive response. The same temperature measuring element can be set to alarm (operating above normal operating temperature) and trip (usually set to the highest temperature corresponding to the motor insulation level).

Other temperature measuring equipment is as follows.

4.12.2 Thermistor (PTC)

These thermal protectors consist of semiconductor detectors, where resistance changes abruptly when a certain temperature is reached. PTC is a thermistor whose resistance changes dramatically with a defined temperature map. A sudden change in resistance interrupts the PTC current, causes the output relay to run, and then causes the main circuit to shut down. Thermistors of different sizes are available.
Compared with other protectors, although they cannot continuously monitor the temperature rise process of the motor, they are not affected by mechanical effects and have a faster response. Thermistor and its circuit system have a full range of protection function, avoid single phase, overload, undervoltage or overvoltage and frequent commutation caused by overheating. For both alarm and tripping functions, two series resistors are required for each phase.

4.12.3 Bimetallic thermal protector

The bimetal thermal protector is a silver contact normally closed thermal protector: when a certain temperature rise is reached, the protector operates; when the temperature drops, the protector automatically returns to the initial position and the silver contact is closed again. The bimetal thermal protector is connected in series with the contact coil for alarm or tripping.

4.13 Frequency inverter drive

4.13.1 Considerations based on rated voltage

When the HGF winding is running with frequency conversion, its related parameters should not exceed the limits in the following table.

Low-voltage motor

Motor rated voltage	Peak voltage (phase-phase)	dV/dT * (phase-phase)	Rise time	Time between pulses
$V_{NOM} \leq 1000$ V	≤ 1600 V	≤ 5200 V/µs	≥ 0,1 µs	≥ 6 µs
460 V < $V_{NOM} \leq$ 575 V	≤ 1800 V	≤ 6500 V/µs		
575 V < $V_{NOM} \leq$ 690 V	≤ 2200 V	≤ 7800 V/µs		

* NEMA MG1 Part 30 Definitions

High-voltage motor
The limit values of HGF motors are shown below, including the performance of direct drive and variable frequency drive (enhanced insulation) :

		Wire insulation (phase-phase)		Main insulation (phase-ground)	
Motor rated voltage	Insulation level (1)	Peak voltage	dV/dT	Peak voltage	dV/dT
$V_{NOM} \leq 1000$ V	Normal	≤ 3100 V	≤ 11300 V/µs	≤ 1800 V	≤ 11300 V/µs
1000 V < V_{NOM} ≤ 4160 V	Normal	≤ 6500 V	≤ 4000 V/µs	≤ 3800 V	≤ 4000 V/µs
	Reinforced	≤ 7800 V	≤ 4000 V/µs	≤ 4500 V	≤ 4000 V/µs
4160 V < V_{NOM} ≤ 6900 V	Normal	≤ 10300 V	≤ 4000 V/µs	≤ 5900 V	≤ 4000 V/µs
	Reinforced	≤ 12400 V	≤ 4000 V/µs	≤ 7200 V	≤ 4000 V/µs
6900 V < V_{NOM} ≤ 10000 V	Normal	≤ 15600 V	≤ 3000 V/µs	≤ 9000 V	≤ 3000 V/µs
	Reinforced	≤ 17100 V	≤ 3000 V/µs	≤ 9900 V	≤ 3000 V/µs

* NEMA MG1 Part 30 Definitions
** Frequency converter motor to strengthen insulation

Notes for low-voltage and high-voltage motors:
1. Switching frequency shall be limited to 5kHz. Switching frequency exceeding 5kHz will accelerate winding aging and may damage bearing.
2. If one of the above conditions is not met (including switching frequency), a filter shall be installed at the output end of the frequency conversion accordingly.
3. The following requirements are derived from the standards IEC60034-17 and IEC60034-25.

4.13.2 Torque limit for variable frequency applications

When the motor frequency conversion is applied, especially when the low speed is applied, the cooling air flow of the motor is low, and the temperature rise of the motor will be higher than that of the directly connected application. High temperature rise can be avoided by using forced air cooling equipment. Even at low motor speed, forced air cooling device can ensure that the motor cooling air flow constant.
TEFC motor can also be used as VFD drive when the motor driven load meets the following requirements:

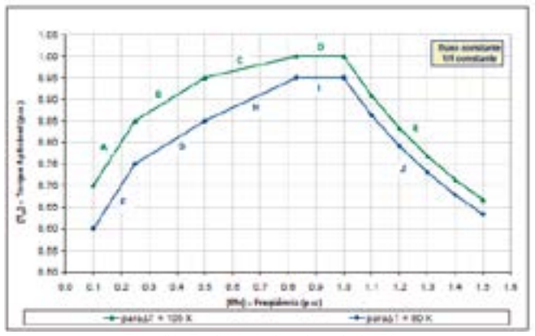


Figure 24 - Frontal declination at constant V/F flux

Derating factors to limit temperature rise at insulation material class level *		
INTERVAL	LIMITED BY	APPLY THIS EQUATION
A	0.10 ≤ f/fn < 0.25	T_R = (f/fn) + 0.60
B	0.25 ≤ f/fn < 0.50	T_R = 0.40(f/fn) + 0.75
C	0.50 ≤ f/fn < 0.83	T_R = 0.15(f/fn) + 0.87
D	0.83 ≤ f/fn ≤ 1.0	T_R = 1.0
E	f/fn > 1.0	T_R = 1/(f/fn) = fn/f

Derating to limit temperature rise at sinusoidal source level **		
INTERVAL	LIMITED BY	APPLY THIS EQUATION
F	0.10 ≤ f/fn < 0.25	T_R = (f/fn) + 0.50
G	0.25 ≤ f/fn < 0.50	T_R = 0.40(f/fn) + 0.65
H	0.50 ≤ f/fn < 0.83	T_R = 0.30f/fn) + 0.70
I	0.83 ≤ f/fn ≤ 1.0	T_R = 0.95
J	f/fn > 1.0	T_R = 0.95 / (f/fn)

(*) When the top curve (green line) is applied, the temperature rise of the motor is limited by the temperature grade of the insulating material. For example, the temperature rise of a motor with insulation grade F should be limited to 105K. This curve is only applicable to motors with Grade F insulation and Grade B temperature rise.

(**) When the lower curve (blue line) is adopted, the temperature rise of the motor driven by frequency conversion is the same as that of the motor driven by sinusoidal power. That is, even if the motor of insulation grade F temperature rise grade B is driven by the frequency converter, it still keeps the temperature rise of grade B (DT=80 K).

Note: The derating curve shown in FIG. 24 is related to the temperature and heat grade of the motor winding. The curve cannot predict the thermal tolerance coefficient of the motor, but only indicates the torque limit of the variable-frequency drive motor.

4.13.3. Axial current limit

As mentioned above, in motor frequency conversion applications, the non-shaft extension bearings must be insulated and the shaft extension bearings must be equipped with grounding carbon brushes to prevent shaft current from flowing through the bearings.

Mechanical speed limit
No matter the frequency conversion drive or direct drive, the speed of HGF motor cannot exceed 120% of the synchronous speed.

4.13.4. Controlled cooling

When independent cooling is needed, the HGF motor can be installed with a forced air cooling device, as shown in the figure below. The forced air cooling device comprises a motor driven directly by a grid power source. The forced cooling device always provides a constant flow of cooling air to the cooling fins of the main motor regardless of the change of speed of the main motor under any application.
The following is the diagram of HGF motor forced air cooling device

Figure. 25 - Forced air cooling device - Cast iron fan hood

Figure. 26 - Forced air cooling device - steel fan hood

After installing the forced air cooling device, the total length of the motor also increases accordingly, as shown in the following table:

HGF motor total length when fitted with forced ventilation unit (mm)				
Frame		Poles	Not Suitable to encoder	Suitable to encoder
IEC	NEMA			
315C/D/E	5009/10/11T	2	2025	2135
		4 - 8	2055	2165
355C/D/E	5810/11/12T	2	2205	2315
		4 - 8	2275	2385
400L/A/B	6806/07/08T	2	2190	2300
		4 - 8	2260	2370
400C/D/E	6809/10/11T	2	2490	2600
		4 - 8	2560	2670
450	70	2	2780	2880
		4 - 8	2800	2900
500	80	4 - 8	3120	3220
560	88	4 - 8	3500	3600
630	96	4 - 8	3700	3800

4.14 Special auxiliary parts

HGF motors can be installed with a variety of accessories to better meet specific application requirements.
The following accessories are commonly used accessories for HGF motors and can be provided upon customer‘s request.

4.14.1 Anti-reversing ratchet

Some applications do not allow the motor to rotate in both directions. In this case, an anti-reverse ratchet can be installed so that the shaft can only rotate in one direction.

4.14.2 Encoder

An encoder can be used when precise speed control is required. The encoder is installed in the fan housing and directly connected with the motor shaft. As standard configuration, WEG USES the Dynapar HS35 encoder.

Figure 27 -- Dynapar HS35 encoder

4.14.3 Surge protective devices

One surge protector can be installed in each phase of HGF motor junction box. This kind of equipment is manufactured according to iec60099-4 standard and divided into 3kV, 6 kV, 9 kV and 12 kV according to voltage

Figure 28 - Surge protector

4.14.4 Capacitor

HGF high voltage motor can be equipped with one capacitor per phase. Capacitors are placed in the main junction box and are recommended for use when the system is likely to generate voltage spikes during operation or atmospheric discharge. The capacitor is mounted on a stainless steel hood and has the following characteristics:

HGF high voltage motor can be equipped with one capacitor per phase. Capacitors are placed in the main junction box and are recommended for use when the system is likely to generate voltage spikes during operation or atmospheric discharge. The capacitor is mounted on a stainless steel hood and has the following characteristics:
· Capacitance - 0.5 F
· Rated voltage - maximum 7.2kV
· Voltage class - 15 kV

Figure 29-HGF motor typical capacitor

4.14.5 Alternative solution

The replacement of the old motor lacks flexibility. To solve this problem, the HGF motor can be configured with a base or extended foot to solve the problem of complete motor replacement.

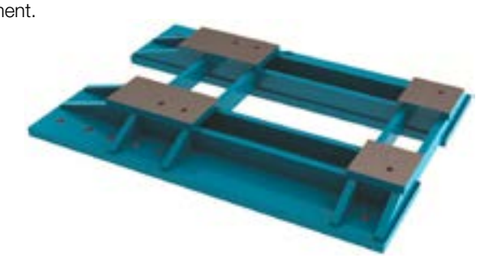


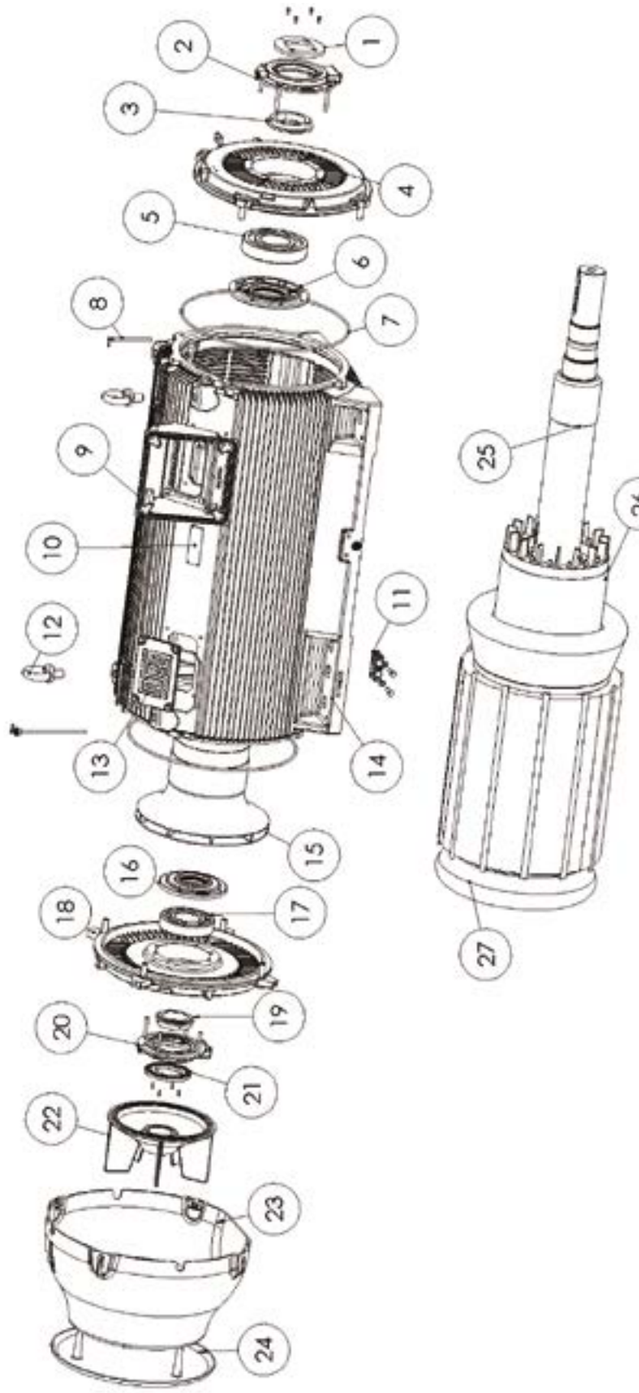
Figure 30 - Motor base

If the required motor frame size (shaft center height) is one level higher than the standard motor (for example, the 315 frame size motor requires 355 shaft center height), then extended feet can be used at this time to change the frame foot height . By using this method, the motor can achieve the required size (including foot installation and shaft center height).

