

W51 HD

Three-phase Electric Motor

Technical Catalogue
NEMA Market

Industrial Motors

Commercial &
Appliance Motors

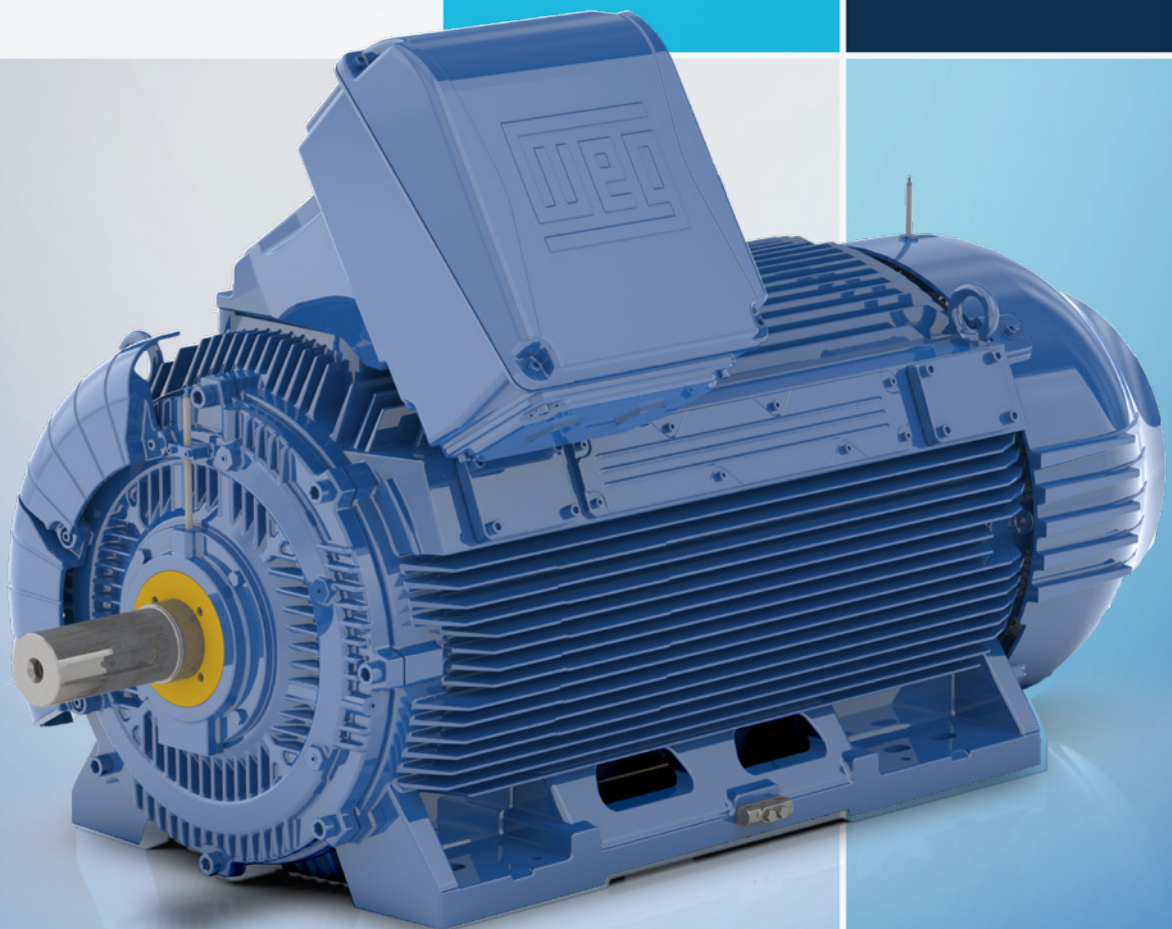
Automation

Digital &
Systems

Energy

Transmission &
Distribution

Coatings



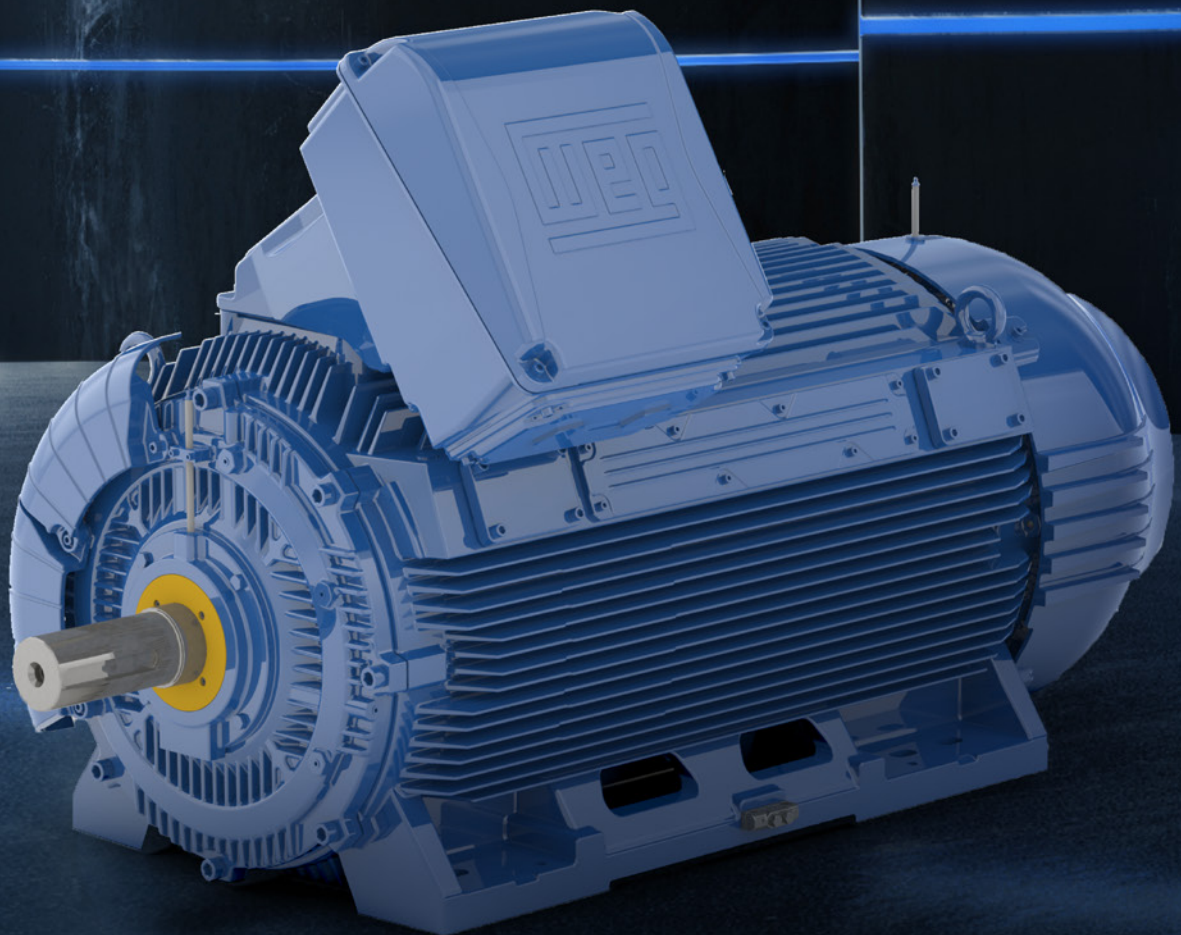
Driving efficiency and sustainability



W51 HD

high density

TAILORED **for**
MAXIMUM
PERFORMANCE

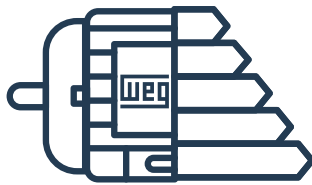


Less vibration

Optimized cooling system

More efficiency

Ready for Industry 4.0



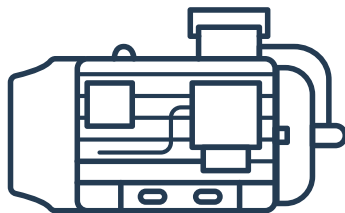
More efficiency

W51HD motors offer higher output/weight ratio and better efficiencies due to low mechanical losses with compact and robust frames.



Optimized cooling system

High thermal exchange due to optimization of the motors cooling systems and DE endshields innovative design.



Customizable

Flexibility in terminal boxes positioning, in the foundation holes and shaft dimensions. Quick and easy modifications, wide range of options and accessories.

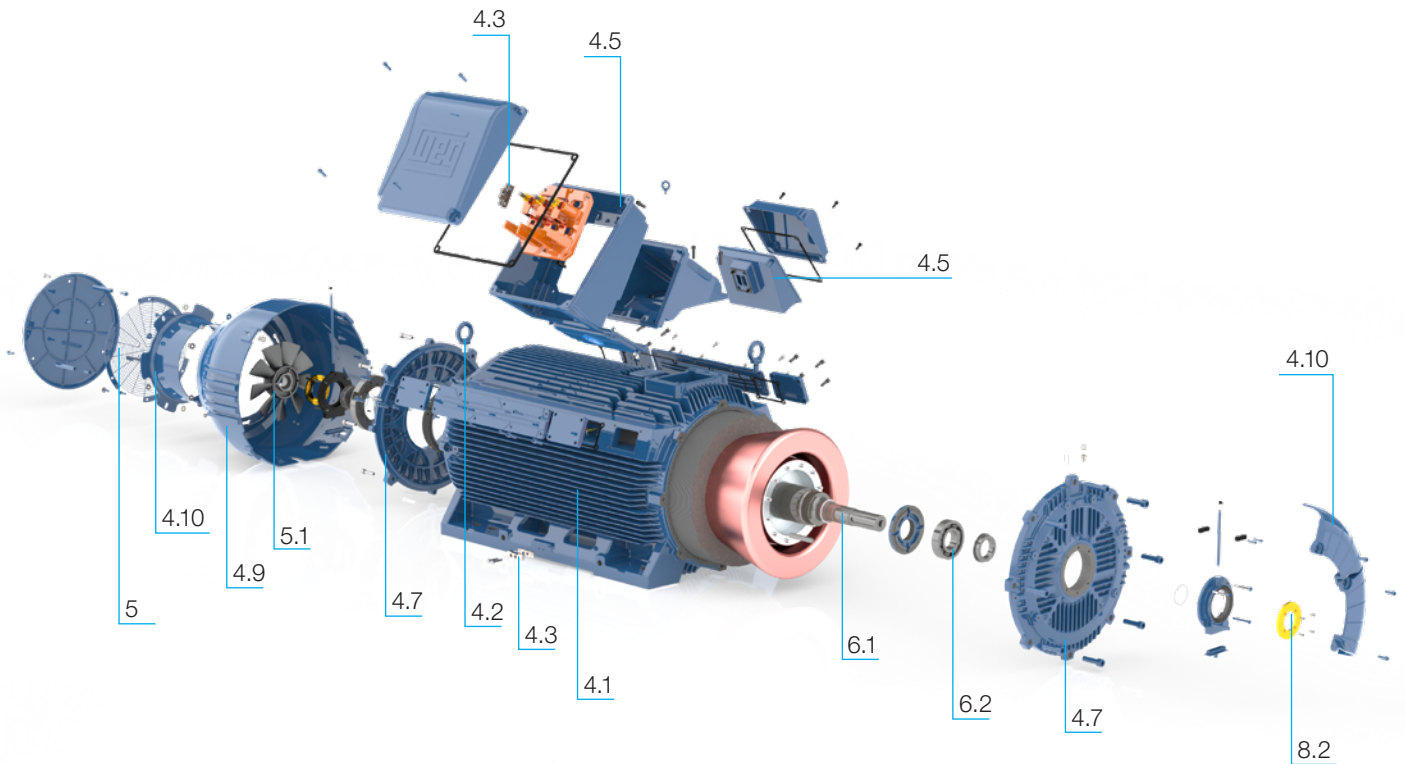


Even more reliable

Lower vibration levels and bearing operating temperature, suitable for variable speed drive operation.



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1. Available Versions

The W51 HD motors are three-phase asynchronous motors with a squirrel-cage rotor, fully enclosed. This line is available in NEMA 5010/11 to 7009/10 and equivalent IEC frames, in low and medium voltage (up to 6.6 kV). Motors above 6.6 kV up to 11 kV can also be supplied upon request.

2. Standards

The W51 HD motors meet the requirements and regulations of the current versions of the following standards in the Table 1.

Standard	Title
NEMA MG 1	Motors and Generators
UL 1004-1	Rotating Electrical Machines - General Requirements
CSA C 22.2 N°100	Motors and Generators
CSA C 22.2 N°213	Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations
API 541	Form-wound Squirrel-Cage Induction Motors – 500 Horsepower and Larger

Table 1 - Standards observed in the motor design

3. Environment

Unless otherwise specified, the rated outputs shown in the electrical data tables in this catalogue refer to products according to NEMA MG 1 Part 14 standard and under the following operating conditions:

- Ambient temperature not exceeding 40 °C.
- Altitude not exceeding 3,300 feet (1,000 m) above sea level. The project of the equipment considered a reduction of 1 °C in the thermal limit of the motor for each 100 m of elevation.
- For temperatures and altitudes other than those indicated above, use Table 2 to find the correction factor that must be used to define the available useful power (Pmax).

$$P_{max} = P_{nom} \times \text{Derating Factor}$$

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	0,70	0,68	0,66	0,64	0,62	0,60	0,58	0,53	0,49
80	0,65	0,64	0,62	0,60	0,58	0,56	0,55	0,48	0,44

Table 2 - Derating factor considering altitude and ambient temperature.

Higher altitudes and wider ambient temperature ranges can also be provided upon request.

4. Construction Details

The information contained herein refers to the standard mounting features and the most common variants of the W51 HD line. Motors for special and/or customized application are also available on request. Please, contact the nearest WEG office.

4.1 Frame

Manufactured in cast iron FC-200, the frames of the W51 HD motors withstand high mechanical impacts, ensure maximum heat dissipation and high mechanical strength and reduce mechanical vibration even when transmitted by external sources. In addition, fins are distributed to have a greater heat dissipation area in the frontal area, which contributes to a uniform temperature distribution throughout the whole motor and reduces the DE bearing temperature. Thus, this unique fin distribution design ensures excellent thermal performance of the motor.

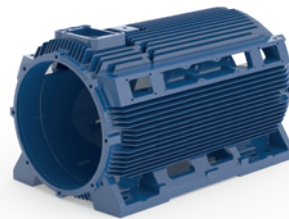


Figure 1 - Frame

W51 HD motors have longitudinal fins that ensure better thermal dissipation and solid and integrated cast feet which provide greater strength (see Figure 2).

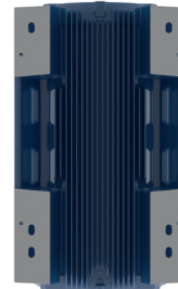


Figure 2 - Solid integrated cast feet ensuring high mechanical strength.

4.2 Eyebolts

To facilitate lifting to the different mounting positions, the W51 HD motors have multiple points for attaching eyebolts.

- Motors with feet:

Standard: five points for attaching eyebolts.

Optional: nine points for attaching eyebolts (the five standard points plus four additional points - two on each motor foot).

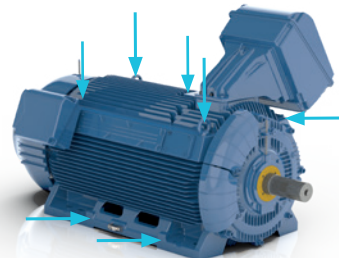


Figure 3 - Eyebolt fixing points for motors with feet.

Motors with two terminal boxes are provided with three main points for lifting eyebolts (two on the back and one in the center).

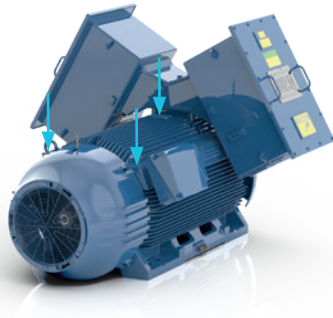


Figure 4 - Eyebolt fixing points for lifting motors with two terminal boxes.

■ Footless motor:

Standard: nine eyebolts (five at top side and four at bottom side).

Optional: nine standard eyebolt fixing points plus and one additional eyebolt fixing point located at the bottom side center.

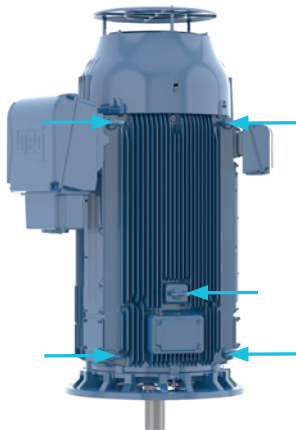


Figure 5 - Eyebolt fixing points for lifting footless motors (at the bottom side).



Figure 6 - Eyebolt fixing points for lifting footless motors (at the top side).

Note:

■ Horizontal motors:

For lifting of horizontal mounted motors use all eyebolts simultaneously. For this procedure, there are two ways: vertical chains (see Figure 7) and inclined chains (see Figure 8).

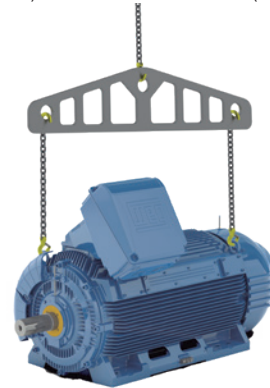


Figure 7 - Lifting with vertical chains.

For lifting motors with inclined chains, the maximum inclination angle of the chain during the lifting process should not exceed 30° in relation to the vertical axis. We recommend to use a spreader bar for maintaining the lifting elements (chain or ropes) in vertical position and thus preventing damage to the motor surface.



Figure 8 - Lifting with inclined chains.

■ Vertical motors:

For lifting of vertical mounted motors always use the eyebolts mounted at the top side of the motor, diametrically opposite, considering the mounting position (see Figure 9). In these cases, it is also necessary to use a spreader bar.



Figure 9 - Lifting of vertical motors.

■ Motors with two main terminal boxes:
For lifting of motors with two terminal boxes, use always three eyebolts as shown in Figure 10.



Figure 10 - Lifting of motors with two main terminal boxes.

4.3 Grounding Terminals

The W51 HD motors are fitted with grounding terminals on the frame (see Figure 11) and inside the main terminal box. These terminals can be positioned on the right or left side of the frame and have cross-section from 25 to 185 mm².

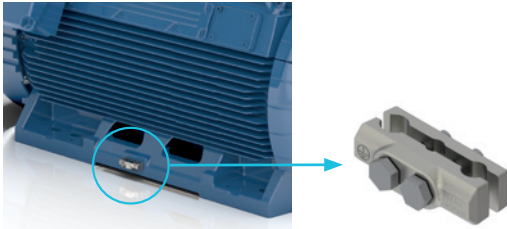


Figure 11 - Detail of the standard grounding terminal for the main terminal box and frame.

4.4 Grounding Brush

The safe area W51 HD motors can also be supplied with a grounding brush in the drive end as an optional item. For operation with variable frequency inverter, W51 HD motors are always fitted with shaft grounding brush at motor drive end (see Figure 12) and insulated non-drive end bearing (see Item 6.2.2), to avoid current flow along the motor shaft, across the bearing and return to the frame thus preventing premature bearing wear and failure due to electric currents flowing through them.

Note: W51 HD motors for hazardous areas cannot be supplied with a grounding brush. Motors for hazardous areas and API 541 are supplied with a grounding cable between the terminal box and the frame, in addition to a grounding cable at the drive end for motors with both bearings insulated.

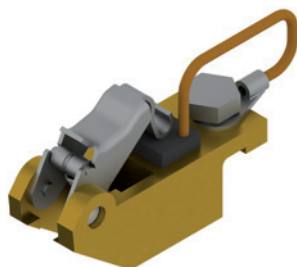


Figure 12 - Shaft grounding brush for bearing.

The W51 HD motors, can optionally be supplied with an AEGIS shaft grounding ring (see Figure 13) installed on the inner bearing cap. For external use can be supplied on request.

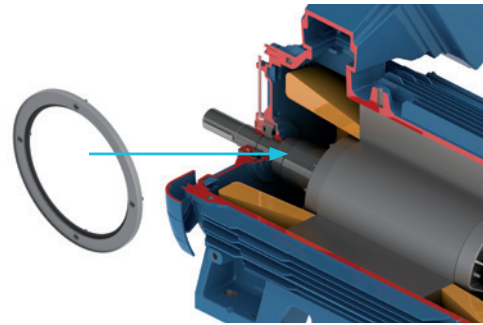


Figure 13 - AEGIS grounding ring.

Note: The incorrect specification and/or inadequate use of the grounding devices can cause serious damage to the machine and people involved in the operation of the motor. Before powering up the motor, ensure that it is properly grounded and that all grounding components are in perfect operating conditions.

4.5 Terminal Box

The W51 HD line has specific terminal boxes for motor power cables and accessory cable connections.

4.5.1 Main Terminal Box

It can be manufactured in cast iron FC-200 or steel plate, and due to its mounting it can be rotated in steps of 90°. The main terminal box has been designed for easier and ergonomically handling during cable connection procedures. In addition, the terminal box is mounted on a support on the top of the motor, allowing easy change of the terminal box position (see Figure 14).

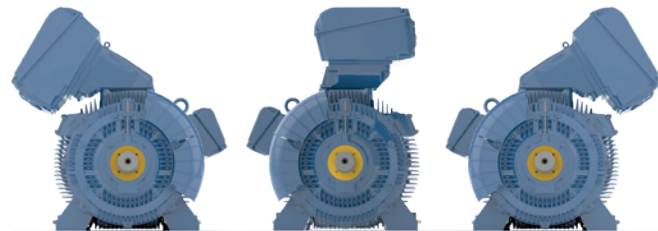


Figure 14 - Changing possibilities of the terminal box position.

Low voltage motors are supplied without a terminal block. High voltage motors are supplied with three connection bolts and can be supplied with screws or connecting bars (see Figure 15).

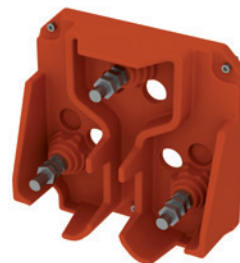


Figure 15 - Terminal block for high voltage motors with three terminals.

Note: The tightening torque of the terminals for motors with high and low voltage must comply with the standard DIN 46200.

The terminal box for high voltage motors is provided with a pressure relief device that ensures component integrity and user safety in case of short circuit. In case of activation of the pressure relief device, please contact WEG authorized servicing center. For safety reasons, this device must never be reassembled and never operate the motor without this safety device installed.

On request, the high voltage motors can also be supplied with an additional terminal box mounted at the opposite side of the main terminal box to enclosure the star point (see Figure 16). High voltage motors can be supplied with surge arrester and/or surge capacitors assembled in specific terminal box (see Section 12 Special accessories). For these cases, the main terminal box is supplied in steel plate (see Figure 16).

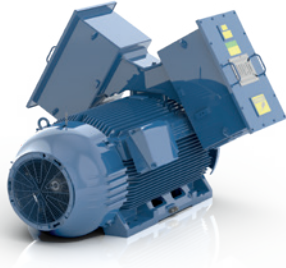


Figure 16 - Motor with access to neutral connection in separated terminal box.

4.5.2 Accessory Terminal Box

The W51 HD motors have a specific terminal box for connecting accessories. This box is also manufactured in cast iron FC-200 and comprises two compartments (see Figure 17).

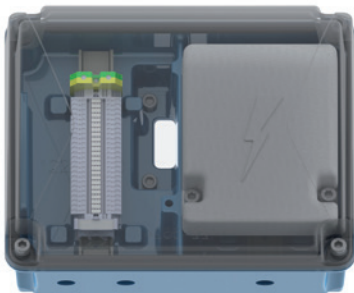


Figure 17 - Accessory terminal box.

4.6 Stator Winding

The stator windings of the W51 HD motors, regardless of voltage, are supplied with Class F insulation system and Class B temperature rise (80 K). Optionally, the motors can be supplied with Class H insulation system and Class B temperature rise (80 K). Other insulation system combinations can be supplied on request.

To monitor the motor heating, the windings are fitted with two sets of Pt-100 per phase and with a set of space heaters in order to prevent water condensation inside the motor. The space heaters are mounted in the air ducts on both sides of the motor, for easy maintenance (see Figure 18).

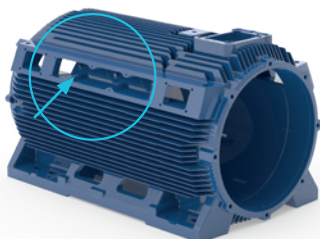


Figure 18 - Air ducts of the frame for air flow.

Since the lifetime of the motor is influenced by the temperature at which it operates, thus it is important to constantly monitor the winding temperature.

Note:

The space heaters must always be switched on when the motor is out of service for long periods and switched off when the motor is running, thereby preventing the deterioration of motor components and possible overheating.

The W51 HD High Voltage insulation systems are designed with mica tape layers and impregnated with epoxy resin through Vacuum Pressure Impregnation - VPI process and carefully manufactured and tested at factory thus ensuring a end product with high levels of reliability, preventing contamination of the impregnation varnish and ensuring voidfree impregnation of windings. For motors that operate with a non sine wave frequency inverter, insulation systems are reinforced to prevent accelerated aging of insulation (available on request).

4.7 Endshields

To improve heat dissipation and ensure lower operating temperatures on the bearing, the DE endshield is provided with fins uniformly distributed.

The endshields are manufactured in cast iron FC-200 and fastened with 8 bolts to ensure maximum rigidity (see Figure 19).

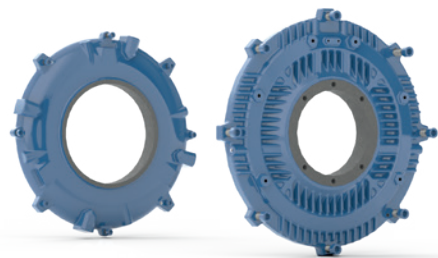


Figure 19 - DE endshield (left) and NDE endshield (right).

Depending on its mounting, the W51 HD can be provided with flange type "D", as shown in Figure 20.

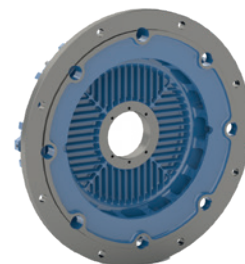


Figure 20 - DE endshield - Flange "D".

4.8 Drains

W51 HD motors have holes for drainage of water that may condense inside of the frame or undesired entry into the motor, thereby preventing corrosion or damage to internal motor components.

W51 HD line has automatic drain plugs with degree of protection IP66 (see Figure 21) which do not require human intervention to open the plug and avoid accumulation of condensed liquids into the motor.

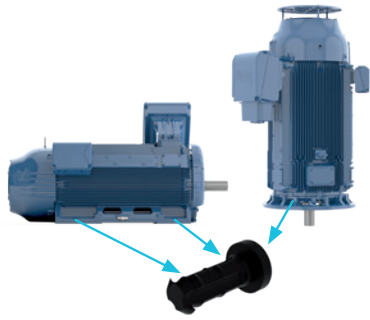


Figure 21 - Positions of automatic drains on the motors of the W51 HD line mounted in the horizontal and vertical position.

4.9 Fan Cover

The fan covers are built in cast iron FC-200 (see Figure 22), have an aerodynamic design, features high mechanical resistance to loads and impacts which allows their application in environments with risk of mechanical impact up to 5 Joules (IK08 according to standard IEC 62262). For motors with sleeve bearings, the fan cover is made of steel plate with the same features as the cast iron version.



Figure 22 - Fan cover manufactured in cast iron FC-200.

The design of the fan cover, combined with the optimized fin distribution on the frame, ensures uniform air speed and minimizes the flow dispersion along the frame, and its shape guarantees increased efficiency of the ventilation system, which directly contributes to improving the motor thermal performance and energy efficiency. Attaching the fan cover directly to the frame adds strength to the set.

The W51 HD acoustic performance is guaranteed by a unique mounting system of the grille and internal baffle (see Figure 23), which ensures reduced noise below the levels established by the standards.

