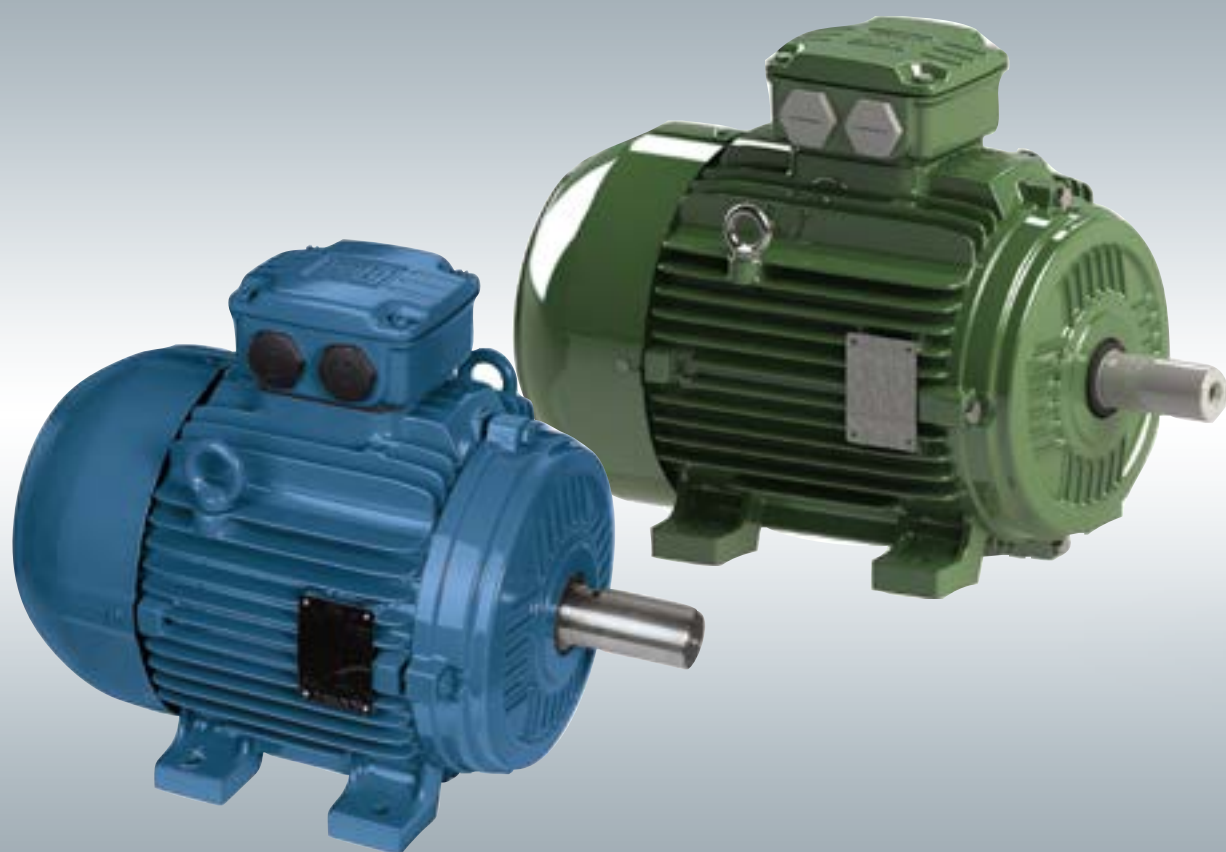


W21

Three Phase LV motors

Technical Catalogue



Motors | Automation | Energy | Transmission & Distribution | Coatings

About WEG

Founded in 1961, WEG is acknowledged today as one of the largest manufacturers of electric motors in the world. Thirty thousand people are employed in the different manufacturing units which cover over 2,500,000 square meters of constructed area.

In support of exports in over 135 countries worldwide, WEG has branch offices located in all five continents and has manufacturing plants in 12 countries supporting more than 1400 service centers around the world.

WEG's great success with export activities is based on the company's willingness to meet worldwide standard requirements, keeping product inventories in strategic locations, personnel training and prompt service.

About WEG (Nantong) Electric Motor Mfg. Co., Ltd

Established in 2005, WEG Nantong is the first manufacturing plant of WEG in Asia-Pacific region. The company is located in Nantong Economic and Technological Development Area, Jiang Su province, covers an area of 67,000 square meters, construction area of 33,750 square meters. The number of employees is around 800. The product range covers Low Voltage, Medium Voltage, High Voltage motors and automation products.

The plant has advanced motor testing laboratory and metrology room to ensure the best performance of each products. The establishment of WEG Nantong has reduced significantly the delivery time and logistic cost for the customers and distributors in Asia-Pacific rion, as well as providing to our customers the closer services with qualified solutions.

About WEG (Jiangsu) Electric Equipment Co., Ltd

Along with the growing demands on China Market and WEG branches abroad, WEG has invested on new green-field plant in China, WEG(Jiangsu) Electric Equipment Co.,Ltd, as known as WEG Rugao, located in Rugao Economic and Technological Development Area, Jiang Su province, covers an area of 160,000 square meters, with registered capital 50 million US dollar. The plant is n operation since November, 2015. The planned capacity of WEG Rugao plant is more than 500 thousand units of industrial motor and thousands sets of spare parts per year. The establishment of WEG Rugao plant will improve the influence of WEG brand in the market and support WEG to become one of the leading company in chinese electric motors market.

Certifications

WEG China



WEG Global





W21 Line - High Efficiency Motors

The increasing demand for electrical energy to sustain global development requires consistent heavy investments in power supply generation. However, in addition to complex medium and long term planning, these investments rely on natural resources, which are becoming depleted due to constant pressures upon the environment. The best strategy, therefore, to maintain energy supply in the short term is to avoid wastage and increase energy efficiency. Electric motors play a major role in this strategy; since around 40% of global energy demand is estimated to be related to electric motor applications. Consequently, any initiatives to increase energy efficiency, by using high efficiency electric motors and frequency inverters, are to be welcomed, as they can make a real contribution to reductions in global energy demand.

At the same time as efficiency initiatives make an impact in traditional market sectors, the application of new technologies in emerging sectors is resulting in profound changes in the

way that electric motors are applied and controlled. By integrating these changes together with the demands for increased energy efficiency, WEG has taken up the challenge and produced a new design of high efficiency motor; one motor that recognised worldwide for its quality, reliability and efficiency.

Using the latest generation of computerised tools, such as structural analysis software (finite element analysis) and computer fluid dynamics, as well as electrical design optimisation software, an innovative - next generation - product has been developed: the W21 motor.

Several key objectives have been achieved in the design of the W21 motor:

- Reduction of noise and vibration levels
- Increased energy efficiency
- Compatibility with present & future generations of frequency inverters
- Global design
- Global warranty



W21_IE3



W21_IE4

Sustainability and Carbon Emission reduction through Premium Efficiency Motors

The Premium Efficiency (IE4) level established in IEC 60034-30-1.2014 is considered the highest efficiency class which a squirrel cage induction motor can achieve whilst remaining economically viable.

It is also the optimum solution to increase the efficiency of an existing application through direct replacement.

So, why have IE4 motors not become the Industry standard? It may be argued that IE4 motors are also premium in price when comparing against IE2 and IE3 efficiency motors.

Whilst this is not strictly untrue, it should be appreciated when considering their lifetime that the cost of acquisition typically represents only 1% of the total cost of ownership of an electric motor. In contrast, the associated energy savings provided by IE4 motors far outweigh this additional investment in purchase price.

The reduction in CO₂ emissions is one of the direct consequences, and therefore benefits, of increasing efficiency in industry.

For example, according to the guidelines set out by the International Energy Agency (IEA) of 504 kg of CO₂ per 1,000kWh, it is possible to reduce CO₂ emissions by approximately 1,000 kg per year with one 3 kW IE3 efficiency motor and by 25,000 kg per year with a 250 kW IE3 efficiency motor, when compared against equivalent standard efficiency (IE1) machines.

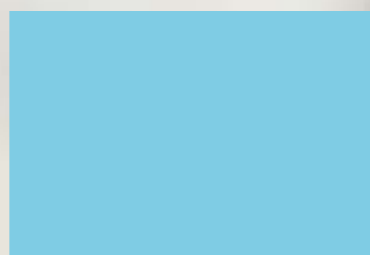
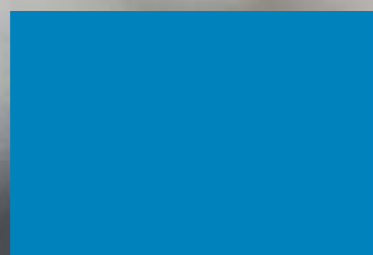
Go to our website at www.weg.net to check the potential reduction in CO₂ emissions and the return on investment. The W21 line from WEG is the first complete range of IE4 motors available to Industry...

...We call it **WEGnology**

WEG Green

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Cast Iron Frame W21 Multi-voltage Motor



Three phase asynchronous motor, with lower acquisition cost and high technology. Easy to adapt to the most application types, allowing to your company agility during installation, easy operation and low maintenance cost,. The project is according to IEC34 standards, which guarantees higher energy savings. The following types of W21 motors are available: IE1, IE2, IE3, IE4 and suitable for the use with Frequency Inverters.