If the required motor frame number (shaft center height) is two levels higher than the standard motor (for example, the motor frame number 315 requires a shaft center height of 400), then steel base can be used at this time. At this time, the upper layer of the base is machined with mounting holes (level L/A/B/D/E) for installing the standard motor selected according to the requirements. The height of the chassis is C/D/E (including the height of the foot and the shaft center).

4.15 Exploded view

The main components of HGF motor are introduced in the following decomposition diagram. Please refer to the detailed dimension drawing for the terminal box (main terminal box and auxiliary terminal box) information.



Items	Part and component name
1	Drive end seal
2	Drive end bearing cover
3	Lubricating ring
4	Drive end cap
5	Drive-end bearing
6	Drive end bearing inner cover
7	Heater band
8	Oil nipple
9	Main junction box bracket
10	Motor nameplate
11	Ground terminal
12	Rings
13	Sealing plate
14	Frame
15	Internal fan
16	Non-drive bearing inner cover
17	Non-driven-end bearing
18	Non-drive end shield
19	Lubricating ring
20	Non-drive end bearing cover
21	Non-drive end seal
22	Fan
23	Fan housing
24	Rain cover
25	Shaft
26	Rotor
27	Stator

5. Structure configuration

Frame			315C/D/E	355C/D/E	400L/A/B	400/C/D/E	450	500	560	630
Mechanical features										
Nameplate identification										
Installation			B3R(E)							
Frame	Material		FC-200 Cast iron							
Protection grade			IP55							
Grounding method			Double ground (+ 2 in the terminal box installed in the frame)							
Cooling mode			Fully enclosed fan cooled (IC411)							
Fan	Material	2P	Aluminum						Consulting	
		4P-12P	Polymer						Consulting	
Fan housing	Material	2P	Use cast iron or steel fan cover/when the motor USES friction-proof bearings and no forced air cooling/When the motor USES a sliding bearing, or an anti-friction bearing and is forced to be air-cooled, use a steel plate fan hood				Steel plate		-	
		4P-12P							steel plate	
End cover	Material		FC-200 Cast iron							
Drain plug			Automatic rubber drain plug							
Bearing	Drive end bearing protection cover/clearance	2P	C3							
	Drive end bearing protection cover/clearance	4P-12P	C3				M-C3			
	Undriven end bearing protection cover/ clearance		C3							
	Thrust bearing		The drive end bearing is equipped with internal and external bearing covers, and the non-drive end bearing is equipped with load-bearing spring							
	Driving end	2P	6314	6314	6315	6315	6220	-	Consulting	
		4P-12P	6320	6322	NU224	NU224	6328	6330		
	Non-driving end	2P	6314	6314	6315	6315	6220	-		
		4P-12P	6316	6320	6320	6320	6322	6324		
Sliding bearing	The axial float		6mm		6mm (2P)/8mm (4P)			8mm	Consulting	
	Thrust bearing		Drive end positioning							
	Driving end	2P	9-80	9-80	9-80	9-80	9-80	-		
		4P-12P	9-90	9-100	11-110	11-110	11-125	11-140		
	Non-driving end	2P	9-80	9-80	9-80	9-80	9-80	-		
		4P-12P	9-90	9-100	11-110	11-110	11-110	11-125		
Bearing seal			Labyrinth Packing							
Joint seal			None							
Lubrication	Type of grease		Mobil Polyrex EM							
	Oiling device		The driving end and the non-driving end are equipped with fuel injectors							
Terminal blocks			Equipped with HGF terminal							
Terminal box	Material		Consulting							
Entrance hole	Main terminal block	Thread size	Low voltage - 2xM63x1.5 /High voltage- M63x1.5							
	Auxiliary terminal box	Thread size	3xM20x1.5							
	Face plate		Plastic thread sealing cover							
Shaft	Drive end threaded hole	2P	M20					Consulting		
		4P-12P	M24					M30		
Key			Equipped with "B" type key							
Vibration level			A grade							
vibrational equilibrium			Half key balance							
Nameplate	Material		AISI 304 stainless steel							
Painting	Project		212P							
	Colour		RAL 5009							
Electrical characteristics										
Design			Low-voltage N-type design							
Voltage			380 to 11000V							
Winding	Material		Copper							
	Dipping paint		Low voltage - continuous drop dip/high voltage - vacuum pressure dip VPI							
	Insulation grade		F (DT 80K)							
Service factor			1.0							
Rotor			Cast aluminium				Copper bar			
Thermal protection device			3 wire PT100-2 pieces per phase							

6. Optional Configuration (IEC)

Characteristic	315C/D/E	355C/D/E	400L/A/B	400/C/D/E	450	500	560	630
Service factor								
Service factor 1.00	P	P	P	P	P	P	P	P
Service factor 1.15	O	O	O	O	O	O	O	O
Service factor 1.25	E	E	E	E	E	E	E	E
Insulation grade								
F DT 70K	E	E	E	E	E	E	E	E
F DT 80K	P	P	P	P	P	P	P	P
F DT 105K	O	O	O	O	O	O	O	O
H DT 80K	E	E	E	E	E	E	E	E
H DT 105K	E	E	E	E	E	E	E	E
H DT 125K	E	E	E	E	E	E	E	E
Heater band								
110-127 / 220-240 V	P	P	P	P	P	P	P	P
380-480 V	O	O	O	O	O	O	O	O
Heat protection device - Alarm (winding)								
Bimetallic thermal protectors - 130°C alarm	O	O	O	O	O	O	O	O
3 wire PT100 - Alarm	P	P	P	P	P	P	P	P
3 wire PT100 - Alarm - calibration	O	O	O	O	O	O	O	O
PTC thermistor - 130°C - Alarm	O	O	O	O	O	O	O	O
Thermal protection - Tripping (winding)								
Bimetal thermal protectors - 155°C - tripping	O	O	O	O	O	O	O	O
Line 3 PT100 - Tripping	P	P	P	P	P	P	P	P
Line 3 PT100 - Tripping - Calibration	O	O	O	O	O	O	O	O
PTC thermistor - 155°C - tripping	O	O	O	O	O	O	O	O
Design								
N (low voltage only)	P	P	P	P	P	P	P	P
Type of junction box								
HGF (FC-200 cast iron)	P	P	P	P	P	P	P	P
HGF (steel plate) high voltage	O	O	O	O	O	O	O	O
HGF (steel plate) low voltage	O	O	O	O	O	O	O	O
Cable gland								
plastic	O	O	O	O	O	O	O	O
copper	O	O	O	O	O	O	O	O
Stainless steel	O	O	O	O	O	O	O	O
Flange								
Flange FF	O	O	O	O	O	O	O	O
Without flange	P	P	P	P	P	P	P	P
Rain cover - cast iron fan cover - 2 and 4 pole 1	O	O	O	O	NA	NA	NA	NA
Rain cover - cast iron fan cover - 6 poles and above 1	O	O	O	O	NA	NA	NA	NA
Terminal blocks								
Terminals - Low and high voltage	P	P	P	P	P	P	P	P
Protection grade								
IP55	P	P	P	P	P	P	P	P
IP56	O	O	O	O	O	O	O	O
IP65	O	O	O	O	O	O	O	O
IP66	O	O	O	O	O	O	O	O
IPW55	O	O	O	O	O	O	O	O
IPW56	O	O	O	O	O	O	O	O
IPW65	O	O	O	O	O	O	O	O
IPW66	O	O	O	O	O	O	O	O
Drive end bearing seal								
Labyrinth seal	P	P	P	P	P	P	P	P
Labyrinth seal+Viton seal	O	O	O	O	O	O	O	O
Mechanical seal 2	O	O	O	O	O	O	O	O
Non drive bearing seal								
Same as the driver	P	P	P	P	P	P	P	P
Spray paint plan								
212E	O	O	O	O	O	O	O	O
212P	P	P	P	P	P	P	P	P
213E	O	O	O	O	O	O	O	O
214P	O	O	O	O	O	O	O	O
212P with PFI 1023	O	O	O	O	O	O	O	O
213E with PFI 1023	O	O	O	O	O	O	O	O
Grounding								
Double ground (1 in the junction box + 2 in the frame)	P	P	P	P	P	P	P	P
Double ground + auxiliary junction box (1 in the junction box + 3 in the frame)	O	O	O	O	O	O	O	O
Fan								
Aluminum (2 and 4 poles)	P	P	P	P	P	P	P	E
Aluminium (6 poles and above)	P	P	P	P	P	P	P	P
Cast iron (4 poles and above)	O	O	O	O	O	O	O	O
Steel plate	NA	NA	NA	NA	NA	NA	P	P
Threaded center hole (shaft)	P	P	P	P	P	P	P	P
Lubrication								
Mobil Polyrex EM	P	P	P	P	P	P	P	P
Oil filling device								
Carbon steel oil filling plant	P	P	P	P	P	P	P	P
Drive end insulation								
Uninsulated conductor	P	P	P	P	P	P	P	P
Insulated bearing	E	E	E	E	E	E	E	E
Insulation cover	E	E	E	E	E	E	E	E
Non-drive end insulation								
Uninsulated conductor	O	O	NA	NA	NA	NA	NA	NA
Insulated bearing	E	E	E	E	E	E	E	E
Insulation cover	P	P	P	P	P	P	P	P
Drive end bearing type								
C3	P	P	P	P	P	P	NA	NA
C4	E	E	E	E	E	E	E	E
Non-drive bearing type								
C3	P	P	P	P	P	P	P	P
C4	E	E	E	E	E	E	E	E
BE angular contact bearing (2-pole) 1	O	O	NA	NA	NA	NA	NA	NA
BE angular contact bearing (4 to 8 poles) 1	O	O	O	O	O	O	NA	NA
Dynamic balance type								
Half bond equilibrium	P	P	P	P	P	P	P	P
Reduced half bond equilibrium	O	O	O	O	O	O	O	O
Shaft material								
42CrMo	P	P	P	P	P	P	P	P
AISI 4140	O	O	O	O	O	O	O	O
AISI 4140 H	NA	NA	NA	NA	P	P	NA	NA
Q345 (4 to 8 poles)	NA	NA	NA	NA	NA	O	P	P
AISI 1524 (4 to 8 poles)	NA	NA	NA	NA	NA	O	O	O