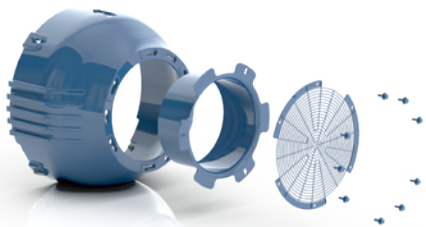


Figure 23 - Mounting system that ensures low noise levels.

4.10 Air Baffle

The W51 HD also has a pair of air baffles made of cast iron on the DE bearing. It was designed in order to guarantee a continuous and uniform airflow over the bearing housing, which significantly lowers its temperature and consequently increases relubrication intervals and bearing life (see Figure 24). Motors with sleeve bearings are supplied with two pairs of

air baffles (see Figure 25).

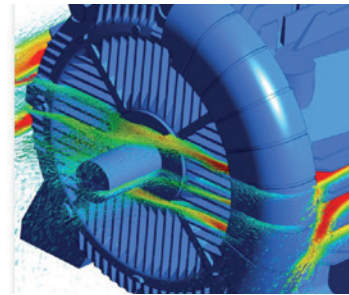


Figure 24 - Representation of the air flow over the DE bearing.

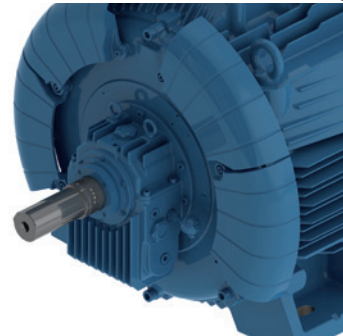


Figure 25 - Two pairs of air baffles for motors with sleeve bearings.

It is noteworthy to mention that for proper motor operation air inlets for motor ventilation are not blocked and that the space surrounding the equipment is enough to keep the air temperature at the baffle inlet below the maximum temperature indicated on the motor main nameplate. For motors installed outdoors ensure that ventilation openings are not blocked and a minimum clearance of 1/4 of the baffle diameter is maintained from the walls to ensure free airflow for the ventilation system. For indoor installations, besides the minimum distance from walls, the air temperature must be checked at the air inlet of the ventilation system to prevent motor overheating. Motors installed outdoors or in vertical position require the use of additional shelter to protect them against the ingress of rainwater and/or solid particles, for instance the use of a drip cover.

Note: The mounting features of the fan cover must not be changed, because they are designed to ensure maximum efficiency of the fans.

4.11 Nameplate

The motors can be supplied with three types of nameplate: main, additional and warning nameplate. All nameplates are made of aluminium and the main and additional plates are laser engraved. Figure 26 shows the location of the nameplates on the W51 HD motor.

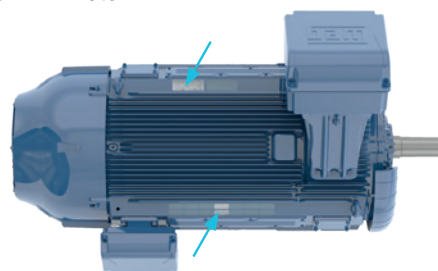


Figure 26 - Location of the nameplates on the electric motor.

4.11.1 Main Nameplate

The main nameplate provides information describing the mounting features and motor performance. It also provides the motor serial number and its year of manufacture. Figure 27 shows the layout of the nameplate on the W51 HD motor.

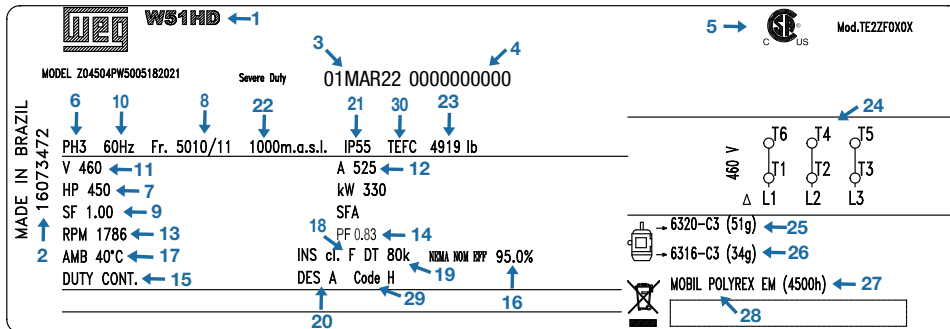


Figure 27 - Main nameplate of the motor.

- 1 - Motor line
- 2 - Motor code
- 3 - Manufacturing date
- 4 - Serial number
- 5 - Certification
- 6 - Number of phases
- 7 - Output power
- 8 - Frame model
- 9 - Service Factor
- 10 - Frequency
- 11 - Rated voltage
- 12 - Rated current
- 13 - Speed
- 14 - Power factor
- 15 - Duty cycle
- 16 - Efficiency
- 17 - Ambient temperature
- 18 - Insulation class
- 19 - Temperature rise of the windings
- 20 - Design
- 21 - Degree of protection
- 22 - Altitude
- 23 - Weight
- 24 - Wiring diagram
- 25 - DE bearing and grease quantity
- 26 - NDE bearing and grease quantity
- 27 - Bearing's relubrication interval (in hours)
- 28 - Grease type used for bearings
- 29 - NEMA code letters for locked rotor kVA
- 30 - Enclosure type

4.11.2 Additional Nameplate

To indicate the available accessories, the W51 HD motors are supplied with additional nameplates that contain informations on temperature sensors (see Figure 28 and Figure 29), space heaters (see Figure 30), and other accessories supplied on customer request. If required, these nameplates can be used to show the TAG codes specific to the motor.

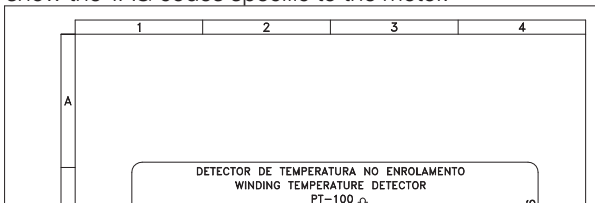


Figure 28 - Additional nameplate for winding temperature detectors (Pt-100).

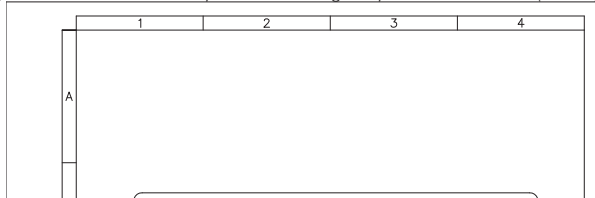


Figure 29 - Additional nameplate of the temperature sensor (Pt-100) for the bearings.

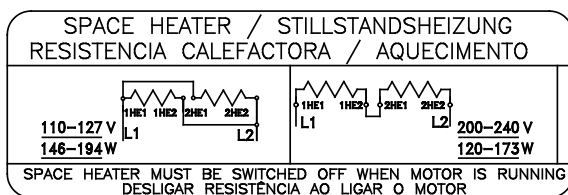


Figure 30 - Additional nameplate for the space heater.

Note: When motor is fitted with dual voltage space heaters, WEG supplies the motor connection set for 127 V. If required to connect to 220 V, the wiring diagram must be changed as shown on the additional nameplate of the space heater.

4.11.3 Warning Plate

Motors with rated voltage above 1 kV are supplied with a warning nameplate (see Figure 31), indicating the presence of high voltage on the motor. Never touch any energized circuits or rotating parts of the motor. Maintenance, installation and any interventions must be performed by qualified staff with appropriate tools only. For more details contact WEG technical support.

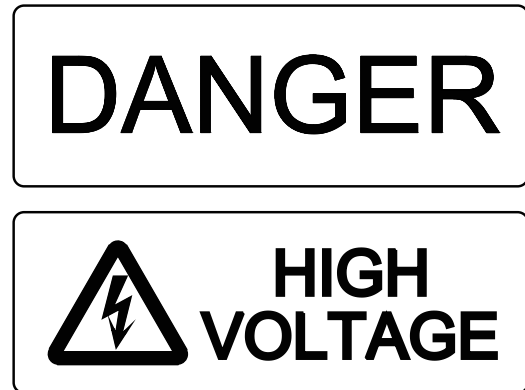


Figure 31 - Warning plate for motors above 1 kV.

5. Ventilation System/Noise Level/Vibration

5.1 Ventilation System

The motors of the W51 HD line comply with the specification of Totally Enclosed Fan Cooled motors (TEFC - IC-411) according to NEMA MG-1 Part 6.

The optional version with forced ventilation (IC 416) can also be provided. On request, WEG can supply non-ventilated (TENV) and Air Over (TEAO) versions. Further information on the IC 416 option can be found in item "10.2 Operation with Frequency Inverter".

5.1.1 Fans

With an innovative ventilation system, W51 HD motors have a uniform distribution of internal temperature.

This system produces a pressure difference between the drive end and non-drive end of the motor, resulting in an air flow through the rotor cooling channels (see Figure 32). This air flow has its continuity ensured by the frame ducts, which complete the internal ventilation circuit (see Figure 33).

The internal ventilation system results in an homogeneous temperature distribution along the stator, and also helps to reduce the bearing temperature levels.

The internal ventilation system adopted for the W51 HD motors is simple and compact and provides the required air flow while increasing the cooling efficiency and reducing the vibration levels.

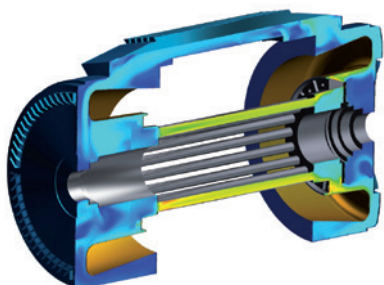


Figure 32 - Demonstration of the airflow through the rotor holes.

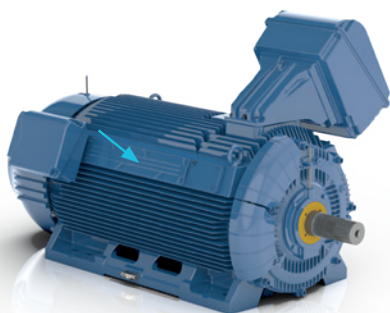


Figure 33 - Airflow channels in the motor frame.

Motors with four or more poles have an external radial fan with straight blades (see Figure 34), that ensures proper airflow even at lower speeds.

The external ventilation of two-pole motors is performed by an axial fan with inclined blades (see Figure 35), which ensures lower noise levels, with high ventilation capacity and efficiency. Made of cast iron FC-200, the fans are unidirectional for 2-pole motors and bidirectional for four or more poles.

As they use unidirectional fans, W51 HD two-pole motors require that the direction of rotation be informed in the order. Aluminum fans can also be supplied, but on request only.



Figure 34 - Radial fan with straight blades.

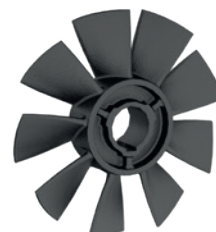


Figure 35 - Axial fan with inclined blades.

5.2 Noise Level

The noise level performance of W51 HD motors is indicated in Table 3. The data refers to motors operating at 50 Hz and 60 Hz with fan covers made of cast iron.

Frame	Sound pressure level dB(A) - 50 Hz				Sound pressure level dB(A) - 60 Hz			
	2P	4P	6P	8P	2P	4P	6P	8P
5010/11	81	80	74	70	84	82	76	73
5810/11				73	85	83	78	76
6809/10	84	82			86	85		
7009/10	86	85	76	78	88	88	80	82

Table 3 - Sound pressure level for motors at 50 Hz and 60 Hz with fan cover made of cast iron.

The sound pressure levels shown in the Table 3 are valid for motors operating with no load and sine-wave power supply. Under load, NEMA MG 1 specifies a sound pressure level increase according to Table 4.

Height of the shaft end - H (in)	2P	4P	6P	8P
H = 12.402	2	3	5	6
13,976 ≤ H		2	4	5

Table 4 - Maximum expected increase of the sound pressure level for motors operated with load.

Note: The sound pressure level increase for motors driven by frequency inverter that depends on the switching frequency of the inverter, may reach up to maximum 11 dB (A) according to IEC 60034-17 and IEC 60034-25.

5.3 Vibration

The vibration of an electrical machine is directly related to its installation conditions. For this reason, it is extremely important that the customer ensures a sturdy base and the required dimensional tolerances. To prevent equipment damage, vibration levels should be monitored regularly and any abnormal behavior must be immediately reported to the nearest authorized repair shop and/or to WEG. Motors with rolling bearings are highly sensitive to vibrations, and can suffer premature wear if exposed to vibrations above the acceptable limits.

It is recommended that vibration measurements be always

performed before and after any maintenance or intervention on the equipment. Whenever possible, the vibrations generated only by the motor must be evaluated by no-load tests, following the procedures described in NEMA MG 1 Part 7.

According to Table 5, the limits of maximum vibration magnitude in displacement, velocity and acceleration defined by NEMA MG 1 Part 7 for motors operating at no-load are classified into vibration grade A and B.

Vibration grade	Mounting	Displacement (mils) (peak to peak)	Velocity (in/s) (peak)	Acceleration (in/s ²) (peak)
A	Resilient	2.4	0.15	0.61
	Rigid	1.9	0.12	0.49
B	Resilient		0.10	0.41
	Rigid	2P, 4P and 6P		
		8P	1.3	0.08

Table 5 - Limits of maximum vibration magnitude in displacement, velocity and acceleration.

When no special vibration requirements are specified in the Purchase Order, motors will be supplied in conformance with vibration grade A, while motors in conformance with vibration grade B will be supplied only on request. All rotors of the W51 HD motors are dynamically balanced with a half key and, as standard, are designed to vibration grade A. Motors with vibration severity level B can be supplied, but only upon prior consultation with WEG.

For vibration monitoring, the D-endshield of the W51 HD motors has three M8 threaded holes where vibration sensors can be fitted (see Figure 38). Optionally, these holes can be supplied with a threaded adapter for fitting the SPM vibration sensor (see Figure 36 and Figure 37).

Due to the air baffles, only two vibration sensors can be assembled on the D-endshield, one on the top and another on the opposite side of the air baffles. In case of changing the terminal box position (in example, to change the mounting from F1 to F2, the position of the air baffles and the threaded adapters for vibration monitoring should also be inverted.



Figure 36 - SPM Sensors.



Figure 37 - Threaded adapter for vibration measurement.

The frames also have flat areas for mounting of vibration sensors at the motor non-drive end. On request, non-drive endshields can be supplied with threaded holes for sensor mounting.

Figure 38 shows the measuring point locations. On request, the vibration sensors can be supplied with the motor.

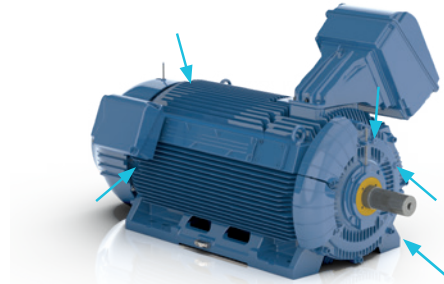


Figure 38 - Location of vibration measuring points.

5.3.1 Shaft Relative Vibration Limits

For machines with sleeve bearings with speed over 1,200 rpm and at rated power over 1,000 kW, NEMA MG 1 Part 7 recommends relative shaft vibration measurements (see Table 6).

Sensor readings may be affected by mechanical and magnetic anomalies of the shaft, commonly referred to as runout.

Vibration grade	Speed range (rpm)	Maximum displacement (mils) (peak to peak)	Maximum combined mechanical and electrical run-out (mils)
A	>1800	2.6	0.65
	≤1800	3.5	0.88
B	>1800	1.5	0.45
	≤1800		

Table 6 - Maximum relative shaft displacement.

The shaft vibration limit for motors with sleeve bearing, including the shaft runout, must not exceed the limits of Table 7.

Synchronous speed (rpm)	Maximum Relative Shaft Vibration (peak-to-peak)
1801 – 3600	0.0028" (70µm)
≤ 1800	0.0035" (90µm)

Table 7 - Maximum relative shaft displacement for motors with sleeve bearing.

6. Shaft/Bearings/Stresses

6.1 Shaft

The shafts of the W51 HD motors comply with NEMA MG 1 and undergo several numerical analyses until reaching the final dimensioning. Among the evaluation steps are: calculation of fatigue considering the stress concentration, torsion, bending and traction-compression efforts, stress and deformation analysis, torsional and modal analysis.

In order to facilitate the maintenance and the coupling of loads, all motors have the shaft with threaded center hole.

The standard shaft material is AISI 4140 steel, and supplied with key type "C" according to ISO 2491. On request, WEG can also supply double-end shaft motors, shaft end with special dimensions, and shafts made of other materials. The dimensions for the shaft and can be found in Section 16 Mechanical Data.

6.2 Bearings

The standard motors are supplied with open ball bearings with C3 clearance and lubricated with grease. On request, motors with ball bearings can be supplied with C4 clearance.

All motors are supplied with Pt-100 temperature sensors in the windings as standard thus ensuring an efficient method for continuous temperature monitoring during operation.

W51 HD for Safety and Hazardous area are supplied with taconite labyrinth seals and, as an option, they can be supplied with taconite labyrinth with slinger, INPRO/SEAL and

mechanical seal. Figure 39 shows the bearing construction form.

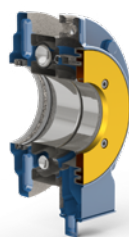


Figure 39 - Bearing construction form.

The vertical motors, for normal thrust loads can be supplied with ball bearings or angular contact ball bearings at the drive side, considering frame size and speed. This bearing configuration ensures optimum operating conditions for the motor in different applications and also prevents possible coupling problem caused due to thermal expansion.

The rated bearing lifetime, L10h, for direct coupling of the W51 HD line motors is 40.000 h (25.000 hours on frame size 7009/10 2-pole). Different bearing lifetime L10h can be evaluated on request.

The rolling bearing lifetime depends on the type and size of the bearing, the radial and axial loads they are subject, the operating conditions, the speed and grease life. Thus, its lifetime is closely related to its correct use, maintenance and lubrication. When the recommended amount of grease and lubrication intervals are respected, the bearings can reach the lifetime afore mentioned.

Note:

The bearing lifetime, L10h, in terms of operating hour, is the life that 90% of bearings is reached or even exceeded when motors are operated in compliance with the data provided in this catalog.

Table 8 lists the standard rolling bearings for different configurations of the W51 HD line.

	Frame	Number of poles	DE	NDE
Horizontal mounting	5010/11	2	6314 C3	6314 C3
		4 – 12	6320 C3	6316 C3
	5810/11	2	6314 C3	6314 C3
		4 – 12	6322 C3	6319 C3
	6809/10	2	6220 C3	6220 C3
		4 – 12	6324 C3	6319 C3
	7009/10	2	6220 C3	6220 C3
		4 – 12	6328 C3	6322 C3
Vertical mounting Normal thrust	5010/11	2	7314 C3	6314 C3
		4 – 12	7320 C3	6316 C3
	5810/11	2	7314 C3	6314 C3
		4 – 12	7322 C3	6319 C3
	6809/10	2	7220 C3	6220 C3
		4 – 12	7324 C3	6319 C3
	7009/10	2	7220 C3	6220 M-C3
		4 – 12	7328 C3	6322 M-C3

Table 8 - Standard roller bearings per frame size.

The W51 HD motors can also be supplied with sleeve bearings with lateral flange and natural cooling (see Figure 40). This option ensures lower maintenance and longer bearing life in non-heavy duty applications with direct coupling. Depending on the customer requirements, other configurations can be supplied on request.



Figure 40 - Sleeve bearing.

Table 9 lists the standard models for motors with sleeve bearings.

	Frame	Number of poles	DE	NDE
Horizontal mounting with sleeve bearings	5010/11	2	9-80	9-80
		4 – 12	9-90	9-90
	5810/11	2	9-80	9-80
		4 – 12	9-100	9-100
	6809/10	2	9-80	9-80
		4 – 12	11-110	11-110
	7009/10	2	9-80	9-80
		4 – 12	11-125	11-125

Table 9 - Standard bearings per frame for motors with sleeve bearing.

Optionally, motors with horizontal mounting for applications with high radial loads can be supplied with roller bearings of the NU series, according to Table 10.

Frame	Number of poles	Roller bearing
		DE
5010/11	4 – 12	NU320 C3
5810/11		NU322 C3
6809/10		NU324 C3
7009/10		NU328 C3

Table 10 - Optional roller bearings of the NU series.

6.2.1 Shaft Locking Device

The W51 HD motors are fitted with a mechanical shaft locking device to prevent damage to the rotor and bearings during transportation (see Figure 41, Figure 42 and Figure 43). This locking device should only be removed right before installation and stored in a safe location for future transportation of the motor.

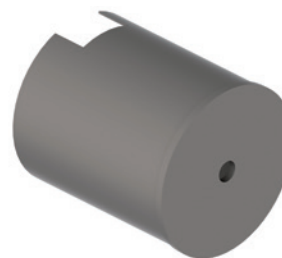


Figure 41 - Shaft locking device for motors with rolling bearing.



Figure 42 - Shaft locking device for motors with special bearing.

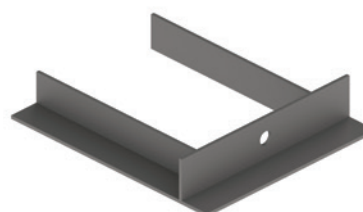


Figure 43 - Shaft locking device for motors with sleeve bearing.

6.2.2 Insulated endshield

In order to avoid bearing damage caused by electrical discharges generated inside the bearings, the W51 HD motors are fitted as standard with insulated NDE bearing (Figure 44). Currents flowing through the bearing have the potential of creating premature failure of these bearings, accelerating the degradation of the lubricant and of the bearing rolling elements. For all motors driven by frequency inverter, the electrical insulation of the NDE bearing and grounding between shaft and frame through grounding brush at drive end is mandatory.

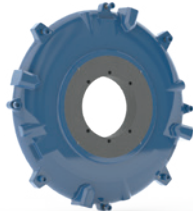


Figure 44 - Insulated NDE endshield.

On motors for hazardous area, the DE-bearing must never be grounded.

Horizontal motors with sleeve bearings, when required, both endshields may be supplied with insulation. Vertical motors with high thrust loads are also supplied with insulated DE bearing. For other configurations, contact WEG.

6.2.3 Lubrication

Bearing Lubrication

The W51 HD motors are fitted with a lubrication system with grease nipples on the DE and ND endshields, and a grease outlet drawer system for removing the old grease. The amount of grease and lubrication intervals are informed on the motor nameplate, and are also specified in Table 11.

	Frame	Number of poles	DE bearing	Grease (g)	50 Hz (h)	60 Hz (h)	NDE bearing	Grease (g)	50 Hz (h)	60 Hz (h)
Horizontal mounting Ball bearings	5010/11	2	6314	27	4500	3500	6314	27	4500	3500
		4-12	6320	50		4500	6316	34		4500
	5810/11	2	6314	27	4500	3500	6314	27	4500	3500
		4-12	6322	60		4500	6319	45		4500
	6809/10	2	6220	24	2700	2000	6220	24	2700	2000
		4-12	6324	72	4500	3800	6319	45	4500	4500
7009/10	2	6220	31	3500	-	6220	31	3500	-	
	4-6-12	6328	93	4500	3800	6322	60	4500	4500	
Vertical mounting Ball bearings	5010/11	2	7314	27	Under request		6314	27	Under request	
		4-6-12	7320	50	2700	2100	6316	34	4500	4200
					4500	4500			4500	4500
	5810/11	2	7314	27	Under request		6314	27	Under request	
		4-6-8-12	7322	60	1600	1600	6319	45	3500	3500
					3900	2900			4500	4500
	6809/10	2	7220	24	Under request		6220	24	Under request	
		4-6-8-12	7324	72	1700	1200	6319	45	4500	3500
					3300	2500			4500	4500
	7009/10	2	7220	31	Under request		6220	31	Under request	
		4-6-8-12	7328	93	2900	2000	6322	60	4300	3200
					4500	4200			4500	4500
Horizontal mounting Roller bearings	5010/11	4	NU320	50	4500	4200	6316	34	4500	4500
		6-12			4500	4500				
	5810/11	4	NU322	60	3300	3300	6319	45	4500	4500
		6-12			4500	4500				
	6809/10	4	NU324	72	3500	2400	6319	45	4500	4500
		6-12			4500	4500				
7009/10	4	NU328	93	1100	600	6322	60	4500	4500	
	6-8-12			2900	2000					4500

Table 11 - Relubrication intervals and amount of grease for grease lubricated bearings.

It is extremely important to follow the lubrication intervals specified on the motor nameplate. An excessive or insufficient lubrication may increase the bearing temperature during operation, resulting in premature wear of the bearings and consequent reduction of their lifetime.

Table 12 specifies the standard type of grease for the motors and indicates some properties of the lubricating grease.

Frame	Number of poles	Lubricant	Lubricant specification
5010/11	2 - 12	Mobil Polyrex EM	Grease with mineral oil, polyurea-based thickener, ISO VG 115
5810/11			
6809/10			
7009/10			

Table 12 - Typical properties of the standard lubricant.

Note:

■ For operation of the motors under other than normal operating conditions, such as: ambient temperature above 40 °C, altitude higher than 1000 m above sea level and axial and/or radial load above the specified in Table 14 to Table 19, please refer to WEG.

■ The use of greases not recommended by WEG or in different amounts than specified above may void the product warranty.

Motors with ball bearings at the drive end (DE) and at the non-drive end (NDE) are fitted with bearings caps and locating bearing at DE and non-locating bearing at NDE with preload washer. When motor is fitted with roller bearing at the drive end, special bearing caps are assembled at the NDE where the locating bearing is assembled.

Sleeve Bearing Lubrication

Depending on the application the W51 HD motor can be supplied with sleeve bearings available on request. This type of bearing requires less maintenance ensures longer lifetime and relubrication intervals.

Table 13 provides key information about lubricants for sleeve bearings.

	Number of poles	Frame	Bearing	Relubrication interval (h)	Amount of oil (L)	Lubricant	Lubricant specification	
				50 Hz and 60 Hz				
Montagem horizontal mancais de deslizamento	2	5010/11	9-80	8000	2,8	FUCHS Renolin DTA 10	ISO VG 32 mineral oil with antifoaming agents and antioxidant additives	
		5810/11						
		6809/10						
		7009/10						
	4 - 8	5010/11	9-90			4,7	FUCHS Renolin DTA 15	ISO VG46 mineral oil with antifoaming agents and antioxidant additives
		5810/11	9-100					
		6809/10	11-110					
		7009/10	11-125					

Table 13 - Lubrication oil used in sleeve bearings.

6.3 Maximum Radial and Axial Loads

Table 14 to Table 19 show the maximum allowable radial and axial loads for the W51 HD motors. The values of the maximum load were calculated considering a L10h bearing lifetime of 40,000 h. The maximum radial load values consider the axial load equal to zero and the maximum axial load values consider the radial load equal to zero. For applications involving simultaneously axial and radial load, refer to WEG on bearing lifetime.

To determine the maximum allowable radial and axial loads on the motor shaft the following factors must be considered:

- Regular operating conditions.
- Shaft material: AISI 4140.
- 2-pole motors: parabolic torque load.

- 4, 6 and 8-pole motors: constant torque load.
- The values consider the application of a standard bearing for horizontal mounted motors.

6.3.1 Radial Loads

The values shown in Table 14, Table 15, Table 16 and Table 17 for the radial loads refer to the force applied to the center of the shaft end, L/2, and the end of the length of the shaft end L (see Figure 45).

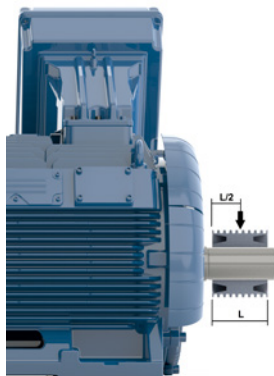


Figure 45 - Radial load applied to the shaft end.

6.3.2 Axial Loads

Axial Loads for Horizontal Mounted Motors

The values shown in Table 18 indicate the maximum allowable values for axial load on the shaft end for horizontal mounted motors fitted with ball bearing.