Standard Features:

Electrical:
 Insulation class: F (B, $\Delta T=80$ K)
 Ambient temperature: 40 °C , 1000 m.a.s.l
 Voltage: frame 80-100, 220-240/380-415V(50Hz) // 440-460V (60Hz)
 Connection type Δ - Δ /Y-Y//Y-Y
 frame 112 and above, 380-415/660-690 (50Hz) //440-460V(60Hz)
 Connection type Δ - Δ /Y-Y// Δ - Δ
 Service Factor: 1.00
 Design: N
 Duty: S1
 Thermal Protection: frame 160 and above, equipped with PTC Thermistor (one per phase)

Mechanical:
 Frame: 80 to 355M/L
 Squirrel cage rotor (die aluminum)
 Protection Degree: IP55
 Cooling Method: TEFC (Totally Enclosed Fan Cooled)
 Sealing: V-ring
 Paint Color: IE2 - RAL 5009
 IE3 - RAL 5009
 IE4 - RAL 6002
 Frame 225 and above,, with regreasing system
 Terminal box with metric threaded holes
 Drain hole
 Vibration Level A

Optional Features:

Electrical:
 Insulation Class: H; Design H
 Thermal Protection: frame up to 132(include), with PTC Thermistor, Thermostat or PT100
 Mechanical:
 Others mountings
 Protection Degree: IP56, IP65, IP66, IPW55, IPW56
 Sealing: Lip seal, Oil seal, Labyrinth taconite(frame 132 and above)
 Space Heater, Double shaft ends
 Roller bearings available for frame 160 and above

Features	Benefits
WISE Insulation System	Increase the electrical strength of the stator, allowing the motor to operate with frequency inverters, without damaging by the voltage peaks*.
Efficiency	IE3 and IE4 motors, guarantee a fast return of investment.
Painting plan for Industrial Environments	Suitable for the use in slightly severe and sheltered environments, with low average humidity, regular temperature variations.
Cast Iron Frame	More mechanical strength for your application
State-of-the-art Ventilation System	Uniform refrigeration of the motor with significant temperature reduction in the external surface and bearings, guarantee high performance and energy saving to your application,
Customization	Product suitable to meet the most demanded applications in the industry.

* Notes:

Motor Rated Voltage	Tehcnical Criteria for use of motors fed by inverters			
	Voltage peak in the motor (Maximum)	dV/dt Inverter Outlet (maximum)	Rise Time(*) of Inverter (Minimum)	MTBP(*) Time between pulses (minimum)
$V_n < 460V$	$\leq 1600V$	$\leq 5200 V/\mu s$	$\geq 0,1 \mu s$	$\geq 6 \mu s$
$460V \leq V_n < 575V$	$\leq 2000V$	$\leq 6500 V/\mu s$		



Aluminum Frame W21 Multi-Voltage motor

WEG Aluminum Frame motor were specially designed to meet market requirements in reference to mounting flexibility since they allow all mounting positions. The foot mounting system offers great flexibility and it is quite simple allowing change on the mounting configuration without requiring any machining or modification on motor feet.. The terminal box can be rotated in 90 degrees. Besides that, these motors allow great advantage on standardization and stock flexibility due to the fact that just one motor is required with mounting possibility on all positions. Additionally, these motors are fully interchangeable with existing cast iron frame motors.

Standard Features:

Electrical:
 Insulation class: F (B, $\Delta T=80$ K)
 Ambient temperature: 40 °C , 1000 m.a.s.l
 Voltage: frame 80-100, 220-240/380-415V(50Hz) // 440-460V (60Hz)
 Connection type Δ - Δ /Y-Y//Y-Y
 frame 112 and above, 380-415/660-690 (50Hz) //440-460V(60Hz)
 Connection type Δ - Δ /Y-Y// Δ - Δ
 Service Factor: 1.00
 Design: N
 Duty: S1
 Thermal Protection: frame 160 and above, equipped with PTC Thermistor (one per phase)



Optional Features:

Electrical:
 Insulation class:H; Design H
 Thermal Protection: Frame132 and below, PTC thermistor, Thermostat or PT100 as optional
 Mechanical:
 Others Mounting
 Protection Degree: IP56, IP65, IP66, IPW55, IPW56
 Sealing: Lip seal, Oil seal,, Labyrinth Taconite(frame 132 and above)
 Space Heater; Double Shaft ends

Mechanical :
 Frame: 63 to 200M/L
 Squirrel cage rotor (die aluminum)
 Protection Degree: IP55
 Cooling Method: TEFC (Totally Enclosed Fan Cooled)
 Sealing: V-ring
 Painting Color: IE2 - RAL 5009; IE3 - RAL 5009
 Terminal box metric threaded holes
 Drain holes
 Vibration Level A

Features	Benefits
Multi-mounting	change the mounting without requiring any machining or modification on motor feet.
Aluminum Frame	better heat dissipation
WISE Insulation System	Increase the electrical strength of the stator, allowing the motor to operate with frequency inverters, without damaging by the voltage peaks*.
Efficiency	IE3 and IE4 efficiency guarantee the fast return on investment
Painting plan for industrial environment	applicable for severe conditions: low humidity, normal temperature variation
Reinforced Ventilation System	reducing significantly temperature on motor surface and in bearing, guarantee the performance and saving energy
Customization	Suitable for diverse applications in industry

* Notes:

Motor Rated Voltage	Tehcnical Criteria for use of motors fed by inverters			
	Voltage peak in the motor (Maximum)	dV/dt Inverter Outlet (maximum)	Rise Time(*) of Inverter (Minimum)	MTBP(*) Time between pulses (minimum)
$V_n < 460V$	$\leq 1600V$	$\leq 5200 V/\mu s$	$\geq 0,1 \mu s$	$\geq 6 \mu s$
$460V \leq V_n < 575V$	$\leq 2000V$	$\leq 6500 V/\mu s$		

W21 Cast Iron Frame Inverter Duty

WEG TEBC cast iron motors were designed to meet several applications where wide speed range variation is required. The windings are enameled with class H varnish and exclusive patented WISE insulation. The independent fan system offers low noise level and maximum cooling at low speeds. As additional feature, the W21 TEBC motor can be supplied with encoder which allows perfect motor speed control for critical applications.

Standard Features:

Electrical:
 Insulation class: F (B, $\Delta T=80$ K)
 Ambient temperature: 40 °C , 1000 m.a.s.l
 Voltage: frame 80-100, 220-240/380-415V(50Hz) // 440-460V (60Hz)
 Connection type Δ - Δ /Y-Y//Y-Y
 frame 112 and above, 380-415/660-690 (50Hz) //440-460V(60Hz)
 Connection type Δ - Δ /Y-Y// Δ - Δ
 Service Factor: 1.00
 Design: N
 Duty: S1
 Thermal Protection: frame 160 and above, equipped with PTC Thermistor (one per phase)

Mechanical:

Frame: 63 to 355M/L
 Squirrel cage rotor (die aluminum)
 Protection Degree: IP55
 Cooling Method: TEFC (Totally Enclosed Fan Cooled)
 Sealing: V-ring
 Paint Color: IE2 - RAL 5009
 IE3 - RAL 5009
 IE4 - RAL 6002
 Frame 225 and above,, with regreasing system
 Terminal box with metric threaded holes
 Drain hole
 Vibration Level A



Optional Features:

Electrical:
 Insulation Class: H; Design H
 Thermal Protection: frame up to 132(include), with PTC Thermistor, Thermostat or PT100
 Mechanical:
 Others mountings
 Protection Degree: IP56, IP65, IP66, IPW55, IPW56
 Sealing: Lip seal, Oil seal, Labyrinth taconite(frame 132 and above)
 Space Heater, Double shaft ends
 Roller bearings available for frame 160 and above

Features	Benefits
Reinforced Insulation System	Operating in extreme conditions, protecting the coil winding and extending the motor's life.
Efficiency	IE3 and IE4 motors, guarantee a fast return of investment.
Painting plan for Industrial Environments	Suitable for the use in slightly severe and sheltered environments, with low average humidity, regular temperature variations.
Cast Iron Frame	More mechanical strength for your application
State-of-the-art Ventilation System	Uniform refrigeration of the motor with significant temperature reduction in the external surface and bearings, guarantee high performance and energy saving to your application,
Customization	Product suitable to meet the most demanded applications in the industry.

* Note: Derating Curve: operating on rated frequency, use the derating curve to check if the maximum torque was suitable for maximum speed operation.

Motor Rated Voltage	Technical Criteria for use of motors fed by inverters			
	Voltage peak in the motor (Maximum)	dV/dt Inverter Outlet (maximum)	Rise Time(*) of Inverter (Minimum)	MTBP(*) Time between pulses (minimum)
575V ≤ V _{RATED} ≤ 690V	≤ 2400V	≤ 7800 V/μs	≥ 0,1 μs	≥ 6 μs



Fan and Exhaust Motor

Most suitable for OEM customers. Standard cooling method is Totally Enclosed Air Over (TEAO), can supply with terminal box and terminal block, or without terminal box and extended leads (1 meter), which allows long distance connection.

Standard Features:

Electrical:
 Insulation class: F (B, $\Delta T=80$ K)
 Ambient temperature: 40 °C , 1000 m.a.s.l
 Voltage: frame 80-100, 220-240/380-415V(50Hz) // 440-460V (60Hz)
 Connection type Δ - Δ /Y-Y//Y-Y
 frame 112 and above, 380-415/660-690 (50Hz) //440-460V(60Hz)
 Connection type Δ - Δ /Y-Y// Δ - Δ
 Service Factor: 1.00
 Design: N
 Duty: S1
 Thermal Protection: frame 160 and above, equipped with PTC Thermistor (one per phase)

Mechanical:

Frame: 63 to 200M/L Aluminum frame
 80 to 355M/L Cast iron frame
 Squirrel cage rotor (die aluminum)
 Protection Degree: IP55
 Cooling Method: TEFC (Totally Enclosed Fan Cooled)
 Sealing: V-ring
 Paint Color: RAL 5009
 Frame 225 and above,, with regreasing system
 Terminal box with metric threaded holes
 Drain hole
 Vibration Level A
 Without Terminal box, with 1 meter extended leads
 If separated terminal box was required, please contact WEG Sales.

Features	Benefits
WISE Insulation System	Increase the electrical strength of the stator, allowing the motor to operate with frequency inverters, without damaging by the voltage peaks*.
Efficiency	IE2 and IE3 motors, guarantee a fast return on investment.
Painting plan for industrial environment	Suitable for the use in slightly severe and sheltered environments, with low average humidity, regular temperature variations.
Customization	Product suitable to meet the most demanded applications in the industry.