6. Optional Configuration (IEC)

Characteristic	315C/D/E	355C/D/E	400L/A/B	400/C/D/E	450	500	560	630
Key								
B Key	P	P	P	P	P	P	P	P
C Key	O	O	O	O	O	O	O	O
Shaft lock device	P	P	P	P	P	P	P	P
Drive end bearing type								
Ball bearing (2-pole)	P	P	P	P	P	NA	NA	NA
Ball bearings (4 to 8 poles)*	P	P	P	P	P	P	NA	NA
Roller bearings (4 to 8 poles)	O	O	O	O	O	O	P	P
Sliding bearing (HGF) 2)	O	O	O	O	O	O	E	E
Non-drive bearing type								
Ball bearing	P	P	P	P	P	P	NA	NA
BE Angle contact ball(2pole)	O	E	NA	NA	NA	NA	NA	NA
BE Angle contact ball(4 to 8pole)	O	O	O	O	O	O	NA	NA
Insulated sliding bearing(HGF)2)	O	O	O	O	O	O	E	E
Bearing cap								
Bearing cap	P	P	P	P	P	P	P	P
Terminal box cover								
Plastic thread sealing cover	P	P	P	P	P	P	P	P
Casting thread sealing cover	O	O	O	O	O	O	O	O
No cap	O	O	O	O	O	O	O	O
Cooling method								
TEFC (fan cooling)	P	P	P	P	P	P	P	P
TFVE Silencer with steel plate	O	O	O	O	O	O	O	O
TFVE With a fiber muffler	O	O	O	O	O	O	O	O
TEBC (Fan cooling)	O	O	O	O	O	O	O	O
TFVF Silencer with steel plate	E	E	E	E	E	E	E	E
TFVF With fiber silencer	E	E	E	E	E	E	E	E
Inside painting								
Internal anticorrosive painting	O	O	O	O	O	O	O	O
Drain contamination								
Open drain cover (automatic)	P	P	P	P	P	P	P	P
Closed drain cover	O	O	O	O	O	O	O	O
The bolt material								
Stainless steel bolt	O	O	O	O	O	O	O	O
Oil extraction								
Through the plastic drain valve	P	P	P	P	P	P	E	E
Drain oil through end cap	E	E	E	E	E	E	E	E
Strong cold suite								
Strong cooling suite with encoder reserved	O	O	O	O	O	O	O	O
Strong cooling suite is not reserved with encoder	O	O	O	O	O	O	O	O
Strongly cooled motor voltage								
208-230/460V	O	O	O	O	O	O	O	O
220-240/380-415//460V	O	O	O	O	O	O	O	O
220/380-440V	O	O	O	O	O	O	O	O
380-415/660-690//460V	O	O	O	O	O	O	O	O
525-550V	O	O	O	O	O	O	O	O
575V	O	O	O	O	O	O	O	O
220/380	O	O	O	O	O	O	O	O
220/440	O	O	O	O	O	O	O	O
230/460V	O	O	O	O	O	O	O	O
240/480V	O	O	O	O	O	O	O	O
380/660V	O	O	O	O	O	O	O	O
400/690V	O	O	O	O	O	O	O	O
440V	O	O	O	O	O	O	O	O
460V	O	O	O	O	O	O	O	O
480V	O	O	O	O	O	O	O	O
Encoder								
Without encoder	P	P	P	P	P	P	P	P
HS 35 encoder	O	O	O	O	O	O	O	O
Leine&Linde XH861 900220-2048	E	E	E	E	E	E	E	E
Drive end grounding carbon brush								
Drive end grounding carbon brush	O	O	O	O	O	O	O	O
Fan housing material - sliding bearing and rolling bearing with strong cooling kit								
Welded steel plate (2-pole horizontal installation)	P	P	P	P	P	NA	NA	NA
Welded steel plate (horizontal installation with 4 poles or above)	O	O	O	O	O	P	P	P
Fan housing material - rolling bearings without strong cooling kit								
Casting	P	P	P	P	NA	NA	NA	NA
Silencer - no strong cooling for motor								
No silencer	P	P	P	P	P	P	P	P
With silencer	O	O	O	O	O	O	O	O
Bearing thermal protection								
Bimetal thermal protectors - drive end/non-drive end	O	O	O	O	O	O	O	O
3 wire PT100 - drive/non-drive	P	P	P	P	P	P	P	P
3-wire calibrated PT100 - drive end/non-drive end	O	O	O	O	O	O	O	O
2 x 3 wire PT100 - Driver end/non-driver end	O	O	O	O	O	O	O	O
2 X 3 line calibrated PT100 - drive end/non-drive end	O	O	O	O	O	O	O	O
Direction of rotation								
Bidirectional (4-8 poles)	P	P	P	P	P	P	P	P
Clockwise (2 poles)	P	P	P	P	P	E	E	E
Counterclockwise (2 poles)	O	O	O	O	O	O	O	O
Steering plate	P	P	P	P	P	P	P	P
Dipping paint								
Low voltage - continuous drip immersion	P	P	P	P	P	P	P	P
high voltage - VPI	P	P	P	P	P	P	P	P
high voltage - 2xVPI	O	O	O	O	O	O	O	O
Vibration level								
A grade	P	P	P	P	P	P	P	P
B grade	O	O	O	O	O	O	O	O
Vibrating sensor								
SPM Vibration sensor reservation	O	O	O	O	O	O	O	O

Note: P(standard), O(optional), NA(not applicable), E(consulting WEG).
* Optional as a 400 stand vertical motor only - roller bearings are not suitable at this time;
1) Standard characteristics of vertical motor;
2) Standard characteristics of sliding bearing motor.

7. Electrical data (IC411) - 380V 50Hz

Output		Frame	Full load torque (Nm)	Locked rotor current Il/In	Locked rotor torque Ti/Tn	Break-down torque Tb/Tn	Inertia J (kg.m²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	380V							
													Efficiency			Power Factor			
kW	HP							Hot	Cold			Rated speed (rpm)	50%	75%	100%	50%	75%	100%	Full load current In (A)
2P																			
200	270	315C/D/E	65	6.9	0.9	2.4	3.2	24	53	1749	75	2980	94.9	95.7	95.8	0.81	0.87	0.89	357.0
250	340	315C/D/E	82	6.9	0.9	2.4	4.0	20	44	1959	75	2978	95.3	95.7	95.8	0.86	0.89	0.89	445.0
280	380	315C/D/E	92	6.9	0.9	2.4	4.0	16	35	1959	75	2977	95.4	95.7	95.8	0.85	0.90	0.90	494.0
315	430	315C/D/E	103	7.5	0.9	2.5	4.5	14	31	2009	75	2979	95.4	95.9	96.0	0.85	0.90	0.90	554.0
355	480	355C/D/E	116	6.8	0.9	2.4	5.7	45	99	2768	82	2976	95.5	96.0	96.1	0.85	0.90	0.90	623.0
400	550	355C/D/E	131	7.0	0.9	2.4	6.4	45	99	2828	82	2980	95.7	96.0	96.2	0.81	0.87	0.89	709.0
450	610	355C/D/E	147	7.0	0.9	2.4	7.1	33	73	3078	82	2982	95.7	96.2	96.2	0.81	0.87	0.89	798.0
500	680	355C/D/E	163	7.0	0.9	2.4	7.9	35	77	2998	82	2980	95.7	96.2	96.2	0.85	0.90	0.90	877.0
560	750	400L/A/B	183	7.5	0.9	2.5	11.0	26	57	3717	88	2980	95.5	96.2	96.2	0.84	0.89	0.90	982.0
630	850	400L/A/B	206	7.5	0.9	2.5	12.9	26	57	3817	88	2980	95.7	96.3	96.3	0.85	0.90	0.90	1110.0
4P																			
250	340	315C/D/E	164	7.5	0.9	2.5	5.8	17	37	1850	75	1485	95.2	95.8	96.0	0.76	0.83	0.86	460.0
280	380	315C/D/E	184	7.5	0.9	2.6	6.3	19	42	1900	75	1485	95.4	95.9	96.0	0.76	0.83	0.86	516.0
315	430	315C/D/E	207	7.5	0.9	2.7	7.0	16	35	2000	75	1485	95.3	95.9	96.0	0.75	0.82	0.85	586.0
355	480	315C/D/E	233	7.5	0.9	2.7	7.6	15	33	2050	75	1485	95.3	95.7	96.0	0.75	0.82	0.86	654.0
450	610	355C/D/E	294	6.7	0.9	2.3	13.8	30	66	2900	75	1489	95.6	96.0	96.2	0.79	0.85	0.87	817.0
500	680	355C/D/E	327	6.7	0.9	2.4	15.3	26	57	3000	75	1488	95.8	96.1	96.3	0.77	0.85	0.87	906.0
560	750	400L/A/B	367	7.0	0.9	2.2	17.6	20	44	3700	78	1488	95.9	96.2	96.4	0.76	0.82	0.86	1030.0
630	850	400C/D/E	412	7	0.9	2.3	20	18	40	4500	78	1489	96	96.3	96.3	0.76	0.82	0.86	1160
710	970	400C/D/E	465	7.7	0.9	2.4	22.4	13	29	4650	78	1487	96.1	96.3	96.4	0.74	0.82	0.86	1290.0
800	1100	450	522	7.0	0.7	2.5	22.0	20	44	5123	85	1492	95.6	96.4	96.6	0.76	0.84	0.86	1460.0
900	1250	450	588	7.0	0.7	2.5	25.0	20	44	5420	85	1492	95.6	96.3	96.6	0.76	0.84	0.86	1640.0
1000	1350	450	653	7.0	0.7	2.5	28.0	20	44	5720	85	1492	95.7	96.5	96.7	0.76	0.84	0.86	1830.0
6P																			
160	220	315C/D/E	158	7.0	0.9	2.2	7.5	20	44	1720	68	988	95.0	95.6	95.6	0.70	0.80	0.82	311.0
185	250	315C/D/E	182	7.0	0.9	2.2	8.8	16	35	1820	68	988	95.1	95.5	95.7	0.70	0.80	0.82	358.0
200	270	315C/D/E	197	7.0	0.9	2.3	9.5	17	37	1860	68	988	95.3	95.5	95.8	0.70	0.80	0.83	382.0
250	340	315C/D/E	247	7.0	0.9	2.4	11.4	14	31	1960	68	985	95.0	95.5	95.8	0.68	0.78	0.82	483.0
280	380	355L/A/B	276	7.0	0.9	2.5	13.1	28	62	2310	70	989	95.0	95.6	95.8	0.70	0.79	0.83	535.0
315	430	355L/A/B	310	7.0	0.9	2.5	14.3	26	57	2400	70	989	95.2	95.9	95.8	0.73	0.82	0.85	587.0
355	480	355C/D/E	350	6.3	0.9	2.5	16.0	27	59	2820	70	988	95.5	95.8	95.8	0.75	0.83	0.86	655.0
450	610	400L/A/B	442	6.2	0.9	2.3	22.0	20	44	3600	70	992	95.6	96.0	96.0	0.73	0.81	0.85	838.0
500	680	400L/A/B	491	6.5	0.9	2.3	24.8	16	35	3800	70	992	95.7	96.1	96.1	0.73	0.82	0.85	931.0
560	750	400C/D/E	550	6.0	0.9	2.3	27.9	16	35	4440	70	992	95.8	96.2	96.2	0.71	0.81	0.85	1040.0
630	850	450	618	6.5	0.8	2.4	33.0	20	44	5100	82	993	96.1	96.2	96.2	0.77	0.84	0.85	1170.0
710	970	450	696	6.5	0.8	2.4	37.4	20	44	5420	82	993	96.1	96.2	96.2	0.77	0.84	0.85	1320.0
800	1100	450	784	6.5	0.8	2.4	41.9	20	44	5720	82	994	96.2	96.3	96.3	0.77	0.84	0.85	1480.0