Frame	Number of poles	Momentary traction or compression (kN)
5010/11	2	2.0
	4	4.6
	6	5.9
	8	7.0
5810/11	2	1.8
	4	4.9
	6	6.3
	8	7.6
6809/10	2	1.5
	4	4.7
	6	5.8
	8	6.6
7009/10	2	Under request
	4	5.5
	6	6.6
	8	7.8

Table 18 - Maximum allowable axial load for horizontal mounted motors.

Radial Load - Ball Bearing

Frame	Radial load - 50 Hz - Fr (kN)							
	2P		4P		6P		8P	
	L/2	L	L/2	L	L/2	L	L/2	L
5010/11	3	3	6.8	6.5	8.3	7.9	10.5	9.9
5810/11	2.5	2.4	6	5.7	8.4	10	9.3	7.2
6809/10	Under request		6.1	7.1	6.7	7.6	7.2	8.7
7009/10	Under request		6.9	6.4	8	7.5	9.2	8.7

Table 14 - Maximum allowable radial loads at 50 Hz for ball bearings.

Frame	Radial load - 60 Hz - Fr (kN)							
	2P		4P		6P		8P	
	L/2	L	L/2	L	L/2	L	L/2	L
5010/11	2.7	2.7	6	5.7	7.8	7.2	7.6	7.2
5810/11	2.2	2.1			7.6	7.1	9.5	8.9
6809/10	Under request		6.1	5.7	7	6.6	6.8	6.4
7009/10	Under request				6.9	6.5	8.2	7.7

Table 15 - Maximum allowable radial loads at 60 Hz for ball bearings.

Radial Load - Roller Bearing

Frame	Radial load - 50 Hz - Fr (kN)					
	4P		6P		8P	
	L/2	L	L/2	L	L/2	L
5010/11	30	20	28	19	30	20
5810/11	32	22	32	21	33	22
6809/10	28	24	28	23	38	23
7009/10	50	40	57	34	63	35

Table 16 - Maximum allowable radial loads at 50 Hz for roller bearings.

Frame	Radial load - 60 Hz - Fr (kN)					
	4P		6P		8P	
	L/2	L	L/2	L	L/2	L
5010/11	28	19	29	19	30	20
5810/11	31	22	32	21	33	22
6809/10	36	25	38	24	38	23
7009/10	47	38	53	40	59	39

Table 17 - Maximum allowable radial loads at 60 Hz for roller bearings.

Note: Roller bearings require a minimum radial load (preload) to ensure proper operation. This type of bearing is not recommended for applications with direct coupling.

Axial Loads for Vertical mounted motors

The values shown in Table 19 indicate the maximum allowable axial load on the shaft end for vertical mounted motors with normal thrust. The Table 19 considers DE bearing with angular contact.

Frame	Number of poles	Thrust (kN)	Momentary compression (kN)
5010/11	2	Under request	
	4	15.4	4.6
	6	18.8	5.9
	8	21.5	7.0
5810/11	2	Under request	
	4	15	4.9
	6	18.2	6.3
	8	21.2	7.6
6809/10	2	Under request	
	4	11.1	4.7
	6	13.5	5.8
	8	16.5	6.6
7009/10	2	Under request	
	4	14.9	5.5
	6	17.5	6.6
	8	20.5	7.8

Table 19 - Maximum allowable axial load for vertical motors with normal thrust.

7. Mounting Forms

The standard motors are supplied in the F1 - mounting (see Figure 46), with the terminal box on the right side of the frame, looking at the non-drive end of the motor. The mounting designation for the W51 HD motors designation the NEMA MG-1 Part 4. Different mounting can be supplied, as shown in Table 20.



Figure 46 - F1 mounting.

Mounting								
	WEG Reference	F2	F1	F3	F2	F1	F3	
Details	Frame	With feet	With feet		With feet	With feet		
	Shaft end	Left	Right		Left	Right		
Mounting								
	WEG Reference	W-6	W-7	W-12	F2	F1	F3	W-6
Details	Frame	With feet			Without feet	Without feet		Without feet
	Shaft end	Downwards			Left	Right		Downwards
Mounting								
	WEG Reference	W-6	W-7	W-12	W-8	W-5	W-11	
Details	Frame	With feet			With feet			
	Shaft end	Downwards			Upwards			

Table 20 - Mountings.

8. Degree of protection/Bearing sealing/Painting

8.1 Degree of Protection

W51 HD for safe and hazardous area motors are supplied with degree of protection IP55, according to IEC 60034-5 requirements.

W51 HD motors can also be supplied with higher degree of protection, as indicated below:

- IP56 for increased degree of protection against water.
- IP65 for increased degree of protection against dust.
- IP66 for increased degree of protection against dust and water.

8.2 Bearing Sealing

The bearing sealing used on the endshields of the W51 HD motor is the taconite labyrinth, which ensures the degree of protection IP55 for the motor frame according to NEMA MG 1 Part 5.

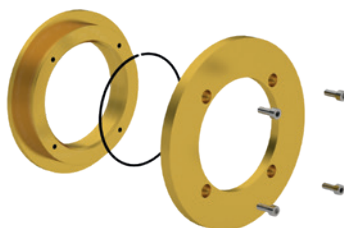


Figure 47 - Taconite Labyrinth

This sealing system protects the motor against the ingress of dust and water into the frame present in the environment.

8.3 Painting

The W51 HD motors can be applied in severe industrial environments, in sheltered locations or outdoors, in the presence of SO₂, steams and solid contaminants, high humidity indexes, alkali and solvent splashes. The painting plan of the motors ensures a minimum of 1,000 hours of corrosion resistance in the test by salt spray chamber according to ASTM B117-03 and corrosion category C4, according to ISO 12944-2. Optionally, W51 HD motors can be supplied with painting plans that have a corrosion classification C5 and CX in accordance with ISO 12944-2.

8.3.1 Internal Anti Corrosive Painting

High humidity indexes can result in premature insulation system deterioration which is the main component that ensures the motor lifetime. Motors applied in environments with relative air humidity of about 95% do not require additional protections beyond the space heater to prevent moisture condensation inside the motor.

However, for use in environments with humidity indexes above 95%, it is recommended to apply an epoxy coating on the internal parts of the motor, also known as tropicalized painting.

9. Voltage/Frequency

According to NEMA MG 1 Part 12 states that, the motor shall operate successfully under running conditions at rated load with a variation in the voltage or the frequency up to the following:

- Plus or minus 10 percent of rated voltage, with rated frequency.
- Plus or minus 5 percent of rated frequency, with rated voltage.
- A combined variation in voltage and frequency of 10 percent (sum of absolute values) of the rated values, provided the frequency variation does not exceed plus or minus 5 percent of rated frequency.

Performance within these voltage and frequency variations will not necessarily be in accordance with the standards established for operation at rated voltage and frequency.

10. Operation Characteristics

During installation and any intervention on the machine, all recommendations for handling, lifting and maintenance must be observed.

10.1 Thermal Protection

In order to monitor the operating condition of the motor, all the W51 HD motors are fitted with temperature sensors in the windings and on the bearings.

In its standard version, the motors are fitted with two resistance temperature detector (Pt-100) with three wires per phase and one resistance temperature detector (Pt-100) per bearing (see Figure 48).

Motors with sleeve bearing use Pt-100 with connection head (see Figure 49), fixed directly to the bearing. These devices generally have three wires, but they can be supplied with 2, 4, 6 (duplex) and 8 cables (duplex), and can be supplied calibrated and/or certified.



Figure 48 - Pt-100



Figure 49 - Pt-100 with connection head.

- Thermostat: bimetallic thermal protectors with silver contacts, NC type (normally closed), which open when predetermined temperature rise is reached. When the activation temperature of the bimetal thermal protector decreases, the thermostat will return to its original position instantaneously allowing to close the contact and the consequent restart of the motor. The thermostats are series connected to the motor coil, and thus can be used for switching off the motor. A second set of bimetal thermal protectors can be used for the alarm, however in this case it must be connected to a specific alarm circuit.
- PTC Thermistors: increase their resistance very fast with temperature increase. The sudden change in resistance interrupts the current in PTC, activates an output relay, which turns off the main circuit (see Figure 50).



Figure 50 - PTC Thermistor.

The thermistors have reduced size, do not have mechanical wear, and provide faster response when compared to other temperature sensors. However they do not allow continuous monitoring of the motor heating process. Thermistors with their electronic circuit controls ensure complete protection against overheating caused by phase-fault, overload, under/overvoltages or frequent reversals of direction of rotation or on/off cycles.

10.2 Operation with Frequency Inverter

The W51 HD motors have a design suitable for applications with variable speed. The standard motor is designed for sine wave filter inverter operation, otherwise a motor with reinforced insulation must be supplied.

All W51 HD motors fitted with rolling bearings have rigid shafts, avoiding the need of skipping frequencies on the inverter in the operating range, however, for speeds above the catalog limits, contact WEG. The W51 HD motors can be supplied for high speed version (up to 5,000 rpm), also on request.

10.2.1 Influence of the Frequency Inverter on Temperature Rise of the Motor

The induction motor may present a higher temperature increase when fed by a frequency inverter, than when fed with sine wave voltage. This overtemperature rise is due to the combination of two factors: the increase of losses on the motor as a function of the harmonic components of the PWM voltage supplied by the inverter, and the reduction of the effectiveness of the ventilation system when the self-ventilated motor operates at low frequencies. Basically the following solutions can be used to prevent the motor overheating:

- Reduction of the rated torque.
- Use of an independent ventilation system (forced ventilation).

Criteria for Torque Reduction

In order to maintain the temperature of the motors within acceptable levels when operating with frequency inverters and without forced ventilation, the load limits shown in Figure 51 must be observed (derating curve of the W51 HD motor).

This torque reduction is a required solution when the motor drives a load with constant torque. In order to drive loads with quadratic torque, usually it is not necessary to apply any torque reduction factor.

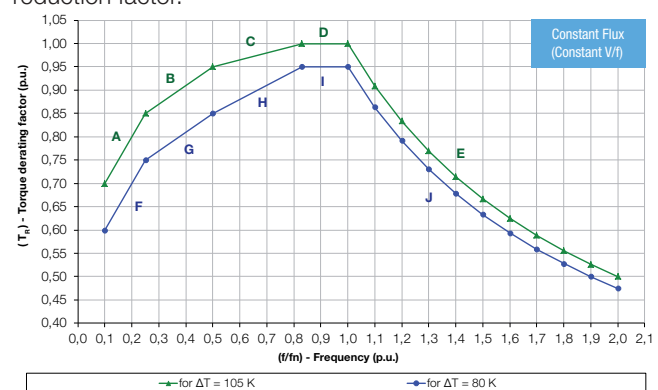


Figure 51 - Derating curve for motors driven by frequency inverter.

For more information on motors operated with frequency inverter, refer to the **Technical Guide - Induction motors fed by PWM frequency inverters (50029350)**, which can be found at www.weg.net.

10.2.2 Forced Ventilation Kit

Motors driven by frequency inverter at low speeds generally require an independent ventilation system. In these cases, the application of a forced ventilation kit ensures constant cooling of the motor throughout its speed range.

The forced ventilation kit (see Figure 52) comprises a 4-pole motor with independent power supply from the main motor,

and it is not subject to its operating conditions. This ventilation kit uses a motor with natural cooling method (IC410 or IC40).



Figure 52 - Detail of the assembly of the forced ventilation kit with cast iron air baffle.

The supply voltages available for the forced ventilation kit of the W51 HD motors are listed in Table 21.

Supply voltage available for the forced ventilation kit (V)
208-230/460
220-240/380-415
220/380-440
380-415/660
525-550
575
220/380
220/440
230/460
240/480
380/660
400/690
440
460
480

Table 21 - Supply voltages available for the forced ventilation kit.

Note:

- Motors with forced ventilation kits present an increase of 3 dB(A) in the noise level, without taking into account the noise produced by the frequency inverter. Since the global noise value depends on the inverter switching frequency, for more precise information, contact WEG.
- The use of the forced ventilation kit changes the motor length. In Section 16 is possible to check the motor length increase due to the use of the forced ventilation kit.

10.2.3 Common-Mode Voltages

The common mode voltages occur when the sum of the voltages at the inverter output is different from zero. They are the main reason why currents flow through the motor bearings driven by static inverter. These currents wear the balls and the ball bearing races, reducing the bearing lifetime and causing premature failures. The W51 HD motors are supplied with shaft grounding brushes to prevent the current flow through the bearing and this avoid its premature failure, see "4.4 Grounding Brush".

11. Installation Characteristics

Some important aspects must be taken into account when dimensioning the installations of the W51 HD motors, which are described below.

11.1 Strength and Mass of the Motor Mechanical Support System (MSS)

Regardless the mounting type or design of the motor Mechanical Support System (MSS), the assembly must be strong enough with relatively high mass.

Several tools can be used to evaluate the strength of the foundation, such as experimental or numerical analysis. The base must present vibration levels less than 30% of the vibration measured on the motor in positions next to the fixation points in the horizontal, vertical and axial directions. The design of the base must also ensure that its the natural frequencies does not match the running frequency of the motor, also

keeping a separation of $\pm 5\%$ from the natural frequency to twice and three times the speed frequency and to once and twice the power line frequency (60 e 120 Hz). Motors that operate with frequency inverter and variable mechanical speed must have the natural frequencies of the system removed from the inverter operating range, so that there are no natural frequencies of the whole system (motor + base + driven equipment) throughout this operating range.

Metal fixtures of the motor must feature anchors securely fastened to the foundation anchor plate, avoiding the connection to the motor only with metal parts.

Since structural steels absorb little external vibration and do not damp the motor vibrations, the global vibration and noise levels may increase.

The base design must be robust and withstand the motor without significant deformation, taking into account the mass and stresses on the foundation informed by WEG on the motor data sheet.

11.2 Dimensional Control

The dimensional control must be precise, with tolerance for flatness, parallelism and perpendicularity between the supports, avoiding soft foot or motor misalignment.

The area of the motor footrests in the drive end and non-drive end must be identical. The foundation must also guarantee 100% support of the DE foot, and the NDE foot must have a support area identical to the DE part or 50% of the total area of the foot (consider the highest value when designing the support).

The foot flatness must be controlled for each motor. W51 HD motors can have flatness of the feet below 0.127 mm according to IEEE 841 standard.

Vertical mounted motors must be mounted on rectangular or round, solid, steel plates with a hole in the center for the shaft extension. The flange support surface must be machined, with threaded or throughout holes, but the fastening screws must be tightened with controlled torque on flat surfaces.

The steel plate must be at least three times thicker than the machine flange (WEG recommend five times). This mounting base plate must be securely fastened to a solid and leveled surface (in compliance with IEC 60034-14 requirements).

The correct number and diameter of fasteners must be used to connect the flange.

12. Special Accessories

Some special accessories can be installed on the W51 HD motors for specific functions, such as speed control, temperature monitoring, and protection against oscillations of the power line or lightning discharges.

12.1 Encoder

For precise speed and shaft position control in critical applications, the W51 HD Safe Area motors can be supplied with an encoder. For W51 HD Hazardous Area motors with encoders, contact WEG.

WEG recommends the use of the following encoders:

- Dynapar- series B58N- 1,024 ppr and 2,048 ppr (hollow shaft). This encoder is easy to mount and ensures good precision (see Figure 53).



Figure 53 - Dynapar B58N Encoder.

- Leine Linde - 861 - 1,024 ppr and 2,048 ppr (hollow shaft). It can also be supplied as an optional item and offers good precision (see Figure 54).



Figure 54 - Leine Linde 861 Encoder.

Other encoder models can be supplied on request.

Note: Mounted on the non-drive end of the motor and directly coupled to the shaft extension, the use of this device increases the motor length, which varies according to the encoder.

12.2 Protection Against Voltage Surge

The terminal box of the motor of the W51 HD high-voltage line can be equipped with a surge arrester per phase (see Figure 55). These components are classified according to the following voltage classes: 3 kV, 6 kV, 9 kV or 12 kV.



Figure 55 - Surge arrester.

Besides the surge arrester, the high-voltage motors also have a surge capacitor per phase as special component (see Figure 56). These devices are installed in the main terminal box and their application recommended in systems potentially subject to voltage peaks during switching operations or lightning discharges. The surge capacitors are installed in a stainless steel enclosure and have the following features:

Capacitance – 0,5 μ F

Rated voltage – up to 7,2 kV

Voltage class – 15 kV

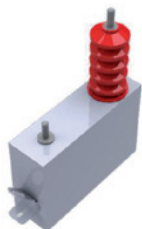


Figure 56 - Surge capacitor used in the W51 HD line.

12.3 Leveling Screw

In order to ensure perfect alignment between the driven machine and the motor, WEG supplies the leveling screws set as an accessory. These components must be used only during the motor installation and must be removed after the shims are placed between the foundation and the machine.

12.4 Non-Reverse Ratchet

Some applications do not allow the inversion of direction of rotation. In order to prevent this reversal, the W51 HD motors must be fitted with the non-reverse ratchet (see Figure 57).



Figure 57 - Non-reverse ratchet.

12.5 Thermometer

In order to monitor the bearing temperature, for both rolling bearing and sleeve bearing, the motors can be fitted with thermometers.

On the rolling bearings, one thermometer can be installed on each endshield, and for sleeve bearings, thermometers can be installed on the bearing shell or oil tank.

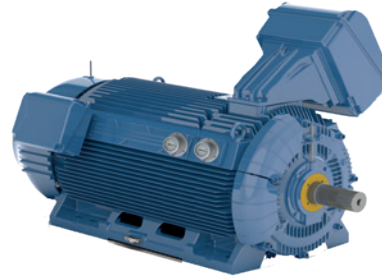


Figure 58 - Thermometers with sights located on the sides.

12.6 Interchangeability Solutions

With the technological progress, machines are increasingly smaller and more efficient, which consequently results in interchangeability problems, especially for older motors or from different manufacturers. In order to solve this problem, the W51 HD motors can be supplied with an intermediate base (see Figure 59) or also with dimensional variations, especially on feet and frame.

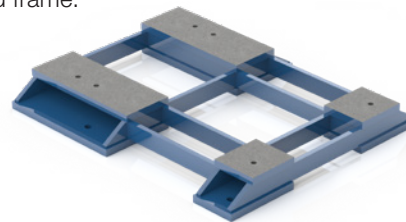


Figure 59 - Intermediate base.

If you need to replace a motor with a frame (shaft end height) immediately above the power standard, the motor can be supplied with a foot extension.

If it is necessary to use the height of two frames above (for example, replace frame 5010/11 with frame 7009/10), the motors can be supplied with intermediate steel base. For this case, the upper part of the base features the fixation drilling of the standard motor in the required power, and the lower base the fixation drilling of two frames immediately above.

12.7 Automatic Lubricator

The automatic lubricator available for the W51 HD motors reduces the motor maintenance, especially in applications in which the motor is in a place with difficult access and high ambient temperature or speeds.

The lubricator, when supplied with the motor, has polyurea based grease and it is configured for the lubrication intervals specified on the motor nameplate. The grease canister must be replaced with the same grease or compatible grease in order to ensure smooth motor operation.

The grease outlet works by the same way of the motors with grease nipple.

Easily-accessible, the lubricator is mounted on the motor sides (see Figure 60).

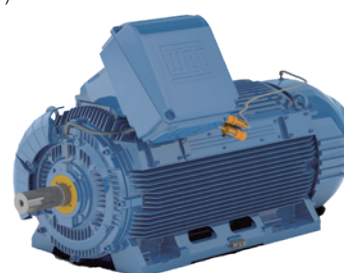


Figure 60 - Lubricator located on the sides.

13. Construction Features

Frame		5010/11	5810/11	6809/10	7009/10			
Mechanical features								
W51 HD Hazardous Area Marking		Class I, Division 2, Groups A,B,C and D, T3 (200 °C)/ T3C (160 °C)						
		Class II, Division 2, Groups F and G, T3 (200 °C)/ T3C (160 °C)						
		Class I and II, Division 2, Groups A, B, C, D, E, F and G, T3 (200 °C)/ T3C (160 °C)						
Mounting		F-1						
Frame Material		Cast Iron FC-200						
Degree of protection		IP55						
Grounding		Double grounding (1 terminal box + 1 frame)						
Cooling method		TEFC						
Fan Material		2P		Cast Iron FC-200				
		4P - 12P						
Fan cover Material		Cast Iron FC-200 (ball bearings) - Steel (sleeve bearings)						
Endshields Material		Cast Iron FC-200						
Drain plug		Automatic drain plug IP66						
Bearing		2P		C3				
		4P - 12P						
		Shielded/clearance NDE		C3				
		Locating bearing		Fixed on DE with external and internal bearing cap and preload spring NDE				
		Drive end		2P	6314	6314	6220	6220
Non-drive end		4P - 12P	6320	6322	6324	6328		
		2P	6314	6314	6220	6220		
		4P - 12P	6316	6319	6319	6322		
		Axial clearance		4 mm				
Sleeve bearings		Locating bearing		Located both bearings				
		Drive end		2P	9-80	9-80	9-80	9-80
				4P - 12P	9-90	9-100	11-110	11-125
		Non-drive end		2P	9-80	9-80	9-80	9-80
				4P - 12P	9-90	9-100	11-110	11-125
Bearing seal		Taconite Labyrinth						
Joint seal		Without						
Lubrication		Type of grease		Mobil Polyrex EM				
		Grease fitting		With grease fitting				
Terminal block		Up to 1 kV		Without Terminal block				
		1 to 6,6 kV		With Terminal block				
Terminal box material		Up to 1 kV		Cast Iron FC-200		Steel		
		1 to 6,6 kV						
		W51 HD Hazardous Area		Up to 1 kV		Steel		
Lead inlet		Main up to 1 kV		2xNPT 3"		2xNPT 4"		
		Main 1 to 6,6 kV		Size		NPT 3"		
		Additional				3xNPT 3/4"		
		Plug		W51 HD Safe Area		Plastic threaded plug		
Shaft		W51 HD Hazardous Area		Brass threaded plug				
		Material		AISI 4140				
		Threaded hole		2P		UNC 3/4"	UNC 7/8"	
		4P - 12P				UNC 7/8"		
Shaft key		C key						
Vibration level		Grade A						
Balancing without/half/full key		With 1/2 key						
Nameplate material		Laser printed Aluminium						
Painting		Type		214P				
		Color		RAL 5009 (Blue)				
Electrical features								
Design		Up to 1 kV		Design A: up to 500HP 2P and 4P, 350HP 6P, 250HP 8P, 200HP 10P, 150HP 12P				
		1 to 6,6 kV		Not Applicable				
Voltage		Single speed		380 V to 6600 V				
Winding		Impregnation		Resin continuous flow				
		Up to 1 kV		VPI				
		1 to 6,6 kV		F (DT 80 K)				
Space heater		W51 HD Safe Area		110-127 / 220-240 V				
		W51 HD Hazardous Area		200-240 V				
Service factor		1,00						
Ambient temperature		Maximum		+40 °C				
		Minimum		-20 °C				
Starting method		DOL						
Rotor		Aluminium or copper according to the motor output (for further information, consult WEG)						
Winding thermal protection		Pt-100 3 leads (2 per phase)						
Bearing thermal protection		Pt-100 3 leads (1 per bearing)						

14. Optional Features ^{1) 2)}

Frame		5010/11	5810/11	6809/10	7009/10
Mechanical optionals					
Terminal box type (W51 HD Safe Area)					
Steel	Up to 1 kV	0	0	SD	SD
	1 to 6,6 kV	0	0	0	0
Cast Iron	Up to 1 kV	SD	SD	0	0
	1 to 6,6 kV	SD	SD	SD	SD
Terminal box type (W51 HD Hazardous Area)					
Steel	Up to 1 kV	SD	SD	SD	SD
	1 to 6,6 kV	SD	SD	SD	SD
Cast Iron	Up to 1 kV	0	0	0	0
	1 to 6,6 kV	0	0	0	0
Terminal block (W51 HD Safe Area)					
Terminal block	Up to 1 kV	0	0	0	0
	1 to 6,6 kV	SD	SD	SD	SD
Connection bolt	Up to 1 kV	SD	SD	SD	SD
	1 to 6,6 kV	0	0	0	0
Terminal block (W51 HD Hazardous Area)					
Terminal block	Up to 1 kV	SD	SD	SD	SD
	1 to 6,6 kV	SD	SD	SD	SD
Connection bolt	Up to 1 kV	0	0	0	0
	1 to 6,6 kV	0	0	0	0
Cable gland (W51 HD Safe Area)					
Without cable gland		SD	SD	SD	SD
Plastic		0	0	0	0
Brass		0	0	0	0
Stainless steel		0	0	0	0
Cable gland (W51 HD Hazardous Area)					
Without cable gland		SD	SD	SD	SD
Brass		0	0	0	0
Flange (W51 HD Safe Area and W51 HD Hazardous)					
Without flange		SD	SD	SD	SD
Flange FF		0	0	0	0
Flange C		0	0	0	-
Fan (W51 HD Safe Area and W51 HD Hazardous)					
Cast iron		SD	SD	SD	SD
Aluminium		0	0	0	0
Bronze		0	0	0	0
Steel		0	0	0	0
Drive end bearing type (W51 HD Safe Area and W51 HD Hazardous)					
Ball bearing (horizontal mounting)		SD	SD	SD	SD
Angular contact ball bearing (vertical mounting/ 2 Poles)		SD	SD	SD	SD
Ball bearing (vertical mounting / 4-12 Poles)		SD	SD	-	-
Angular contact ball bearing (vertical mounting/ 4-12 Poles)		-	-	SD	SD
Rolling bearing NU (4-12 Poles)		0	0	0	0
Sleeve bearing (Insulated)		0	0	0	0
Non-drive end bearing type (W51 HD Safe Area and W51 HD Hazardous)					
Ball bearing		SD	SD	SD	SD
Sleeve bearing (Insulated)		0	0	0	0
Insulated drive endshield hub (W51 HD Safe Area and W51 HD Hazardous)					
Non insulated		SD	SD	SD	SD
Insulated bearing		0	0	0	0
Insulated end shield		0	0	0	0
Insulated non-drive endshield hub (W51 HD Safe Area and W51 HD Hazardous)					
Insulated end shield		SD	SD	SD	SD
Insulated bearing		0	0	0	0
Non insulated		0	0	0	0
DE and NDE bearing seal (W51 HD Safe Area and W51 HD Hazardous)					
Taconite labyrinth		SD	SD	SD	SD
INPRO/SEAL		0	0	0	0
Taconite labyrinth with slinger		0	0	0	0
Mechanical seal		0	0	0	0
Joint seal (W51 HD Safe Area and W51 HD Hazardous)					
Loctite 5923 (Permatex) on joints		0	0	0	0
Shaft (W51 HD Safe Area and W51 HD Hazardous)					
Shaft locking device		SD	SD	SD	SD
Second shaft end		0	0	0	0
Balance type (W51 HD Safe Area and W51 HD Hazardous)					
Balancing without key		0	0	0	0
Balancing with full key		0	0	0	0
Key (W51 HD Safe Area and W51 HD Hazardous)					
B key		0	0	0	0
C key		SD	SD	SD	SD
Vibration level (W51 HD Safe Area and W51 HD Hazardous)					
Grade A		SD	SD	SD	SD
Grade B		0	0	0	0
According to API		0	0	0	0

Notes:

1) Other optional features, on request.

2) Some combinations of optional features are not allowed - then contact WEG.