Smoke Extraction Motor

Assure safety where a large concentration of people in commercial and industrial facilities is present, for example : shopping centers, factories, warehouses, covered parking lots, tunnels and other places. The Smoke Extraction motors are certified* for high temperatures and guarantee a fast smoke and heat extraction and delay in fire propagation, allowing free access to the emergency exits.

Standard Features:

Electrical:
 Insulation class: F (B, $\Delta T=80$ K)
 Ambient temperature: 40 °C , 1000 m.a.s.l
 Voltage: frame 80-100, 220-240/380-415V(50Hz) // 440-460V (60Hz)
 Connection type Δ - Δ /Y-Y//Y-Y
 frame 112 and above, 380-415/660-690 (50Hz) //440-460V(60Hz)
 //440-460V(60Hz)
 Connection type Δ - Δ /Y-Y// Δ - Δ
 Service Factor: 1.00
 Design: N
 Duty: S1
 Thermal Protection: frame 160 and above, equipped with PTC Thermistor (one per phase)

Mechanical:

Frame: 63 to 200M/L Aluminum frame
 80 to 355M/L Cast iron frame
 Squirrel cage rotor (die aluminum)
 Protection Degree: IP55
 Cooling Method: TEFC (Totally Enclosed Fan Cooled)
 Sealing: V-ring

Paint Color:RAL 5009
 Frame 225 and above,, with regreasing system
 Terminal box with metric threaded holes
 Drain hole
 Vibration Level A
 Without Terminal box, with 1 meter extended leads
 AISI 304 Stainless steel nameplate
 Dimensional according to IEC-72 standards
 Electrical performance according to IEC34 standards
 Regreasing System:
 Frame 160 and above (300°C/1hour and 400°C/2hours)
 Frame 225 and above (200°C/2hours)
 Cooling method: TEFC

Duty	F200	F300	F400
	S1 - 40°C	S1 - 40°C	S1 - 40°C
	S2* - 200°C - 2hours	S2* - 300°C - 1hour	S2* - 400°C - 2hours
Motor Certificate	WEG Declaration	BSRIA-U.K. Frame 80 to 250 Certificate applicable to 300°C/2hours	BSRIA-UK. Frame 80 to 180 Output: 0.75kW-27kW
			CTICM-France Frame: 90 to 280 Poles: IV,VI,VIII,VI/IV,VIII/IV,VI
Insulation Class	Class F, temp. rise 80K	Class H, temp. rise 80K or 105K	
Standard	EN 12101-3		
Poles/ Frame	2, 4/2 (frame 80 to 315S/M)		
	4, 6, 8, 8/4, 6/4 (frame 80 to 355M/L)		
Cooling Method	TEFC or TEAO (foot mounted or flange mounted/frame 80 to 250)		

* Operate in normal condition and emergency condition.

Features	Benefits
WISE Insulation System	Increase the electrical strength of the stator, allowing the motor to operate with frequency inverters, without damaging by the voltage peaks*.
Painting plan for Industrial Environments	Suitable for the use in slightly severe and sheltered environments, with low average humidity, regular temperature variations.
Cast Iron Frame	More mechanical strength for your application
State-of-the-art Ventilation System	Uniform refrigeration of the motor with significant temperature reduction in the external surface and bearings, guarantee high performance and energy saving to your application,
Customization	Product suitable to meet the most demanded applications in the industry.



W21 Brake Motor

In order to have high performance, it is necessary to have equipment working according to its needs. WEG Brake motor is perfect to equipment where fast safety stops, positioning and time saving are required. WEG braking solutions allows synergy in the production process, helping with agility and safety. WEG Brake motors are available in efficiency up to IE4 and they are suitable for the use with frequency inverters (with independent power supply)*. The standard braking torque for each size of motors can be found in the table. If the required braking torque was not listed, please contact WEG sales.

Standard Features:

Electrical:
 Insulation class: F (B, $\Delta T=80$ K)
 Ambient temperature: 40 °C , 1000 m.a.s.l
 Voltage: frame 63-100, 220-240/380-415V(50Hz) // 440-460V (60Hz)
 Connection type Δ - Δ /Y-Y//Y-Y
 frame 112 and above, 380-415/660-690 (50Hz) //440-460V(60Hz)
 //440-460V(60Hz)
 Connection type Δ - Δ /Y-Y// Δ - Δ
 Service Factor: 1.00
 Design: N
 Duty: S1
 Thermal Protection: frame 160 and above, equipped with PTC Thermistor (one per phase)

Mechanical:

Frame: 63 to 200M/L Aluminum frame
 80 and above Cast iron frame
 Squirrel cage rotor (die aluminum)
 Protection Degree: IP55
 Cooling Method: TEFC (Totally Enclosed Fan Cooled)
 Sealing: V-ring
 Frame 225 and above,, with regreasing system
 Terminal box with metric threaded holes
 Ball bearings
 Drain hole
 Vibration Level A

Frame	BKT (Nm)	Frame	BKT (Nm)	Frame	BKT (Nm)	Frame	BKT (Nm)
63	2	71	4	90L	8	132S	60
	4		8		16		80
63	2	80	4	100L	16	160M	80
	4		8		32		150
63	2	80	4	112M	32	160M	80
	4		8		60		150
71	4	90S	8	132S	60	160L	80
	8		16		80		150

* BKT = Braking torque

Optional Features:

Electrical:
 Insulation Class: H; Design H
 Thermal Protection: frame up to 132(include), with PTC Thermistor, Thermostat or PT100

Mechanical:

Others mountings
 Protection Degree: IP56, IP65, IP66, IPW55, IPW56
 Sealing: Lip seal, Oil seal, Labyrinth taconite(frame 132 and above)
 Space Heater
 Roller bearings available for frame 160 and above

Feature	Benefits
High Performance Braking system	IE3 and IE4 motors, guarantee a fast return of investment.
Manual Braking Release (Optional)	Possibility to keep the motor free switching during emergency or necessary situations
WISE Insulation System	Increase the electrical strength of the stator, allowing the motor to operate with frequency inverters, without damaging by the voltage peaks*.
Efficiency	IE3 and IE4 motors, guarantee a fast return of investment.
Painting plan for Industrial Environments	Suitable for the use in slightly severe and sheltered environments, with low average humidity, regular temperature variations.
State-of-the-art Ventilation System	Uniform refrigeration of the motor with significant temperature reduction in the external surface and bearings, guarantee high performance and energy saving to your application,
Customization	Product suitable to meet the most demanded applications in the industry.

Note:

Motor Rated Voltage	Technical Criteria for use of motors fed by inverters			
	Voltage peak in the motor (Maximum)	dV/dt Inverter Outlet (maximum)	Rise Time(*) of Inverter (Minimum)	MTBP(*) Time between pulses (minimum)
Vn < 460V	≤ 1600V	≤ 5200 V/μs	≥ 0,1 μs	≥ 6 μs
460V ≤ Vn < 575V	≤ 2000 V	≤ 6500 V/μs		

Cast Iron Frame Ex ec - Non Sparking Motor

The installation of electric motors where a flammable mixture is not frequently present but may represent risks, must comply to the most demanded safety standards for the protection of life, machines and environment. Following the highest safety standards, WEG Ex nA motors are flexible to adapt to various applications allowing to your company agility during installation, easy operation, low maintenance cost and safety. WEG Ex nA motors are available in efficiency IE1, IE2 and IE3 and suitable for the use with frequency inverters.

Standard Features:

Electrical:
 Insulation class: F (B, $\Delta T=80$ K)
 Ambient temperature: 40 °C , 1000 m.a.s.l
 Voltage: frame 63-100, 220-240/380-415V(50Hz) // 440-460V (60Hz)
 Connection type Δ - Δ /Y-Y//Y-Y
 frame 112 and above, 380-415/660-690 (50Hz) //440-460V(60Hz)
 Connection type Δ - Δ /Y-Y// Δ - Δ
 Service Factor: 1.00
 Design: N
 Duty: S1
 Thermal Protection: frame 160 and above, equipped with PTC Thermistor (one per phase)
 Zone 2: Temperature class T3
 Zone 22: Maximum temperature of motor surface T125°C

Mechanical

Frame material: cast iron
 Squirrel Cage Rotor (Die aluminum)
 Protection Degree: IP55
 Cooling Method: TEFC(Totally Enclosed Fan Cooled)
 Sealing: V-ring
 Frame 160 and above with regreasing system
 Terminal box with metric threaded holes
 Drain Holes
 Vibration Level A
 IECEx certification

Optional Features:

Electrical:
 Insulation Class: H; Design H
 Thermal Protection: frame up to 132(include), with PTC Thermistor, Thermostat or PT100
Mechanical:
 Others mountings
 Protection Degree: IP56, IP65, IP66, IPW55, IPW56
 Sealing: Lip seal, Oil seal, Labyrinth taconite(frame 132 and above)
 Space Heater,
 Roller bearings available for frame 160 and above

Features	Benefits
Reduced surface temperature	Do not allow conductive dust ignition in contact with the motor or during suspension in the air.
Certification for the use with frequency inverter	Guarantee applications in speed variation and hazardous area such as Zone 2 according to certification
Efficiency	IE2 and IE3 efficiency motors, guarantee a fast return on investment
WISE Insulation System	Increase the electrical strength of the stator, allowing the motor to operate with frequency inverters, without damaging by the voltage peaks*.
Painting plan for Severe Environment	Special for industrial severe environments, sheltered or not, which may contain SO2, steam, solid contaminants and high humidity.
Flexibility	Product suitable to meet the most demanded applications in the industry.

Notes:
Classification
 WEG Ex nA motor line, which was up to now designed to operate at areas classified as Zone 2 (combustible gas), are now suitable to operate also at Zone 22 containing non-conductive combustible dusts. Based on a careful design carried out in conformance with pre-established requirements of applicable European Standards and Directives these motors offer you the reliability and safety that you need.
IEC Standard: Zone 2 (gas) and 22 (non-conductive dust); Group II
CENELEC Standard: Group II; Category 3G (gas) and 3D (non-conductive dust)
Certification
 WEG non sparking motors meet standard EN IEC 60079-0 and EN IEC 60079-15 (no-sparking), as well as EN 61241-0 and EN 61241-1 (Zone 22 - non-conductive dust and as customer option, they are certified by BASEEFA. WEG Manufacturing System meets ATEX Directive 94/9-EC and is certified by PTB (Physikalisch-Technische Bundesanstalt).



