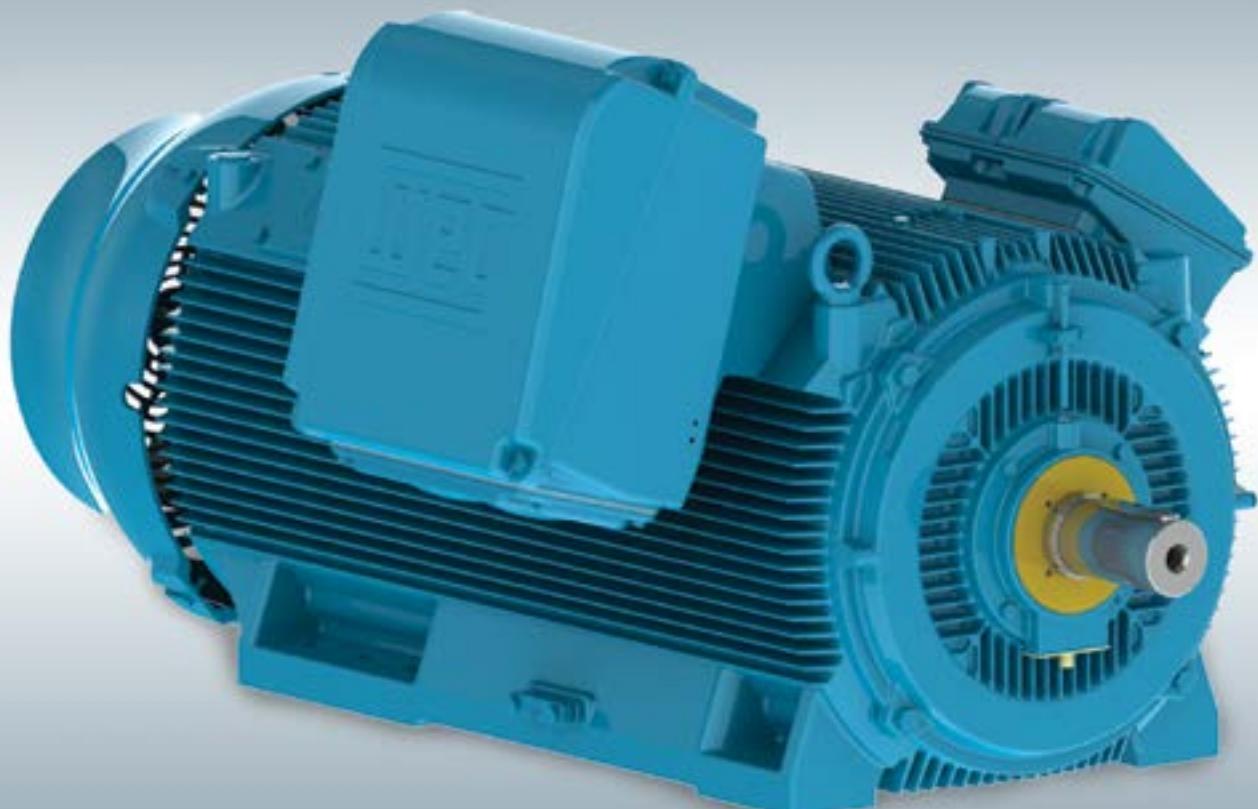


# HGF

## Three-phase Induction Motor Technical Catalogue - Asian Market



Motors | Automation | Energy | Transmission & Distribution | Coatings

## HGF

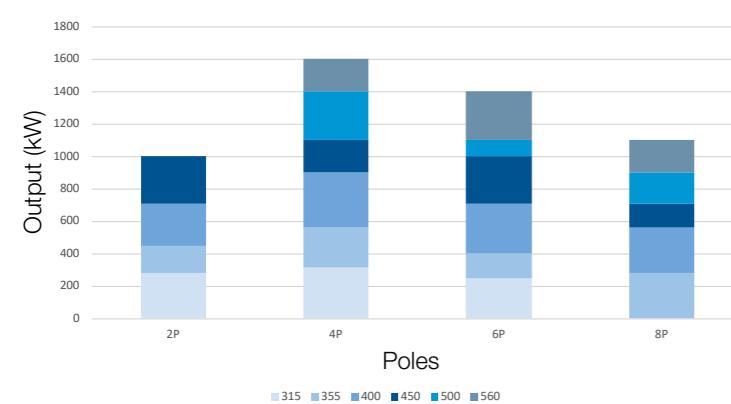
### Three-phase Induction Motor

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.