SD - Standard / O - Optional

14. Optional Features ^{1) 2)}

Frame	5010/11	5810/11	6809/10	7009/10
Lubrication				
Aeroshell 7	0	0	0	0
Isoflex NBU 15	0	0	0	0
Oil Mist	0	0	0	0
Grease fitting				
Carbon steel grease fitting	SD	SD	SD	SD
Stainless steel grease fitting	0	0	0	0
Threaded grease fitting NPT 1/4"	0	0	0	0
Grease fitting able to <i>Oil Mist</i>	0	0	0	0
Grease outlet				
Grease outlet by plastic slide valve	SD	SD	SD	SD
Grease outlet through endshield	0	0	0	0
Drain (W51 HD Safe Area)				
Automatic drain plug IP66	SD	SD	SD	SD
Stainless steel threaded drain plug (closed)	0	0	0	0
Threaded T-type drain plug (automatic)	0	0	0	0
Drain (W51 HD Hazardous Area)				
Automatic drain plug IP66	SD	SD	SD	SD
Threaded drain plug in stainless steel (closed)	0	0	0	0
Degree of protection (W51 HD Safe Area and W51 HD Hazardous Area)				
IP55	SD	SD	SD	SD
IP56	0	0	0	0
IP65	0	0	0	0
IP66	0	0	0	0
Painting plan				
214P - ISO 12944 C4 durability class "Medium" - Indicated for aggressive sheltered and non-sheltered environment. Industrial application that allows SO ₂ , steams, solid contaminant, high humidity and alkali and solvent sprinkles presence.	SD	SD	SD	SD
212E - ISO 12944 C5 (I and M) durability class "High" - Indicated for marine aggressive environment or marine industrial environment, sheltered allowing high humidity and alkali and solvent sprinkles presence. Indicate to pulp and paper, mining and chemical industrial applications.	0	0	0	0
212P - ISO CX/C5 (I and M) durability class "Very High" - Indicated for marine aggressive environment or marine industrial environment, sheltered or nonsheltered, allowing high humidity presence. Indicate to pulp and paper, mining and chemical industrial applications.	0	0	0	0
Internal tropicalized painting (epoxi)	0	0	0	0
Other mechanical options				
Ventilated bearing	SD	SD	SD	SD
Drip cover	0	0	0	0
Special flatness in the feet - Dowel pins	0	0	0	0
IOT options				
WEG Motor Scan	0	0	0	0

Notes:

1) Other optional features, on request.

2) Some combinations of optional features are not allowed - then contact WEG.

SD - Standard

O - Optional

14. Optional Features ^{1) 2)}

Frame	5010/11	5810/11	6809/10	7009/10
Electrical optionals				
Winding protection (W51 HD Safe Area)				
2-wire Pt-100, 1 per phase or 2 per phase (alarm)	0	0	0	0
3-wire Pt-100, 1 per phase or 2 per phase (alarm)	0	0	0	0
2-wire Pt-100, 1 per phase or 2 per phase (tripping)	0	0	0	0
3-wire Pt-100, 1 per phase (tripping)	0	0	0	0
3-wire Pt-100, 2 per phase (tripping)	SD	SD	SD	SD
3-wire Pt-100, 1 per phase or 2 per phase, calibrated (alarm)	0	0	0	0
3-wire Pt-100, 1 per phase or 2 per phase, calibrated (tripping)	0	0	0	0
PTC thermistor - 130 °C (alarm)	0	0	0	0
PTC thermistor - 155 °C (tripping)	0	0	0	0
Winding protection (W51 HD Hazardous Area)				
2-wire Pt-100, 1 per phase or 2 per phase (alarm)	0	0	0	0
3-wire Pt-100, 1 per phase or 2 per phase (alarm)	0	0	0	0
2-wire Pt-100, 1 per phase or 2 per phase (tripping)	0	0	0	0
3-wire Pt-100, 1 per phase (tripping)	0	0	0	0
3-wire Pt-100, 2 per phase (tripping)	SD	SD	SD	SD
3-wire Pt-100, 1 per phase or 2 per phase, calibrated (alarm)	0	0	0	0
3-wire Pt-100, 1 per phase or 2 per phase, calibrated (tripping)	0	0	0	0
PTC thermistor - 130 °C (alarm)	0	0	0	0
PTC thermistor - 155 °C (tripping)	0	0	0	0
3-wire Pt-100, 1 per phase or 2 per phase, ATEX (alarm)	0	0	0	0
3-wire Pt-100, 1 per phase or 2 per phase, ATEX (tripping)	0	0	0	0
Bearing thermal protection (W51 HD Safe Area)				
3-wire Pt-100 - drive end / non drive end	SD	SD	SD	SD
3-wire calibrated Pt-100 - drive end / non drive end	0	0	0	0
Two 3-wire Pt-100 - drive end / non drive end	0	0	0	0
Two 3-wire calibrated Pt-100 - drive end / non drive end	0	0	0	0
Bimetal thermal protector - drive end / non-drive end	0	0	0	0
Bearing thermal protection (W51 HD Hazardous Area)				
3-wire Pt-100 - drive end / non drive end	SD	SD	SD	SD
3-wire calibrated Pt-100 - drive end / non drive end	0	0	0	0
Two 3-wire Pt-100 - drive end / non drive end	0	0	0	0
Two 3-wire calibrated Pt-100 - drive end / non drive end	0	0	0	0
Space heaters (W51 HD Safe Area)				
110-127/220-240 V	SD	SD	SD	SD
380-480 V	0	0	0	0
Space heaters (W51 HD Hazardous Area)				
200-240 V	SD	SD	SD	SD
110-127 V	0	0	0	0
Insulation class (W51 HD Safe Area)				
F DT 80K	SD	SD	SD	SD
F DT 105K	0	0	0	0
H DT 80K (Up to 1 kV)	0	0	0	0
H DT 105K (Up to 1 kV)	0	0	0	0
Insulation class (W51 HD Hazardous Area)				
F DT 80K	SD	SD	SD	SD
Forced ventilation kit				
Forced ventilation kit prepared for encoder assembly	0	0	0	0
Forced ventilation kit do not prepared for encoder assembly	0	0	0	0
Encoder				
Without encoder	SD	SD	SD	SD
Dynapar B58N 1024	0	0	0	0
Dynapar B58N 2048	0	0	0	0
Leine&Linde XH861 900220-1024	0	0	0	0
Leine&Linde XH861 900220-2048	0	0	0	0
Grounding brush kit (W51 HD Safe Area)				
Drive end grounding brush	0	0	0	0
Drive end SGR grounding brush	0	0	0	0
Other electrical optionals				
Current transformer	0	0	0	0
Prepurge system (W51 HD Hazardous Area)	0	0	0	0

Notes:

- 1) Other optional features, on request.
- 2) Some combinations of optional features are not allowed - then contact WEG.

SD - Standard

O - Optional

15. Electrical Data

15.1 W51 HD Safe and Hazardous Area - Low Voltage

Output		Frame	Full Load Torque (Nm)	Locked Rotor Current		Locked Rotor Torque Ti/Tn	Breakdown Torque Tb/Tn	Inertia J (kgm²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	Service Factor	440 V							
				Code	II/In				Rated speed (rpm)	% of full load				Full load current In (A)							
										Efficiency					Power Factor						
HP	kW	Hot	Cold	50	75	100	50	75	100												
II Poles																					
300	220	5010/11	434	G	7.2	1.2	2.6	71.2	28	62	3768	80.0	1.00	3580	94.4	95.3	95.8	0.82	0.87	0.89	339
340	250	5010/11	492	G	6.8	0.9	2.5	83.1	24	53	3967	80.0	1.00	3579	94.8	95.5	95.8	0.84	0.88	0.90	380
350	260	5010/11	507	G	6.8	0.9	2.5	83.1	24	53	3967	80.0	1.00	3579	94.8	95.5	95.8	0.84	0.88	0.90	396
380	280	5010/11	550	G	6.8	1.6	2.5	92.5	24	53	4143	84.0	1.00	3577	95.2	96.0	96.1	0.84	0.88	0.89	430
400	300	5010/11	579	G	6.8	1.6	2.5	92.5	24	53	4143	84.0	1.00	3577	95.2	96.0	96.1	0.84	0.88	0.89	460
450	330	5010/11	652	G	7.0	1.0	2.5	102	24	53	4386	84.0	1.00	3575	95.6	96.2	96.3	0.85	0.89	0.91	494
480	355	5010/11	696	G	7.0	1.0	2.5	121	20	44	5753	84.0	1.00	3575	95.8	96.3	96.4	0.85	0.89	0.91	531
500	370	5010/11	725	G	7.0	1.0	2.5	121	20	44	5753	84.0	1.00	3575	95.8	96.3	96.4	0.85	0.89	0.91	553
550	400	5810/11	798	F	6.2	0.9	2.4	135	40	88	5993	84.0	1.00	3573	95.6	96.3	96.3	0.86	0.90	0.91	599
600	440	5810/11	868	H	7.8	1.4	3.0	145	36	79	6103	84.0	1.00	3583	95.7	96.4	96.5	0.81	0.86	0.89	672
610	450	5810/11	882	H	7.8	1.4	3.0	145	36	79	6103	84.0	1.00	3583	95.7	96.4	96.5	0.81	0.86	0.89	688
650	480	5810/11	942	G	6.8	0.9	2.3	154	36	79	6280	85.0	1.00	3575	95.8	96.5	96.6	0.87	0.90	0.91	716
680	500	5810/11	985	G	6.8	0.9	2.3	171	45	99	6346	85.0	1.00	3576	96.0	96.7	96.6	0.86	0.90	0.91	746
700	515	5810/11	1014	G	6.8	0.9	2.3	171	45	99	6346	85.0	1.00	3576	96.0	96.7	96.6	0.86	0.90	0.91	769
740	545	5810/11	1073	G	7.2	1.0	2.4	187	40	88	6611	85.0	1.00	3574	96.0	96.7	96.7	0.86	0.90	0.91	813
750	560	5810/11	1087	G	7.2	1.0	2.4	187	40	88	6611	85.0	1.00	3574	96.0	96.7	96.7	0.86	0.90	0.91	835
800	590	5810/11	1159	H	7.8	0.8	2.4	187	35	77	6611	85.0	1.00	3575	96.0	96.7	96.7	0.86	0.90	0.91	880
810	600	6809/10	1172	G	7.0	1.3	2.4	261	26	57	8020	85.0	1.00	3580	95.5	96.3	96.5	0.84	0.90	0.91	897
850	630	6809/10	1230	G	7.2	1.3	2.4	282	26	57	8306	86.0	1.00	3580	95.6	96.3	96.5	0.84	0.90	0.91	941
900	660	6809/10	1302	G	7.2	1.0	2.4	282	26	57	8306	86.0	1.00	3580	95.7	96.4	96.6	0.84	0.89	0.90	1000
950	700	6809/10	1375	G	7.2	1.3	2.4	306	26	57	8571	86.0	1.00	3579	95.8	96.4	96.6	0.85	0.90	0.90	1060
970	710	6809/10	1404	G	7.2	1.3	2.4	306	26	57	8571	86.0	1.00	3579	95.8	96.4	96.6	0.85	0.90	0.90	1070
1000	750	6809/10	1447	H	7.8	1.4	2.5	306	26	57	8637	86.0	1.00	3580	95.9	96.5	96.7	0.85	0.90	0.91	1120
Optionals																					
500	370	5810/11	725	F	6.2	0.9	2.4	123	45	99	5684	84.0	1.00	3573	95.6	96.2	96.3	0.86	0.89	0.90	560
800	590	6809/10	1158	G	7.0	1.3	2.4	261	26	57	8020	85.0	1.00	3580	95.5	96.3	96.5	0.84	0.90	0.91	882
IV Poles																					
400	300	5010/11	1159	G	6.7	2.5	2.4	142	15	33	4567	78.0	1.00	1788	96.0	96.0	95.9	0.77	0.84	0.87	472
430	315	5010/11	1246	G	6.7	2.5	2.4	142	15	33	4595	78.0	1.00	1788	96.0	96.0	95.9	0.77	0.84	0.87	495
450	330	5010/11	1304	G	6.9	2.6	2.5	142	15	33	4586	78.0	1.00	1788	96.0	96.0	96.2	0.78	0.85	0.88	511
480	355	5010/11	1392	G	6.8	2.8	2.4	154	15	33	4730	82.0	1.00	1787	96.0	96.0	96.2	0.80	0.86	0.88	550
500	370	5010/11	1449	G	6.5	2.7	2.3	154	15	33	4730	82.0	1.00	1788	96.0	96.0	96.1	0.80	0.86	0.88	574
550	400	5010/11	1594	H	7.5	2.9	2.6	168	15	33	4886	82.0	1.00	1788	96.2	96.4	96.3	0.77	0.85	0.87	626
600	440	5010/11	1738	H	8.0	2.9	2.8	173	15	33	4952	82.0	1.00	1789	95.9	96.4	96.4	0.74	0.83	0.87	688
610	450	5010/11	1767	H	8.0	2.9	2.8	173	15	33	4952	82.0	1.00	1789	95.9	96.4	96.4	0.74	0.83	0.87	704
650	480	5010/11	1888	G	7.0	1.3	2.5	185	15	33	5096	82.0	1.00	1784	96.0	96.2	95.9	0.85	0.89	0.90	730
680	500	5810/11	1968	H	7.3	2.4	2.9	249	15	33	5936	82.0	1.00	1790	96.0	96.6	96.6	0.73	0.81	0.84	809
700	515	5810/11	2026	G	7.1	2.5	2.7	271	17	37	6130	83.0	1.00	1790	96.3	96.7	96.7	0.76	0.83	0.86	813
740	545	5810/11	2141	G	6.7	2.4	2.5	292	14	31	6326	83.0	1.00	1791	96.4	96.7	96.6	0.74	0.83	0.86	861
750	560	5810/11	2170	G	6.7	2.4	2.5	292	14	31	6326	83.0	1.00	1791	96.4	96.7	96.6	0.74	0.83	0.86	885
800	590	5810/11	2314	H	7.8	2.7	3.0	304	13	29	6458	83.0	1.00	1791	96.2	96.7	96.8	0.73	0.81	0.84	952
850	630	5810/11	2460	G	7.1	1.1	2.5	327	15	33	6619	83.0	1.00	1790	96.6	96.8	96.6	0.86	0.90	0.92	930
900	660	6809/10	2605	G	6.9	1.4	2.9	451	20	44	7945	83.0	1.00	1790	96.0	96.3	96.5	0.82	0.88	0.89	1010
950	700	6809/10	2751	G	6.7	1.5	2.8	486	20	44	8183	85.0	1.00	1789	96.4	96.5	96.8	0.82	0.88	0.89	1070
970	710	6809/10	2809	G	6.6	1.5	2.7	486	20	44	8183	85.0	1.00	1789	96.4	96.5	96.7	0.83	0.87	0.89	1080
1000	750	6809/10	2896	G	6.9	1.8	2.8	520	20	44	8421	85.0	1.00	1789	96.4	96.5	96.8	0.84	0.88	0.90	1130
1100	800	6809/10	3184	G	7.5	1.8	3.0	591	20	44	8961	85.0	1.00	1790	96.5	96.6	96.9	0.82	0.88	0.90	1200
1150	850	6809/10	3334	G	7.5	1.2	2.5	574	20	44	9135	85.0	1.00	1787	97.1	97.2	97.1	0.85	0.89	0.91	1260
1250	900	6809/10	3624	G	7.5	1.2	2.5	574	20	44	9135	85.0	1.00	1787	97.1	97.2	97.1	0.85	0.89	0.91	1340
1300	950	7009/10	3756	G	7.2	0.7	2.5	624	20	44	11539	85.0	1.00	1793	96.7	97.0	96.9	0.78	0.85	0.88	1460
1350	1000	7009/10	3901	G	7.2	0.7	2.5	624	20	44	11539	88.0	1.00	1793	96.7	97.0	96.9	0.78	0.85	0.88	1540
1500	1100	7009/10	4334	G	6.7	0.7	2.5	660	20	44	11825	88.0	1.00	1793	96.8	97.0	96.9	0.80	0.86	0.89	1670
1600	1200	7009/10	4621	J	7.8	0.8	2.5	655	20	44	11856	88.0	1.00	1794	96.8	97.1	97.0	0.69	0.80	0.84	1930
Optionals																					
650	480	5810/11	1882	G	6.4	2.4	2.4	249	16	35	5923	82.0	1.00	1789	96.2	96.5	96.4	0.78	0.84	0.86	760
850	630	6809/10	2463	F	6.1	1.3	2.6	415	20	44	7656	83.0	1.00	1788	96.1	96.4	96.5	0.84	0.88	0.89	963
1250	900	7009/10	3610	G	7.3	0.7	2.5	624	20	44	11572	85.0	1.00	1794	96.5	96.9	96.8	0.77	0.85	0.88	1390

15.1 W51 HD Safe and Hazardous Area - Low Voltage

Output		Frame	Full Load Torque (Nm)	Locked Rotor Current I _L /I _n		Locked Rotor Torque T _L /T _n	Breakdown Torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	Service Factor	440 V						Full load current I _n (A)	
				Code	II/In				Hot	Cold				Rated speed (rpm)	% of full load			Full load current I _n (A)			
															Efficiency				Power Factor		
VI Poles																					
250	185	5010/11	1091	J	8.4	2.0	2.8	178	17	37	3649	72.0	1.00	1187	94.3	94.8	95.8	0.73	0.82	0.86	295
270	200	5010/11	1178	J	8.4	2.0	2.8	178	17	37	3649	76.0	1.00	1187	94.3	94.8	95.8	0.73	0.82	0.86	319
300	220	5010/11	1311	J	8.4	1.9	2.8	209	16	35	3903	76.0	1.00	1186	94.7	95.2	95.8	0.74	0.82	0.86	350
350	260	5010/11	1529	J	8.4	2.1	2.9	244	16	35	4101	76.0	1.00	1186	94.9	95.4	95.8	0.73	0.82	0.86	414
380	280	5010/11	1660	J	8.4	2.1	2.9	244	16	35	4101	76.0	1.00	1186	94.9	95.4	95.8	0.73	0.82	0.86	446
400	300	5010/11	1749	H	7.8	2.7	3.4	273	23	51	4877	76.0	1.00	1185	94.3	94.6	95.0	0.74	0.84	0.87	476
430	315	5810/11	1872	E	4.9	1.5	2.1	263	20	44	5473	76.0	1.00	1190	95.2	95.6	95.5	0.72	0.79	0.82	528
450	330	5810/11	1959	D	4.7	1.5	2.0	263	20	44	5473	76.0	1.00	1190	95.3	96.0	95.5	0.73	0.80	0.82	553
480	355	5810/11	2090	D	4.5	1.5	1.9	297	20	44	5737	78.0	1.00	1190	95.5	96.0	95.7	0.74	0.81	0.83	586
500	370	5810/11	2171	F	5.5	1.8	2.3	323	20	44	5936	78.0	1.00	1193	95.4	96.0	96.0	0.69	0.78	0.81	624
550	400	5810/11	2395	D	4.7	1.6	1.9	351	20	44	6139	78.0	1.00	1190	95.6	96.2	95.9	0.74	0.81	0.83	659
600	440	5810/11	2608	F	5.4	1.8	2.3	377	20	44	6353	78.0	1.00	1192	95.4	96.0	95.9	0.69	0.77	0.81	743
610	450	5810/11	2654	F	5.3	1.8	2.2	377	20	44	6353	78.0	1.00	1191	95.5	96.0	95.9	0.70	0.78	0.81	760
650	480	5810/11	2828	E	5.0	1.7	2.1	406	20	44	6549	78.0	1.00	1191	95.7	96.2	96.1	0.72	0.80	0.82	799
680	500	5810/11	2963	F	6.2	1.2	2.4	422	20	44	6573	78.0	1.00	1189	96.0	96.0	96.1	0.76	0.83	0.86	794
700	515	6809/10	3042	G	6.3	1.3	2.5	522	18	40	7971	78.0	1.00	1192	96.1	96.5	96.5	0.71	0.81	0.85	824
740	545	6809/10	3216	G	6.3	1.3	2.2	551	19	42	8159	78.0	1.00	1192	96.1	96.5	96.5	0.70	0.80	0.84	882
750	560	6809/10	3260	G	6.3	1.3	2.2	551	19	42	8159	78.0	1.00	1192	96.1	96.5	96.5	0.70	0.80	0.84	907
800	590	6809/10	3477	G	6.3	1.3	2.2	589	20	44	8379	78.0	1.00	1192	96.1	96.5	96.5	0.69	0.80	0.84	955
810	600	6809/10	3521	G	6.3	1.3	2.2	589	20	44	8379	78.0	1.00	1192	96.1	96.5	96.5	0.69	0.80	0.84	971
850	630	6809/10	3694	G	6.3	1.6	2.2	626	20	44	9790	78.0	1.00	1192	96.1	96.5	96.5	0.69	0.80	0.84	1020
900	660	6809/10	3912	G	6.5	1.4	2.4	662	20	44	10011	78.0	1.00	1192	96.2	96.6	96.6	0.69	0.80	0.84	1070
950	700	7009/10	4126	G	6.5	0.7	2.3	888	20	44	11951	78.0	1.00	1193	96.5	96.7	96.7	0.78	0.84	0.87	1090
970	710	7009/10	4212	G	6.5	0.7	2.3	888	20	44	11951	78.0	1.00	1193	96.5	96.7	96.7	0.78	0.84	0.87	1110
1000	750	7009/10	4343	G	6.5	0.8	2.3	888	20	44	11951	80.0	1.00	1193	96.6	96.8	96.8	0.78	0.84	0.87	1170
1100	800	7009/10	4773	G	6.5	0.8	2.3	947	20	44	12282	80.0	1.00	1194	96.6	96.8	96.8	0.78	0.84	0.87	1250
1150	850	7009/10	4990	G	6.5	0.8	2.3	947	20	44	12282	80.0	1.00	1194	96.6	96.8	96.8	0.78	0.84	0.87	1320
1250	900	7009/10	5424	F	6.5	0.8	2.3	1050	20	44	12943	80.0	1.00	1194	96.7	96.9	96.9	0.76	0.84	0.87	1400
1300	950	7009/10	5641	G	6.5	0.8	2.3	1050	20	44	12943	80.0	1.00	1194	96.7	96.9	96.9	0.76	0.84	0.87	1480
1350	1000	7009/10	5858	G	6.5	0.8	2.3	1050	20	44	12943	80.0	1.00	1194	96.8	97.0	97.0	0.76	0.84	0.87	1550
Optionals																					
400	300	5810/11	1741	E	4.7	1.5	2.0	247	20	44	5365	76.0	1.00	1190	95.3	95.7	95.5	0.73	0.80	0.82	503
680	500	6809/10	2956	G	6.3	1.3	2.5	522	18	40	7971	78.0	1.00	1192	96.1	96.5	96.5	0.71	0.81	0.85	800
900	660	7009/10	3908	G	6.5	0.7	2.3	888	20	44	11951	78.0	1.00	1193	96.5	96.7	96.7	0.78	0.84	0.87	1030
VIII Poles																					
200	150	5010/11	1166	F	5.5	1.2	2.4	199	24	53	3815	70.0	1.00	889	94.1	94.7	95.0	0.68	0.78	0.82	253
250	185	5010/11	1459	F	5.5	1.2	2.3	240	26	57	4112	73.0	1.00	888	94.5	95.1	95.1	0.70	0.78	0.82	311
300	220	5010/11	1748	F	5.5	1.2	2.5	282	21	46	4421	73.0	1.00	889	94.9	95.3	95.3	0.68	0.78	0.82	369
340	220	5010/11	1981	E	5.5	1.2	2.5	282	21	46	4421	73.0	1.00	889	94.9	95.3	95.3	0.68	0.78	0.82	369
350	260	5010/11	2040	F	5.5	1.2	2.5	282	21	46	4421	73.0	1.00	889	94.9	95.3	95.3	0.68	0.78	0.82	437
380	280	5810/11	2210	F	5.5	1.2	2.3	418	23	51	5182	73.0	1.00	891	95.3	95.8	95.7	0.68	0.78	0.82	468
400	300	5810/11	2326	F	5.5	1.2	2.3	418	23	51	5182	76.0	1.00	891	95.3	95.8	95.7	0.68	0.78	0.82	502
430	315	5810/11	2498	F	5.7	1.2	2.3	477	17	37	6218	76.0	1.00	892	95.4	96.0	95.9	0.68	0.78	0.82	526
450	330	5810/11	2614	F	5.7	1.2	2.3	477	17	37	6218	76.0	1.00	892	95.4	96.0	95.9	0.68	0.78	0.82	551
500	370	5810/11	2904	G	6.3	1.3	2.4	581	17	37	6549	76.0	1.00	892	95.4	96.0	96.0	0.67	0.77	0.82	617
550	400	6809/10	3191	G	6.6	1.1	2.3	724	22	48	7718	72.0	1.00	893	95.0	95.7	96.0	0.67	0.78	0.82	667
600	440	6809/10	3481	G	6.6	1.1	2.3	778	22	48	7938	78.0	1.00	893	95.1	95.8	96.1	0.67	0.78	0.82	733
610	450	6809/10	3539	G	6.6	1.1	2.3	778	22	48	7938	78.0	1.00	893	95.1	95.8	96.1	0.67	0.78	0.82	749
650	480	6809/10	3771	G	6.6	1.1	2.3	833	22	48	8159	78.0	1.00	893	95.1	95.8	96.1	0.67	0.78	0.82	799
700	515	6809/10	4061	G	6.6	1.1	2.3	888	22	48	8379	78.0	1.00	893	95.2	95.9	96.2	0.67	0.78	0.82	857
740	545	6809/10	4293	G	6.6	1.1	2.3	1050	22	48	10231	78.0	1.00	893	95.3	96.0	96.3	0.67	0.78	0.82	906
750	560	6809/10	4351	G	6.6	1.1	2.3	1050	22	48	10231	78.0	1.00	893	95.3	96.0	96.3	0.67	0.78	0.82	931
800	590	6809/10	4641	G	6.6	1.1	2.3	1050	22	48	10231	78.0	1.00	893	95.4	96.1	96.4	0.67	0.78	0.82	979
810	610	7009/10	4689	F	5.9	0.8	2.1	1260	26	57	12282	72.0	1.00	895	96.1	96.5	96.5	0.70	0.80	0.85	976
850	630	7009/10	4920	F	5.9	0.8	2.1	1260	26	57	12282	78.0	1.00	895	96.1	96.5	96.5	0.70	0.80	0.85	1010
900	660	7009/10	5210	F	5.9	0.8	2.1	1350	26	57	12613	78.0	1.00	895	96.1	96.5	96.5	0.70	0.80	0.85	1060
950	700	7009/10	5499	F	5.9	0.8	2.1	1430	26	57	12943	78.0	1.00	895	96.3	96.6	96.6	0.70	0.80	0.85	1120
970	710	7009/10	5615	F	5.9	0.8	2.1	1430	26	57	12943	78.0	1.00	895	96.3	96.6	96.6	0.70	0.80	0.85	1130
1000	750	7009/10	5789	F	5.9	0.8	2.1	1530	26	57	13406	78.0	1.00	895	96.3	96.6	96.6	0.72	0.81	0.86	1180
Optionals																					
350	260	5810/11	2033	F	5.5	1.2	2.3	373	21	46	4961	73.0	1.00	892	95.0	95.5	95.5	0.68	0.78	0.82	436
500	370	6809/10	2901	G	6.6	1.1	2.3	667	22	48	7475	72.0	1.00	893	95.0	95.6	95.9	0.67	0.78	0.82	617
800	590	7009/10	4631	F	5.9	0.8	2.1	1260	26	57	12282	72.0	1.00	895	96.1	96.5	96.5	0.70	0.80	0.85	944