Optional Features:

Electrical:
 Insulation Class: H; Design H
 Thermal Protection: frame up to 132(include), with PTC Thermistor, Thermostat or PT100
Mechanical:
 Others mountings; Protection Degree: IP56, IP65, IP66, IPW55, IPW56
 Sealing: Lip seal, Oil seal, Labyrinth taconite (frame 132 and above)
 Space Heater, Roller bearings available for frame 160 and above

Cast Iron Frame Ex d/Ex de - Explosion Proof Motor

The installation of electric motors where flammable products are continuously handled, processed or stored, must comply with the most demanding safety standards in order to guarantee life protection, machines and environment. Following to the highest safety standards WEG explosion proof motors are made of robust construction, modern system of flame retention with joint parts carefully designed, precision machining in the T-box eliminating imperfections in the joint parts and fixation with high mechanical strength bolts.

Standard Features:

Electrical:
 Output range: 0.55kW to 315kW
 Insulation class: F(B, $\Delta T=80$ K)
 Ambient temperature: 40 °C , 1000 m.a.s.l
 Voltage: frame 90-100L, 220-240/380-415V(50Hz) // 440-460V (60Hz)
 Connection type Δ - Δ /Y-Y//Y-Y
 frame 112 and above, 380-415/660-690 (50Hz) //440-460V(60Hz)
 Connection type Δ - Δ /Y-Y// Δ - Δ
 Service Factor: 1.00
 Design: N
 Duty: S1
 Thermal Protection: frame 160 and above, equipped with PTC Thermistor (one per phase)

Mechanical

Frame size: 90 to 355M/L
 Squirrel Cage Rotor (Die aluminum)
 Protection Degree: IP55
 Cooling Method: TEFC(Totally Enclosed Fan Cooled)
 Sealing: V-ring
 Frame 225 and above with regreasing system
 Paint color: RAL5009
 Terminal box with metric threaded holes

Feature	Benefits
Modern flame retention system with robust frame, end shields and T-box.	Avoid flame propagation from inside the motor to the external side, guaranteeing safety protection to the life, machines and environment.
Certification for the use with frequency inverters – T4	Guarantee in speed variation applications and hazardous areas such as Zone 1 and Zone 2, according to CESI certification.
Additional nameplate for the use with frequency inverters.	Easy identification of the conditions of operation temperature (speed and torque range)
Efficiency	Premium Efficiency (EFF1) motors, guarantee a fast investment pay back.
Painting Plan for Severe Environments	Special for industrial severe environments, sheltered or not, which may contain SO2, steam, solid contaminants and high humidity.
Customization	Product suitable to meet the most demanding applications in the industry.

*Notes:

Motor Rated Voltage	Technical Criteria for use of motors fed by inverters			
	Voltage peak in the motor (Maximum)	dV/dt Inverter Outlet (maximum)	Rise Time(*) of Inverter (Minimum)	MTBP(*) Time between pulses (minimum)
Vn < 460V	≤ 1600V	≤ 5200 V/μs	≥ 0,1 μs	≥ 6 μs
460V ≤ Vn < 575V	≤ 1800V	≤ 6500 V/μs		

Classification:
IEC Standard Zone 1; Group IIB
CENELEC Standard Group IIB; Category 2
 The classification for Zone 1 means that the motor is suitable to operate also in Zone 2 once Zone 1 represents an operating condition worse than Zone 2. The same applies to Groups and Categories: Ex d and Ex de motors are suitable to operate also in Group IIA and Category 3.
Certification:
 WEG explosion proof motors (Ex d) with increased safety terminal boxes (Ex de) are manufactured according to standard EN IEC 60079-0 and EN IEC 60079-1 and have EC-Type Examination Certificate from CESI (Centro Elettrotecnico Sperimentale Italiano S.P.A). WEG Manufacturing System meets ATEX Directive 94/9-EC and is certified by PTB (Physikalisch-Technische Bundesanstalt).



Cast Iron Frame Ex e Increased Safety Motor

The installation of electric motors where flammable products are continuously handled, processed or stored, must comply with the most demanded safety standards in order to guarantee life protection, machines and environment. WEG increased safety motors are certified by PTB – Physikalisch - Technische Bundesanstalt. The PTB certificates of conformity for explosion proof in increased safety enclosure “e” as per EN50014/ EN50019 are: Ex e – Increased safety motors (class of temperature T3 / T4).

Standard Features:

Electrical:
Output Range: 0.18kW to 100kW
Insulation class: F (B, $\Delta T=80$ K)
Ambient temperature: 40 °C , 1000 m.a.s.l
Voltage: 218-242/380-420/655-690V
Design: N
Duty: S1
Temperature rise: T1/T2/T3/T4

Mechanical:
Frame: 80 to 315S/M
Squirrel Cage rotor (die aluminum)
Protection Degree: IP55
Sealing: V-ring
Paint color: RAL 5010
Thermal Protection: Frame 160 and above, 110°C/T4 (one per phase)
Terminal box with increased safety
Cooling method: TEFC (totally enclosed fan cooled)
Fan material: Aluminum

Optional Features:

Mechanical:
Others Mountings
Protection Degree: IP56, IP65, IP66
Sealing: Lip seal, Oil seal, Labyrinth taconite
Roller bearings available for frame 160 and above

Features	Benefits
WISE Insulation System	Increase stator electrical strength, allowing the motor to operate with frequency inverters, without damaging by the voltage peaks.
Painting Plan for Industrial Environments	Suitable to be used in slightly severe and sheltered environments, with low average humidity, regular temperature variations.
Cast Iron Frame	More strength for your application
State-of-the-art Ventilation System	Uniform refrigeration of the motor with significant temperature reduction in the external surface and bearings, guarantee high performance and energy saving to your application.
Customization	Product suitable to meet the most demanded applications in the industry.

Notes:
Classification:
IEC Standard: CENELEC Standard:
Zone 1 and 2, Group II Group II; Category 2 and Zone 1
The classification in Zone 1 means that the motor is suitable to operate also in Zone 2 Category 3) once Zone 1 represents an operating condition worse than Zone 2.
WEG increased Safety motors (Ex e) are manufactured according to standard EN IEC 60079-0 and EN IEC 60079-7 and have EC-Type Examination Certificate from PTB (Physikalisch-Technische Bundesanstalt). WEG Manufacturing System meets ATEX Directive 94/9-EC and is certified by PTB (Physikalisch-Technische Bundesanstalt).



Cast Iron Frame Ex d Brake Motor

The installation of electric motors where flammable products are continuously handled, processed or stored must comply with the most demanding safety standards in order to guarantee life protection, machines and environment. Following to the highest safety standards WEG explosion proof motors integrate the high performance of the brakes. Proper solution to equipment where fast safety stops are required, as well as precise positioning with safety in hazardous areas such as Zone 1 and Zone 2. WEG Exd motors with brake are available in IE2 efficiency and are certified to operate with frequency inverters.*

Standard Features:

Electrical:
Output range: 2.2kW to 18.5kW
Insulation class: F(B, $\Delta T=80$ K)
Ambient temperature: 40 °C , 1000 m.a.s.l
Voltage: 380-415/660-690V(50Hz)//440-460V(60Hz)
Connection Type Δ - Δ /Y-Y// Δ - Δ
Design: N
Duty: S1
Temperature class: T3 or T4
Thermal Protection: PTC thermistor 130°C/T4 and 155°C T3, Thermostat 140°C-Brake

Mechanical:
Frame: 132S to 160L
Squirrel Cage rotor (die aluminum)
Protection Degree: IP55
Cooling method: TEFC: (Totally enclosed fan cooled)
Painting plan: 202P
Paint Color: RAL 5009
Terminal box with metric threaded holes



Optional Features:

Mechanical:
Others Mountings
Protection degree: IP56, IP65, IP66
Sealing: Lip seal, oil seal, labyrinth taconite

Features	Benefits
High performance braking system	Guarantee precise braking, fast and safe with easy maintenance.
Manual brake release	Possibility to keep the motor free during emergency situations or whenever necessary.
Modern flame retention system with robust frame, end shields and T-box.	Avoid flame propagation from inside the motor to the external side, guaranteeing safety life protection, machines and environment.
Certification for the use with frequency inverters – T4.	Guarantee in speed variation applications and hazardous areas such as Zone 1 and Zone 2, according to CESI certification.
Additional nameplate	Easy identification of the motors in the factory and traceability.
Efficiency	Premium Efficiency (EFF1) motors, guarantee a fast investment pay back.
Painting Plan for Severe Environments	Special for industrial severe environments, sheltered or not, which may contain SO2, steam, solid contaminants and high humidity.
Customization	Product suitable to meet the most demanded applications in the industry.

* Notes:

Motor Rated Voltage	Technical Criteria for use of motors fed by inverters			
	Voltage peak in the motor (Maximum)	dV/dt Inverter Outlet (maximum)	Rise Time(*) of Inverter (Minimum)	MTBP(*) Time between pulses (minimum)
$V_n < 460V$	$\leq 1600V$	$\leq 5200 V/\mu s$	$\geq 0,1 \mu s$	$\geq 6 \mu s$
$460V \leq V_n < 575V$	$\leq 1800V$	$\leq 6500 V/\mu s$		

Classification:
IEC Standard: CENELEC Standard:
Zone 1; Group IIB Group IIB; Category 2
The classification in Zone 1 means that the motor is suitable to operate also in Zone 2 once Zone 1 represents an operating condition worse than Zone 2.
The same applies to Groups and Categories: Ex d and Ex de motors are suitable to operate also in Group IIA and Category 3.
Certification:
WEG explosion proof motors (Ex d) with increased safety terminal boxes (Ex de) are manufactured according to standard EN IEC 60079-0 and EN IEC 60079-1 and have EC-Type Examination Certificate from CESI (Centro Elettrotecnico Sperimentale Italiano S.P.A). WEG Manufacturing System meets ATEX Directive 94/9-EC and is certified by PTB (Physikalisch-Technische Bundesanstalt).