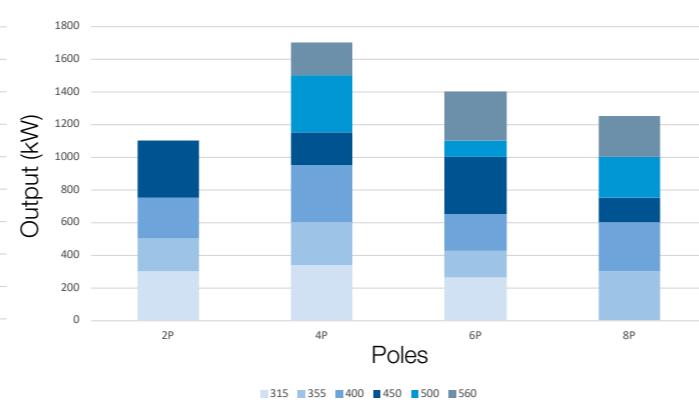


With the project updating in all aspects, the HGF motors present excellent performance levels, with one of the best rated output x frame size ratio available in the market.

**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 – IC416
- 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.

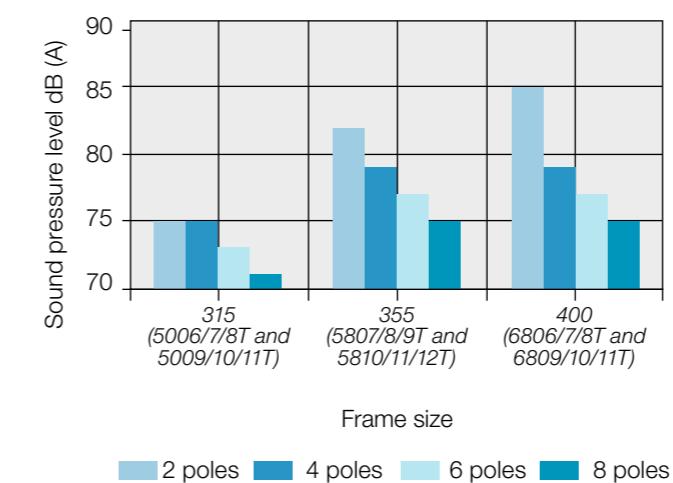
Additional noise suppressors are available as special feature.



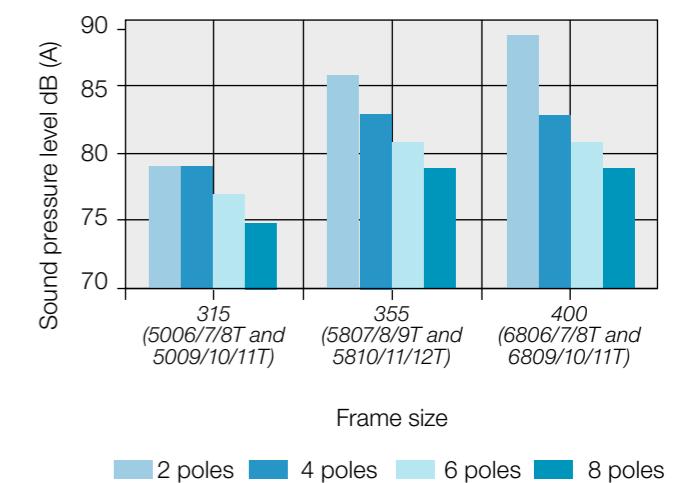
### Sound pressure level

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<sub>2</sub> 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 in 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