*Indicates temperature rise class F

7. Electrical data (IC411) - 380V 50Hz

Output		Frame	Full load torque (Nm)	Locked rotor current Il/In	Locked rotor torque Ti/Tn	Break-down torque Tb/Tn	Inertia J (kg.m²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	380V							
													Efficiency			Power Factor			
kW	HP							Hot	Cold			Rated speed (rpm)	50%	75%	100%	50%	75%	100%	Full load current In (A)
8P																			
160	220	315C/D/E	211	7.0	0.8	2.3	10.1	22	48	1850	68	738	93.9	94.5	94.5	0.68	0.78	0.82	314.0
185	250	315C/D/E	244	7.0	0.8	2.4	11.9	25	55	2000	68	738	94.1	94.6	94.6	0.70	0.79	0.82	362.0
200	270	315C/D/E	264	7.0	0.8	2.2	12.9	19	42	2100	68	739	94.3	94.5	94.6	0.68	0.78	0.82	391.0
250	340	355L/A/B	328	7.0	0.8	2.3	17.6	21	46	2450	70	742	94.4	94.5	94.6	0.67	0.76	0.82	486.0
280	380	355C/D/E	368	7.0	0.8	2.2	20.1	22	48	2820	70	742	94.4	94.5	94.6	0.70	0.78	0.82	544.0
315	430	355C/D/E	413	7.0	0.8	2.2	22.3	19	42	2980	70	742	94.4	94.5	94.6	0.68	0.77	0.82	612.0
355	480	400L/A/B	465	6.8	0.8	2.5	32.2	22	48	3600	70	743	94.6	95.2	95.5	0.66	0.77	0.81	697.0
400	550	400L/A/B	524	6.8	0.8	2.5	32.8	22	48	3600	70	743	94.6	95.3	95.6	0.66	0.77	0.81	785.0
450	610	400L/A/B	590	6.8	0.8	2.5	37.3	20	44	3800	70	743	94.8	95.5	95.8	0.66	0.77	0.81	881.0
500	680	400C/D/E	655	6.8	0.8	2.5	44.3	22	48	4640	70	743	95.0	95.7	96.0	0.66	0.77	0.81	977.0
560	750	450	732	7.0	0.8	2.2	60.2	26	57	5875	75	745	95.6	96.0	96.1	0.71	0.80	0.84	1050.0
630	850	450	825	7.0	0.8	2.2	64.6	26	57	6080	75	744	95.8	96.2	96.3	0.74	0.82	0.84	1180.0
10P																			
75	100	315L/A/B	124	7.0	0.8	2.0	6.9	15	33	1580	78	590	91.6	92.5	92.5	0.51	0.63	0.70	176.0
90	125	315L/A/B	149	7.0	0.8	2.0	8.4	15	33	1700	78	590	91.8	92.8	92.8	0.51	0.63	0.70	211.0
110	150	315C/D/E	182	7.0	0.8	2.0	10.1	15	33	1900	78	590	92.2	93.0	93.0	0.51	0.63	0.70	257.0
132	175	315C/D/E	218	7.0	0.8	2.0	12.9	15	33	2100	78	590	92.6	93.2	93.2	0.51	0.63	0.70	307.0
160	220	355L/A/B	264	7.0	0.8	2.0	17.0	20	44	2350	80	591	92.8	93.8	94.0	0.50	0.62	0.69	375.0
185	250	355C/D/E	305	7.0	0.8	2.0	20.1	20	44	2750	80	591	93.0	94.0	94.2	0.50	0.62	0.69	433.0
200	270	355C/D/E	330	7.0	0.8	2.0	21.7	20	44	2820	80	591	93.2	94.2	94.4	0.50	0.62	0.69	466.0
220	300	355C/D/E	363	7.0	0.8	2	24.8	20	44	2980	80	591	93.4	94.4	94.6	0.5	0.62	0.69	512
250	340	400L/A/B	411	7.0	0.8	2.2	26.5	22	48	3400	80	593	94.8	95.4	95.4	0.60	0.72	0.78	509.0
280	380	400L/A/B	460	7.0	0.8	2.2	31.1	22	48	3545	80	593	95.0	95.6	95.6	0.60	0.72	0.78	571.0
315	430	400L/A/B	517	7.0	0.8	2.2	33.5	22	48	3725	80	593	95.2	95.8	95.8	0.60	0.72	0.78	640.0
355	480	400L/A/B	583	7.0	0.8	2.2	38.1	22	48	3930	80	593	95.4	96.0	96.0	0.60	0.72	0.78	720.0
400	550	400L/A/B	657	7.0	0.8	2.2	40.4	22	48	4100	80	593	95.6	96.2	96.2	0.60	0.72	0.78	809.0
450	610	450	737	7.0	0.8	2.2	67.0	25	55	4770	80	595	95.4	95.8	95.8	0.60	0.72	0.79	903.0
500	680	450	818	7.0	0.8	2.2	75.0	25	55	5020	80	595	95.6	96.0	96.0	0.60	0.72	0.79	1000.0
560	750	450	917	6.2	0.8	2.2	80.0	25	55	5305	80	595	95.8	96.2	96.2	0.61	0.73	0.80	1110.0
High-Output Design																			
250	340	355C/D/E*	412	7.0	0.8	2.0	26.4	20	44	3050	80	591	93.4	94.4	94.6	0.50	0.62	0.69	582.0
12P																			
132	175	355L/A/B	261	7.0	0.8	1.8	18.5	20	44	2460	80	493	93.3	94.0	94.0	0.48	0.60	0.67	319.0
160	220	355C/D/E	316	7.0	0.8	1.8	24.6	20	44	3100	80	493	93.5	94.0	94.0	0.48	0.60	0.67	386.0
200	270	400L/A/B	393	7.0	0.8	2.1	33.0	20	44	3400	80	496	94.0	94.5	94.5	0.54	0.67	0.74	435.0
250	340	400L/A/B	492	7.0	0.8	2.3	38.6	20	44	3690	80	495	94.8	95.0	95.0	0.57	0.69	0.75	533.0
280	380	400C/D/E	551	7.0	0.8	2.3	41.0	20	44	4230	80	495	94.8	95.0	95.0	0.57	0.69	0.75	597.0
315	430	450	620	7.0	0.8	1.9	59.1	40	88	4555	80	495	94.9	95.1	95.1	0.61	0.71	0.77	654.0
355	480	450	699	7.0	0.8	1.9	67.6	40	88	4790	80	495	95.1	95.3	95.3	0.61	0.71	0.77	735
400	550	450	787	7.0	0.8	1.9	72	40	88	5050	80	495	95.3	95.5	95.5	0.61	0.71	0.77	826
450	610	450	885	7.0	0.8	1.9	76.2	40	88	5310	80	495	95.5	95.7	95.7	0.62	0.72	0.78	916

7. Electrical data (IC411) - 3300V 50Hz

Output		Frame	Full load torque (Nm)	Locked rotor current Il/In	Locked rotor torque Ti/Tn	Break-down torque Tb/Tn	Inertia J (kg.m²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	3300V							
													Efficiency			Power Factor			
kW	HP							Hot	Cold			Rated speed (rpm)	50%	75%	100%	50%	75%	100%	Full load current In (A)
2P																			
250	340	315C/D/E	801	6.8	1.2	2.0	3.3	17	19	1831	75	2981	93.4	94.3	94.4	0.81	0.87	0.89	52.1
280	380	315C/D/E	897	6.7	1.2	2.0	3.5	17	18	1873	75	2981	93.8	94.6	94.6	0.82	0.88	0.89	58.2
315	430	315C/D/E	1011	7.2	1.1	2.0	2.9	22	24	1986	75	2976	94.3	95.0	94.9	0.84	0.88	0.89	65.3
355	480	355C/D/E	1139	7.0	1.0	1.9	3.9	21	22	2569	82	2975	94.0	94.8	94.9	0.85	0.88	0.89	73.6
400	550	355C/D/E	1285	6.8	1.0	1.8	4.2	21	22	2631	82	2974	94.4	95.0	95.0	0.85	0.88	0.89	82.8
450	610	355C/D/E	1444	7.4	1.1	2.0	4.5	18	19	2729	82	2977	94.5	95.2	95.3	0.85	0.88	0.89	92.9
500	680	400L/A/B	1604	7.4	0.8	2.1	7.0	16	17	3598	88	2977	94.7	95.4	95.4	0.80	0.86	0.88	104.3
560	750	400L/A/B	1794	8.0	1.0	2.8	7.2	15	24	3635	88	2981	95.6	96.1	96.1	0.85	0.88	0.89	114.6
630	850	400L/A/B	2020	7.1	1.0	2.7	7.3	15	24	3660	88	2978	95.9	96.2	96.1	0.85	0.88	0.89	128.8
710	970	400C/D/E	2275	7.5	1.2	2.9	13.5	19	30	4605	88	2980	96.0	96.3	96.2	0.85	0.88	0.89	145.0
800	1100	450	2556	7.5	0.8	2.3	20.7	29	31	5790	88	2989	94.4	95.3	95.4	0.85	0.88	0.89	162.9
900	1250	450	2877	7.3	1.1	2.7	21.0	24	25	5815	88	2987	94.5	95.5	95.8	0.85	0.88	0.89	184.7
1000	1350	450	3198	7.1	1.1	2.6	21.1	21	22	5866	88	2986	94.9	95.8	96.0	0.85	0.88	0.89	204.8
4P																			
250	340	315C/D/E	1613	6.7	1.0	2.2	3.8	33	34	1844	75	1480	94.7	94.9	94.5	0.79	0.85	0.87	53.0
280	380	315C/D/E	1806	6.9	1.0	2.3	4.1	30	32	1911	75	1481	94.9	95.1	94.7	0.79	0.85	0.87	59.2
315	430	315C/D/E	2030	6.2	1.1	2.5	4.1	25	26	1925	75	1482	95.0	95.2	94.8	0.76	0.84	0.87	67.0
355	480	315C/D/E	2280	6.8	1.3	2.7	6.0	20	21	2059	75	1487	94.9	95.3	95.1	0.76	0.84	0.87	75.0
400	550	355C/D/E	2573	7.1	0.9	2.0	7.4	29	31	2673	75	1485	94.5	95.1	95.0	0.78	0.84	0.86	85.4
450	610	355C/D/E	2892	6.9	0.9	2.0	7.8	33	35	2746	75	1486	94.9	95.4	95.2	0.76	0.83	0.85	97.1
500	680	355C/D/E	3212	7.0	0.9	2.0	8.8	33	35	2915	75	1486	95.0	95.5	95.4	0.76	0.83	0.85	107.6
560	750	355C/D/E	3598	7.1	0.9	2.0	8.8	28	30	2944	75	1486	95.2	95.6	95.5	0.74	0.82	0.85	121.0
630	850	400L/A/B	4041	6.9	0.8	2.4	13.7	21	22	3666	78	1489	95.6	96.1	96.0	0.74	0.83	0.86	133.6
710	970	400L/A/B	4559	6.9	0.9	2.5	14.7	18	19	3794	78	1487	95.7	96.2	96.0	0.73	0.82	0.85	151.5
800	1100	400C/D/E	5129	6.2	0.9	2.5	17.0	16	17	4495	78	1490	95.9	96.3	96.2	0.70	0.80	0.84	173.3
900	1250	400C/D/E	5769	6.4	0.9	2.5	17.5	16	17	4505	78	1490	96.1	96.5	96.4	0.71	0.81	0.85	192.7
1000	1350	450	6410	6.4	0.9	2.5	28.1	16	17	5968	85	1490	96.2	96.6	96.5	0.72	0.81	0.85	213.1
1100	1500	450	7037	7.4	1.0	2.7	30.8	21	22	6025	85	1493	96.3	96.6	96.7	0.76	0.84	0.87	228.0
1250	1700	450	7997	7.2	1.0	2.6	32.0	19	20	6128	85	1493	96.3	96.6	96.7	0.74	0.83	0.86	261.7
1400	1900	500	8959	6.3	0.9	2.4	44.5	22	23	7552	90	1492	96.3	96.8	96.7	0.81	0.87	0.89	283.8
1600	2200	500	10237	6.3	0.9	2.5	47.6	20	21	7831	90	1493	96.4	96.9	96.9	0.81	0.87	0.89	324.0
1800	2500	560	11496	7.0	0.8	2.6	102.3	32	34	11108	92	1495	96.7	97.1	97.2	0.82	0.87	0.89	365.7
6P																			
250	340	315C/D/E	2419	6.6	0.9	2.3	5.6	35	37	1943	68	987	93.8	94.3	94.1	0.64	0.75	0.79	58.6
280	380	315C/D/E	2710	6.7	0.9	2.3	6.4	36	38	2065	68	987	94.0	94.5	94.2	0.65	0.75	0.80	65.0
315	430	355C/D/E	3035	6.8	0.9	2.6	9.3	36	43	2630	70	991	94.4	95.0	94.9	0.60	0.72	0.78	74.7
355	480	355C/D/E	3421	6.7	0.9	2.5	10.1	35	43	2710	70	991	94.5	95.1	95.0	0.64	0.75	0.81	81.1
400	550	355C/D/E	3855	6.8	0.9	2.5	10.8	34	39	2818	70	991	95.0	95.4	95.2	0.65	0.76	0.81	90.6
450	610	355C/D/E	4332	6.5	1.1	2.6	12.2	23	33	2958	70	992	94.7	95.3	95.3	0.59	0.71	0.78	105.9
500	680	400L/A/B	4813	6.6	1.0	2.6	17.7	30	31	3565	70	992	95.2	95.7	95.7	0.66	0.77	0.81	112.4
560	750	400L/A/B	5389	6.9	1.0	2.7	18.7	25	26	3669	70	992	95.1	95.7	95.7	0.63	0.75	0.80	127.7
630	850	400L/A/B	6063	6.8	0.9	2.6	21.1	26	27	3902	70	992	95.4	95.9	95.9	0.65	0.76	0.81	142.0
710	970	400C/D/E	6851	7.1	1.0	1.9	26.5	19	20	4837	70	990	95.2	95.7	95.6	0.69	0.78	0.81	159.7
800	1100	450	7680	6.6	0.9	2.4	42.1	33	34	5892	82	995	95.1	95.9	96.0	0.69	0.79	0.83	176.3
900	1250	450	8645	6.1	0.9	2.4	44.5	29	31	5923	82	994	95.8	96.0	96.2	0.72	0.81	0.84	192.8
1000	1350	450	9596	6.9	1.1	2.5	46.8	23	25	6068	82	995	95.5	96.0	96.2	0.65	0.76	0.81	222.8
1100	1500	500	10564	6.3	0.9	2.4	82.9	26	28	7086	80	994	96.1	96.5	96.4	0.76	0.84	0.87	230.1
1250	1700	500	12005	6.4	0.9	2.5	88.3	24	25	7344	80	994	96.2	96.6	96.5	0.76	0.84	0.87	261.2
1400	1900	560	13422	6.3	0.7	2.5	129.4	49	55	10041	88	996	96.4	96.5	96.6	0.81	0.87	0.89	284.0
1600	2200	560	15339	6.5	0.7	2.6	144.2	47	49	10778	88	996	96.4	96.6	96.7	0.76	0.84	0.87	329.5
8P																			
250	340	355C/D/E	3216	6.7	1.0	2.4	13.1	33	40	2700	70	742	93.6	94.2	94.0	0.60	0.72	0.77	60.1
280	380	355C/D/E	3603	6.6	1.0	2.3	14.0	33	38	2784	70	742	93.8	94.4	94.2	0.61	0.72	0.77	67.1
315	430	355C/D/E	4052	6.7	1.1	2.4	14.5	28	34	2823	70	742	93.8	94.4	94.2	0.59	0.71	0.76	76.5
355	480	400L/A/B	4569	6.9	1.2	2.1	25.8	32	33	3374	70	742	94.5	95.0	94.7	0.66	0.76	0.80	81.6
400	550	400L/A/B	5153	6.6	1.1	1.9	29.7	36	37	3571	70	741	94.7	95.0	94.7	0.69	0.78	0.81	90.7
450	610	400C/D/E	5798	6.4	1.0	1.9	26.0	35	37	4389	70	741	94.4	95.0	94.8	0.58	0.71	0.76	105.1
500	680	400C/D/E	6429	6.2	1.1	2.3	30.8	29	31	4498	70	743	94.2	94.9	94.9	0.59	0.71	0.77	120.2
560	750	400C/D/E	7216	6.5	1.1	1.9	33.1	35	36	4647	70	741	94.8	95.2	94.9	0.66	0.76	0.80	129.5
630	850	450	8109	7.0	0.8	2.2	54.1	27	28	6094	75	742	94.5	95.1	95.1	0.60	0.72	0.77	150.5
710	970	450	9108	6.1	1.0	2.5	56.3	38	42	6162	75	744	95.6	96.0	95.8	0.73	0.81	0.85	152.9
750	1000	450	9620	6.0	0.9	2.5	59.2	35	43	6294	75	745	95.6	96.0	95.8	0.71	0.80	0.84	163.0
800	1100	450	10260	6.1	0.9	2.5	63.4	31	43	6481	75	745	95.6	96.0	95.8	0.72	0.81	0.84	173.4
900	1250	500	11522	6.5	0.7	2.2	95.1	44	66	6694	78	746	95.7	96.2	96.1	0.72	0.80	0.83	197.3
1000	1350	500	12807	6.3	0.7	2.1	107.3	43	66	7086	78	746	95.9	96.3	96.2	0.74	0.82	0.84	215.9
1100	1500	560	14071	7.0	0.7	2.4	252.7	57	66	10433	80	747	95.7	96.3	96.3	0.74	0.82	0.85	235.0
1250	1700	560	15988	7.1	0.7	2.4	268.3	53	59	10764	80	747	95.8	96.4	96.4	0.74	0.82	0.85	266.6