15.1 W51 HD Safe and Hazardous Area - Low Voltage

Output		Frame	Full Load Torque (Nm)	Locked Rotor Current I _L /I _n		Locked Rotor Torque T _L /T _n	Breakdown Torque T _b /T _n	Inertia J (kgm ²)	Allowable locked rotor time (s)		Weight (kg)	Sound dB(A)	Service Factor	440 V							
				Code	I _L /I _n				Hot	Cold				Rated speed (rpm)	% of full load			Full load current I _n (A)			
															Efficiency		Power Factor				
X Poles																					
125	90	5010/11	912	G	5.5	1.5	2.0	164	15	33	3418	70.0	1.00	710	91.8	93.0	93.0	0.51	0.63	0.70	181
150	110	5010/11	1095	G	5.5	1.5	2.0	199	15	33	3638	73.0	1.00	710	92.2	93.3	93.3	0.51	0.63	0.70	221
175	132	5010/11	1277	H	5.5	1.5	2.0	240	15	33	4079	73.0	1.00	710	92.6	93.6	93.6	0.51	0.63	0.70	264
200	150	5010/11	1464	H	5.8	1.6	2.0	282	15	33	4366	73.0	1.00	708	92.8	93.9	93.9	0.51	0.63	0.70	299
250	185	5010/11	1824	H	5.8	1.6	2.0	327	15	33	4653	73.0	1.00	710	93.0	94.0	94.0	0.51	0.63	0.70	369
270	200	5810/11	1962	H	5.5	1.3	2.2	403	20	44	5072	73.0	1.00	713	93.0	94.0	94.2	0.48	0.60	0.67	416
300	220	5810/11	2189	H	5.6	1.6	1.9	463	20	44	5954	76.0	1.00	710	93.3	94.3	94.5	0.49	0.61	0.68	449
340	250	5810/11	2471	G	5.5	1.3	2.2	567	20	44	6615	76.0	1.00	713	93.6	94.6	94.8	0.49	0.61	0.68	509
350	260	5810/11	2543	H	5.5	1.3	2.2	567	20	44	6615	76.0	1.00	713	93.6	94.6	94.8	0.49	0.61	0.68	529
380	280	5810/11	2761	G	5.5	1.3	2.2	626	20	44	6725	76.0	1.00	713	93.6	94.6	94.8	0.49	0.61	0.68	570
400	300	5810/11	2907	H	5.5	1.3	2.2	626	20	44	6725	76.0	1.00	713	93.6	94.6	94.8	0.49	0.61	0.68	611
430	315	6809/10	3120	F	5.5	1.0	2.2	738	22	48	7894	75.0	1.00	714	95.1	95.8	95.8	0.60	0.72	0.78	553
450	330	6809/10	3265	F	5.5	1.0	2.2	738	22	48	7894	75.0	1.00	714	95.1	95.8	95.8	0.60	0.72	0.78	579
480	355	6809/10	3483	F	5.5	1.0	2.2	795	22	48	8136	75.0	1.00	714	95.3	96.0	96.0	0.60	0.72	0.78	622
500	370	6809/10	3628	F	5.5	1.0	2.2	795	22	48	8136	75.0	1.00	714	95.3	96.0	96.0	0.60	0.72	0.78	648
550	400	6809/10	3991	F	5.5	1.0	2.2	785	22	48	8666	75.0	1.00	714	95.5	96.2	96.2	0.60	0.72	0.78	699
600	440	6809/10	4354	F	5.5	1.0	2.2	959	22	48	8930	75.0	1.00	714	95.7	96.4	96.4	0.60	0.72	0.78	768
610	450	7009/10	4426	G	6.2	0.8	2.2	1470	25	55	10518	75.0	1.00	714	95.6	96.1	96.1	0.67	0.77	0.81	759
650	480	7009/10	4716	G	6.2	0.8	2.2	1470	25	55	10518	75.0	1.00	714	95.6	96.1	96.1	0.67	0.77	0.81	809
680	500	7009/10	4934	G	6.2	0.8	2.2	1570	25	55	10805	78.0	1.00	714	95.7	96.2	96.2	0.67	0.77	0.81	842
700	515	7009/10	5079	G	6.2	0.8	2.2	1570	25	55	10805	78.0	1.00	714	95.7	96.2	96.2	0.67	0.77	0.81	867
740	545	7009/10	5370	G	6.2	0.8	2.2	1660	25	55	11069	78.0	1.00	714	95.7	96.2	96.2	0.67	0.77	0.81	918
750	560	7009/10	5442	G	6.2	0.8	2.2	1660	25	55	11069	78.0	1.00	714	95.7	96.2	96.2	0.67	0.77	0.81	943
800	590	7009/10	5805	G	6.2	0.8	2.2	1780	25	55	11356	78.0	1.00	714	95.8	96.4	96.4	0.67	0.77	0.81	991
850	630	7009/10	6168	G	6.2	0.8	2.2	1900	25	55	11698	78.0	1.00	714	95.8	96.4	96.4	0.67	0.77	0.81	1060
Optionals																					
250	185	5810/11	1817	H	5.5	1.3	2.2	403	20	44	5072	73.0	1.00	713	93.0	94.0	94.2	0.48	0.60	0.67	385
400	300	6809/10	2902	F	5.5	1.0	2.2	629	22	48	7365	75.0	1.00	714	94.9	95.6	95.6	0.60	0.72	0.78	528
600	440	7009/10	4354	G	6.2	0.8	2.2	1470	25	55	10518	75.0	1.00	714	95.6	96.1	96.1	0.67	0.77	0.81	742
XII Poles																					
175	132	5810/11	1529	F	4.5	1.2	1.7	430	20	44	5248	68.0	1.00	593	93.8	94.3	94.3	0.50	0.61	0.67	274
200	150	5810/11	1747	F	4.5	1.2	1.7	451	20	44	5336	68.0	1.00	593	93.8	94.3	94.3	0.50	0.61	0.67	312
250	185	5810/11	2188	F	4.5	1.2	1.7	539	20	44	6218	70.0	1.00	592	93.9	94.3	94.3	0.50	0.62	0.68	379
300	220	5810/11	2625	F	4.5	1.2	1.7	610	20	44	8622	70.0	1.00	592	94.0	94.3	94.3	0.50	0.62	0.68	450
340	250	6809/10	2976	F	5.5	1.0	2.0	838	20	44	8015	70.0	1.00	592	94.0	94.9	95.0	0.57	0.69	0.76	454
350	260	6809/10	3063	G	5.5	1.0	2.0	838	20	44	8015	74.0	1.00	592	94.0	94.9	95.0	0.57	0.69	0.76	473
400	300	6809/10	3495	G	5.5	0.9	2.0	1000	20	44	9570	74.0	1.00	593	94.4	94.9	95.1	0.59	0.69	0.76	545
430	315	7009/10	3744	F	5.5	0.8	1.9	1400	40	88	10044	70.0	1.00	595	95.3	95.5	95.5	0.61	0.71	0.77	562
450	330	7009/10	3918	F	5.5	0.8	1.9	1400	40	88	10044	70.0	1.00	595	95.3	95.5	95.5	0.61	0.71	0.77	589
500	370	7009/10	4354	F	5.5	0.8	1.9	1400	40	88	10253	70.0	1.00	595	95.4	95.6	95.6	0.61	0.71	0.77	660
550	400	7009/10	4789	F	5.5	0.8	1.9	1500	40	88	10562	70.0	1.00	595	95.5	95.7	95.7	0.61	0.71	0.77	712
600	440	7009/10	5224	F	5.5	0.8	1.9	1600	40	88	11135	74.0	1.00	595	95.6	95.8	95.8	0.61	0.71	0.77	783
610	450	7009/10	5311	F	5.5	0.8	1.9	1600	40	88	11135	74.0	1.00	595	95.6	95.8	95.8	0.61	0.71	0.77	800
650	480	7009/10	5660	F	5.5	0.8	1.9	1710	40	88	11466	74.0	1.00	595	95.7	95.9	95.9	0.62	0.72	0.78	842
680	500	7009/10	5921	F	5.5	0.8	1.9	1810	40	88	11709	74.0	1.00	595	95.8	96.0	96.0	0.62	0.72	0.78	876
700	515	7009/10	6095	F	5.5	0.8	1.9	1810	40	88	11709	74.0	1.00	595	95.8	96.0	96.0	0.62	0.72	0.78	902
750	560	7009/10	6531	F	5.5	0.8	1.9	1910	40	88	12392	74.0	1.00	595	95.9	96.1	96.1	0.62	0.72	0.78	980
Optionals																					
300	220	6809/10	2625	F	5.0	1.0	2.0	800	20	44	7629	70.0	1.00	592	94.0	94.3	94.5	0.57	0.69	0.76	402
400	300	7009/10	3483	G	5.5	0.8	1.9	1400	40	88	10044	70.0	1.00	595	95.3	95.5	95.5	0.61	0.71	0.77	535

15.2 W51 HD Safe and Hazardous Area - High Voltage 1,2 kV to 5,0 kV

Output		Frame	Full Load Torque (ft.lb)	Locked Rotor Current I/In		Locked Rotor Torque Tl/Tn	Breakdown Torque Tb/Tn	Inertia J (sq.ft.lb)	Allowable locked rotor time (s)		Weight (lb)	Sound dB(A)	Service Factor	4160 V							
				Code	I/In				Hot	Cold				% of full load						Full load current In (A)	
														Efficiency			Power Factor				
HP	kW											Rated speed (rpm)	50	75	100	50	75	100			
II Poles																					
340	250	5010/11	492	H	7.5	1.0	2.2	54.6	17	37	4110	80.0	1.00	3577	94.6	95.3	95.3	0.81	0.86	0.88	41.4
350	260	5010/11	507	H	7.5	0.9	2.1	54.6	17	37	4110	80.0	1.00	3576	94.7	95.3	95.3	0.82	0.86	0.88	43.0
380	280	5010/11	550	H	7.5	1.1	2.2	64.1	17	37	4311	80.0	1.00	3577	94.9	95.5	95.3	0.81	0.86	0.88	46.3
400	300	5010/11	579	H	7.5	1.1	2.5	66.4	16	35	4384	84.0	1.00	3580	95.0	95.6	95.7	0.80	0.86	0.88	49.4
430	315	5010/11	622	H	7.5	1.1	2.2	66.4	16	35	4384	84.0	1.00	3580	95.3	95.8	95.7	0.81	0.86	0.88	51.9
450	330	5010/11	651	G	7.2	1.0	2.4	68.8	16	35	4478	84.0	1.00	3579	95.2	95.7	95.7	0.81	0.87	0.89	53.8
500	370	5010/11	724	H	7.5	1.0	2.3	73.6	16	35	4564	84.0	1.00	3578	95.2	95.6	95.5	0.83	0.87	0.89	60.4
550	400	5010/11	796	H	7.6	1.1	2.5	80.7	16	35	4714	84.0	1.00	3580	95.3	95.8	95.7	0.81	0.87	0.89	65.2
600	440	5010/11	870	H	7.5	1.1	2.2	114	20	44	4855	84.0	1.00	3575	95.3	95.7	95.6	0.82	0.87	0.88	72.6
610	450	5810/11	885	H	7.5	1.1	2.5	109	20	44	5702	85.0	1.00	3570	95.5	96.1	96.0	0.82	0.88	0.90	72.3
650	480	5810/11	943	H	7.5	1.1	2.5	126	20	44	6057	85.0	1.00	3570	95.5	96.1	96.0	0.82	0.88	0.90	77.1
700	515	5810/11	1015	H	7.5	1.1	2.5	135	21	46	6209	85.0	1.00	3573	95.7	96.1	96.0	0.85	0.90	0.91	81.8
750	560	5810/11	1088	H	7.5	0.9	2.5	123	20	44	5993	85.0	1.00	3572	95.5	96.1	96.0	0.82	0.88	0.90	90.0
800	590	5810/11	1158	H	7.5	0.9	2.5	173	23	51	6313	85.0	1.00	3579	95.4	95.9	96.0	0.87	0.91	0.91	93.7
850	630	6809/10	1229	H	7.5	0.8	2.5	206	20	44	8242	85.0	1.00	3582	95.9	96.3	96.2	0.85	0.89	0.89	102
900	660	6809/10	1302	H	7.5	0.8	2.5	206	20	44	8242	86.0	1.00	3582	95.9	96.3	96.2	0.86	0.89	0.89	107
950	700	6809/10	1374	H	7.5	0.8	2.5	221	20	44	8522	86.0	1.00	3582	95.9	96.3	96.3	0.87	0.89	0.89	113
970	710	6809/10	1403	H	7.5	0.8	2.5	221	20	44	8522	86.0	1.00	3582	95.9	96.3	96.3	0.87	0.89	0.89	115
1000	750	6809/10	1447	H	7.3	0.9	2.5	233	18	40	8741	86.0	1.00	3580	96.3	96.6	96.5	0.88	0.90	0.90	120
1100	800	6809/10	1591	H	7.4	0.9	2.5	304	17	37	8465	86.0	1.00	3583	95.0	95.6	95.6	0.83	0.88	0.89	130
1250	900	6809/10	1807	G	7.4	1.0	2.5	323	17	37	8948	86.0	1.00	3583	95.0	95.6	95.6	0.83	0.88	0.89	147
1350	1000	7009/10	1953	G	6.7	0.7	2.5	548	20	44	11093	88.0	1.00	3581	96.4	96.7	96.5	0.85	0.89	0.90	160
1500	1100	7009/10	2170	G	6.7	0.8	2.5	584	20	44	11433	88.0	1.00	3581	96.4	96.7	96.5	0.87	0.90	0.90	176
1600	1200	7009/10	2313	H	7.7	0.9	2.5	617	20	44	11750	88.0	1.00	3584	95.3	96.0	96.1	0.86	0.90	0.90	193
Optional																					
600	440	5810/11	870	H	7.5	1.2	2.5	109	21	46	5702	84.0	1.00	3575	95.5	96.1	96.1	0.82	0.88	0.90	70.6
800	590	6809/10	1156	H	7.6	0.8	2.5	206	23	51	8242	85.0	1.00	3584	95.9	96.3	96.2	0.85	0.89	0.91	93.5
1250	900	7009/10	1808	G	6.8	0.7	2.5	510	20	44	10756	88.0	1.00	3581	96.4	96.7	96.5	0.85	0.89	0.90	144
IV Poles																					
380	280	5010/11	1103	H	7.0	1.2	2.4	94.9	20	44	4214	78.0	1.00	1785	94.0	94.9	95.0	0.68	0.78	0.83	49.3
400	300	5010/11	1161	H	7.0	1.2	2.4	94.9	20	44	4214	78.0	1.00	1785	94.0	94.9	95.0	0.68	0.78	0.83	52.8
430	315	5010/11	1248	H	7.0	1.2	2.4	99.7	20	44	4306	82.0	1.00	1785	94.0	94.9	95.0	0.68	0.78	0.83	55.4
450	330	5010/11	1306	H	7.0	1.2	2.4	114	20	44	4496	82.0	1.00	1785	94.0	94.9	95.0	0.68	0.78	0.83	58.1
500	370	5010/11	1451	H	7.0	1.2	2.4	123	20	44	4653	82.0	1.00	1785	94.0	94.9	95.0	0.68	0.78	0.83	65.1
550	400	5010/11	1596	H	7.0	1.4	2.5	135	20	44	4809	82.0	1.00	1785	94.4	95.3	95.4	0.68	0.78	0.82	71.0
600	440	5010/11	1742	H	7.0	1.3	2.5	154	20	44	5096	82.0	1.00	1784	94.7	95.4	95.4	0.72	0.81	0.84	76.2
610	450	5010/11	1768	G	7.0	1.0	2.5	154	20	44	5321	82.0	1.00	1788	94.7	95.4	95.4	0.79	0.85	0.87	75.2
650	480	5010/11	1883	G	7.0	1.1	2.4	206	20	44	5321	82.0	1.00	1788	95.0	95.6	95.5	0.80	0.86	0.88	79.3
700	515	5810/11	2031	H	7.0	1.8	2.3	230	20	44	6251	83.0	1.00	1786	94.0	95.2	95.9	0.70	0.80	0.82	90.9
750	560	5810/11	2176	H	7.0	1.8	2.4	263	20	44	6659	83.0	1.00	1786	95.1	95.9	96.0	0.71	0.80	0.83	97.5
800	590	5810/11	2322	G	7.0	1.1	2.5	214	20	44	6454	83.0	1.00	1785	96.2	96.5	96.3	0.76	0.83	0.87	97.7
850	630	5810/11	2463	H	7.0	1.0	2.5	320	20	44	6703	83.0	1.00	1788	95.5	96.1	96.2	0.74	0.82	0.85	107
900	660	6809/10	2603	G	6.5	0.9	2.4	373	20	44	7940	83.0	1.00	1791	94.6	95.4	95.6	0.72	0.80	0.84	114
950	700	6809/10	2750	G	6.5	0.9	2.4	401	20	44	8218	85.0	1.00	1790	94.7	95.5	95.7	0.68	0.80	0.83	122
970	710	6809/10	2808	G	6.5	0.9	2.4	401	20	44	8218	85.0	1.00	1790	94.8	95.6	95.8	0.68	0.80	0.83	124
1000	750	6809/10	2893	G	6.5	0.9	2.4	430	20	44	8498	85.0	1.00	1791	94.9	95.7	95.9	0.68	0.80	0.83	131
1100	800	6809/10	3184	G	6.5	0.9	2.4	486	20	44	9054	85.0	1.00	1790	95.0	95.8	96.0	0.68	0.80	0.83	139
1250	900	6809/10	3616	G	6.5	1.0	2.5	510	20	44	9237	85.0	1.00	1791	95.1	95.9	96.1	0.73	0.81	0.84	155
1350	1000	6809/10	3905	H	7.5	1.3	2.5	615	20	44	9248	85.0	1.00	1791	95.5	96.3	96.5	0.71	0.80	0.84	171
1500	1100	7009/10	4337	H	7.0	0.8	2.5	570	20	44	11182	88.0	1.00	1792	96.1	96.2	96.4	0.73	0.81	0.84	189
1700	1250	7009/10	4915	G	7.0	0.8	2.5	605	20	44	11526	88.0	1.00	1792	96.1	96.3	96.4	0.73	0.82	0.85	212
1900	1400	7009/10	5493	G	7.0	0.8	2.5	660	20	44	12125	88.0	1.00	1792	96.2	96.5	96.6	0.74	0.82	0.85	237
Optional																					
650	480	5810/11	1886	H	7.0	1.8	2.2	214	20	44	6048	83.0	1.00	1786	94.0	95.2	95.9	0.70	0.80	0.82	84.7
850	630	6809/10	2460	G	6.5	0.9	2.4	342	20	44	7662	83.0	1.00	1790	94.3	95.3	95.6	0.73	0.81	0.84	109
1350	1000	7009/10	3903	H	7.5	0.8	2.5	534	20	44	10838	88.0	1.00	1792	96.0	96.5	96.4	0.72	0.81	0.84	171

15.2 W51 HD Safe and Hazardous Area - High Voltage 1,2 kV to 5,0 kV

Output		Frame	Full Load Torque (ft.lb)	Locked Rotor Current		Locked Rotor Torque Tl/Tn	Breakdown Torque Tb/Tn	Inertia J (sq.ft.lb)	Allowable locked rotor time (s)		Weight (lb)	Sound dB(A)	Service Factor	4160 V							
				Code	II/In				Hot	Cold				% of full load						Full load current In (A)	
														Efficiency			Power Factor				
														50	75	100	50	75	100		
VI Poles																					
340	250	5010/11	1487	G	6.0	1.4	2.2	131	16	35	4691	76.0	1.00	1185	94.5	95.0	94.8	0.63	0.73	0.78	46.9
350	260	5010/11	1530	G	6.0	1.5	2.2	142	16	35	4851	76.0	1.00	1185	94.6	95.1	94.9	0.64	0.74	0.79	48.4
380	280	5010/11	1663	G	6.0	1.4	2.1	142	16	35	4851	76.0	1.00	1184	94.7	95.1	94.9	0.65	0.75	0.79	51.8
400	300	5010/11	1747	G	6.0	1.6	2.4	153	16	35	5002	76.0	1.00	1186	94.6	95.2	95.0	0.62	0.73	0.78	56.3
430	315	5010/11	1880	G	6.0	1.5	2.2	153	15	33	5002	76.0	1.00	1185	94.7	95.2	95.0	0.64	0.74	0.78	58.7
450	330	5010/11	1961	H	7.0	1.3	2.3	203	15	33	5252	76.0	1.00	1189	95.1	95.6	95.4	0.68	0.78	0.81	59.0
480	355	5810/11	2093	G	6.0	1.2	2.2	290	18	40	6006	78.0	1.00	1188	94.6	95.1	95.1	0.66	0.75	0.79	65.6
500	370	5810/11	2181	G	6.0	1.2	2.2	290	18	40	6006	78.0	1.00	1188	94.7	95.2	95.2	0.66	0.75	0.79	68.3
550	400	5810/11	2399	G	6.0	1.2	2.2	313	18	40	6207	78.0	1.00	1188	94.7	95.2	95.2	0.66	0.75	0.79	73.8
600	440	5810/11	2617	G	6.0	1.2	2.2	336	18	40	6407	78.0	1.00	1188	94.8	95.3	95.3	0.66	0.75	0.79	81.1
610	450	5810/11	2660	G	6.0	1.2	2.2	336	18	40	6407	78.0	1.00	1188	94.8	95.3	95.3	0.66	0.75	0.79	83.0
650	480	5810/11	2830	G	6.0	1.3	2.2	358	18	40	6608	78.0	1.00	1190	94.9	95.5	95.4	0.66	0.75	0.79	88.0
700	515	5810/11	3045	E	5.4	0.9	2.0	447	20	44	6821	78.0	1.00	1191	95.5	95.8	95.6	0.75	0.82	0.84	89.3
750	560	6809/10	3260	H	7.0	1.1	2.5	595	20	44	8581	78.0	1.00	1192	95.4	95.7	95.7	0.67	0.77	0.81	100
800	590	6809/10	3477	H	7.0	1.1	2.5	595	20	44	8581	78.0	1.00	1192	95.5	95.8	95.8	0.67	0.77	0.81	106
850	630	6809/10	3688	H	7.0	1.1	2.5	633	20	44	8847	78.0	1.00	1194	95.6	95.9	95.9	0.68	0.78	0.82	111
900	660	6809/10	3905	H	7.0	1.1	2.5	669	20	44	9123	78.0	1.00	1194	95.6	95.9	95.8	0.67	0.78	0.82	117
950	700	6809/10	4136	H	7.0	1.2	2.5	778	25	55	9162	78.0	1.00	1190	95.0	95.3	95.5	0.75	0.83	0.85	120
970	710	6809/10	4223	H	7.0	1.2	2.5	778	25	55	9162	78.0	1.00	1190	95.3	95.4	95.4	0.75	0.83	0.85	122
1000	750	6809/10	4346	H	7.0	1.2	2.5	824	25	55	9446	78.0	1.00	1192	95.4	95.5	95.5	0.76	0.84	0.86	126
1100	800	7009/10	4773	H	7.5	0.9	2.5	863	20	44	12097	80.0	1.00	1194	95.9	96.4	96.3	0.72	0.81	0.85	136
1250	900	7009/10	5424	H	7.5	1.0	2.5	1040	25	55	11998	80.0	1.00	1194	95.4	96.1	96.2	0.71	0.80	0.84	154
1350	1000	7009/10	5853	H	7.5	1.0	2.5	1040	25	55	12001	80.0	1.00	1195	95.3	96.0	96.1	0.69	0.79	0.83	174
1500	1100	7009/10	6509	H	7.5	1.0	2.5	1040	25	55	11978	80.0	1.00	1194	95.4	96.1	96.1	0.69	0.79	0.83	191
Optionals																					
450	330	5810/11	1962	G	6.0	1.2	2.2	268	18	40	5806	78.0	1.00	1188	94.6	95.1	95.1	0.66	0.75	0.79	61.0
700	515	6809/10	3042	H	7.0	1.1	2.5	557	20	44	8315	78.0	1.00	1192	95.3	95.6	95.6	0.67	0.77	0.81	92.3
1000	750	7009/10	4335	H	7.5	0.9	2.5	738	20	44	11456	80.0	1.00	1195	95.6	96.2	96.3	0.68	0.78	0.83	130
VIII Poles																					
200	150	5010/11	1166	H	5.9	1.2	2.5	199	12	26	3815	73.0	1.00	889	92.4	93.0	93.0	0.56	0.68	0.75	29.8
250	185	5010/11	1457	H	6.1	1.3	2.5	240	12	26	4079	73.0	1.00	889	92.5	93.0	93.0	0.58	0.69	0.76	36.3
300	220	5010/11	1748	G	6.1	1.3	2.5	301	12	26	4498	73.0	1.00	889	92.9	93.4	93.4	0.57	0.68	0.76	43.0
350	260	5010/11	2040	H	6.1	1.3	2.5	301	12	26	4498	73.0	1.00	889	92.9	93.4	93.4	0.57	0.68	0.76	50.8
400	300	5810/11	2326	G	6.0	1.3	2.2	411	22	48	6218	76.0	1.00	891	94.1	94.5	95.0	0.63	0.74	0.79	55.5
450	330	5810/11	2620	G	6.0	1.8	2.2	465	22	48	6725	76.0	1.00	890	94.5	94.5	95.0	0.64	0.75	0.79	61.0
500	370	5810/11	2911	G	6.0	1.8	2.2	465	22	48	6725	76.0	1.00	890	94.5	94.5	95.0	0.64	0.75	0.79	68.4
550	400	6809/10	3198	F	6.0	1.0	2.3	777	22	48	9151	78.0	1.00	891	95.1	95.3	95.3	0.70	0.79	0.82	71.0
600	440	6809/10	3489	G	6.0	1.0	2.3	777	22	48	9151	78.0	1.00	891	95.2	95.4	95.4	0.70	0.79	0.82	78.1
650	480	6809/10	3780	G	6.0	1.1	2.4	833	22	48	9349	78.0	1.00	891	95.3	95.5	95.5	0.69	0.78	0.81	86.1
700	515	6809/10	4066	G	6.2	1.0	2.5	941	22	48	9790	78.0	1.00	892	95.4	95.6	95.6	0.68	0.78	0.81	92.3
750	560	6809/10	4356	G	6.2	1.0	2.5	1000	22	48	10011	78.0	1.00	892	95.4	95.6	95.6	0.68	0.78	0.81	100
800	590	6809/10	4647	G	6.2	1.0	2.5	1050	22	48	10474	78.0	1.00	892	95.4	95.6	95.6	0.68	0.78	0.81	106
850	630	6809/10	4926	G	6.2	1.0	2.5	1100	22	48	10694	78.0	1.00	894	95.5	95.7	95.7	0.68	0.78	0.81	113
900	660	6809/10	5216	G	6.2	1.0	2.5	1100	22	48	10694	78.0	1.00	894	95.4	95.8	95.8	0.67	0.77	0.81	118
950	700	7009/10	5499	F	5.8	0.8	2.2	1300	30	66	12288	78.0	1.00	895	95.7	96.0	96.0	0.69	0.79	0.82	123
1000	750	7009/10	5795	F	5.8	0.8	2.2	1370	30	66	12619	78.0	1.00	894	95.8	96.1	96.1	0.69	0.79	0.82	132
1100	800	7009/10	6375	F	5.8	0.8	2.2	1540	30	66	13230	78.0	1.00	894	95.9	96.2	96.2	0.70	0.79	0.82	141
1250	900	7009/10	7244	F	6.0	0.8	2.2	1550	30	66	13451	78.0	1.00	894	96.0	96.3	96.3	0.70	0.79	0.82	158
Optionals																					
350	260	5810/11	2035	G	6.0	1.3	2.2	335	22	48	5733	76.0	1.00	891	94.2	94.7	94.7	0.60	0.71	0.77	49.5
500	370	6809/10	2907	G	6.0	1.0	2.3	722	22	48	8930	78.0	1.00	891	95.0	95.2	95.2	0.70	0.79	0.82	65.8
900	660	7009/10	5210	F	5.8	0.8	2.2	1300	30	66	12288	78.0	1.00	895	95.6	95.9	95.9	0.69	0.79	0.82	116
X Poles																					
200	150	5810/11	1459	H	5.5	1.9	2.2	439	11	24	5590	76.0	1.00	710	91.6	92.8	93.0	0.43	0.55	0.63	35.5
250	185	5810/11	1824	H	5.5	1.7	2.2	494	11	24	5887	76.0	1.00	710	91.8	93.0	93.2	0.44	0.56	0.64	43.0
300	220	5810/11	2189	H	5.5	1.7	2.2	546	11	24	6560	76.0	1.00	710	92.1	93.3	93.5	0.44	0.56	0.64	51.0
350	260	5810/11	2554	H	5.5	1.7	2.2	546	11	24	6560	76.0	1.00	710	92.1	93.3	93.5	0.44	0.56	0.64	60.3
400	300	6809/10	2907	G	5.5	0.9	2.0	546	28	62	6758	78.0	1.00	713	94.1	94.8	94.8	0.58	0.69	0.74	59.4
450	330	6809/10	3270	G	5.5	0.9	2.0	612	28	62	7089	78.0	1.00	713	94.3	95.0	95.0	0.59	0.70	0.75	64.3
500	370	6809/10	3633	G	5.5	0.9	2.0	691	28	62	7464	78.0	1.00	713	94.5	95.2	95.2	0.59	0.70	0.75	71.9
550	400	6809/10	3996	F	5.5	0.9	2.0	778	28	62	7894	78.0	1.00	713	94.7	95.4	95.4	0.60	0.71	0.76	76.6
600	400	6809/10	4360	F	5.5	0.9	2.0	778	28	62	7894	78.0	1.00	713	94.7	95.4	95.4	0.60	0.71	0.76	76.6
650	480	7009/10	4723	F	5.5	0.9	2.0	1020	31	68	10650	78.0	1.00	713	95.2	95.5	95.5	0.66	0.76	0.80	87.2
700	515	7009/10	5086	F	5.5	0.9	2.0	1070	31	68	10882	78.0	1.00	713	95.3	95.6	95.6	0.66	0.76	0.80	93.5
750	560	7009/10	5450	F	5.5	0.9	2.0	1210	31	68	11477	78.0	1.00	713	95.5	95.8	95.8	0.66	0.76	0.80	101
800	590	7009/10	5813	F	5.5	0.9	2.0														