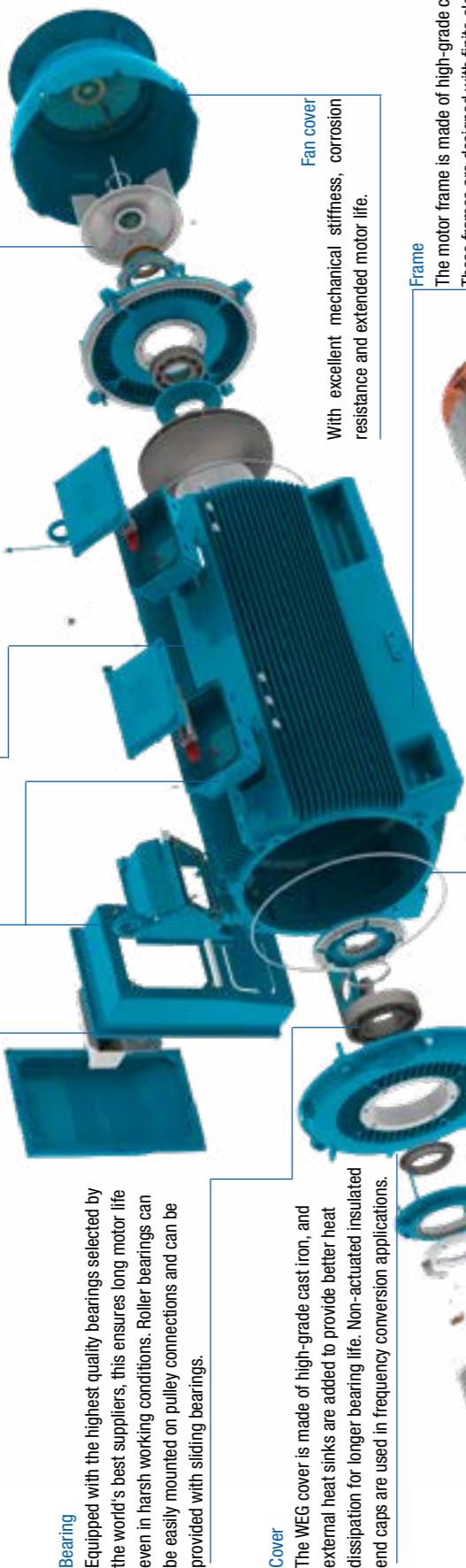
**Terminal block**  
The main and auxiliary junction boxes are made with enough space for the main power supply and auxiliary leads. It can rotate at 90° intervals and has one or more threaded cable entry points (except when installing surge capacitors or lightning guards). The high pressure main junction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

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

**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 thermochimically treated low electrical loss magnetic steel lamination produces high operating efficiency and enhanced reliability. Copper bar rotors are also available.
- Shaft**  
WEG HGF motor shafts provide high mechanical strength, prevent load flexure, and minimize fatigue, thus achieving superior performance.
- Seal**  
The WEG HGF motor provides labyrinth seals to protect the motor from dust and humidity.
- Drain**  
The condensate drain plug of the plastic allows condensation to be discharged from the chassis.
- 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.
- 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.

## Contents

1. Introduction.....	10
2. Classification.....	10
3. Standard.....	10
4. Structural details.....	11
4.1 Shell protection.....	11
4.2 Fan cover .....	12
4.3 Terminal box.....	12
4.4 Stator winding.....	12
4.5 Nameplate .....	13
4.5.1 Main nameplate.....	13
4.5.2 Auxiliary nameplate.....	13
4.5.3 Warning nameplate.....	13
4.6 Cooling system, noise and vibration levels.....	13
4.6.1 Cooling system.....	13
4.6.2 Noise level.....	13
4.6.3 Vibration level.....	14
4.6.4 Axial displacement limit.....	14
4.7 Shafts, bearings and loading.....	15
4.7.1 Shaft .....	15
4.7.2 Bearing .....	15
4.7.2.1 Axial bearing configuration.....	16
4.7.2.2 Transportation lock.....	16
4.7.2.3 Insulation cover.....	16
4.7.3 Lubrication.....	16
4.7.3.1 Lubricated - rolling bearings .....	16
4.7.3.2 Lubrication - Vertical installation of high axial thrust.....	18
4.7.3.3 Lubricated plain bearings .....	18
4.7.4 Maximum available shaft load.....	18
4.7.4.1 Radial load .....	18
4.7.4.2 Axial thrusting - Horizontal mounting.....	19
4.7.4.3 Axial thrusting - vertical installation.....	19
4.7.4.3.1 Normal thrusting.....	19
4.7.4.3.2 High thrusting .....	19
4.8 Installation.....	20
4.9 Level of protection and painting .....	20
4.9.1 Level of protection .....	20
4.9.2 Painting .....	20
4.10 Voltage/Frequency .....	21
4.11 Ambient X Insulation .....	21
4.12 Motor protection .....	21
4.12.1 PT-100.....	21
4.12.2 Thermistor (PTC) .....	20
4.12.3 Bimetallic thermal protector .....	20
4.13 Frequency inverter drive .....	22
4.13.1 Considerations based on rated voltage .....	22
4.13.2 Torque limits for frequency conversion applications .....	22
4.13.3 Axial current limit .....	22
4.13.4 Controlled cooling .....	22
4.14 Special auxiliary parts.....	23
4.14.1 Anti-reversing ratchet .....	23
4.14.2 Encoder .....	23
4.14.3 Surge protective devices .....	23
4.14.4 Capacitor .....	23
4.14.5 Alternative solution .....	23
4.15 Exploded view .....	24
5. Structure configuration (IEC).....	25
6. Optional Configuration (IEC).....	26
7. Electrical data (IEC) .....	28
8. Mechanical data (IEC) .....	32
9. Service.....	39