7. Electrical data (IC411) - 6000V 50Hz

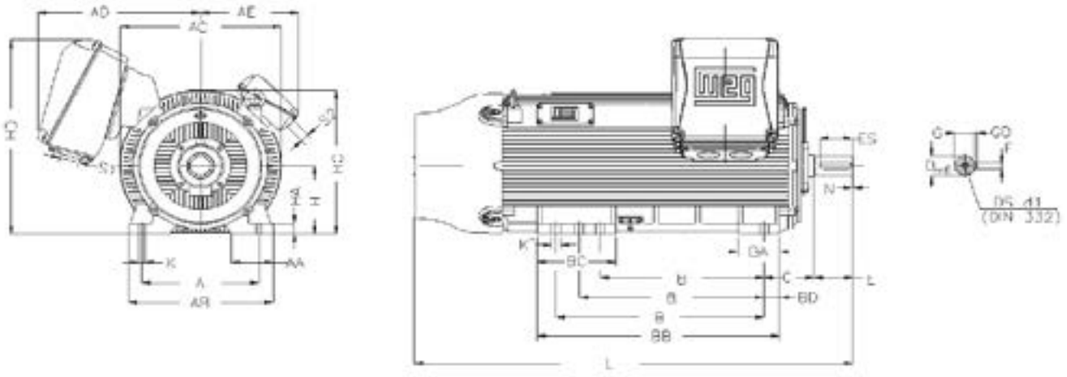
Output		Frame	Full load torque (Nm)	Locked rotor current Il/In	Locked rotor torque Ti/Tn	Break-down torque Tb/Tn	Inertia J (kg.m²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	6000V							
												Rated speed (rpm)	Efficiency			Power Factor			Full load current In (A)
kW	HP							Hot	Cold				50%	75%	100%	50%	75%	100%	
2P																			
220	300	315C/D/E	705	6.5	1.0	2.3	3.2	16	22	1777	75	2981	92.9	94.2	94.5	0.82	0.87	0.89	25.2
250	340	315C/D/E	801	7.0	1.1	2.5	3.3	14	19	1802	75	2982	93.2	94.4	94.8	0.78	0.85	0.88	28.8
280	380	315C/D/E	898	6.9	1.0	2.3	2.9	22	23	1942	75	2979	93.6	94.5	94.5	0.82	0.87	0.89	32.0
315	430	355C/D/E	1139	6.2	1.0	2.0	3.9	23	24	2519	82	2976	93.5	94.4	94.5	0.82	0.87	0.88	40.9
355	480	355C/D/E	1284	7.0	1.0	1.9	4.2	23	24	2605	82	2975	93.9	94.7	94.7	0.84	0.88	0.89	45.8
400	550	355C/D/E	1445	6.9	1.0	1.8	4.5	22	23	2699	82	2975	94.3	95.0	94.9	0.85	0.88	0.89	51.3
450	610	355C/D/E	1604	6.3	1.0	2.0	4.9	19	20	2783	82	2977	94.0	94.9	94.9	0.85	0.88	0.89	57.0
500	680	400L/A/B	1603	6.3	0.8	2.4	6.8	23	37	3536	88	2978	95.1	95.7	95.6	0.85	0.88	0.89	56.6
560	750	400L/A/B	1794	7.0	1.1	2.7	6.7	18	28	3521	88	2981	95.4	96.0	96.0	0.85	0.88	0.89	63.1
630	850	400C/D/E	2019	7.4	1.1	2.8	12.1	20	32	4331	88	2980	95.7	96.1	96.0	0.85	0.88	0.89	71.0
710	970	400C/D/E	2276	7.1	1.1	2.7	12.1	19	20	4318	88	2979	95.8	96.2	96.1	0.85	0.88	0.89	79.9
750	1000	450	2398	6.6	1.0	2.3	17.0	36	37	5547	88	2987	94.2	95.1	95.5	0.85	0.88	0.89	84.1
800	1100	450	2558	7.4	1.2	2.8	19.6	24	25	5628	88	2986	94.3	95.3	95.6	0.85	0.88	0.89	90.5
900	1250	450	2876	7.5	1.1	2.8	20.9	24	25	5737	88	2988	94.4	95.5	95.7	0.85	0.88	0.89	101.6
1000	1350	450	3198	6.8	1.1	2.6	21.1	22	23	5806	88	2986	94.7	95.7	95.9	0.85	0.88	0.89	112.8
4P																			
220	300	315C/D/E	1416	6.5	1.1	2.6	3.5	23	31	1764	75	1484	94.1	94.5	94.3	0.73	0.82	0.86	26.2
250	340	315C/D/E	1609	6.6	1.2	2.6	4.1	18	28	1872	75	1484	94.2	94.6	94.3	0.77	0.84	0.87	29.2
280	380	315C/D/E	1803	6.4	1.1	2.5	4.4	19	30	1940	75	1483	94.6	94.9	94.5	0.77	0.84	0.87	32.8
315	430	315C/D/E	2029	6.6	1.2	2.6	4.5	18	27	2011	75	1483	94.8	95.0	94.7	0.75	0.83	0.87	36.8
355	480	355C/D/E	2283	7.1	0.9	2.1	6.9	31	33	2570	75	1485	94.8	95.2	95.0	0.77	0.84	0.87	41.5
400	550	355C/D/E	2571	7.5	0.9	2.3	7.4	27	29	2664	75	1486	94.8	95.3	95.2	0.75	0.83	0.86	47.1
450	610	355C/D/E	2892	7.5	1.0	2.3	8.5	27	28	2831	75	1486	94.4	95.1	95.1	0.75	0.83	0.86	52.8
500	680	355C/D/E	3218	6.9	0.9	2.0	8.0	28	30	2794	75	1484	94.9	95.4	95.2	0.75	0.83	0.85	59.4
560	750	400L/A/B	3593	6.7	0.9	2.3	13.7	25	26	3639	78	1488	95.4	95.9	95.8	0.76	0.84	0.87	65.0
630	850	400L/A/B	4043	6.1	0.9	2.6	13.7	19	20	3632	78	1488	95.4	95.9	95.8	0.71	0.81	0.85	74.7
710	970	400L/A/B	4553	6.9	0.8	2.4	14.7	20	20	3750	78	1489	95.7	96.2	96.0	0.74	0.83	0.86	82.8
750	1000	400C/D/E	4799	6.9	0.8	2.6	18.1	21	22	4480	78	1492	95.8	96.0	96.1	0.70	0.81	0.84	87.4
800	1100	400C/D/E	5138	6.9	0.9	2.5	18.2	20	21	4503	78	1487	96.0	96.3	96.1	0.72	0.81	0.85	94.5
900	1250	400C/D/E	5772	6.3	0.9	2.7	19.1	18	19	4665	78	1489	96.0	96.4	96.3	0.65	0.76	0.82	110.2
1000	1350	450	6397	7.6	0.9	3.0	29.4	21	22	5811	85	1493	96.1	96.3	96.5	0.76	0.84	0.87	113.3
1250	1700	500	7993	6.4	0.8	2.6	42.3	26	27	7149	90	1493	95.9	96.5	96.6	0.79	0.86	0.88	141.1
1400	1900	500	8951	6.5	0.8	2.6	52.6	25	26	7779	90	1494	96.0	96.6	96.7	0.79	0.86	0.88	157.5
1600	2200	560	10217	7.1	0.8	2.7	96.2	34	36	10718	92	1496	96.3	96.9	97.0	0.80	0.86	0.88	179.6
6P																			
220	300	315C/D/E	2126	6.2	1.2	2.6	6.0	24	38	1960	68	988	93.2	93.9	93.7	0.63	0.74	0.80	28.4
250	340	315C/D/E	2418	6.7	1.1	2.3	6.4	28	42	2028	68	987	93.5	94.1	93.8	0.65	0.75	0.80	32.1
280	380	355C/D/E	2695	6.5	1.0	2.5	10.8	25	40	2768	70	992	94.1	94.8	94.8	0.62	0.74	0.80	35.6
315	430	355C/D/E	3033	6.1	0.9	2.4	11.5	24	38	2844	70	992	94.7	95.5	95.5	0.65	0.76	0.81	39.0
355	480	355C/D/E	3420	6.7	0.9	2.3	11.4	33	49	2857	70	991	94.9	95.6	95.7	0.62	0.74	0.79	45.0
400	550	355C/D/E	3853	6.8	0.9	2.4	12.1	31	44	2942	70	991	95.0	95.7	95.8	0.61	0.73	0.79	51.2
450	610	400L/A/B	4334	6.2	1.0	2.4	17.5	35	37	3514	70	992	95.0	95.5	95.4	0.69	0.79	0.83	54.8
500	680	400L/A/B	4815	6.3	1.0	2.4	18.7	32	34	3626	70	992	95.2	95.7	95.6	0.68	0.78	0.82	61.1
560	750	400L/A/B	5391	6.6	1.1	2.6	19.9	29	30	3743	70	992	95.1	95.7	95.6	0.66	0.77	0.82	69.1
630	850	400C/D/E	6071	6.7	1.1	2.2	24.7	17	18	4581	70	991	94.5	95.2	95.3	0.64	0.75	0.80	79.9
710	970	400C/D/E	6815	6.6	1.1	2.2	33.6	37	39	5020	70	995	94.1	95.1	95.4	0.69	0.79	0.83	86.3
800	1100	450	7680	6.6	1.0	2.3	44.5	30	32	5803	82	995	95.5	96.0	96.3	0.71	0.80	0.84	94.6
900	1250	500	8638	6.8	1.1	2.4	80.1	27	28	7090	80	995	95.5	96.0	96.3	0.69	0.79	0.84	107.2
1000	1350	500	9605	6.0	0.9	2.3	84.1	30	32	7180	80	994	96.0	96.4	96.3	0.78	0.85	0.87	114.7
1100	1500	500	10560	6.4	0.9	2.5	89.9	28	29	7445	80	995	96.0	96.5	96.5	0.76	0.84	0.87	126.2
1250	1700	560	11979	6.5	0.6	2.4	120.7	50	59	9781	88	996	95.9	96.5	96.6	0.77	0.85	0.88	141.9
1400	1900	560	13416	6.5	0.7	2.5	137.6	51	59	10434	88	997	96.1	96.7	96.7	0.78	0.86	0.88	157.9
8P																			
220	300	355C/D/E	2831	6.6	1.1	2.3	12.3	30	44	2613	70	742	93.4	94.0	93.8	0.61	0.72	0.78	29.0
250	340	355C/D/E	3212	6.3	1.1	2.4	13.1	26	34	2699	70	743	93.0	93.9	94.0	0.54	0.67	0.74	34.7
280	380	355C/D/E	3596	6.3	1.1	2.4	13.8	31	32	2767	70	744	93.4	94.6	94.9	0.52	0.65	0.72	39.3
315	430	400L/A/B	4052	7.0	1.2	2.1	29.6	40	45	3540	70	742	94.2	94.7	94.4	0.67	0.77	0.81	39.8
355	480	400L/A/B	4574	6.3	1.0	1.8	24.4	44	47	3562	70	741	94.1	94.6	94.4	0.67	0.76	0.79	45.6
400	550	400C/D/E	5153	6.4	1.0	1.9	26.0	40	42	4218	70	741	94.1	94.7	94.5	0.66	0.75	0.79	51.4
450	610	400C/D/E	5798	6.4	1.1	1.9	29.2	39	41	4388	70	741	94.6	95.0	94.7	0.67	0.76	0.80	57.3
500	680	400C/D/E	6451	6.1	0.9	1.7	33.1	44	46	4647	70	740	94.9	95.2	94.8	0.70	0.78	0.81	62.8
560	750	450	7197	6.5	1.0	2.5	64.2	25	27	6402	75	743	94.4	95.1	95.1	0.56	0.68	0.74	76.1
630	850	450	8077	6.9	0.9	2.4	66.7	34	54	6518	75	745	95.4	95.6	95.8	0.71	0.80	0.84	75.3
710	970	500	9100	6.2	0.9	2.5	92.3	32	51	6780	78	745	95.4	95.7	95.9	0.70	0.79	0.83	85.4
800	1100	500	10237	6.9	0.8	2.3	100.2	40	65	6846	78	746	95.5	96.0	96.0	0.72	0.81	0.84	94.9
900	1250	500	11517	6.0	0.8	2.4	107.4	36	57	7067	78	746	95.6	96.1	96.0	0.73	0.82	0.85	106.0
1000	1350	560	12790	6.0	0.7	2.4	223.3	43	63	9753	80	747	95.3	96.0	96.0	0.73	0.81	0.85	118.4
1100	1500	560	14071	6.0	0.7	2.3	252.7	46	65	10381	80	747	95.5	96.1	96.2	0.74	0.82	0.85	129.3