15.3 W51 HD Safe and Hazardous Area - High Voltage 5,1 kV to 6,6 kV

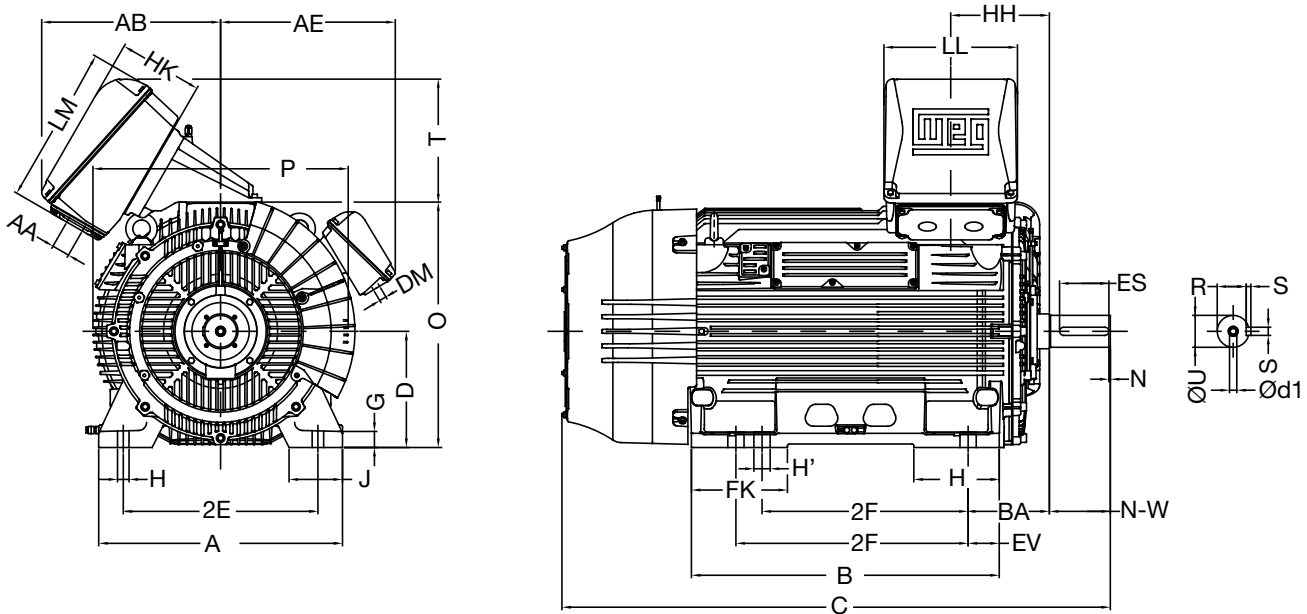
Output		Frame	Full Load Torque (ft.lb)	Locked Rotor Current I _L /I _n		Locked Rotor Torque T _L /T _n	Breakdown Torque T _b /T _n	Inertia J (sq.ft.lb)	Allowable locked rotor time (s)		Weight (lb)	Sound dB(A)	Service Factor	Rated speed (rpm)	6600 V						Full load current I _n (A)
				Code	I _L /I _n				Hot	Cold					% of full load						
															Efficiency			Power Factor			
II Poles																					
340	250	5010/11	492	G	6.8	1.0	2.2	54.6	21	46	4095	80.0	1.00	3578	94.0	94.8	94.8	0.79	0.85	0.87	26.5
350	260	5010/11	507	G	6.8	0.9	2.1	54.6	21	46	4095	80.0	1.00	3578	94.2	94.8	94.8	0.80	0.85	0.88	27.3
380	280	5010/11	550	G	7.0	1.0	2.2	61.7	20	44	4271	80.0	1.00	3579	94.5	95.1	95.1	0.81	0.86	0.88	29.3
400	300	5010/11	580	G	6.5	0.9	2.0	66.4	22	48	4359	84.0	1.00	3576	94.8	95.3	95.1	0.84	0.88	0.89	31.0
430	315	5010/11	623	G	6.5	0.8	1.9	66.4	22	48	4359	84.0	1.00	3575	94.9	95.3	95.1	0.85	0.88	0.89	32.6
450	330	5010/11	651	G	7.0	1.0	2.2	68.8	18	40	4447	84.0	1.00	3579	94.9	95.5	95.4	0.82	0.87	0.89	34.0
500	370	5010/11	724	G	6.8	0.9	2.1	73.6	17	37	4527	84.0	1.00	3578	95.2	95.6	95.4	0.83	0.87	0.89	38.1
550	400	5010/11	796	G	7.0	1.0	2.2	80.7	17	37	4690	84.0	1.00	3578	95.3	95.8	95.7	0.83	0.88	0.89	41.1
600	440	5010/11	870	G	7.2	1.4	2.3	116	18	40	4829	84.0	1.00	3573	95.2	95.7	95.5	0.85	0.89	0.90	44.8
610	450	5810/11	885	G	7.0	1.0	2.4	123	18	40	5768	84.0	1.00	3573	95.1	95.7	95.7	0.85	0.89	0.90	45.7
650	480	5810/11	943	G	6.8	0.9	2.3	135	18	40	5949	85.0	1.00	3571	95.3	95.8	95.7	0.87	0.90	0.91	48.2
700	515	5810/11	1016	F	6.5	0.9	2.2	145	19	42	6154	85.0	1.00	3570	95.5	96.0	95.8	0.88	0.91	0.91	51.7
750	560	5810/11	1088	G	7.0	1.0	2.5	145	16	35	6145	85.0	1.00	3573	95.5	96.0	96.0	0.86	0.90	0.91	56.1
800	590	5810/11	1159	G	6.8	0.7	2.2	173	21	46	6267	85.0	1.00	3576	95.7	96.2	96.1	0.88	0.90	0.90	59.7
850	630	6809/10	1229	G	7.0	0.8	2.5	192	18	40	7945	85.0	1.00	3583	95.4	96.2	96.3	0.85	0.89	0.91	62.9
900	660	6809/10	1302	G	6.8	0.7	2.5	206	20	44	8198	86.0	1.00	3581	95.7	96.3	96.4	0.87	0.90	0.91	65.8
950	700	6809/10	1374	G	7.0	0.7	2.5	221	18	40	8416	86.0	1.00	3583	95.7	96.4	96.5	0.86	0.90	0.91	69.7
970	710	6809/10	1403	G	7.0	0.7	2.5	221	18	40	8416	86.0	1.00	3582	95.8	96.4	96.5	0.87	0.90	0.91	70.7
1000	750	6809/10	1446	G	7.0	0.7	2.5	233	18	40	8668	86.0	1.00	3583	95.7	96.4	96.5	0.87	0.90	0.91	74.7
1100	800	6809/10	1591	G	7.0	0.9	2.4	304	16	35	8668	86.0	1.00	3582	95.3	95.9	95.9	0.83	0.88	0.89	82.0
1250	900	6809/10	1807	H	7.5	1.0	2.5	323	15	33	8932	86.0	1.00	3583	95.5	96.0	96.0	0.82	0.87	0.89	92.1
1350	1000	7009/10	1952	H	7.5	0.8	2.5	551	19	42	11018	88.0	1.00	3584	95.9	96.3	96.2	0.86	0.89	0.90	101
1500	1100	7009/10	2169	G	7.0	0.8	2.5	584	19	42	11345	88.0	1.00	3583	96.1	96.4	96.3	0.87	0.90	0.90	111
1600	1200	7009/10	2314	H	7.5	0.8	2.5	617	18	40	11653	88.0	1.00	3583	95.3	95.9	96.0	0.87	0.90	0.90	121
Optionals																					
600	440	5810/11	870	G	7.0	1.0	2.5	123	18	40	5768	84.0	1.00	3573	95.0	95.6	95.7	0.85	0.89	0.90	44.7
800	590	6809/10	1157	G	6.8	0.7	2.5	192	20	44	7953	85.0	1.00	3582	95.3	96.1	96.2	0.86	0.89	0.91	59.0
1250	900	7009/10	1807	G	7.5	0.8	2.5	520	21	46	10659	88.0	1.00	3584	95.6	96.1	96.1	0.86	0.89	0.90	91.0
IV Poles																					
340	250	5010/11	986	G	6.2	1.1	2.4	85.4	28	62	4070	78.0	1.00	1787	93.6	94.4	94.5	0.68	0.78	0.83	27.9
350	260	5010/11	1015	G	6.0	1.0	2.3	85.4	28	62	4070	78.0	1.00	1786	93.7	94.5	94.5	0.69	0.79	0.83	29.0
380	280	5010/11	1102	G	6.2	1.1	2.4	97.3	27	59	4247	78.0	1.00	1787	93.9	94.8	94.8	0.69	0.79	0.83	31.1
400	300	5010/11	1160	G	6.2	1.1	2.4	97.3	26	57	4238	82.0	1.00	1787	94.1	94.9	94.9	0.69	0.79	0.83	33.3
430	315	5010/11	1247	G	6.2	1.1	2.4	102	27	59	4315	82.0	1.00	1787	94.2	94.9	94.9	0.70	0.79	0.83	35.0
450	330	5010/11	1305	G	6.4	1.2	2.5	114	26	57	4503	82.0	1.00	1787	94.4	95.1	95.2	0.70	0.80	0.83	36.5
480	355	5010/11	1392	F	6.0	1.1	2.3	114	26	57	4503	82.0	1.00	1786	94.6	95.3	95.2	0.72	0.81	0.84	38.8
500	370	5010/11	1451	F	5.8	1.0	2.2	123	28	62	4637	82.0	1.00	1785	94.7	95.3	95.2	0.74	0.82	0.84	40.5
550	400	5010/11	1595	G	6.4	1.2	2.4	135	25	55	4794	82.0	1.00	1787	94.7	95.4	95.5	0.72	0.81	0.84	43.6
600	440	5010/11	1738	G	6.4	0.9	2.3	180	20	44	4957	82.0	1.00	1789	95.2	95.7	95.6	0.79	0.85	0.85	47.4
610	450	5810/11	1767	H	6.8	1.7	2.5	199	19	42	5841	82.0	1.00	1789	94.8	95.6	95.8	0.68	0.78	0.83	49.5
650	480	5810/11	1883	G	6.6	1.7	2.4	216	20	44	6037	83.0	1.00	1788	95.1	95.8	95.9	0.70	0.79	0.83	52.8
680	500	5810/11	1970	G	6.6	1.7	2.4	230	20	44	6251	83.0	1.00	1788	95.2	96.0	96.1	0.71	0.80	0.83	54.8
700	515	5810/11	2028	G	6.4	1.6	2.3	230	20	44	6251	83.0	1.00	1788	95.3	96.0	96.1	0.72	0.80	0.83	56.5
750	560	5810/11	2173	G	6.6	1.7	2.3	263	21	46	6608	83.0	1.00	1788	95.1	95.9	96.0	0.72	0.80	0.84	60.7
800	590	5810/11	2317	H	7.0	1.0	2.5	320	27	59	6608	83.0	1.00	1789	95.4	96.1	96.2	0.71	0.80	0.84	63.9
850	630	6809/10	2456	H	7.2	1.2	2.5	370	19	42	7905	83.0	1.00	1793	95.3	96.2	96.5	0.64	0.75	0.82	69.6
900	660	6809/10	2601	H	7.2	1.2	2.5	399	19	42	8156	85.0	1.00	1793	95.4	96.3	96.5	0.64	0.75	0.82	73.0
950	700	6809/10	2747	G	6.6	1.1	2.5	425	22	48	8412	85.0	1.00	1792	95.7	96.5	96.6	0.69	0.78	0.83	76.4
970	710	6809/10	2804	G	6.6	1.0	2.5	425	22	48	8412	85.0	1.00	1792	95.8	96.5	96.6	0.69	0.79	0.83	77.5
1000	750	6809/10	2891	H	6.8	1.1	2.5	453	22	48	8652	85.0	1.00	1792	95.8	96.5	96.7	0.69	0.78	0.82	82.7
1100	800	6809/10	3180	G	6.8	1.1	2.5	482	21	46	8930	85.0	1.00	1792	95.4	96.0	96.0	0.68	0.78	0.82	88.9
1250	900	6809/10	3616	H	7.5	1.2	2.5	648	17	37	9451	85.0	1.00	1791	95.5	96.1	96.1	0.71	0.80	0.84	97.5
1350	1000	7009/10	3901	G	6.8	0.8	2.5	626	15	33	11616	88.0	1.00	1793	96.0	96.5	96.4	0.73	0.82	0.85	107
1500	1100	7009/10	4334	G	6.7	0.8	2.5	626	14	31	11671	88.0	1.00	1793	96.2	96.6	96.5	0.74	0.82	0.85	117
1700	1250	7009/10	4915	G	6.6	0.8	2.5	660	13	29	12066	88.0	1.00	1792	95.7	96.3	96.3	0.75	0.82	0.85	134
Optionals																					
600	440	5810/11	1738	H	7.0	1.8	2.5	199	19	42	5841	82.0	1.00	1789	94.8	95.6	95.8	0.67	0.77	0.83	48.4
800	590	6809/10	2313	G	6.8	1.1	2.5	370	22	48	7905	83.0	1.00	1792	95.3	96.2	96.4	0.67	0.77	0.83	64.5
1250	900	7009/10	3614	G	6.5	0.8	2.5	593	17	37	11287	88.0	1.00	1792	95.9	96.4	96.3	0.74	0.82	0.85	96.2

15.3 W51 HD Safe and Hazardous Area - High Voltage 5,1 kV to 6,6 kV

Output		Frame	Full Load Torque (ft.lb)	Locked Rotor Current		Locked Rotor Torque Ti/Tn	Breakdown Torque Tb/Tn	Inertia J (sq.ft.lb)	Allowable locked rotor time (s)		Weight (lb)	Sound dB(A)	Service Factor	6600 V							
				Code	I/In				Rated speed (rpm)	% of full load				Full load current In (A)							
										Efficiency					Power Factor						
HP	kW							Hot	Cold					50	75	100	50	75	100		
VI Poles																					
350	260	5010/11	1528	H	6.4	1.8	2.5	142	25	55	4805	76.0	1.00	1187	93.7	94.4	94.4	0.59	0.71	0.78	30.9
380	280	5010/11	1660	G	6.0	1.7	2.3	142	25	55	4805	76.0	1.00	1186	93.9	94.5	94.4	0.61	0.72	0.78	33.3
400	300	5010/11	1749	G	5.8	1.6	2.2	152	25	55	4946	76.0	1.00	1185	94.1	94.5	94.3	0.63	0.74	0.79	35.2
430	315	5010/11	1874	H	6.8	1.4	2.2	190	25	55	5047	76.0	1.00	1189	94.6	95.0	94.7	0.69	0.78	0.80	36.4
450	330	5810/11	1956	H	6.8	1.7	2.5	292	25	55	6037	76.0	1.00	1192	93.8	94.5	94.5	0.60	0.71	0.78	39.2
480	355	5810/11	2090	G	6.0	1.5	2.2	313	25	55	6227	78.0	1.00	1190	94.3	94.8	94.6	0.65	0.75	0.79	41.6
500	370	5810/11	2171	J	7.5	2.0	2.5	337	25	55	6364	78.0	1.00	1193	93.4	94.3	94.4	0.56	0.69	0.78	44.0
550	400	5810/11	2391	H	7.2	1.8	2.5	337	25	55	6397	78.0	1.00	1192	93.8	94.6	94.6	0.59	0.70	0.78	47.4
600	440	5810/11	2608	J	7.5	2.0	2.5	358	25	55	6591	78.0	1.00	1192	93.7	94.6	94.7	0.56	0.69	0.78	52.1
610	450	5810/11	2651	J	7.4	1.9	2.5	358	25	55	6591	78.0	1.00	1192	93.8	94.6	94.7	0.57	0.69	0.78	53.3
650	480	5810/11	2820	J	7.5	1.3	2.5	446	25	55	6763	78.0	1.00	1194	94.2	94.9	95.0	0.63	0.75	0.80	55.2
680	500	6809/10	2951	H	7.2	1.2	2.5	560	25	55	8344	78.0	1.00	1194	95.0	95.6	95.6	0.65	0.76	0.81	56.5
700	515	6809/10	3037	H	7.0	1.1	2.5	560	25	55	8344	78.0	1.00	1194	95.1	95.7	95.7	0.66	0.76	0.81	58.1
750	560	6809/10	3254	G	6.6	1.0	2.5	596	25	55	8577	78.0	1.00	1194	95.4	95.8	95.7	0.69	0.78	0.82	62.4
800	590	6809/10	3468	J	7.5	1.3	2.5	596	25	55	8542	78.0	1.00	1195	94.9	95.6	95.7	0.61	0.73	0.80	67.4
850	630	6809/10	3688	H	7.0	1.1	2.5	634	25	55	8822	78.0	1.00	1194	95.1	95.7	95.7	0.66	0.76	0.81	71.1
900	660	6809/10	3905	H	7.5	1.3	2.5	823	25	55	9407	78.0	1.00	1194	95.1	95.7	95.7	0.72	0.81	0.85	71.0
950	700	6809/10	4126	H	7.5	1.2	2.5	823	25	55	9407	78.0	1.00	1193	95.1	95.6	95.6	0.73	0.82	0.85	75.4
970	710	7009/10	4209	G	6.8	0.9	2.5	826	25	55	10630	80.0	1.00	1194	95.4	95.9	95.9	0.71	0.80	0.84	77.1
1000	750	7009/10	4339	H	6.8	0.8	2.5	933	25	55	11246	80.0	1.00	1194	95.5	96.0	96.0	0.72	0.81	0.84	81.4
1100	800	7009/10	4769	H	7.2	0.9	2.5	933	25	55	11246	80.0	1.00	1195	95.4	96.0	96.0	0.70	0.79	0.84	86.8
1250	900	7009/10	5424	G	7.0	0.9	2.5	1040	25	55	11872	80.0	1.00	1194	95.7	96.2	96.1	0.72	0.81	0.84	97.5
1350	1000	7009/10	5858	F	6.0	0.7	2.3	1040	25	55	11949	80.0	1.00	1194	95.6	96.1	96.1	0.75	0.83	0.85	107
Optionals																					
430	315	5810/11	1869	J	7.2	1.8	2.5	292	25	55	6037	76.0	1.00	1192	93.6	94.4	94.5	0.59	0.70	0.78	37.4
650	480	6809/10	2820	H	7.0	1.1	2.5	522	25	55	8070	78.0	1.00	1194	95.0	95.6	95.6	0.66	0.76	0.81	54.2
950	700	7009/10	4119	G	6.8	0.9	2.5	826	25	55	10630	80.0	1.00	1195	95.3	95.9	95.9	0.70	0.80	0.84	76.0
VIII Poles																					
200	150	5810/11	1163	G	5.6	1.2	2.2	242	20	44	4631	73.0	1.00	891	92.9	93.4	93.5	0.62	0.73	0.78	18.0
250	185	5810/11	1454	G	5.6	1.2	2.2	292	20	44	5601	73.0	1.00	891	93.3	93.9	94.0	0.62	0.73	0.78	22.1
300	220	5810/11	1744	G	5.7	1.2	2.2	361	20	44	6042	76.0	1.00	891	93.5	94.1	94.2	0.62	0.73	0.78	26.2
350	260	5810/11	2035	G	5.6	1.2	2.2	389	20	44	6218	76.0	1.00	891	94.0	94.3	94.4	0.62	0.73	0.78	30.9
400	300	5810/11	2326	G	5.6	1.2	2.2	415	20	44	6395	76.0	1.00	891	94.1	94.4	94.5	0.60	0.71	0.76	36.5
450	330	5810/11	2617	G	5.6	1.2	2.2	415	20	44	6395	76.0	1.00	891	94.1	94.4	94.5	0.60	0.71	0.76	40.2
500	370	6809/10	2911	F	5.7	1.1	2.3	831	19	42	8159	72.0	1.00	890	94.5	95.0	95.0	0.70	0.79	0.82	41.5
550	400	6809/10	3202	G	6.2	1.0	2.3	885	19	42	9548	78.0	1.00	890	94.6	95.1	95.1	0.66	0.76	0.80	46.0
600	440	6809/10	3493	G	6.3	1.0	2.3	942	19	42	9790	78.0	1.00	890	94.7	95.2	95.2	0.66	0.76	0.80	50.5
650	480	6809/10	3784	G	6.3	1.0	2.3	994	19	42	10011	78.0	1.00	890	94.8	95.3	95.3	0.66	0.76	0.80	55.1
700	515	6809/10	4066	G	6.3	1.0	2.3	1050	19	42	10231	78.0	1.00	892	94.9	95.4	95.4	0.66	0.76	0.80	59.0
750	560	6809/10	4356	G	6.3	1.0	2.3	1130	19	42	10562	78.0	1.00	892	95.0	95.5	95.5	0.67	0.77	0.81	63.3
800	590	6809/10	4647	G	6.3	1.0	2.3	1130	19	42	10562	78.0	1.00	892	95.1	95.6	95.6	0.67	0.77	0.81	66.7
850	630	7009/10	4920	F	5.5	0.8	2.2	1300	27	59	12293	78.0	1.00	895	95.0	95.8	95.9	0.67	0.77	0.81	70.9
900	660	7009/10	5210	F	5.5	0.8	2.2	1380	27	59	12619	78.0	1.00	895	95.1	95.9	96.0	0.68	0.78	0.82	73.3
950	700	7009/10	5499	F	5.5	0.8	2.2	1450	27	59	12950	78.0	1.00	895	95.2	96.0	96.1	0.68	0.78	0.82	77.7
1000	750	7009/10	5789	F	5.5	0.8	2.2	1550	27	59	13417	78.0	1.00	895	95.2	96.0	96.1	0.68	0.78	0.82	83.3
1100	800	7009/10	6368	F	5.9	0.9	2.4	1550	23	51	13417	78.0	1.00	895	95.3	96.1	96.2	0.68	0.78	0.82	88.7
Optionals																					
450	330	6809/10	2622	F	5.7	1.1	2.3	776	19	42	7938	72.0	1.00	889	94.3	94.8	94.8	0.70	0.79	0.82	37.1
800	590	7009/10	4631	F	5.5	0.8	2.2	1230	27	59	11962	78.0	1.00	895	95.0	95.7	95.8	0.67	0.77	0.81	66.5

16. Mechanical Data

16.1 Frames 5010/11 to 7009/10



Frame	N° poles	2E	J	A	P	AB	AE	2F	B	FK	EV	C	Shaft End					
													U	N-W	ES	N	S	R
5010/11	2	20	5.174	25.591	28.647	24.382	22.309	36.000	46.172	15.33	3.499	71.380	2.375	4.750	4.330	0.197	0.625	2.021
	4 to 12												3.625	10.625	9.055		0.875	3.134
5810/11	2	23	6.174	30.096	31.404	24.44	23.382	40.000	48.853	16.778	3.874	76.864	2.375	4.750	4.330		0.625	2.021
	4 to 12		6.178										3.875	11.625	9.842		1.000	3.309
6809/10	2	27	6.904	33.071	34.949	24.382	25.139	45.000	54.573	17.205	5.062	83.841	3.250	5.750	4.33	0.750	2.831	
	4 to 12												4.375	11.625	9.843	1.000	3.817	
7009/10	2	30	8.983	37.008	38.099	24.406	25.962	50.000	62.123	21.306	5.077	93.400	3.375	6.750	5.512	0.875	2.880	
	4 to 12												5.125	11.625	9.842	1.250	4.423	

Frame	N° poles	D	G	O	T	HH	HK	H	H Hole	H'	BA	LL	LM	d1	AA	DM	Bearings		
																	DE	NDE	
5010/11	2	12.5	2.105	26.87	16.658	14.311	11.410	12.102	1.102	1.496	8.500	18.110	21.417	UNC3/4"-10	2xNPT 3"	3xNPT 3/4"	6314 C3	6314 C3	
	4 to 12							12.502		1.890				10.000			21.318	UNC3/4"-10	6320 C3
5810/11	2	14.5	2.608	30.642	16.658	13.346		12.502	1.417	2.205	11.500		21.417	UNC7/8"-9	2xNPT 4"		3xNPT 3/4"	6314 C3	6314 C3
	4 to 12				16.724			17.343						21.418				UNC7/8"-9	6322 C3
6809/10	2	17	2.066	34.717	16.65	13.902	17.343	1.417	2.205	11.500	21.417	UNC3/4"-10	2xNPT 4"	3xNPT 3/4"	6220 C3	6220 C3			
	4 to 12						18.786					UNC1"-8			6324 C3	6319 C3			
7009/10	2	17.5	1.868	37.579	16.758	13.622	18.786	1.417	2.205	11.500	21.417	UNC7/8"-9	2xNPT 4" / NPT 3"		3xNPT 3/4"	6220 C3	6220 C3		
	4 to 12						UNC1.1/4"-7					6328 M-C3				6322 C3			

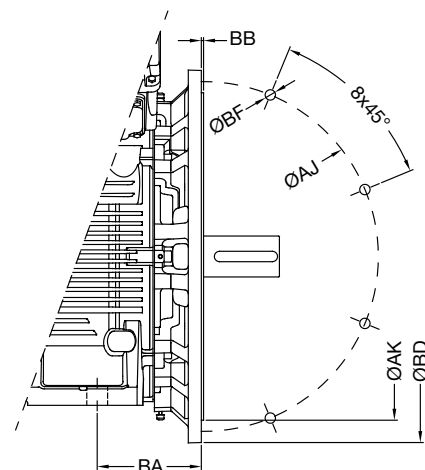
1) For motors with voltage 1.2 kV and above the dimension AB will be 34.987", dimension LM will be 32.874" and dimension S1 will be NPT 3".

2) Dimensions in inches.

16.2 "D" Flange

Dimensions in inches.

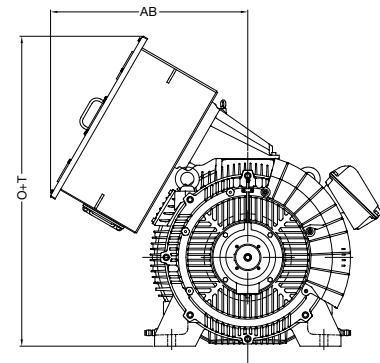
Frame	Flange	BA	AJ	AK	BD	BF	BB	N° holes
5010/11	D-558	8.500	22.000	18.000	23.976	0.826	0.250	8
5810/11	D-762	10.000	30.000	28.000	32.008			
6809/10	D-895	11.500	35.252	33.250	37.244	1.000		
7009/10	FF-1080		42.520	39.370	45.276	1.102	0.236	



16.3 External Motor Dimensions with Steel Plate Terminal Box

Dimensions in inches.