## 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:

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

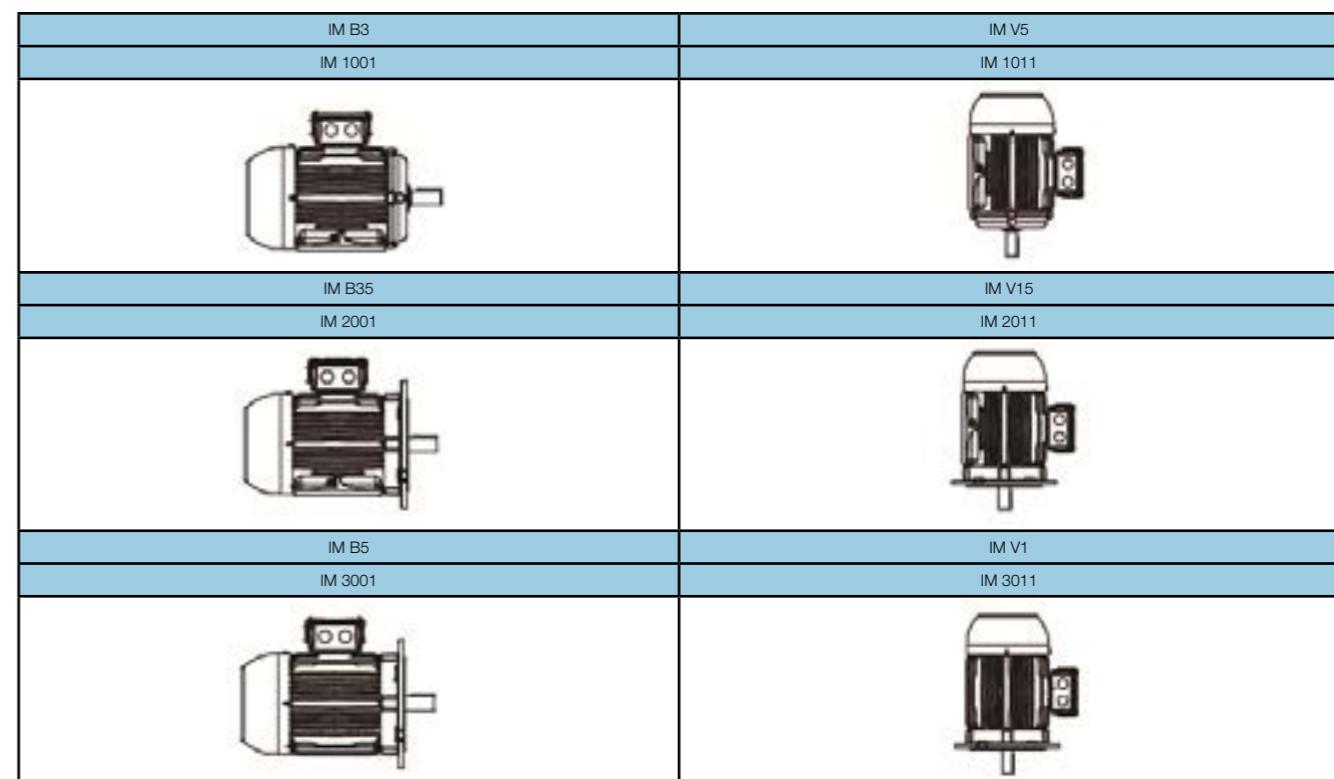
## 4. Structural details

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.