Motor for zone 21 Dust Ignition Proof



WEG WDIP line (Dust Ignition Proof) has been specially designed to maximize safety and quality of hazardous area motors – Zone 21 (grain processing, cereals, textile fibers, powder coating, polymers, etc.) Reliability and safety under the presence of conductive dust in suspension in the air (cloud) or layer (up to 5mm), according to IEC standards.

Standard Features:

Electrical:

Output range: 0.12kW to 250kW
 Insulation class: F (B, $\Delta T=80$ K)
 Ambient temperature: 40 °C , 1000 m.a.s.l
 Voltage: frame 80-100, 220-240/380-415V(50Hz) // 440-460V (60Hz)
 Connection type Δ - Δ /Y-Y//Y-Y
 frame 112 and above, 380-415/660-690 (50Hz) //440-460V(60Hz)
 Connection type Δ - Δ /Y-Y// Δ - Δ

Service Factor: 1.00

Design: N

Duty: S1

Mechanical:

Frame: 80 to 355M/L
 Squirrel cage rotor (die aluminum)
 Protection Degree: IP66
 Sealing: frame 80, oil seal
 frame 90S to 355M/L, W3 seal
 Paint color: RAL 5009
 Thermal protection: 140C (one per phase)
 Cooling method: TEFC (Totally enclosed fan cooled)

Optional features:

Electrical:

Insulation class: H; Design H
 Thermal Protection: PTC thermistor, thermostat or PT100

Mechanical:

Protection degree: IP65
 Sealing: frame 90S to 355M/L, oil seal
 Space heater; Roller bearings available for frame 160 and above.

Features	Benefits
WISE Insulation System	Increase stator electrical strength, allowing the motor to operate with frequency inverters, without damaging by voltage peaks.
Efficiency	Premium Efficiency (EFF1) motors, guarantee a fast investment pay back.
Painting Plan for Industrial Environments	Suitable to be used in slightly severe and sheltered environments, with low average humidity, regular temperature variations.
Cast Iron Frame	More strength for your application
State-of-the-art Ventilation System	Uniform refrigeration of the motor with significant temperature reduction in the external surface and bearings, guarantee high performance and energy saving to your application.
Customization	Product suitable to meet the most demanded applications in the industry.

Notes:

Classification:
 IEC Standard: 61241-1 CENELEC Standard: 61241-1
 Zone 21 (dust); Group II Group II; Category 2 Zone 21 (dust)

Certification:
 WEG Cast iron Multivoltage Motors for Zone 21 meet ATEX Directive 94/9/EC 94/4EC and have EC-Type Examination Certificate from CESI (Centro elettrotecnico Sperimentale Italiano S.P.A. as per EN 60079-15 and EN 61241-1.
 WEG Motors for Zone 21 of WDIP Line (Dust Ignition Proof) are manufactured according to Standard EN 61241-0, EN 61241-1, EN IEC 60079-0 and EN IEC 60079-1 and have EC-Type Examination Certificate from CESI (Centro Elettrotecnico Sperimentale Italiano S.P.A.). WEG Manufacturing System meets ATEX Directive 94/9-EC and is certified by PTB (Physikalisch-Technische Bundesanstalt).

1. Construction Details

1.1 Frame / endshields

The frames can be cast iron or aluminum. The cast iron frame and endshields are manufactured with FC-200 cast iron and they were designed in such a way to improve the heat exchange and to provide enough mechanical strength to meet the most critical applications. Frame 112 and above are fitted with lifting eyebolts for easier handling on installation.



Figure 1. Cast iron frame (left) and Aluminum frame (right)

All endshields are designed with drain holes to allow drainage of condensed water out of frame. These drain holes are fitted with rubber plugs that allow draining such condensed water and comply with the degree of protection.

1.2 Grounding

The W21 cast iron motor, frame 80 to 200 are designed with two grounding lugs: one is placed inside the terminal box, another one is on the frame. Frame 225-355 are designed with three grounding lugs: one is inside the terminal box and the other two are on the frame.



Figure 2. Grounding

1.3 Fan cover

The standard fan cover is made of steel plate.



Figure 3. Fan cover in steel plate

1.4 Terminal box

The terminal box is made of aluminum. It is designed with plenty internal space for easier cable connection and it allows rotation in 90 degrees steps which results in flexibility on installation. Cast iron terminal box is optional if required.



Figure 4.1 - Aluminum Terminal box



Figure 4.2 - Cast iron terminal box

1.5 Connection Leads

The connection leads are marked in accordance with IEC 60034-8 and are supplied with specific connection terminals. W21 motors wound for 380V are fitted with polyester made BMC (Bulk Moulding Compound) terminal blocks, which are reinforced with fiber glass, as shown on the figure below.



Figure 5 - Six-pin terminal block

1.6 Nameplate

Nameplates are made of AISI 304 stainless steel. All the information are printed onto the nameplates by laser. Nameplate included main informations of motor, such as: serial number, output, voltage, current, frequency, protection degree, power factor, insulation class, bearings type, grease and regreasing interval, etc. IEC frame up to 200 has vertical nameplate and frame 225 and above has horizontal nameplate.

Details on nameplate

- Motor material number
- Three phase
- Rated voltage
- Duty
- Efficiency
- Frame size
- Protection degree
- Insulation class
- Temperature rise
- Frequency
- Rated output
- Full load speed (rpm)
- Rated Current
- Power factor
- Ambient temperature
- Service factor
- Altitude
- Weight
- DE bearing type
- NDE bearing type
- Bearing grease type
- Δ connection diagram
- Y connection diagram
- Regreasing interval
- Certification

2. Cooling system / Noise level / Vibration level

2.1 Cooling system / Noise level

The W21 standard motor line is totally enclosed fan cooled TEFC (IC411), as per IEC60034-6. Non-ventilated TENV(IC410), air over TEAO(IC418) and forced ventilation (TEBC) are available on request. More information about IC416 can be found in the section about Variable Frequency Drive Operation. Fans are made of polypropylene from frame IEC63 to 315 and made of aluminum in frames 355M/L. Designed for low noise level, the W21 motors comply with IEC60034-9 standard and the corresponding sound pressure levels. Tables below shown sound pressure levels in dB (A), the permit tolerance is + 3dB).

Frame	2 Poles	4 poles	6 poles	8 poles
63	52	44	43	-
71	56	43	43	41
80	59	44	43	42
90	64	49	45	43
100	67	53	44	50
112	64	56	48	46
132	68	60	52	48
160	70	67	56	51
180	70	64	56	51
200	74	69	58	53
225	82	70	61	56
250	82	70	61	56
280	83	76	66	59
315	84	77	69	62
355	81	79	73	70

Table 1 - Sound pressure level for 50Hz motors

The noise level figures shown on the table above are taken at no load. Under load the IEC 60034-9 standard foresees an increase of the sound pressure levels as shown on table 3

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

Table 3 - Maximum expected increase of sound pressure level for loaded motors

Note: with canopy can decrease the noise level in 2 dBs.

2.2 Vibration level

W21 motors are dynamically balanced with half key and the standard version meets the vibration levels of Grade A (without special vibration requirements) described in IEC 60034-14 Standard. As an option, motors can be supplied in conformance with vibration of Grade B. The RMS speed and vibration levels in mm/s of Grades A and B are shown in table 4.

Vibration	Shaft Height (mm)	60 ≤ H ≤ 132	132 < H ≤ 280	H > 280
		Vibration speed RMS (mm/s)		
Grade A	Free Suspension	2.8	2.8	2.8
Grade B	Free Suspension	1.1	1.8	1.8

Table 4. - Speed and vibration levels

3. Shaft / Bearings / Thrusts

3.1 Shaft

The shaft of W21 standard motors is made of SAE 1040/45 steel, in frames IEC 63 to 315S/M, and in SAE 1040/45 steel or SAE 4140 steel for frames 355M/L. When supplied with roller bearings as optional, the shaft material must be SAE 4140. As they are fitted with SAE 4140 steel shafts in frames 355M/L, W21 motors can employ roller bearings, making them suitable for heavy duty applications such as pulley and belt applications. Information about maximum allowable radial and axial loads on shaft ends is given in tables 6, 7 and 8.

Important: To modify bearings from ball into roller, drive end and non-drive end bearing caps (internal and external) need to be replaced since non-drive end bearing remains locked. If further information is required, please contact WEG service Department.

Shafts are supplied with A type key in frame sizes 63 to 200 and type B in frames 225 to 355, and with dimensions shown in section 14- Mechanical data. All these shafts are supplied with threaded center holes with dimensions that comply with table 4.

Frame	Poles	Dimension	Depth of thread (mm)
63	All	M4	7
71	All	M5	12.5
80	All	M6	16
90	All	M8	19
100	All	M10	22
112	All	M10	22
132	All	M12	28
160	All	M16	36
180	All	M16	36
200	All	M20	42
225S/M	All	M20	42
250S/M	All	M20	42
280S/M	All	M20	42
315S/M	All	M20	42
355M/L	2 poles	M20	42
	Others Poles	M24	50

Table 4. Center hole dimensions for Drive end shaft

3.2 Bearings

WEG motors are supplied with ball bearings as standard. and have regreasing system for motor frame 225 and above. WEG cooperate with international recognized bearing brands (FAG, NSK, NTN, C&U etc), assuring the excellent performance of motor and longer motor life. If specific bearing brand was required, please inform WEG before placing order. The W21 series motors frame 63 to 100 are supplied with 62 series bearings on drive end, and for frame 112 and above with 63 series bearings.

Bearing life time is L10h with 20,000 hours in conformance with maximum radial and axial loads as described in tables 5 and 6. For direct coupling arrangements (free of radial and axial thrusts), bearing life time will be L10h with 40,000 hours.