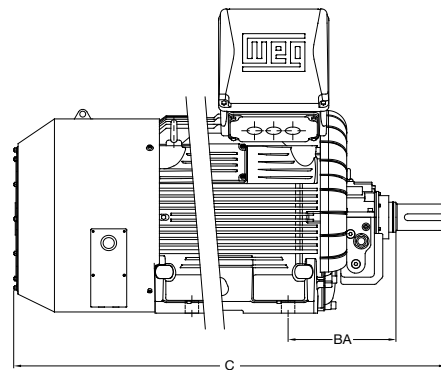
Frame	Designation			
	Steel 1 and Steel 2		Steel 11	
	AB	O+T	AB	O+T
5010/11	35.000	47.677	34.016	48.071
5810/11		51.220		51.614
6809/10		54.961		55.354
7009/10		58.780		59.173



16.4 External Motor Dimensions with Sleeve Bearing

Dimensions in inches.

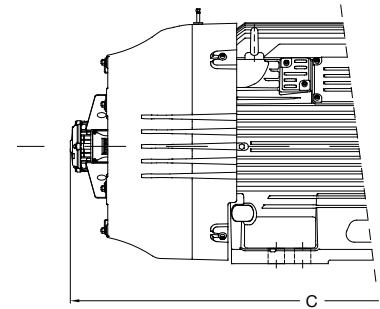
Frame	N° poles	BA	C
5010/11	2	14.764	83.779
	4 - 8		84.960
5810/11	2	16.732	89.094
	4 - 8		89.881
6809/10	2	17.716	97.126
	4 - 8		98.700
7009/10	2	18.700	105.511
	4 - 8		108.661



16.5 External Motor Dimensions with Forced Ventilation

Dimensions in inches.

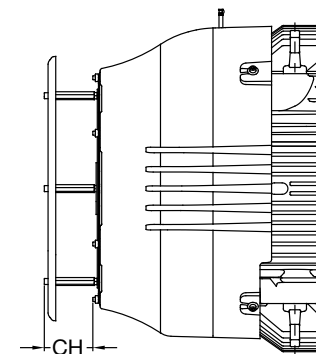
Frame	N° poles	C
5010/11	2	78.622
	4 - 8	79.803
5810/11	2	84.173
	4 - 8	86.929
6809/10	2	90.826
	4 - 8	92.401
7009/10	2	99.881
	4 - 8	13.031



16.6 Drip Cover Height

Dimensions in inches.

Frame	CH
5010/11	3.583
5810/11	
6809/10	4.685
7009/10	



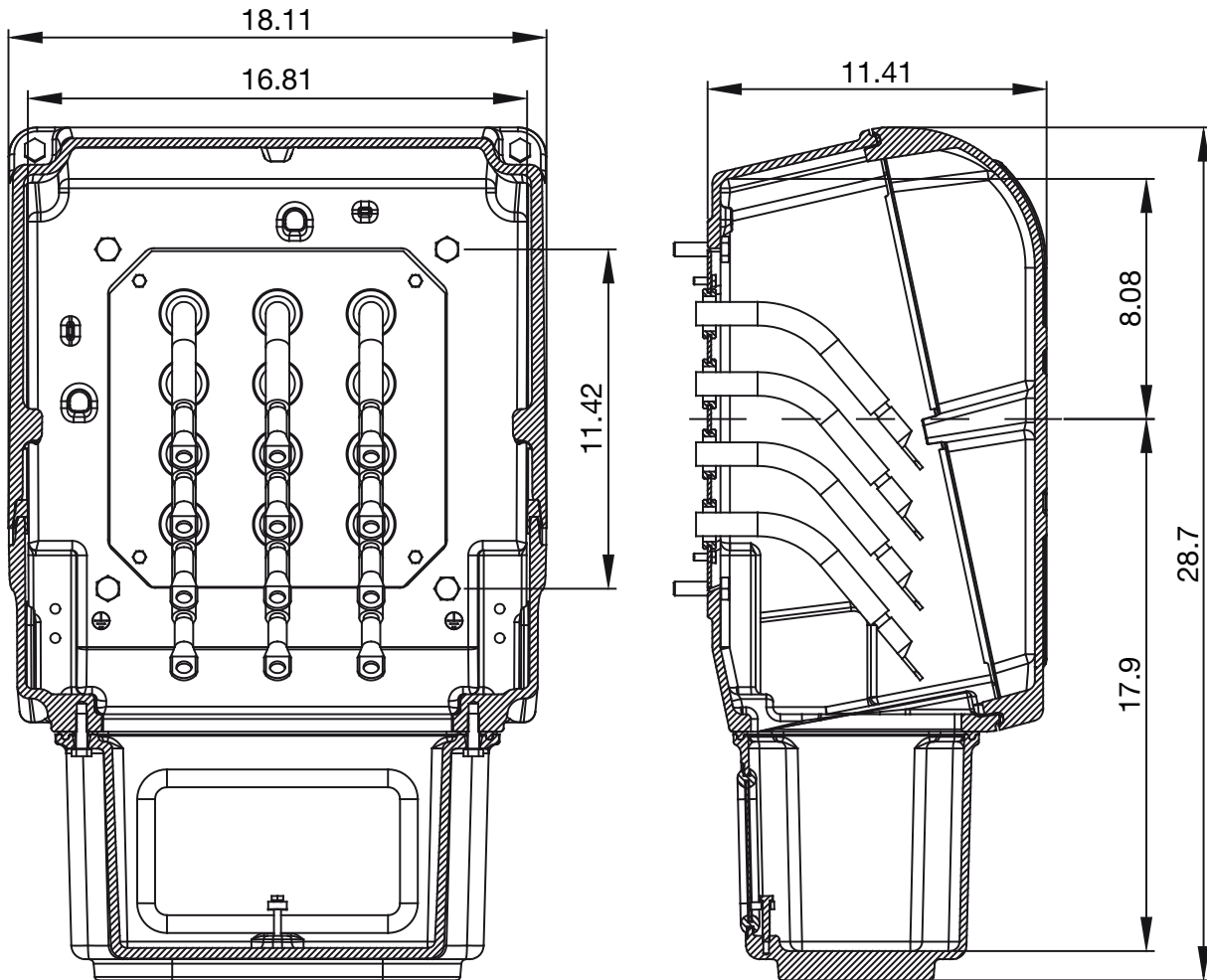
17. Terminal Boxes

The terminal boxes can be manufactured in cast iron FC-200 or in steel plate. Below see the external dimensionals and some technical features.

17.1 Cast Iron Terminal Boxes

17.1.1 Iron 02

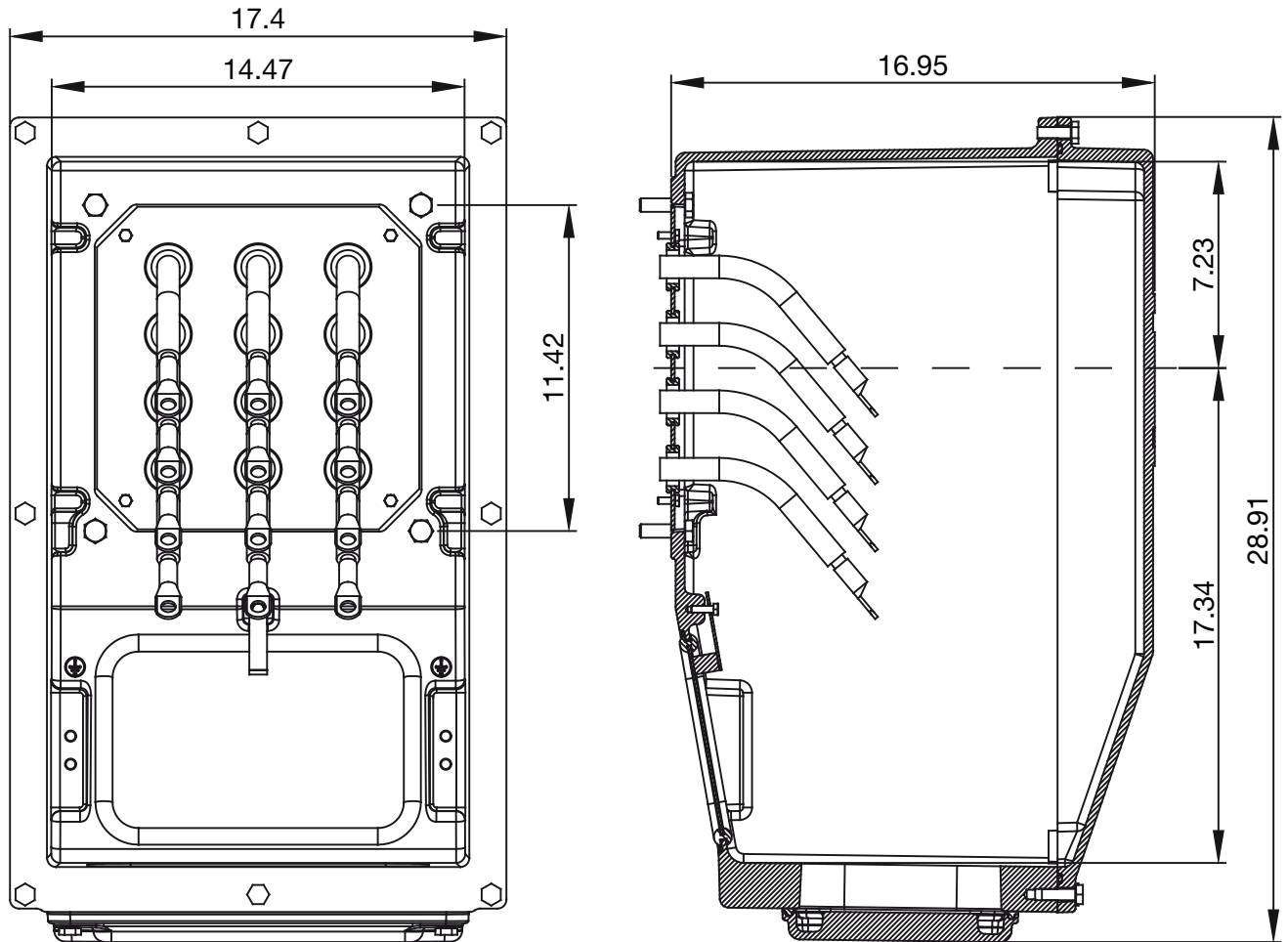
Dimensions in inches.



Technical data	
Maximum quantity of leads	4 per phase
Entry plates for leads designation	Type 02
Internal volume	3,978.7 in ³
Grounding terminal	Internal
Approximate weight	154.3 lb
Degree of protection	IP66
General data	
Minimum terminal box thickness	0.275 in
Rotate in steps of 90°	
Pressure relief device in the back of the terminal box in case of short circuit	Yes

17.1.2 Cast Iron 04

Dimensions in inches.

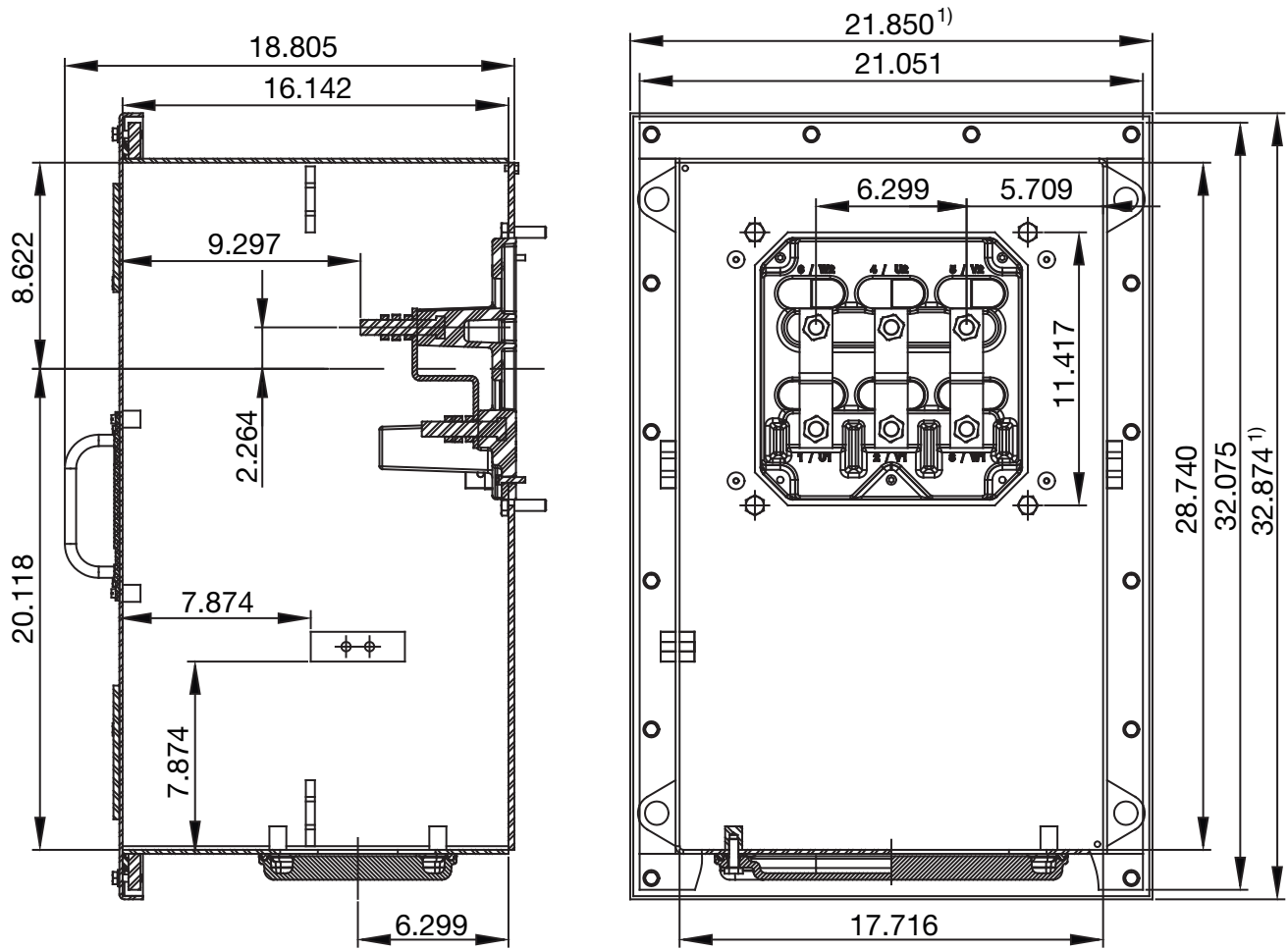


Technical data	
Maximum quantity of leads	4 per phase
Entry plates for leads designation	Type 01
Internal volume	5,644.7 in ³
Grounding terminal	Internal
Approximate weight	231.5 lb
Degree of protection	IP66
General data	
Minimum terminal box thickness	0.315 in
Rotate in steps of 90°	Yes
Pressure relief device in the back of the terminal box in case of short circuit	

17.2 Steel Plate Terminal Boxes

17.2.1 Steel 01

Dimensions in inches.

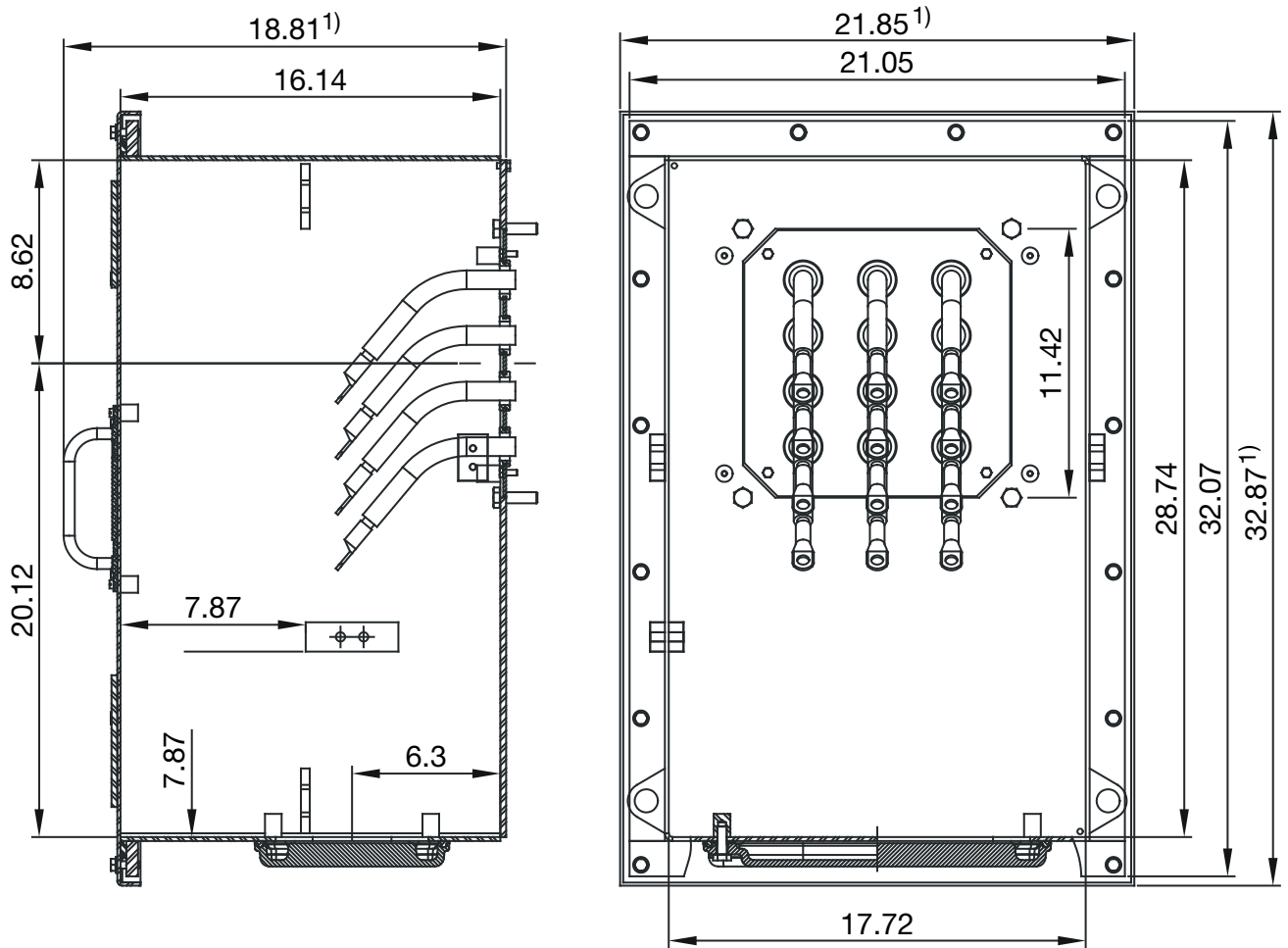


1) Cover dimension.

Technical data	
Maximum quantity of leads	1 per phase
Entry plates for leads designation	Type 01
Internal volume	8,018.52 in ³
Grounding terminal	Internal or external
Approximate weight	209.4 lb
Degree of protection	IP66
General data	
Minimum terminal box thickness	0.132 in
Rotate in steps of 90°	Yes
Eyebolts	4 eyebolts

17.2.2 Steel 02

Dimensions in inches.

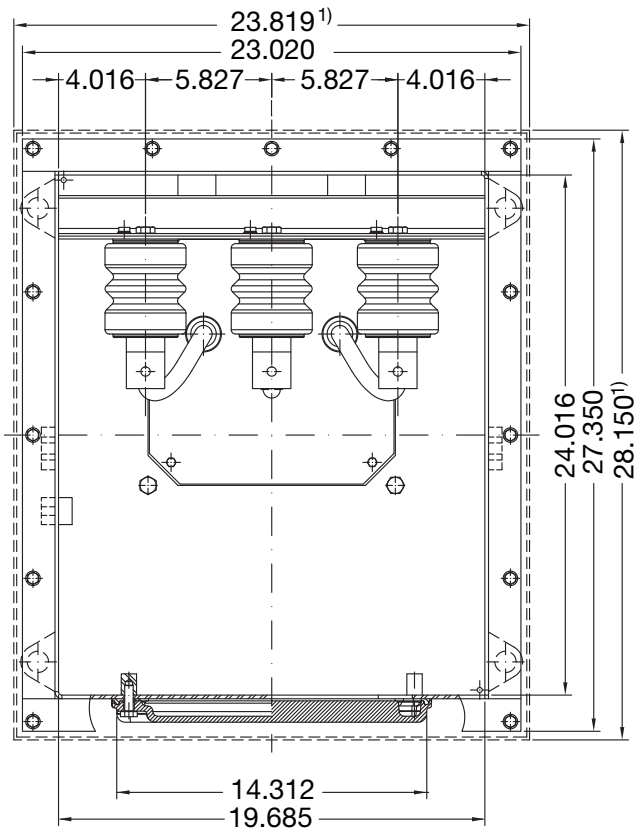
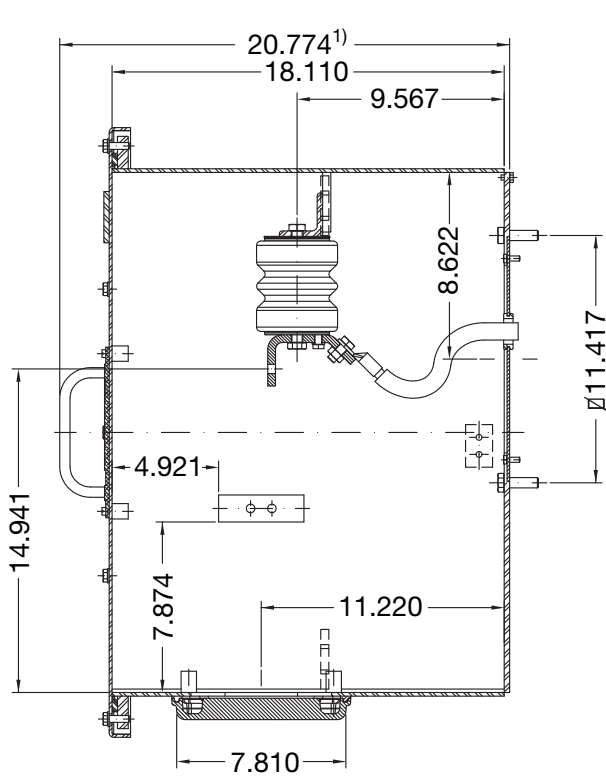


1) Cover dimension.

Technical data	
Maximum quantity of leads	4 per phase
Entry plates for leads designation	Type 01
Internal volume	8,226 in ³
Grounding terminal	Internal or external
Approximate weight	187.39 lb
Degree of protection	IP66
General data	
Minimum terminal box thickness	0.132 in
With eyebolts	4 eyebolts
Rotate in steps of 90°	Yes
Pressure relief device in the back of the terminal box in case of short circuit	

17.2.3 Steel 03

Dimensions in inches.

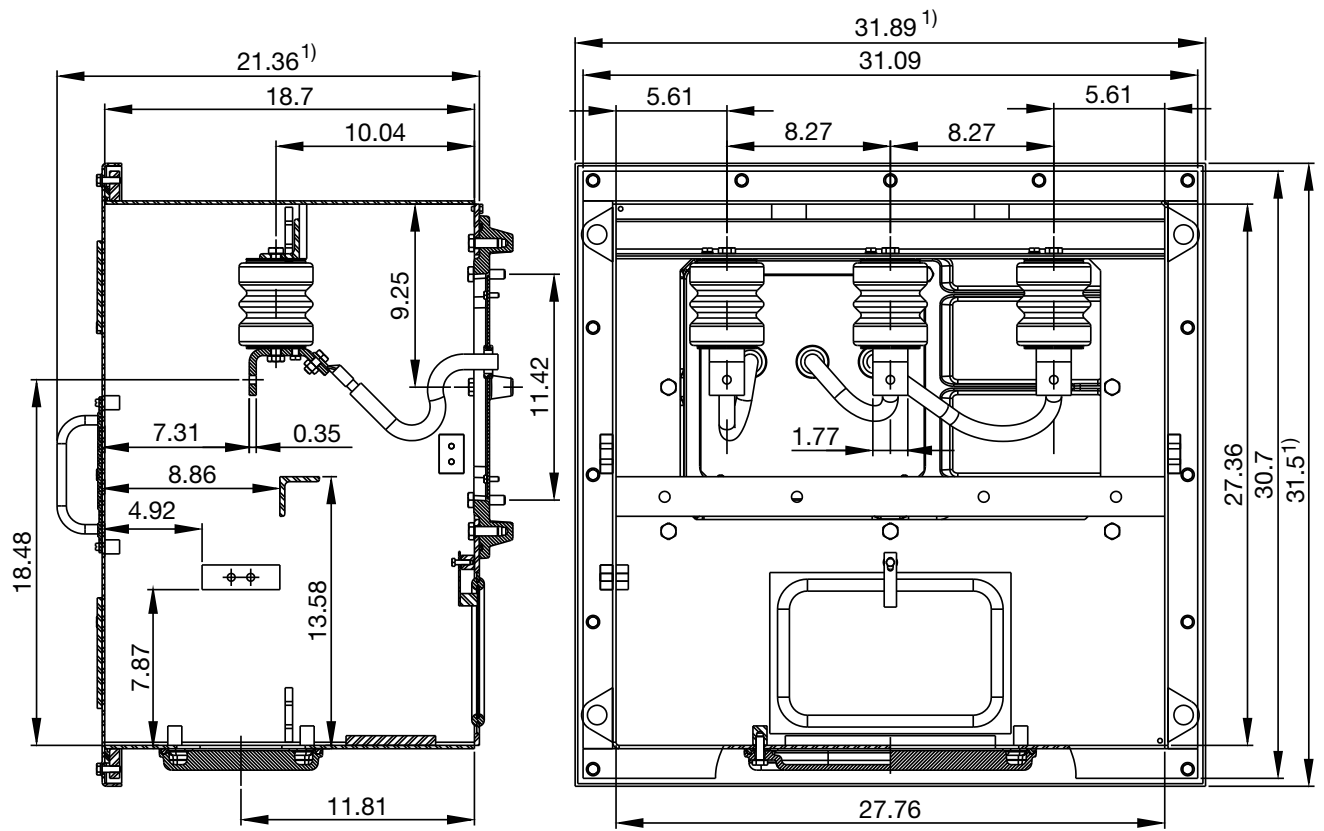


1) Cover dimension.

Technical data	
Maximum quantity of leads	4 per phase
Entry plates for leads designation	Type 01
Internal volume	8,439.6 in ³
Grounding terminal	Internal or external
Approximate weight	209.44 lb
Degree of protection	IP66
General data	
Minimum terminal box thickness	0.132 in
With eyebolts	4 eyebolts
Rotate in steps of 90°	
Pressure relief device in the back of the terminal box in case of short circuit	Yes

17.2.4 Steel 04

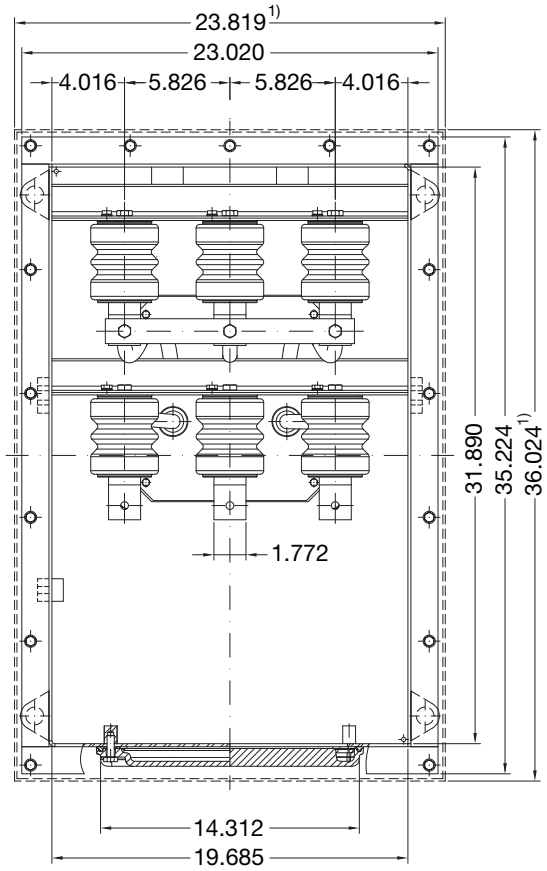
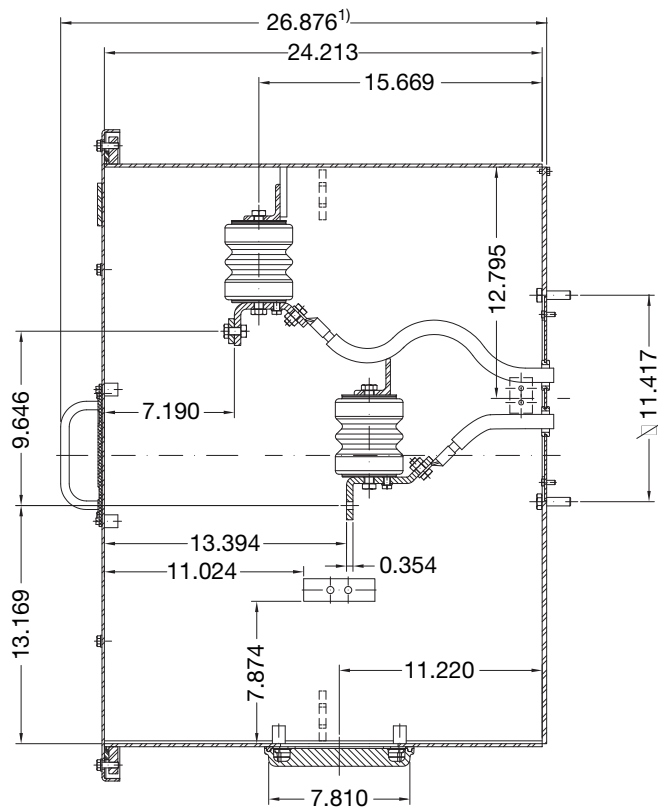
Dimensions in inches.