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:

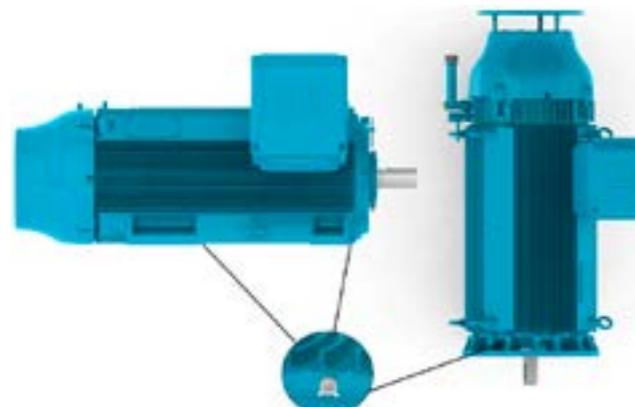


Figure 1-Position of the drain hole of HGF motor installed horizontally and vertically

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.

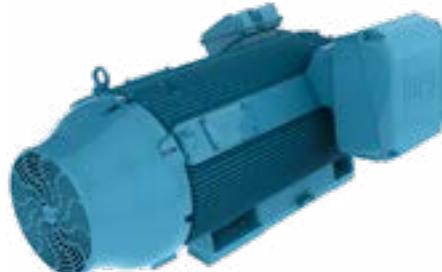


Figure 2-HGF IEC 315L/A/B to 400C/D/E motors

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.

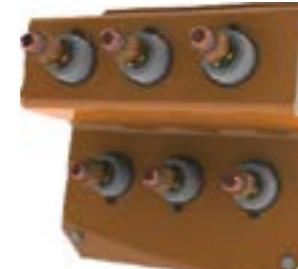


Figure 7-IEC low voltage motor terminal

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

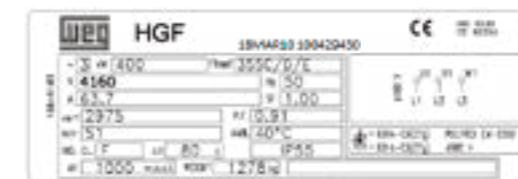


Figure 9-Example of a nameplate-main nameplate

##### 4.5.2 Auxiliary nameplate

###### A) PT-100

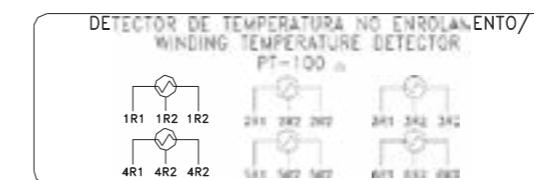


Figure 10-Example nameplate-winding PT-100

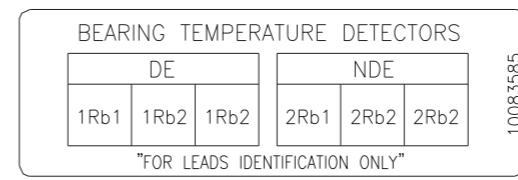


Figure 11-Example nameplate-bearing PT-100

###### B) Heating tape

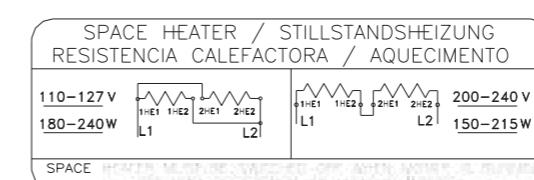


Figure 12-Example of a nameplate-heating tape

#### 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	2 poles	4 poles
315 C/D/E	5009/10/11T	75	75
355 C/D/E	5810/11/12T	82	79
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	2 poles	4 poles
315 C/D/E	5009/10/11T	79	79
355 C/D/E	5810/11/12T	86	83
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	2 poles	4 poles
315 C/D/E	5009/10/11T	75	75
355 C/D/E	5810/11/12T	82	79
400L/A/B & 400 C/D/E	6806/7/8T & 6809/10/11T	85	79
450	7006/10	88	88
500	8006/10	88	92
560	8806/10	-	92
630	9606/10	-	92
		85	80
		82	82
		85	82
		88	82
		92	82

