7. Electrical data (IC411) - 10000V 50Hz

Output		Frame	Full load torque (Nm)	Locked rotor current Il/In	Locked rotor torque Ti/Tn	Break-down torque Tb/Tn	Inertia J (kg.m²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	10000V							
												Rated speed (rpm)	Efficiency			Power Factor			Full load current In (A)
kW	HP							Hot	Cold				50%	75%	100%	50%	75%	100%	
2P																			
280	380	355C/D/E	897	6.5	1.2	2.5	3.9	21	22	2554	82	2981	92.7	93.9	94.2	0.82	0.88	0.89	19.3
315	430	355C/D/E	1010	6.6	1.0	2.1	4.2	23	25	2634	82	2979	93.3	94.2	94.3	0.84	0.88	0.89	21.7
355	480	400L/A/B	1137	6.8	1.1	2.2	6.4	24	39	3397	88	2980	94.0	94.8	94.8	0.79	0.86	0.89	24.3
400	550	400L/A/B	1281	7.1	1.1	2.4	6.6	23	36	3457	88	2981	94.3	95.0	95.1	0.73	0.82	0.86	28.2
450	610	400L/A/B	1439	7.4	1.2	2.3	9.4	18	19	3536	88	2986	94.2	95.1	95.2	0.76	0.84	0.87	31.2
500	680	400C/D/E	1604	7.5	1.0	2.4	10.9	13	20	4178	88	2977	94.9	95.4	95.4	0.85	0.88	0.89	34.0
560	750	400C/D/E	1793	7.8	1.2	2.4	11.5	20	23	4175	88	2982	94.9	95.6	95.6	0.84	0.88	0.89	38.0
560	750	450	1791	7.1	1.2	2.2	17.5	35	36	5324	88	2986	95.6	96.1	96.1	0.85	0.88	0.89	37.8
630	850	450	2013	7.1	1.1	2.2	18.8	34	36	5459	88	2988	93.3	94.6	95.0	0.85	0.88	0.89	43.0
710	970	450	2270	7.1	1.1	2.2	19.5	32	33	5606	88	2987	93.6	94.9	95.2	0.85	0.88	0.89	48.4
750	1000	450	2398	7.6	1.3	2.3	19.6	26	27	5608	88	2987	93.8	95.0	95.3	0.85	0.88	0.89	51.1
800	1100	450	2557	7.5	1.2	2.3	19.5	26	27	5621	88	2988	94.0	95.1	95.5	0.85	0.88	0.89	54.4
4P																			
280	380	355C/D/E	1797	6.4	0.9	2.1	7.2	38	50	2659	75	1488	93.3	94.2	94.2	0.75	0.83	0.85	20.1
315	430	355C/D/E	2022	6.4	0.9	2.1	7.8	36	47	2741	75	1488	93.6	94.4	94.4	0.75	0.83	0.85	22.6
355	480	400L/A/B	2278	6.7	0.9	2.3	13.4	34	42	3624	78	1488	94.2	94.9	94.8	0.78	0.84	0.87	24.9
400	550	400L/A/B	2566	7.0	1.0	2.4	14.4	27	37	3750	78	1488	94.6	95.1	95.0	0.77	0.84	0.87	27.9
450	610	400L/A/B	2886	6.3	1.1	2.6	13.6	24	29	3633	78	1489	94.5	95.1	95.1	0.74	0.83	0.86	31.8
500	680	400L/A/B	3206	6.4	1.1	2.7	13.6	21	26	3632	78	1489	94.7	95.3	95.2	0.73	0.82	0.85	35.5
530	720	400L/A/B	3389	7.5	1.2	2.7	17.3	16	23	3688	78	1493	94.6	95.4	95.4	0.68	0.78	0.83	38.5
560	750	400C/D/E	3588	6.5	1.1	2.7	17.3	23	28	4464	78	1490	95.1	95.6	95.6	0.71	0.80	0.85	40.0
630	850	400C/D/E	4037	6.6	1.1	2.7	18.2	19	25	4569	78	1490	95.2	95.6	95.7	0.70	0.80	0.84	45.1
710	970	450	4547	7.7	1.1	2.6	27.6	15	16	5542	85	1491	95.3	95.6	95.7	0.76	0.84	0.87	49.2
800	1100	450	5115	7.6	1.0	2.7	29.3	21	29	5794	85	1494	95.6	95.8	96.0	0.72	0.81	0.85	56.2
900	1250	450	5761	8.0	1.1	2.7	32.6	14	15	6139	85	1492	95.7	95.8	96.1	0.76	0.84	0.88	61.4
1000	1350	500	6398	6.9	0.7	2.3	42.6	41	43	7175	90	1493	95.4	96.1	96.1	0.83	0.88	0.89	67.4
1100	1500	500	7036	6.4	0.8	2.5	44.9	34	36	7379	90	1493	95.6	96.2	96.3	0.82	0.88	0.89	73.8
1250	1700	500	7996	6.2	0.8	2.4	47.8	34	36	7647	90	1493	95.8	96.4	96.4	0.82	0.87	0.89	84.0
1400	1900	560	8944	6.9	0.8	2.6	90.1	34	36	10429	92	1495	95.9	96.6	96.7	0.83	0.88	0.90	92.6
1500	2000	560	9586	6.6	0.7	2.6	81.9	33	35	10788	92	1494	96.0	96.8	97.0	0.80	0.86	0.89	100.9
6P																			
280	380	400L/A/B	2695	6.7	1.0	2.7	19.4	22	36	3633	70	992	93.7	94.5	94.4	0.69	0.79	0.83	20.5
315	430	400L/A/B	3033	6.3	0.9	2.6	19.4	25	40	3624	70	992	93.7	94.5	94.4	0.69	0.79	0.83	23.1
355	480	400L/A/B	3419	6.3	0.9	2.7	19.3	32	42	3639	70	992	93.9	94.7	94.7	0.66	0.77	0.82	26.5
400	550	400L/A/B	3849	6.4	1.0	2.4	19.9	26	41	3691	70	992	94.2	94.9	94.9	0.68	0.78	0.82	29.7
450	610	400C/D/E	4340	7.1	1.0	1.9	25.7	31	32	4631	70	990	94.0	94.7	94.6	0.69	0.78	0.81	33.8
500	680	400C/D/E	4814	7.0	1.2	2.3	26.5	24	25	4707	70	992	93.9	94.8	94.8	0.65	0.76	0.80	38.0
560	750	450	5385	6.5	1.1	2.7	40.6	23	30	5601	82	993	94.4	95.1	95.1	0.71	0.81	0.85	39.9
630	850	450	6046	6.8	1.0	2.7	44.5	25	40	5794	82	995	94.9	95.4	95.7	0.70	0.80	0.84	44.9
710	970	450	6814	6.5	1.0	2.6	48.7	24	39	5913	82	995	95.1	95.5	95.7	0.71	0.80	0.85	50.4
800	1100	500	7683	6.0	0.8	2.4	83.3	30	40	7160	80	994	95.4	95.9	95.9	0.76	0.83	0.86	55.8
900	1250	500	8639	6.5	0.9	2.6	87.7	25	33	7347	80	995	95.4	96.0	96.0	0.74	0.82	0.86	63.1
1000	1350	500	9600	6.4	0.9	2.5	88.8	28	34	7437	80	995	95.6	96.1	96.1	0.75	0.83	0.86	69.6
1100	1500	560	10545	6.4	0.7	2.6	124.7	51	66	9875	88	996	95.1	95.9	96.1	0.77	0.84	0.87	76.0
1250	1700	560	11981	6.1	0.6	2.5	128.2	48	65	10000	88	996	95.4	96.2	96.3	0.76	0.84	0.87	86.6
8P																			
250	340	400L/A/B	3207	7.1	1.0	2.2	28.1	34	55	3522	70	744	92.6	93.5	93.5	0.62	0.73	0.78	19.7
280	380	400L/A/B	3585	7.5	0.8	2.1	38.4	24	39	3722	70	746	92.9	93.8	93.7	0.66	0.76	0.81	21.3
280	380	400C/D/E	3602	6.9	0.9	2.1	31.4	51	54	4157	70	742	92.7	93.6	93.6	0.65	0.75	0.80	21.7
315	430	400C/D/E	4050	7.2	1.0	2.2	33.4	44	46	4257	70	743	92.6	93.7	93.7	0.62	0.73	0.79	24.7
355	480	400C/D/E	4571	6.6	0.9	1.9	37.2	49	51	4456	70	742	93.0	93.8	93.7	0.66	0.76	0.80	27.4
400	550	450	5116	7.0	0.9	2.6	55.7	21	33	5869	75	747	92.8	94.0	94.2	0.59	0.71	0.78	31.6
450	610	450	5757	6.8	1.0	2.7	53.2	17	28	5854	75	746	92.1	93.5	93.8	0.47	0.60	0.69	40.3
500	680	450	6395	6.3	1.0	2.6	56.1	19	31	6007	75	747	93.2	94.3	94.5	0.60	0.72	0.78	39.2
560	750	500	7157	6.6	0.8	2.8	84.9	23	36	6323	78	747	94.1	95.0	95.2	0.61	0.73	0.79	43.2
630	850	500	8052	6.7	0.9	2.8	89.9	20	32	6475	78	747	94.2	95.1	95.3	0.61	0.73	0.79	48.6
710	970	500	9075	6.7	0.9	2.8	99.9	20	32	6795	78	747	94.4	95.3	95.4	0.63	0.74	0.80	54.0
800	1100	500	10226	6.5	0.8	2.7	113.8	23	38	7262	78	747	94.8	95.5	95.6	0.65	0.75	0.81	59.9
900	1250	560	11513	6.3	0.6	2.1	238.7	55	88	10016	80	746	94.8	95.5	95.8	0.73	0.81	0.84	64.4
1000	1350	560	12785	6.3	0.8	2.5	238.7	34	55	10017	80	747	94.7	95.5	95.8	0.70	0.79	0.83	72.2
1100	1500	560	14059	6.8	0.9	2.7	254.3	29	46	10316	80	747	94.6	95.6	95.8	0.68	0.78	0.82	80.3