Note: Life time L10 means that at least 90% of the bearings submitted to maximum indicated loads will reach the numbers of predicted hours. The maximum allowable radial and axial



Table 13 - Total length of motor with / without blower kit

Figure 9 - W21 motor with forced ventilation kit

7. Tolerances for electrical data

Efficiency (η)	-0.15 (1- η) for P _{nom} ≤ 150 kW / -0.1 (1- η) for P _{nom} > 150 kW Where η is a decimal number
Power factor	$\frac{1 - \cos \phi}{6}$ Minimum 0.02 and Maximum 0.07
Slip	± 20% for P _{nom} ≥ 1 kW and ± 30 % for P _{nom} < 1 kW
Starting current	20% (without lower limit)
Starting torque	- 15% + 25%
Breakdown torque	- 10 %
Moment of inertia	± 10 %

The following tolerances are allowed in accordance with IEC 60034-1:

Table 14 - Tolerances for electrical data

8. Space heaters

The use of space heaters are recommended in two situations:
1. Motors installed in environments with relative air humidity up to 95%, in which the motor may remain idle for periods greater than 24 hours;

2. Motors installed in environments with relative air humidity greater than 95%, regardless of the operating schedule. It should be highlighted that in this situation it is strongly recommended that an epoxy paint known as tropicalized painting is applied in the internal components of the motor. More information can be obtained in section 4.2.1.

The supply voltage for space heaters must be defined by the Customer. For all frame sizes, W21 motors can be provided with space heaters suitable for 110-127 V, 220-240 V and 380-480 V. The power rating and number of space heaters fitted depends on the size of the motor as indicated in table 15 below:

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

Table 15 - Power and quantity of space heaters

9. Thermal protections

9.1 Pt-100

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

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



Figure 10 - Pt-100

9.2 Thermistor (PTC)



Figure 11 - Thermistor (PTC)

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

PTC is considered a thermistor with the resistance increasing drastically to a well defined temperature figure. This sudden resistance variation blocks the PTC current, causing the output relay to operate, and the main circuit to switch-off.

The thermistors are of small dimensions, do not wear and have quicker response if compared to other protectors, although they do not allow continuous monitoring of motor operating temperature.

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

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

WEG Automation has a product called RPW which is an electronic relay intended specifically to read the PTC signal and operate its output relay. For more information go to the website www.weg.net.

9.3 Bimetallic thermal protectors (Thermostat)

These are silver-contact thermal sensors, normally closed, that operate at certain temperature rise. When their operating temperature decreases, they go back to the original position instantaneously, allowing the silver contact to close again.

The bimetallic thermal protectors are series-connected with the contactor coil, and can be used either as alarm or trip.

There are also other types of thermal protectors such as Pt-1000, KTY and thermocouples. Contact your local WEG office closest to you for more information.

10. Packaging

W21 motors frame 63 to 132 have carton box as standard packaging (figure 12). Frame 160 to 355, the packaging of motor are carton box or wooden box WEG choose different packaging according to the mounting and frame size of motors). The WEG packaging is under continuous improvement, it is subject to change without previous notifications.