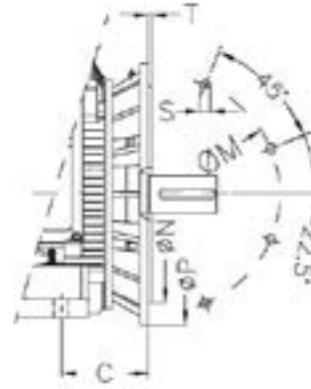




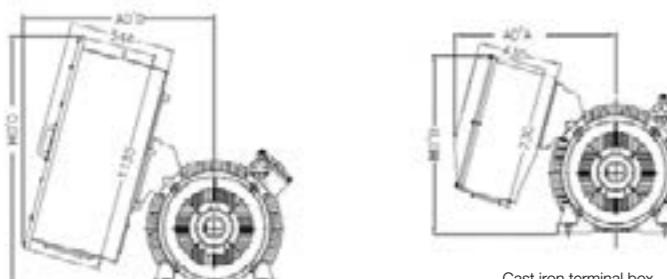


## 8. Mechanical data (IEC) (Unit : mm)

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



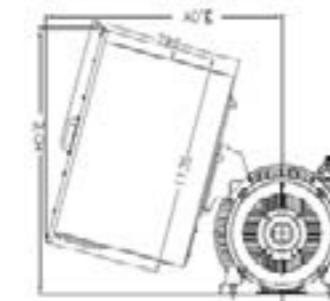
IEC Frame	Flange							
	Flange	C	ØM	ØN	ØP	ØS	T	Nº of Holes
450	FF - 1080	315	1080	1000	1150	28		
500	FF - 1180	375	1180	1120	1100	28		
560	-	-	-	-	-	-	6	
630	-	-	-	-	-	-		8



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



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



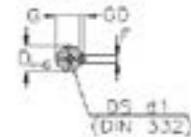
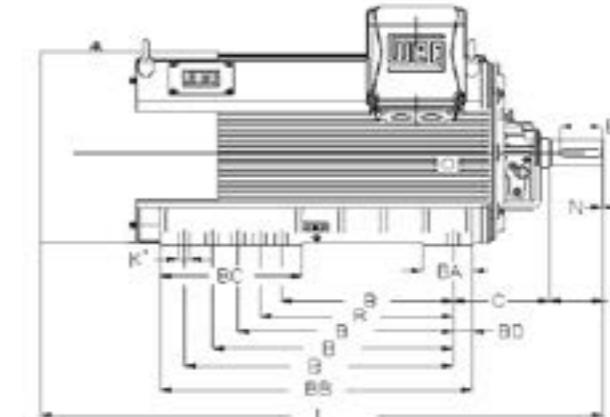
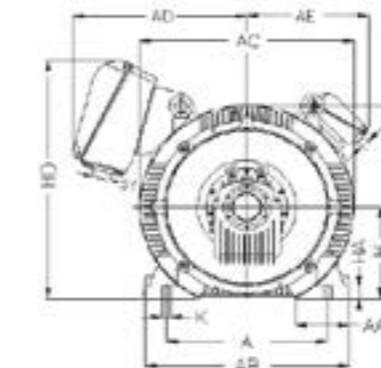
Cast iron terminal box  
(NEMA I, voltage up to 1kV)