8. Mechanical data (IEC) (Unit: mm)

Motor dimensions - anti-friction bearing and general thrust vertical motor
Frame size HGF 315C/D/E to 400C/D/E



IEC Frame	A	AA	AB	AC	AD**	AE	B	BA	BC	BB	BD	C	D	E	ES	N	F	G	GD
315C/D/E	508	180	628	675	705	405	710	180	340	1050	68	216	65*	140	125	5	18	58	11
							800												
							900						90	170	140		25	81	14
355C/D/E	610	230	750	765	735	430	900	200	380	1300	80	254	65*	140	125		18	58	11
							1000												
							1120						100	210	170		28	90	16
400L/A/B	686	218	840	875	775	470	710	220	360	1070		280	70*	140	125		20	62.5	12
							800												
							900						110	210	170		28	100	16
400C/D/E							1000		415	1425			70*	140	125		20	62.5	12
							1120												
							1250						110	210	170		28	100	16

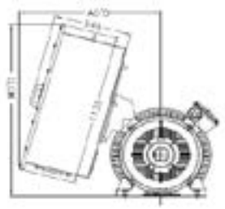
IEC Frame	H	HA.	HC	HD**	K	K´	L	CH	d1	s1	s2	Bearings			
												HGF		HGF API 541	
												DE	NDE	DE	NDE
315C/D/E	315	475	655	885	28	38	1870	125	M20	2xM63x1.5	3xM20x1.5	6314	6314	6314	6314
							1900		M24			6320	6316	6320	6320
355C/D/E	355	50	740	950	28	48	2075		M20			6314	6314	6314	6314
							2145		M24			6322	6319	6322	6322
400L/A/B	400		840	1035	36	56	2105	130	M20			6315	6315	6315	6315
							2175		M24			6324	6319	6324	6324
400C/D/E							2405		M20			6315	6315	6315	6315
							2475		M24			6324	6319	6324	6324

Note: * is the data of 2-pole motor.

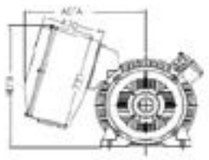
8. Mechanical data (IEC) (Unit: mm)

Flange, fan hood with muffler and steel junction box dimensions - Horizontal and general thrust vertical mounting motors
Frame size HGF 315C/D/E to 400C/D/E

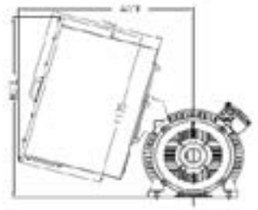
IEC Frame	AC	HC	Steel plate fan cover					
			L' with silencer			L' without silencer		
			Poles			Poles		
			2	4	≥6	2	4	≥6
315C/D/E			1945	2005		1910	1835	
355C/D/E			2180	2290		2150	2060	
400L/A/B	890	845	2165	2370	2360	-	2070	2110
400C/D/E			2465	2670	2660	-	2370	2410



Steel plate terminal box
(NEMA II, voltage up to 6.9kV)

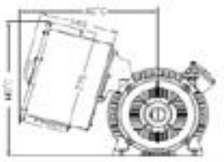


Cast iron terminal box
(NEMA I, voltage up to 1kV)

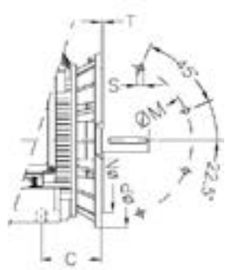


Steel plate terminal box
(Can be placed capacitor and
lightning arrester)

Steel plate terminal box
(NEMA I, voltage up to 1kV)



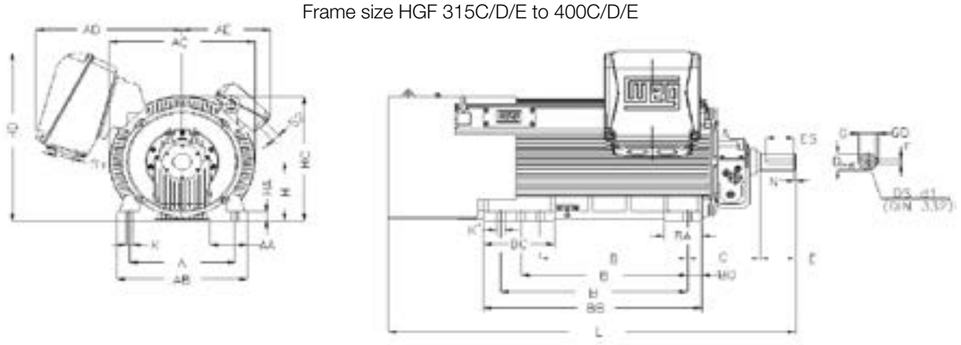
IEC Frame	Steel plate terminal box									
	AD'A	HD'A	AD'B	HD'B	AD'C	HD'C	AD'D	HD'D	AD'E	HD'E
315C/D/E	-	-	925	985	970	1020	990	1300	1225	1365
355C/D/E	-	-	955	1050	1005	1085	1025	1375	1255	1430
400L/A/B	-	-	995	1135	1045	1170	1065	1450	1295	1515
400C/D/E										



IEC Frame	Flange							
	Flange	C	ØM	ØN	ØP	ØS	T	N° of Holes
315C/D/E	FF-600	216	600	550	660	24	6	8
355C/D/E	FF-740	254	740	680	800	24		
400L/A/B	FF-940	280	940	880	1000	28		
400C/D/E								

8. Mechanical data (IEC) (Unit: mm)

Motor dimensions - Sliding bearing
Frame size HGF 315C/D/E to 400C/D/E



IEC Frame	A	AA	AB	AC	AD**	AE	B	BA	BC	BB	BD	C	C**	D	E	ES	N	F	G	GD
315C/D/E	508	180	628	675	705	405	710 800 900	180	340	1050	68	375	425**	65* 90	140 170	125 140	5	18 25	58 81	11 14
355C/D/E	610	230	750	765	735	430	900 1000 1120	200	380	1300	80	425	450**	65* 100	140 210	125 170		18 28	58 90	11 16
400L/A/B	686	218	840	875	775	470	710 800 900	220	360	1070		450	475** 500**	70* 110	140 210	125 170		20 28	625 100	12 16
400C/D/E							1000 1120 1250		415	1425			475** 500**	70* 110	140 210	125 170		20 28	625 100	12 16

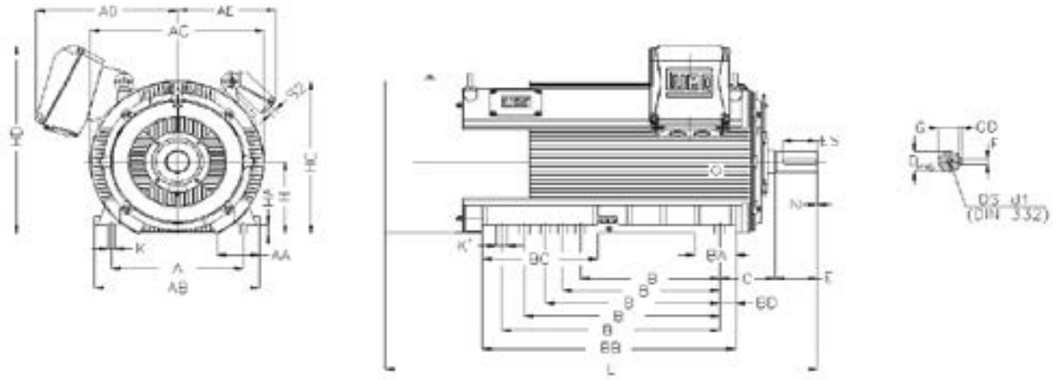
IEC Frame	H	HA.	HC	HD**	K	K´	L	L**	d1	s1	s2	Sliding bearing			
												HGF		HGF API 541	
												DE	NDE	DE	NDE
315C/D/E	315	475	655	885	28	38	1830	2280**	M20	2xRP(RWG)3"	3xRP(RWG)3/4"	FNLB 9-80 IP55	FNLQ 9-80 IP55	FNLB 9-80 IP55	FNLB 9-80 IP55
							2130	2365**	M24			FNLB 9-90 IP55	FNLQ 9-90 IP55	FNLB 9-90 IP55	FNLB 9-90 IP55
355C/D/E	35	50	740	950		48	2435	2490**	M20			FNLB 9-80 IP55	FNLQ 9-80 IP55	FNLB 9-80 IP55	FNLB 9-80 IP55
							2370	2635**	M24			FNLB 9-100 IP55	FNLQ 9-100 IP55	FNLB 9-100 IP55	FNLB 9-100 IP55
400L/A/B	400		840	1035	36	56	2450	2475**	M20			FNLB 9-80 IP55	FNLQ 9-80 IP55	FNLB 9-80 IP55	FNLB 9-80 IP55
							2390	2775**	M24			FNLB 11-110 IP55	FNLQ 11-110 IP55	FNLB 11-110 IP55	FNLB 11-110 IP55
400C/D/E							2750	2775**	M20			FNLB 9-80 IP55	FNLQ 9-80 IP55	FNLB 9-80 IP55	FNLB 9-80 IP55
							2690	3075**	M24			FNLB 11-110 IP55	FNLQ 11-110 IP55	FNLB 11-110 IP55	FNLB 11-110 IP55

Frame	Dimensions of fan cover with noise suppressor			
	HGF		HGF API 541	
	Poles		Poles	
	2	>=4	2	>=4
315C/D/E	2230	2315	2380	2365
355C/D/E	2465	2610	2490	2635
400L/A/B	2450	2725	2475	2775
400C/D/E	2750	3025	2775	3075

Note: * is the data of 2-pole motor; ** Is HGF API 541

8. Mechanical data (IEC) (Unit: mm)

Motor dimensions - anti-friction bearing and general thrust vertical motor
Frame size HGF 450 to 630



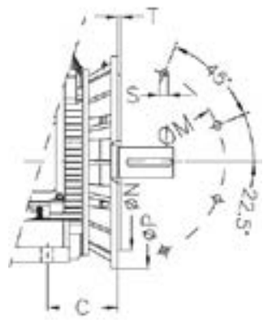
IEC Frame	A	AA	AB	AC	AD	AE	B	BA	BC	BB	BD	C	D	E	ES	N	F	G	GD
450	750	250	950	1000	815	540	800 900 1000 1120 1250	230	660	1450	90	315	85* 130	170* 250	140* 200	5	22* 32	76* 119	14* 18
500	850	275	1050	1100	825	550	900 1000 1120 1250 1400	300	450	1660	150	375	120	210	-		32	128	20
560	950	320	1200	1220	890	620	1000 1120 1250 1400 1600	400	500	1900	180	400	130	250	-		32	119	18
630	1250	330	1440	1400	940	670	1000 1120 1250 1400 1600	450	600	2000	180	450	150	250	-		36	138	20

IEC Frame	H	HA.	HC	HD	K	K´	L	d1	s1	s2	Bearings			
											HGF		HGF API 541	
											DE	NDE	DE	NDE
450	450	60	950	1155	36	56	2655	M20*	2xM63x1.5	2xM20x1.5	6220	6220	6220	6220
							2485	M24			6328	6324	6328	6328
500	500	65	1050	1215	42	62	2670	M24			6330	6324	6330	6330
560	560	70	1174	1321	42	62	2850	M24			On request			
630	630	80	1360	1490	42	72	3200	M30						

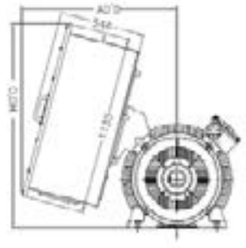
Note: * is the data of 2-pole motor.
Frame 560 with grease lubrication; Frame 630 4Poles with oil lubrication;
Frame 630 6P and above with grease lubrication.