1) Cover dimension.

Technical data	
Maximum quantity of leads	1 per phase
Entry plates for leads designation	Type 01
Internal volume	14,157.5 in ³
Grounding terminal	Internal or external
Approximate weight	297.62 lb
Degree of protection	IP66
General data	
Minimum terminal box thickness	0.132 in
With eyebolts	4 eyebolts
Rotate in steps of 90°	
Pressure relief device in the back of the terminal box in case of short circuit	Yes

17.2.5 Steel 05

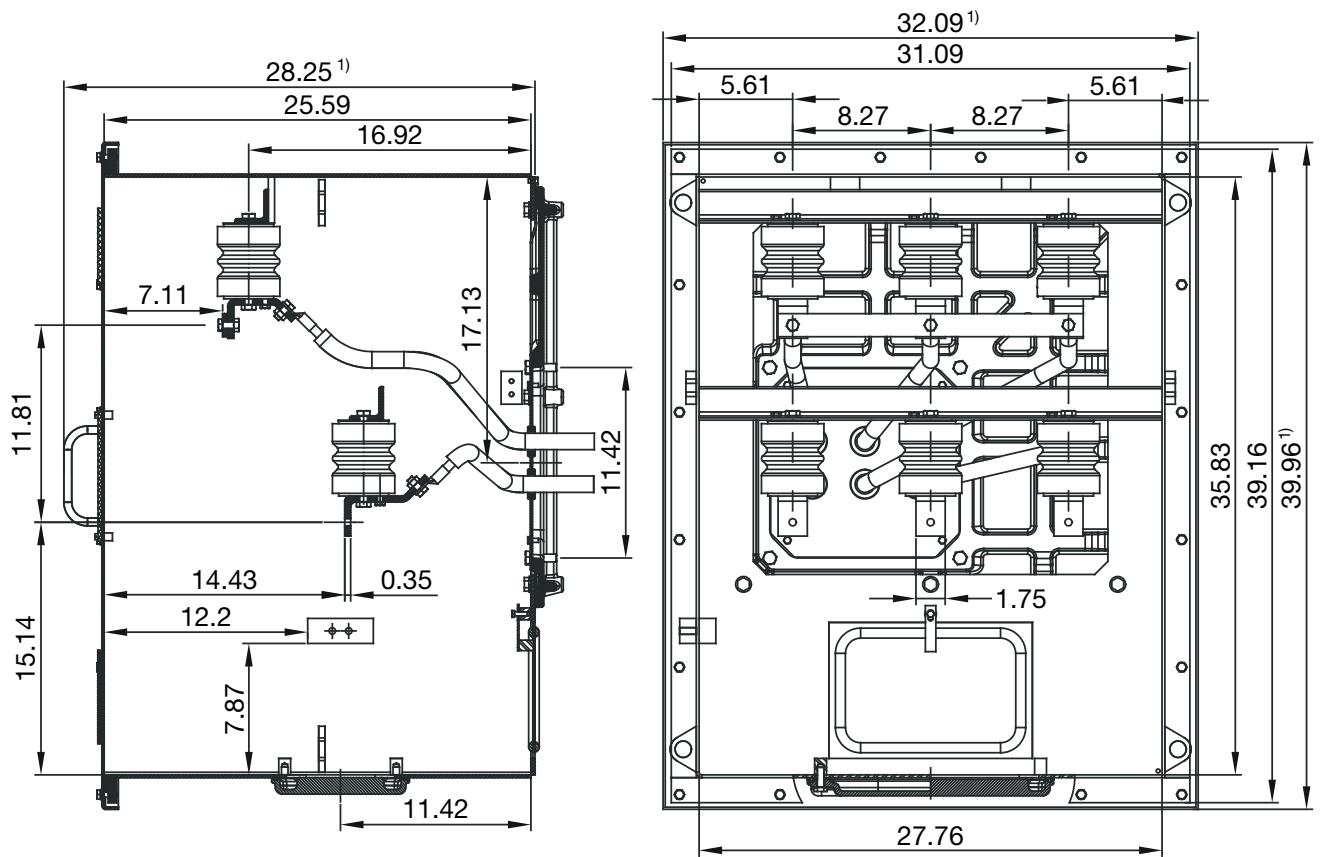


1) Cover dimension.

Technical data	
Maximum quantity of leads	1 per phase
Entry plates for leads designation	Type 01
Internal volume	14,834.9 in ³
Grounding terminal	Internal or external
Approximate weight	286.6 lb
Degree of protection	IP66
General data	
Minimum terminal box thickness	0.132 in
With eyebolts	4 eyebolts
Rotate in steps of 90°	
Pressure relief device in the back of the terminal box in case of short circuit	Yes

17.2.6 Steel 06

Dimensions in inches.

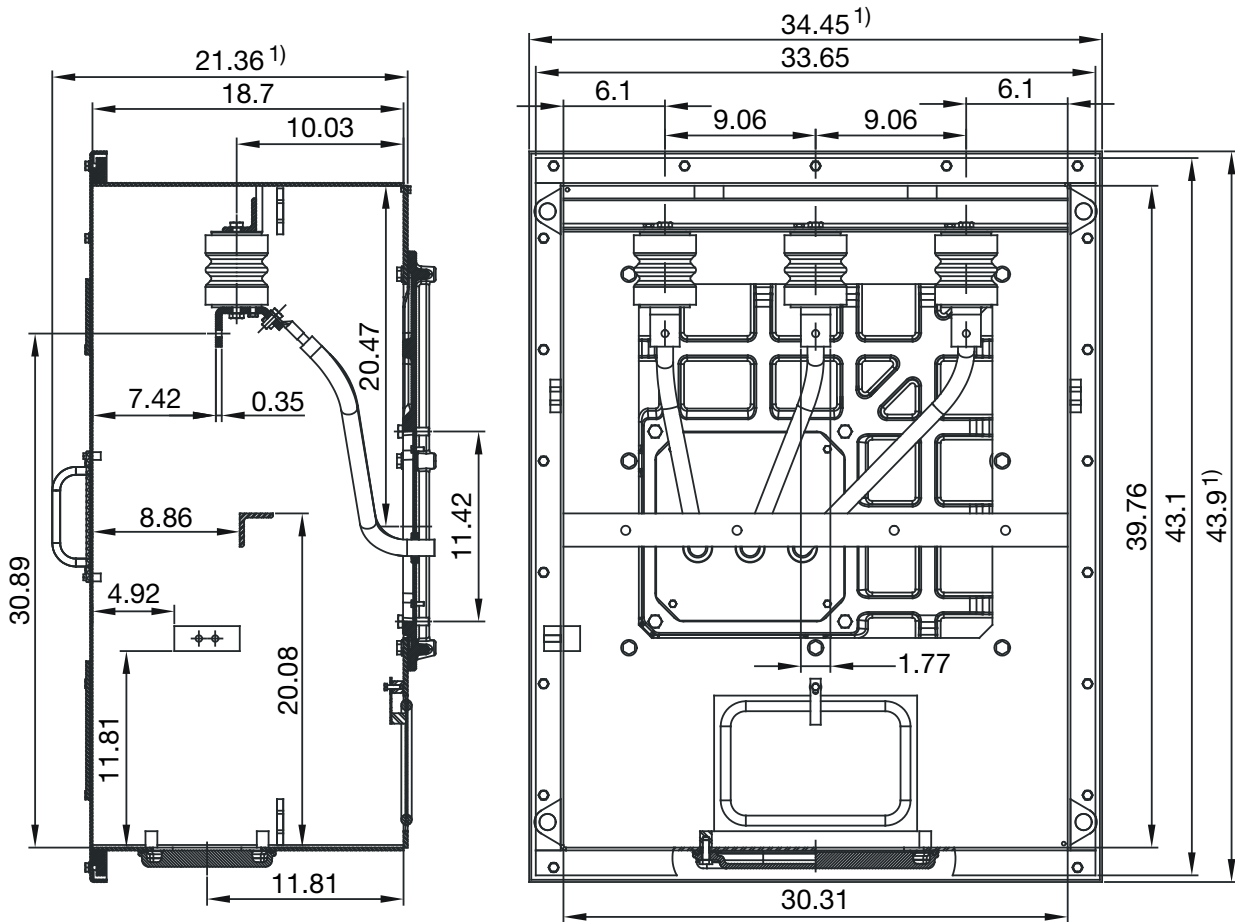


1) Cover dimension.

Technical data	
Maximum quantity of leads	2 per phase
Entry plates for leads designation	Type 01
Internal volume	25,446.9 in ³
Grounding terminal	Internal or external
Approximate weight	429.9 lb
Degree of protection	IP66
General data	
Minimum terminal box thickness	0.132 in
With eyebolts	4 eyebolts
Rotate in steps of 90°	
Pressure relief device in the back of the terminal box in case of short circuit	Yes

17.2.7 Steel 07

Dimensions in inches.

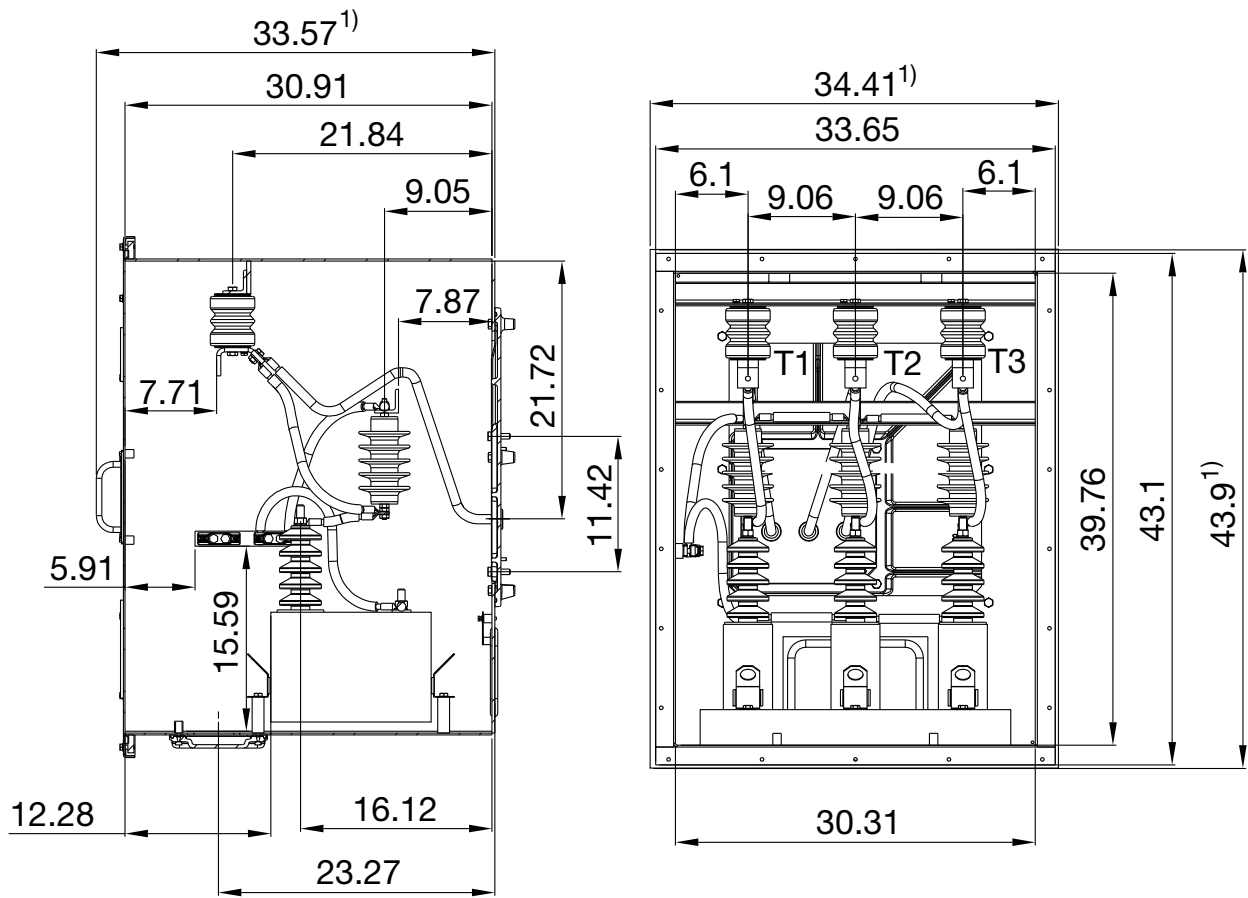


1) Cover dimension.

Technical data	
Maximum quantity of leads	1 per phase
Entry plates for leads designation	Type 01
Internal volume	22,517.8 in ³
Grounding terminal	Internal or external
Approximate weight	374.8 lb
Degree of protection	IP66
General data	
Minimum terminal box thickness	0.132 in
With eyebolts	4 eyebolts
Rotate in steps of 90°	
Pressure relief device in the back of the terminal box in case of short circuit	Yes

17.2.8 Steel 08

Dimensions in inches.

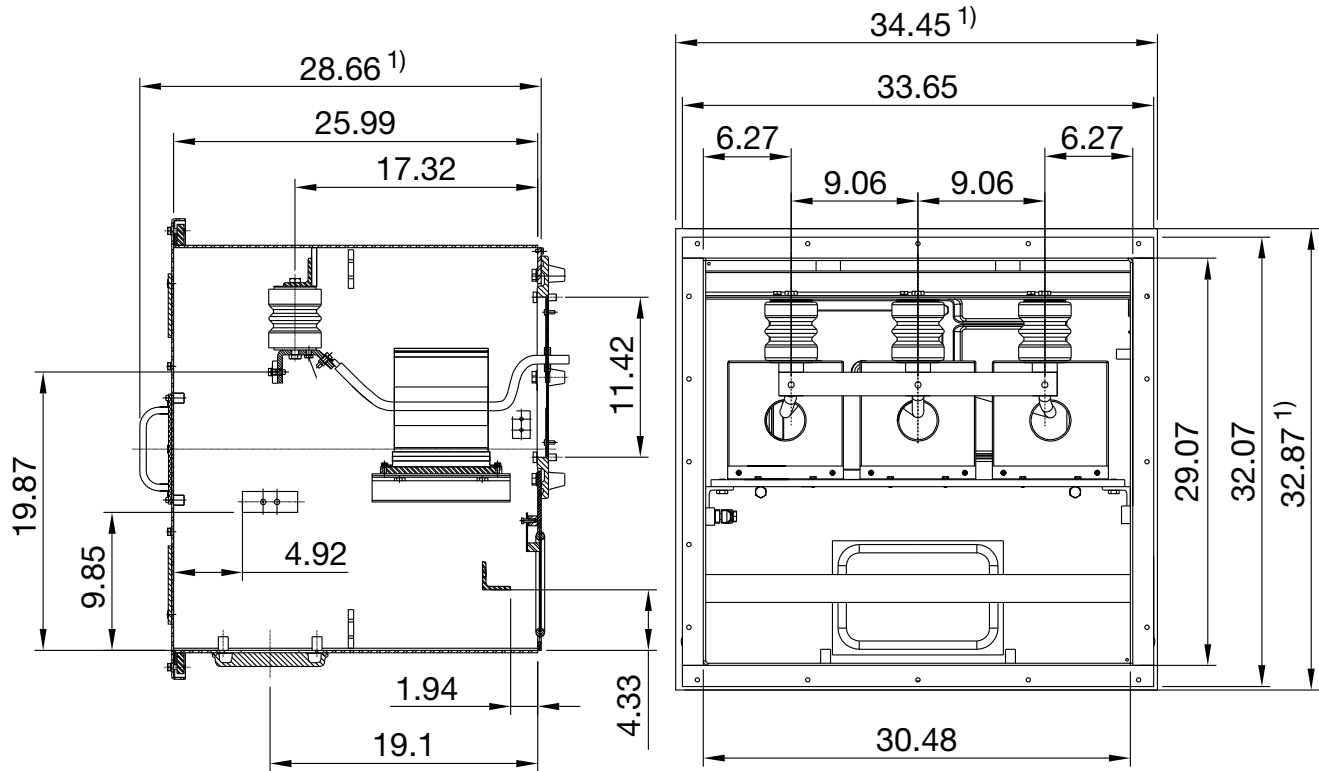


1) Cover dimension.

Technical data	
Maximum quantity of leads	1 per phase
Entry plates for leads designation	Type 01
Internal volume	35,637.9 in ³
Grounding terminal	Internal or external
Approximate weight	628.3 lb
Degree of protection	IP66
General data	
Minimum terminal box thickness	0.132 in
With eyebolts	4 eyebolts
Rotate in steps of 90°	
Pressure relief device in the back of the terminal box in case of short circuit	Yes

17.2.9 Steel 09

Dimensions in inches.



1) Cover dimension.

Technical data	
Maximum quantity of leads	2 per phase
Entry plates for leads designation	Type 01
Internal volume	22,633.7 in ³
Grounding terminal	Internal or external
Approximate weight	562.2 lb
Degree of protection	IP66
General data	
Minimum terminal box thickness	0.132 in
With eyebolts	4 eyebolts
Rotate in steps of 90°	
Pressure relief device in the back of the terminal box in case of short circuit	Yes

18. Packaging

W51 HD motors in frames 5010/11 to 6809/10 are packaged in wooden pallets (see Figure 61). The dimensions, weights and volumes are listed in the Table 22.

Frame	External height (in)	External width (in)	External length (in)	Weight (lb)	Volume (in ³)
5010/11	9.842	62.991	82.677	275.36	51,259.95
5810/11		55.118	86.614	254.63	46,988.28
6809/10		70.866	98,425	443.57	76,889.92

Table 22 - Wooden pallets dimensions, weights and volumes for motors with side terminal boxes.

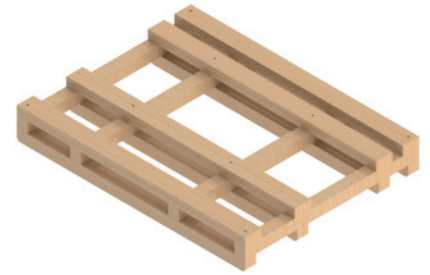


Figure 61 - Wooden pallet.

For frame 7009/10, the motors are packaged in steel pallets (see Figure 62). Dimensions, weights and volumes are in Table 23.

Frame	External height (in)	External width (in)	External length (in)	Weight (lb)	Volume (in ³)
7009/10	9.449	66.929	104.330	291	65,966.67

Table 23 - Steel crates dimensions, weights and volumes for motors with side terminal boxes.

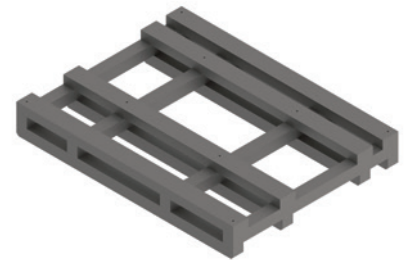
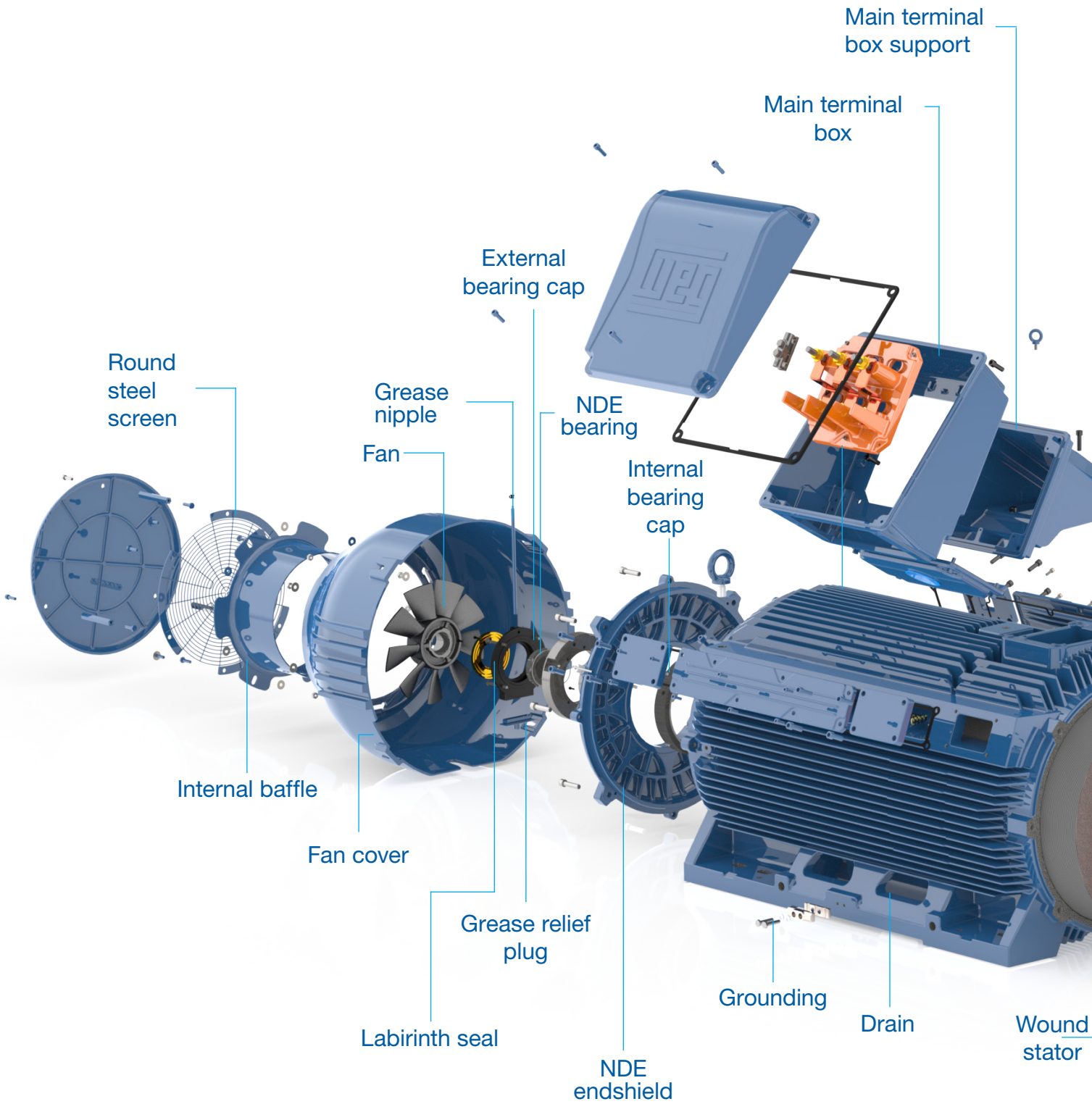
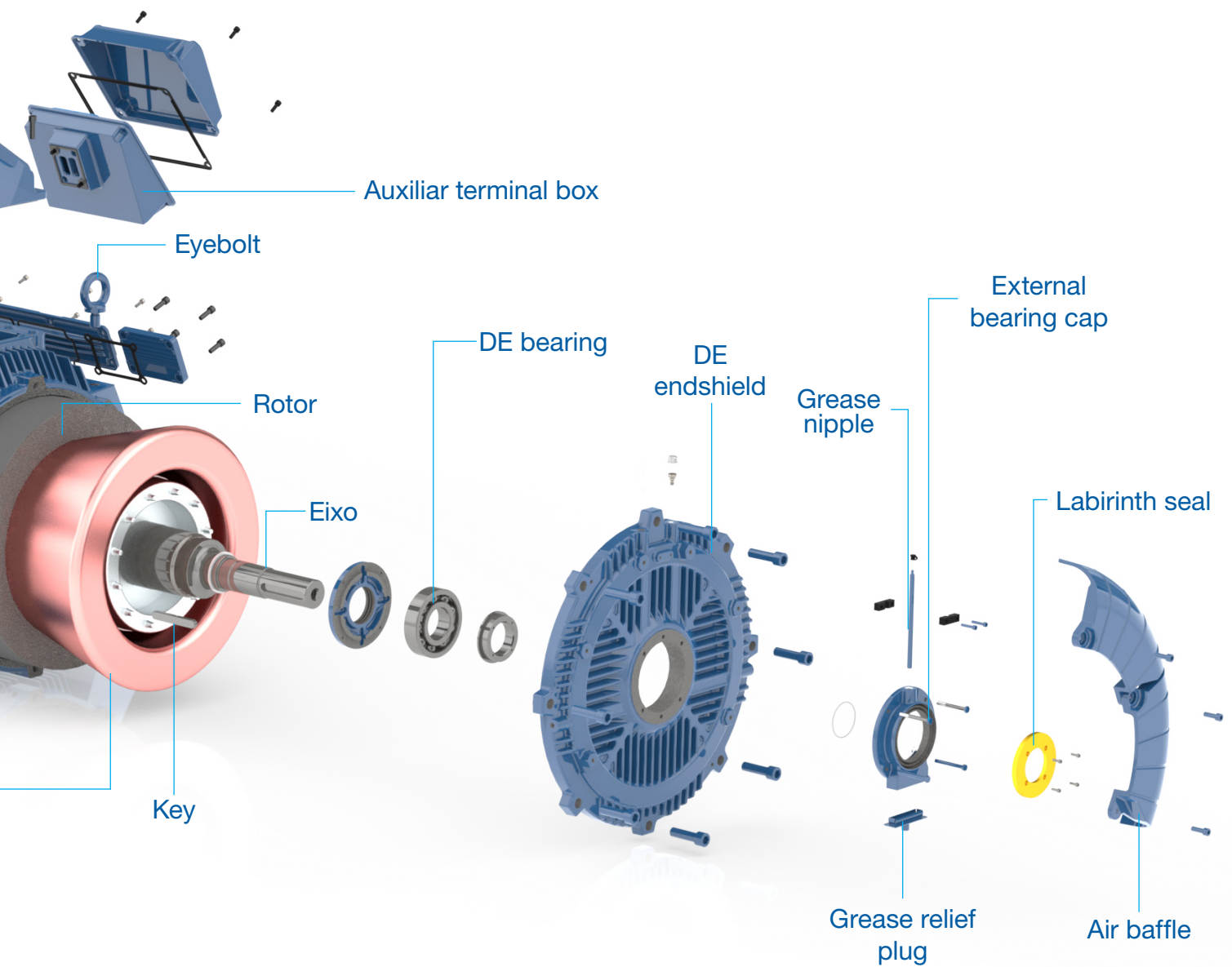


Figure 62 - Steel crates.

19. Spare Parts





The scope of WEG Group solutions is not limited to products and solutions presented in this catalogue.

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The values shown are subject to change without prior notice.
The information contained is reference values.