Figure 12 - Carton box



Figure 13 - Crate 1



Figure 13 - Crate 2



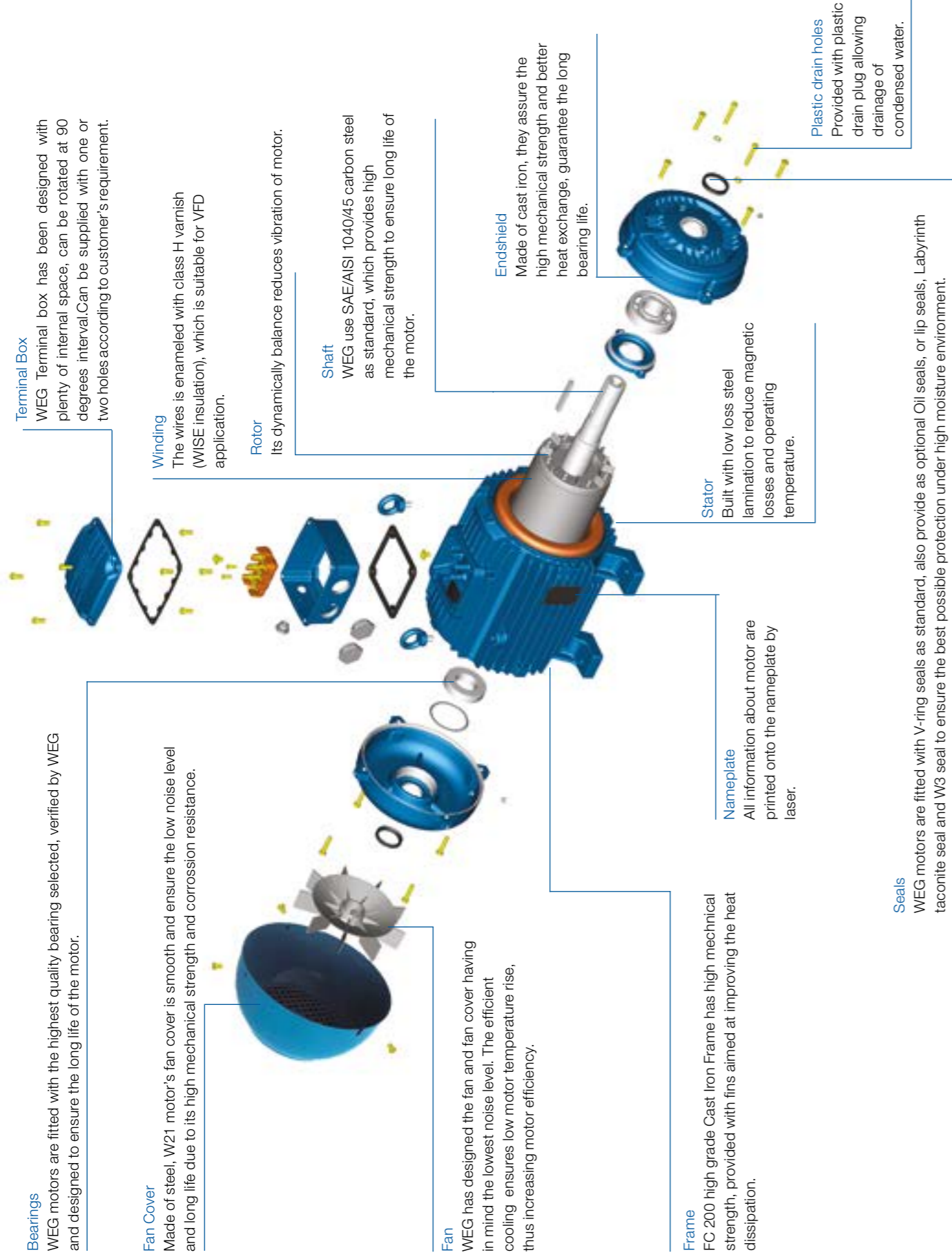
Figure 13 - Crate 3



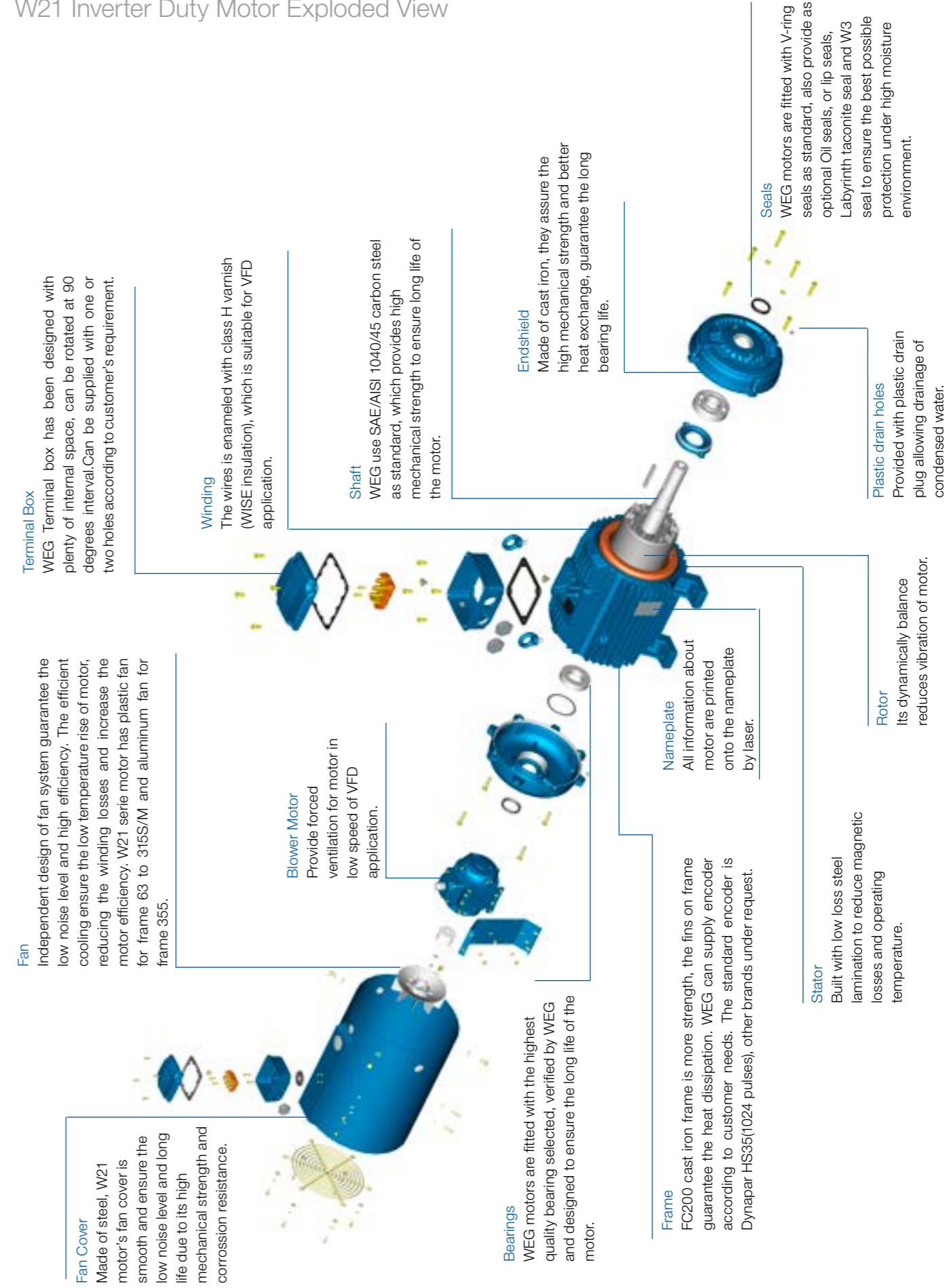
Figure 14 - Carton box 2



Cast Iron Frame W21 Multi-voltage Motor Exploded View



Cast Iron Frame W21 Inverter Duty Motor Exploded View



11. Construction Features

Frame		63	71	80	90S	90L	
Mechanical Features							
Nameplate Marks		CE; IEC 60034; Q/320691AAB10-2020					
Mounting		B3T					
Frame	Material	Aluminum		Cast Iron (or aluminum 80/90S/L)			
Protection Degree		IP55					
Grounding		NA	Single grounding(Terminal box)				
Cooling method		TEFC					
Fan	Material	Plastic					
Fan cover	Material	Steel Plate					
Endshields	Material	FC-200 Cast iron					
Drain hole		NBR black drain					
Bearings	Clearance (D.E)		ZZ				
	Clearance (N.D.E)		ZZ				
	Locking		None				
	Drive End	2P 4-8P	6201	6203	6204	6205	6205
	Non Drive End	2P 4-8P	6201	6202	6203	6204	6204
Bearing Seal		V-rings					
Joint Seal		None					
Lubrication	Type	Mobil Polyrex EM 103					
	Grease fitting	none					
Terminal block		BMC 6 pins					
Terminal Box	material	Aluminum					
Additional terminal box		None					
Lead inlet	Main	2xM20x1.5			2xM25x1.5		
	Size	Equipped with plastic cover for transportation and storage					
Shaft	Material		SAE 1040/45				
	D.E Threaded hole	2p	M4	M5	M6	M8	M8
		4p-8p					
Key		A type (China : B type)					
Vibration		Grade A					
Balance		1/2 key					
Nameplate	Material	Stainless steel AISI 304					
Painting	Plan	207A					
	Color	RAL 5009					
Electrical Features							
Design		N					
Voltage		220-240/380-415V(50HZ)//440-460V(60HZ),6 terminals, connection type Δ-Δ/Y-Y//Y-Y					
Insulation Class		F(DT 80K)					
Service Factor		1.00					
Rotor		Die cast aluminum					
Thermal Protection		None					

Note: For features out of those described on above table, please consult nearest WEG sales office.

Frame		100L	112M	132S	132M	160M	
Mechanical Features							
Nameplate Marks		CE; IEC 60034; Q/320691AAB10-2020					
Mounting		B3T					
Frame	Material	Cast iron (or Aluminum 100L,112M,132S,132M,160M/L)					
Protection Degree		IP55					
Grounding		Single grounding(Terminal box)					
Cooling method		TEFC					
Fan	Material	Plastic					
Fan cover	Material	Steel plate					
Endshields	Material	FC-200 cast iron					
Drain hole		with automatic plastic drain plug					
Bearings	Clearance (D.E)		ZZ			ZZ-C3	
	Clearance (N.D.E)		ZZ			ZZ-C3	
	Locking		None			Locked on DE with internal and external bearing caps and pre-load springs on NDE	
	Drive End	2P 4-8P	6206	6307	6308		6308
	Non Drive End	2P 4-8P	6205	6206	6207	6207	6209
Bearing Seal		V-rings					
Joint Seal		none					
Lubrication	Type	Mobil Polyrex EM 103					
	Grease fitting	None					
Terminal block		BMC 6 pins					
Terminal Box	material	Aluminum					
Additional terminal box		None					
Lead inlet	Main	2xM25x1.5		2xM32x1.5		2xM40x1.5	
	Size	Equipped with plastic cover for transportation and storage					
Shaft	Material		SAE 1040/45				
	D.E Threaded hole	2p	M10	M10	M12	M12	M16
		4p-8p					
Key		A type (China : B type)					
Vibration		Grade A					
Balance		1/2 key					
Nameplate	Material	Stainless steel AISI 304					
Painting	Plan	207A			203A		
	Color	RAL 5009					
Electrical Features							
Design		N					
Voltage		220-240/380-415V (50HZ)//440-460V (60HZ),6 terminals, Connection type Δ-Δ/Y-Y//Y-Y	220-240380-415V(50HZ)//440-460V(60HZ),6 terminals,connection type Δ-Δ/Y-Y//Y-Y				
Insulation Class		F(DT 80K)					
Service Factor		1.00					
Rotor		Die cast aluminum					
Thermal Protection		None				PTC Thermistor -155 °C	

Note: For features out of those described on above table, please consult nearest WEG sales office.

Frame		160L	180M	180L	200M	200L	
Mechanical Features							
Nameplate Marks		CE; IEC 60034; Q/320691AAB10-2020					
Mounting		B3T					
Frame	Material	Cast iron (or Aluminum 160M/L,180M/L,200M/L)					
Protection Degree		IP55					
Grounding		Single grounding(Terminal box)					
Cooling method		TEFC					
Fan	Material	Plastic					
Fan cover	Material	Steel Plate					
Endshields	Material	FC-200 cast iron					
Drain hole		NBR black drain					
Bearings	Clearance (D.E)		ZZ-C3				
	Clearance (N.D.E)		ZZ-C3				
	Locking		Locked on DE with internal and external bearing caps and pre-load springs on NDE				
	Drive End	2P	6309	6311	6311	6312	6312
		4-8P					
	Non Drive End	2P	6209	6211	6211	6212	6212
4-8P							
Bearing Seal		V-ring					
Joint Seal		None					
Lubrication	Type	Mobil POLIREX EM 103					
	Grease fitting	None					
Terminal block		BMC 6 pins					
Terminal Box	material	Aluminum					
Additional terminal box		None					
Lead inlet	Main	2xM40x1.5			2xM50x1.5		
	Size	Equipped with plastic cover for transportation and storage					
Shaft	Material		SAE 1040/45				
	D.E Threaded hole	2p	M16	M16	M16	M20	M20
		4p-8p					
Key		A type (China : B type)					
Vibration		Grade A					
Balance		1/2 key					
Nameplate	Material	Stainless steel AISI 304					
Painting	Plan	203A					
	Color	RAL 5007					
Electrical Features							
Design		N					
Voltage		380-415/660-690V(50HZ)//440-460V(60HZ), 6terminals, connection type Δ-Δ/Y-Y//Y-Y					
Insulation Class		F(DT 80K)					
Service Factor		1.00					
Rotor		Die cast aluminum					
Thermal Protection		PTC Thermistor -155 °C					

Note: For features out of those described on above table, please consult nearest WEG sales office.

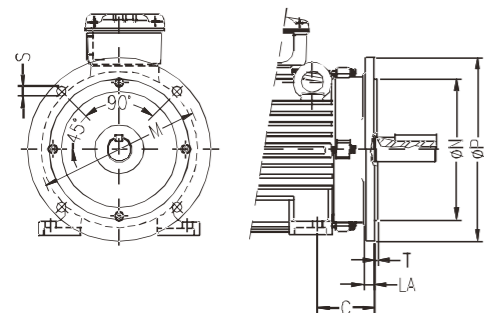
Frame		225S/M	250S/M	280S/M	315S/M	355M/L	
Mechanical Features							
Nameplate Marks		CE; IEC 60034; Q/320691AAB10-2020					
Mounting		B3T					
Frame	Material	Cast iron					
Protection Degree		IP55					
Grounding		Double grounding(Terminal box+Outside frame)					
Cooling method		TEFC					
Fan	Material	Plastic				Aluminum	
Fan cover	Material	Steel plate					
Endshields	Material	FC-200 cast iron					
Drain hole		NBR black drain					
Bearings	Clearance (D.E)		C3				
	Clearance (N.D.E)		C3				
	Locking		Locked on DE with internal and external bearing caps and pre-load springs on NDE				
	Drive End	2P	6314	6314	6314	6314	6316
		4-8P			6316	6319	6322
	Non Drive End	2P	6314	6314	6314	6314	6314
4-8P		6316			6316	6319	
Bearing Seal		V-ring					
Joint Seal		None					
Lubrication	Type	Mobil POLIREX EM 103					
	Grease fitting	regreasing nipples in DE and NDE endshields					
Terminal block		BMC 6 pins					
Terminal Box	material	FC-200 cast iron					
Additional terminal box		None					
Lead inlet	Main	2xM50x1.5	2xM63x1.5				
	Size	Threaded plug for transport and storage; cable gland as optional					
Shaft	Material		SAE 1040/45				4140*
	D.E Threaded hole	2p	M20	M20	M20	M20	M20
		4p-8p					M24
Key		B type (China : C type)					
Vibration		Grade A					
Balance		1/2 key					
Nameplate	Material	Stainless steel AISI 304					
Painting	Plan	203A					
	Color	RAL 5007					
Electrical Features							
Design		N					
Voltage		380-415/660-690V(50HZ)//440-460V(60HZ),6 terminals, connection type Δ-Δ/Y-Y//Y-Y					
Insulation Class		F(DT 80K)					
Service Factor		1.00					
Rotor		Die cast aluminum					
Thermal Protection		PTC Thermistor -155 °C					

Note: For features out of those described on above table, please consult nearest WEG sales office.

*According to the market, the shaft material will have different design.