8. Mechanical data (IEC) (Unit: mm)

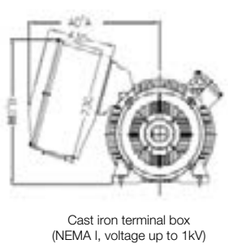
Flange, fan hood with muffler and steel junction box dimensions - Horizontal and general thrust vertical mounting motors
Frame size HGF 450 to 630



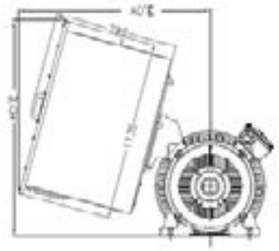
IEC Frame	Flange							
	Flange	C	ØM	ØN	ØP	ØS	T	N° of Holes
450	FF - 1080	315	1080	1000	1150	28	6	8
500	FF - 1180	375	1180	1120	1100	28		
560	-	-	-	-	-	-		
630	-	-	-	-	-	-		



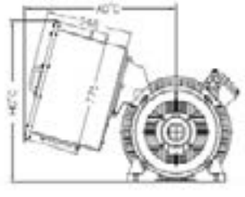
Steel plate terminal box
(NEMA II, voltage up to 6.9kV)

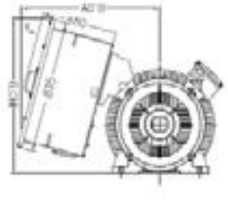


Cast iron terminal box
(NEMA I, voltage up to 1kV)



Steel plate terminal box
(Can be placed capacitor and
lightning arrester)



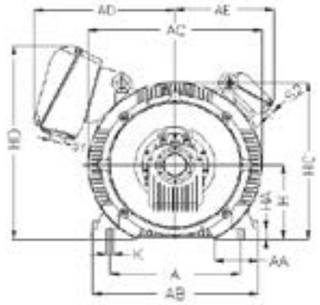


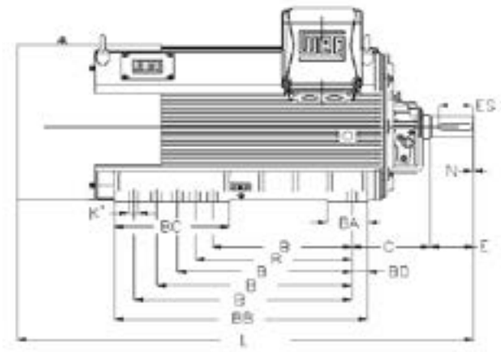
Steel plate termina box
(NEMA I, voltage up to 1kV)

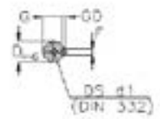
IEC Frame	Steel plate terminal box									
	AD'A	HD'A	AD'B	HD'B	AD'C	HD'C	AD'D	HD'D	AD'E	HD'E
450	950	1200	1035	1255	1085	1295	1105	1575	1335	1635
500	-	-	-	-	-	-	-	-	-	-
560	-	-	-	-	-	-	-	-	-	-
630	-	-	-	-	-	-	-	-	-	-

8. Mechanical data (IEC) (Unit: mm)

Motor dimensions - Sliding bearing
Frame size HGF 450 to 630







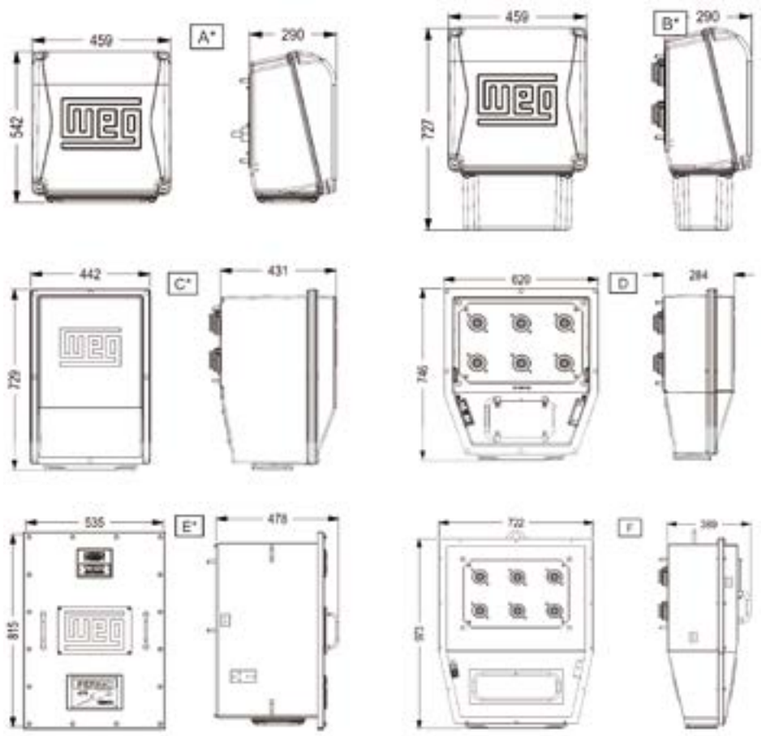
IEC Frame	A	AA	AB	AC	AD	AE	B	BA	BC	BB	BD	C	D	E	ES	N	F	G	GD
450	750	250	950	1000	815	540	800	230	660	1450	90	475	85*	170*	140*	5	22*	76*	14*
							900												
							1000						130	250	200		32	119	18
							1120												
							1250												
500	850	275	1050	1100	825	550	900	300	450	1660	150	500	120	210	200		32	119	18
							1000												
							1120												
							1250												
							1400												
560	950	320	1200	1220	890	620	1000	400	500	1900	180	560	130	250	200		32	119	18
							1120												
							1250												
							1400												
							1600												
630	1250	330	1440	1400	940	670	1000	450	600	2000	180	600	150	250	200		36	138	20
							1120												
							1250												
							1400												
							1600												

IEC Frame	H	HA.	HC	HD	K	K'	L	d1	s1	s2	Bearings			
											HGF		HGF API 541	
											DE	NDE	DE	NDE
450	450	60	950	1155	36	56	2885	M20*	2xM63x1.5	2xM20x1.5	FNLB 9-80 IP55	FNLQ 9-80 IP55	FNLB 9-80 IP55	FNLB 9-80 IP55
							2805	M24			FNLB 11-125 IP55	FNLQ 11-125 IP55	FNLB 11-125 IP55	FNLB 11-125 IP55
500	500	65	1050	1215	42	62	2920	M24			FNLB 11-125 IP55	FNLQ 11-125 IP55	FNLB 11-125 IP55	FNLB 11-125 IP55
560	560	70	1174	1321	42	62	3130	M24			Consult WEG			
630	630	80	1360	1490	42	72	3400	M30						

Note: * is the data of 2-pole motor.

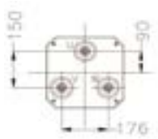
8. Mechanical data (IEC) (Unit : mm)

IEC Market Standard/Optional HGF terminal box dimensions

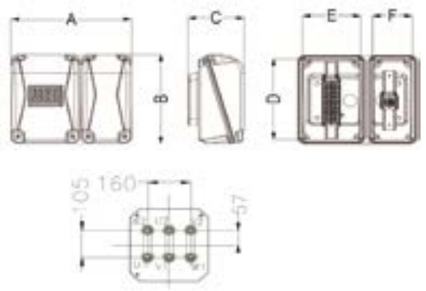


HGF terminal box	Voltage	Frame	Number of cables		Star terminal box - same terminal box or Y/D start	Additional star terminal box
			Outgoing line	Terminal blocks		
A	380-690V	315-500	12	6	OK	OK
B	3300V	315-500	12	3	NA	OK
	6600V					
C	380-690	315-500	NA	12	OK	NA
D	3300V	315-500	NA	6	OK	NA
	6600V					
E	380-690	315-500	12	12	OK	OK
	3300V	315-630	12	3	NA	OK
	6600V					
F	10000V	315-630	NA	6	OK	NA

IEC Frame	A	B	C	D	E	F
315C/D/E	325	280	146	278	175	125
355C/D/E~400C/D/E	325	280	140	278	175	125
450~630	375	280	124	279	175	175



High voltage HGF terminal - IEC



Low voltage HGF terminal - IEC

SERVICE

Driving efficiency and sustainability

From our wide Services portfolio, stands out the list of interventions on products from WEG activity areas: Electric Motors, Energy and Automation, being the most common:

	Products		Procedure	
	Automation	Motor	Internal	External
General Repair and overhaul	X	X	X	X
Product repair that may include the replacement of the components by original parts	X	X	X	X
Commissioning and start up	X	X		X
Repair of electrical machines (Ex and Safety)		X	X	X
Inspection and/or replacement of sleeve bearing or bearings		X	X	X
Repair of the sleeve bearings shell		X	X	X
High, Medium and Low Voltage rewinding		X	X	
Stator or rotor core replacement		X	X	
Brushes and brushes holder replacement		X	X	X
Shaft complete replacement or repair of shafts with grinding finishing of complete rotor		X	X	
Dynamic balancing of rotor (Maximum speed 1600 rpm 20T)		X	X	
Field dynamic balancing		X		X
Centring service		X		X
Painting (standard and special plan)		X	X	X
Inspection, tests and technical analysis	X	X	X	X
Energy Efficiency Study	X	X		X
Training of product maintenance	X	X		X

Inspection, Tests and Technical Analyses

From all the inspections, tests and technical analyses we have capacity to offer, we emphasize the following:

- Production and expedition of spare parts to all over the world;
- Application diagnosis on site or in our factory;
- Technical advise on best, reliable and efficient solutions on energy saving.

Automation

- Analysis of application improvements and technical assessment to the client, helping on the choice of the most appropriate equipment, targeting the application/optimizing installation efficiency
- Manufacturing, Installation, Modification, Start-Up and Maintenance of Electrical Panels
- Support on the settings parametrization of Variable Speed Drives and Soft Starters
- Commissioning and Start-Up of applications with Variable Speed Drives
- WEG Products Training

Explosive Atmospheres

Electric Motors

- Commissioning and Start-Up of applications with electric motors
- Alignment applications with electric motors
- Vibration analysis and failures diagnosis
- Dimensional check of Electric Motors and Components/Spare Parts
- Electric Motors maintenance
- Electric Motors Mechanical and Electrical refurbishment:
  - Replacement of bearings / sleeve bearings
  - Recovery of sleeve bearings
  - Rewinding of Electric Motors (stator/rotor) - in Low, Medium and High Voltage (up to 11kV)
  - Recover / Refurbishment / replacement of spare parts
  - Replacement of rotor shafts
  - Repair and replacement of accessories, temperature sensors and anti-condensation heaters and other auxiliaries
- Balancing in factory up to 1600 rpm (20T, Ø Max. 4640 mm)
- Dynamic balancing on site
- Electric Motors modification to new operating conditions (IP protection, cooling system, auxiliaries mounting form, terminal boxes, external loads, etc)
- Painting and finishing recovery
- Customer training on electric motors
- Repair electric machines (Ex and Safety)
- Energy analysis and efficiency of electric motors

CUSTOMER SERVICE DEPARTMENT

128#, Xinkai South Road, Nantong Economic & Technological Development Area, Nantong, Jiangsu, China
Phone: +86 513 8592 0153 Fax: +86 513 8592 3262 Email: service-cn@weg.net

The scope of WEG Group solutions is not limited to the products and solutions presented in this catalogue.
To know our portfolio, Please consult us.

For WEG's worldwide operations visit our website

www.weg.net

ENERGY

Tel: (86) 0513-85989333
Fax: (86) 0513-85922161

info-cn@weg.net

WEG (Nantong) Electric Motor Mfg. Co.,Ltd.
#128, South Xin Kai Road, NETDA, Nantong, Jiangsu

Wechat Public Account

WEG Website

Cod: 50103095 | Rev: 04 | Date (m/y): 07/2025.