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

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



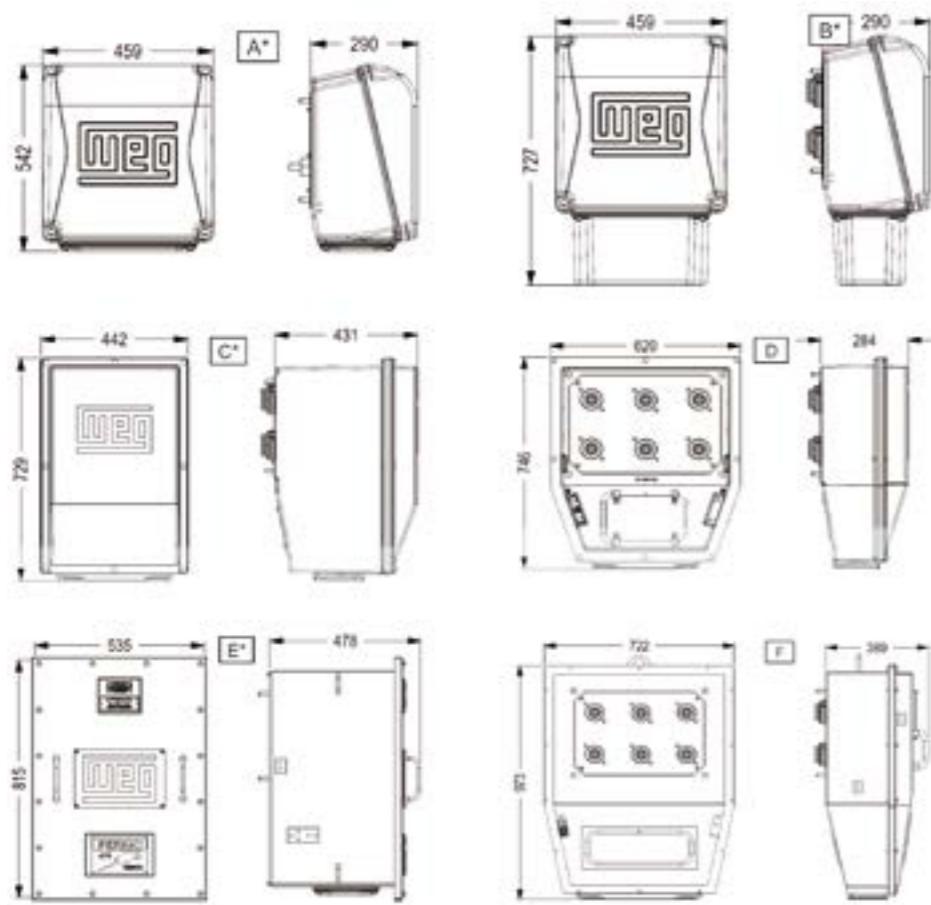
IEC Frame	A	AA	AB	AC	AD	AE	B	BA	BC	BB	BD	C	D	E	ES	N	F	G	GD		
	750	250	950	1000	815		800 900 1000 1120 1250	230	660	1450	90	475	85*	170*	140*	22*	76*	14*			
450	850	275	1050	1100	825	550	900 1000 1120 1250 1400	300	450	1660	150	500	120	210	200	32	119	18			
							1000 1120 1250 1400 1600	400	500	1900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

IEC Frame	H	HA.	HC	HD	K	K'	L	d1	s1	s2	Bearings							
											HGF				HGF API 541			
											DE	NDE	DE	NDE	DE	DE	NDE	
450	450	60	950	1155	36	56	2885	M20*			FNLB 9-80 IP55	FNLQ 9-80 IP55	FNLB 9-80 IP55	FNLQ 9-80 IP55				
							2805	M24			FNLB 11-125 IP55	FNLQ 11-125 IP55	FNLB 11-125 IP55	FNLQ 11-125 IP55				
500	500	65	1050	1215	42	62	2920	M24			FNLB 11-125 IP55	FNLQ 11-125 IP55	FNLB 11-125 IP55	FNLQ 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.

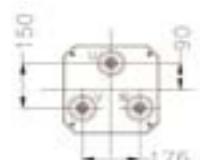
## 8. Mechanical data (IEC) (Unit : mm)

IEC Market Standard/Optional HGF terminal box dimensions

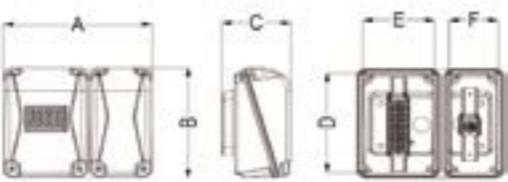


HGF terminal box	Voltage	Frame	Number of cables		Star terminal box - same terminal box or Y/D start	Additional star terminal box
			Outgoing line	Terminal blocks		
A	380-690V	315-500	12	6	OK	OK
B	3300V	315-500	12	3	NA	OK
	6600V					
C	380-690	315-500	NA	12	OK	NA
D	3300V	315-500	NA	6	OK	NA
	6600V				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

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:

### 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



### 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



For WEG's worldwide  
operations visit our website



**www.weg.net**



+86 513 8598 9333

info-cn@weg.net

WEG (Nantong) Electric Motor Mfg. CO.,Ltd  
#128, Xinkai South Road, NETDA,  
Nantong - Jiang Su - China