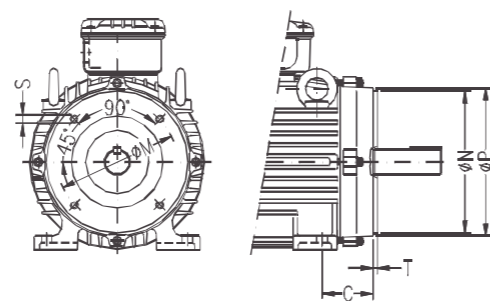
FLANGE FF (IEC)

Installation with constructive mountings
B35, B5, V1, V3, V15, V36



FLANGE FC IEC B14A,B14B & NEMA C

Installation with constructive mountings
B14, B34, V18, V19



FLANGE FF (IEC)

IEC Frame	"FF" Flange										N° of Holes
	Flange	C	LA	M	N	P	T	S	a		
63	FF-115	40	9	115	95	140	3	10	45°	4	
71	FF-130	45		130	110	160					
80	FF-165	50	10	165	130	200	3.5	12			
90S/L		56									
100L	FF-215	63	11	215	180	250	4	15			
112M		70									
132S/M	FF-265	89	12	265	230	300	5	19			
160M/L	FF-300	108							18	300	250
180M/L		121									
200M/L	FF-350	133	18	350	300	400	5	19			
225S/M	FF-400	149							22	400	350
250S/M	FF-500	168	500	450	550						
280S/M		190									
315S/M	FF-600	216	22	600	550	660	6	24			
355M/L	FF-740	254							22	740	680

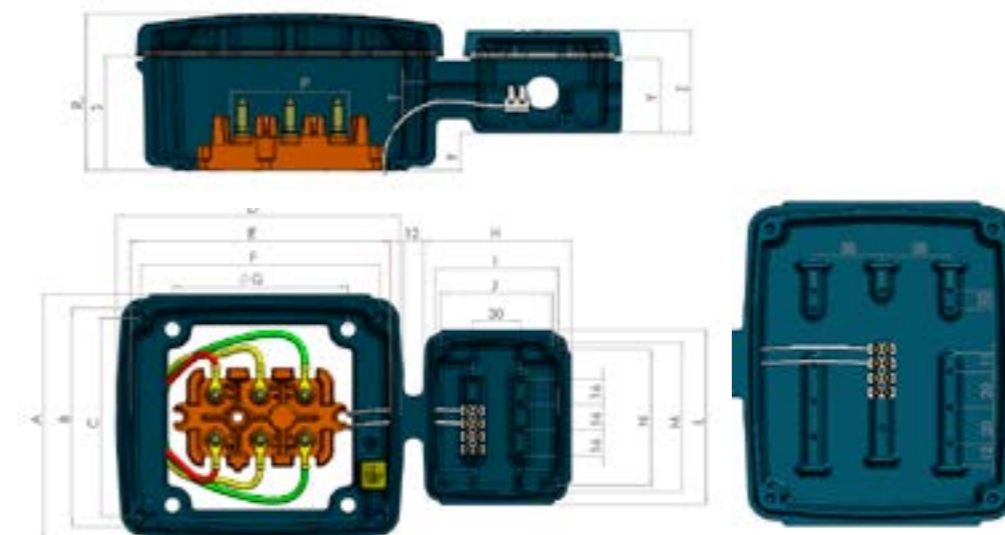
FLANGE C-DIN (DIN 42677) (B14A)

IEC Frame	"C" DIN Flange								N° of Holes
	Flange	C	M	N	P	S	T		
63	C-90	40	75	60	90	M5	2.5	4	
71	C-105	45	85	70	105	M6			
80	C-120	50	100	80	120	M8	3		
90S/L	C-140	56	115	95	140		3.5		
100L	C-160	63	130	110	160	M10	4		
112M		70							
132S/M	C-200	89	165	130	200	M10	4		
160M/L	C-250	108	215	180	250	M12			

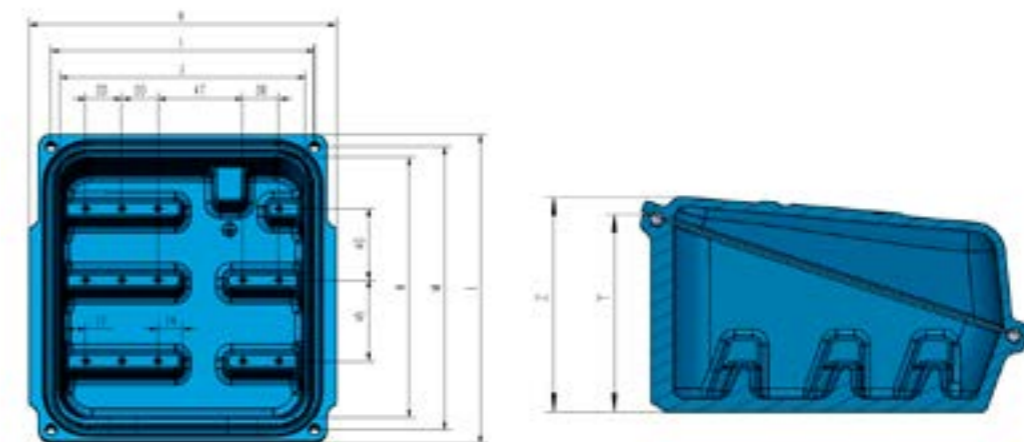
FLANGE FC (NEMA)

IEC Frame	"FC" Flange							N° of Holes
	Flange	C	M	N	P	S	T	
63	FC-95	40	95.2	76.2	143	UNC 1/4" x20	4	4
71		45						
80		50						
90S/L	56	149.2	114.3	165	UNC 3/8" x16			
100L	63							
112M	FC-184	70	184.2	215.9	225	UNC 1/2" x13	6.3	8
132S/M		89						
160M/L		108						
180M/L	FC-228	121	228.6	266.7	280			
200M/L		133						
225S/M	FC-279	149	279.4	317.5	395	UNC 5/8" x11		
250S/M	FC-355	168	355.6	406.4	455			
280S/M		190						
315S/M	FC-368	216	368.3	419.1	455			
355M/L		254						

14. Terminal Box



* Additional terminal box is applicable only for frames from 225 to 355



*355 Additional Terminal Box

Frame	A	B	C	D	E	F	G	H	I	J
63-100*	85	74	65	100	88	80	56	-	-	-
63-100	92	77	70	108	93	85	56	85	71	65
112-132	117	100	88	137	120	108	70	92	77	70
160-180	154	137	124	180	163	150	110	92	77	70
200	170	153	136	200	183	166	120	92	77	70
225-250	212	190	172	250	228	208	150	154	137	124
280	265	243	214	315	298	264	150	154	137	124
315	315	289	260	375	349	318	200	154	137	124
355	355	322	286	425	397	352	260	170	146	136

Frame	L	M	N	P	R	S	T	W	Y	Z
63-100	100	86	80	42	59	44	10	3	42.5	57.5
112-132	108	93	85	50	67	49	13.5	7	42	57
160-180	108	93	85	67	89	64	13.5	23	42	57
200	108	93	85	84	94	78	13.5	37	42	57
225-250	180	163	150	100	114	94	17	32.5	61.5	86.5
280	180	163	150	126	143	125	17	63.5	61.5	86.5
315	180	163	150	160	172	144	17	82.5	61.5	86.5
355	171	157	144	163	232	197	23	140	85	95

* The size of single terminal box

15. Mounting forms

The mounting configuration for the W21 motor lines comply with IEC 60034-7 standard. Standard mounting forms and their variations are shown in table 14. After the designation, a characteristic letter is used to define the terminal box position. So, the mounting code IM B3 can be seen in WEG documents as detailed below (without IM code).

B3L - terminal box on left hand side of the motor frame

B3T - terminal box on top of the motor frame

B3R - terminal box on right hand side of the motor frame

Note: The terminal box position is defined viewing the motor from the shaft end (figure 26).

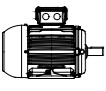

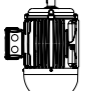


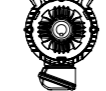
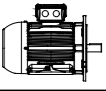
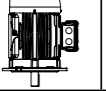
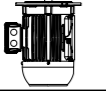
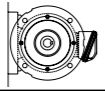
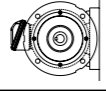
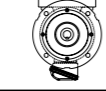
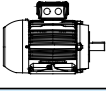
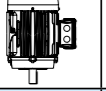
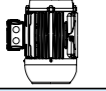
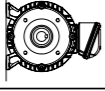
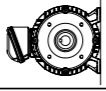
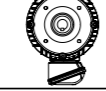
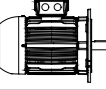
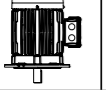
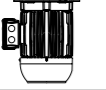
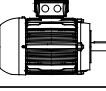
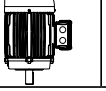
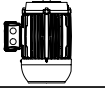
Basic mountings	Other type of mounting				
IM B3	IM V5	IM V6	IM B6	IM B7	IM B8
IM 1001	IM 1011	IM 1031	IM 1051	IM 1061	IM 1071
					
IM B35	IM V15	IM V36	-*)	-*)	-*)
IM 2001	IM 2011	IM 2031	IM 2051	IM 2061	IM 2071
					
IM B34	IM V17	IM V37	-*)	-*)	-*)
IM 2101	IM 2111	IM 2131	IM 2151	IM 2161	IM 2171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

Table 16 - Mountings configurations

*) Non-defined mountings by IEC 60034-7

Important:

- The mountings IM B34 and IM B14 with C-DIN flange, in accordance with DIN standard EN 50347, are limited to frame size 132; C flange in accordance with NEMA MG 1 Part 4 standard is available for frames 63 to 355M/L.
- For motors mounted vertically shaft down fitting of a drip cover is recommended to prevent ingress of small objects into the fan cover. The increase in total length of the motor with drip cover is shown in the section 19.
- For vertically shaft up mounted motors installed in environments containing liquids, the use of a rubber slinger is recommended to prevent the ingress of liquid into the motor through the shaft.



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

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

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



Automation

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



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

Electric Motors

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



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